CONTRACT DOCUMENTS

Schedule I
Reconstruction of Taxiway F

FAA AIP Project No. 3-06-0179-043-2023
County of Ventura, Department of Airports Specification No. DOA 23-03
County of Ventura, Department of Airports Project No. OXR-150

Oxnard Airport

COUNTY of VENTURA
Department of Airports

Oxnard, California

Sponsored By:

County of Ventura, California
Federal Aviation Administration
California Department of Transportation Aviation Division

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

Issued for Bid
May 25, 2023

JVIATION®
A WOOLPERT COMPANY
1300 Eastman Ave, Suite 214, Ventura, CA 93003
JVIATION.COM

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NOTICE INVITING BIDS
(INVITATION FOR BIDS)

Oxnard Airport
Oxnard, CA
AIP Project No. 3-06-0179-043-2023
County Specification No. DOA 23-03, County Project No. OXR-150

Sealed bids (proposals), subject to the conditions contained herein, for improvements to the Oxnard Airport, Oxnard, CA, AIP Project No. 3-06-0179-043-2023, County Specification No. DOA 23-03 and County Project No. OXR-150 will be received by the County of Ventura: Department of Airports, Administration Office Public Counter, bid box, 2nd Floor Lobby, 555 Airport Way, Suite B; Camarillo, CA 93010, until Tuesday, June 27, 2023, at 10:00 A.M. local time, and then publicly opened and read aloud.

The work involved will include the following:

Schedule I – Reconstruction of Taxiway F

The approximate quantities of major bid items involved in the proposed work are:

Schedule I

P-101a Demolish Asphalt Pavement ..... 90,000 SY
P-152a Unclassified Excavation and Haul-Off ..... 15,030 CY
P-152d Unclassified Excavation and Stockpile Onsite ..... 7,510 CY
P-155a Lime Treated Subgrade, 16-Inch Depth ..... 63,500 SY
P-156a Cement Treated Subgrade, 16-Inch Depth ..... 63,500 SY
P-209a Crushed Aggregate Base Course ..... 11,100 CY
P-401a Asphalt Concrete Surface Course (PG 70-10) ..... 15,100 TON
P-620b Marking, 2 Coats with Beads (All Colors) ..... 58,300 SF
D-701a 18-inch RCP, Class IV, Complete ..... 570 LF
D-705a Underdrain Pipe, 6-Inch ..... 9,300 LF
L-110a Install 1-2" SCH. 40 PVC Conduit, Direct Earth Buried (DEB) ..... 7,400 LF
L-110b Install 1-2" SCH. 40 PVC Conduit, Concrete Encased CE) ..... 6,600 LF
L-115a Install Electrical Pullbox, 4'x4', Aircraft Rated ..... 4 EA
L-125a Install LED L-861T Taxiway Edge Light, Complete ..... 70 EA
L-125b Install In-Pavement LED L-852T Taxiway Edge Light, Complete ..... 66 EA
L-125d Reinstall LED L-858 Guidance Sign, Size 1, 3 Module on New Foundation, Complete ..... 8 EA

Construction for this project is expected to take 90 Calendar Day(s) for Schedule I.

Contract Documents. The complete set of Specifications and Contract Documents can be downloaded from Jviation, a Woolpert Company's bid site (http://bid.jviation.com) beginning on May 25, 2023. In order to submit a responsive bid as a Prime Contractor and to receive all necessary addendum(s) for this project, you must be on the Planholder's List. To view all planholder documents (contract documents, plans and addendums) you must fill out the online form located at (https://jviation.com/bid-request/). By filling out and submitting this form, you agree to be publicly listed on the bid site with your contact information as a planholder for all projects requested. **It is the planholder's responsibility to review the site for addendums and changes before submitting their proposal. This includes review for environmental changes. Environmental changes**

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during construction could take up to four weeks for approval. For additional information, please contact us via email at bid.info@woolpert.com.

*Note that contractors will NOT be automatically added to new projects. You will need to re-submit the online form for access to new projects. Once granted access, additional projects will use your same login credentials. Plan ahead when submitting the online request form and allow up to 2 business days for approval and access to projects.

Pre-Bid Conference. There will be an in-person pre-bid conference for interested contractors and their subcontractors on June 8, 2023 at 10:00 a.m. local time at the Oxnard Airport Aircraft Rescue and Fire Fighting (ARFF) Shelter at the Oxnard Airport, 2889 W. 5th Street, Oxnard, CA 93030. It is highly recommended that any prime contractor wishing to bid on this project attend the pre-bid conference and have an opportunity to meet with the County's representatives and address any questions that may arise. A site visit for interested contractors will immediately follow the pre-bid conference.

Bid Conditions. The bidder or proposer is required to provide all information as required within the Contract Documents. The bidder or proposer is required to bid on all items of every schedule or as otherwise detailed in the Instructions to Bidders.

Bids (Proposals) may be held by County of Ventura, California for a period not to exceed 120 Calendar days from the date of the bid opening for the purpose of evaluating bids prior to award of contract. The right is reserved, as County of Ventura, California may require, to reject any and all bids and to waive any informality in the bids received.

All questions regarding the bid are to be directed to Matt Gilbreath, P.E. with Jviation, a Woolpert Company, via email at Matt.Gilbreath@woolpert.com.

Contractor Payment. In lieu of retainage, the Contractor may exercise at its option the establishment of an escrow account per paragraph 90-08. See Appendix D of Division 8 County of Ventura Standard Specifications for the escrow agreement form sample.

Bid Bond. Guarantee will be required with each bid (proposal) as a certified check on a solvent bank or a Bid Bond (Bid Guarantee) in the amount of five percent (5%) of the total amount of the bid, made payable to the County of Ventura, California.

Performance & Payment Bond. The successful bidder will be required to furnish separate performance and payment bonds each in an amount equal to 100% of the contract price.

In accordance with Section 22300 of the Public Contracts Code, securities may be substituted for funds withheld.

Airport and Airway Improvement Act of 1982 as Amended. In accordance with the Davis-Bacon Act, as amended, the Contractor will be required to comply with the wage and labor requirements and to pay minimum wages in accordance with the schedule of wage rates established by the United States Department of Labor.

Prevailing Wage Rates. Contractor will be required to pay employees and keep records in accordance with the Davis-Bacon Act (29 CFR Part 5 and/or the Federal Fair Labor Standards Act (29 CFR part 201). The higher of either the State or Federal wages must be paid to employees. Both

determinations must be complied with. The Contractor must post copies of the prevailing wage schedule at each job site.

The California Prevailing Wage Rates determined by the State for Ventura County may be found here: https:///www.dir.ca.gov/OPRL/DPreWageDetermination.htm
Federal Prevailing Wage rates may be found here and in Division 6 of these Contract Documents: https://beta.sam.gov/

Equal Employment Opportunity and Affirmative Action Requirement. The proposed contract is under and subject to 41 CFR Part 60-4 and Executive Order 11246 of September 24, 1965, as amended, and to the equal opportunity clause and the Standard Federal Equal Employment Opportunity Construction Contract specifications including the goals and timetables for minority and female participation.

Title VI Solicitation Notice: The County of Ventura, California, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 USC §§ 2000d to 2000d-4) and the Regulations, hereby notifies all bidders or offerors that it will affirmatively ensure that any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full and fair opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, national origin (including limited English proficiency), creed, sex (including sexual orientation and gender identity), age, or disability in consideration for an award.

DBE Requirement.

Information submitted as a matter of bidder responsibility:

The Owner's award of this contract is conditioned upon Bidder or Offeror satisfying the good faith effort requirements of 49 CFR §26.53.

The successful Bidder or Offeror must provide written confirmation of participation from each of the DBE firms the Bidder or Offeror lists in its commitment within five days after bid opening.

1) The names and addresses of Disadvantaged Business Enterprise (DBE) firms that will participate in the contract;
2) A description of the work that each DBE firm will perform;
3) The dollar amount of the participation of each DBE firm listed under (1);
4) Written statement from Bidder or Offeror that attests their commitment to use the DBE firm(s) listed under (1) to meet the Owner's project goal;
5) Written confirmation from each listed DBE firm that it is participating in the contract in the kind and amount of work provided in the prime contractor's commitment; and
6) If Bidder or Offeror cannot meet the advertised project DBE goal, evidence of good faith efforts undertaken by the Bidder or Offeror as described in appendix A to 49 CFR part 26. The documentation of good faith efforts must include copies of each DBE and non-DBE subcontractor quote submitted to the bidder when a non-DBE subcontractor was selected over a DBE for work on the contract.

The bidder shall make good faith efforts, as defined in Appendix A of 49 CFR Part 26, Regulations of the Office of the Secretary of Transportation, to subcontract **6.20%** of the dollar value of the prime contract to small business concerns owned and controlled by socially and economically disadvantaged individuals (DBE). In the event that the bidder for this solicitation qualifies as a DBE, the contract goal shall be deemed to have been met. Individuals who are rebuttably presumed to be socially and economically disadvantaged include, women, Black Americans,

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Hispanic Americans, Native Americans, Asian-Pacific Americans, and Asian-Indian Americans. The apparent successful bidder will be required to submit information concerning the DBE's that will participate in this contract. The information will include the name and address of each DBE, a description of the work to be performed by each named firm, and the dollar value of the contract. If the bidder fails to achieve the contract goal stated herein, it will be required to provide documentation demonstrating that it made good faith efforts in attempting to do so. A bid that fails to meet these requirements will be considered non-responsive. Those firms currently certified as DBE's by the CA Department of Transportation are eligible to participate as DBE's on this contract. A list of these firms can be obtained from the State, the consulting engineer, or the Sponsor.

FAA Buy American Preference. The Contractor certifies that its bid/offer is in compliance with 49 USC § 50101, BABA and other related Made in America Laws,1 U.S. statutes, guidance, and FAA policies, which provide that Federal funds may not be obligated unless all iron, steel and manufactured goods used in AIP funded projects are produced in the United States, unless the Federal Aviation Administration has issued a waiver for the product; the product is listed as an Excepted Article, Material Or Supply in Federal Acquisition Regulation subpart 25.108; or is included in the FAA Nationwide Buy American Waivers Issued list.

The bidder or offeror must complete and submit the certification of compliance with FAA's Buy American Preference, BABA and Made in America laws included herein with their bid or offer. The Airport Sponsor/Owner will reject as nonresponsive any bid or offer that does not include a completed certification of compliance with FAA's Buy American Preference and BABA.

The bidder or offeror certifies that all constructions materials, defined to mean an article, material, or supply other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives that are or consist primarily of: non-ferrous metals; plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables); glass (including optic glass); lumber; or drywall used in the project are manufactured in the U.S.

[1] Per Executive Order 14005 "Made in America Laws" means all statutes, regulations, rules, and Executive Orders relating to federal financial assistance awards or federal procurement, including those that refer to "Buy America" or "Buy American," that require, or provide a preference for, the purchase or acquisition of goods, products, or materials produced in the United States, including iron, steel, and manufactured products offered in the United States.

Trade Restriction Certification. By submission of an offer, the Offeror certifies that with respect to this solicitation and any resultant contract, the Offeror –

1) is not owned or controlled by one or more citizens of a foreign country included in the list of countries that discriminate against U.S. firms as published by the Office of the United States Trade Representative (USTR);

2) has not knowingly entered into any contract or subcontract for this project with a person that is a citizen or national of a foreign country included on the list of countries that discriminate against U.S. firms as published by the USTR; and

3) has not entered into any subcontract for any product to be used on the Federal project that is produced in a foreign country included on the list of countries that discriminate against U.S. firms published by the USTR.

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This certification concerns a matter within the jurisdiction of an agency of the United States of America and the making of a false, fictitious, or fraudulent certification may render the maker subject to prosecution under Title 18 USC § 1001.

The Offeror/Contractor must provide immediate written notice to the Owner if the Offeror/Contractor learns that its certification or that of a subcontractor was erroneous when submitted or has become erroneous by reason of changed circumstances. The Contractor must require subcontractors provide immediate written notice to the Contractor if at any time it learns that its certification was erroneous by reason of changed circumstances.

Unless the restrictions of this clause are waived by the Secretary of Transportation in accordance with 49 CFR § 30.17, no contract shall be awarded to an Offeror or subcontractor:

1) who is owned or controlled by one or more citizens or nationals of a foreign country included on the list of countries that discriminate against U.S. firms published by the USTR; or
2) whose subcontractors are owned or controlled by one or more citizens or nationals of a foreign country on such USTR list; or
3) who incorporates in the public works project any product of a foreign country on such USTR list.

Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render, in good faith, the certification required by this provision. The knowledge and information of a contractor is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

The Offeror agrees that, if awarded a contract resulting from this solicitation, it will incorporate this provision for certification without modification in all lower tier subcontracts. The Contractor may rely on the certification of a prospective subcontractor that it is not a firm from a foreign country included on the list of countries that discriminate against U.S. firms as published by USTR, unless the Offeror has knowledge that the certification is erroneous.

This certification is a material representation of fact upon which reliance was placed when making an award. If it is later determined that the Contractor or subcontractor knowingly rendered an erroneous certification, the Federal Aviation Administration (FAA) may direct through the Owner cancellation of the contract or subcontract for default at no cost to the Owner or the FAA.

Notice Of The Requirement For Affirmative Action To Ensure Equal Employment Opportunity

1. The Offeror's or Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth herein.

2. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

Timetables

Goals for minority participation for each trade: **21.5%**

Goals for female participation in each trade: **6.9%**

These goals are applicable to all of the Contractor's construction work (whether or not it is Federal or federally assisted) performed in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the

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Contractor also is subject to the goals for both its federally involved and non-federally involved construction.

The Contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3(a) and its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the Executive Order and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

3. The Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs (OFCCP) within 10 working days of award of any construction subcontract in excess of $10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address, and telephone number of the subcontractor; employer identification number of the subcontractor; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the subcontract is to be performed.

4. As used in this notice and in the contract resulting from this solicitation, the "covered area" is the County of Ventura, Oxnard, CA.

Federal Fair Labor Standards Act (Federal Minimum Wage). All contracts and subcontracts that result from this solicitation incorporate by reference the provisions of 29 CFR part 201, et seq, the Federal Fair Labor Standards Act (FLSA), with the same force and effect as if given in full text. The FLSA sets minimum wage, overtime pay, recordkeeping, and child labor standards for full and part-time workers.
The Contractor has full responsibility to monitor compliance to the referenced statute or regulation. The Contractor must address any claims or disputes that arise from this requirement directly with the U.S. Department of Labor – Wage and Hour Division.

Certification of Offeror/Bidder Regarding Debarment. By submitting a bid/proposal under this solicitation, the bidder or offeror certifies that neither it nor its principals are presently debarred or suspended by any Federal department or agency from participation in this transaction.

Other Federal Provisions. Award of contract is also subject to the following Federal Provisions:

- Civil Rights – Title VI Assurances
- Lobbying Federal Employees
- Recovered Materials
- Government-wide Requirements for Drug-free Workplace
- Other Federal Provisions included in Part A of the Special Provisions

Successful Bidder/Contractor will be required to insert applicable federal contract provisions in all subcontracts and shall be responsible for compliance by subcontractor(s).

Required Contractors License(s). Proposers or Bidders shall have a **Class A** California Contractors license at the time of award.

Public Works Contractor Registration Law (SB 854). Per Public Works Contractor Registration Law (SB 854), Contractors and Subcontractors who intend to Propose (Bid) or perform work on this

Project must be registered with the Department of Industrial Relations at the time of Contract award. Information is available at https://www.dir.ca.gov/faqslist.html.

- No Contractor or Subcontractor may be listed on a bid proposal for a public works project submitted on or after March 1, 2015) unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5 [with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.1(a)].
- No Contractor or Subcontractor may be awarded a contract for public work on a public works project (awarded on or after April 1, 2015) unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5.
- This project is subject to compliance monitoring and enforcement by the Department of Industrial Relations.

County of Ventura Department of Airports
Camarillo, CA

INSTRUCTIONS TO BIDDERS

Hereinafter in these Contract Documents including these Instructions to Bidders, Sponsor/Owner refers to County of Ventura, California and Engineer refers to Jviation, a Woolpert Company, 1300 Eastman Ave., Suite 214, Ventura, CA 93003.

1. Submission of Bids (Proposals)

a. **Division 2 of the Contract Documents shall be completed and submitted in its entirety, in order for the Bid (Proposal) to be considered responsive.**

b. **Qualifications shall be furnished as described in Division 2-43 with the bid proposal.**

c. Bids (Proposals) are to be submitted in a sealed envelope to the bid box at the County of Ventura: Department of Airports (DOA), Administration Office Public Counter, 2nd Floor Lobby, 555 Airport Way, Suite B; Camarillo, CA 93010. The DOA, Public Counter is located in the DOA Administration Office, which is at the Camarillo Airport.

d. Date/Time: Bids (Proposals) shall be received on or before: Tuesday, June 27, 2023, at 10:00 A.M. local time, County of Ventura: Department of Airports, Administration Office Public Counter, 2nd Floor Lobby, 555 Airport Way, Suite B; Camarillo, CA 93010

e. Bidding Documents: Bidding documents must be downloaded from Jviation, a Woolpert Company's bid site (http://bid.jviation.com). **Note:** Plan ahead when submitting the online request form and allow up to 2 business days for approval and access to projects.

f. **Bid Bond of five (5) % of the amount bid is required if total bid exceeds $20,000.00 or is required elsewhere in this solicitation.**

2. Pre-Bid Conference

A pre-bid is scheduled for Thursday, June 8, 2023, at 10:00 a.m., located at the Oxnard Airport ARFF Shelter, 2889 W 5th St., Oxnard, CA 93030. Any contractor wishing to bid on this project is highly encouraged to attend the pre-bid conference and will have an opportunity to meet with the County's representatives and address any questions that may arise. All bidders should become familiar with all invitation specifications and plans prior to attending the pre-bid conference.

Site Visit: An escorted, vehicular site visit will be provided following the pre-bid conference at the Oxnard Airport. Each contractor will be allowed 1 vehicle with up to 2 occupants on-site during this time period. Contractors wishing to attend shall meet at 2889 W 5th St., Oxnard, CA 93030. Vehicles will be under continuous escort, and no questions will be answered during the escort.

3. Late Bids (Proposals) /Late Modifications of Bids (Proposals)

a. Bids (Proposals) received in the office designated under Item 1 above, after the exact time set for opening are considered "late bids", and will not be accepted by the Bid Opening Official. Bidders or Proposers are solely responsible for ensuring their bids arrive on time

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and to the place of bid proposals specified in the Notice Inviting Bids. The time used is local standard time as obtained from Pacific Telephone's Standard Time. The clock on the Public Counter will be set to local standard time and will govern closure of the Bid Box. Bidders or Proposers should note that other clocks in the building may not be set to the correct time and should not be relied upon.

b. The Owner will not consider a late bid (proposal) or late modification of bid (proposal) unless received prior to contract award and -

(1) There is conclusive evidence that the bid proposal was submitted to the office designated in Item 1 above, on time and was mishandled by the Oxnard Airport (i.e., lost or misplaced) staff responsible for handling/receiving bid proposals. Mishandling by other units or offices at the Oxnard Airport does not constitute airport staff.

(2) Or - it was the only bid proposal received.

4. Mistakes in Bids (Proposals) - Confirmation of Bid (Proposal)

When it appears from a review of the bid proposal that a mistake has been made, the bidder or proposer may be requested to confirm their bid proposal. Situations in which the confirmation may be requested include obvious, apparent errors on the face of the bid proposal or a bid proposal unreasonably lower than the other bids submitted. All mistakes in bid proposals will be handled in accordance with the County of Ventura, California policy.

5. Minor Informalities/Irregularities in Bids

a. A minor informality or irregularity is one that is merely a matter of form and not of substance. It also pertains to some immaterial defect in a bid proposal or variation of a bid proposal from the exact requirements of the invitation that can be corrected or waived without being prejudicial to other bidders or proposers. The defect or variation is considered immaterial when the effect on price, quantity, quality, or delivery is negligible when contrasted with the total cost or scope of the services being acquired.

b. If the Owner determines that the bid proposal submitted contains a minor informality or irregularity, then the Director shall give the bidder or proposer an opportunity to cure any deficiency resulting from a minor informality or irregularity in a bid proposal, or waive the deficiency, whichever is to the advantage of the Owner. In no event will the bidder or proposer be allowed to change the bid amount. Examples of minor informalities or irregularities include but are not limited to the following:

(1) Bidder or Proposer fails to sign the Bid (Proposal), but only if the unsigned bid proposal is accompanied by other material evidence, which indicates the bidder's or proposer's intention to be bound by the unsigned bid proposal. (Such as Bid Bond, or signed cover letter which references the bid proposal and amount of bid proposal).

(2) Bidder or Proposer fails to acknowledge an Addendum - this may be considered a minor informality only if the Addendum, which was not acknowledged, involves only a matter of form or has either no effect or merely a negligible effect on price, quantity, quality, or delivery of the item or services bid upon.

6. Rejection of Bids (Proposals)

Any bid proposal that fails to conform to the essential requirements of the invitation for bids will be rejected. The County of Ventura shall have the right to reject any bids proposals presented in accordance with Section 20150.9 of the California Public Contracts Code.

a. Any bid proposal that does not conform to the applicable specifications shall be rejected unless the invitation authorizes the submission of alternate bid proposals and the items or services offered as alternates meet the requirements specified in the invitation for bids.

b. A bid proposal shall be rejected when the bidder imposes conditions that would modify requirements of the invitation or limit the bidder's or proposer's liability to the Owner, since to allow the bidder or proposer to impose such conditions would be prejudicial to other bidders or proposers. For example, bid proposals shall be rejected in which the bidder or proposer:

(1) Protects against future changes in conditions, such as increased costs, if total possible costs to the Owner cannot be determined.

(2) Fails to state a price and indicates that price shall be "price in effect at time of delivery".

(3) States a price but qualifies it as being subject to "price in effect at time of delivery".

(4) Takes exceptions to the invitation for bids terms and conditions.

(5) Inserts the bidder's or proposer's terms and conditions.

(6) Limits the rights of the Owner under any contract/invitation for bid clause.

7. Estimated Quantities

The quantities listed for each of the items in the bid schedule are only estimated quantities. Contractors are required to bid a firm unit cost for each item specified. The actual quantities ordered may fluctuate up or down. The unit prices proposed by each bidder or proposer will remain firm and will not be re-negotiated if the estimated quantities are not met or are exceeded. For bidding purposes, if there is a conflict between the extended total of an item and the Unit Price, the Unit Price shall prevail and be considered as the amount of the bid (proposal).

8. Number of Copies

Bidder or Proposer shall submit in its sealed and marked envelope, one (1) copy of its bid (proposal), signed in ink, and, if applicable, one (1) original copy of the Bid Bond as defined under Items 1.f. and 10.

9. Identification of Bid (Proposal)

Bids (Proposals) must be returned in a sealed envelope and addressed to the County of Ventura: Department of Airports, Administration Office Public Counter, 2nd Floor Lobby, 555 Airport Way, Suite B; Camarillo, CA 93010 and marked as follows:

Project: Oxnard Airport Reconstruction of Taxiway F

Bid of _____

(Name of Contractor)

for improvements to the Oxnard Airport, Oxnard, CA, AIP Project No. 3-06-0179-043-2023, DOA Spec. No. 23-03 and DOA Project No. OXR-150. To be opened Tuesday, June 27, 2023, at 10:00 A.M., local time in the County of Ventura: Department of Airports, Administration Office Public Counter, 2nd Floor Lobby, 555 Airport Way, Suite B; Camarillo, CA 93010.

Any offer (bid/proposal) that is submitted without being properly marked may be opened for identification prior to the deadline for receipt of offers (bids/proposals) and then resealed.

10. Bid Bond Requirements

A Bid Bond is required in the amount of five (5) % of the amount bid when (1) the total amount of your accumulative bid proposal is more than $20,000 or (2) is required elsewhere in this solicitation. This Bid Bond must meet the conditions specified under Item 19 Bond Requirements and shall be submitted using the form in Division 2 of this solicitation.

11. Preparation of Bid Offer (Proposal)

a. Bidders or Proposers are expected to examine the drawings, specifications, bid documents, proposed contract forms, terms and conditions, and all other instructions and solicitation documents. Bidders or Proposers are expected to visit the jobsite to determine all requirements and conditions that will affect the work. Failure to do so will not relieve a bidder or proposer from responsibility to know what is contained in this invitation for bid, or site conditions affecting the work.

b. The bidder or proposer certifies that it has checked all of its figures and understands that the Owner will not be responsible for any errors or omissions on the part of the bidders or proposers in preparing its bid proposal.

c. All items, (unless the invitation specifically states otherwise) including any additive or deductive alternates on the bid schedule, **must** be completely filled out or the bid proposal will be determined non-responsive and ineligible for consideration for award.

d. The bidder or proposer declares that the person or persons signing this bid proposal is/are authorized to sign on behalf of the firm listed and to fully bind the bidder or proposer to all the requirements of the solicitation.

e. The bidder or proposer certifies that no person or firm other than the bidder or proposer or as otherwise indicated has any interest whatsoever in this bid/offer (proposal) or the contract that may be entered into as a result of this bid/offer (proposal) and that in all respects the offer is legal and firm, submitted in good faith without collusion or fraud.

f. By submitting a bid (proposal), the bidder or proposer certifies that it has complied and will comply with all requirements of local, state, and federal laws, and that no legal requirements have been or will be violated in making or accepting this bid.

g. If there is a discrepancy between the unit price and the total price, the unit price shall be used to determine the applicable total.

h. In case of conflict between words and numerals, the words, unless obviously incorrect, shall govern.

12. Basis of Award

The Owner intends to award a contract resulting from this solicitation to the lowest, responsive, responsible bidder, whose offer, conforming to the solicitation, will be most advantageous to, and in the best interest of, the Owner, cost or price and other factors considered.

a. In addition to other factors, bid offers (proposals) will be evaluated on the basis of advantages and disadvantages to the Owner that might result from offers received.

b. The Owner reserves the right to reject any or all bids (proposals) and to waive informalities and/or irregularities in the bid offer (proposal).

c. Total bid will be evaluated and awarded as follows: It is the Owner's intent to award this bid proposal based on the **TOTAL BASE BID (SCHEDULE I); split awards will not be made.**

d. It is the intention of the County to award the contract to the bidder submitting the lowest responsible and responsive bid (based on unit prices and estimated quantities) within the funds available for work included in the base bid which consists of Schedule I. Bidders must offer pricing on all items in all Schedules. The project award is contingent on the availability of funding.

13. Period of Acceptance

The bidder or proposer agrees that its bid offer (proposal) shall remain open for acceptance by the Owner for a period of 120 Calendar days from and including the date specified in the solicitation for receipt of bids (proposals).

14. Contract Award

The signature of the bidder or proposer indicates that within thirty (30) calendar days from acceptance of its bid offer (proposal) it will execute a contract with the Owner and furnish a project specific Certificate of Insurance, furnish Performance and Payment Bonds and any other documents required by the Contract Documents.

15. Notice to Proceed

Work may not start under any awarded contract until a written Notice to Proceed is issued by the Owner. The Owner may issue the Notice to Proceed any time after the contract is signed and, if required, insurance and bonds have been provided in accordance with Item 19 below.

Although the acceptance period allows for the project to be awarded within 120 Calendar days from the date specified in the solicitation for receipt of bids (proposals), construction for this project is expected to take place during the 2024 Construction Season.

Exhibit 1

16. Amendments to the Solicitation

a. If this solicitation is amended, then all specifications, terms and conditions, which are not amended, remain unchanged.

b. Bidders or Proposers shall acknowledge receipt of any addendum to this solicitation (1) by signing and returning the amendment, (2) by identifying the amendment number and date in the space provided for this purpose on the form for submitting a bid offer, or (3) by letter or facsimile.

c. Acknowledged addendums must be received prior to bid opening. Bidders or Proposers are encouraged to include signed addenda or initialed acknowledgement with returned bids.

17. Explanations to Prospective Bidders

Any prospective bidder or proposer desiring an explanation or interpretation of the solicitation documents, drawings, specifications, etc., must request it in writing by June 15, 2023 no later than 4:00 p.m. local time to allow a reply to reach all prospective bidders or proposers before the time for submission of bids (proposals). Oral explanations or instructions given before the opening of bids will not be binding. Any information provided to a prospective bidder or proposer during the bid preparation stage will be promptly furnished to all other prospective bidders or proposers as an addendum to the solicitation if that information is necessary in submitting bid offers (proposals) or if the lack of it would be prejudicial to other prospective bidders or proposers.

18. Questions and Other Requests for Information

For all questions or requests, please direct to:
Matt Gilbreath, P.E. (Matt.Gilbreath@woolpert.com)

19. Bond Requirements

a. Bid (offer/proposal) Bond

(1) The bidder or proposer is required to furnish a Bid Bond in the form of certified check, cashier's check, irrevocable letter of credit, or surety Bid Bond acceptable to the Contracting Officer in the sum equal to at least 5% of the total amount of the Bid (Proposal) payable without condition to County of Ventura, California, if: (1) the total amount of your accumulative bid is more than $20,000 or (2) is required elsewhere in this solicitation.

(2) The Bid Bond shall guarantee that the bid will not be withdrawn or modified after the time set for the receipt of bid (proposal) offers, and if accepted, that the person, firm or corporation submitting same shall within thirty (30) calendar days after being notified of the acceptance of its bid offer, enter into a contract and shall, within said time, furnish the required bonds and all insurance certificates called for under this invitation for bid.

(3) The Bid Bonds of all bidders or proposers, except for the two lowest bidders, will be returned to the respective bidders only in the event a self-addressed, stamped

Exhibit 1

envelope is provided along with a written request from the contractor that their Bid Bond be returned. However, if a certified check or a cashier's check is submitted in lieu of the Bid Bond, it will be returned as soon as possible after the lowest responsive and responsible bidder is determined and a contract is executed.

(4) In the event the bidder or proposer whose bid offer is accepted fails to enter into the contract and/or furnish the proper bonds, its certified check, cashier's check, irrevocable letter of credit, or surety Bid Bond will be forfeited in full to the Owner.

b. Performance, Labor and Materials Payment, and Maintenance Bonds

Bonds shall:

(1) Be for the full amount of the contract price;

(2) Guarantee the Contractor's faithful performance of the work under this contract, and the prompt and full payment for all labor and materials involved therein;

(3) Guarantee protection to the Owner against liens of any kind;

(4) Be, when a surety bond is furnished, from a surety company operating lawfully in the State of CA and shall be accompanied with an acceptable "Power-of-Attorney" form attached to each bond copy.

(5) Be issued from a surety company that is acceptable to the Owner; and

(6) Be submitted using the forms in County of Ventura Standard Specifications of this solicitation.

20. Specifications and Drawings

Upon award of the contract, the Owner will be responsible for furnishing the selected contractor a minimum of one (1) hard copy set of both the specifications and drawings. The Contractor will be required to purchase additional half size sets for $125.00 as desired.

21. Type of Contract

It is the intent of this Invitation for Bids to award a firm fixed unit price contract based on the unit prices and estimated quantities offered by the lowest responsive and responsible bidder. Contract unit prices shall remain firm and fixed throughout the contract performance period. Actual quantities used in the work will be used to determine contractor payments and final project cost.

22. Bid (Proposal) Results

Once the Sponsor has had the opportunity to thoroughly evaluate the bids, the Bid Tabulation Summary will be posted on our website: bid.jviation.com.

Bid (Proposal) result tabulations will also be emailed upon request. To request an email of the bid tabulation, email Matt.Gilbreath@woolpert.com.

23. Terms, Conditions and Special Provisions

Bidders or Proposers are advised to pay special attention to the General and Special Provisions of the Contract Documents. These sections may contain requirements that will have an impact on all potential bidders or proposers, such as Federal Provisions, Liquidated Damages, Indemnification, DBE participation, type of contract, and delivery schedule.

The Contractor shall submit a Safety Plan Compliance Document (SPCD) to the Engineer and Airport Operator prior to Notice to Proceed, as required by FAA Advisory Circular (AC) 150/5370-2G "Operational Safety on Airports During Construction".

24. Bid (Proposal) Protests

Bidders or Proposers are notified, that in accordance with FAA policy, bid protests based on an allegedly defective bid solicitation, shall be in writing and received by the Sponsor prior to the bid (proposal) opening.

For bid (proposal) protests based on an alleged improper evaluation of bid proposals, a protest must be received by the Sponsor in writing within 10 days after the Notice of Award to the winning bidder is issued. It is the responsibility of the protesting bidder or proposer to keep apprised of when the Notice of Award is issued by calling or emailing the Sponsor for updates.

25. Licensing of Bidder

Before submitting a bid proposal, Proposers or Bidders shall be licensed in accordance with the provisions of Sections 7000 through 7145 of the Business and Professions Code of the State of California in the classification required for the work bid on. The Bidder's license number, classification, and expiration date shall be inserted on the last page of the bid proposal document. The Bidder's name shall correspond in all respects with the name shown on the license. License numbers and names are checked with the State.

26. California Registration Requirement

- No Contractor or Subcontractor may be listed on a bid proposal for a public works project submitted on or after March 1, 2015) unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5 [with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.1(a)].
- No Contractor or Subcontractor may be awarded a contract for public work on a public works project (awarded on or after April 1, 2015) unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5.
- This project is subject to compliance monitoring and enforcement by the Department of Industrial Relations.

27. Minimum Wage and Certified Payroll

Labor on this Project shall be paid no less than the greater of the minimum Prevailing Rates of Wages established by the U.S. Secretary of Labor or by the State of California, Department of Industrial Relations.

1) Federal wage determinations issued under the Davis-Bacon and related Acts are available electronically at no cost at https://beta.sam.gov/. The bidder may contact the Director of

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the Department of Industrial Relations, phone number (415)703-4774 or www.dir.ca.gov/dlsr/PWD (website), to obtain a schedule of the State general prevailing wages applicable to the location and work to be done. The Contractor and the Contractor's subcontractors are responsible for compliance with the requirements of Section 1777.5 and 1777.6 of the Labor Code of the State of California regarding employment of apprentices.

2) The Contractor shall submit two (2) copies of all certified payroll, including subcontractors, to the Engineer and State of California, each month. Failure to submit complete certified payroll in a timely manner may delay progress payments. For certified payroll to be considered for review, the submittal must contain the necessary information in a clear, logical manner. Refer to "Required Federal Contractor Provisions." Contractors are responsible for also submitted certified payroll records to the Labor Commissioner using DIR's electronic certified payroll reporting system http://www.dir.ca.gov/Public-Works/Certified-Payroll-Reporting.html.

28. List of Subcontractors

A. Pursuant to the provisions of Section 4100 through 4114 of the Public Contract Code of the State of California, all Bids (Proposals) shall be accompanied by a List of Subcontractors that the Bidder or Proposer proposes to use who will perform work or labor or render service to the Bidder or Proposer in excess of one-half of one percent of the Bidder's or Proposer's total bid or $10,000, whichever is greater. The names, principal business addresses, license number, and portion of work that will be done by each Subcontractor shall be submitted on the form, which is furnished in the Bid (Proposal) Forms of this Contract Documents Book.

B. Bidder or Proposer shall be solely responsible to correct any errors in the listing of the California Contractor's license number.

C. A deadline of 24 hours after Proposal (Bid) opening is established by which a Bidder or Proposer must submit corrected California Contractor's license number information to the Agency.

D. A Bidder's Proposer's failure to submit corrected California Contractor's license numbers will cause the Bid (Proposal) to be non-responsive.

E. If the Bidder or Proposer fails to specify a Subcontractor for a portion of the work to be performed under the Contract in excess of one-half of one percent of the Bidder's or Proposer's total bid, the Bidder or Proposer agrees to perform that portion itself. The successful Bidder or Proposer shall not, without the consent of the Agency, either:

1) Substitute any person, firm, or corporation as subcontractor in place of the Subcontractor designated in the original Proposal (Bid); or
2) Permit any Subcontractor to be assigned or transferred or allow it to be performed by anyone other the original Subcontractor listed in the bid.

BIDDER'S CHECKLIST

The undersigned Bidder, by initialing upon each line, below, acknowledges that the following fully completed and executed Bid Documents are attached to, incorporated herein by reference and made a condition of this Bid Proposal:

DIVISION	TITLE	INITIALS
2-3	Contract Proposal (Bid)	_____
2-7	Bid Bond	_____
2-9	Contractor Information	_____
2-11	Subcontractor/Material Supplier Sheet	_____
2-13	Disadvantaged Business Utilization Commitment	_____
2-15	DBE Participation Form	_____
2-19	Equal Employment Opportunity Report Statement	_____
2-21	Buy America Certification	_____
2-27	Buy America Waiver Request	_____
2-29	Buy America Preference-Final Assembly Questionnaire	_____
2-33	Buy America Conformance Listing	_____
2-35	Non-Collusion Affidavit	_____
2-37	Public Contract Code	
	Sections 10285.1, 10162, and 10232	_____
2-39	Drug-Free Workplace Certification	_____
2-41	Certification of Offeror/Bidder Regarding Tax	
	Delinquency and Felony Convictions	_____
2-43	Contractor's Statement of Qualifications	_____
2-45	Bid Proposal	_____

CONTRACT PROPOSAL (BID)

TO: Oxnard Airport
Ventura County, CA

1. The undersigned hereby certifies that they have examined the form of contract, plans and specifications and other associated Contract Documents for the improvement of Oxnard Airport, Project No. 3-06-0179-043-2023, County Specification No. DOA 23-03 and County Project No. OXR-150. The undersigned further certifies that he/she has examined the site of the work, has determined for himself/herself the conditions affecting the work and subject to acceptance of the bid proposal, agrees to provide at his or her expense, all labor , insurance, superintendence, machinery, plant, equipment, tools, apparatus, appliances, and means of construction, and all materials and supplies complete the entire work, including work incidental thereto, in conformance with the plans, specifications, and associated Contract Documents. The undersigned certifies that he/she meets the Contractor's license classification "A" requirement.

2. The undersigned acknowledges that the Contract Documents consist of the Notice Inviting Bids (Invitation for Bid), Instruction to Bidders, all issued Addenda, Proposal (Bid), Statement of Qualifications, Anticipated Sub-Contracts, Form of Proposal Guaranty, Notice of Award, Contract Agreement, Performance & Payment Bonds, Notice to Proceed, Release on Contract Form, Wage Rates, General Provisions, Special Provisions, Plans, Technical Specifications, attached appendices and referenced documents.

3. The undersigned, in compliance with your Invitation for Bids dated June 27, 2023, hereby proposes to do the work called for in said contract and specifications and shown on said plans and to furnish all materials, tools, labor, and all appliances and appurtenances necessary for the said work at the following unit rates and prices:

   Bid Spreadsheet begins on page 2-45.

   TOTAL BID (Base Bid based on unit prices and estimated quantities) _____

   _____

   TOTAL BID IN WORDS _____

   _____

4. The undersigned understands that the above quantities of work to be done are approximate only and are intended principally to serve as a guide in evaluating the bids. Final project payments will be made on actual quantities and unit prices.

5. It is understood that the schedule of minimum wage rates, as established by the Secretary of Labor and included in the Specifications, are to govern on this project, and the undersigned certifies that he/she has examined this schedule of wage rates and that the prices bid are based on such established wage rates.

6. The undersigned prime contractor, if not a certified DBE, hereby assures that they will make sufficient and reasonable efforts to meet the DBE goals, that they will subcontract 6.20 % of the dollar value of the prime contract to DBE firms, and that they will include the DBE clauses required by the sponsor's DBE Program in all subcontracts which offer subcontracting opportunities. The undersigned will complete and submit with the bid the attached DBE

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Participation Form. If unable to meet the project goal, the undersigned shall submit a demonstration of good faith effort in accordance with Special Provisions, Part B, Section 3.3 of the Contract Documents.

7. The undersigned agree upon written notice of the acceptance of this bid, that within thirty (30) days after the award, that he/she will execute the contract in accordance with the bid as accepted and give contract (Performance and Payment) bonds on attached forms. (See FAA Provisions Sections 30-06 & 80-02, and VCSS-DOA Section 6-7.4). Agency is allowed 120 Calendar Days to award the contract.

8. The undersigned further agrees that if awarded the contract, he/she will commence the work within ten (10) calendar days after the receipt of a Notice to Proceed and that he/she will complete the work within the allotted calendar days associated with the awarded bid schedule(s)/bid alternate(s). An extension of time may be allowed when extra or additional work is ordered by the engineer. Liquidated damages in the amount identified in Section 80-08 shall be paid to the Airport for that time which exceeds the number of calendar day(s) allowed in this paragraph. Further, each phase of work under the project has additional liquidated damage clauses, as outlined in Section 80-08 FAILURE TO COMPLETE ON TIME.

9. As an evidence of good faith in submitting this proposal, the undersigned encloses a certified check or Bid Bond in the amount of _____dollars ($_____) which, in case the undersigned refuses or fails to accept an award and to enter into a contract and file the required bonds within the prescribed time, shall be forfeited to the Oxnard Airport, Ventura County, CA, as liquidated damages.

10. By entering into this contract, the Contractor certifies that neither it (nor he/she) nor any person or firm who has an interest in the Contractor's firm is a person or firm ineligible to be awarded government contracts by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

11. No part of this contract shall be subcontracted to any person or firm ineligible for award of a government contract by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

12. The undersigned hereby declares that the only parties interested in this proposal are named herein, that this proposal is made without collusion with any other person, or corporation. That no member of the council, officer or agent of County of Ventura, California, is directly or indirectly financially interested in this bid.

13. Liability insurance class L-D is required per VCSS-DOA Section 7-4.2, the VCSS-DOA is located in Division 8.

14. The undersigned acknowledges receipt of the following Addendums:

Addendum No._____ Date Received _____

Addendum No._____ Date Received _____

Addendum No._____ Date Received _____

Addendum No._____ Date Received _____

Addendum No._____ Date Received _____

SIGNATURE OF BIDDER:

By _____

Name and Title of Authorized Agent

_____

Name of Company

_____

Address of Company

_____

License No., Class, and Expiration Date

_____

State Tax ID No.

_____

Federal Tax ID No.

_____

DIR Registration No.

"Contractor's License No., Class & Expiration date are made under penalty of perjury."

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that _____ _____ as Principal, hereinafter called Contractor, and _____, licensed to do business as such in the State of California, as Surety, hereby bind themselves and their respective heirs, executors, administrators, successors, and assigns, unto County of Ventura, California, as Obligee, in the penal sum of _____ Dollars ($_____) for the payment whereof Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, by these presents.

WHEREAS,

The Contractor has submitted to the Obligee, a contract bid dated the _____ day of _____ for the following contract:

_____

_____

_____

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if the Contractor bid is accepted by the Obligee and the Contractor is awarded the contract in whole or in part, the Contractor shall enter into the Contract with the Obligee in accordance with the terms of such bid, give such Payment and Performance Bonds as may be specified in the Contract Documents with good and sufficient surety for the faithful performance of such Contract and for the prompt payment of labor and materials furnished in the prosecution thereof, or in the event of failure of the Contractor to enter such Contract and give such bond or bonds, if the Contractor shall promptly pay the Obligee the amount of this bond as set forth herein above, then the obligation shall be null and void, otherwise this obligation will remain in full force and effect.

IN WITNESS WHEREOF, the above parties have executed this instrument, the _____ day of _____, 20___.

<u>SIGNATURE OF PRINCIPAL (as applicable)</u>

A. Individual, partnership or joint venture _____
(Signature of sole proprietor or general partner)

B. Corporation _____
Name of Corporate Principal

Attest: _____ By _____
Secretary (affix seal)

SIGNATURE OF SURETY

Name and address of Corporate Surety

_____

_____

By _____ (seal)
Attorney in Fact (attach power of attorney)

ACCEPTANCE BY

The foregoing bond is approved.

Date _____ By _____

The foregoing bond is in due form according to law and is approved.

Date _____ By _____

CONTRACTOR INFORMATION

1. Name of Bidder/Contractor: _____

2. Type of Business Entity: _____

   NOTE: If bidder is **partnership** or **joint venture**, give full names of all partners or joint ventures. Bid must be signed by all Joint Ventures. If bidder is a **limited liability company**, bid must be signed by an authorized manager (may be signed by member-manager if LLC is organized to allow management by members).

3. Address of Contractor: _____

   _____

   _____

4. Telephone: _____ Fax: _____

   E-mail: _____

5. Established where and when: _____

6. Contractor's Banking Information: _____

   _____

   _____

7. Principal Officers of Contractor (managers and members if LLC):

   Name: _____ Name: _____

   Title: _____ Title: _____

   Name: _____ Name: _____

   Title: _____ Title: _____

   Name: _____ Name: _____

   Title: _____ Title: _____

8. Bidder's/Contractor's state of incorporation (state of organization if an LLC or Partnership):

_____

9. Bidder's Surety: _____

10. Surety's State of Incorporation: _____

11. Name and Address of person to receive payment _____

_____

_____

12. If the Bidder/Contractor is a Joint Venture, it shall attach a certified copy of the Joint Venture Agreement. The Joint Venture Agreement will not be included as part of the Contract Documents.

13. The Bidder/Contractor shall identify all applicable labor agreements (if any) to be used in the performance of the work:

_____

_____

_____

_____

_____

SUBCONTRACTOR/MATERIAL SUPPLIER LIST

The bidder shall provide information on all subcontractors/material suppliers bidding or quoting on subcontracts for this project. Pursuant to the provisions set forth in Title I, Division 5, Chapter 2 (Section 4100-4113, Inclusive) of the Government Code of the State of California – It is required that the Contractor set forth in his or her Proposal (Bid) the name and principal address of each Subcontractor who will perform work or labor or render service to the Contractor on or about the construction.

If a Contractor fails to specify a Subcontractor for any portion of the work to be performed under the Contract, on or about the construction of the project, in excess of ½ of 1% of the Contractor's total Bid, he or she shall be deemed to have agreed to perform such portion himself or herself, using his or her own resources and employed personnel and he or she shall not be permitted to subcontract that portion of the work, except under the conditions set forth in Section 4107 of the Government Code of the State of California. Subcontractors shall not sublet their work as a whole.

Should the Contractor violate any of the provisions of said Chapter, his or her so doing will be deemed a violation of his or her Contract and the awarding authority shall have the right to terminate the Contractor's control over the work. Upon any such violation, the Contractor may be subject to such penalties as are prescribed by Law. Contractor shall also verify below that each listed subcontractor has registered and paid a fee to the Department of Industrial Relations pursuant to Labor Code 1725.5. [Note: Reproduce page two of this section for additional listings needed beyond the length of this form.]

Name of Firm	Address	Type of Work to be Performed on Contract	Licensed in			Contractors License #	Class	DIR License #	Certified DBE		Certification Number	Bid Amount	Date Firm Established	*GRS
			Yes	No	State				Yes	No				

***GRS - Annual Gross Receipts**

Enter 1 for less than $1 million
Enter 2 for more than $1 million but less than $5 million
Enter 3 for more than $5 million but less than $10 million
Enter 4 for more than $10 million but less than $15 million
Enter 5 for more than $15 million

Name of Firm	Address	Type of Work to be Performed on Contract	Licensed in			Contractors		DIR	Certified DBE		Certification	Bid	Date Firm	*GRS
			Yes	No	State	License #	Class	License #	Yes	No	Number	Amount	Established	

Date

Signature

Company Name

Title

DISADVANTAGED BUSINESS UTILIZATION COMMITMENT

_____ The bidder agrees to expend at least _____% DBE utilization on this project.

_____ The bidder (if unable to meet the goal of _____ % DBE) is committed to a minimum of _____% DBE utilization on this project and has submitted documentation showing good faith effort.

NOTE: Failure to submit a "Good Faith Effort" at the time of the Bid opening may result in the bid being considered as non-responsive.

For the purposes of this commitment, the term "Disadvantaged Business Enterprise" shall mean a business:

a. Which is at least 51 % owned by one or more minorities or women, or in the case of a publicly owned business, at least 51 % of the stock of which is owned by one or more minorities or women; and

b. Whose management and daily business operations are controlled by one or more such individuals.

"Disadvantaged Group Member" or "Disadvantaged" means a person who is a citizen or lawful, permanent resident of the United States, and who is:

a. Black (a person having origins in any of the black racial groups of Africa);

b. Hispanic (a person of Spanish or Portuguese culture, with origins in Mexico, South or Central America, or the Caribbean Islands, regardless of race);

c. Asian American (a person having origins in any of the original peoples of the Far East, Southeast Africa, the Indian subcontinent, or the Pacific Islands);

d. American Indian or Alaskan Native (a person having origins in any of the original peoples of North America);

e. Member of other groups, or other individuals, found to be economically and socially disadvantaged by the Small Business Administration under Section 8(a) of the Small Business Act, as Amended 15 U.S.C. 637 (a);

f. A female person who requests to be considered as a DBE, and who "owns" and "controls" a business as defined herein.

Disadvantaged Business Enterprises may be employed as contractors, subcontractors, or suppliers.

Date: _____

_____
Company

_____
State Registration No.

_____
Authorized Agent (print)

_____
Signature of Authorized Agent

DBE PARTICIPATION FORM

The undersigned, hereby assures that he/she will ensure DBE participation for the amount(s) shown, if awarded a contract for this project in the amount of $: _____.

All eligible DBE firms must be certified by the California Department of Transportation prior to bid opening.

Name of DBE Firm: _____

DBE contract amount: $_____ % of total contract: _____ %

DBE Firm Address: _____

_____

DBE contact person: Name: _____

Phone: _____

The DBE is a: ☐ Prime Contractor ☐ Subcontractor ☐ Manufacturer ☐ Supplier

Category of DBE: ☐ Native American ☐ Hispanic ☐ Asian Pacific ☐ Black

☐ Non minority Woman ☐ Other

Work to be performed by DBE: _____

DBE certification Agency: _____

Expiration Date: _____

(Please include a copy of the latest DBE certification)

Name of DBE Firm: _____

DBE contract amount: $_____ % of total contract: _____ %

DBE Firm Address: _____

_____

DBE contact person: Name: _____

Phone: _____

The DBE is a: ☐ Prime Contractor ☐ Subcontractor ☐ Manufacturer ☐ Supplier

Category of DBE: ☐ Native American ☐ Hispanic ☐ Asian Pacific ☐ Black

☐ Non minority Woman ☐ Other

Work to be performed by DBE: _____

DBE certification Agency: _____

Expiration Date: _____

(Please include a copy of the latest DBE certification)

1249
1250 Name of DBE Firm: _____
1251 DBE contract amount: $_____ % of total contract: _____ %
1252 DBE Firm Address: _____
1253 _____
1254 DBE contact person: Name: _____
1255 Phone: _____
1256 The DBE is a: ☐ Prime Contractor ☐ Subcontractor ☐ Manufacturer ☐ Supplier
1257 Category of DBE: ☐ Native American ☐ Hispanic ☐ Asian Pacific ☐ Black
1258 ☐ Non minority Woman ☐ Other
1259 Work to be performed by DBE: _____
1260 DBE certification Agency: _____
1261 Expiration Date: _____
1262 (Please include a copy of the latest DBE certification)
1263
1264
1265
1266 Name of DBE Firm: _____
1267 DBE contract amount: $_____ % of total contract: _____ %
1268 DBE Firm Address: _____
1269 _____
1270 DBE contact person: Name: _____
1271 Phone: _____
1272 The DBE is a: ☐ Prime Contractor ☐ Subcontractor ☐ Manufacturer ☐ Supplier
1273 Category of DBE: ☐ Native American ☐ Hispanic ☐ Asian Pacific ☐ Black
1274 ☐ Non minority Woman ☐ Other
1275 Work to be performed by DBE: _____
1276 DBE certification Agency: _____
1277 Expiration Date: _____
1278 (Please include a copy of the latest DBE certification)
1279
1280

	$ Amount		$ DBE Credit Participation	% DBE
DBE Prime Contractor	$		$	%
DBE Subcontractor	$		$	%
DBE Supplier *	$	x 0.60	$	%
DBE Manufacturer	$		$	%
Total Amount DBE			$	%
DBE Goal			$	%

* Only 60% credit allowed for DBE suppliers

If the total DBE participation shown is less than the DBE goal required by the specifications, you must attach documentation of your good faith efforts to achieve the goal.

The bidder agrees to certify that the disadvantaged firm(s) engaged to provide materials or services in the completion of this project:

a. is a bona fide Disadvantaged Business Enterprise, and;

b. has executed a binding contract to provide specific materials or services for a specific dollar amount.

The bidder will provide written notice to County of Ventura, California indicating the Disadvantaged Business Enterprise(s) it intends to use in conjunction with this contract. This written notice is to be submitted with the bid proposal. Certification that the Disadvantaged Business Enterprise(s) has executed a binding contract with the bidder for materials or services should be provided to County of Ventura, California. Breach of this commitment constitutes a breach of the bidder's contract if awarded.

The undersigned hereby certifies that he or she has read the terms of this commitment and is authorized to bind the bidder to this commitment.

Date: _____

_____
Company

_____
State Registration No.

_____
Authorized Agent (print)

_____
Signature of Authorized Agent

EQUAL EMPLOYMENT OPPORTUNITY REPORT STATEMENT

Each bidder shall complete and sign the Equal Employment Opportunity Report Statement. A bid may be considered unresponsive and may be rejected, in the Owner's sole discretion, if the bidder fails to provide the fully executed statement or fails to furnish the required data. The bidder shall also, prior to award, furnish such other pertinent information regarding its own employment policies and practices as well as those of its proposed subcontractors as the Federal Aviation Administration (FAA), the Owner, or the Executive Vice Chairman of the President's Committee may require.

The bidder shall furnish similar statements executed by each of its first-tier and second-tier subcontractors and shall obtain similar compliance by each subcontractor, before awarding subcontracts. No subcontract shall be awarded to any non-complying subcontractor.

EQUAL EMPLOYMENT OPPORTUNITY REPORT STATEMENT

As Required in 41 CFR 60-1.7(b)

The bidder shall complete the following statements by checking the appropriate blanks. Failure to complete these blanks may be grounds for rejection of the bid:

1. The bidder has ___ has not ___ developed and has on file at each establishment affirmative action programs pursuant to 41 CFR 60-1.40 and 41 CFR 60-2.

2. The bidder has ___ has not ___ participated in any previous contract or subcontract subject to the equal opportunity clause prescribed by Executive order 11246, as amended.

3. The bidder has ___ has not ___ filed with the Joint Reporting Committee the annual compliance report on Standard Form 100 (EEO-1 Report).

4. The bidder does ___ does not ___ employ fifty or more employees.

Date: _____

_____
Company

_____
State Registration No.

_____
Authorized Agent (print)

_____
Signature of Authorized Agent

BUY AMERICA CERTIFICATION

(Title 49 U.S.C. Section 50101)

Project name: Reconstruction of Taxiway F
Airport name: Oxnard Airport
AIP number: 3-06-0179-043-2023

The Contractor certifies that its bid/offer is in compliance with 49 USC § 50101, BABA and other related Made in America Laws,2 U.S. statutes, guidance, and FAA policies, which provide that Federal funds may not be obligated unless all iron, steel and manufactured goods used in AIP funded projects are produced in the United States, unless the Federal Aviation Administration has issued a waiver for the product; the product is listed as an Excepted Article, Material Or Supply in Federal Acquisition Regulation subpart 25.108; or is included in the FAA Nationwide Buy American Waivers Issued list.

The bidder or offeror must complete and submit the certification of compliance with FAA's Buy American Preference, BABA and Made in America laws included herein with their bid or offer. **The Airport Sponsor/Owner will reject as nonresponsive any bid or offer that does not include a completed certification of compliance with FAA's Buy American Preference and BABA.**

The bidder or offeror certifies that all constructions materials, defined to mean an article, material, or supply other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives that are or consist primarily of: non-ferrous metals; plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables); glass (including optic glass); lumber; or drywall used in the project are manufactured in the U.S.

The bidder certifies it and all associated subcontractors will comply with the Buy American preferences established under Title 49 U.S.C. Section 50101 as follows:

U.S.C. Section 50101 - Buying goods produced in the United States

(a) Preference. - The Secretary of Transportation may obligate an amount that may be appropriated to carry out section 106(k), 44502(a)(2), or 44509, subchapter I of chapter 471 (except section 47127), or chapter 481 (except sections 48102(e), 48106, 48107, and 48110) of this title for a project only if steel and manufactured goods used in the project are produced in the United States.

(b) Waiver. - The Secretary may waive subsection (a) of this section if the Secretary finds that -

(1) Applying subsection (a) would be inconsistent with the public interest;

(2) The steel and goods produced in the United States are not produced in a sufficient and reasonably available amount or are not of a satisfactory quality;

(3) When procuring a facility or equipment under section 44502(a)(2) or 44509, subchapter I of chapter 471 (except section 47127), or chapter 481 (except sections 48102(e), 48106, 48107, and 48110) of this title -

A. The cost of components and subcomponents produced in the United States is more than 60% of the cost of all components of the facility or equipment; and

[1] Per Executive Order 14005 "Made in America Laws" means all statutes, regulations, rules, and Executive Orders relating to federal financial assistance awards or federal procurement, including those that refer to "Buy America" or "Buy American," that require, or provide a preference for, the purchase or acquisition of goods, products, or materials produced in the United States, including iron, steel, and manufactured products offered in the United States.

Exhibit 1

B. Final assembly of the facility or equipment has occurred in the United States; or

(4) Including domestic material will increase the cost of the overall project by more than 25%.

(c) Labor Costs. - In this section, labor costs involved in final assembly are not included in calculating the cost of components.

* * * * * * *

Sponsors desiring a Type 2 waiver should submit their waiver request, with justification, before issuing a solicitation for bids or a request for proposal for a project.

The Sponsor must submit a Type 2, Type 3, or Type 4 waiver request prior to executing the contract. The FAA will generally not consider waiver requests after execution of the contract except where extraordinary and extenuating circumstances exist.

The FAA Office of Airports maintains listings of projects and products that have received a waiver from the Buy American Preference requirements for project specific and nationwide use. Each of these conformance lists is available online at www.faa.gov/airports/aip/buy_american/. Products listed on the FAA Nationwide Buy American Conformance list do not require additional submittal of domestic content information. Nationwide waivers expire five years from the date issued, unless revoked earlier by the FAA.

Certification of Compliance with FAA Buy American Preference – Construction Projects
(Non-building construction projects, equipment acquisition projects)

As a matter of bid responsiveness, the bidder or offeror must complete, sign, date, and submit this certification statement with its proposal. The bidder or offeror must indicate how it intends to comply with 49 USC § 50101, BABA and other related Made in America Laws, U.S. statutes, guidance, and FAA policies, by selecting one of the following certification statements. These statements are mutually exclusive. Bidder must select one or the other (i.e., not both) by inserting a checkmark (✓) or the letter "X".

☐ Bidder or offeror hereby certifies that it will comply with 49 USC § 50101, BABA and other related U.S. statutes, guidance, and policies of the FAA by:

a) Only installing iron, steel and manufactured products produced in the United States;

b) Only installing construction materials defined as: an article, material, or supply – other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives that are or consist primarily of non-ferrous metals; plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables); glass (including optic glass); lumber or drywall that have been manufactured in the United States.

c) Installing manufactured products for which the Federal Aviation Administration (FAA) has issued a waiver as indicated by inclusion on the current FAA Nationwide Buy American Waivers Issued listing; or

d) Installing products listed as an Excepted Article, Material or Supply in Federal Acquisition Regulation Subpart 25.108.

By selecting this certification statement, the bidder or offeror agrees:

a) To provide to the Airport Sponsor or the FAA evidence that documents the source and origin of the iron, steel, and/or manufactured product.

b) To faithfully comply with providing U.S. domestic products.

c) To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.

d) Certify that all construction materials used in the project are manufactured in the U.S.

☐ The bidder or offeror hereby certifies it cannot comply with the 100 percent Buy American Preferences of 49 USC § 50101(a) but may qualify for a Type 3 or Type 4 waiver under 49 USC § 50101(b). By selecting this certification statement, the apparent bidder or offeror with the apparent low bid agrees:

a) To the submit to the Airport Sponsor or FAA within 15 calendar days of being selected as the responsive bidder, a formal waiver request and required documentation that supports the type of waiver being requested.

b) That failure to submit the required documentation within the specified timeframe is cause for a non-responsive determination that may result in rejection of the proposal.

c) To faithfully comply with providing U.S. domestic products at or above the approved U.S. domestic content percentage as approved by the FAA.

Exhibit 1

d) To furnish U.S. domestic product for any waiver request that the FAA rejects.
e) To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.

Required Documentation

Type 2 Waiver (Nonavailability) - The iron, steel, manufactured goods or construction materials or manufactured goods are not available in sufficient quantity or quality in the United States. The required documentation for the Nonavailability waiver is

a) Completed Content Percentage Worksheet and Final Assembly Questionnaire

b) Record of thorough market research, consideration where appropriate of qualifying alternate items, products, or materials including;

c) A description of the market research activities and methods used to identify domestically manufactured items capable of satisfying the requirement, including the timing of the research and conclusions reached on the availability of sources.

Type 3 Waiver – The cost of components and subcomponents produced in the United States is more than 60 percent of the cost of all components and subcomponents of the "facility/project." The required documentation for a Type 3 waiver is:

a) Completed Content Percentage Worksheet and Final Assembly Questionnaire including;
b) Listing of all manufactured products that are not comprised of 100 percent U.S. domestic content (excludes products listed on the FAA Nationwide Buy American Waivers Issued listing and products excluded by Federal Acquisition Regulation Subpart 25.108; products of unknown origin must be considered as non-domestic products in their entirety).
c) Cost of non-domestic components and subcomponents, excluding labor costs associated with final assembly and installation at project location.
d) Percentage of non-domestic component and subcomponent cost as compared to total "facility" component and subcomponent costs, excluding labor costs associated with final assembly and installation at project location.

Type 4 Waiver (Unreasonable Costs) - Applying this provision for iron, steel, manufactured goods or construction materials would increase the cost of the overall project by more than 25 percent. The required documentation for this waiver is:

a) A completed Content Percentage Worksheet and Final Assembly Questionnaire from
b) At minimum two comparable equal bids and/or offers;
c) Receipt or record that demonstrates that supplier scouting called for in Executive Order 14005, indicates that no domestic source exists for the project and/or component;
d) Completed waiver applications for each comparable bid and/or offer.

False Statements: Per 49 USC § 47126, this certification concerns a matter within the jurisdiction of the Federal Aviation Administration and the making of a false, fictitious, or fraudulent certification may render the maker subject to prosecution under Title 18, United States Code.

Exhibit 1

Date	Signature
Company Name	Title

BUY AMERICA WAIVER REQUEST

Title 49 U.S.C Section 50101 (b)

For Airfield Development Projects funded under the Airport Improvement Program

Instructions for Permissible Waivers

Nationwide Waivers: The FAA Office of Airports maintains listings of projects and products that have received a waiver from the Buy American Preference requirements for project specific and nationwide use. Each of these conformance lists is available online at www.faa.gov/airports/aip/buy_american/. Products listed on the FAA Nationwide Buy American Conformance list do not require additional submittal of domestic content information. Nationwide waivers expire five years from the date issued, unless revoked earlier by the FAA

Section 50101(b)(1) & (b)(2) Waivers:

The bidder may request a waiver based upon the best interests of the public, Section 50101 (b)(1) or request a waiver based upon insufficient supply of U.S. manufactured products, Section 50101 (b)(2), however approval is rare and waivers may only be approved by the FAA Office of Airports in Washington DC.

Section 50101(b)(3) Waiver:

The bidder may request a waiver if 60% or more of the components and subcomponents in the facility or equipment are produced in the United States and final assembly occurs in the U.S. Bidder is hereby advised that the Owner's approval with the bidder's waiver request is contingent upon FAA approval.

1. "Equipment" in Section 50101 shall mean the following:
   a) Individual type "L" items (Airfield Lighting Equipment) as listed in FAA Advisory Circular 150/5345-53.
   b) Individual bid items as established within FAA Advisory Circular 150/5370-10.
   c) A waiver request may only address one specific equipment item. Submit separate requests for each equipment item for which a waiver.
   d) Items listed under the Nationwide Waiver referenced above do not require further review.
2. The bidder must base the U.S. percentage upon the value that results from completing the following Content Percentage Calculation Worksheet. The Bidder must submit the content percentage calculation worksheet as an attachment to the waiver request.
3. Components/subcomponents are the material and products composing the "equipment".
4. The final assembly of the AIP-funded "equipment" must be within the USA *(Section 50101(b)(3)(B))*. Final assembly is the substantial transformation of the components and subcomponents into the end product. Final assembly location is the location where the equipment is assembled, not the project site itself.
5. All steel used in the "Equipment" must be produced in the United States.
6. The Buy American requirements apply to all tier contractors and subcontractors. All contractors/subcontractors are required to provide appropriate documentation that indicates origin of manufacturer and percentage of domestic made product.
7. The bidder is hereby advised there is no implied or expressed guarantee that a requested waiver will be issued by the Federal Aviation Administration (FAA). Less than 60% USA component/subcomponent proposed for this facility CANNOT be waived. Products made with foreign steel are not eligible for a waiver.

8. Products and material made in Canada or Mexico must be considered as foreign made products.
9. Preparation of a Content Percentage Calculation Worksheet is not necessary for equipment listed on the FAA national listing:

http://www.faa.gov/airports/aip/buy_american/

Bidder however shall submit a listing of any equipment it proposes to install on the project that is included on the Nationwide Buy American conformance list.

10. In any calculation of Buy American percentage, the labor for the final assembly is excluded. This is because the Buy American statute is based on the cost of materials and equipment, not Labor.

Instructions for Section 50101(b)(4) Waiver:

1. The bidder may request a waiver if application of Buy America preferences results in a 25% cost increase in the overall project. This waiver is rarely applicable. Consult the Owner before making this request.

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U.S. Department of Transportation
Federal Aviation Administration

OMB CONTROL NUMBER: 2120-0569
EXPIRATION DATE: 6/30/2023

– CONFIDENTIAL –

NOT SUBJECT TO DISCLOSURE UNDER EXEMPTION # 4 OF THE FREEDOM OF INFORMATION ACT

FAA Buy American Preference Construction Project Content Percentage Worksheet

Airport Sponsor:

Date:

Airport Worksite:

Worksite LOCID:

Project Description:

Total material cost:

U.S. Content: %

Non-U.S. Content: %

Project Material Structure List (Bill of Materials)

Line	Material Level (1 or 2)	Materials	Cost of U.S. Origin Materials	Cost of Non-U.S. Materials
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

For FAA Use Only

FAA Form 5100-143 (8/20)

Page 1 of 2

Line	Material Level (1 or 2)	Materials	Cost of U.S. Origin Materials	Cost of Non-U.S. Materials
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
		SUBTOTAL		

For FAA Use Only

TOTAL MATERIAL COST:

U.S. Content: %

Non-U.S. Content: %

The undersigned certifies that this information is true and accurate to the best of their knowledge.
A false certification represents a violation of 18 U.S.C § 1001 and 49 U.S.C § 47126.
Signatory has the burden of proof to establish compliance.

Signature:

Name:

Title:

Submit by Email

FAA Form 5100-143 (8/20)

Page 2 of 2

U.S. Department of Transportation
Federal Aviation Administration

OMB CONTROL NUMBER: 2120-0569
EXPIRATION DATE: 6/30/2023

– CONFIDENTIAL –

NOT SUBJECT TO DISCLOSURE UNDER EXEMPTION # 4 OF THE FREEDOM OF INFORMATION ACT

FAA Buy American Preference Construction Project Content Percentage Worksheet

Airport Sponsor:
Airport Worksite:
Worksite LOCID:
Project Description:

Date:

Total material cost:
U.S. Content: %
Non-U.S. Content: %

Project Material Structure List (Bill of Materials)

Line	Material Level (1 or 2)	Materials	Cost of U.S. Origin Materials	Cost of Non-U.S. Materials	For FAA Use Only
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

FAA Form 5100-143 (8/20)

Page 1 of 2

Line	Material Level (1 or 2)	Materials	Cost of U.S. Origin Materials	Cost of Non-U.S. Materials	For FAA Use Only
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
		SUBTOTAL			

TOTAL MATERIAL COST:
U.S. Content: %
Non-U.S. Content: %

The undersigned certifies that this information is true and accurate to the best of their knowledge.
A false certification represents a violation of 18 U.S.C § 1001 and 49 U.S.C § 47126.
Signatory has the burden of proof to establish compliance.

Signature: _____

Name:

Title:

FAA Form 5100-143 (8/20)

Page 2 of 2

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Exhibit 1

U.S. Department of Transportation
Federal Aviation Administration

OMB CONTROL NUMBER: 2120-0569
EXPIRATION DATE: 6/30/2023

-- CONFIDENTIAL –
NOT SUBJECT TO DISCLOSURE UNDER EXEMPTION # 4
OF THE FREEDOM OF INFORMATION ACT

Buy American Preferences – Final Assembly Questionnaire

To assist the Federal Aviation Administration (FAA) in making the determination of whether final assembly of the product occurs in the United States, please complete and submit this questionnaire when requesting a Buy American Waiver under 49 USC § 50101(b)(3)(A).

Company Name: Date:

FAA Eligible Item: FAA Item Number (if applicable):

Address of Final Assembly Location:

1. Provide a description of the assembly process occurring at the specified final location in the United States.
   a. Describe the final assembly process and its various operations.
   b. How long does the final assembly process take to complete?
2. Provide a description of the resources used to conduct the assembly of the product at the specified location in the United States.
   a. How many employees are involved in the final assembly process and what is the general skill level of those employees?
   b. What type of equipment is used during the final assembly process?
   c. What is a rough estimate of the associated cost to conduct final assembly of the product at the specified location in the United States?

The undersigned certifies that this information is true and accurate to the best of their knowledge. A false certification represents a violation of 18 U.S.C § 1001 and 49 U.S.C § 47126. Signatory has the burden of proof to establish compliance.

Signature: _____

Name:

Submit by Email

FAA Form 5100-137 (8/20) SUPERSEDES PREVIOUS EDITION

Exhibit 1

BUY AMERICA CONFORMANCE LISTING

Title 49 U.S.C Section 50101 (b)

For Airfield Development Projects funded under the Airport Improvement Program

- Preparation of a Component Cost Calculation Table is not necessary for equipment listed on the FAA national listing: http://www.faa.gov/airports/aip/buy_american/

- Bidder shall submit a listing of equipment it proposes to install on the project that is included on the current National Buy American conformance list.

Equipment Type	Name of Manufacturer	Product Number

Certification Signature:

Bidder hereby certifies that the above listed equipment, which we propose for installation on the subject project, is on the current National Buy America Conformance list as established at: http://www.faa.gov/airports/aip/buy_american/

I hereby certify the above information is accurate and complete.

_____ _____

Bidder's Firm Name *Date*

_____

Signature

NON-COLLUSION AFFIDAVIT

I, the person whose signature is affixed to the last page of this Proposal (Bid), submit this Proposal (Bid) to the Board of Supervisors and hereby declare:

1. That the Proposer or Bidder has read this Proposal (Bid) and has abided by and agrees to the conditions herein and has carefully examined the project Plans and read the Specifications and does hereby propose to furnish all materials and do all the work required to complete the work in accordance with the Plans and Specifications for the Unit Prices or Lump Sum amounts named in the Schedule of Work and Prices.

2. That the Addenda indicated on the last page of this Proposal (Bid) are acknowledged.

3. That the Proposer or Bidder, as Principal, acknowledges himself as being bound by the attached Bid Bond or other acceptable Bid Guarantee.

4. That the Proposal (Bid) is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation; that the Proposal (Bid) is genuine and not collusive or sham; that the Proposer or Bidder has not directly or indirectly colluded, conspired, connived, or agreed with any Proposer or Bidder or anyone else to put in a sham Proposal (Bid), or that anyone shall refrain from bidding; that the Bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the Proposal (Bid) price of the Proposer or Bidder or any other Proposer or Bidder, or to fix any overhead, profit, or cost element of the Proposal (Bid) price, or of that of any other proposer or Bidder, or to secure any advantage against the public body awarding the Contract of anyone interested in the proposed Contract; that all statements contained in the Proposal (Bid) are true; and, further, that the Proposer or Bidder has not, directly or indirectly, submitted a Proposal (bid) price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid, and will not pay, any fee to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham Proposal (Bid).

Date	Signature
Company Name	Title

PUBLIC CONTRACT CODE SECTION 10285.1 STATEMENT

In accordance with the Public Contract Code Section 10285.1 (Chapter 376, Stats. 1985), the Proposer or Bidder hereby declares under penalty of perjury under the laws of the State of California that the

Proposer or Bidder has _____; has not _____ been convicted within the preceding three years of any offenses referred to in that Section including any charge of fraud, bribery, collusion, conspiracy, or any other act in violation of an State or Federal Antitrust Law in connection with the bidding upon, award of, or performance of, any public works contract as defined in Public Contract Code Section 1101, with any public entity, as defined in Public Contract Code Section 1100, including the Regents of the University of California or the Trustees of the California State University. The term "Proposer" or "Bidder" is understood to include any partner, member, officer, director, responsible managing officer, or responsible managing employee thereof, as referred to in Section 10285.1.

Note: The Proposer or Bidder must place a check mark after "has" or "has not" in one of the blank spaces provided. The above Statement is part of the Proposal (Bid). Signing this Proposal (Bid) on the signature portion thereof shall also constitute signature of this Statement.

Proposers or Bidders are cautioned that making a false certification may subject the certifier to criminal prosecution.

PUBLIC CONTRACT CODE SECTION 10162 QUESTIONNARE

In accordance with Public Contract Code Section 10162, the Proposer or Bidder shall complete, under penalty of perjury, the following questionnaire:

Has the Proposer or Bidder, any officer of the Proposer or Bidder, or any employee of the Proposer or Bidder who has a proprietary interest in the Proposer or Bidder, ever been disqualified, removed, or otherwise prevented from Proposing (Bidding) on, or completing a federal, state, or local government project because of a violation of law or a safety regulation?

Yes ____ : No _____ If the answer is yes, explain the circumstances in the following space
(Attach additional sheets as necessary)

PUBLIC CONTRACT SECTION 10232 STATEMENT

In accordance with the Public Contract Code Section 10232, the Contractor, hereby states under penalty of perjury, that no more than one final un-appealable finding of contempt of court by a Federal County has been issued against the Contractor within the immediately preceding two-year period because of the Contractor's failure to comply with an order of a Federal Court which orders the Contractor to comply with an order of the National Labor Relations Board.

Note: The above Statement and Questionnaire are part of the Proposal (Bid). Signing this Proposal (Bid) on the signature portion thereof shall also constitute signature of this Statement and Questionnaire.

Proposers or Bidders are cautioned that making a false certification may subject the certifier to criminal prosecution.

STATE OF CALIFORNIA

DRUG-FREE WORKPLACE CERTIFICATION

STD. 21 (Rev. 10/2019)

CERTIFICATION

I, the official named below, hereby swear that I am duly authorized legally to bind the contractor or grant recipient to the certification described below. I am fully aware that this certification, executed on the date below, is made under penalty of perjury under the laws of the State of California.

CONTRACTOR/BIDDER FIRM NAME	FEDERAL ID NUMBER
BY *(Authorized Signature)*	DATE EXECUTED
PRINTED NAME AND TITLE OF PERSON SIGNING	TELEPHONE NUMBER *(Include Area Code)* ( )
TITLE	
CONTRACTOR/BIDDER FIRM'S MAILING ADDRESS	

The contractor or grant recipient named above hereby certifies compliance with Government Code Section 8355 in matters relating to providing a drug-free workplace. The above named contractor or grant recipient will:

1. Publish a statement notifying employees that unlawful manufacture, distribution, dispensation, possession, or use of a controlled substance is prohibited and specifying actions to be taken against employees for violations, as required by Government Code Section 8355(a).

2. Establish a Drug-Free Awareness Program as required by Government Code Section 8355(b), to inform employees about all of the following:

   (a) The dangers of drug abuse in the workplace,

   (b) The person's or organization's policy of maintaining a drug-free workplace,

   (c) Any available counseling, rehabilitation and employee assistance programs, and

   (d) Penalties that may be imposed upon employees for drug abuse violations.

3. Provide as required by Government Code Section 8355(c), that every employee who works on the proposed contract or grant:

   (a) Will receive a copy of the company's drug-free workplace policy statement, and

   (b) Will agree to abide by the terms of the company's statement as a condition of employment on the contract or grant.

4. At the election of the contractor or grantee, from and after the "Date Executed" and until _____ (DATE) (NOT TO EXCEED 36 MONTHS), the state will regard this certificate as valid for all contracts or grants entered into between the contractor or grantee and this state agency without requiring the contractor or grantee to provide a new and individual certificate for each contract or grant. If the contractor or grantee elects to fill in the blank date, then the terms and conditions of this certificate shall have the same force, meaning, effect and enforceability as if a certificate were separately, specifically, and individually provided for each contract or grant between the contractor or grantee and this state agency.

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CERTIFICATION OF OFFEROR/BIDDER REGARDING TAX DELINQUENCY AND FELONY CONVICTIONS

The applicant must complete the following two certification statements. The applicant must indicate its current status as it relates to tax delinquency and felony conviction by inserting a checkmark (✓) in the space following the applicable response. The applicant agrees that, if awarded a contract resulting from this solicitation, it will incorporate this provision for certification in all lower tier subcontracts.

Certifications

1) The applicant represents that it is ( ) is not ( ) a corporation that has any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability.

2) The applicant represents that it is ( ) is not ( ) is not a corporation that was convicted of a criminal violation under any Federal law within the preceding 24 months.

Note

If an applicant responds in the affirmative to either of the above representations, the applicant is ineligible to receive an award unless the sponsor has received notification from the agency suspension and debarment official (SDO) that the SDO has considered suspension or debarment and determined that further action is not required to protect the Government's interests. The applicant therefore must provide information to the owner about its tax liability or conviction to the Owner, who will then notify the FAA Airports District Office, which will then notify the agency's SDO to facilitate completion of the required considerations before award decisions are made.

Term Definitions

Felony conviction: Felony conviction means a conviction within the preceding twenty-four (24) months of a felony criminal violation under any Federal law and includes conviction of an offense defined in a section of the U.S. code that specifically classifies the offense as a felony and conviction of an offense that is classified as a felony under 18 U.S.C. § 3559.

Tax Delinquency: A tax delinquency is any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted, or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability.

Date	Signature
Company Name	Title

CONTRACTOR'S STATEMENT OF QUALIFICATIONS

All questions must be answered and the data given must be clear and comprehensive. This statement must be notarized. If necessary, questions may be answered on separate attached sheets. The Bidder may submit any additional information he or she desires.

1. Name of Bidder and office where project will be administered: _____

2. Provide evidence of financial responsibility consisting of a confidential statement or report of Contractor's financial resources and liabilities as of the last calendar year or last fiscal year. Such statement or report shall be certified by a public accountant. Unless otherwise specified, a bidder may submit evidence that he or she is prequalified with the State Highway Division and is on the current "bidder's list" of the state in which the proposed work is located. Such evidence of State Highway Division prequalification may be submitted as evidence of financial responsibility in lieu of the certified statements or reports specified above.

3. List two or more construction projects similar in size (at least $10 million total construction cost) and scope to this project that your company has completed within the past 3 years. Provide the following:

a. Project Name: _____
b. Owner Name: _____
c. Owner Contact: _____
d. Beginning Contract Amount: _____
e. Total Cost of Change Orders: _____
f. Project Duration:_____
g. Total Time Extensions: _____
h. Project Superintendent: _____

a. Project Name: _____
b. Owner Name: _____
c. Owner Contact: _____
d. Beginning Contract Amount: _____
e. Total Cost of Change Orders: _____
f. Project Duration:_____
g. Total Time Extensions: _____
h. Project Superintendent: _____

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BID PROPOSAL SUMMARY

Bidder Name: _____

SCHEDULE I TOTAL $ _____

TOTAL ALL SCHEDULES $ _____

Bidder has examined the proposed site and is familiar with all site conditions.

_____
Signature

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SCHEDULE I						
Item No.	**Description**		**Units**	**Estimated Quantity**	**Unit Price**	**Total**
C-100a	Contractor Quality Control Program (CQCP)	at the unit price of: _____ dollars and _____ cents.	LS	1	$	$
C-105a	Mobilization (10% Maximum)	at the unit price of: _____ dollars and _____ cents.	LS	1	$	$
SP-100a	Airfield Safety and Traffic Control	at the unit price of: _____ dollars and _____ cents.	LS	1	$	$
SP-100b	Construction Staking and Survey Layout	at the unit price of: _____ dollars and _____ cents.	LS	1	$	$
SP-100c	Airport Access and Haul Route Repair	at the unit price of: _____ dollars and _____ cents.	SY	4,500	$	$
SP-100d	In-Place Drying Techniques	at the unit price of: _____ dollars and _____ cents.	SY	6,400	$	$
SP-100e	Subgrade Stabilization, Excavation Below Subgrade	at the unit price of: _____ dollars and _____ cents.	CY	1,300	$	$
SP-100f	Multi-Axial Geogrid	at the unit price of: _____ dollars and _____ cents.	SY	2,000	$	$
SP-100g	Underground Utility Investigation and Potholing	at the unit price of: _____ dollars and _____ cents.	HR	24	$	$
SP-100h	Install Checkpoint Marker	at the unit price of: _____ dollars and _____ cents.	LS	1	$	$
SP-100i	Excess Unclassified Excavation Stockpile Management	at the unit price of: _____ dollars and _____ cents.	LS	1	$	$
SP-102a	Compliance with Pollution, Erosion, and Siltation Control	at the unit price of: _____ dollars and _____ cents.	LS	1	$	$
SP-126a	Demolish Conduit, Cable, and Counterpoise	at the unit price of: _____ dollars and _____ cents.	LF	6,500	$	$
SP-126b	Demolish Concrete Encased Conduit, Cable, and Counterpoise	at the unit price of: _____ dollars and _____ cents.	LF	7,200	$	$
SP-126c	Remove Existing Cable and Counterpoise	at the unit price of: _____ dollars and _____ cents.	LF	400	$	$
SP-126d	Demolish Electrical Pullbox	at the unit price of: _____ dollars and _____ cents.	EA	7	$	$
SP-126e	Demolish FAA Pullbox	at the unit price of: _____ dollars and _____ cents.	EA	5	$	$
SP-126f	Demolish Airfield Sign and Pad	at the unit price of: _____ dollars and _____ cents.	EA	9	$	$
SP-126g	Demolish Elevated Taxiway Edge Light and Can. Salvage Existing Fixture	at the unit price of: _____ dollars and _____ cents.	EA	69	$	$
SP-126h	Demolish In-pavement Taxiway Edge Light and Can. Salvage Existing Fixture	at the unit price of: _____ dollars and _____ cents.	EA	71	$	$
SP-126i	Demolish Abandoned Waterline, if Encountered	at the unit price of: _____ dollars and _____ cents.	LF	400	$	$
SP-126j	Demolish Concrete Valley Gutter	at the unit price of: _____ dollars and _____ cents.	LF	130	$	$
P-101a	Demolish Asphalt Pavement	at the unit price of: _____ dollars and _____ cents.	SY	90,000	$	$
P-101b	Asphalt Crack Repair (under 1.5" width)	at the unit price of: _____ dollars and _____ cents.	LF	2,100	$	$
P-101c	Asphalt Crack Repair (over 1.5" width)	at the unit price of: _____ dollars and _____ cents.	SF	200	$	$
P-101d	Cold Mill, Variable Depth (2 inches maximum)	at the unit price of: _____ dollars and _____ cents.	SY	3,500	$	$

SCHEDULE I						
Item No.	**Description**		**Units**	**Estimated Quantity**	**Unit Price**	**Total**
P-101e	Removal of Existing Underdrain Pipe, Complete	at the unit price of: _____ dollars and _____ cents.	LF	1,120	$	$
P-101f	Removal of Underdrain Cleanout, Complete	at the unit price of: _____ dollars and _____ cents.	EA	12	$	$
P-101g	Removal of Underdrain Inspection Pit, Complete	at the unit price of: _____ dollars and _____ cents.	EA	3	$	$
P-152a	Unclassified Excavation and Haul-Off	at the unit price of: _____ dollars and _____ cents.	CY	15,030	$	$
P-152b	Embankment in Place	at the unit price of: _____ dollars and _____ cents.	CY	1,085	$	$
P-152c	Subgrade Preparation	at the unit price of: _____ dollars and _____ cents.	SY	140	$	$
P-152d	Unclassified Excavation and Stockpile Onsite	at the unit price of: _____ dollars and _____ cents.	CY	7,510	$	$
P-155a	Lime Treated Subgrade, 16-Inch Depth	at the unit price of: _____ dollars and _____ cents.	SY	63,500	$	$
P-155b	Lime	at the unit price of: _____ dollars and _____ cents.	TON	1,500	$	$
P-156a	Cement Treated Subgrade, 16-Inch Depth	at the unit price of: _____ dollars and _____ cents.	SY	63,500	$	$
P-156b	Cement	at the unit price of: _____ dollars and _____ cents.	TON	1,250	$	$
P-209a	Crushed Aggregate Base Course	at the unit price of: _____ dollars and _____ cents.	CY	11,100	$	$
P-401a	Asphalt Surface Course (PG 70-10)	at the unit price of: _____ dollars and _____ cents.	TON	15,100	$	$
P-620a	Surface Preparation (Obliteration)	at the unit price of: _____ dollars and _____ cents.	SF	5,450	$	$
P-620b	Marking, 2 Coats with Beads (All Colors)	at the unit price of: _____ dollars and _____ cents.	SF	22,000	$	$
P-620c	Marking, Single Coat with No Beads (All Colors)	at the unit price of: _____ dollars and _____ cents.	SF	58,300	$	$
P-620d	Marking, Single Coat with Beads (All Colors)	at the unit price of: _____ dollars and _____ cents.	SF	12,000	$	$
P-620e	12-Foot Single Designation Surface Painted Holding Position Signs	at the unit price of: _____ dollars and _____ cents.	EA	4	$	$
P-620f	9-Foot Double Designation Surface Painted Holding Position Signs	at the unit price of: _____ dollars and _____ cents.	EA	3	$	$
P-620g	12-Foot Double Designation Surface Painted Holding Position Signs	at the unit price of: _____ dollars and _____ cents.	EA	4	$	$
P-621a	Grooving	at the unit price of: _____ dollars and _____ cents.	SY	270	$	$
D-701a	18-inch RCP, Class IV, Complete	at the unit price of: _____ dollars and _____ cents.	LF	570	$	$
D-705a	Underdrain Pipe, 6-Inch	at the unit price of: _____ dollars and _____ cents.	LF	9,300	$	$
D-705b	Underdrain Pipe Cleanout	at the unit price of: _____ dollars and _____ cents.	EA	38	$	$
D-751a	Storm Manhole	at the unit price of: _____ dollars and _____ cents.	EA	14	$	$
D-751b	Storm Inlet	at the unit price of: _____ dollars and _____ cents.	EA	2	$	$
D-751c	Connect to Existing Manhole/Inlet/Cleanout/Underdrain	at the unit price of: _____ dollars and _____ cents.	EA	10	$	$

SCHEDULE I						
Item No.	**Description**		**Units**	**Estimated Quantity**	**Unit Price**	**Total**
D-751d	Adjust Existing Inlet to Grade	at the unit price of: _____ dollars and _____ cents.	EA	1	$	$
D-754a	Construct Concrete Valley Gutter and Apron	at the unit price of: _____ dollars and _____ cents.	LF	130	$	$
T-901a	Seeding	at the unit price of: _____ dollars and _____ cents.	AC	12	$	$
T-905a	Topsoil (Imported)	at the unit price of: _____ dollars and _____ cents.	CY	4,650	$	$
L-108a	Install #8 AWG, L-824C, 5000V, Wire	at the unit price of: _____ dollars and _____ cents.	LF	20,500	$	$
L-108b	Install #6 AWG, Bare Copper Counterpoise Including Ground Rods and Terminations	at the unit price of: _____ dollars and _____ cents.	LF	14,250	$	$
L-110a	Install 1-2" SCH. 40 PVC Conduit, Direct Earth Buried (DEB)	at the unit price of: _____ dollars and _____ cents.	LF	7,400	$	$
L-110b	Install 1-2" SCH. 40 PVC Conduit, Concrete Encased (CE)	at the unit price of: _____ dollars and _____ cents.	LF	6,600	$	$
L-110c	Install 5-2" SCH. 40 PVC Conduit, Concrete Encased (CE)	at the unit price of: _____ dollars and _____ cents.	LF	100	$	$
L-110d	Concrete Encase Existing FAA Line Under Proposed Pavement	at the unit price of: _____ dollars and _____ cents.	LF	400	$	$
L-115a	Install Electrical Pullbox, 4'x4', Aircraft Rated	at the unit price of: _____ dollars and _____ cents.	EA	4	$	$
L-115b	Install L-867B Junction Box, Complete	at the unit price of: _____ dollars and _____ cents.	EA	2	$	$
L-125a	Install LED L-861T Taxiway Edge Light, Complete	at the unit price of: _____ dollars and _____ cents.	EA	70	$	$
L-125b	Install In-Pavement LED L-852T Taxiway Edge Light, Complete	at the unit price of: _____ dollars and _____ cents.	EA	66	$	$
L-125c	Install LED L-858 Guidance Sign, Size 1, 2 Module, Complete	at the unit price of: _____ dollars and _____ cents.	EA	1	$	$
L-125d	Reinstall LED L-858 Guidance Sign, Size 1, 3 Module on New Foundation, Complete	at the unit price of: _____ dollars and _____ cents.	EA	8	$	$
CVSS DOA 9-4	Execution of Release on Contract	at the unit price of: _____ dollars and _____ cents.	LS	1	$	$

SCHEDULE I TOTAL $ _____

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PART 1 - GENERAL CONTRACT PROVISIONS

SECTION 10
DEFINITION OF TERMS

When the following terms are used in these specifications, in the contract, or in any documents or other instruments pertaining to construction where these specifications govern, the intent and meaning shall be defined as follows:

Paragraph Number	Term	Definition
10-01	**AASHTO**	The American Association of State Highway and Transportation Officials.
10-02	**Access Road**	The right-of-way, the roadway and all improvements constructed thereon connecting the airport to a public roadway.
10-03	**Advertisement**	A public announcement, as required by local law, inviting bids for work to be performed and materials to be furnished.
10-04	**Airport**	Airport means an area of land or water which is used or intended to be used for the landing and takeoff of aircraft; an appurtenant area used or intended to be used for airport buildings or other airport facilities or rights of way; airport buildings and facilities located in any of these areas, and a heliport.
10-05	**Airport Improvement Program (AIP)**	A grant-in-aid program, administered by the Federal Aviation Administration (FAA).
10-06	**Air Operations Area (AOA)**	The term air operations area (AOA) shall mean any area of the airport used or intended to be used for the landing, takeoff, or surface maneuvering of aircraft. An air operation area shall include such paved or unpaved areas that are used or intended to be used for the unobstructed movement of aircraft in addition to its associated runway, taxiway, or apron.
10-07	**Apron**	Area where aircraft are parked, unloaded or loaded, fueled and/or serviced.
10-08	**ASTM International (ASTM)**	Formerly known as the American Society for Testing and Materials (ASTM).
10-09	**Award**	The Owner's notice to the successful bidder of the acceptance of the submitted bid.
10-10	**Bidder (Proposer)**	Any individual, partnership, firm, or corporation, acting directly or through a duly authorized representative, who submits a proposal for the work contemplated.
10-11	**Building Area**	An area on the airport to be used, considered, or intended to be used for airport buildings or other airport facilities or rights-of-way together with all airport buildings and facilities located thereon.
10-12	**Calendar Day**	Every day shown on the calendar.

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Paragraph Number	Term	Definition
10-13	**Certificate of Analysis (COA)**	The COA is the manufacturer's Certificate of Compliance (COC) including all applicable test results required by the specifications.
10-14	**Certificate of Compliance (COC)**	The manufacturer's certification stating that materials or assemblies furnished fully comply with the requirements of the contract. The certificate shall be signed by the manufacturer's authorized representative.
10-15	**Change Order**	A written order to the Contractor covering changes in the plans, specifications, or proposal quantities and establishing the basis of payment and contract time adjustment, if any, for work within the scope of the contract and necessary to complete the project.
10-16	**Contract**	A written agreement between the Owner and the Contractor that establishes the obligations of the parties including but not limited to performance of work, furnishing of labor, equipment and materials and the basis of payment. The awarded contract includes but may not be limited to: Advertisement, Contract form, Proposal, Performance bond, payment bond, General provisions, certifications and representations, Technical Specifications, Plans, Supplemental Provisions, standards incorporated by reference and issued addenda.
10-17	**Contract Item (Pay Item)**	A specific unit of work for which a price is provided in the contract.
10-18	**Contract Time**	The number of calendar days or working days, stated in the proposal, allowed for completion of the contract, including authorized time extensions. If a calendar date of completion is stated in the proposal, in lieu of a number of calendar or working days, the contract shall be completed by that date.
10-19	**Contractor**	The individual, partnership, firm, or corporation primarily liable for the acceptable performance of the work contracted and for the payment of all legal debts pertaining to the work who acts directly or through lawful agents or employees to complete the contract work.
10-20	**Contractors Quality Control (QC) Facilities**	The Contractor's QC facilities in accordance with the Contractor Quality Control Program (CQCP).
10-21	**Contractor Quality Control Program (CQCP)**	Details the methods and procedures that will be taken to assure that all materials and completed construction required by the contract conform to contract plans, technical specifications and other requirements, whether manufactured by the Contractor, or procured from subcontractors or vendors.

Paragraph Number	Term	Definition
10-22	**Control Strip**	A demonstration by the Contractor that the materials, equipment, and construction processes results in a product meeting the requirements of the specification.
10-23	**Construction Safety and Phasing Plan (CSPP)**	The overall plan for safety and phasing of a construction project developed by the airport operator, or developed by the airport operator's consultant and approved by the airport operator. It is included in the invitation for bids and becomes part of the project specifications.
10-24	**Drainage System**	The system of pipes, ditches, and structures by which surface or subsurface waters are collected and conducted from the airport area.
10-25	**Engineer**	The individual, partnership, firm, or corporation duly authorized by the Owner to be responsible for engineering, inspection, and/or observation of the contract work and acting directly or through an authorized representative.
10-26	**Equipment**	All machinery, together with the necessary supplies for upkeep and maintenance; and all tools and apparatus necessary for the proper construction and acceptable completion of the work.
10-27	**Extra Work**	An item of work not provided for in the awarded contract as previously modified by change order or supplemental agreement, but which is found by the Owner's Engineer or Resident Project Representative (RPR) to be necessary to complete the work within the intended scope of the contract as previously modified.
10-28	**FAA**	The Federal Aviation Administration. When used to designate a person, FAA shall mean the Administrator or their duly authorized representative.
10-29	**Federal Specifications**	The federal specifications and standards, commercial item descriptions, and supplements, amendments, and indices prepared and issued by the General Services Administration.
10-30	**Force Account**	**a.** Contract Force Account - A method of payment that addresses extra work performed by the Contractor on a time and material basis. **b.** Owner Force Account - Work performed for the project by the Owner's employees.
10-31	**Intention of Terms**	Whenever, in these specifications or on the plans, the words "directed," "required," "permitted," "ordered," "designated," "prescribed," or words of like import are used, it shall be understood that the direction, requirement, permission, order, designation, or prescription of the Engineer and/or Resident Project Representative (RPR) is intended; and similarly, the

Paragraph Number	Term	Definition
		words "approved," "acceptable," "satisfactory," or words of like import, shall mean approved by, or acceptable to, or satisfactory to the Engineer and/or RPR, subject in each case to the final determination of the Owner. Any reference to a specific requirement of a numbered paragraph of the contract specifications or a cited standard shall be interpreted to include all general requirements of the entire section, specification item, or cited standard that may be pertinent to such specific reference.
10-32	**Lighting**	A system of fixtures providing or controlling the light sources used on or near the airport or within the airport buildings. The field lighting includes all luminous signals, markers, floodlights, and illuminating devices used on or near the airport or to aid in the operation of aircraft landing at, taking off from, or taxiing on the airport surface.
10-33	**Major and Minor Contract Items**	A major contract item shall be any item that is listed in the proposal, the total cost of which is equal to or greater than 20% of the total amount of the award contract. All other items shall be considered minor contract items.
10-34	**Materials**	Any substance specified for use in the construction of the contract work.
10-35	**Modification of Standards (MOS)**	Any deviation from standard specifications applicable to material and construction methods in accordance with FAA Order 5300.1.
10-36	**Notice to Proceed (NTP)**	A written notice to the Contractor to begin the actual contract work on a previously agreed to date. If applicable, the Notice to Proceed shall state the date on which the contract time begins.
10-37	**Owner**	The term "Owner" shall mean the party of the first part or the contracting agency signatory to the contract. Where the term "Owner" is capitalized in this document, it shall mean airport Sponsor only. The Owner for this project is County of Ventura, California.
10-38	**Passenger Facility Charge (PFC)**	Per 14 Code of Federal Regulations (CFR) Part 158 and 49 United States Code (USC) § 40117, a PFC is a charge imposed by a public agency on passengers enplaned at a commercial service airport it controls.
10-39	**Pavement Structure**	The combined surface course, base course(s), and subbase course(s), if any, considered as a single unit.
10-40	**Payment bond**	The approved form of security furnished by the Contractor and their own surety as a guaranty that the Contractor will pay in full all bills and accounts for materials and labor used in the construction of the work.

Paragraph Number	Term	Definition
10-41	**Performance bond**	The approved form of security furnished by the Contractor and their own surety as a guaranty that the Contractor will complete the work in accordance with the terms of the contract.
10-42	**Plans**	The official drawings or exact reproductions which show the location, character, dimensions and details of the airport and the work to be done and which are to be considered as a part of the contract, supplementary to the specifications. Plans may also be referred to as 'contract drawings.'
10-43	**Project**	The agreed scope of work for accomplishing specific airport development with respect to a particular airport.
10-44	**Proposal (Bid)**	The written offer of the bidder (when submitted on the approved proposal form) to perform the contemplated work and furnish the necessary materials in accordance with the provisions of the plans and specifications.
10-45	**Proposal guaranty**	The security furnished with a proposal to guarantee that the bidder will enter into a contract if their own proposal is accepted by the Owner.
10-46	**Quality Assurance (QA)**	Owner's responsibility to assure that construction work completed complies with specifications for payment.
10-47	**Quality Control (QC)**	Contractor's responsibility to control material(s) and construction processes to complete construction in accordance with project specifications.
10-48	**Quality Assurance (QA) Inspector**	An authorized representative of the Engineer and/or Resident Project Representative (RPR) assigned to make all necessary inspections, observations, tests, and/or observation of tests of the work performed or being performed, or of the materials furnished or being furnished by the Contractor.
10-49	**Quality Assurance (QA) Laboratory**	The official quality assurance testing laboratories of the Owner or such other laboratories as may be designated by the Engineer or RPR. May also be referred to as Engineer's, Owner's, or QA Laboratory.
10-50	**Resident Project Representative (RPR)**	The individual, partnership, firm, or corporation duly authorized by the Owner to be responsible for all necessary inspections, observations, tests, and/or observations of tests of the contract work performed or being performed, or of the materials furnished or being furnished by the Contractor, and acting directly or through an authorized representative.
10-51	**Runway**	The area on the airport prepared for the landing and takeoff of aircraft.
10-52	**Runway Safety Area (RSA)**	A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to aircraft. See the construction safety and phasing plan (CSPP) for limits of the RSA.

Paragraph Number	Term	Definition
10-53	**Safety Plan Compliance Document (SPCD)**	Details how the Contractor will comply with the CSPP.
10-54	**Specifications**	A part of the contract containing the written directions and requirements for completing the contract work. Standards for specifying materials or testing which are cited in the contract specifications by reference shall have the same force and effect as if included in the contract physically.
10-55	**Sponsor**	A Sponsor is defined in 49 USC § 47102(24) as a public agency that submits to the FAA for an AIP grant; or a private Owner of a public-use airport that submits to the FAA an application for an AIP grant for the airport.
10-56	**Structures**	Airport facilities such as bridges; culverts; catch basins, inlets, retaining walls, cribbing; storm and sanitary sewer lines; water lines; underdrains; electrical ducts, manholes, handholes, lighting fixtures and bases; transformers; navigational aids; buildings; vaults; and, other manmade features of the airport that may be encountered in the work and not otherwise classified herein.
10-57	**Subgrade**	The soil that forms the pavement foundation.
10-58	**Superintendent**	The Contractor's executive representative who is present on the work during progress, authorized to receive and fulfill instructions from the RPR, and who shall supervise and direct the construction.
10-59	**Supplemental Agreement**	A written agreement between the Contractor and the Owner that establishes the basis of payment and contract time adjustment, if any, for the work affected by the supplemental agreement. A supplemental agreement is required if: (1) in scope work would increase or decrease the total amount of the awarded contract by more than 25%: (2) in scope work would increase or decrease the total of any major contract item by more than 25%; (3) work that is not within the scope of the originally awarded contract; or (4) adding or deleting of a major contract item.
10-60	**Surety**	The corporation, partnership, or individual, other than the Contractor, executing payment or performance bonds that are furnished to the Owner by the Contractor.
10-61	**Taxilane**	A taxiway designed for low speed movement of aircraft between aircraft parking areas and terminal areas.
10-62	**Taxiway**	The portion of the air operations area of an airport that has been designated by competent airport authority for movement of aircraft to and from the airport's runways, aircraft parking areas, and terminal areas.
10-63	**Taxiway/Taxilane Safety Area (TSA)**	A defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an aircraft. See

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Paragraph Number	Term	Definition
		the construction safety and phasing plan (CSPP) for limits of the TSA.
10-64	**Work**	The furnishing of all labor, materials, tools, equipment, and incidentals necessary or convenient to the Contractor's performance of all duties and obligations imposed by the contract, plans, and specifications.
10-65	**Working day**	A working day shall be any day other than a legal holiday, Saturday, or Sunday on which the normal working forces of the Contractor may proceed with regular work for at least six (6) hours toward completion of the contract. When work is suspended for causes beyond the Contractor's control, it will not be counted as a working day. Saturdays, Sundays and holidays on which the Contractor's forces engage in regular work will be considered as working days.

END OF SECTION 10

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SECTION 20
PROPOSAL REQUIREMENTS AND CONDITIONS

20-01 ADVERTISEMENT (Notice to Bidders). The advertisement can be found on Division 1-1. This project has been advertised on the following dates:

Ventura County Star: May 25, 2023 and June 8, 2023

20-02 QUALIFICATION OF BIDDERS. Each bidder shall submit evidence of competency and evidence of financial responsibility to perform the work to the Owner at the time of bid opening.

Evidence of competency, unless otherwise specified, shall consist of statements covering the bidder's past experience on similar work, and a list of equipment and a list of key personnel that would be available for the work.

Each bidder shall furnish the Owner satisfactory evidence of their financial responsibility. Evidence of financial responsibility, unless otherwise specified, shall consist of a confidential statement or report of the bidder's financial resources and liabilities as of the last calendar year or the bidder's last fiscal year. Such statements or reports shall be certified by a public accountant. At the time of submitting such financial statements or reports, the bidder shall further certify whether their financial responsibility is approximately the same as stated or reported by the public accountant. If the bidder's financial responsibility has changed, the bidder shall qualify the public accountant's statement or report to reflect the bidder's true financial condition at the time such qualified statement or report is submitted to the Owner.
Unless otherwise specified, a bidder may submit evidence that they are prequalified with the State Highway Division and are on the current "bidder's list" of the state in which the proposed work is located. Evidence of State Highway Division prequalification may be submitted as evidence of financial responsibility in lieu of the certified statements or reports specified above.

20-03 CONTENTS OF PROPOSAL FORMS. The Owner's proposal forms state the location and description of the proposed construction; the place, date, and time of opening of the proposals; and the estimated quantities of the various items of work to be performed and materials to be furnished for which unit bid prices are asked. The proposal form states the time in which the work must be completed, and the amount of the proposal guaranty that must accompany the proposal. The Owner will accept only those Proposals properly executed on physical forms or electronic forms provided by the Owner. Bidder actions that may cause the Owner to deem a proposal irregular are given in paragraph 20-09, *IRREGULAR PROPOSALS*.

Mobilization is limited to 10 percent of the total project cost.

A pre-bid conference is non-mandatory on this project to discuss as a minimum, the following items: material requirements; submittals; Quality Control/Quality Assurance requirements; the construction safety and phasing plan including airport access and staging areas; and unique airfield paving construction requirements. The time, date, and place of the meeting are provided in the Instructions to Bidder.

20-04 ISSUANCE OF PROPOSAL FORMS. The Owner reserves the right to refuse to issue a proposal form to a prospective bidder if the bidder is in default for any of the following reasons:

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a. Failure to comply with any prequalification regulations of the Owner, if such regulations are cited, or otherwise included, in the proposal as a requirement for bidding.

b. Failure to pay, or satisfactorily settle, all bills due for labor and materials on former contracts in force with the Owner at the time the Owner issues the proposal to a prospective bidder.

c. Documented record of Contractor default under previous contracts with the Owner.

d. Documented record of unsatisfactory work on previous contracts with the Owner.

20-05 INTERPRETATION OF ESTIMATED PROPOSAL QUANTITIES. An estimate of quantities of work to be done and materials to be furnished under these specifications is given in the proposal. It is the result of careful calculations and is believed to be correct. It is given only as a basis for comparison of proposals and the award of the contract. The Owner does not expressly, or by implication, agree that the actual quantities involved will correspond exactly therewith; nor shall the bidder plead misunderstanding or deception because of such estimates of quantities, or of the character, location, or other conditions pertaining to the work. Payment to the Contractor will be made only for the actual quantities of work performed or materials furnished in accordance with the plans and specifications. It is understood that the quantities may be increased or decreased as provided in the Section 40, paragraph 40-02, *ALTERATION OF WORK AND QUANTITIES,* without in any way invalidating the unit bid prices.

20-06 EXAMINATION OF PLANS, SPECIFICATIONS, AND SITE. The bidder is expected to carefully examine the site of the proposed work, the proposal, plans, specifications, and contract forms. Bidders shall satisfy themselves to the character, quality, and quantities of work to be performed, materials to be furnished, and to the requirements of the proposed contract. The submission of a proposal shall be prima facie evidence that the bidder has made such examination and is satisfied to the conditions to be encountered in performing the work and the requirements of the proposed contract, plans, and specifications.

Boring logs and other records of subsurface investigations and tests are available for inspection of bidders. It is understood and agreed that such subsurface information, whether included in the plans, specifications, or otherwise made available to the bidder, was obtained and is intended for the Owner's design and estimating purposes only. Such information has been made available for the convenience of all bidders. It is further understood and agreed that each bidder is solely responsible for all assumptions, deductions, or conclusions which the bidder may make or obtain from their own examination of the boring logs and other records of subsurface investigations and tests that are furnished by the Owner.

20-07 PREPARATION OF PROPOSAL. The bidder shall submit their proposal on the forms furnished by the Owner. All blank spaces in the proposal forms, unless explicitly stated otherwise, must be correctly filled in where indicated for each and every item for which a quantity is given. The bidder shall state the price (written in ink or typed) both in words and numerals which they propose for each pay item furnished in the proposal. In case of conflict between words and numerals, the words, unless obviously incorrect, shall govern.

The bidder shall correctly sign the proposal in ink. If the proposal is made by an individual, their name and post office address must be shown. If made by a partnership, the name and post office address of each member of the partnership must be shown. If made by a corporation, the person signing the

proposal shall give the name of the state where the corporation was chartered and the name, titles, and business address of the president, secretary, and the treasurer. Anyone signing a proposal as an agent shall file evidence of their authority to do so and that the signature is binding upon the firm or corporation.

20-08 RESPONSIVE AND RESPONSIBLE BIDDER. A responsive bid conforms to all significant terms and conditions contained in the Owner's invitation for bid. It is the Owner's responsibility to decide if the exceptions taken by a bidder to the solicitation are material or not and the extent of deviation it is willing to accept.

A responsible bidder has the ability to perform successfully under the terms and conditions of a proposed procurement, as defined in 2 CFR § 200.318(h). This includes such matters as Contractor integrity, compliance with public policy, record of past performance, and financial and technical resources.

20-09 IRREGULAR PROPOSALS. Proposals shall be considered irregular for the following reasons:

a. If the proposal is on a form other than that furnished by the Owner, or if the Owner's form is altered, or if any part of the proposal form is detached.

b. If there are unauthorized additions, conditional or alternate pay items, or irregularities of any kind that make the proposal incomplete, indefinite, or otherwise ambiguous.

c. If the proposal does not contain a unit price for each pay item listed in the proposal, except in the case of authorized alternate pay items, for which the bidder is not required to furnish a unit price.

d. If the proposal contains unit prices that are obviously unbalanced.

e. If the proposal is not accompanied by the proposal guaranty specified by the Owner.

f. If the applicable Disadvantaged Business Enterprise information is incomplete.

The Owner reserves the right to reject any irregular proposal and the right to waive technicalities if such waiver is in the best interest of the Owner and conforms to local laws and ordinances pertaining to the letting of construction contracts.

20-10 BID GUARANTEE. Each separate proposal shall be accompanied by a bid bond, certified check, or other specified acceptable collateral, in the amount specified in the proposal form. Such bond, check, or collateral, shall be made payable to the Owner.

20-11 DELIVERY OF PROPOSAL. Each proposal submitted shall be placed in a sealed envelope plainly marked with the project number, location of airport, and name and business address of the bidder on the outside. When sent by mail, preferably registered, the sealed proposal, marked as indicated above, should be enclosed in an additional envelope. No proposal will be considered unless received at the place specified in the advertisement or as modified by Addendum before the time specified for opening all bids. Proposals received after the bid opening time shall be returned to the bidder unopened.

20-12 WITHDRAWAL OR REVISION OF PROPOSALS. A bidder may withdraw or revise (by withdrawal of one proposal and submission of another) a proposal provided that the bidder's request for withdrawal is received by the Owner by email (erin.powers@ventura.org) before the time specified for opening bids. Revised proposals must be received at the place specified in the advertisement before the time specified for opening all bids.

20-13 PUBLIC OPENING OF PROPOSALS. Proposals shall be opened, and read, publicly at the time and place specified in the advertisement. Bidders, their authorized agents, and other interested persons are invited to attend. Proposals that have been withdrawn (by written or telegraphic request) or received after the time specified for opening bids shall be returned to the bidder unopened.

20-14 DISQUALIFICATION OF BIDDERS. A bidder shall be considered disqualified for any of the following reasons:

a. Submitting more than one proposal from the same partnership, firm, or corporation under the same or different name.

b. Evidence of collusion among bidders. Bidders participating in such collusion shall be disqualified as bidders for any future work of the Owner until any such participating bidder has been reinstated by the Owner as a qualified bidder.

c. If the bidder is considered to be in "default" for any reason specified in paragraph 20-04, Issuance of Proposal Forms, of this section.

20-15 DISCREPANCIES AND OMISSIONS. A Bidder who discovers discrepancies or omissions with the project bid documents shall immediately notify the Owner's Engineer of the matter. A bidder that has doubt as to the true meaning of a project requirement may submit to the Owner's Engineer a written request for interpretation no later than **7** days prior to bid opening.

Any interpretation of the project bid documents by the Owner's Engineer will be by written addendum issued by the Owner. The Owner will not consider any instructions, clarifications or interpretations of the bidding documents in any manner other than written addendum.

END OF SECTION 20

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SECTION 30
AWARD AND EXECUTION OF CONTRACT

30-01 CONSIDERATION OF PROPOSALS. After the proposals are publicly opened and read, they will be compared on the basis of the summation of the products obtained by multiplying the estimated quantities shown in the proposal by the unit bid prices. If a bidder's proposal contains a discrepancy between unit bid prices written in words and unit bid prices written in numbers, the unit bid price written in words shall govern.

Until the award of a contract is made, the Owner reserves the right to reject a bidder's proposal for any of the following reasons:

a. If the proposal is irregular as specified in Section 20, paragraph 20-09, *IRREGULAR PROPOSALS*.

b. If the bidder is disqualified for any of the reasons specified Section 20, paragraph 20-14, *DISQUALIFICATION OF BIDDERS*.

In addition, until the award of a contract is made, the Owner reserves the right to reject any or all proposals, waive technicalities, if such waiver is in the best interest of the Owner and is in conformance with applicable state and local laws or regulations pertaining to the letting of construction contracts; advertise for new proposals; or proceed with the work otherwise. All such actions shall promote the Owner's best interests.

30-02 AWARD OF CONTRACT. The award of a contract, if it is to be awarded, shall be made within 120 Calendar days of the date specified for publicly opening proposals, unless otherwise specified herein.

If the Owner elects to proceed with an award of contract, the Owner will make award to the responsible bidder whose bid, conforming with all the material terms and conditions of the bid documents, is the lowest in price.

30-03 CANCELLATION OF AWARD. The Owner reserves the right to cancel the award without liability to the bidder, except return of proposal guaranty, at any time before a contract has been fully executed by all parties and is approved by the Owner in accordance with paragraph 30-07, *APPROVAL OF CONTRACT*.

30-04 RETURN OF PROPOSAL GUARANTY. All proposal guaranties, except those of the two lowest bidders, will be returned immediately after the Owner has made a comparison of bids as specified in the paragraph 30-01, *CONSIDERATION OF PROPOSALS*. Proposal guaranties of the two lowest bidders will be retained by the Owner until such time as an award is made, at which time, the unsuccessful bidder's proposal guaranty will be returned. The successful bidder's proposal guaranty will be returned as soon as the Owner receives the contract bonds as specified in paragraph 30-05, *REQUIREMENTS OF CONTRACT BONDS*.

30-05 REQUIREMENTS OF CONTRACT BONDS. At the time of the execution of the contract, the successful bidder shall furnish the Owner a surety bond or bonds that have been fully executed by the bidder and the surety guaranteeing the performance of the work and the payment of all legal debts that may be incurred by reason of the Contractor's performance of the work. The surety

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and the form of the bond or bonds shall be acceptable to the Owner. Unless otherwise specified in this subsection, the surety bond or bonds shall be in a sum equal to the full amount of the contract.

30-06 EXECUTION OF CONTRACT. The successful bidder shall sign (execute) the necessary agreements for entering into the contract and return the signed contract to the Owner, along with the fully executed surety bond or bonds specified in paragraph 30-05, *REQUIREMENTS OF CONTRACT BONDS,* of this section, within 30 calendar days from the date mailed or otherwise delivered to the successful bidder.

30-07 APPROVAL OF CONTRACT. Upon receipt of the contract and contract bond or bonds that have been executed by the successful bidder, the Owner shall complete the execution of the contract in accordance with local laws or ordinances, and return the fully executed contract to the Contractor. Delivery of the fully executed contract to the Contractor shall constitute the Owner's approval to be bound by the successful bidder's proposal and the terms of the contract.

30-08 FAILURE TO EXECUTE CONTRACT. Failure of the successful bidder to execute the contract and furnish an acceptable surety bond or bonds within the period specified in paragraph 30-06, *EXECUTION OF CONTRACT,* of this section shall be just cause for cancellation of the award and forfeiture of the proposal guaranty, not as a penalty, but as liquidated damages to the Owner.

END OF SECTION 30

SECTION 40
SCOPE OF WORK

40-01 INTENT OF CONTRACT. The intent of the contract is to provide for construction and completion, in every detail, of the work described. It is further intended that the Contractor shall furnish all labor, materials, equipment, tools, transportation, and supplies required to complete the work in accordance with the plans, specifications, and terms of the contract.

40-02 ALTERATION OF WORK AND QUANTITIES. The Owner reserves the right to make such changes in quantities and work as may be necessary or desirable to complete, in a satisfactory manner, the original intended work. Unless otherwise specified in the Contract, the Owner's Engineer or RPR shall be and is hereby authorized to make, in writing, such in-scope alterations in the work and variation of quantities as may be necessary to complete the work, provided such action does not represent a significant change in the character of the work.

For purpose of this section, a significant change in character of work means: any change that is outside the current contract scope of work; any change (increase or decrease) in the total contract cost by more than 25%; or any change in the total cost of a major contract item by more than 25%.

Work alterations and quantity variances that do not meet the definition of significant change in character of work shall not invalidate the contract nor release the surety. Contractor agrees to accept payment for such work alterations and quantity variances in accordance with Section 90, paragraph 90-03, *COMPENSATION FOR ALTERED QUANTITIES*.

Should the value of altered work or quantity variance meet the criteria for significant change in character of work, such altered work and quantity variance shall be covered by a supplemental agreement. Supplemental agreements shall also require consent of the Contractor's surety and separate performance and payment bonds. If the Owner and the Contractor are unable to agree on a unit adjustment for any contract item that requires a supplemental agreement, the Owner reserves the right to terminate the contract with respect to the item and make other arrangements for its completion.

40-03 OMITTED ITEMS. The Owner, the Owner's Engineer or the RPR may provide written notice to the Contractor to omit from the work any contract item that does not meet the definition of major contract item. Major contract items may be omitted by a supplemental agreement. Such omission of contract items shall not invalidate any other contract provision or requirement.

Should a contract item be omitted or otherwise ordered to be non-performed, the Contractor shall be paid for all work performed toward completion of such item prior to the date of the order to omit such item. Payment for work performed shall be in accordance with Section 90, paragraph 90-04, *PAYMENT FOR OMITTED ITEMS*.

40-04 EXTRA WORK. Should acceptable completion of the contract require the Contractor to perform an item of work not provided for in the awarded contract as previously modified by change order or supplemental agreement, Owner may issue a Change Order to cover the necessary extra work. Change orders for extra work shall contain agreed unit prices for performing the change order work in accordance with the requirements specified in the order, and shall contain any adjustment to the contract time that, in the RPR's opinion, is necessary for completion of the extra work.

When determined by the RPR to be in the Owner's best interest, the RPR may order the Contractor to proceed with extra work as provided in Section 90, paragraph 90-05, *PAYMENT FOR EXTRA WORK*. Extra work that is necessary for acceptable completion of the project, but is not within the general scope of the work covered by the original contract shall be covered by a supplemental agreement as defined in Section 10, paragraph 10-59, *SUPPLEMENTAL AGREEMENT*.

If extra work is essential to maintaining the project critical path, RPR may order the Contractor to commence the extra work under a Time and Material contract method. Once sufficient detail is available to establish the level of effort necessary for the extra work, the Owner shall initiate a change order or supplemental agreement to cover the extra work.

Any claim for payment of extra work that is not covered by written agreement (change order or supplemental agreement) shall be rejected by the Owner.

40-05 MAINTENANCE OF TRAFFIC. It is the explicit intention of the contract that the safety of aircraft, as well as the Contractor's equipment and personnel, is the most important consideration. The Contractor shall maintain traffic in the manner detailed in the Construction Safety and Phasing Plan (CSPP).

a. It is understood and agreed that the Contractor shall provide for the free and unobstructed movement of aircraft in the air operations areas (AOAs) of the airport with respect to their own operations and the operations of all subcontractors as specified in Section 80, paragraph 80-04, *LIMITATION OF OPERATIONS*. It is further understood and agreed that the Contractor shall provide for the uninterrupted operation of visual and electronic signals (including power supplies thereto) used in the guidance of aircraft while operating to, from, and upon the airport as specified in Section 70, paragraph 70-15, *CONTRACTOR'S RESPONSIBILITY FOR UTILITY SERVICE AND FACILITIES OF OTHERS*.

b. With respect to their own operations and the operations of all subcontractors, the Contractor shall provide marking, lighting, and other acceptable means of identifying personnel, equipment, vehicles, storage areas, and any work area or condition that may be hazardous to the operation of aircraft, fire-rescue equipment, or maintenance vehicles at the airport in accordance with the construction safety and phasing plan (CSPP) and the safety plan compliance document (SPCD).

c. When the contract requires the maintenance of an existing road, street, or highway during the Contractor's performance of work that is otherwise provided for in the contract, plans, and specifications, the Contractor shall keep the road, street, or highway open to all traffic and shall provide maintenance as may be required to accommodate traffic. The Contractor, at their expense, shall be responsible for the repair to equal or better than preconstruction conditions of any damage caused by the Contractor's equipment and personnel. The Contractor shall furnish, erect, and maintain barricades, warning signs, flag person, and other traffic control devices in reasonable conformity with the Manual on Uniform Traffic Control Devices (MUTCD) (http://mutcd.fhwa.dot.gov/), unless otherwise specified. The Contractor shall also construct and maintain in a safe condition any temporary connections necessary for ingress to and egress from abutting property or intersecting roads, streets or highways.

40-06 REMOVAL OF EXISTING STRUCTURES. All existing structures encountered within the established lines, grades, or grading sections shall be removed by the Contractor, unless such existing structures are otherwise specified to be relocated, adjusted up or down, salvaged, abandoned in place, reused in the work or to remain in place. The cost of removing such existing structures shall not be measured or paid for directly, but shall be included in the various contract items.

Should the Contractor encounter an existing structure (above or below ground) in the work for which the disposition is not indicated on the plans, the Resident Project Representative (RPR) shall be notified prior to disturbing such structure. The disposition of existing structures so encountered shall be immediately determined by the RPR in accordance with the provisions of the contract.

Except as provided in Section 40, paragraph 40-07, *RIGHTS IN AND USE OF MATERIALS FOUND IN THE WORK*, it is intended that all existing materials or structures that may be encountered (within the lines, grades, or grading sections established for completion of the work) shall be used in the work as otherwise provided for in the contract and shall remain the property of the Owner when so used in the work.

40-07 RIGHTS IN AND USE OF MATERIALS FOUND IN THE WORK. Should the Contractor encounter any material such as (but not restricted to) sand, stone, gravel, slag, or concrete slabs within the established lines, grades, or grading sections, the use of which is intended by the terms of the contract to be embankment, the Contractor may at their own option either:

a. Use such material in another contract item, providing such use is approved by the RPR and is in conformance with the contract specifications applicable to such use; or,

b. Remove such material from the site, upon written approval of the RPR; or

c. Use such material for the Contractor's own temporary construction on site; or,

d. Use such material as intended by the terms of the contract.

Should the Contractor wish to exercise option a., b., or c., the Contractor shall request the RPR's approval in advance of such use.

Should the RPR approve the Contractor's request to exercise option a., b., or c., the Contractor shall be paid for the excavation or removal of such material at the applicable contract price. The Contractor shall replace, at their expense, such removed or excavated material with an agreed equal volume of material that is acceptable for use in constructing embankment, backfills, or otherwise to the extent that such replacement material is needed to complete the contract work. The Contractor shall not be charged for use of such material used in the work or removed from the site.

Should the RPR approve the Contractor's exercise of option a., the Contractor shall be paid, at the applicable contract price, for furnishing and installing such material in accordance with requirements of the contract item in which the material is used.

It is understood and agreed that the Contractor shall make no claim for delays by reason of their own exercise of option a., b., or c.

The Contractor shall not excavate, remove, or otherwise disturb any material, structure, or part of a structure which is located outside the lines, grades, or grading sections established for the work, except where such excavation or removal is provided for in the contract, plans, or specifications.

40-08 FINAL CLEANUP. Upon completion of the work and before acceptance and final payment will be made, the Contractor shall remove from the site all machinery, equipment, surplus and discarded materials, rubbish, temporary structures, and stumps or portions of trees. The Contractor shall cut all brush and woods within the limits indicated and shall leave the site in a neat and presentable condition. Material cleared from the site and deposited on adjacent property will not be considered as having been disposed of satisfactorily, unless the Contractor has obtained the written permission of the property Owner.

END OF SECTION 40

SECTION 50
CONTROL OF WORK

50-01 AUTHORITY OF THE RESIDENT PROJECT REPRESENTATIVE (RPR). The RPR has final authority regarding the interpretation of project specification requirements. The RPR shall determine acceptability of the quality of materials furnished, method of performance of work performed, and the manner and rate of performance of the work. The RPR does not have the authority to accept work that does not conform to specification requirements.

50-02 CONFORMITY WITH PLANS AND SPECIFICATIONS. All work and all materials furnished shall be in reasonably close conformity with the lines, grades, grading sections, cross-sections, dimensions, material requirements, and testing requirements that are specified (including specified tolerances) in the contract, plans, or specifications.

If the RPR finds the materials furnished, work performed, or the finished product not within reasonably close conformity with the plans and specifications, but that the portion of the work affected will, in their opinion, result in a finished product having a level of safety, economy, durability, and workmanship acceptable to the Owner, the RPR will advise the Owner of their determination that the affected work be accepted and remain in place. The RPR will document the determination and recommend to the Owner a basis of acceptance that will provide for an adjustment in the contract price for the affected portion of the work. Changes in the contract price must be covered by contract change order or supplemental agreement as applicable.

If the RPR finds the materials furnished, work performed, or the finished product are not in reasonably close conformity with the plans and specifications and have resulted in an unacceptable finished product, the affected work or materials shall be removed and replaced or otherwise corrected by and at the expense of the Contractor in accordance with the RPR's written orders.

The term "reasonably close conformity" shall not be construed as waiving the Contractor's responsibility to complete the work in accordance with the contract, plans, and specifications. The term shall not be construed as waiving the RPR's responsibility to insist on strict compliance with the requirements of the contract, plans, and specifications during the Contractor's execution of the work, when, in the RPR's opinion, such compliance is essential to provide an acceptable finished portion of the work.

The term "reasonably close conformity" is also intended to provide the RPR with the authority, after consultation with the Sponsor and FAA, to use sound engineering judgment in their determinations to accept work that is not in strict conformity, but will provide a finished product equal to or better than that required by the requirements of the contract, plans and specifications.

The RPR will not be responsible for the Contractor's means, methods, techniques, sequences, or procedures of construction or the safety precautions incident thereto.

50-03 COORDINATION OF CONTRACT, PLANS, AND SPECIFICATIONS. The contract, plans, specifications, and all referenced standards cited are essential parts of the contract requirements. If electronic files are provided and used on the project and there is a conflict between the electronic files and hard copy plans, the hard copy plans shall govern. A requirement occurring in one is as binding as though occurring in all. They are intended to be complementary and to describe and provide for a complete work. In case of discrepancy, calculated dimensions will govern over scaled

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dimensions; contract technical specifications shall govern over contract general provisions, plans, cited standards for materials or testing, and cited advisory circulars (ACs); contract general provisions shall govern over plans, cited standards for materials or testing, and cited ACs; plans shall govern over cited standards for materials or testing and cited ACs. If any paragraphs contained in the Special Provisions conflict with General Provisions or Technical Specifications, the Special Provisions shall govern.

From time to time, discrepancies within cited testing standards occur due to the timing of the change, edits, and/or replacement of the standards. If the Contractor discovers any apparent discrepancy within standard test methods, the Contractor shall immediately ask the RPR for an interpretation and decision, and such decision shall be final.

The Contractor shall not take advantage of any apparent error or omission on the plans or specifications. In the event the Contractor discovers any apparent error or discrepancy, Contractor shall immediately notify the Owner or the designated representative in writing requesting their written interpretation and decision.

50-04 LIST OF SPECIAL PROVISIONS. See Division 4 and *County of Ventura Standard Specifications Section 2.5.2* for the Project Special Provisions and Order of Precedence.

50-05 COOPERATION OF CONTRACTOR. The Contractor shall be supplied with **one** hard copies or an electronic PDF of the plans and specifications. The Contractor shall have available on the construction site at all times one hardcopy each of the plans and specifications. Additional hard copies of plans and specifications may be obtained by the Contractor for the cost of reproduction.

The Contractor shall give constant attention to the work to facilitate the progress thereof, and shall cooperate with the RPR and their inspectors and with other Contractors in every way possible. The Contractor shall have a competent superintendent on the work at all times who is fully authorized as their agent on the work. The superintendent shall be capable of reading and thoroughly understanding the plans and specifications and shall receive and fulfill instructions from the RPR or their authorized representative.

50-06 COOPERATION BETWEEN CONTRACTORS. The Owner reserves the right to contract for and perform other or additional work on or near the work covered by this contract.

When separate contracts are let within the limits of any one project, each Contractor shall conduct the work not to interfere with or hinder the progress of completion of the work being performed by other Contractors. Contractors working on the same project shall cooperate with each other as directed.

Each Contractor involved shall assume all liability, financial or otherwise, in connection with their own contract and shall protect and hold harmless the Owner from any and all damages or claims that may arise because of inconvenience, delays, or loss experienced because of the presence and operations of other Contractors working within the limits of the same project.

The Contractor shall arrange their work and shall place and dispose of the materials being used to not interfere with the operations of the other Contractors within the limits of the same project. The Contractor shall join their work with that of the others in an acceptable manner and shall perform it in proper sequence to that of the others.

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50-07 CONSTRUCTION LAYOUT AND STAKES.

The Engineer/RPR shall establish necessary horizontal and vertical control. The establishment of Survey Control and/or reestablishment of survey control shall be by a State Licensed Land Surveyor. Contractor is responsible for preserving integrity of horizontal and vertical controls established by Engineer/RPR. In case of negligence on the part of the Contractor or their employees, resulting in the destruction of any horizontal and vertical control, the resulting costs will be deducted as a liquidated damage against the Contractor.

Prior to the start of construction, the Contractor will check all control points for horizontal and vertical accuracy and certify in writing to the RPR that the Contractor concurs with survey control established for the project. All lines, grades and measurements from control points necessary for the proper execution and control of the work on this project will be provided to the RPR. The Contractor is responsible to establish all layout required for the construction of the project.

Copies of survey notes will be provided to the RPR for each area of construction and for each placement of material as specified to allow the RPR to make periodic checks for conformance with plan grades, alignments and grade tolerances required by the applicable material specifications. Surveys will be provided to the RPR prior to commencing work items that cover or disturb the survey staking. Survey(s) and notes shall be provided in the following format(s): **electronic format approved by the RPR**.

Laser, GPS, String line, or other automatic control shall be checked with temporary control as necessary. In the case of error, on the part of the Contractor, their surveyor, employees or subcontractors, resulting in established grades, alignment or grade tolerances that do not concur with those specified or shown on the plans, the Contractor is solely responsible for correction, removal, replacement and all associated costs at no additional cost to the Owner.

No direct payment will be made, unless otherwise specified in contract documents, for this labor, materials, or other expenses. The cost shall be included in the price of the bid for the various items of the Contract.

50-08 AUTHORITY AND DUTIES OF QUALITY ASSURANCE (QA) INSPECTORS. QA inspectors shall be authorized to inspect all work done and all material furnished. Such QA inspection may extend to all or any part of the work and to the preparation, fabrication, or manufacture of the materials to be used. QA inspectors are not authorized to revoke, alter, or waive any provision of the contract. QA inspectors are not authorized to issue instructions contrary to the plans and specifications or to act as foreman for the Contractor.

QA Inspectors are authorized to notify the Contractor or their representatives of any failure of the work or materials to conform to the requirements of the contract, plans, or specifications and to reject such nonconforming materials in question until such issues can be referred to the RPR for a decision.

50-09 INSPECTION OF THE WORK. All materials and each part or detail of the work shall be subject to inspection. The RPR shall be allowed access to all parts of the work and shall be furnished with such information and assistance by the Contractor as is required to make a complete and detailed inspection.

If the RPR requests it, the Contractor, at any time before acceptance of the work, shall remove or uncover such portions of the finished work as may be directed. After examination, the Contractor

shall restore said portions of the work to the standard required by the specifications. Should the work thus exposed or examined prove acceptable, the uncovering, or removing, and the replacing of the covering or making good of the parts removed will be paid for as extra work; but should the work so exposed or examined prove unacceptable, the uncovering, or removing, and the replacing of the covering or making good of the parts removed will be at the Contractor's expense.

Provide advance written notice to the RPR of work the Contractor plans to perform each week and each day. Any work done or materials used without written notice and allowing opportunity for inspection by the RPR may be ordered removed and replaced at the Contractor's expense.

Should the contract work include relocation, adjustment, or any other modification to existing facilities, not the property of the (contract) Owner, authorized representatives of the Owners of such facilities shall have the right to inspect such work. Such inspection shall in no sense make any facility owner a party to the contract, and shall in no way interfere with the rights of the parties to this contract.

50-10 REMOVAL OF UNACCEPTABLE AND UNAUTHORIZED WORK. All work that does not conform to the requirements of the contract, plans, and specifications will be considered unacceptable, unless otherwise determined acceptable by the RPR as provided in paragraph 50-02, *CONFORMITY WITH PLANS AND SPECIFICATIONS*.

Unacceptable work, whether the result of poor workmanship, use of defective materials, damage through carelessness, or any other cause found to exist prior to the final acceptance of the work, shall be removed immediately and replaced in an acceptable manner in accordance with the provisions of Section 70, paragraph 70-14, *CONTRACTOR'S RESPONSIBILITY FOR WORK*.

No removal work made under provision of this paragraph shall be done without lines and grades having been established by the RPR. Work done contrary to the instructions of the RPR, work done beyond the lines shown on the plans or as established by the RPR, except as herein specified, or any extra work done without authority, will be considered as unauthorized and will not be paid for under the provisions of the contract. Work so done may be ordered removed or replaced at the Contractor's expense.

Upon failure on the part of the Contractor to comply with any order of the RPR made under the provisions of this subsection, the RPR will have authority to cause unacceptable work to be remedied or removed and replaced; and unauthorized work to be removed and recover the resulting costs as a liquidated damage against the Contractor.

50-11 LOAD RESTRICTIONS. The Contractor shall comply with all legal load restrictions in the hauling of materials on public roads beyond the limits of the work. A special permit will not relieve the Contractor of liability for damage that may result from the moving of material or equipment.

The operation of equipment of such weight or so loaded as to cause damage to structures or to any other type of construction will not be permitted. Hauling of materials over the base course or surface course under construction shall be limited as directed. No loads will be permitted on a concrete pavement, base, or structure before the expiration of the curing period. The Contractor, at their own expense, shall be responsible for the repair to equal or better than preconstruction conditions of any damage caused by the Contractor's equipment and personnel.

50-12 MAINTENANCE DURING CONSTRUCTION. The Contractor shall maintain the work during construction and until the work is accepted. Maintenance shall constitute continuous and

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effective work prosecuted day by day, with adequate equipment and forces so that the work is maintained in satisfactory condition at all times.

In the case of a contract for the placing of a course upon a course or subgrade previously constructed, the Contractor shall maintain the previous course or subgrade during all construction operations.

All costs of maintenance work during construction and before the project is accepted shall be included in the unit prices bid on the various contract items, and the Contractor will not be paid an additional amount for such work.

50-13 FAILURE TO MAINTAIN THE WORK. Should the Contractor at any time fail to maintain the work as provided in paragraph 50-12, *MAINTENANCE DURING CONSTRUCTION*, the RPR shall immediately notify the Contractor of such noncompliance. Such notification shall specify a reasonable time within which the Contractor shall be required to remedy such unsatisfactory maintenance condition. The time specified will give due consideration to the exigency that exists.

Should the Contractor fail to respond to the RPR's notification, the Owner may suspend any work necessary for the Owner to correct such unsatisfactory maintenance condition, depending on the exigency that exists. Any maintenance cost incurred by the Owner, shall be recovered as a liquidated damage against the Contractor.

50-14 PARTIAL ACCEPTANCE. If at any time during the execution of the project the Contractor substantially completes a usable unit or portion of the work, the occupancy of which will benefit the Owner, the Contractor may request the RPR to make final inspection of that unit. If the RPR finds upon inspection that the unit has been satisfactorily completed in compliance with the contract, the RPR may accept it as being complete, and the Contractor may be relieved of further responsibility for that unit. Such partial acceptance and beneficial occupancy by the Owner shall not void or alter any provision of the contract.

50-15 FINAL ACCEPTANCE. Upon due notice from the Contractor of presumptive completion of the entire project, the RPR and Owner will make an inspection. If all construction provided for and contemplated by the contract is found to be complete in accordance with the contract, plans, and specifications, such inspection shall constitute the final inspection. The RPR shall notify the Contractor in writing of final acceptance as of the date of the final inspection.

If, however, the inspection discloses any work, in whole or in part, as being unsatisfactory, the RPR will notify the Contractor and the Contractor shall correct the unsatisfactory work. Upon correction of the work, another inspection will be made which shall constitute the final inspection, provided the work has been satisfactorily completed. In such event, the RPR will make the final acceptance and notify the Contractor in writing of this acceptance as of the date of final inspection.

50-16 CLAIMS FOR ADJUSTMENT AND DISPUTES. If for any reason the Contractor deems that additional compensation is due for work or materials not clearly provided for in the contract, plans, or specifications or previously authorized as extra work, the Contractor shall notify the RPR in writing of their intention to claim such additional compensation before the Contractor begins the work on which the Contractor bases the claim. If such notification is not given or the RPR is not afforded proper opportunity by the Contractor for keeping strict account of actual cost as required, then the Contractor hereby agrees to waive any claim for such additional compensation. Such notice by the Contractor and the fact that the RPR has kept account of the cost of the work shall not in any way be construed as proving or substantiating the validity of the claim. When the work on which the

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claim for additional compensation is based has been completed, the Contractor shall, within 10 calendar days, submit a written claim to the RPR who will present it to the Owner for consideration in accordance with local laws or ordinances.

Nothing in this subsection shall be construed as a waiver of the Contractor's right to dispute final payment based on differences in measurements or computations.

END OF SECTION 50

SECTION 60
CONTROL OF MATERIALS

60-01 SOURCE OF SUPPLY AND QUALITY REQUIREMENTS. The materials used in the work shall conform to the requirements of the contract, plans, and specifications. Unless otherwise specified, such materials that are manufactured or processed shall be new (as compared to used or reprocessed).

In order to expedite the inspection and testing of materials, the Contractor shall furnish documentation to the RPR as to the origin, composition, and manufacture of all materials to be used in the work. Documentation shall be furnished promptly after execution of the contract but, in all cases, prior to delivery of such materials.

At the RPR's option, materials may be approved at the source of supply before delivery. If it is found after trial that sources of supply for previously approved materials do not produce specified products, the Contractor shall furnish materials from other sources.

The Contractor shall furnish airport lighting equipment that meets the requirements of the specifications; and is listed in AC 150/5345-53, *Airport Lighting Equipment Certification Program* and *Addendum*, that is in effect on the date of advertisement.

60-02 SAMPLES, TESTS, AND CITED SPECIFICATIONS. All materials used in the work shall be inspected, tested, and approved by the RPR before incorporation in the work unless otherwise designated. Any work in which untested materials are used without approval or written permission of the RPR shall be performed at the Contractor's risk. Materials found to be unacceptable and unauthorized will not be paid for and, if directed by the RPR, shall be removed at the Contractor's expense.

Unless otherwise designated, quality assurance tests will be made by and at the expense of the Owner in accordance with the cited standard methods of ASTM, American Association of State Highway and Transportation Officials (AASHTO), federal specifications, Commercial Item Descriptions, and all other cited methods, which are current on the date of advertisement for bids.

The testing organizations performing on-site quality assurance field tests shall have copies of all referenced standards on the construction site for use by all technicians and other personnel. Unless otherwise designated, samples for quality assurance will be taken by a qualified representative of the RPR. All materials being used are subject to inspection, test, or rejection at any time prior to or during incorporation into the work. Copies of all tests will be furnished to the Contractor's representative at their request after review and approval of the RPR.

A **legible, hand written** copy of all Contractor QC test data shall be provided to the RPR daily, along with printed reports, in an **electronic spreadsheet file**, on a weekly basis. After completion of the project, and prior to final payment, the Contractor shall submit a final report to the RPR showing all test data reports, plus an analysis of all results showing ranges, averages, and corrective action taken on all failing tests.

The Contractor shall employ a Quality Control (QC) testing organization to perform all Contractor required QC tests in accordance with Item C-100 Contractor Quality Control Program (CQCP).

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60-03 CERTIFICATION OF COMPLIANCE/ANALYSIS (COC/COA). The RPR may permit the use, prior to sampling and testing, of certain materials or assemblies when accompanied by manufacturer's COC stating that such materials or assemblies fully comply with the requirements of the contract. The certificate shall be signed by the manufacturer. Each lot of such materials or assemblies delivered to the work must be accompanied by a certificate of compliance in which the lot is clearly identified. The COA is the manufacturer's COC and includes all applicable test results.

Materials or assemblies used on the basis of certificates of compliance may be sampled and tested at any time and if found not to be in conformity with contract requirements will be subject to rejection whether in place or not.

The form and distribution of certificates of compliance shall be as approved by the RPR.

When a material or assembly is specified by "brand name or equal" and the Contractor elects to furnish the specified "or equal," the Contractor shall be required to furnish the manufacturer's certificate of compliance for each lot of such material or assembly delivered to the work. Such certificate of compliance shall clearly identify each lot delivered and shall certify as to:

a. Conformance to the specified performance, testing, quality or dimensional requirements; and,

b. Suitability of the material or assembly for the use intended in the contract work.

The RPR shall be the sole judge as to whether the proposed "or equal" is suitable for use in the work.

The RPR reserves the right to refuse permission for use of materials or assemblies on the basis of certificates of compliance.

60-04 PLANT INSPECTION. The RPR or their authorized representative may inspect, at its source, any specified material or assembly to be used in the work. Manufacturing plants may be inspected from time to time for the purpose of determining compliance with specified manufacturing methods or materials to be used in the work and to obtain samples required for acceptance of the material or assembly.

Should the RPR conduct plant inspections, the following conditions shall exist:

a. The RPR shall have the cooperation and assistance of the Contractor and the producer with whom the Contractor has contracted for materials.

b. The RPR shall have full entry at all reasonable times to such parts of the plant that concern the manufacture or production of the materials being furnished.

c. If required by the RPR, the Contractor shall arrange for adequate office or working space that may be reasonably needed for conducting plant inspections. Place office or working space in a convenient location with respect to the plant.

It is understood and agreed that the Owner shall have the right to retest any material that has been tested and approved at the source of supply after it has been delivered to the site. The RPR shall have the right to reject only material which, when retested, does not meet the requirements of the contract, plans, or specifications.

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60-05 ENGINEER/RESIDENT PROJECT REPRESENTATIVE (RPR) FIELD OFFICE. The Contractor shall provide dedicated space for the use of the engineer, RPR, and inspectors, as a field office for the duration of the project. This space shall be located conveniently near the construction and shall be separate from any space used by the Contractor. The Contractor shall furnish water, sanitary facilities, heat, air conditioning, and electricity**.** This facility shall be an approved weatherproof building meeting the current CalTrans Specifications for a Field Office. The Contractor shall be responsible for payment of the basic monthly charge, long distance and local calls. The Contractor shall furnish a network capable color photocopier/printer (capabilities for up to 11" x 17" media for copying, scanning directly to email, and printing via Windows XP 32-bit, Windows 7 64-bit and Windows 10 64-bit computers), office chairs, water, sanitary facilities, heat, air conditioning, and electricity. The Contractor shall provide and be responsible for payment of Internet access for computers and equipment at the jobsite office location, with consistent minimum performance of 15 Mbps download, 5 Mbps upload and ping latency under 100ms, as tested from computers and equipment behind the firewall to https://www.speedtest.net/. Internet protection shall be provided with a current production, supported, and updated firewall configured with all outbound ports available. The Contractor shall provide and maintain all wired and wireless connectivity to the Internet and between devices. The Contractor and the Contractor's superintendent shall provide all reasonable facilities to enable the Engineer to inspect the workmanship and materials used in the work.

Failure by the Contractor to provide these amenities to the Engineer's onsite personnel will result in the delay of payment to the Contractor.

60-06 STORAGE OF MATERIALS. Materials shall be stored to assure the preservation of their quality and fitness for the work. Stored materials, even though approved before storage, may again be inspected prior to their use in the work. Stored materials shall be located to facilitate their prompt inspection. The Contractor shall coordinate the storage of all materials with the RPR. Materials to be stored on airport property shall not create an obstruction to air navigation nor shall they interfere with the free and unobstructed movement of aircraft. Unless otherwise shown on the plans and/or CSPP, the storage of materials and the location of the Contractor's plant and parked equipment or vehicles shall be as directed by the RPR. Private property shall not be used for storage purposes without written permission of the Owner or lessee of such property. The Contractor shall make all arrangements and bear all expenses for the storage of materials on private property. Upon request, the Contractor shall furnish the RPR a copy of the property Owner's permission.

All storage sites on private or airport property shall be restored to their original condition by the Contractor at their expense, except as otherwise agreed to (in writing) by the Owner or lessee of the property.

60-07 UNACCEPTABLE MATERIALS. Any material or assembly that does not conform to the requirements of the contract, plans, or specifications shall be considered unacceptable and shall be rejected. The Contractor shall remove any rejected material or assembly from the site of the work, unless otherwise instructed by the RPR.

Rejected material or assembly, the defects of which have been corrected by the Contractor, shall not be returned to the site of the work until such time as the RPR has approved its use in the work.

60-08 OWNER FURNISHED MATERIALS. The Contractor shall furnish all materials required to complete the work, except those specified, if any, to be furnished by the Owner. Owner-furnished materials shall be made available to the Contractor at the location specified.

All costs of handling, transportation from the specified location to the site of work, storage, and installing Owner-furnished materials shall be included in the unit price bid for the contract item in which such Owner-furnished material is used.

After any Owner-furnished material has been delivered to the location specified, the Contractor shall be responsible for any demurrage, damage, loss, or other deficiencies that may occur during the Contractor's handling, storage, or use of such Owner-furnished material. The Owner will deduct from any monies due or to become due the Contractor any cost incurred by the Owner in making good such loss due to the Contractor's handling, storage, or use of Owner-furnished materials.

END OF SECTION 60

SECTION 70
LEGAL REGULATIONS AND RESPONSIBILITY TO PUBLIC

70-01 LAWS TO BE OBSERVED. The Contractor shall keep fully informed of all federal and state laws, all local laws, ordinances, and regulations and all orders and decrees of bodies or tribunals having any jurisdiction or authority, which in any manner affect those engaged or employed on the work, or which in any way affect the conduct of the work. The Contractor shall at all times observe and comply with all such laws, ordinances, regulations, orders, and decrees; and shall protect and indemnify the Owner and all their officers, agents, or servants against any claim or liability arising from or based on the violation of any such law, ordinance, regulation, order, or decree, whether by the Contractor or the Contractor's employees.

70-02 PERMITS, LICENSES, AND TAXES. The Contractor shall procure all permits and licenses, pay all charges, fees, and taxes, and give all notices necessary and incidental to the due and lawful execution of the work.

70-03 PATENTED DEVICES, MATERIALS, AND PROCESSES. If the Contractor is required or desires to use any design, device, material, or process covered by letters of patent or copyright, the Contractor shall provide for such use by suitable legal agreement with the Patentee or Owner. The Contractor and the surety shall indemnify and hold harmless the Owner, any third party, or political subdivision from any and all claims for infringement by reason of the use of any such patented design, device, material or process, or any trademark or copyright, and shall indemnify the Owner for any costs, expenses, and damages which it may be obliged to pay by reason of an infringement, at any time during the execution or after the completion of the work.

70-04 RESTORATION OF SURFACES DISTURBED BY OTHERS. The Owner reserves the right to authorize the construction, reconstruction, or maintenance of any public or private utility service, FAA or National Oceanic and Atmospheric Administration (NOAA) facility, or a utility service of another government agency at any time during the progress of the work. To the extent that such construction, reconstruction, or maintenance has been coordinated with the Owner, such authorized work (by others) must be shown on the plans.

Except as listed above, the Contractor shall not permit any individual, firm, or corporation to excavate or otherwise disturb such utility services or facilities located within the limits of the work without the written permission of the RPR.

Should the Owner of public or private utility service, FAA, or NOAA facility, or a utility service of another government agency be authorized to construct, reconstruct, or maintain such utility service or facility during the progress of the work, the Contractor shall cooperate with such Owners by arranging and performing the work in this contract to facilitate such construction, reconstruction or maintenance by others whether or not such work by others is listed above. When ordered as extra work by the RPR, the Contractor shall make all necessary repairs to the work which are due to such authorized work by others, unless otherwise provided for in the contract, plans, or specifications. It is understood and agreed that the Contractor shall not be entitled to make any claim for damages due to such authorized work by others or for any delay to the work resulting from such authorized work.

70-05 FEDERAL PARTICIPATION. The United States Government has agreed to reimburse the Owner for some portion of the contract costs. The contract work is subject to the inspection and approval of duly authorized representatives of the FAA Administrator. No requirement of this

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contract shall be construed as making the United States a party to the contract nor will any such requirement interfere, in any way, with the rights of either party to the contract.

70-06 SANITARY, HEALTH, AND SAFETY PROVISIONS. The Contractor's worksite and facilities shall comply with applicable federal, state, and local requirements for health, safety and sanitary provisions.

70-07 PUBLIC CONVENIENCE AND SAFETY. The Contractor shall control their operations and those of their subcontractors and all suppliers, to assure the least inconvenience to the traveling public. Under all circumstances, safety shall be the most important consideration.

The Contractor shall maintain the free and unobstructed movement of aircraft and vehicular traffic with respect to their own operations and those of their own subcontractors and all suppliers in accordance with Section 40, paragraph 40-05, *MAINTENANCE OF TRAFFIC,* and shall limit such operations for the convenience and safety of the traveling public as specified in Section 80, paragraph 80-04, *LIMITATION OF OPERATIONS*.

The Contractor shall remove or control debris and rubbish resulting from its work operations at frequent intervals, and upon the order of the RPR. If the RPR determines the existence of Contractor debris in the work site represents a hazard to airport operations and the Contractor is unable to respond in a prompt and reasonable manner, the RPR reserves the right to assign the task of debris removal to a third party and recover the resulting costs as a liquidated damage against the Contractor.

70-08 CONSTRUCTION SAFETY AND PHASING PLAN (CSPP). The Contractor shall complete the work in accordance with the approved Construction Safety and Phasing Plan (CSPP) developed in accordance with AC 150/5370-2, *Operational Safety on Airports During Construction*. The CSPP is on sheet(s) **G050 to G055** of the project plans.

70-09 USE OF EXPLOSIVES. The use of explosives is not permitted on this project.

70-10 PROTECTION AND RESTORATION OF PROPERTY AND LANDSCAPE. The Contractor shall be responsible for the preservation of all public and private property, and shall protect carefully from disturbance or damage all land monuments and property markers until the Engineer/RPR has witnessed or otherwise referenced their location and shall not move them until directed.

The Contractor shall be responsible for all damage or injury to property of any character, during the execution of the work, resulting from any act, omission, neglect, or misconduct in manner or method of executing the work, or at any time due to defective work or materials, and said responsibility shall not be released until the project has been completed and accepted.

When or where any direct or indirect damage or injury is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work, or in consequence of the non-execution thereof by the Contractor, the Contractor shall restore, at their expense, such property to a condition similar or equal to that existing before such damage or injury was done, by repairing, or otherwise restoring as may be directed, or the Contractor shall make good such damage or injury in an acceptable manner.

70-11 RESPONSIBILITY FOR DAMAGE CLAIMS. The Contractor shall indemnify and hold harmless the Engineer/RPR and the Owner and their officers, agents, and employees from all suits,

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actions, or claims, of any character, brought because of any injuries or damage received or sustained by any person, persons, or property on account of the operations of the Contractor; or on account of or in consequence of any neglect in safeguarding the work; or through use of unacceptable materials in constructing the work; or because of any act or omission, neglect, or misconduct of said Contractor; or because of any claims or amounts recovered from any infringements of patent, trademark, or copyright; or from any claims or amounts arising or recovered under the "Workmen's Compensation Act," or any other law, ordinance, order, or decree. Money due the Contractor under and by virtue of their own contract considered necessary by the Owner for such purpose may be retained for the use of the Owner or, in case no money is due, their own surety may be held until such suits, actions, or claims for injuries or damages shall have been settled and suitable evidence to that effect furnished to the Owner, except that money due the Contractor will not be withheld when the Contractor produces satisfactory evidence that he or she is adequately protected by public liability and property damage insurance.

70-12 THIRD PARTY BENEFICIARY CLAUSE. It is specifically agreed between the parties executing the contract that it is not intended by any of the provisions of any part of the contract to create for the public or any member thereof, a third-party beneficiary or to authorize anyone not a party to the contract to maintain a suit for personal injuries or property damage pursuant to the terms or provisions of the contract.

70-13 OPENING SECTIONS OF THE WORK TO TRAFFIC. If it is necessary for the Contractor to complete portions of the contract work for the beneficial occupancy of the Owner prior to completion of the entire contract, such "phasing" of the work must be specified below and indicated on the approved Construction Safety and Phasing Plan (CSPP) and the project plans. When so specified, the Contractor shall complete such portions of the work on or before the date specified or as otherwise specified.

Phase or Description	Required Date or Sequence of Owner's Beneficial Occupancy	Work Shown on Plan Sheet
Refer to the Phasing Plans of the Construction Drawings.		

Upon completion of any portion of work listed above, such portion shall be accepted by the Owner in accordance with Section 50, paragraph 50-14, *PARTIAL ACCEPTANCE*.

No portion of the work may be opened by the Contractor until directed by the Owner in writing. Should it become necessary to open a portion of the work to traffic on a temporary or intermittent basis, such openings shall be made when, in the opinion of the RPR, such portion of the work is in an acceptable condition to support the intended traffic. Temporary or intermittent openings are considered to be inherent in the work and shall not constitute either acceptance of the portion of the work so opened or a waiver of any provision of the contract. Any damage to the portion of the work so opened that is not attributable to traffic which is permitted by the Owner shall be repaired by the Contractor at their expense.

The Contractor shall make their own estimate of the inherent difficulties involved in completing the work under the conditions herein described and shall not claim any added compensation by reason of delay or increased cost due to opening a portion of the contract work.

The Contractor must conform to safety standards contained AC 150/5370-2 and the approved CSPP.

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Contractor shall refer to the plans, specifications, and the approved CSPP to identify barricade requirements, temporary and/or permanent markings, airfield lighting, guidance signs and other safety requirements prior to opening up sections of work to traffic.

70-14 CONTRACTOR'S RESPONSIBILITY FOR WORK. Until the RPR's final written acceptance of the entire completed work, excepting only those portions of the work accepted in accordance with Section 50, paragraph 50-14, *PARTIAL ACCEPTANCE*, the Contractor shall have the charge and care thereof and shall take every precaution against injury or damage to any part due to the action of the elements or from any other cause, whether arising from the execution or from the non-execution of the work. The Contractor shall rebuild, repair, restore, and make good all injuries or damages to any portion of the work occasioned by any of the above causes before final acceptance and shall bear the expense thereof except damage to the work due to unforeseeable causes beyond the control of and without the fault or negligence of the Contractor, including but not restricted to acts of God such as earthquake, tidal wave, tornado, hurricane or other cataclysmic phenomenon of nature, or acts of the public enemy or of government authorities.

If the work is suspended for any cause whatever, the Contractor shall be responsible for the work and shall take such precautions necessary to prevent damage to the work. The Contractor shall provide for normal drainage and shall erect necessary temporary structures, signs, or other facilities at their own expense. During such period of suspension of work, the Contractor shall properly and continuously maintain in an acceptable growing condition all living material in newly established planting, seeding, and sodding furnished under the contract, and shall take adequate precautions to protect new tree growth and other important vegetative growth against injury.

70-15 CONTRACTOR'S RESPONSIBILITY FOR UTILITY SERVICE AND FACILITIES OF OTHERS. As provided in paragraph 70-04, *RESTORATION OF SURFACES DISTURBED BY OTHERS*, the Contractor shall cooperate with the owner of any public or private utility service, FAA or NOAA, or a utility service of another government agency that may be authorized by the Owner to construct, reconstruct or maintain such utility services or facilities during the progress of the work. In addition, the Contractor shall control their operations to prevent the unscheduled interruption of such utility services and facilities.

To the extent that such public or private utility services, FAA, or NOAA facilities, or utility services of another governmental agency are known to exist within the limits of the contract work, the approximate locations have been indicated on the plans and/or in the contract documents.

It is understood and agreed that the Owner does not guarantee the accuracy or the completeness of the location information relating to existing utility services, facilities, or structures that may be shown on the plans or encountered in the work. Any inaccuracy or omission in such information shall not relieve the Contractor of the responsibility to protect such existing features from damage or unscheduled interruption of service.

It is further understood and agreed that the Contractor shall, upon execution of the contract, notify the Owners of all utility services or other facilities of their plan of operations. Such notification shall be in writing addressed to "The Person to Contact" as provided in this paragraph and paragraph 70-04, *RESTORATION OF SURFACES DISTURBED BY OTHERS*. A copy of each notification shall be given to the RPR.

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In addition to the general written notification provided, it shall be the responsibility of the Contractor to keep such individual Owners advised of changes in their plan of operations that would affect such Owners.

Prior to beginning the work in the general vicinity of an existing utility service or facility, the Contractor shall again notify each such Owner of their plan of operation. If, in the Contractor's opinion, the Owner's assistance is needed to locate the utility service or facility or the presence of a representative of the Owner is desirable to observe the work, such advice should be included in the notification. Such notification shall be given by the most expeditious means to reach the utility owner's "Person to Contact" no later than two normal business days prior to the Contractor's commencement of operations in such general vicinity. The Contractor shall furnish a written summary of the notification to the RPR.

The Contractor's failure to give the two days' notice shall be cause for the Owner to suspend the Contractor's operations in the general vicinity of a utility service or facility.

Where the outside limits of an underground utility service have been located and staked on the ground, the Contractor shall be required to use hand excavation methods within 3 feet (1 m) of such outside limits at such points as may be required to ensure protection from damage due to the Contractor's operations.

Should the Contractor damage or interrupt the operation of a utility service or facility by accident or otherwise, the Contractor shall immediately notify the proper authority and the RPR and shall take all reasonable measures to prevent further damage or interruption of service. The Contractor, in such events, shall cooperate with the utility service or facility owner and the RPR continuously until such damage has been repaired and service restored to the satisfaction of the utility or facility owner.

The Contractor shall bear all costs of damage and restoration of service to any utility service or facility due to their operations whether due to negligence or accident. The Owner reserves the right to deduct such costs from any monies due or which may become due the Contractor, or their own surety.

70-15.1 FAA FACILITIES AND CABLE RUNS. The Contractor is hereby advised that the construction limits of the project include existing facilities and buried cable runs that are owned, operated and maintained by the FAA. The Contractor, during the execution of the project work, shall comply with the following:

a. The Contractor shall permit FAA maintenance personnel the right of access to the project work site for purposes of inspecting and maintaining all existing FAA owned facilities.

b. The Contractor shall provide notice to the FAA Air Traffic Organization (ATO)/Technical Operations/System Support Center (SSC) Point-of-Contact through the airport Operator a minimum of seven (7) calendar days prior to commencement of construction activities in order to permit sufficient time to locate and mark existing buried cables and to schedule any required facility outages.

c. If execution of the project work requires a facility outage, the Contractor shall contact the FAA Point-of-Contact a minimum of 72 hours prior to the time of the required outage.

d. Any damage to FAA cables, access roads, or FAA facilities during construction caused by the Contractor's equipment or personnel whether by negligence or accident will require

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the Contractor to repair or replace the damaged cables, access road, or FAA facilities to FAA requirements. The Contractor shall not bear the cost to repair damage to underground facilities or utilities improperly located by the FAA.

e. If the project work requires the cutting or splicing of FAA owned cables, the FAA Point-of-Contact shall be contacted a minimum of 72 hours prior to the time the cable work commences. The FAA reserves the right to have a FAA representative on site to observe the splicing of the cables as a condition of acceptance. All cable splices are to be accomplished in accordance with FAA specifications and require approval by the FAA Point-of-Contact as a condition of acceptance by the Owner. The Contractor is hereby advised that FAA restricts the location of where splices may be installed. If a cable splice is required in a location that is not permitted by FAA, the Contractor shall furnish and install a sufficient length of new cable that eliminates the need for any splice.

70-16 FURNISHING RIGHTS-OF-WAY. The Owner will be responsible for furnishing all rights-of-way upon which the work is to be constructed in advance of the Contractor's operations.

70-17 PERSONAL LIABILITY OF PUBLIC OFFICIALS. In carrying out any of the contract provisions or in exercising any power or authority granted by this contract, there shall be no liability upon the Engineer, RPR, their authorized representatives, or any officials of the Owner either personally or as an official of the Owner. It is understood that in such matters they act solely as agents and representatives of the Owner.

70-18 NO WAIVER OF LEGAL RIGHTS. Upon completion of the work, the Owner will expeditiously make final inspection and notify the Contractor of final acceptance. Such final acceptance, however, shall not preclude or stop the Owner from correcting any measurement, estimate, or certificate made before or after completion of the work, nor shall the Owner be precluded or stopped from recovering from the Contractor or their surety, or both, such overpayment as may be sustained, or by failure on the part of the Contractor to fulfill their obligations under the contract. A waiver on the part of the Owner of any breach of any part of the contract shall not be held to be a waiver of any other or subsequent breach.

The Contractor, without prejudice to the terms of the contract, shall be liable to the Owner for latent defects, fraud, or such gross mistakes as may amount to fraud, or as regards the Owner's rights under any warranty or guaranty.

70-19 ENVIRONMENTAL PROTECTION. The Contractor shall comply with all federal, state, and local laws and regulations controlling pollution of the environment. The Contractor shall take necessary precautions to prevent pollution of streams, lakes, ponds, and reservoirs with fuels, oils, asphalts, chemicals, or other harmful materials and to prevent pollution of the atmosphere from particulate and gaseous matter.

70-20 ARCHAEOLOGICAL AND HISTORICAL FINDINGS. Unless otherwise specified in this subsection, the Contractor is advised that the site of the work is not within any property, district, or site, and does not contain any building, structure, or object listed in the current National Register of Historic Places published by the United States Department of Interior.

Should the Contractor encounter, during their operations, any building, part of a building, structure, or object that is incongruous with its surroundings, the Contractor shall immediately cease operations in that location and notify the RPR. The RPR will immediately investigate the Contractor's finding

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and the Owner will direct the Contractor to either resume operations or to suspend operations as directed.

Should the Owner order suspension of the Contractor's operations in order to protect an archaeological or historical finding, or order the Contractor to perform extra work, such shall be covered by an appropriate contract change order or supplemental agreement as provided in Section 40, paragraph 40-04, *EXTRA WORK,* and Section 90, paragraph 90-05, *PAYMENT FOR EXTRA WORK*. If appropriate, the contract change order or supplemental agreement shall include an extension of contract time in accordance with Section 80, paragraph 80-07, *DETERMINATION AND EXTENSION OF CONTRACT TIME*.

70-21 INSURANCE REQUIREMENTS. See Section 7.4 of the *County of Ventura Standard Specifications* for insurance requirements.

END OF SECTION 70

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SECTION 80
EXECUTION AND PROGRESS

80-01 SUBLETTING OF CONTRACT. The Owner will not recognize any subcontractor on the work. The Contractor shall at all times when work is in progress be represented either in person, by a qualified superintendent, or by other designated, qualified representative who is duly authorized to receive and execute orders of the Resident Project Representative (RPR).

The Contractor shall perform, with his organization, an amount of work equal to at least 50 percent of the total contract cost.

Should the Contractor elect to assign their contract, said assignment shall be concurred in by the surety, shall be presented for the consideration and approval of the Owner, and shall be consummated only on the written approval of the Owner.

The Contractor shall provide copies of all subcontracts to the RPR prior to the end of the preconstruction mobilization phase and prior to the subcontractor being utilized on the project. As a minimum, the information shall include the following:

- Subcontractor's legal company name.
- Subcontractor's legal company address, including County name.
- Principal contact person's name, telephone and fax number.
- Complete narrative description, and dollar value of the work to be performed by the subcontractor.
- Copies of required insurance certificates in accordance with the specifications.
- Minority/ non-minority status.
- Federal Contract Provisions for Airport Improvement Program Projects must be included in-full in the contract. These cannot be included by reference only; they must be in the signed documents provided to the RPR.

80-02 NOTICE TO PROCEED (NTP). The Owners notice to proceed will state the date on which contract time commences. The Contractor is expected to commence project operations within 10 days of the NTP date. The Contractor shall notify the RPR at least 24 hours in advance of the time contract operations begins. The Contractor shall not commence any actual operations prior to the date on which the notice to proceed is issued by the Owner.

80-03 EXECUTION AND PROGRESS. Unless otherwise specified, the Contractor shall submit their coordinated construction schedule showing all work activities for the RPR's review and acceptance at least 10 days prior to the start of work. The Contractor's progress schedule, once accepted by the RPR, will represent the Contractor's baseline plan to accomplish the project in accordance with the terms and conditions of the Contract. The RPR will compare actual Contractor progress against the baseline schedule to determine that status of the Contractor's performance. The

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Contractor shall provide sufficient materials, equipment, and labor to guarantee the completion of the project in accordance with the plans and specifications within the time set forth in the proposal.

If the Contractor falls significantly behind the submitted schedule, the Contractor shall, upon the RPR's request, submit a revised schedule for completion of the work within the contract time and modify their operations to provide such additional materials, equipment, and labor necessary to meet the revised schedule. Should the execution of the work be discontinued for any reason, the Contractor shall notify the RPR at least 24 hours in advance of resuming operations.

The Contractor shall not commence any actual construction prior to the date on which the NTP is issued by the Owner.

The project schedule shall be prepared as a network diagram in Critical Path Method (CPM), Program Evaluation and Review Technique (PERT), or other format, or as otherwise specified. It shall include information on the sequence of work activities, milestone dates, and activity duration. The schedule shall show all work items identified in the project proposal for each work area and shall include the project start date and end date.

The Contractor shall maintain the work schedule and provide an update and analysis of the progress schedule on a **weekly** basis, or as otherwise specified in the contract. Submission of the work schedule shall not relieve the Contractor of overall responsibility for scheduling, sequencing, and coordinating all work to comply with the requirements of the contract.

80-04 LIMITATION OF OPERATIONS. The Contractor shall control their operations and the operations of their subcontractors and all suppliers to provide for the free and unobstructed movement of aircraft in the air operations areas (AOA) of the airport.

When the work requires the Contractor to conduct their operations within an AOA of the airport, the work shall be coordinated with airport operations (through the RPR) at least 72 hours prior to commencement of such work. The Contractor shall not close an AOA until so authorized by the RPR and until the necessary temporary marking, signage and associated lighting is in place as provided in Section 70, paragraph 70-08, *CONSTRUCTION SAFETY AND PHASING PLAN (CSPP)*.

When the contract work requires the Contractor to work within an AOA of the airport on an intermittent basis (intermittent opening and closing of the AOA), the Contractor shall maintain constant communications as specified; immediately obey all instructions to vacate the AOA; and immediately obey all instructions to resume work in such AOA. Failure to maintain the specified communications or to obey instructions shall be cause for suspension of the Contractor's operations in the AOA until satisfactory conditions are provided. The areas of the AOA identified in the Construction Safety Phasing Plan (CSPP) and as listed below, cannot be closed to operating aircraft to permit the Contractor's operations on a continuous basis and will therefore be closed to aircraft operations intermittently as follows:

AOA	Time Periods for Closure	Type of Communications Required	Control Authority
Refer to the Safety Plan of the Construction Drawings			**Airport Operations**

The Contractor shall be required to conform to safety standards contained in AC 150/5370-2, *Operational Safety on Airports During Construction* and the approved CSPP.

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80-04.1 OPERATIONAL SAFETY ON AIRPORT DURING CONSTRUCTION. All Contractors' operations shall be conducted in accordance with the approved project Construction Safety and Phasing Plan (CSPP) and the Safety Plan Compliance Document (SPCD) and the provisions set forth within the current version of AC 150/5370-2, *Operational Safety on Airports During Construction*. The CSPP included within the contract documents conveys minimum requirements for operational safety on the airport during construction activities. The Contractor shall prepare and submit a SPCD that details how it proposes to comply with the requirements presented within the CSPP.

The Contractor shall implement all necessary safety plan measures prior to commencement of any work activity. The Contractor shall conduct routine checks to assure compliance with the safety plan measures.

The Contractor is responsible to the Owner for the conduct of all subcontractors it employs on the project. The Contractor shall assure that all subcontractors are made aware of the requirements of the CSPP and SPCD and that they implement and maintain all necessary measures.

No deviation or modifications may be made to the approved CSPP and SPCD unless approved in writing by the Owner. The necessary coordination actions to review Contractor proposed modifications to an approved CSPP or approved SPCD can require a significant amount of time.

80-05 CHARACTER OF WORKERS, METHODS, AND EQUIPMENT. The Contractor shall, at all times, employ sufficient labor and equipment for prosecuting the work to full completion in the manner and time required by the contract, plans, and specifications.

All workers shall have sufficient skill and experience to perform properly the work assigned to them. Workers engaged in special work or skilled work shall have sufficient experience in such work and in the operation of the equipment required to perform the work satisfactorily.

Any person employed by the Contractor or by any subcontractor who violates any operational regulations or operational safety requirements and, in the opinion of the RPR, does not perform his work in a proper and skillful manner or is intemperate or disorderly shall, at the written request of the RPR, be removed immediately by the Contractor or subcontractor employing such person, and shall not be employed again in any portion of the work without approval of the RPR.

Should the Contractor fail to remove such person or persons, or fail to furnish suitable and sufficient personnel for the proper execution of the work, the RPR may suspend the work by written notice until compliance with such orders.

All equipment that is proposed to be used on the work shall be of sufficient size and in such mechanical condition as to meet requirements of the work and to produce a satisfactory quality of work. Equipment used on any portion of the work shall not cause injury to previously completed work, adjacent property, or existing airport facilities due to its use.

When the methods and equipment to be used by the Contractor in accomplishing the work are not prescribed in the contract, the Contractor is free to use any methods or equipment that will accomplish the work in conformity with the requirements of the contract, plans, and specifications.

When the contract specifies the use of certain methods and equipment, such methods and equipment shall be used unless otherwise authorized by the RPR. If the Contractor desires to use a method or

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type of equipment other than specified in the contract, the Contractor may request authority from the RPR to do so. The request shall be in writing and shall include a full description of the methods and equipment proposed and of the reasons for desiring to make the change. If approval is given, it will be on the condition that the Contractor will be fully responsible for producing work in conformity with contract requirements. If, after trial use of the substituted methods or equipment, the RPR determines that the work produced does not meet contract requirements, the Contractor shall discontinue the use of the substitute method or equipment and shall complete the remaining work with the specified methods and equipment. The Contractor shall remove any deficient work and replace it with work of specified quality, or take such other corrective action as the RPR may direct. No change will be made in basis of payment for the contract items involved nor in contract time as a result of authorizing a change in methods or equipment under this paragraph.

80-06 TEMPORARY SUSPENSION OF THE WORK. The Owner shall have the authority to suspend the work wholly, or in part, for such period or periods the Owner may deem necessary, due to unsuitable weather, or other conditions considered unfavorable for the execution of the work, or for such time necessary due to the failure on the part of the Contractor to carry out orders given or perform any or all provisions of the contract.

In the event that the Contractor is ordered by the Owner, in writing, to suspend work for some unforeseen cause not otherwise provided for in the contract and over which the Contractor has no control, the Contractor may be reimbursed for actual money expended on the work during the period of shutdown. No allowance will be made for anticipated profits. The period of shutdown shall be computed from the effective date of the written order to suspend work to the effective date of the written order to resume the work. Claims for such compensation shall be filed with the RPR within the time period stated in the RPR's order to resume work. The Contractor shall submit with their own claim information substantiating the amount shown on the claim. The RPR will forward the Contractor's claim to the Owner for consideration in accordance with local laws or ordinances. No provision of this article shall be construed as entitling the Contractor to compensation for delays due to inclement weather or for any other delay provided for in the contract, plans, or specifications.

If it becomes necessary to suspend work for an indefinite period, the Contractor shall store all materials in such manner that they will not become an obstruction nor become damaged in any way. The Contractor shall take every precaution to prevent damage or deterioration of the work performed and provide for normal drainage of the work. The Contractor shall erect temporary structures where necessary to provide for traffic on, to, or from the airport.

80-07 DETERMINATION AND EXTENSION OF CONTRACT TIME. The number of calendar days shall be stated in the proposal and contract and shall be known as the Contract Time.

If the contract time requires extension for reasons beyond the Contractor's control, it shall be adjusted as follows:

80-07.1 CONTRACT TIME BASED ON CALENDAR DAYS. Contract Time based on calendar days shall consist of the number of calendar days stated in the contract counting from the effective date of the Notice to Proceed and including all Saturdays, Sundays, holidays, and non-work days. All calendar days elapsing between the effective dates of the Owner's orders to suspend and resume all work, due to causes not the fault of the Contractor, shall be excluded.

At the time of final payment, the contract time shall be increased in the same proportion as the cost of the actually completed quantities bears to the cost of the originally estimated quantities in the

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proposal. Such increase in the contract time shall not consider either cost of work or the extension of contract time that has been covered by a change order or supplemental agreement. Charges against the contract time will cease as of the date of final acceptance.

80-08 FAILURE TO COMPLETE ON TIME. For each calendar day or working day, as specified in the contract, that any work remains uncompleted after the contract time (including all extensions and adjustments as provided in paragraph 80-07, *DETERMINATION AND EXTENSION OF CONTRACT TIME*) the sum specified in the contract and proposal as liquidated damages (LD) will be deducted from any money due or to become due the Contractor or their own surety. Such deducted sums shall not be deducted as a penalty but shall be considered as liquidation of a reasonable portion of damages including but not limited to additional engineering services that will be incurred by the Owner should the Contractor fail to complete the work in the time provided in their contract.

SCHEDULE	PHASE	LIQUIDATED DAMAGES COST	ALLOWED CONSTRUCTION TIME
Schedule I	Preconstruction Mobilization Phase	$500.00/15 minutes for night closures which consists of time for the FAA, Airport Staff, Construction Manager, Resident Engineer, and non-use for the Night Closures; $500/calendar day(s) for remainder.	10 Calendar Days (2 Calendar Days of Night Closures)
Schedule I	Phase 1	$6,150/calendar day(s) which consists of $2,500/calendar day(s) for non-use, $1,950/calendar day(s) for Construction Manager, and $1,700/calendar day(s) for Resident Engineer.	28 Calendar Days
Schedule I	Phase 2	$6,150/calendar day(s) which consists of $2,500/calendar day(s) for non-use, $1,950/calendar day(s) for Construction Manager, and $1,700/calendar day(s) for Resident Engineer.	32 Calendar Days
Schedule I	Phase 3	$6,150/calendar day(s) which consists of $2,500/calendar day(s) for non-use, $1,950/calendar day(s) for Construction Manager, and $1,700/calendar day(s) for Resident Engineer.	20 Calendar Days

The maximum construction time allowed for Schedule I will be the sum of the time allowed for Schedule I Preconstruction Mobilization Phase and Schedule I Phases 1, 2, and 3, but not more than **90** days. Permitting the Contractor to continue and finish the work or any part of it after the time fixed for its completion, or after the date to which the time for completion may have been extended, will in no way operate as a waiver on the part of the Owner of any of its rights under the contract.

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80-09 DEFAULT AND TERMINATION OF CONTRACT. The Contractor shall be considered in default of their contract and such default will be considered as cause for the Owner to terminate the contract for any of the following reasons, if the Contractor:

a. Fails to begin the work under the contract within the time specified in the Notice to Proceed, or

b. Fails to perform the work or fails to provide sufficient workers, equipment and/or materials to assure completion of work in accordance with the terms of the contract, or

c. Performs the work unsuitably or neglects or refuses to remove materials or to perform anew such work as may be rejected as unacceptable and unsuitable, or

d. Discontinues the execution of the work, or

e. Fails to resume work which has been discontinued within a reasonable time after notice to do so, or

f. Becomes insolvent or is declared bankrupt, or commits any act of bankruptcy or insolvency, or

g. Allows any final judgment to stand against the Contractor unsatisfied for a period of 10 days, or

h. Makes an assignment for the benefit of creditors, or

i. For any other cause whatsoever, fails to carry on the work in an acceptable manner.

Should the Owner consider the Contractor in default of the contract for any reason above, the Owner shall immediately give written notice to the Contractor and the Contractor's surety as to the reasons for considering the Contractor in default and the Owner's intentions to terminate the contract.

If the Contractor or surety, within a period of 10 days after such notice, does not proceed in accordance therewith, then the Owner will, upon written notification from the RPR of the facts of such delay, neglect, or default and the Contractor's failure to comply with such notice, have full power and authority without violating the contract, to take the execution of the work out of the hands of the Contractor. The Owner may appropriate or use any or all materials and equipment that have been mobilized for use in the work and are acceptable and may enter into an agreement for the completion of said contract according to the terms and provisions thereof, or use such other methods as in the opinion of the RPR will be required for the completion of said contract in an acceptable manner.

All costs and charges incurred by the Owner, together with the cost of completing the work under contract, will be deducted from any monies due or which may become due the Contractor. If such expense exceeds the sum which would have been payable under the contract, then the Contractor and the surety shall be liable and shall pay to the Owner the amount of such excess.

80-10 TERMINATION FOR NATIONAL EMERGENCIES. The Owner shall terminate the contract or portion thereof by written notice when the Contractor is prevented from proceeding with the construction contract as a direct result of an Executive Order of the President with respect to the execution of war or in the interest of national defense.

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When the contract, or any portion thereof, is terminated before completion of all items of work in the contract, payment will be made for the actual number of units or items of work completed at the contract price or as mutually agreed for items of work partially completed or not started. No claims or loss of anticipated profits shall be considered.

Reimbursement for organization of the work, and other overhead expenses, (when not otherwise included in the contract) and moving equipment and materials to and from the job will be considered, the intent being that an equitable settlement will be made with the Contractor.

Acceptable materials, obtained or ordered by the Contractor for the work and that are not incorporated in the work shall, at the option of the Contractor, be purchased from the Contractor at actual cost as shown by receipted bills and actual cost records at such points of delivery as may be designated by the RPR.

Termination of the contract or a portion thereof shall neither relieve the Contractor of their responsibilities for the completed work nor shall it relieve their surety of its obligation for and concerning any just claim arising out of the work performed.

80-11 WORK AREA, STORAGE AREA AND SEQUENCE OF OPERATIONS. The Contractor shall obtain approval from the RPR prior to beginning any work in all areas of the airport. No operating runway, taxiway, or air operations area (AOA) shall be crossed, entered, or obstructed while it is operational. The Contractor shall plan and coordinate work in accordance with the approved CSPP and SPCD.

END OF SECTION 80

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SECTION 90
MEASUREMENT AND PAYMENT

90-01 MEASUREMENT OF QUANTITIES. All work completed under the contract will be measured by the RPR, or their authorized representatives, using United States Customary Units of Measurement.

The method of measurement and computations to be used in determination of quantities of material furnished and of work performed under the contract will be those methods generally recognized as conforming to good engineering practice.

Unless otherwise specified, longitudinal measurements for area computations will be made horizontally, and no deductions will be made for individual fixtures (or leave-outs) having an area of 9 square feet (0.8 square meters) or less. Unless otherwise specified, transverse measurements for area computations will be the neat dimensions shown on the plans or ordered in writing by the RPR.

Unless otherwise specified, all contract items which are measured by the linear foot such as electrical ducts, conduits, pipe culverts, underdrains, and similar items shall be measured parallel to the base or foundation upon which such items are placed.

The term "lump sum" when used as an item of payment will mean complete payment for the work described in the contract. When a complete structure or structural unit (in effect, "lump sum" work) is specified as the unit of measurement, the unit will be construed to include all necessary fittings and accessories.

When requested by the Contractor and approved by the RPR in writing, material specified to be measured by the cubic yard (cubic meter) may be weighed, and such weights will be converted to cubic yards (cubic meters) for payment purposes. Factors for conversion from weight measurement to volume measurement will be determined by the RPR and shall be agreed to by the Contractor before such method of measurement of pay quantities is used.

Measurement and Payment Terms

Term	Description
Excavation and Embankment Volume	In computing volumes of excavation, the average end area method will be used unless otherwise specified.
Measurement and Proportion by Weight	The term "ton" will mean the short ton consisting of 2,000 pounds (907 km) avoirdupois. All materials that are measured or proportioned by weights shall be weighed on accurate, independently certified scales by competent, qualified personnel at locations designated by the RPR. If material is shipped by rail, the car weight may be accepted provided that only the actual weight of material is paid for. However, car weights will not be acceptable for material to be passed through mixing plants. Trucks used to haul material being paid for by weight shall be weighed empty daily at such times as the RPR directs, and each truck shall bear a plainly legible identification mark.
Measurement by Volume	Materials to be measured by volume in the hauling vehicle shall be hauled in approved vehicles and measured therein at the point of delivery. Vehicles for this purpose may be of any size or type acceptable for the materials hauled, provided that the body is of such shape that the actual contents may be readily

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Term	Description
	and accurately determined. All vehicles shall be loaded to at least their water level capacity, and all loads shall be leveled when the vehicles arrive at the point of delivery.
Asphalt Material	Asphalt materials will be measured by the gallon (liter) or ton (kg). When measured by volume, such volumes will be measured at 60°F (16°C) or will be corrected to the volume at 60°F (16°C) using ASTM D1250 for asphalts. Net certified scale weights or weights based on certified volumes in the case of rail shipments will be used as a basis of measurement, subject to correction when asphalt material has been lost from the car or the distributor, wasted, or otherwise not incorporated in the work. When asphalt materials are shipped by truck or transport, net certified weights by volume, subject to correction for loss or foaming, will be used for computing quantities.
Cement	Cement will be measured by the ton (kg) or hundredweight (km).
Structure	Structures will be measured according to neat lines shown on the plans or as altered to fit field conditions.
Timber	Timber will be measured by the thousand feet board measure (MFBM) actually incorporated in the structure. Measurement will be based on nominal widths and thicknesses and the extreme length of each piece.
Plates and Sheets	The thickness of plates and galvanized sheet used in the manufacture of corrugated metal pipe, metal plate pipe culverts and arches, and metal cribbing will be specified and measured in decimal fraction of inch.
Miscellaneous Items	When standard manufactured items are specified such as fence, wire, plates, rolled shapes, pipe conduit, etc., and these items are identified by gauge, unit weight, section dimensions, etc., such identification will be considered to be nominal weights or dimensions. Unless more stringently controlled by tolerances in cited specifications, manufacturing tolerances established by the industries involved will be accepted.
Scales	Scales must be tested for accuracy and serviced before use. Scales for weighing materials which are required to be proportioned or measured and paid for by weight shall be furnished, erected, and maintained by the Contractor, or be certified permanently installed commercial scales. Platform scales shall be installed and maintained with the platform level and rigid bulkheads at each end. Scales shall be accurate within 0.5% of the correct weight throughout the range of use. The Contractor shall have the scales checked under the observation of the RPR before beginning work and at such other times as requested. The intervals shall be uniform in spacing throughout the graduated or marked length of the beam or dial and shall not exceed 0.1% of the nominal rated capacity of the scale, but not less than one pound (454 grams). The use of spring balances will not be permitted. In the event inspection reveals the scales have been "overweighing" (indicating more than correct weight) they will be immediately adjusted. All materials received subsequent to the last previous correct weighting-accuracy test will be reduced by the percentage of error in excess of 0.5%.

Term	Description
	In the event inspection reveals the scales have been under-weighing (indicating less than correct weight), they shall be immediately adjusted. No additional payment to the Contractor will be allowed for materials previously weighed and recorded. Beams, dials, platforms, and other scale equipment shall be so arranged that the operator and the RPR can safely and conveniently view them. Scale installations shall have available ten standard 50-pound (2.3 km) weights for testing the weighing equipment or suitable weights and devices for other approved equipment. All costs in connection with furnishing, installing, certifying, testing, and maintaining scales; for furnishing check weights and scale house; and for all other items specified in this subsection, for the weighing of materials for proportioning or payment, shall be included in the unit contract prices for the various items of the project.
Rental Equipment	Rental of equipment will be measured by time in hours of actual working time and necessary traveling time of the equipment within the limits of the work. Special equipment ordered in connection with extra work will be measured as agreed in the change order or supplemental agreement authorizing such work as provided in paragraph 90-05 *Payment for Extra Work*.
Pay Quantities	When the estimated quantities for a specific portion of the work are designated as the pay quantities in the contract, they shall be the final quantities for which payment for such specific portion of the work will be made, unless the dimensions of said portions of the work shown on the plans are revised by the RPR. If revised dimensions result in an increase or decrease in the quantities of such work, the final quantities for payment will be revised in the amount represented by the authorized changes in the dimensions.

90-02 SCOPE OF PAYMENT. The Contractor shall receive and accept compensation provided for in the contract as full payment for furnishing all materials, for performing all work under the contract in a complete and acceptable manner, and for all risk, loss, damage, or expense of whatever character arising out of the nature of the work or the execution thereof, subject to the provisions of Section 70, paragraph 70-18, *NO WAIVER OF LEGAL RIGHTS*.

When the "basis of payment" subsection of a technical specification requires that the contract price (price bid) include compensation for certain work or material essential to the item, this same work or material will not also be measured for payment under any other contract item which may appear elsewhere in the contract, plans, or specifications.

90-03 COMPENSATION FOR ALTERED QUANTITIES. When the accepted quantities of work vary from the quantities in the proposal, the Contractor shall accept as payment in full, so far as contract items are concerned, payment at the original contract price for the accepted quantities of work actually completed and accepted. No allowance, except as provided for in Section 40, paragraph 40-02, *ALTERATION OF WORK AND QUANTITIES,* will be made for any increased expense, loss of expected reimbursement, or loss of anticipated profits suffered or claimed by the Contractor

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which results directly from such alterations or indirectly from their own unbalanced allocation of overhead and profit among the contract items, or from any other cause.

90-04 PAYMENT FOR OMITTED ITEMS. As specified in Section 40, paragraph 40-03, *OMITTED ITEMS,* the RPR shall have the right to omit from the work (order nonperformance) any contract item, except major contract items, in the best interest of the Owner.

Should the RPR omit or order nonperformance of a contract item or portion of such item from the work, the Contractor shall accept payment in full at the contract prices for any work actually completed and acceptable prior to the RPR's order to omit or non-perform such contract item.

Acceptable materials ordered by the Contractor or delivered on the work prior to the date of the RPR's order will be paid for at the actual cost to the Contractor and shall thereupon become the property of the Owner.

In addition to the reimbursement hereinbefore provided, the Contractor shall be reimbursed for all actual costs incurred for the purpose of performing the omitted contract item prior to the date of the RPR's order. Such additional costs incurred by the Contractor must be directly related to the deleted contract item and shall be supported by certified statements by the Contractor as to the nature the amount of such costs

90-05 PAYMENT FOR EXTRA WORK. Extra work, performed in accordance with Section 40, paragraph 40-04, *EXTRA WORK*, will be paid for at the contract prices or agreed prices specified in the change order or supplemental agreement authorizing the extra work.

90-06 PARTIAL PAYMENTS Partial payments will be made to the Contractor at least once each month as the work progresses. Said payments will be based upon estimates, prepared by the RPR, of the value of the work performed and materials complete and in place, in accordance with the contract, plans, and specifications. Such partial payments may also include the delivered actual cost of those materials stockpiled and stored in accordance with paragraph 90-07, *PAYMENT FOR MATERIALS ON HAND*. No partial payment will be made when the amount due to the Contractor since the last estimate amounts to less than five hundred dollars.

The Owner may hold retainage from prime Contractors and provide for prompt and regular incremental acceptances of portions of the prime contract, pay retainage to prime Contractors based on these acceptances, and require a contract clause obligating the prime Contractor to pay all retainage owed to the subcontractor for satisfactory completion of the accepted work within 30 days after the Owner's payment to the prime Contractor. If Option 3 is selected, the percent withheld may range from 0% to 10% but in no case may it exceed 10%. When establishing a suitable retainage value that protects the Owner's interests, give consideration that the performance and payment bonds also provide similar protection of Owner interests. Owner may elect to incrementally release retainage if owner is satisfied its interest with completion of the project are protected in an adequate manner. If Option 3 is selected, insert the following clause and specify a suitable value where indicated:

a. From the total of the amount determined to be payable on a partial payment, 5% percent of such total amount will be deducted and retained by the Owner for protection of the Owner's interests. Unless otherwise instructed by the Owner, the amount retained by the Owner will be in effect until the final payment is made except as follows:

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(1) Contractor may request release of retainage on work that has been partially accepted by the Owner in accordance with Section 50-14. Contractor must provide a certified invoice to the RPR that supports the value of retainage held by the Owner for partially accepted work.

(2) In lieu of retainage, the Contractor may exercise at its option the establishment of an escrow account per paragraph 90-08.

b. The Contractor is required to pay all subcontractors for satisfactory performance of their contracts no later than 30 days after the Contractor has received a partial payment. Contractor must provide the Owner evidence of prompt and full payment of retainage held by the prime Contractor to the subcontractor within 30 days after the subcontractor's work is satisfactorily completed. A subcontractor's work is satisfactorily completed when all the tasks called for in the subcontract have been accomplished and documented as required by the Owner. When the Owner has made an incremental acceptance of a portion of a prime contract, the work of a subcontractor covered by that acceptance is deemed to be satisfactorily completed.

c. When at least 95% of the work has been completed to the satisfaction of the RPR, the RPR shall, at the Owner's discretion and with the consent of the surety, prepare estimates of both the contract value and the cost of the remaining work to be done. The Owner may retain an amount not less than twice the contract value or estimated cost, whichever is greater, of the work remaining to be done. The remainder, less all previous payments and deductions, will then be certified for payment to the Contractor.

It is understood and agreed that the Contractor shall not be entitled to demand or receive partial payment based on quantities of work in excess of those provided in the proposal or covered by approved change orders or supplemental agreements, except when such excess quantities have been determined by the RPR to be a part of the final quantity for the item of work in question.

No partial payment shall bind the Owner to the acceptance of any materials or work in place as to quality or quantity. All partial payments are subject to correction at the time of final payment as provided in paragraph 90-09, *ACCEPTANCE AND FINAL PAYMENT*.

The Contractor shall deliver to the Owner a complete release of all claims for labor and material arising out of this contract before the final payment is made. If any subcontractor or supplier fails to furnish such a release in full, the Contractor may furnish a bond or other collateral satisfactory to the Owner to indemnify the Owner against any potential lien or other such claim. The bond or collateral shall include all costs, expenses, and attorney fees the Owner may be compelled to pay in discharging any such lien or claim.

90-07 PAYMENT FOR MATERIALS ON HAND. Partial payments may be made to the extent of the delivered cost of materials to be incorporated in the work, provided that such materials meet the requirements of the contract, plans, and specifications and are delivered to acceptable sites on the airport property or at other sites in the vicinity that are acceptable to the Owner. Such delivered costs of stored or stockpiled materials may be included in the next partial payment after the following conditions are met:

a. The material has been stored or stockpiled in a manner acceptable to the RPR at or on an approved site.

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b. The Contractor has furnished the RPR with acceptable evidence of the quantity and quality of such stored or stockpiled materials.

c. The Contractor has furnished the RPR with satisfactory evidence that the material and transportation costs have been paid.

d. The Contractor has furnished the Owner legal title (free of liens or encumbrances of any kind) to the material stored or stockpiled.

e. The Contractor has furnished the Owner evidence that the material stored or stockpiled is insured against loss by damage to or disappearance of such materials at any time prior to use in the work.

It is understood and agreed that the transfer of title and the Owner's payment for such stored or stockpiled materials shall in no way relieve the Contractor of their responsibility for furnishing and placing such materials in accordance with the requirements of the contract, plans, and specifications.

In no case will the amount of partial payments for materials on hand exceed the contract price for such materials or the contract price for the contract item in which the material is intended to be used.

No partial payment will be made for stored or stockpiled living or perishable plant materials. The Contractor shall bear all costs associated with the partial payment of stored or stockpiled materials in accordance with the provisions of this paragraph.

90-08 PAYMENT OF WITHHELD FUNDS. At the Contractor's option, if an Owner withholds retainage in accordance with the methods described in paragraph 90-06 *PARTIAL PAYMENTS*, the Contractor may request that the Owner deposit the retainage into an escrow account. The Owner's deposit of retainage into an escrow account is subject to the following conditions:

a. The Contractor shall bear all expenses of establishing and maintaining an escrow account and escrow agreement acceptable to the Owner.

b. The Contractor shall deposit to and maintain in such escrow only those securities or bank certificates of deposit as are acceptable to the Owner and having a value not less than the retainage that would otherwise be withheld from partial payment.

c. The Contractor shall enter into an escrow agreement satisfactory to the Owner.

d. The Contractor shall obtain the written consent of the surety to such agreement.

90-09 ACCEPTANCE AND FINAL PAYMENT. When the contract work has been accepted in accordance with the requirements of Section 50, paragraph 50-15, *FINAL ACCEPTANCE*, the RPR will prepare the final estimate of the items of work actually performed. The Contractor shall approve the RPR's final estimate or advise the RPR of the Contractor's objections to the final estimate which are based on disputes in measurements or computations of the final quantities to be paid under the contract as amended by change order or supplemental agreement. The Contractor and the RPR shall resolve all disputes (if any) in the measurement and computation of final quantities to be paid within 30 calendar days of the Contractor's receipt of the RPR's final estimate. If, after such 30-day period, a dispute still exists, the Contractor may approve the RPR's estimate under protest of the quantities

in dispute, and such disputed quantities shall be considered by the Owner as a claim in accordance with Section 50, paragraph 50-16, *CLAIMS FOR ADJUSTMENT AND DISPUTES*.

After the Contractor has approved, or approved under protest, the RPR's final estimate, and after the RPR's receipt of the project closeout documentation required in paragraph 90-11, *CONTRACTOR FINAL PROJECT DOCUMENTATION*, final payment will be processed based on the entire sum, or the undisputed sum in case of approval under protest, determined to be due the Contractor less all previous payments and all amounts to be deducted under the provisions of the contract. All prior partial estimates and payments shall be subject to correction in the final estimate and payment.

If the Contractor has filed a claim for additional compensation under the provisions of Section 50, paragraph 50-16, *CLAIMS FOR ADJUSTMENTS AND DISPUTES,* or under the provisions of this paragraph, such claims will be considered by the Owner in accordance with local laws or ordinances. Upon final adjudication of such claims, any additional payment determined to be due the Contractor will be paid pursuant to a supplemental final estimate.

90-10 CONSTRUCTION WARRANTY.

a. In addition to any other warranties in this contract, the Contractor warrants that work performed under this contract conforms to the contract requirements and is free of any defect in equipment, material, workmanship, or design furnished, or performed by the Contractor or any subcontractor or supplier at any tier.

b. This warranty shall continue for a period of one year from the date of final acceptance of the work, except as noted. If the Owner takes possession of any part of the work before final acceptance, this warranty shall continue for a period of one year from the date the Owner takes possession. However, this will not relieve the Contractor from corrective items required by the final acceptance of the project work. Light Emitting Diode emitting diode (LED) light fixtures with the exception of obstruction lighting, must be warranted by the manufacturer for a minimum of four (4) years after date of installation inclusive of all electronics.

c. The Contractor shall remedy at the Contractor's expense any failure to conform, or any defect. In addition, the Contractor shall remedy at the Contractor's expense any damage to Owner real or personal property, when that damage is the result of the Contractor's failure to conform to contract requirements; or any defect of equipment, material, workmanship, or design furnished by the Contractor.

d. The Contractor shall restore any work damaged in fulfilling the terms and conditions of this clause. The Contractor's warranty with respect to work repaired or replaced will run for one year from the date of repair or replacement.

e. The Owner will notify the Contractor, in writing, within **seven (7)** days after the discovery of any failure, defect, or damage.

f. If the Contractor fails to remedy any failure, defect, or damage within **14** days after receipt of notice, the Owner shall have the right to replace, repair, or otherwise remedy the failure, defect, or damage at the Contractor's expense.

g. With respect to all warranties, express or implied, from subcontractors, manufacturers, or suppliers for work performed and materials furnished under this contract, the Contractor shall:

(1) Obtain all warranties that would be given in normal commercial practice;

(2) Require all warranties to be executed, in writing, for the benefit of the Owner, as directed by the Owner, and

(3) Enforce all warranties for the benefit of the Owner.

h. This warranty shall not limit the Owner's rights with respect to latent defects, gross mistakes, or fraud.

90-11 Contractor Final Project Documentation. Approval of final payment to the Contractor is contingent upon completion and submittal of the items listed below. The final payment will not be approved until the RPR approves the Contractor's final submittal. The Contractor shall:

a. Provide two (2) copies of all manufacturers warranties specified for materials, equipment, and installations.

b. Provide weekly payroll records (not previously received) from the general Contractor and all subcontractors.

c. Complete final cleanup in accordance with Section 40, paragraph 40-08, Final Cleanup.

d. Complete all punch list items identified during the Final Inspection.

e. Provide complete release of all claims for labor and material arising out of the Contract.

f. Provide a certified statement signed by the subcontractors, indicating actual amounts paid to the Disadvantaged Business Enterprise (DBE) subcontractors and/or suppliers associated with the project.

g. When applicable per state requirements, return copies of sales tax completion forms.

h. Manufacturer's certifications for all items incorporated in the work.

i. All required record drawings, as-built drawings or as-constructed drawings.

j. Project Operation and Maintenance (O&M) Manual(s).

k. Security for Construction Warranty.

l. Equipment commissioning documentation submitted, if required.

END OF SECTION 90

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PART 2 - GENERAL CONSTRUCTION ITEMS

ITEM C-100
CONTRACTOR QUALITY CONTROL PROGRAM (CQCP)

100-01 GENERAL. Quality is more than test results. Quality is the combination of proper materials, testing, workmanship, equipment, inspection, and documentation of the project. Establishing and maintaining a culture of quality is key to achieving a quality project. The Contractor shall establish, provide, and maintain an effective Contractor Quality Control Program (CQCP) that details the methods and procedures that will be taken to assure that all materials and completed construction required by this contract conform to contract plans, technical specifications and other requirements, whether manufactured by the Contractor, or procured from subcontractors or vendors. Although guidelines are established and certain minimum requirements are specified here and elsewhere in the contract technical specifications, the Contractor shall assume full responsibility for accomplishing the stated purpose.

The Contractor shall establish a CQCP that will:

a. Provide qualified personnel to develop and implement the CQCP.

b. Provide for the production of acceptable quality materials.

c. Provide sufficient information to assure that the specification requirements can be met.

d. Document the CQCP process.

The Contractor shall not begin any construction or production of materials to be incorporated into the completed work until the CQCP has been reviewed and approved by the Resident Project Representative (RPR). No partial payment will be made for materials subject to specific quality control (QC) requirements until the CQCP has been reviewed and approved.

The QC requirements contained in this section and elsewhere in the contract technical specifications are in addition to and separate from the quality assurance (QA) testing requirements. QA testing requirements are the responsibility of the RPR or Contractor as specified in the specifications.

A Quality Control (QC)/Quality Assurance (QA) workshop with the Engineer, Resident Project Representative (RPR), Contractor, subcontractors, testing laboratories, and Owner's representative must be held prior to start of construction. The QC/QA workshop will be facilitated by the Contractor. The Contractor shall coordinate with the Airport and the RPR on time and location of the QC/QA workshop. Items to be addressed, at a minimum, will include:

a. Review of the CQCP including submittals, QC Testing, Action & Suspension Limits for Production, Corrective Action Plans, Distribution of QC reports, and Control Charts.

b. Discussion of the QA program.

c. Discussion of the QC and QA Organization and authority including coordination and information exchange between QC and QA.

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d. Establish regular meetings to discuss control of materials, methods and testing.

e. Establishment of the overall QC culture.

Paving projects over $500,000 shall have a Quality Control (QC)/Quality Assurance (QA) workshop with the Engineer, Contractor, subcontractors, testing laboratories, and Owner's representative at start of construction. The workshop shall address QC and QA requirements of the project specifications. The Contractor shall coordinate with the Airport and the Engineer on time and location of the QC/QA workshop.

100-02 DESCRIPTION OF PROGRAM.

a. **General description.** The Contractor shall establish a CQCP to perform QC inspection and testing of all items of work required by the technical specifications, including those performed by subcontractors. The CQCP shall ensure conformance to applicable specifications and plans with respect to materials, off-site fabrication, workmanship, construction, finish, and functional performance. The CQCP shall be effective for control of all construction work performed under this Contract and shall specifically include surveillance and tests required by the technical specifications, in addition to other requirements of this section and any other activities deemed necessary by the Contractor to establish an effective level of QC.

b. **Contractor Quality Control Program (CQCP).** The Contractor shall describe the CQCP in a written document that shall be reviewed and approved by the RPR prior to the start of any production, construction, or off-site fabrication. The written CQCP shall be submitted to the RPR for review and approval at least 10 calendar days before the CQCP Workshop. The Contractor's CQCP and QC testing laboratory must be approved in writing by the RPR prior to the Notice to Proceed (NTP).

The CQCP shall be organized to address, as a minimum, the following:

1. QC organization and resumes of key staff
2. Project progress schedule
3. Submittals schedule
4. Inspection requirements
5. QC testing plan
6. Documentation of QC activities and distribution of QC reports
7. Requirements for corrective action when QC and/or QA acceptance criteria are not met
8. Material quality and construction means and methods. Address all elements applicable to the project that affect the quality of the pavement structure including subgrade, subbase, base, and surface course. Some elements that must be addressed include, but is not limited to mix design, aggregate grading, stockpile management, mixing and transporting, placing

Exhibit 1

and finishing, quality control testing and inspection, smoothness, laydown plan, equipment, and temperature management plan.

The Contractor must add any additional elements to the CQCP that is necessary to adequately control all production and/or construction processes required by this contract

100-03 CQCP ORGANIZATION. The CQCP shall be implemented by the establishment of a QC organization. An organizational chart shall be developed to show all QC personnel, their authority, and how these personnel integrate with other management/production and construction functions and personnel.

The organizational chart shall identify all QC staff by name and function, and shall indicate the total staff required to implement all elements of the CQCP, including inspection and testing for each item of work. If necessary, different technicians can be used for specific inspection and testing functions for different items of work. If an outside organization or independent testing laboratory is used for implementation of all or part of the CQCP, the personnel assigned shall be subject to the qualification requirements of paragraphs 100-03a and 100-03b. The organizational chart shall indicate which personnel are Contractor employees and which are provided by an outside organization.

The QC organization shall, as a minimum, consist of the following personnel:

a. Program Administrator. The Contractor Quality Control Program Administrator (CQCPA) must be a full-time employee of the Contractor, or a consultant engaged by the Contractor. The CQCPA must have a minimum of five (5) years of experience in QC pavement construction with prior QC experience on a project of comparable size and scope as the contract.

Included in the five (5) years of paving/QC experience, the CQCPA must meet at least one of the following requirements:

(1) Professional Engineer with one (1) year of airport paving experience.

(2) Engineer-in-training with two (2) years of airport paving experience.

(3) National Institute for Certification in Engineering Technologies (NICET) Civil Engineering Technology Level IV with three (3) years of airport paving experience.

(4) An individual with four (4) years of airport paving experience, with a Bachelor of Science Degree in Civil Engineering, Civil Engineering Technology or Construction.

The CQCPA must have full authority to institute any and all actions necessary for the successful implementation of the CQCP to ensure compliance with the contract plans and technical specifications. The CQCPA authority must include the ability to immediately stop production until materials and/or processes are in compliance with contract specifications. The CQCPA must report directly to a principal officer of the construction firm. The CQCPA may supervise the Quality Control Program on more than one project provided that person can be at the job site within two (2) hours after being notified of a problem.

b. QC technicians. A sufficient number of QC technicians necessary to adequately implement the CQCP must be provided. These personnel must be either Engineers, engineering technicians, or experienced craftsman with qualifications in the appropriate field equivalent to NICET Level II in Civil Engineering Technology or higher, and shall have a minimum of two (2) years of experience in their area of expertise.

The QC technicians must report directly to the CQCPA and shall perform the following functions:

(1) Inspection of all materials, construction, plant, and equipment for conformance to the technical specifications, and as required by paragraph 100-6.
(2) Performance of all QC tests as required by the technical specifications and paragraph100-8.
(3) Performance of tests for the RPR when required by the technical specifications.

Certification at an equivalent level of qualification and experience by a state or nationally recognized organization will be acceptable in lieu of NICET certification.

c. Staffing levels. The Contractor shall provide sufficient qualified QC personnel to monitor each work activity at all times. Where material is being produced in a plant for incorporation into the work, separate plant and field technicians shall be provided at each plant and field placement location. The scheduling and coordinating of all inspection and testing must match the type and pace of work activity. The CQCP shall state where different technicians will be required for different work elements.

100-04 PROJECT PROGRESS SCHEDULE. Critical QC activities must be shown on the project schedule as required by Section 80, paragraph 80-03, *EXECUTION AND PROGRESS*.

100-05 SUBMITTALS SCHEDULE. The Contractor shall submit a detailed listing of all submittals (for example, mix designs, material certifications) and shop drawings required by the technical specifications. The listing can be developed in a spreadsheet format and shall include as a minimum:

a. Specification item number

b. Item description

c. Description of submittal

d. Specification paragraph requiring submittal

e. Scheduled date of submittal

100-06 INSPECTION REQUIREMENTS. QC inspection functions shall be organized to provide inspections for all definable features of work, as detailed below. All inspections shall be documented by the Contractor as specified by paragraph 100-9.

Inspections shall be performed as needed to ensure continuing compliance with contract requirements until completion of the particular feature of work. Inspections shall include the following minimum requirements:

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a. During plant operation for material production, QC test results and periodic inspections shall be used to ensure the quality of aggregates and other mix components, and to adjust and control mix proportioning to meet the approved mix design and other requirements of the technical specifications. All equipment used in proportioning and mixing shall be inspected to ensure its proper operating condition. The CQCP shall detail how these and other QC functions will be accomplished and used.

b. During field operations, QC test results and periodic inspections shall be used to ensure the quality of all materials and workmanship. All equipment used in placing, finishing, and compacting shall be inspected to ensure its proper operating condition and to ensure that all such operations are in conformance to the technical specifications and are within the plan dimensions, lines, grades, and tolerances specified. The CQCP shall document how these and other QC functions will be accomplished and used.

100-07 CONTRACTOR QC TESTING FACILITY.

a. For projects that include Item P-401, Item P-403, and Item P-404, the Contractor shall ensure facilities, including all necessary equipment, materials, and current reference standards, are provided that meet requirements in the following paragraphs of ASTM D3666, *Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials*:

- 8.1.3 Equipment Calibration and Checks;
- 8.1.9 Equipment Calibration, Standardization, and Check Records;
- 8.1.12 Test Methods and Procedures

b. For projects that include P-501, the Contractor shall ensure facilities, including all necessary equipment, materials, and current reference standards, are provided that meet requirements in the following paragraphs of ASTM C1077, *Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation*:

- 7 Test Methods and Procedures
- 8 Facilities, Equipment, and Supplemental Procedures

100-08 QC TESTING PLAN. As a part of the overall CQCP, the Contractor shall implement a QC testing plan, as required by the technical specifications. The testing plan shall include the minimum tests and test frequencies required by each technical specification Item, as well as any additional QC tests that the Contractor deems necessary to adequately control production and/or construction processes.

The QC testing plan can be developed in a spreadsheet fashion and shall, as a minimum, include the following:

a. Specification item number (e.g., P-401)

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b. Item description (e.g., Hot Mix Asphalt Pavements)

c. Test type (e.g., gradation, grade, asphalt content)

d. Test standard (e.g., ASTM or American Association of State Highway and Transportation Officials (AASHTO) test number, as applicable)

e. Test frequency (e.g., as required by technical specifications or minimum frequency when requirements are not stated)

f. Responsibility (e.g., plant technician)

g. Control requirements (e.g., target, permissible deviations)

The QC testing plan shall contain a statistically-based procedure of random sampling for acquiring test samples in accordance with ASTM D3665. The RPR shall be provided the opportunity to witness QC sampling and testing.

All QC test results shall be documented by the Contractor as required by paragraph 100-9.

100-09 DOCUMENTATION. The Contractor shall maintain current QC records of all inspections and tests performed. These records shall include factual evidence that the required QC inspections or tests have been performed, including type and number of inspections or tests involved; results of inspections or tests; nature of defects, deviations, causes for rejection, etc.; proposed remedial action; and corrective actions taken.

These records must cover both conforming and defective or deficient features, and must include a statement that all supplies and materials incorporated in the work are in full compliance with the terms of the contract. Legible copies of these records shall be furnished to the RPR daily. The records shall cover all work placed subsequent to the previously furnished records and shall be verified and signed by the CQCPA.

Contractor QC records required for the contract shall include, but are not necessarily limited to, the following records:

a. **Daily inspection reports.** Each Contractor QC technician shall maintain a daily log of all inspections performed for both Contractor and subcontractor operations. These technician's daily reports shall provide factual evidence that continuous QC inspections have been performed and shall, as a minimum, include the following:

(1) Technical specification item number and description

(2) Compliance with approved submittals

(3) Proper storage of materials and equipment

(4) Proper operation of all equipment

(5) Adherence to plans and technical specifications

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(6) Summary of any necessary corrective actions

(7) Safety inspection.

(8) Photographs and/or video.

The daily inspection reports shall identify all QC inspections and QC tests conducted, results of inspections, location and nature of defects found, causes for rejection, and remedial or corrective actions taken or proposed.

The daily inspection reports shall be signed by the responsible QC technician and the CQCPA. The RPR shall be provided at least one copy of each daily inspection report on the work day following the day of record. When QC inspection and test results are recorded and transmitted electronically, the results must be archived.

b. Daily test reports. The Contractor shall be responsible for establishing a system that will record all QC test results. Daily test reports shall document the following information:

(1) Technical specification item number and description

(2) Test designation

(3) Location

(4) Date of test

(5) Control requirements

(6) Test results

(7) Causes for rejection

(8) Recommended remedial actions

(9) Retests

Test results from each day's work period shall be submitted to the RPR prior to the start of the next day's work period. When required by the technical specifications, the Contractor shall maintain statistical QC charts. When QC daily test results are recorded and transmitted electronically, the results must be archived.

100-10 CORRECTIVE ACTION REQUIREMENTS. The CQCP shall indicate the appropriate action to be taken when a process is deemed, or believed, to be out of control (out of tolerance) and detail what action will be taken to bring the process into control. The requirements for corrective action shall include both general requirements for operation of the CQCP as a whole, and for individual items of work contained in the technical specifications.

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The CQCP shall detail how the results of QC inspections and tests will be used for determining the need for corrective action and shall contain clear rules to gauge when a process is out of control and the type of correction to be taken to regain process control.

When applicable or required by the technical specifications, the Contractor shall establish and use statistical QC charts for individual QC tests. The requirements for corrective action shall be linked to the control charts.

100-11 INSPECTION AND/OR OBSERVATIONS BY THE RPR. All items of material and equipment are subject to inspection and/or observation by the RPR at the point of production, manufacture or shipment to determine if the Contractor, producer, manufacturer or shipper maintains an adequate QC system in conformance with the requirements detailed here and the applicable technical specifications and plans. In addition, all items of materials, equipment and work in place shall be subject to inspection and/or observation by the RPR at the site for the same purpose.

Inspection and/or observations by the RPR does not relieve the Contractor of performing QC inspections of either on-site or off-site Contractor's or subcontractor's work.

100-12 NONCOMPLIANCE.

a. The Resident Project Representative (RPR) will provide written notice to the Contractor of any noncompliance with their CQCP. After receipt of such notice, the Contractor must take corrective action.

b. When QC activities do not comply with either the CQCP or the contract provisions or when the Contractor fails to properly operate and maintain an effective CQCP, and no effective corrective actions have been taken after notification of non-compliance, the RPR will recommend the Owner take the following actions:

(1) Order the Contractor to replace ineffective or unqualified QC personnel or subcontractors and/or

(2) Order the Contractor to stop operations until appropriate corrective actions are taken.

METHOD OF MEASUREMENT

100-13 Basis of measurement and payment. Quality Control Program (CQCP) is for the personnel, tests, facilities and documentation required to implement the CQCP. The CQCP will be paid as a lump sum with the following schedule of partial payments:

a. With first pay request, 25% with approval of CQCP and completion of the Quality Control (QC)/Quality Assurance (QA) workshop.
b. When 25% or more of the original contract is earned, an additional 25%.
c. When 50% or more of the original contract is earned, an additional 20%.
d. When 75% or more of the original contract is earned, an additional 20%
e. After final inspection and acceptance of project, the final 10%.

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BASIS OF PAYMENT

100-14 Payment will be made under:

Item C-100a Contractor Quality Control Program (CQCP) – Lump Sum

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

National Institute for Certification in Engineering Technologies (NICET)

ASTM International (ASTM)

ASTM C1077	Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation
ASTM D3665	Standard Practice for Random Sampling of Construction Materials
ASTM D3666	Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials

END OF ITEM C-100

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ITEM C-102
TEMPORARY AIR AND WATER POLLUTION, SOIL EROSION, AND SILTATION CONTROL

DESCRIPTION

102-1. This item shall consist of temporary control measures as shown on the plans or as ordered by the Resident Project Representative (RPR) during the life of a contract to control pollution of air and water, soil erosion, and siltation through the use of silt fences, berms, dikes, dams, sediment basins, fiber mats, gravel, mulches, grasses, slope drains, and other erosion control devices or methods.

Temporary erosion control shall be in accordance with the approved erosion control plan; the approved Construction Safety and Phasing Plan (CSPP) and AC 150/5370-2, *Operational Safety on Airports During Construction*. The temporary erosion control measures contained herein shall be coordinated with the permanent erosion control measures specified as part of this contract to the extent practical to assure economical, effective, and continuous erosion control throughout the construction period.

Temporary control may include work outside the construction limits such as borrow pit operations, equipment and material storage sites, waste areas, and temporary plant sites.

Temporary control measures shall be designed, installed and maintained to minimize the creation of wildlife attractants that have the potential to attract hazardous wildlife on or near public-use airports.

MATERIALS

102-2.1 Grass. Grass that will not compete with the grasses sown later for permanent cover per Item T-901 shall be a quick-growing species (such as ryegrass, Italian ryegrass, or cereal grasses) suitable to the area providing a temporary cover. Selected grass species shall not create a wildlife attractant.

102-2.2 Mulches. Mulches may be hay, straw, fiber mats, netting, bark, wood chips, or other suitable material reasonably clean and free of noxious weeds and deleterious materials per Item T-908. Mulches shall not create a wildlife attractant.

102-2.3 Fertilizer. Fertilizer shall be a standard commercial grade and shall conform to all federal and state regulations and to the standards of the Association of Official Agricultural Chemists.

102-2.4 Slope drains. Slope drains may be constructed of pipe, fiber mats, rubble, concrete, asphalt, or other materials that will adequately control erosion.

102-2.5 Silt fence. Silt fence shall consist of polymeric filaments which are formed into a stable network such that filaments retain their relative positions. Synthetic filter fabric shall contain ultraviolet ray inhibitors and stabilizers to provide a minimum of six months of expected usable construction life. Silt fence shall meet the requirements of ASTM D6461.

102-2.6 Other. All other materials shall meet commercial grade standards and shall be approved by the RPR before being incorporated into the project.

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CONSTRUCTION REQUIREMENTS

102-3.1 General. In the event of conflict between these requirements and pollution control laws, rules, or regulations of other federal, state, or local agencies, the more restrictive laws, rules, or regulations shall apply.

The RPR shall be responsible for assuring compliance to the extent that construction practices, construction operations, and construction work are involved.

A Storm Water Pollution Prevention Plan (SWPPP) and Notice of Intent (NOI) shall be developed and implemented by the Contractor. Any submittal fees associated with the SWPPP shall be borne by the Contractor.

The Contractor shall provide a QSP as a data submitter for the project to the SMARTS system.

102-3.2 Schedule. Prior to the start of construction, the Contractor shall submit schedules in accordance with the approved Construction Safety and Phasing Plan (CSPP) and the plans for accomplishment of temporary and permanent erosion control work for clearing and grubbing; grading; construction; paving; and structures at watercourses. The Contractor shall also submit a proposed method of erosion and dust control on haul roads and borrow pits and a plan for disposal of waste materials. Work shall not be started until the erosion control schedules and methods of operation for the applicable construction have been accepted by the RPR.

102-3.3 Construction details. The Contractor will be required to incorporate all permanent erosion control features into the project at the earliest practicable time as outlined in the plans and approved CSPP. Except where future construction operations will damage slopes, the Contractor shall perform the permanent seeding and mulching and other specified slope protection work in stages, as soon as substantial areas of exposed slopes can be made available. Temporary erosion and pollution control measures will be used to correct conditions that develop during construction that were not foreseen during the design stage; that are needed prior to installation of permanent control features; or that are needed temporarily to control erosion that develops during normal construction practices, but are not associated with permanent control features on the project.

Where erosion may be a problem, schedule and perform clearing and grubbing operations so that grading operations and permanent erosion control features can follow immediately if project conditions permit. Temporary erosion control measures are required if permanent measures cannot immediately follow grading operations. The RPR shall limit the area of clearing and grubbing, excavation, borrow, and embankment operations in progress, commensurate with the Contractor's capability and progress in keeping the finish grading, mulching, seeding, and other such permanent control measures current with the accepted schedule. If seasonal limitations make such coordination unrealistic, temporary erosion control measures shall be taken immediately to the extent feasible and justified as directed by the RPR.

The Contractor shall provide immediate permanent or temporary pollution control measures to minimize contamination of adjacent streams or other watercourses, lakes, ponds, or other areas of water impoundment as directed by the RPR. If temporary erosion and pollution control measures are required due to the Contractor's negligence, carelessness, or failure to install permanent controls as a part of the work as scheduled or directed by the RPR, the work shall be performed by the Contractor and the cost shall be incidental to this item.

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The RPR may increase or decrease the area of erodible earth material that can be exposed at any time based on an analysis of project conditions.
The erosion control features installed by the Contractor shall be maintained by the Contractor during the construction period.

Provide temporary structures whenever construction equipment must cross watercourses at frequent intervals. Pollutants such as fuels, lubricants, bitumen, raw sewage, wash water from concrete mixing operations, and other harmful materials shall not be discharged into any waterways, impoundments or into natural or manmade channels.

102-3.4 Installation, maintenance and removal of silt fence. Silt fences shall extend a minimum of 16 inches (41 cm) and a maximum of 34 inches (86 cm) above the ground surface. Posts shall be set no more than 10 feet (3 m) on center. Filter fabric shall be cut from a continuous roll to the length required minimizing joints where possible. When joints are necessary, the fabric shall be spliced at a support post with a minimum 12-inch (300-mm) overlap and securely sealed. A trench shall be excavated approximately 4 inches (100 mm) deep by 4 inches (100 mm) wide on the upslope side of the silt fence. The trench shall be backfilled and the soil compacted over the silt fence fabric. The Contractor shall remove and dispose of silt that accumulates during construction and prior to establishment of permanent erosion control. The fence shall be maintained in good working condition until permanent erosion control is established. Silt fence shall be removed upon approval of the RPR.

METHOD OF MEASUREMENT

102-4.1 Refer to SP-102 Water Pollution Control, Erosion Control, and SWPPP Specification.

BASIS OF PAYMENT

102-5.1 Refer to SP-102 Water Pollution Control, Erosion Control, and SWPPP Specification.

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Advisory Circulars (AC)

AC 150/5200-33 *Hazardous Wildlife Attractants on or Near Airports*

AC 150/5370-2 *Operational Safety on Airports During Construction*

ASTM International (ASTM)

ASTM D6461 *Standard Specification for Silt Fence Materials*

United States Department of Agriculture (USDA)

Exhibit 1

FAA/USDA	Wildlife Hazard Management at Airports, A Manual for Airport Personnel

END OF ITEM C-102

ITEM C-105
MOBILIZATION

105-1 DESCRIPTION. This item of work shall consist of, but is not limited to, work and operations necessary for the movement of personnel, equipment, facilities, material and supplies to and from the project site for work on the project except as provided in the contract as separate pay items.

105-2 MOBILIZATION LIMIT. Mobilization shall be limited to 10 percent of the total project cost.

105-3 POSTED NOTICES. Prior to commencement of construction activities, the Contractor must post the following documents in a prominent and accessible place where they may be easily viewed by all employees of the prime Contractor and by all employees of subcontractors engaged by the prime Contractor: Equal Employment Opportunity (EEO) Poster "Equal Employment Opportunity is the Law" in accordance with the Office of Federal Contract Compliance Programs Executive Order 11246, as amended; Davis Bacon Wage Poster (WH 1321) - DOL "Notice to All Employees" Poster; and Applicable Davis-Bacon Wage Rate Determination. These notices must remain posted until final acceptance of the work by the Owner.

105-4 ENGINEER/RPR FIELD OFFICE. The Contractor shall provide dedicated space for the use of the field RPR and inspectors, as a field office for the duration of the project. This space shall be located conveniently near the construction and shall be separate from any space used by the Contractor. The Contractor shall furnish water, sanitary facilities, heat, air conditioning, and electricity in accordance with local building codes.

METHOD OF MEASUREMENT

105-5 Basis of measurement and payment. Based upon the contract lump sum price for "Mobilization" partial payments will be allowed as follows:

a. With first pay request, 25%.

b. When 25% or more of the original contract is earned, an additional 25%.

c. When 50% or more of the original contract is earned, an additional 40%.

d. After Final Inspection, Staging area clean-up and delivery of all Project Closeout materials as required by Section 90, paragraph 90-11, *Contractor Final Project Documentation,* the final 10%.

BASIS OF PAYMENT

105-6 Payment will be made under:

Item C-105a Mobilization (10% Maximum) – Lump Sum

Exhibit 1

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Office of Federal Contract Compliance Programs (OFCCP)

Executive Order 11246, as amended

EEOC-P/E-1 – Equal Employment Opportunity is the Law Poster

United States Department of Labor, Wage and Hour Division (WHD)

WH 1321 – Employee Rights under the Davis-Bacon Act Poster

END OF ITEM C-105

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ITEM C-110
METHOD OF ESTIMATING PERCENTAGE OF MATERIAL WITHIN SPECIFICATION LIMITS (PWL)

110-01 GENERAL. When the specifications provide for acceptance of material based on the method of estimating percentage of material within specification limits (PWL), the PWL will be determined in accordance with this section. All test results for a lot will be analyzed statistically to determine the total estimated percent of the lot that is within specification limits. The PWL is computed using the sample average (X) and sample standard deviation (S_n) of the specified number (n) of sublots for the lot and the specification tolerance limits, L for lower and U for upper, for the particular acceptance parameter. From these values, the respective Quality index, Q_L for Lower Quality Index and/or Q_U for Upper Quality Index, is computed and the PWL for the lot for the specified n is determined from Table 1. All specification limits specified in the technical sections shall be absolute values. Test results used in the calculations shall be to the significant figure given in the test procedure.

There is some degree of uncertainty (risk) in the measurement for acceptance because only a small fraction of production material (the population) is sampled and tested. This uncertainty exists because all portions of the production material have the same probability to be randomly sampled. The Contractor's risk is the probability that material produced at the acceptable quality level is rejected or subjected to a pay adjustment. The Owner's risk is the probability that material produced at the rejectable quality level is accepted.

It is the intent of this section to inform the Contractor that, in order to consistently offset the Contractor's risk for material evaluated, production quality (using population average and population standard deviation) must be maintained at the acceptable quality specified or higher. In all cases, it is the responsibility of the Contractor to produce at quality levels that will meet the specified acceptance criteria when sampled and tested at the frequencies specified.

110-02 METHOD FOR COMPUTING PWL. The computational sequence for computing PWL is as follows:

a. Divide the lot into n sublots in accordance with the acceptance requirements of the specification.

b. Locate the random sampling position within the sublot in accordance with the requirements of the specification.

c. Make a measurement at each location, or take a test portion and make the measurement on the test portion in accordance with the testing requirements of the specification.

d. Find the sample average (X) for all sublot test values within the lot by using the following formula:

$X = (x_1 + x_2 + x_3 + \ldots x_n) / n$

Where: X = Sample average of all sublot test values within a lot

$x_1, x_2, \ldots x_n$ = Individual sublot test values

n = Number of sublot test values

e. Find the sample standard deviation (S_n) by use of the following formula:

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$S_n = [(d_1^2 + d_2^2 + d_3^2 + \ldots d_n^2)/(n-1)]^{1/2}$

Where: S_n = Sample standard deviation of the number of sublot test values in the set

$d_1, d_2, \ldots d_n$ = Deviations of the individual sublot test values $x_1, x_2, \ldots$ from the average value X

that is: $d_1 = (x_1 - X)$, $d_2 = (x_2 - X) \ldots d_n = (x_n - X)$

n = Number of sublot test values

f. For single sided specification limits (i.e., L only), compute the Lower Quality Index Q_L by use of the following formula:

$Q_L = (X - L) / S_n$

Where: L = specification lower tolerance limit

Estimate the percentage of material within limits (PWL) by entering Table 1 with Q_L, using the column appropriate to the total number (n) of measurements. If the value of Q_L falls between values shown on the table, use the next higher value of PWL.

g. For double-sided specification limits (i.e., L and U), compute the Quality Indexes Q_L and Q_U by use of the following formulas:

$Q_L = (X - L) / S_n$

and

$Q_U = (U - X) / S_n$

Where: L and U = specification lower and upper tolerance limits

Estimate the percentage of material between the lower (L) and upper (U) tolerance limits (PWL) by entering Table 1 separately with Q_L and Q_U, using the column appropriate to the total number (n) of measurements, and determining the percent of material above P_L and percent of material below P_U for each tolerance limit. If the values of Q_L fall between values shown on the table, use the next higher value of P_L or P_U. Determine the PWL by use of the following formula:

$PWL = (P_U + P_L) - 100$

Where: P_L = percent within lower specification limit

P_U = percent within upper specification limit

EXAMPLE OF PWL CALCULATION

Project: Example Project

Test Item: Item P-401, Lot A.

A. PWL Determination for Mat Density.

1. Density of four random cores taken from Lot A.

A-1 = 96.60

A-2 = 97.55

A-3 = 99.30

A-4 = 98.35

n = 4

2. Calculate average density for the lot.

$X = (x_1 + x_2 + x_3 + \ldots x_n) / n$

Exhibit 1

$X = (96.60 + 97.55 + 99.30 + 98.35) / 4$
$X = 97.95\%$ density

3. Calculate the standard deviation for the lot.
$S_n = [((96.60 - 97.95)^2 + (97.55 - 97.95)^2 + (99.30 - 97.95)^2 + (98.35 - 97.95)^2)) / (4 - 1)]^{1/2}$
$S_n = [(1.82 + 0.16 + 1.82 + 0.16) / 3]^{1/2}$
$S_n = 1.15$

4. Calculate the Lower Quality Index Q_L for the lot. (L=96.3)
$Q_L = (X - L) / S_n$
$Q_L = (97.95 - 96.30) / 1.15$
$Q_L = 1.4348$

5. Determine PWL by entering Table 1 with $Q_L = 1.44$ and n= 4.
PWL = 98

B. PWL Determination for Air Voids.

1. Air Voids of four random samples taken from Lot A.
A-1 = 5.00
A-2 = 3.74
A-3 = 2.30
A-4 = 3.25

2. Calculate the average air voids for the lot.
$X = (x_1 + x_2 + x_3 \ldots n) / n$
$X = (5.00 + 3.74 + 2.30 + 3.25) / 4$
$X = 3.57\%$

3. Calculate the standard deviation S_n for the lot.
$S_n = [((3.57 - 5.00)^2 + (3.57 - 3.74)^2 + (3.57 - 2.30)^2 + (3.57 - 3.25)^2) / (4 - 1)]^{1/2}$
$S_n = [(2.04 + 0.03 + 1.62 + 0.10) / 3]^{1/2}$
$S_n = 1.12$

4. Calculate the Lower Quality Index Q_L for the lot. (L= 2.0)
$Q_L = (X - L) / S_n$
$Q_L = (3.57 - 2.00) / 1.12$
$Q_L = 1.3992$

5. Determine P_L by entering Table 1 with $Q_L = 1.41$ and n = 4.
$P_L = 97$

6. Calculate the Upper Quality Index Q_U for the lot. (U= 5.0)
$Q_U = (U - X) / S_n$
$Q_U = (5.00 - 3.57) / 1.12$
$Q_U = 1.2702$

7. Determine P_U by entering Table 1 with $Q_U = 1.29$ and n = 4.
$P_U = 93$

Exhibit 1

8. Calculate Air Voids PWL

$PWL = (P_L + P_U) - 100$

$PWL = (97 + 93) - 100 = 90$

EXAMPLE OF OUTLIER CALCULATION (Reference ASTM E 178)

Project: Example Project
Test Item: Item P-401, Lot A.

A. Outlier Determination for Mat Density.

1. Density of four random cores taken from Lot A arranged in descending order.

A-3 = 99.30
A-4 = 98.35
A-2 = 97.55
A-1 = 96.60

2. From ASTM E178, Table 1, for n=4 an upper 5% significance level, the critical value for test criterion = 1.463.

3. Use average density, standard deviation, and test criterion value to evaluate density measurements.

a. For measurements greater than the average:

If (measurement - average)/(standard deviation) is less than test criterion, then the measurement is not considered an outlier.

For A-3, check if (99.30 - 97.95) / 1.15 is greater than 1.463.

Since 1.174 is less than 1.463, the value is not an outlier.

b. For measurements less than the average:

If (average - measurement)/(standard deviation) is less than test criterion, then the measurement is not considered an outlier.

For A-1, check if (97.95 - 96.60) / 1.15 is greater than 1.463.

Since 1.435 is less than 1.463, the value is not an outlier.

Note: In this example, a measurement would be considered an outlier if the density were:

Greater than $(97.95 + 1.463 \times 1.15) = 99.63\%$

OR

less than $(97.95 - 1.463 \times 1.15) = 96.27\%$

Exhibit 1

Table 1. Table for Estimating Percent of Lot Within Limits (PWL)

Percent Within Limits (P_L and P_U)	Positive Values of Q (Q_L and Q_U)							
	n=3	n=4	n=5	n=6	n=7	n=8	n=9	n=10
99	1.1541	1.4700	1.6714	1.8008	1.8888	1.9520	1.9994	2.0362
98	1.1524	1.4400	1.6016	1.6982	1.7612	1.8053	1.8379	1.8630
97	1.1496	1.4100	1.5427	1.6181	1.6661	1.6993	1.7235	1.7420
96	1.1456	1.3800	1.4897	1.5497	1.5871	1.6127	1.6313	1.6454
95	1.1405	1.3500	1.4407	1.4887	1.5181	1.5381	1.5525	1.5635
94	1.1342	1.3200	1.3946	1.4329	1.4561	1.4717	1.4829	1.4914
93	1.1269	1.2900	1.3508	1.3810	1.3991	1.4112	1.4199	1.4265
92	1.1184	1.2600	1.3088	1.3323	1.3461	1.3554	1.3620	1.3670
91	1.1089	1.2300	1.2683	1.2860	1.2964	1.3032	1.3081	1.3118
90	1.0982	1.2000	1.2290	1.2419	1.2492	1.2541	1.2576	1.2602
89	1.0864	1.1700	1.1909	1.1995	1.2043	1.2075	1.2098	1.2115
88	1.0736	1.1400	1.1537	1.1587	1.1613	1.1630	1.1643	1.1653
87	1.0597	1.1100	1.1173	1.1192	1.1199	1.1204	1.1208	1.1212
86	1.0448	1.0800	1.0817	1.0808	1.0800	1.0794	1.0791	1.0789
85	1.0288	1.0500	1.0467	1.0435	1.0413	1.0399	1.0389	1.0382
84	1.0119	1.0200	1.0124	1.0071	1.0037	1.0015	1.0000	0.9990
83	0.9939	0.9900	0.9785	0.9715	0.9671	0.9643	0.9624	0.9610
82	0.9749	0.9600	0.9452	0.9367	0.9315	0.9281	0.9258	0.9241
81	0.9550	0.9300	0.9123	0.9025	0.8966	0.8928	0.8901	0.8882
80	0.9342	0.9000	0.8799	0.8690	0.8625	0.8583	0.8554	0.8533
79	0.9124	0.8700	0.8478	0.8360	0.8291	0.8245	0.8214	0.8192
78	0.8897	0.8400	0.8160	0.8036	0.7962	0.7915	0.7882	0.7858
77	0.8662	0.8100	0.7846	0.7716	0.7640	0.7590	0.7556	0.7531
76	0.8417	0.7800	0.7535	0.7401	0.7322	0.7271	0.7236	0.7211
75	0.8165	0.7500	0.7226	0.7089	0.7009	0.6958	0.6922	0.6896
74	0.7904	0.7200	0.6921	0.6781	0.6701	0.6649	0.6613	0.6587
73	0.7636	0.6900	0.6617	0.6477	0.6396	0.6344	0.6308	0.6282
72	0.7360	0.6600	0.6316	0.6176	0.6095	0.6044	0.6008	0.5982
71	0.7077	0.6300	0.6016	0.5878	0.5798	0.5747	0.5712	0.5686
70	0.6787	0.6000	0.5719	0.5582	0.5504	0.5454	0.5419	0.5394
69	0.6490	0.5700	0.5423	0.5290	0.5213	0.5164	0.5130	0.5105
68	0.6187	0.5400	0.5129	0.4999	0.4924	0.4877	0.4844	0.4820
67	0.5878	0.5100	0.4836	0.4710	0.4638	0.4592	0.4560	0.4537
66	0.5563	0.4800	0.4545	0.4424	0.4355	0.4310	0.4280	0.4257
65	0.5242	0.4500	0.4255	0.4139	0.4073	0.4030	0.4001	0.3980
64	0.4916	0.4200	0.3967	0.3856	0.3793	0.3753	0.3725	0.3705
63	0.4586	0.3900	0.3679	0.3575	0.3515	0.3477	0.3451	0.3432
62	0.4251	0.3600	0.3392	0.3295	0.3239	0.3203	0.3179	0.3161
61	0.3911	0.3300	0.3107	0.3016	0.2964	0.2931	0.2908	0.2892
60	0.3568	0.3000	0.2822	0.2738	0.2691	0.2660	0.2639	0.2624
59	0.3222	0.2700	0.2537	0.2461	0.2418	0.2391	0.2372	0.2358
58	0.2872	0.2400	0.2254	0.2186	0.2147	0.2122	0.2105	0.2093
57	0.2519	0.2100	0.1971	0.1911	0.1877	0.1855	0.1840	0.1829
56	0.2164	0.1800	0.1688	0.1636	0.1607	0.1588	0.1575	0.1566
55	0.1806	0.1500	0.1406	0.1363	0.1338	0.1322	0.1312	0.1304
54	0.1447	0.1200	0.1125	0.1090	0.1070	0.1057	0.1049	0.1042
53	0.1087	0.0900	0.0843	0.0817	0.0802	0.0793	0.0786	0.0781
52	0.0725	0.0600	0.0562	0.0544	0.0534	0.0528	0.0524	0.0521
51	0.0363	0.0300	0.0281	0.0272	0.0267	0.0264	0.0262	0.0260
50	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Percent Within Limits (P_L and P_U)	Negative Values of Q (Q_L and Q_U)							
	n=3	n=4	n=5	n=6	n=7	n=8	n=9	n=10
49	-0.0363	-0.0300	-0.0281	-0.0272	-0.0267	-0.0264	-0.0262	-0.0260
48	-0.0725	-0.0600	-0.0562	-0.0544	-0.0534	-0.0528	-0.0524	-0.0521
47	-0.1087	-0.0900	-0.0843	-0.0817	-0.0802	-0.0793	-0.0786	-0.0781
46	-0.1447	-0.1200	-0.1125	-0.1090	-0.1070	-0.1057	-0.1049	-0.1042
45	-0.1806	-0.1500	-0.1406	-0.1363	-0.1338	-0.1322	-0.1312	-0.1304
44	-0.2164	-0.1800	-0.1688	-0.1636	-0.1607	-0.1588	-0.1575	-0.1566
43	-0.2519	-0.2100	-0.1971	-0.1911	-0.1877	-0.1855	-0.1840	-0.1829
42	-0.2872	-0.2400	-0.2254	-0.2186	-0.2147	-0.2122	-0.2105	-0.2093
41	-0.3222	-0.2700	-0.2537	-0.2461	-0.2418	-0.2391	-0.2372	-0.2358
40	-0.3568	-0.3000	-0.2822	-0.2738	-0.2691	-0.2660	-0.2639	-0.2624
39	-0.3911	-0.3300	-0.3107	-0.3016	-0.2964	-0.2931	-0.2908	-0.2892
38	-0.4251	-0.3600	-0.3392	-0.3295	-0.3239	-0.3203	-0.3179	-0.3161
37	-0.4586	-0.3900	-0.3679	-0.3575	-0.3515	-0.3477	-0.3451	-0.3432
36	-0.4916	-0.4200	-0.3967	-0.3856	-0.3793	-0.3753	-0.3725	-0.3705
35	-0.5242	-0.4500	-0.4255	-0.4139	-0.4073	-0.4030	-0.4001	-0.3980
34	-0.5563	-0.4800	-0.4545	-0.4424	-0.4355	-0.4310	-0.4280	-0.4257
33	-0.5878	-0.5100	-0.4836	-0.4710	-0.4638	-0.4592	-0.4560	-0.4537
32	-0.6187	-0.5400	-0.5129	-0.4999	-0.4924	-0.4877	-0.4844	-0.4820
31	-0.6490	-0.5700	-0.5423	-0.5290	-0.5213	-0.5164	-0.5130	-0.5105
30	-0.6787	-0.6000	-0.5719	-0.5582	-0.5504	-0.5454	-0.5419	-0.5394
29	-0.7077	-0.6300	-0.6016	-0.5878	-0.5798	-0.5747	-0.5712	-0.5686
28	-0.7360	-0.6600	-0.6316	-0.6176	-0.6095	-0.6044	-0.6008	-0.5982
27	-0.7636	-0.6900	-0.6617	-0.6477	-0.6396	-0.6344	-0.6308	-0.6282
26	-0.7904	-0.7200	-0.6921	-0.6781	-0.6701	-0.6649	-0.6613	-0.6587
25	-0.8165	-0.7500	-0.7226	-0.7089	-0.7009	-0.6958	-0.6922	-0.6896
24	-0.8417	-0.7800	-0.7535	-0.7401	-0.7322	-0.7271	-0.7236	-0.7211
23	-0.8662	-0.8100	-0.7846	-0.7716	-0.7640	-0.7590	-0.7556	-0.7531
22	-0.8897	-0.8400	-0.8160	-0.8036	-0.7962	-0.7915	-0.7882	-0.7858
21	-0.9124	-0.8700	-0.8478	-0.8360	-0.8291	-0.8245	-0.8214	-0.8192
20	-0.9342	-0.9000	-0.8799	-0.8690	-0.8625	-0.8583	-0.8554	-0.8533
19	-0.9550	-0.9300	-0.9123	-0.9025	-0.8966	-0.8928	-0.8901	-0.8882
18	-0.9749	-0.9600	-0.9452	-0.9367	-0.9315	-0.9281	-0.9258	-0.9241
17	-0.9939	-0.9900	-0.9785	-0.9715	-0.9671	-0.9643	-0.9624	-0.9610
16	-1.0119	-1.0200	-1.0124	-1.0071	-1.0037	-1.0015	-1.0000	-0.9990
15	-1.0288	-1.0500	-1.0467	-1.0435	-1.0413	-1.0399	-1.0389	-1.0382
14	-1.0448	-1.0800	-1.0817	-1.0808	-1.0800	-1.0794	-1.0791	-1.0789
13	-1.0597	-1.1100	-1.1173	-1.1192	-1.1199	-1.1204	-1.1208	-1.1212
12	-1.0736	-1.1400	-1.1537	-1.1587	-1.1613	-1.1630	-1.1643	-1.1653
11	-1.0864	-1.1700	-1.1909	-1.1995	-1.2043	-1.2075	-1.2098	-1.2115
10	-1.0982	-1.2000	-1.2290	-1.2419	-1.2492	-1.2541	-1.2576	-1.2602
9	-1.1089	-1.2300	-1.2683	-1.2860	-1.2964	-1.3032	-1.3081	-1.3118
8	-1.1184	-1.2600	-1.3088	-1.3323	-1.3461	-1.3554	-1.3620	-1.3670
7	-1.1269	-1.2900	-1.3508	-1.3810	-1.3991	-1.4112	-1.4199	-1.4265
6	-1.1342	-1.3200	-1.3946	-1.4329	-1.4561	-1.4717	-1.4829	-1.4914
5	-1.1405	-1.3500	-1.4407	-1.4887	-1.5181	-1.5381	-1.5525	-1.5635
4	-1.1456	-1.3800	-1.4897	-1.5497	-1.5871	-1.6127	-1.6313	-1.6454
3	-1.1496	-1.4100	-1.5427	-1.6181	-1.6661	-1.6993	-1.7235	-1.7420
2	-1.1524	-1.4400	-1.6016	-1.6982	-1.7612	-1.8053	-1.8379	-1.8630
1	-1.1541	-1.4700	-1.6714	-1.8008	-1.8888	-1.9520	-1.9994	-2.0362

END OF SECTION 110

Exhibit 1

SPECIAL PROVISIONS

Part A – Federal Requirements

1. CIVIL RIGHTS ACT OF 1964, TITLE VI ASSURANCES

Compliance with Nondiscrimination Requirements:

During the performance of this contract, the Contractor, for itself, its assignees and successors in interest (hereinafter referred to as the "Contractor") agrees as follows:

1.1(a) Compliance with Regulations. The Contractor (hereinafter includes consultants) will comply with the **Title VI List of Pertinent Nondiscrimination Acts and Authorities**, as they may be amended from time to time, which are herein incorporated by reference and made a part of this contract.

1.1(b) Nondiscrimination. The Contractor, with regard to the work performed by it during the contract, will not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The Contractor will not participate directly or indirectly in the discrimination prohibited by the Nondiscrimination Acts and Authorities, including employment practices when the contract covers any activity, project, or program set forth in Appendix B of 49 CFR part 21.

1.1(c) Solicitations for Subcontracts, including Procurements of Materials and Equipment. In all solicitations, either by competitive bidding, or negotiation made by the Contractor for work to be performed under a subcontract, including procurements of materials, or leases of equipment, each potential subcontractor or supplier will be notified by the Contractor of the Contractor's obligations under this contract and the Nondiscrimination Acts and Authorities on the grounds of race, color, or national origin.

1.1(d) Information and Reports. The Contractor will provide all information and reports required by the Acts, the Regulations, and directives issued pursuant thereto and will permit access to its books, records, accounts, other sources of information and its facilities as may be determined by the sponsor or the Federal Aviation Administration to be pertinent to ascertain compliance with such Nondiscrimination Acts and Authorities and instructions. Where any information required of a Contractor is in the exclusive possession of another who fails or refuses to furnish the information, the Contractor will so certify to the sponsor or the Federal Aviation Administration, as appropriate, and will set forth what efforts it has made to obtain the information.

1.1(e) Sanctions for Noncompliance. In the event of a Contractor's noncompliance with the nondiscrimination provisions of this contract, the sponsor will impose such contract sanctions as it or the Federal Aviation Administration may determine to be appropriate, including, but not limited:

Exhibit 1

a. Withholding of payments to the Contractor under the contract until the Contractor complies, and/or

b. Cancellation, termination, or suspension of the contract, in whole or in part.

1.1(f) Incorporation of Provisions. The Contractor will include the provisions of paragraphs 1.1(a) through 1.1(f) in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts, the Regulations and directives issued pursuant thereto. The Contractor will take action with respect to any subcontract or procurement as the sponsor or the Federal Aviation Administration may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, that if the Contractor becomes involved in, or is threatened with litigation by a subcontractor, or supplier because of such direction, the Contractor may request the sponsor to enter into any litigation to protect the interests of the sponsor. In addition, the Contractor may request the United States to enter into the litigation to protect the interests of the United States.

1.2 Title VI List of Pertinent Nondiscrimination Acts and Authorities. During the performance of this contract, the Contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the "Contractor") agrees to comply with the following non-discrimination statutes and authorities; including but not limited to:

- Title VI of the Civil Rights Act of 1964 (42 USC § 2000d *et seq*., 78 stat. 252), (prohibits discrimination on the basis of race, color, national origin);

- 49 CFR part 21 (Non-discrimination in Federally assisted programs of the Department of Transportation—Effectuation of Title VI of the Civil Rights Act of 1964);

- The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 USC § 4601), (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);

- Section 504 of the Rehabilitation Act of 1973, (29 USC § 794 *et seq*.), as amended, (prohibits discrimination on the basis of disability); and 49 CFR part 27 (Nondiscrimination on the Basis of Disability in Programs or Activities Receiving Federal Financial Assistance);

- The Age Discrimination Act of 1975, as amended, (42 USC § 6101 *et seq*.), (prohibits discrimination on the basis of age);

- Airport and Airway Improvement Act of 1982, (49 USC § 471, Section 47123), as amended, (prohibits discrimination based on race, creed, color, national origin, or sex);

- The Civil Rights Restoration Act of 1987, (PL 100-209), (broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, the Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms "programs or activities" to include all of the programs or activities of the Federal-aid recipients, sub-recipients and Contractors, whether such programs or activities are Federally funded or not);

- Titles II and III of the Americans with Disabilities Act of 1990 (42 USC § 12101, et seq) (prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities) as implemented by U.S. Department of Transportation regulations at 49 CFR parts 37 and 38;

- The Federal Aviation Administration's Nondiscrimination statute (49 USC § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);

- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, (ensures nondiscrimination against minority populations by discouraging programs, policies, and activities with disproportionately high and adverse human health or environmental effects on minority and low-income populations);

- Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. 74087 (2005)];

- Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 USC §1681 et seq).

References: 49 CFR § 47123; FAA Order 1400.11

2. GENERAL CIVIL RIGHTS PROVISIONS

GENERAL CIVIL RIGHTS PROVISIONS

In all its activities within the scope of its airport program, the Contractor agrees to comply with pertinent statutes, Executive Orders, and such rules as identified in Title VI List of Pertinent Nondiscrimination Acts and Authorities to ensure that no person shall, on the grounds of race, color, national origin (including limited English proficiency), creed, sex (including sexual orientation and gender identity), age, or disability be excluded from participating in any activity conducted with or benefiting from Federal assistance.

This provision is in addition to that required by Title VI of the Civil Rights Act of 1964

The above provision binds the Contractor and subcontractors from the bid solicitation period through the completion of the contract.

References: 49 USC § 47123

3. LOBBYING AND INFLUENCING FEDERAL EMPLOYEES

CERTIFICATION REGARDING LOBBYING

The Bidder or Offeror certifies by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

3.1 No Federal appropriated funds have been paid or will be paid, by or on behalf of the Bidder or Offeror, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

3.2 If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

3.3 The undersigned shall require that the language of this certification be included in the award documents for all sub-awards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all sub-recipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

Reference: 49 CFR Part 20, Appendix A; 31 U.S.C. § 1352 – Byrd Anti-Lobbying Amendment;2 CFR part 200, Appendix II(J)

4. ACCESS TO RECORDS AND REPORTS

The Contractor must maintain an acceptable cost accounting system. The Contractor agrees to provide the Sponsor, the Federal Aviation Administration and the Comptroller General of the United States or any of their duly authorized representatives access to any books, documents, papers, and records of the contractor which are directly pertinent to the specific contract for the purpose of making audit, examination, excerpts and transcriptions. The Contractor agrees to maintain all books, records and reports required under this contract for a period of not less than three years after final payment is made and all pending matters are closed.

References: 2 CFR § 200.333, 2 CFR § 200.336, FAA Order 5100.38

5. DISADVANTAGED BUSINESS ENTERPRISES

5.1 Contract Assurance (§26.13) The Contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The Contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of Department of Transportation assisted contracts. Failure by the Contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy, as the Owner deems appropriate, which may include, but is not limited to:

1) Withholding monthly progress payments;
2) Assessing sanctions;
3) Liquidated damages; and/or
4) Disqualifying the Contractor from future bidding as non-responsible.

5.2 Prompt Payment (§26.29) The prime contractor agrees to pay each subcontractor under this prime contract for satisfactory performance of its contract no later than 30 days from the receipt of each payment the prime contractor receives from Ventura County. The prime contractor agrees further to return retainage payments to each subcontractor within 30 days after the subcontractor's work is satisfactorily completed.

Any delay or postponement of payment from the above referenced time frame may occur only for good cause following written approval of the Ventura County. This clause applies to both DBE and non-DBE subcontractors.

5.3 Termination of DBE Subcontracts (49 CFR § 26.53(f); The prime contractor must not terminate a DBE subcontractor listed in response to paragraph 12.3.1 (or an approved substitute DBE firm) without prior written consent of the County of Ventura. This includes, but is not limited to, instances in which the prime contractor seeks to perform work originally designated for a DBE subcontractor with its own forces or those of an affiliate, a non-DBE firm, or with another DBE firm.

The prime contractor shall utilize the specific DBEs listed to perform the work and supply the materials for which each is listed unless the contractor obtains written consent from the County of Ventura. Unless the County of Ventura's consent is provided, the prime contractor shall not be entitled to any payment for work or material unless it is performed or supplied by the listed DBE.

The County of Ventura may provide such written consent only if the County of Ventura agrees, for reasons stated in the concurrence document, that the prime contractor has good cause to terminate the DBE firm. For purposes of this paragraph, good cause includes the circumstances listed in 49 CFR §26.53.

Before transmitting to the County of Ventura its request to terminate and/or substitute a DBE subcontractor, the prime contractor must give notice in writing to the DBE subcontractor, with a copy to the County of Ventura, of its intent to request to terminate and/or substitute, and the reason for the request.

The prime contractor must give the DBE five days to respond to the prime contractor's notice and advise the County of Ventura and the contractor of the reasons, if any, why it objects to the proposed termination of its subcontract and why the County of Ventura should not approve the prime contractor's action. If required in a particular case as a matter of public necessity (e.g., safety), the County of Ventura may provide a response period shorter than five days.

In addition to post-award terminations, the provisions of this section apply to preaward deletions of or substitutions for DBE firms put forward by offerors in negotiated procurements.

Reference: 49 CFR Part 26

6. PROHIBITION ON CERTAIN TELECOMMUNICATIONS AND VIDEO SURVEILLANCE SERVICES OR EQUIPMENT

Contractor and Subcontractor agree to comply with mandatory standards and policies relating to use and procurement of certain telecommunications and video surveillance services or equipment in compliance with the National Defense Authorization Act [Public Law 115-232 § 889(f)(1)].

Reference: 2 CFR § 200 Appendix II(K); 2 CFR § 200.216

7. BREACH OF CONTRACT TERMS

Any violation or breach of terms of this contract on the part of the contractor or its subcontractors may result in the suspension or termination of this contract or such other action that may be necessary to enforce the rights of the parties of this agreement.

Owner will provide Contractor written notice that describes the nature of the breach and corrective actions the Contractor must undertake in order to avoid termination of the contract. Owner reserves the right to withhold payments to Contractor until such time the Contractor corrects the breach or the Owner elects to terminate the contract. The Owner's notice will identify a specific date by which the Contractor must correct the breach. Owner may proceed with termination of the contract if the Contractor fails to correct the breach by deadline indicated in the Owner's notice.

The duties and obligations imposed by the Contract Documents and the rights and remedies available thereunder are in addition to, and not a limitation of, any duties, obligations, rights and remedies otherwise imposed or available by law.

Reference: 2 CFR § 200 Appendix II(A)

8. TRADE RESTRICTION CERTIFICATION

By submission of an offer, the Offeror certifies that with respect to this solicitation and any resultant contract, the Offeror –

a. is not owned or controlled by one or more citizens of a foreign country included in the list of countries that discriminate against U.S. firms as published by the Office of the United States Trade Representative (USTR);

b. has not knowingly entered into any contract or subcontract for this project with a person that is a citizen or national of a foreign country included on the list of countries that discriminate against U.S. firms as published by the USTR; and

c. has not entered into any subcontract for any product to be used on the Federal project that is produced in a foreign country included on the list of countries that discriminate against U.S. firms published by the USTR

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This certification concerns a matter within the jurisdiction of an agency of the United States of America and the making of a false, fictitious, or fraudulent certification may render the maker subject to prosecution under Title 18, USC, Section 1001.

The Offeror/Contractor must provide immediate written notice to the Owner if the Offeror/Contractor learns that its certification or that of a subcontractor was erroneous when submitted or has become erroneous by reason of changed circumstances. The Contractor must require subcontractors provide immediate written notice to the Contractor if at any time it learns that its certification was erroneous by reason of changed circumstances.

Unless the restrictions of this clause are waived by the Secretary of Transportation in accordance with 49 CFR 30.17, no contract shall be awarded to an Offeror or subcontractor:

(1) who is owned or controlled by one or more citizens or nationals of a foreign country included on the list of countries that discriminate against U.S. firms published by the USTR or

(2) whose subcontractors are owned or controlled by one or more citizens or nationals of a foreign country on such USTR list or

(3) who incorporates in the public works project any product of a foreign country on such USTR list;

Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render, in good faith, the certification required by this provision. The knowledge and information of a contractor is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

The Offeror agrees that, if awarded a contract resulting from this solicitation, it will incorporate this provision for certification without modification in in all lower tier subcontracts. The Contractor may rely on the certification of a prospective subcontractor that it is not a firm from a foreign country included on the list of countries that discriminate against U.S. firms as published by U.S.T.R, unless the Offeror has knowledge that the certification is erroneous.

This certification is a material representation of fact upon which reliance was placed when making an award. If it is later determined that the Contractor or subcontractor knowingly rendered an erroneous certification, the Federal Aviation Administration (FAA) may direct through the Owner cancellation of the contract or subcontract for default at no cost to the Owner or the FAA.

References: 49 CFR Part 30; *49 USC § 50104*

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9. VETERAN'S PREFERENCE

In the employment of labor (excluding executive, administrative, and supervisory positions), the contractor and all sub-tier contractors must give preference to covered veterans as defined within Title 49 United States Code Section 47112. Covered veterans include Vietnam-era veterans, Persian Gulf veterans, Afghanistan-Iraq war veterans, disabled veterans, and small business concerns (as defined by 15 U.S.C. 632) owned and controlled by disabled veterans. This preference only applies when there are covered veterans readily available and qualified to perform the work to which the employment relates.

References: Title 49 U.S.C. 47112(c)

10. DAVIS BACON REQUIREMENTS

10.1 Minimum Wages.

(i) All laborers and mechanics employed or working upon the site of the work will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by the Secretary of Labor under the Copeland Act (29 CFR Part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalent thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the Contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (1)(iv) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR Part 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: *Provided*, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under (1)(ii) of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the Contractor and its subcontractors at the site of the work in a prominent and accessible place where it can easily be seen by the workers.

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(ii)

(A) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(1) The work to be performed by the classification requested is not performed by a classification in the wage determinations;

(2) The classification is utilized in the area by the construction industry; and

(3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(B) If the Contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(C) In the event the Contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(D) The wage rate (including fringe benefits where appropriate) determined pursuant to subparagraphs (1)(ii) (B) or (C) of this paragraph, shall be paid to all workers performing work in the

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classification under this contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the Contractor does not make payments to a trustee or other third person, the Contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, *Provided*, that the Secretary of Labor has found, upon the written request of the Contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the Contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

10.2 Withholding. The Federal Aviation Administration or the sponsor shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the Contractor under this contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the Contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of work, all or part of the wages required by the contract, the Federal Aviation Administration may, after written notice to the Contractor, Sponsor, Applicant, or Owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

10.3 Payrolls and Basic Records.

(i) Payrolls and basic records relating thereto shall be maintained by the Contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the Contractor shall maintain records that show that the commitment to provide

such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records that show the costs anticipated or the actual costs incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

(ii)

(A) The Contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the (write in name of appropriate federal agency) if the agency is a party to the contract, but if the agency is not such a party, the Contractor will submit the payrolls to the applicant, Sponsor, or Owner, as the case may be, for transmission to the (write in name of agency). The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (*e.g.* , the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH–347 is available for this purpose from the Wage and Hour Division Web site at *www.dol.gov/whd/forms/wh347instr.htm* or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the (write in name of appropriate federal agency) if the agency is a party to the contract, but if the agency is not such a party, the Contractor will submit them to the applicant, Sponsor, or Owner, as the case may be, for transmission to the (write in name of agency), the Contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the sponsoring government agency (or the applicant, Sponsor, or Owner).

(B) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the Contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(1) The payroll for the payroll period contains the information required to be provided under 29 CFR § 5.5(a)(3)(ii), the

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appropriate information is being maintained under 29 CFR § 5.5(a)(3)(ii), and that such information is correct and complete;

(2) Each laborer and mechanic (including each helper, apprentice and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations 29 CFR Part 3;

(3) Each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(C) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph (3)(ii)(B) of this section.

(D) The falsification of any of the above certifications may subject the Contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 231 of Title 31 of the United States Code.

(iii) The Contractor or subcontractor shall make the records required under paragraph (3)(i) of this section available for inspection, copying or transcription by authorized representatives of the Sponsor, the Federal Aviation Administration or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the Contractor or subcontractor fails to submit the required records or to make them available, the Federal agency may, after written notice to the Contractor, Sponsor, applicant or Owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

10.4 Apprentices and Trainees.

(i) **Apprentices**. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State Apprenticeship Agency recognized by the Bureau, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such

an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the Contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a Contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the Contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Bureau of Apprenticeship and Training, or a State Apprenticeship Agency recognized by the Bureau, withdraws approval of an apprenticeship program, the Contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) **Trainees**. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination that provides

for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the Contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(iii) **Equal Employment Opportunity**. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.

10.5 Compliance with Copeland Act Requirements. The Contractor shall comply with the requirements of 29 CFR Part 3, which are incorporated by reference in this contract.

10.6 Subcontracts. The Contractor or subcontractor shall insert in any subcontracts the clauses contained in 29 CFR Part 5.5(a)(1) through (10) and such other clauses as the Federal Aviation Administration may by appropriate instructions require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR Part 5.5.

10.7 Contract Termination: Debarment. A breach of the contract clauses in paragraphs 11.1 through 11.10 of this section may be grounds for termination of the contract, and for debarment as a Contractor and a subcontractor as provided in 29 CFR 5.12.

10.8 Compliance with Davis-Bacon and Related Act Requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by reference in this contract.

10.9 Disputes Concerning Labor Standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR Parts 5, 6 and 7. Disputes within the meaning of this clause include disputes between the Contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

10.10 Certification of Eligibility.

(i) By entering into this contract, the Contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the Contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

Reference: 2 CFR § 200 Appendix II(D), 29 CFR Part 5

11. EQUAL OPPORTUNITY CLAUSE AND SPECIFICATIONS

EQUAL OPPORTUNITY CLAUSE

During the performance of this contract, the Contractor agrees as follows:

11.1 The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, gender identity, or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, sexual orientation, gender identity, or national origin. Such action shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

11.2 The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive considerations for employment without regard to race, color, religion, sex, sexual orientation, gender identity, or national origin.

11.3 The Contractor will not discharge or in any other manner discriminate against any employee or applicant for employment because such employee or applicant has inquired about, discussed, or disclosed the compensation of the employee or applicant or another employee or applicant. This provision shall not apply to instances in which an employee who has access to the compensation information of other employees or applicants as a part of such employee's essential job functions discloses the compensation of such other employees or applicants to individuals who do not otherwise have access to such information, unless such disclosure is in response to a

formal complaint or charge, in furtherance of an investigation, proceeding, hearing, or action, including an investigation conducted by the employer, or is consistent with the contractor's legal duty to furnish information.

11.4 The Contractor will send to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding, a notice to be provided by the agency contracting officer, advising the labor union or workers' representative of the Contractor's commitments under this section 202 of Executive Order 11246 of September 24, 1965, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

11.5 The Contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, as amended, and of the rules, regulations, and relevant orders of the Secretary of Labor.

11.6 The Contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the contracting agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

11.7 In the event of the Contractor's noncompliance with the nondiscrimination clauses of this contract or with any such rules, regulations, or orders, this contract may be canceled, terminated, or suspended in whole or in part and the Contractor may be declared ineligible for further Government contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

11.8 The Contractor will include the provisions of paragraphs (1) through (8) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as may be directed by the Secretary of Labor as a means of enforcing such provisions, including sanctions for noncompliance: Provided, however, that in the event the contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction, the Contractor may request the United States to enter into such litigation to protect the interests of the United States.

STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY CONSTRUCTION CONTRACT SPECIFICATIONS

11.9 As used in these specifications:

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a. "Covered area" means the geographical area described in the solicitation from which this contract resulted;

b. "Director" means Director, Office of Federal Contract Compliance Programs (OFCCP), U.S. Department of Labor, or any person to whom the Director delegates authority;

c. "Employer identification number" means the Federal social security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941;

d. "Minority" includes:

(1) Black (all) persons having origins in any of the Black African racial groups not of Hispanic origin);

(2) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin regardless of race);

(3) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and

(4) American Indian or Alaskan native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

11.10. Whenever the Contractor, or any subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of $10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.

11.11. If the Contractor is participating (pursuant to 41 CFR part 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or subcontractor participating in an approved plan is individually required to comply with its obligations under the EEO clause and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors or subcontractors toward a goal in an approved Plan does not excuse any covered Contractor's or subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.

11.12. The Contractor shall implement the specific affirmative action standards provided in paragraphs 12.14a through 12.14p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. Covered construction Contractors performing construction work in a geographical area where they do not have a Federal or federally assisted construction contract shall apply the minority and female goals established for the geographical area where the work is being performed. Goals are published periodically in the Federal Register in notice form, and such notices may be obtained from any Office of Federal Contract Compliance Programs office or from Federal procurement contracting officers. The Contractor is expected to make substantially uniform progress in meeting its goals in each craft during the period specified.

11.13. Neither the provisions of any collective bargaining agreement nor the failure by a union with whom the Contractor has a collective bargaining agreement to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246 or the regulations promulgated pursuant thereto.

11.14. In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.

11.15. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully and shall implement affirmative action steps at least as extensive as the following:

a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other onsite supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.

b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.

c. Maintain a current file of the names, addresses, and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source, or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefore along with whatever additional actions the Contractor may have taken.

d. Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or female sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.

e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under 12.8b above.

f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

g. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination, or other employment decisions including specific review of these items with onsite supervisory personnel such a superintendents, general foremen, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

h. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and subcontractors with whom the Contractor does or anticipates doing business.

i. Direct its recruitment efforts, both oral and written, to minority, female, and community organizations, to schools with minority and female students; and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations, such as the above, describing the openings, screening procedures, and tests to be used in the selection process.

j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable provide after school, summer, and vacation employment to minority and female youth both on the site and in other areas of a Contractor's workforce.

k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR part 60-3.

l. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel, for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.

m. Ensure that seniority practices, job classifications, work assignments, and other personnel practices do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.

n. Ensure that all facilities and company activities are non-segregated except that separate or single user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.

o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction Contractors and suppliers, including circulation of solicitations to minority and female Contractor associations and other business associations.

p. Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.

11.16. Contractors are encouraged to participate in voluntary associations, which assist in fulfilling one or more of their affirmative action obligations (12.14a through 12.14p). The efforts of a Contractor association, joint Contractor union, Contractor community, or other similar groups of which the Contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under 12.14a through 12.14p of these specifications provided that the Contractor actively participates in the group, makes every effort to assure that the group has a positive

impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female workforce participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.

11.17. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if a specific minority group of women is underutilized).

11.18. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, sexual orientation, gender orientation, or national origin.

11.19. The Contractor shall not enter into any subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.

11.20. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination, and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.

11.21. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 12.14 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR part 60-4.8.

11.22. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government, and to keep records. Records shall at least include for each employee, the name, address, telephone number, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the

indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, Contractors shall not be required to maintain separate records.

11.23. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program.

References: Executive Order 11246; 41 CFR Part 60-1.4; 41 CFR Part 60-4.3; 2 CFR 200 Appendix II(C)

12. PROHIBITION OF SEGREGATED FACILITIES

(a) The Contractor agrees that it does not and will not maintain or provide for its employees any segregated facilities at any of its establishments, and that it does not and will not permit its employees to perform their services at any location under its control where segregated facilities are maintained. The Contractor agrees that a breach of this clause is a violation of the Equal Employment Opportunity clause in this contract.

(b) "Segregated facilities," as used in this clause, means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees, that are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, sex, sexual orientation, gender identity, or national origin because of written or oral policies or employee custom. The term does not include separate or single-user rest rooms or necessary dressing or sleeping areas provided to assure privacy between the sexes.

(c) The Contractor shall include this clause in every subcontract and purchase order that is subject to the Equal Employment Opportunity clause of this contract.

References: 41 CFR Part 60; 2 CFR Part 200, Appendix II (C)

13. NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY

13.1 The Offeror's or Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth herein.

Exhibit 1

13.2 The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

Timetables:

-Goals for minority participation for each trade: 21.5% (Ventura County)

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Participation Goals for Minorities and Females

-Goals for female participation in each trade: 6.9%

These goals are applicable to all of the Contractor's construction work (whether or not it is Federal or federally-assisted) performed in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the Contractor also is subject to the goals for both its federally involved and non-federally involved construction

The Contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3(a), and its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project, for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the Executive Order and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed

13.3 The Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs (OFCCP) within 10 working days of award of any construction subcontract in excess of $10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address, and telephone number of the subcontractor; employer identification number of the subcontractor; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the subcontract is to be performed

13.4 As used in this notice and in the contract resulting from this solicitation, the "covered area" is California, Ventura County, and Oxnard.

References: Executive Order 11246; 41 CFR Parts 60 – 4;

14. TERMINATION OF CONTRACT

14.1 TERMINATION FOR CONVENIENCE (CONSTRUCTION & EQUIPMENT CONTRACTS)

The Owner may terminate this contract in whole or in part at any time by providing written notice to the Contractor. Such action may be without cause and without prejudice to any other right or remedy of Owner. Upon receipt of a written notice of termination, except as explicitly directed by the Owner, the Contractor shall immediately proceed with the following obligations regardless of any delay in determining or adjusting amounts due under this clause:

1. Contractor must immediately discontinue work as specified in the written notice.

2. Terminate all subcontracts to the extent they relate to the work terminated under the notice.

3. Discontinue orders for materials and services except as directed by the written notice.

4. Deliver to the Owner all fabricated and partially fabricated parts, completed and partially completed work, supplies, equipment and materials acquired prior to termination of the work and as directed in the written notice.

5. Complete performance of the work not terminated by the notice.

6. Take action as directed by the Owner to protect and preserve property and work related to this contract that Owner will take possession.

Owner agrees to pay Contractor for:

1) completed and acceptable work executed in accordance with the contract documents prior to the effective date of termination;

2) documented expenses sustained prior to the effective date of termination in performing work and furnishing labor, materials, or equipment as required by the contract documents in connection with uncompleted work;

3) reasonable and substantiated claims, costs and damages incurred in settlement of terminated contracts with Subcontractors and Suppliers; and

4) reasonable and substantiated expenses to the Contractor directly attributable to Owner's termination action

Owner will not pay Contractor for loss of anticipated profits or revenue or other economic loss arising out of or resulting from the Owner's termination action.

The rights and remedies this clause provides are in addition to any other rights and remedies provided by law or under this contract.

14.2 TERMINATION FOR CAUSE (CONSTRUCTION)

Section 80-09 of FAA Advisory Circular 150/5370-10 establishes standard language for conditions, rights and remedies associated with Owner termination of this contract for cause due to default of the Contractor.

References: 2 CFR § 200 Appendix II(B); FAA Advisory Circular 150/5370-10, Section 80-09

15. DEBARMENT AND SUSPENSION

15.1 APPLICABILITY

The contract agreement that ultimately results from this solicitation is a "covered transaction" as defined by Title 2 CFR Part 180. Bidder must certify at the time they submit their proposal that neither it nor its principals are presently debarred or suspended by any Federal department or agency from participation in this transaction. The bidder with the successful bid further agrees to comply with Title 2 CFR Part 1200 and Title 2 CFR Part 180, Subpart C by administering each lower tier subcontract that exceeds $25,000 as a "covered transaction".

15.2 CERTIFICATE OF OFFEROR/BIDDER REGARDING DEBARMENT

By submitting a bid/proposal under this solicitation, the bidder or offeror certifies that neither it nor its principals are presently debarred or suspended by any Federal department or agency from participation in this transaction.

15.3 CERTIFICATION OF LOWER TIER CONTRACTORS REGARDING DEBARMENT

The successful bidder, by administering each lower tier subcontract that exceeds $25,000 as a "covered transaction", must verify each lower tier participant of a "covered transaction" under the project is not presently debarred or otherwise disqualified from participation in this federally assisted project. The successful bidder will accomplish this by:

1. Checking the System for Award Management at website: http://www.sam.gov

2. Collecting a certification statement similar to the Certificate of Offeror/Bidder Regarding Debarment above.

3. Inserting a clause or condition in the covered transaction with the lower tier contract

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If the Federal Aviation Administration later determines that a lower tier participant failed to disclose to a higher tier participant that it was excluded or disqualified at the time it entered the covered transaction, the FAA may pursue any available remedies, including suspension and debarment of the non-compliant participant.

Reference Title 2 CFR Part 180 (Subpart C) Title 2; CFR Part 1200; DOT Order 4200.5 DOT Suspension & Debarment Procedures & Ineligibility

16. CONTRACT WORKHOURS AND SAFETY STANDARDS ACT REQUIREMENTS

16.1 Overtime Requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic, including watchmen and guards, in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such work week.

16.2 Violation; Liability for Unpaid Wages; Liquidated Damages. In the event of any violation of the clause set forth in paragraph (1) of this clause, the Contractor or any subcontractor responsible therefore shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1) of this clause, in the sum of $29 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1) of this clause.

16.3 Withholding for Unpaid Wages and Liquidated Damages. The Federal Aviation Administration (FAA) or the Owner shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2) of this clause.

16.4 Subcontractors. The Contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraphs (1) through (4) and also a clause requiring the subcontractor to include these clauses in any lower tier subcontracts. The prime

contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1) through (4) of this clause.

References: 2 CFR § 200 Appendix II (E), 2 CFR § 5.5(b), 40 USC § 3702, 40 USC § 3704

17. CLEAN AIR AND WATER POLLUTION CONTROL

Contractor agrees to comply with all applicable standards, orders, and regulations issued pursuant to the Clean Air Act (42 U.S.C. § 740-7671q) and the Federal Water Pollution Control Act as amended (33 U.S.C. § 1251-1387). The Contractor agrees to report any violation to the Owner immediately upon discovery. The Owner assumes responsibility for notifying the Environmental Protection Agency (EPA) and the Federal Aviation Administration.

Contractor must include this requirement in all subcontracts that exceeds $150,000.

References: 2 CFR § 200, Appendix II(G)

18. BUY AMERICAN PREFERENCE

The Contractor certifies that its bid/offer is in compliance with 49 USC § 50101, BABA and other related Made in America Laws, 3 U.S. statutes, guidance, and FAA policies, which provide that Federal funds may not be obligated unless all iron, steel and manufactured goods used in AIP funded projects are produced in the United States, unless the Federal Aviation Administration has issued a waiver for the product; the product is listed as an Excepted Article, Material Or Supply in Federal Acquisition Regulation subpart 25.108; or is included in the FAA Nationwide Buy American Waivers Issued list.

The bidder or offeror must complete and submit the certification of compliance with FAA's Buy American Preference, BABA and Made in America laws included herein with their bid or offer. The Airport Sponsor/Owner will reject as nonresponsive any bid or offer that does not include a completed certification of compliance with FAA's Buy American Preference and BABA.

The bidder or offeror certifies that all constructions materials, defined to mean an article, material, or supply other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives that are or consist primarily of: non-ferrous metals; plastic and polymer-based products (including polyvinylchloride, composite building materials, and

[1] Per Executive Order 14005 "Made in America Laws" means all statutes, regulations, rules, and Executive Orders relating to federal financial assistance awards or federal procurement, including those that refer to "Buy America" or "Buy American," that require, or provide a preference for, the purchase or acquisition of goods, products, or materials produced in the United States, including iron, steel, and manufactured products offered in the United States.

polymers used in fiber optic cables); glass (including optic glass); lumber; or drywall used in the project are manufactured in the U.S.

The Buy American Preference incorporates statutory requirements and policies outlined in the in 49 USC § 50101, Executive Order 14005, and BABA.

18.1 Section 50101 of 49 USC requires that all steel and manufactured goods used on AIP projects be produced in the United States. This section also gives the FAA the ability to issue a waiver to a Sponsor to use non-domestic material on an AIP funded project subject to meeting certain conditions. A Sponsor may request that the FAA issue a waiver from the Buy American Preference requirements if the FAA finds that:

1) Applying the provision is not in the public interest.
2) The steel or manufactured goods are not available in sufficient quantity or quality in the United States.
3) The cost of components and subcomponents produced in the United States is more than 60 percent of the total components of a facility or equipment, and final assembly has taken place in the United States. Items that have an FAA standard specification item number (such as specific airport lighting equipment) are considered the equipment.
4) Applying this provision would increase the cost of the overall project by more than 25 percent.

18.2 The FAA Office of Airports maintains listings of projects and products that have received a waiver from the Buy American Preference requirements for project specific and nationwide use. Each of these conformance lists is available online at www.faa.gov/airports/aip/buy_american/.

Products listed on the FAA Nationwide Buy American Conformance list do not require additional submittal of domestic content information. Nationwide waivers expire five years from the date issued, unless revoked earlier by the FAA.

18.3 Bids or offers that are not accompanied by a completed Buy America Certification must be rejected as nonresponsive.

Buy America Certification is included in Division 2 of these Contract Documents.

References: Title 49 U.S.C. § 50101

19. COPELAND "ANTI-KICKBACK" ACT

Contractor must comply with the requirements of the Copeland "Anti-Kickback" Act (18 USC 874 and 40 USC 3145), as supplemented by Department of Labor regulation 29 CFR part 3. Contractor and subcontractors are prohibited from inducing, by any means, any person employed on the project to give up any part of the compensation to which the employee is entitled. The Contractor and each Subcontractor must submit to the Owner, a weekly

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statement on the wages paid to each employee performing on covered work during the prior week. Owner must report any violations of the Act to the Federal Aviation Administration.

Reference: 2 CFR § 200 Appendix II(D), 29 CFR parts 3 & 5

20. FEDERAL FAIR LABOR STANDARDS ACT (FEDERAL MINIMUM WAGE)

All contracts and subcontracts that result from this solicitation incorporate by reference the provisions of 29 CFR part 201, et seq, the Federal Fair Labor Standards Act (FLSA), with the same force and effect as if given in full text. The FLSA sets minimum wage, overtime pay, recordkeeping, and child labor standards for full and part time workers.

The contractor has full responsibility to monitor compliance to the referenced statute or regulation. The contractor must address any claims or disputes that arise from this requirement directly with the U.S. Department of Labor – Wage and Hour Division.

Reference: 29 USC § 201, et seq. 2 CFR § 200.430

21. OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970

All contracts and subcontracts that result from this solicitation incorporate by reference the requirements of 29 CFR Part 1910 with the same force and effect as if given in full text. The employer must provide a work environment that is free from recognized hazards that may cause death or serious physical harm to the employee. The employer retains full responsibility to monitor its compliance and their subcontractor's compliance with the applicable requirements of the Occupational Safety and Health Act of 1970 (20 CFR Part 1910). The employer must address any claims or disputes that pertain to a referenced requirement directly with the U.S. Department of Labor – Occupational Safety and Health Administration.

Reference 20 CFR part 1910

22. DISTRACTED DRIVING

TEXTING WHEN DRIVING

In accordance with Executive Order 13513, "Federal Leadership on Reducing Text Messaging While Driving" (10/1/2009) and DOT Order 3902.10 "Text Messaging While Driving" (12/30/2009), Federal Aviation Administration encourages recipients of Federal grant funds to adopt and enforce safety policies that decrease crashes by distracted drivers, including policies to ban text messaging while driving when performing work related to a grant or subgrant.

In support of this initiative, the Owner encourages the Contractor to promote policies and initiatives for its employees and other work personnel that decrease crashes by distracted drivers, including policies that ban text messaging while driving motor vehicles while performing work activities associated with the project. The Contractor must include the

substance of this clause in all sub-tier contracts exceeding $10,000 that involve driving a motor vehicle in performance of work activities associated with the project.

Reference Executive Order 13513, and DOT Order 3902.10

23. PROCUREMENT OF RECOVERED MATERIALS

Contractor and subcontractor agree to comply with Section 6002 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act, and the regulatory provisions of 40 CFR Part 247. In the performance of this contract and to the extent practicable, the Contractor and subcontractors are to use of products containing the highest percentage of recovered materials for items designated by the Environmental Protection Agency (EPA) under 40 CFR Part 247 whenever:

1) The contract requires procurement of $10,000 or more of a designated item during the fiscal year; or,

2) The contractor has procured $10,000 or more of a designated item using Federal funding during the previous fiscal year.

The list of EPA-designated items is available at
www.epa.gov/smm/comprehensive-procurement-guidelines-construction-products

Section 6002(c) establishes exceptions to the preference for recovery of EPA-designated products if the contractor can demonstrate the item is:

a) Not reasonably available within a timeframe providing for compliance with the contract performance schedule;

b) Fails to meet reasonable contract performance requirements; or

c) Is only available at an unreasonable price.

24. SEISMIC SAFETY (49 CFR PART 41). The Contractor agrees to ensure that all work performed under this contract, including work performed by subcontractors, conforms to a building code standard that provides a level of seismic safety substantially equivalent to standards established by the National Earthquake Hazards Reduction Program (NEHRP). Local building codes that model their code after the current version of the International Build Code (IBC) meet the NEHRP equivalency level for seismic safety.

25. DOMESTIC PREFERENCES FOR PROCUREMENTS

CERTIFICATION REGARDING DOMESTIC PREFERENCES FOR PROCUREMENTS

The Bidder or Offeror certifies by signing and submitting this bid or proposal that, to the greatest extent practicable, the Bidder or Offeror has provided a preference for the purchase, acquisition, or use of goods, products, or materials produced in the United States (including,

but not limited to, iron, aluminum, steel, cement, and other manufactured products) in compliance with 2 CFR § 200.322.

SPECIAL PROVISIONS

PART B - FAA REQUIREMENTS

1. AIRPORT IMPROVEMENT PROGRAM.

The work in this contract is included in Airport Improvement Program (AIP) Project Number 3-06-0179-043-2023 which is being undertaken and accomplished by the Owner in accordance with the terms and conditions of a grant agreement between the Owner and the United States, under the Airport Improvement Act per Chapter 471 of Title 49 of the United States Code (U.S.C.), as amended by the airport, and the Airway Safety and Capacity Expansion Act of 1987, pursuant to which the United States has agreed to pay a certain percentage of the associated project costs that are determined to be allowable under said Act. The Contractor shall note that the United States is not a party to this contract and no reference in this contract to the FAA or any representative thereof, or to any rights granted to the FAA or any representative thereof, or the United States, by the contract, make the United States a party to this contract.

2. DBE ADMINISTRATION **Required if Federal funds exceed $250,000**

2.1 Eligibility of DBE's:

Those firms currently certified as DBE's by the CA Department of Transportation are eligible to participate as DBE's on this contract. A list of these firms can be obtained from the State, the consulting engineer, or the Sponsor. Previous acceptance of a DBE by the FAA, State or Sponsor does not ensure acceptance on this project.

2.2 Counting DBE Participation Towards DBE Goals:

DBE participation toward attainment of the goal will be computed on the basis of the subcontract prices agreed to between the contractor and subcontractors for the contract items or portions of items being sublet, as shown on the DBE Participation Form and attachments. Credit will only be given for use of DBE's that are certified or accepted according to this specification. DBE participation shall be counted toward meeting the DBE goal in accordance with the following:

a. Commercially Useful Function:

The Sponsor shall count toward the DBE goal only those expenditures to DBE's that perform a commercially useful function in the work of the contract. A DBE performs a commercially useful function when it is responsible for execution of a distinct element of work by actually performing, managing, and supervising that work. To determine if a DBE is performing a commercially useful function, the amount of work subcontracted, industry practices, and other relevant factors will be evaluated. If consistent with industry practices, a DBE shall enter into a subcontract or other contractual written agreement. A DBE Contractor may subcontract a portion of the work up to the amount allowed under standard

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subcontracting contract provisions of normal industry practices. A DBE is presumed not to be performing a commercially useful function if the DBE is performing outside these guidelines.

b. Materials and Supplies:

The Sponsor shall count toward the DBE goal the expenditures for materials and supplies obtained from DBE suppliers and manufacturers as described below. The DBE's must assume the actual and contractual responsibility for the provision of the materials and supplies:

(1) The entire expenditure to a DBE manufacturer will be counted toward the DBE goal. A manufacturer must operate or maintain a factory or establishment that produces on the premises the materials or supplies that are obtained by the contractor.

(2) Sixty percent of expenditures to a DBE regular dealer will be counted toward the DBE goal. A regular dealer must perform a commercially useful function in the supply process including buying the materials or supplies, maintaining an inventory and regularly selling materials to the public. Bulk items such as steel, cement, gravel, stone and petroleum products need not be kept in stock, but the dealer must own or operate distribution equipment.

(3) No credit will be given toward the DBE goal, if the prime contractor makes a direct payment to a non-DBE material supplier. However, it will be permissible for a material supplier to invoice the prime contractor and the DBE jointly and be paid by the prime contractor making remittance to the DBE firm and material supplier jointly.

(4) No credit, toward the DBE goal, will be given for the cost of materials or equipment used in a DBE firm's work when those costs are paid by a deduction from the prime contractor's payment(s) to the DBE firm.

c. Owner-Operator Trucking:

The Sponsor shall count toward the DBE goal, the entire delivery fee paid to DBE owner-operators performing trucking for the contractor, if they appear on the contractor's payroll and separate records are furnished to the Sponsor documenting the expenditures. The records shall include for each owner-operator; their social security number; driver's license number; vehicle registration number; current vehicle license number; truck number; and a complete record of the contract fees paid to them.

d. Joint Venture:

When a joint venture contract is involved, the Sponsor shall count towards the DBE goal that portion of the contract total dollar value equal to the percentage of ownership and control of each DBE firm within the joint venture. Such

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crediting is subject to the sponsor's acceptance of the joint venture agreement. The Bidder must furnish the joint venture agreement with the DBE Participation Form. The joint venture agreement must include a detailed breakdown of the following:

(1) Contract responsibility of the DBE for specific contract items of work,

(2) Capital participation by the DBE,

(3) Specific equipment to be provided by the DBE,

(4) Specific responsibilities of the DBE regarding control of the joint venture,

(5) Specific workers and skills to be provided by the DBE, and

(6) Percentage distribution to the DBE of the projected profit or loss incurred by the joint venture.

The joint venture must be certified by the sponsor prior to the sponsor submitting the proposal to the FAA. A copy of the sponsor's certification letter must be submitted to FAA along with the DBE Participation Form.

3. DBE AWARD DOCUMENTATION AND PROCEDURE:

All bidders shall certify in the bid proposal their intent to meet or exceed the established goal or to demonstrate good faith efforts to meet the goal. Failure to make such certification or failure to demonstrate good faith efforts will render a bid non responsive.

3.1 DBE Participation Form:

The apparent successful bidder must submit with the bid the following information on the proposed DBE Participation Form attached to the Proposal. The information shall demonstrate the contractor's intended participation by certified DBE's. When the required information is not provided by the apparent low bidder the bid will be ruled non responsive and will not be considered. The information furnished shall consist of:

a. The names, addresses, contact persons, phone numbers, and category of DBE firms to be used on the contract;

b. A list of the bid items of work to be performed by the DBE and the percent to be credited toward the DBE goal;

c. The dollar value of each of the DBE work items; and

d. If the DBE goal is not met, a statement of why the goal and a demonstration of the good faith efforts taken to meet the DBE goal.

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3.2 Sponsor Evaluation:

In selecting the lowest responsible bidder, the Sponsor will evaluate the DBE information provided with the bid. The Sponsor may request additional DBE information and may allow the bidders, up to 7 calendar days after bid submittal to supplement or resubmit information concerning their proposed DBE participation. Prior to awarding the contract the Sponsor will verify verbally and/or in writing that the information submitted by the apparent successful bidder is accurate and complete.

3.3 Good Faith Efforts:

If the bidder is unable to meet the DBE goal, the bidder must submit evidence of good faith efforts taken to meet the goal. Good faith efforts conducted after the bid opening will not be considered adequate to fulfill these bid requirements. Good faith efforts may include but are not limited to:

a. Efforts to select portions of the work for performance by DBE's, in order to increase the likelihood of achieving the DBE goal. This can include, but is not limited to, breaking down contracts into economically feasible units to facilitate DBE participation. Selection of portions of work shall be at least equal to the DBE goal.

b. Written notification to individual DBE's likely to participate in the contract sent at least 7 calendar days prior to the bid opening. The notification shall list specific items or types of work and shall be sent to a reasonable number of DBE's qualified to participate in the contract.

c. Efforts to negotiate with DBE's for specific items of work including:

(1) Names, addresses, and telephone numbers of DBE's who were contacted, the dates of initial contact and information on further contacts made to determine with certainty if the DBE's were interested. Personal or phone contacts are expected;

(2) Description of the information provided to the DBE's regarding the plans, specifications and estimated quantities for portions of the work to be performed;

(3) Individual statements as to why agreements with DBE's were not reached; and

(4) Information on each DBE contacted but rejected and the reasons for the rejection.

d. Efforts to assist the DBE's that need assistance in obtaining bonding, insurance, or lines of credit required by the contractor.

e. Documentation that qualified DBE's are not available or not interested.

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f. Advertisements in general circulation media, trade association publications and disadvantaged-focus media concerning subcontracting opportunities.

g. Efforts to use the services of available disadvantaged community organizations; disadvantaged contractor's groups; local, state and federal disadvantaged business assistance offices; and other organizations that provide assistance in recruitment and placement of DBE's.

The demonstration of good faith efforts by the contractor must prove the contractor actively and aggressively sought out DBE's to participate in the project. The following actions would not be considered acceptable reasons for failure to meet the DBE goal and would not constitute a good faith effort:

a. The DBE was unable to provide adequate performance and/or payment bonds.

b. A reasonable DBE bid was rejected based on price.

c. The DBE would not agree to perform the subcontract work at the prime contractors unit bid price.

d. Union versus non-union status of the DBE firm.

e. The prime contractor would normally perform all work included in this contract.

f. The prime contractor solicited DBE participation by mail only.

3.4 Post Award Compliance:

If the contract is awarded on less than full DBE goal participation, the contractor is not relieved of the responsibility to make a determined effort to meet the full goal amount during the life of the contract. In such a case, the contractor shall continue good faith efforts throughout the life of the contract to increase the DBE participation to meet the contract goal.

If a DBE is unwilling or unable to perform the work specified, the contractor shall request from the Sponsor and FAA, relief from the obligation to use that DBE. Efforts will be made by the contractor to acquire from the DBE a letter which states the reason the DBE is unwilling or unable to complete its obligations under the project. If this results in a DBE contract shortfall, the contractor shall immediately take steps to obtain another certified DBE to perform an equal dollar value of allowable credit. If a new DBE cannot be found, the contractor shall submit evidence of good faith efforts within 15 calendar days of the request for relief. The contractor shall submit the new DBE's name, address, work items and the dollar amount of each item. The sponsor and the FAA shall approve the new DBE before the DBE starts work.

If the contractor fails to conform to the approved DBE participation or if it becomes evident that the remaining work will not meet the approved participation, then the contractor shall submit evidence showing either how the contractor intends to meet the DBE participation, or what circumstances have changed affecting the DBE

Exhibit 1

participation. If the sponsor is not satisfied with the evidence, then liquidated damages may be assessed for the difference between the approved and actual DBE participation.

3.5 Records and Reports:

The contractor shall keep records as necessary to determine compliance with the DBE obligations. The records shall include but are not limited to:

a. Record of DBE Participation: The names of disadvantaged and non-disadvantaged subcontractors, regular dealers, manufacturers, consultant and service agencies; the type of work or materials or services performed on or incorporated in the project; and the actual value of such work.

b. Efforts to Utilize DBE Firms: Documentation of all efforts made to seek out disadvantaged contractor organizations and individual disadvantaged contractors for work on this project. All correspondence, personal contacts, telephone calls, etc., to obtain the services of DBE's should be documented.

c. Final DBE Certification: Upon completion of the individual DBE firm's work, the prime contractor shall submit a certification attesting to the actual work performed by the DBE firm and the amount paid the DBE firm. This certification shall be signed by both the prime contractor and the DBE firm.

4. FAA INSPECTION/REVIEW.

The Contractor shall allow any authorized representative of the FAA to inspect and review any work or materials used in the performance of this contract.

5. FAA.

The Contractor shall permit FAA personnel the right to enter the work site during the term of the contract for maintenance of existing navigation and communication facilities.

In the event that the proposed AIP work will impact existing FAA navigation and communication facilities, the Engineer will notify FAA one week in advance of construction activity in order to allow the FAA sufficient time to locate and mark existing field cables and to avoid an unscheduled facility outage. The Engineer shall coordinate with FAA concerning all operation and shutdown of all FAA navigational facilities during this construction project.

Any FAA equipment/cable that is damaged by the contractor shall be repaired as approved by FAA personnel. If FAA cables are anticipated to facilitate construction, the Contractor shall provide advance notice to FAA in order to mobilize an FAA technician to the site for observation of the splicing. Splicing and cable repair shall meet the FAA specifications and shall be accomplished to the satisfaction of FAA. All such work shall be performed by qualified workmen regularly engaged in cable repair & splicing. In the event the existing cable cannot be repaired to the satisfaction of FAA personnel, new cable of like kind shall be procured and installed by the Contractor.

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6. OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION.

All work within the Airport Operations Area shall be accomplished in conformance to Advisory Circular 150/5370-2G and the Construction Safety and Phasing Plan (CSPP) contained in Division 5 of this document. The CSPP conveys minimum requirements for operational safety on the airport during construction activities. The Contractor shall prepare and submit for approval, a Safety Plan Compliance Document (SPCD), prior to Notice to Proceed, that details how it proposes to comply with the requirements presented within the CSPP.

SPECIAL PROVISIONS

PART C – AIRPORT REQUIREMENTS

1. HAUL ROADS:

The Contractor shall obtain approval from the Engineer prior to establishing haul roads within the airport property. Once established, the haul roads shall be utilized for all equipment traffic, and the equipment shall not be allowed to stray or wander away from the established routes. The haul roads shall be the responsibility of the Contractor and shall be maintained and kept in good order at all times. Water, when required, shall be applied at the locations and in the amounts necessary to minimize dust and dirt in the air operations area. Haul roads across any active runway or taxiway shall be kept clean and in good order at all times. The Contractor shall repair any damage caused by the movement of equipment on any of the haul roads, whether in designated or undesignated areas. After completion of the project, the Contractor shall be required to re-grade any unpaved portions of the haul road and to reseed the area with local native grasses to match the existing conditions of the area. The performance of any work as specified by this provision, including watering, maintenance, seeding, and repair of the haul roads, shall not be measured and paid for directly, but shall be considered as necessary and incidental to the work.

Establishment of haul roads off of Airport property shall be the sole responsibility of the Contractor.

2. AIRPORT SECURITY:

The Contractor will be required to submit to the airport prior to the commencement of construction, evidence in the form of a certification letter that all of their employees who will have unescorted access to the AOA have been checked for employment, security, and criminal history for the last ten years. The letter will also certify that these employees meet all security regulations as required by the Sponsor's security program.

During the course of the construction operations, the Contractor will be allowed to utilize a maximum of two (2) airport access "Security Gates" as entrance to the construction site and one (1) airport access gate to access the maintenance yard for quality assurance/quality control trailers. This gate and the associated haul roads shall be designated by the Engineer. The Contractor shall be required to keep this gate guarded and closed during construction hours. The gate may be opened only for authorized vehicle traffic flow. At times that a gate guard is not present at a gate, it shall be closed and securely locked. The Contractor's key personnel will be required to obtain an "airport security" gate access card from the Airport Operations Office and must escort all other personnel and vehicles used on the construction project. Said permit/access card shall hold the Contractor responsible for all vehicles and personnel on the airport property other than those that have individual authorization. All authorized vehicles and construction equipment must display a three foot by three foot flag with international orange and white 12 inch squares displayed in full view above the vehicles. Passengers in any authorized vehicles shall be the responsibility of the Contractor. The "gate guard" shall allow no unauthorized vehicle or person to enter the "air operations" side of the airport without the above stipulated "security clearance." The Contractor and the Contractor's "security gate guard" shall be held duly responsible to

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uphold the above security stipulations at all times during the progress of the construction project. No deviations from these security measures shall be allowed at any time. There shall be a $1,000.00 penalty for each deviation from these security provisions.

3. RADIO COMMUNICATIONS:

The Contractor's superintendent and flagman shall be required to monitor transceiver radios tuned to the 121.9 MHz MHz frequency at all times, unless the tower is closed from the hours of 9:00 p.m. to 7:00 a.m., then the Contractor will monitor and communicate through the CTAF frequency 134.95 MHz. Radios shall be supplied by the Contractor. Such radios shall be used to obtain proper clearance in regard to the movement of equipment, trucks, etc., on the airport. Further, any unusual occurrences in the flight pattern of approaching or departing aircraft shall be acknowledged by all concerned so that operation of the airport and the construction work can be safely carried on at all times.

4. WORK SCHEDULE:

Immediately after the award of contract, the Contractor shall file with the Engineer a time chart or schedule of proposed progress, a plan of construction and proposed detailed methods of carrying out the work, including a full statement of equipment and equipment layout for the job.

The Sponsor reserves the right to request changes in the sequence of project schedules if such change is required in the interest of safety or airport operation.

5. CONTRACTOR'S QUALITY CONTROL PROGRAM:

The contractor and their chosen testing laboratory shall submit a quality control plan submitted and approved prior to the Notice to Proceed (NTP). The quality control plan should contain the following items:

a. Names of testing laboratories and consulting engineer firms with quality control responsibilities on the project, together with a description of the services to be provided.

b. Procedures for the testing laboratories to meet the requirements of the applicable ASTM, AASHTO or other standards referenced in the contract specifications.

c. Qualifications of engineering supervision and construction inspection personnel.

d. A listing of all tests required by the contract specifications, including the type and frequency of tests to be taken, the method of sampling, the applicable test standard, and the acceptance criteria or tolerance permitted for each type of test.

e. Procedures for ensuring that the tests are taken in accordance with the program, that they are documented daily, that the proper corrective actions, where necessary, are undertaken, and that the quantity of materials used is adequate.

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6. SEQUENCE OF WORK:

The Contractor will be required to accomplish the work items according to the schedule of construction as submitted to the Engineer following the award of the contract. Prior to closing any taxiways or apron area, they shall be marked in conformance with the FAA Advisory Circular 150/5340-1 latest edition. This shall consist of placing barricades and flashers on each taxiway and closed runway crosses on the effected runways. Flashers must be well anchored so they do not blow over from jet blasts or strong winds. Closed taxiway, apron area, and other airfield markings and maintenance of these items are considered a necessity and an incidental part of the work, and no separate measurement or payment will be made. The Contractor shall consider the costs and distribute them to the various bid items.

The Contractor shall not allow men or equipment within **75** feet of any runway centerline or within **39.5** feet of the centerline of any taxiway, nor shall he permit materials to be stored or stocked within **400** feet of any runway centerline or within **62** feet of the centerline of any taxiway during the entire period of this project without first obtaining approval of the Engineer. When the Contractor's operations require the closing of any runway or taxiway, the Contractor shall mark said runway or taxiway in accordance with the plans and specifications at no additional cost to the Sponsor.

Prior to construction on any taxiway or runway, the Contractor shall, upon approval by the Engineer, close the taxiway or runway and begin work. The Contractor shall be responsible for clearly marking and defining the closed taxiways or runways by use of warning lights, barricades, flags and closed taxiway or runway markings in conformance with FAA Advisory Circular 150/5370-2 latest edition. The Contractor shall be responsible for maintaining these barricades and keeping them clearly visible at all times.

The Sponsor shall meet with the Contractor immediately after the award of the contract to work up the sequence of work for the project.

7. CLOSURE OF AIR OPERATIONS AREAS:

Barricades are considered a necessary and incidental part of the work and no separate measurement or payment will be made therefore. The Contractor shall consider the costs and distribute them to the various bid items.

8. ACCIDENT PREVENTION:

Precautions shall be exercised at all times for the protection of persons (including employees) and property, and that the safety provisions of applicable laws and of applicable building construction codes shall be observed, and that machinery, equipment, and explosives shall be guarded and all hazards shall be eliminated in accordance with the safety provisions of the Manual of Accident Prevention in Construction, published by the Associated General Contractors of America, to the extent that such provisions are not in contravention of applicable law.

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9. EXISTING UNDERGROUND CABLES:

The FAA shall attempt to locate all of their underground cables that are located in the vicinity of the work areas, prior to construction in the area. The Contractor shall attempt to locate the Sponsor's and all other public underground cables prior to construction. Damage to the underground cables through negligence on the part of the Contractor will require replacement by the Contractor at no cost to the Sponsor. Any splicing or replacing of damaged cable shall meet current FAA specifications.

10. UTILITIES:

Any utilities required by the Contractor for the prosecution of the work shall be paid for by said Contractor.

11. INDEMNIFICATION:

The Contractor agrees to indemnify and save harmless County of Ventura Department of Airports/City of Oxnard, its officers, agents, and employees, against any and all damages to property or injuries to or death of any person or persons, including property and employees or agents of County of Ventura Department of Airports/City of Oxnard, and further agrees to defend, indemnify and save harmless, County of Ventura Department of Airports/City of Oxnard, its officers, agents, and employees from any claims, demands, suits, actions, proceedings of any kind or nature resulting from or arising out of operations in connection herewith, including operations of subcontractors and acts of omissions of employees or agents of the Contractor or his subcontractors.

12. SALES AND USE TAXES:

Construction and building materials sold to the contractors and subcontractors for use on public works owned by County of Ventura, California, are exempt from State Sales and Use Taxes. However, such materials will be subject to any Sales and Use Taxes imposed by local cities and counties. This change in the State Tax Law has no effect of Sales and Use Taxes imposed by other local taxing authorities. Contractor shall provide proof of exemption prior to commencing work.

13. PERMITS AND COMPLIANCE WITH LAWS:

The Contractor shall procure and pay for all permits, licenses, and bonds necessary for the prosecution of his work, and/or required by Local, State, and Federal regulations and laws, as pertains particularly to permits and transportation of materials and equipment, or other operations which are not a specific requirement of these specifications. The Contractor shall give all notices, pay all fees and taxes, and comply with all Federal, State, and Local laws, ordinances, rules, and regulations, and building and construction codes bearing on the conduct of the work.

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14. EXECUTED CONTRACTS:

Each contract shall be executed in five original copies and there shall be executed originals of the Contractor's Performance Bond and Payment Bond in equal number to the executed originals of the contract. Two copies of such executed documents will be retained by County of Ventura, California, one copy shall be delivered to the FAA, and two copies will be delivered to the Contractor. The cost of executing the Contract, bonds and insurance, including all notary fees and incidental expenses are to be paid by the Contractor to whom the contract is awarded.

15. SUBLETTING OR ASSIGNING OF CONTRACTS:

The Contractor shall perform, with his organization, an amount of work equal to at least 50% of the total contract cost. No assignment by the Contractor of any principal construction contract or any part thereof or of the funds to be received thereunder by the Contractor will be recognized unless such assignment has received the prior written approval of the Sponsor, which shall be at Sponsor's sole discretion, and the Surety has been given due notice of such assignment and has also consented in writing thereto.

Such written approval of the Sponsor shall not relieve the Contractor of any obligation incurred by him, under the contract, unless otherwise expressly stated in the approval.

The following language must appear in any assignment:

"It is agreed that the funds to be paid to the assignee under this assignment are subject to a prior lien for services rendered or materials supplied for the performance of the work called for in said contract in favor of all persons, firms, or corporations rendering such services or supplying such materials."

16. QUALIFICATION OF DISADVANTAGED BUSINESS ENTERPRISES:

A Contractor, or subcontractor, will be considered as certified if that company has received a letter of certification from an organization, whose procedures for certifying business, is acceptable to the FAA.

A Contractor is permitted to use 100% of the Contract amount for the unit of work if the Contractor, or subcontractor, performs the construction, installation, rehabilitation, etc. of that work item(s).

A Contractor is permitted to use only 60% of the Contract amount for the purchase of material from a certified DBE supplier.

The Contractor is required to submit, to the Engineer, the names, work terms and contract value of all subcontractors, prior to commencing work. The Contractor is required to submit the names, work items and final contract amounts of all subcontractors after the substantial completion of the project

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17. ACCEPTANCE TESTING:

Acceptance testing shall be the responsibility of the Engineer, unless otherwise specified in the technical specifications. All test results from Contractor required testing shall be submitted to the Engineer at the completion of the testing activity.

18. GRADE CONTROL AND SURFACE TOLERANCE:

The Contractor will be required to provide a minimum of one 2-person survey crew on site at all times during the work to assure compliance with Section 100 of the General Provisions and to provide the following at a minimum.

1. Provide all construction staking as required by Section 50 of the General Provisions and Plans.

2. Provide continuous straight edging records on a daily basis to the Engineer and under the direct observation/supervision of the Engineer as required. Submit results on forms provided by the Engineer. These will be accepted on a lot basis by the Engineer.

3. Provide daily grade tolerance surveys for completed courses of pavement to assure grade tolerances are being met. All survey data shall be provided in electronic ASCII format (or equivalent as approved by the engineer) and shall include Point Number, Northing, Easting, Elevation, and Description (PNEZD format). All point descriptions shall be coded in accordance with the naming convention specified in the contractor's "Point Description Key Code" as provided to the engineer prior to the beginning of construction.

4. Assist in other verification surveys during roto-milling operations, field design adjustments, and as-built survey work as required at the direction of the Engineer.

19. CONSTRUCTION MANAGEMENT PLAN:

The Contractor and testing firm are required to prepare a Quality Control Program as required under SECTION 100, CONTRACTOR QUALITY CONTROL PROGRAM, of the General provisions. The Contractor shall obtain from the testing laboratory a proposed schedule of material testing submitted on forms provided by the Engineer, an example of which, is included following this specification. The requirements for the quality control program specified under Section 100 shall formulate a portion of the **CONSTRUCTION MANAGEMENT PLAN (CMP)** required under this item.

The Engineer will assemble and submit the CMP. The Contractor must complete sections of the CMP as indicated on the following pages. All sections indicated to be completed by the Contractor must be titled as shown. Other sections will be completed by the Engineer as indicated. The plan will be submitted to the Sponsor and FAA for approval a minimum of 10 days prior to construction. Approval of the CMP must be obtained prior to commencing any paving operations. Changes in the Contractor's personnel, sub-contractor's personnel, testing

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laboratory's personnel or testing procedures will require revision to the plan. The Contractor is required to submit any changes immediately to the Engineer.

The following outline shall be utilized as a guide for preparation of the CMP. Modifications may be incorporated as approved by the Engineer.

I. Introduction/Summary (Completed by Engineer)

II. Personnel

1. Name of Sponsor representatives who have responsibility and authority for contract administration. (by Engineer)

2. Consulting Engineer and staff showing qualifications, experience and project responsibilities. (by Engineer)

3. Contractor project personnel and responsibilities. (by Contractor)

4. Quality Control Testing Laboratory project personnel and responsibilities. (by Contractor)

5. Acceptance Testing Laboratory project personnel and responsibilities (by Certified Testing Firm)

III. Inspection Procedures and Frequencies (by Contractor) (Refer to Section 100)

IV. Submittal Process (by Contractor) (Refer to Section 100)

V. Quality Control Testing (by Contractor) (Refer to Section 100)

VI. Acceptance Testing (by Certified Testing Firm)

VII. Test Results

1. Quality Control Testing (by Contractor) (Refer to Section 100)

2. Acceptance Testing (by Certified Testing Laboratory)

VIII. Final Test and Quality Control Report (by Contractor)

At the end of the project and prior to final inspection and reduction of contract retainage, the prime contractor shall prepare and submit to the engineer for review and for FAA concurrence a final project summary report. Two bound copies and one loose leaf copy shall be submitted. The report shall include a summary of all tests taken with results, plus a narrative explaining the action taken for all failing tests within the context of the specifications. The Contractor shall correlate required tests shown in the specifications to those accomplished. Copies of all Certificates of Compliance for each material installed shall be included in the section pertaining to that material. Examples of typical Certificates of Compliance are for bituminous material, cement, fly ash, antistripping agent, pavement paint, etc. This summary shall contain all

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referenced material tests required by the Quality Control Program outlined in Section 100 of these specifications. In addition, it shall summarize all acceptance testing results.

The report shall be bound in booklet form with divisions for each bid item, i.e., excavation, base courses, pavement materials, electrical items, drainage items and any other materials. Each section shall be clearly marked with a divider including the section name and section table of contents. The report must contain a summary of all tests by lot or pay item, highlighted to indicate failed tests and/or reduced pay results, and reference to any approved change order that accepted any out of tolerance material. The individual sections shall begin with a narrative discussing any failed tests followed by a summary of the testing required and accomplished during the progress of the work. Within each section, the Contractor shall summarize individual test results in the format indicated on the following test summary forms provided by the Engineer. The forms are available in Microsoft Word format upon request. Additional or updated forms may be substituted by the Engineer prior to construction.

Any airfield lighting, electrical fixtures or other equipment used in the project shall have instruction books or factory installation sheets showing exploded views of the assembled parts with trouble shooting tips clearly shown. This information is of the type normally supplied by the manufacturer but must be in a presentable form. Single line wiring diagrams and circuit directories shall also be included in the summary with any recommended maintenance procedures suggested by the supplier or manufacturer.

Contractor is responsible for providing information before Notice to Proceed.

20. INSTRUCTION MANUALS:

At the end of project construction, the Contractor shall provide to the airport three instruction manuals. The manuals shall include as a minimum the following:

1. Names, addresses, and phone numbers of electrical equipment suppliers/manufacturers.

2. Component parts list with manufacturer and part number.

3. Final wiring diagrams of lighting control system (where a new control panel and/or control system is installed).

4. Equipment schematic and wiring diagrams showing all components cross referenced to the parts list.

5. Installation manuals.

6. Maintenance and troubleshooting instruction.

7. Operating instructions.

8. Equipment Warranties.

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Manuals for each piece of equipment provided shall be separated by dividers. The dividers shall be labeled accordingly. Three ring binders marked with the project schedule(s), date of final inspection, as well as Contractor's electrical subcontractors names, addresses, and phone numbers.

21. CONSTRUCTION CLOSEOUT

In addition to the items discussed in section 90-11 of the General Provisions, after the final inspection has been completed, a Notice of Contractor's Final Settlement will be issued for publication in accordance with applicable state, local, and federal requirements. Contractor is required to submit on company letterhead and signed by supervisor or company officer the following:

a) Affidavit that all wages, material purchases, and subcontractors have been paid in full.

b) List of all subcontractors used on the project with final dollar value of subcontracts and DBE subcontractors identified.

c) All test results in format required by the FAA. All tests results must be approved and accepted before the Engineer will release any final retainage amounts.

Final payment will not be authorized until these items have been completed.

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SPECIAL PROVISIONS

PART D – STATE REQUIREMENTS

Labor and Employment Law Overview: California

Summary

- California law prohibits an employer from discriminating and retaliating against employees in a variety of protected classes. Employers must also provide pregnancy accommodations, provide equal pay, allow wage discussions, allow employees to access their personnel files and protect whistleblowers. See EEO, Diversity and Employee Relations.
- California permits preemployment drug testing and background checks, but limits salary history inquiries. See Recruiting and Hiring.
- In California, there are requirements relating to the minimum wage, overtime, meal and rest breaks, breastfeeding breaks and child labor. See Wage and Hour.
- California has laws that relate to employee pay and benefits, including temporary disability insurance, health care continuation, pay statements, wage deductions and wage notice requirements. See Pay and Benefits.
- Under California law, employees are entitled to certain leaves or time off, including family and medical leave, paid family leave, paid sick leave, domestic violence leave and emergency responder leave. See Time Off and Leaves of Absence.
- California law requires employers to provide a safe working environment for their employees, including the development of a written Injury and Illness Prevention Program. California also prohibits smoking in the workplace and using a hand-held cell phone while driving. See Health and Safety.
- When employment ends, California employers must comply with applicable final pay, job reference and mass layoff notification requirements. See Organizational Exit.

Introduction to Employment Law in California

Many consider California the state with the most proscriptive variances from federal law, including broader antidiscrimination protections, a higher minimum wage, paid family leave insurance and paid sick leave.

Select California employment requirements are summarized below to help an employer understand the range of employment laws affecting the employer-employee relationship in the state. An employer must comply with both federal and state law.

An employer must also comply with applicable municipal law obligations affecting the employment relationship, in addition to complying with state and federal requirements.

EEO, Diversity and Employee Relations

Key California requirements impacting EEO, diversity and employee relations are:

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Fair Employment Practices

The California Fair Employment and Housing Act (FEHA) prohibits employers with five or more employees from discriminating in the terms and conditions of employment. Protected characteristics include:

- Race (including hair texture, protective hairstyles and other traits historically associated with race);
- Religion;
- Color;
- National origin and ancestry;
- Physical or mental disability;
- Medical condition;
- Genetic information;
- Marital status;
- Sex (including breastfeeding and related conditions);
- Sexual orientation;
- Gender identity/gender expression;
- Pregnancy (including childbirth and related medical conditions);
- Age; and
- Military or veteran status.

Harassment is a form of illegal discrimination that is prohibited under the FEHA.

The FEHA also prohibits retaliation against a person who opposes, reports or assists another person in opposing unlawful discrimination.

Pregnancy Accommodation

The FEHA requires an employer to provide reasonable accommodations to an employee because of pregnancy, childbirth or a related medical condition. Examples of reasonable accommodations include modified duties, schedules or equipment.

Religious Accommodation

The FEHA explicitly provides for religious accommodation in employment. The FEHA requires an employer to show significant difficulty or expense to prove undue hardship, versus the de minimus standard under federal law.

Disability Accommodation

An employer is obligated to provide reasonable accommodations to qualified individuals with disabilities. The FEHA makes it a separate violation for an employer to fail to engage in the interactive process.

Equal Pay

California prohibits discrimination on the basis of sex, race and ethnicity in the payment of wages for substantially similar work. As a defense against a wage discrimination claim, an employer must show that the pay differential is based on a bona fide factor other than sex, such as seniority, merit, quality or quantity of production, education, training or experience. Prior salary, on its own, does not justify a wage differential.

Exhibit 1

Discussion of Wages

An employer may not prohibit employees from disclosing, discussing or inquiring about their own wages or the wages of another employee and may not discriminate or retaliate against employees for engaging in such conduct.

Access to Personnel Files

California employers must provide current and former employees with access to their personnel files. The employer must make the records available for inspection by the requester at reasonable times and intervals, but generally no later than 30 calendar days after receiving a written request. The employer may charge a fee that equals the actual cost of copying the materials.

Whistleblower Protections

A California employer may not make, adopt or enforce any rule, regulation or policy preventing an employee from being a whistleblower. Also, an employer may not retaliate because an employee:

- Is a whistleblower;
- Refuses to participate in an activity that would result in a violation of a state or federal statute or a violation of or noncompliance with a state or federal rule or regulation; or
- Exercises his or her rights as a whistleblower in any former employment.

A whistleblower is an employee who discloses information to a government or law enforcement agency where the employee has reasonable cause to believe that the information discloses:

- A violation of a state or federal statute;
- A violation of or noncompliance with a state or federal rule or regulation; or
- Unsafe working conditions or work practices in the employee's employment or place of employment.

Be aware that where there is overlap between federal, state and/or local law, complying with the law that offers the greatest rights or benefits to the employee will generally apply.

Additional information on EEO, diversity and employee relations practices in California can be found in the California Employee Handbook Table of Contents, Disabilities (ADA): California, EEO - Discrimination: California, EEO - Harassment: California, EEO - Retaliation: California, HR Management: California, Employee Discipline: California, California Workplace Labor and Employment Law Posters and Does This Law Apply to My Organization in California? Federal requirements can be found in Disabilities (ADA): Federal, EEO - Discrimination: Federal, EEO - Harassment: Federal, EEO - Retaliation: Federal, HR Management: Federal and Employee Discipline: Federal.

Recruiting and Hiring

Key California requirements impacting recruiting and hiring are:

Drug Testing

Drug testing of job applicants is allowed in California. An employer must provide applicants with notice of the drug testing requirement.

Exhibit 1

Credit Checks

Under the Consumer Credit Reporting Agencies Act, an employer may perform credit checks only for certain positions (e.g., a law enforcement position), and it must provide applicants for such positions with notice that a credit check will be performed. Further, the employer must notify applicants of any adverse action taken on the basis of the credit check.

Criminal Checks

An employer must show that any criminal history information sought is job-related and consistent with business necessity. The employer may not consider certain types of criminal history when making hiring decisions, including:

- An arrest that did not result in conviction;
- Participation in a pre-trial or post-trial diversion program;
- Convictions that have been ordered sealed, expunged or eliminated by statute;
- An arrest, detention or court disposition that occurred while a person was subject to a juvenile court; and
- A nonfelony conviction for marijuana possession that is more than two years old.

Consumer Reports

An employer may seek investigative consumer reports for employment purposes. The Investigative Consumer Reporting Agencies Act requires the employer to provide written notice to applicants before the report is procured.

Ban the Box

The California Fair Employment and Housing Act prohibits an employer with five or more employees from including any question on a job application that asks about the applicant's criminal conviction history. This statewide "ban the box" law also prohibits covered employers from inquiring about or considering an applicant's criminal history until the applicant has received a conditional offer.

Salary History Inquiry Restrictions

California prohibits an employer from relying on a job applicant's salary history as a factor in determining whether to offer employment or what salary to offer. The law bans employers from asking applicants about their salary history, including compensation and benefits, orally or in writing.

An employer may consider or rely on salary history information that an applicant discloses voluntarily and without prompting, but may not rely on prior salary, by itself, to justify any disparity in compensation. In addition, an employer must provide a position's pay scale to an applicant who makes a reasonable request for that information.

Be aware that where there is overlap between federal, state and/or local law, complying with the law that offers the greatest rights or benefits to the employee will generally apply.

Additional information on recruiting and hiring practices in California can be found in the California Employee Handbook Table of Contents, Preemployment Screening and Testing: California, Interviewing and Selecting Job Candidates: California and Does This Law Apply to My Organization in

Exhibit 1

California? Federal requirements can be found in Preemployment Screening and Testing: Federal and Interviewing and Selecting Job Candidates: Federal.

Wage and Hour

Key California requirements impacting wages and hours are:

Minimum Wage

The minimum wage in California varies depending on the size of the employer. Currently, an employer with 25 or fewer employees must pay employees $13.00 per hour and an employer with 26 or more employees must pay employees $14.00 per hour.

Overtime

California law requires an employer to pay employees overtime for all hours worked in excess of 40 hours in a workweek and eight hours in a workday. An employer is also required to pay overtime to employees who work a seventh consecutive day in a workweek.

A California employer must pay overtime to nonexempt employees at the rate of one and one-half times the employee's regular rate of pay for all hours worked in excess of 40 in any workweek; for all hours worked in excess of eight, up to and including 12 hours, in any workday; and for the first eight hours of work on the seventh consecutive day of work in a workweek. An employer is further required to pay double the employee's regular rate of pay for all hours worked in excess of 12 in any workday and for all hours worked in excess of eight on the seventh consecutive day of work in a workweek.

Rest Breaks

A California employer must provide nonexempt employees with a paid 10-minute rest period for each four-hour work period. Rest periods must be given as close to the middle of the work period as is practicable. An employee is entitled to one hour of pay for each workday that the rest period is not authorized or permitted.

Meal Breaks

An employer in California must provide nonexempt employees with no less than a 30-minute meal period if they work more than five hours a day. A second meal period of no less than 30 minutes must be provided when the employee's work period is more than 10 hours. An employee is entitled to one hour of pay for each shift that the meal period is not provided.

Breastfeeding Breaks

A California employer must provide a reasonable amount of break time to accommodate an employee desiring to express breast milk for the employee's infant child each time the employee has need to express milk. When possible, the break time should run concurrently with any break time already provided to the employee. Break time that does not run concurrently with the existing break time does not have to be paid. An employer is not required to provide break time if doing so would seriously disrupt the employer's operations.

An employer must provide an employee with the use of a room or other location for the employee to express milk in private. The room or location may include the place where the employee normally works if it otherwise meets certain legal requirements. Under certain circumstances, an employer may claim undue hardship.

Exhibit 1

An employer must develop and implement a lactation accommodation policy and include it in the employee handbook or policies provided to employees. The employer must distribute the policy to new employees upon hire and when an employee makes an inquiry about or requests parental leave.

Child Labor

Child labor laws in California restrict the occupations in which minors may be employed and the number of hours and times during which they may work.

For most occupations, California had adopted the federal standards into its own regulations. However, California's regulations also forbid minors under the age of 16 from working in additional occupations, involving, among others, several types of machines, railroads, dangerous acids, scaffolding and tobacco.

California also has a complex set of requirements that govern the times during which minors may work. These requirements differ depending on the age of the minor, with separate working time restrictions set out for 16- and 17-year-olds, for 14- and 15-year-olds and for 12- and 13-year-olds.

California requires almost all minors to have a permit to work.

California also has many additional regulations that are specific to the entertainment industry.

Be aware that where there is overlap between federal, state and/or local law, complying with the law that offers the greatest rights or benefits to the employee will generally apply.

Additional information on wage and hour practices in California can be found in the California Employee Handbook Table of Contents, Minimum Wage: California, Overtime: California, Hours Worked: California, Child Labor: California, California Workplace Labor and Employment Law Posters and Does This Law Apply to My Organization in California? Federal requirements can be found in Minimum Wage: Federal, Overtime: Federal, Hours Worked: Federal and Child Labor: Federal.

Pay and Benefits

Key California requirements impacting pay and benefits are:

Temporary Disability Insurance

California's State Disability Insurance (SDI) program is a state-run plan administered by the Employment Development Department (EDD). SDI provides partial wage replacement to eligible workers who are unable to perform their regular or customary work due to a nonwork-related illness or injury, including pregnancy-related conditions. The program is funded entirely by taxes withheld from employees' wages.

An employer has the option of establishing a voluntary private plan, subject to EDD approval, in lieu of the state-administered plan.

Health Care Continuation

The California Continuation Benefits Replacement Act (Cal-COBRA) requires group health plans issued to employers with two to 19 employees to offer continuation coverage to qualified beneficiaries (employees and eligible dependents). Cal-COBRA mirrors the federal Consolidated Omnibus Budget Reconciliation Act (COBRA) in terms of qualifying events and timelines. Cal-COBRA's notice requirements and premiums differ from COBRA.

Cal-COBRA also requires group health plans to offer an insured who has exhausted continuation coverage under federal COBRA the opportunity to continue coverage for up to 36 months from the date

Exhibit 1

the insured's continuation coverage began, if the insured is entitled to fewer than 36 months of COBRA coverage.

Payment of Wages

California requires that employees be paid either in cash or by checks that can be cashed in full, without fees or discounts, at an established place of business located within the state.

Direct deposit is permitted if:

- The employee chooses the financial institution;
- The financial institution has a branch in California; and
- The employee voluntarily authorizes the deposit.

Pay Statements

California employers must provide each employee with an accurate, itemized written pay statement in the form of a detachable part of a check or a separate written statement. Statements must be provided each time wages are paid, or at least semimonthly, and must contain the following information:

- Gross wages earned;
- Total hours worked (for nonexempt employees);
- Number of piece-rate units earned and the applicable piece rate (for piece-rate basis employees);
- All deductions;
- Net wages earned;
- Inclusive dates of the pay period;
- Employee's name and last four digits of employee's Social Security Number or employee ID number;
- Employer's name and address;
- All applicable hourly rates in effect during the pay period and the corresponding number of hours worked at each rate by the employee; and
- If paying overtime from a previous pay period, the previous overtime shown as a correction, and the inclusive dates for the pay period the overtime was worked.

Additional requirements exist for piece-rate employees and temporary services employees.

Pay Frequency

Employers must designate paydays in advance.

Nonexempt employees must be paid all wages earned at least twice a month (i.e., semimonthly) on regular paydays designated in advance. Overtime must be paid by the following payday for the next regular payroll period following the payroll period in which the overtime wages were earned.

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Exempt employees may be paid once a month on or before the 26th of each month in which the salary is earned, including the amount yet to be earned from the 26th through the end of the month.

Wage Deductions

An employer may make deductions from an employee's wages if required by state or federal law or court order, with the employee's written authorization or for other permissible reasons, including but not limited to child support withholding, creditor garnishments and tax levies.

Wage Notices

The Wage Theft Prevention Act requires an employer to provide notice of certain pay-related information (e.g., the employee's rate of pay and the basis for such rate, the employer's regular pay period, the employer's name) to nonexempt employees at the time of hire and any time the information changes.

Be aware that where there is overlap between federal, state and/or local law, complying with the law that offers the greatest rights or benefits to the employee will generally apply.

Additional information on pay and benefits practices in California can be found in the California Employee Handbook Table of Contents, Insurance and Disability Benefits: California, Health Care Continuation (COBRA): California, Payment of Wages: California, Involuntary and Voluntary Pay Deductions: California, California Workplace Labor and Employment Law Posters and Does This Law Apply to My Organization in California? Federal requirements can be found in Insurance and Disability Benefits: Federal, Health Care Continuation (COBRA): Federal, Payment of Wages: Federal and Involuntary and Voluntary Pay Deductions: Federal.

Time Off and Leaves of Absence

Key California requirements impacting time off and leaves of absence are:

Family and Medical Leave

The California Family Rights Act (CFRA) requires employers with five or more employees to provide eligible employees with up to 12 weeks of job-protected leave in a 12-month period for the employee's or a covered family member's serious health condition, for the birth or placement for adoption or foster care of a child, or for a qualifying exigency related to the covered active duty or call to covered active duty of an employee's spouse, domestic partner, child or parent in the US Armed Forces. While the CFRA and the federal Family and Medical Leave Act (FMLA) parallel each other to a large degree, there are areas in which they differ, such as covered family members and what is considered a serious health condition.

Paid Family Leave

California provides for paid family leave (PFL) benefits under a Family Temporary Disability Insurance program. Eligible employees receive partial wage replacement when taking time off to care for a seriously ill family member (i.e., child, parent, spouse, registered domestic partner, grandparent, grandchild, sibling or parent-in-law), to bond with a child within one year of birth or placement for adoption or foster care, or to participate in a qualifying exigency related to the covered active duty or call to covered active duty of the employee's spouse, domestic partner, or parent who is the US Armed Forces. Employees may take up to eight weeks of PFL in a 12-month period.

Paid Sick Leave

Under the Healthy Workplaces, Healthy Families Act (HWHFA), eligible employees may take paid sick leave for the following reasons:

- Diagnosis, care or treatment of the employee's or a covered family member's existing health condition;
- Preventive care for the employee or a covered family member; and
- For an employee who is a victim of domestic violence, sexual assault or stalking to obtain legal, medical or social services.

Employees may accrue and use up to 24 hours (or three days) of paid sick leave per year. Total accrual, including carryover of unused accrued time, may not exceed 48 hours (or six days) per year.

Other Time Off Requirements Affecting California Employers

In addition to the CFRA and HWHFA, a California employer is also required to comply with more than a dozen other leave and time off laws, such as:

- Pregnancy disability leave (covering employers with five or more employees);
- Kin care leave;
- Family military leave (covering employers with 25 or more employees);
- Bone marrow and organ donor leave (covering employers with 15 or more employees);
- School activities leave (covering employers with 25 or more employees);
- School discipline leave;
- Domestic violence and crime victim leave;
- Leave to attend judicial proceedings;
- Jury duty leave;
- Voting leave;
- Election official leave;
- Military leave;
- Civil Air Patrol leave (covering employers with more than 15 employees);
- Literacy leave (covering employers with 25 or more employees);
- Drug and alcohol rehabilitation leave (covering employers with 25 or more employees);
- Day of rest requirements.

Be aware that where there is overlap between federal, state and/or local law, complying with the law that offers the greatest rights or benefits to the employee will generally apply.

Additional information on time off and leave of absence practices in California can be found in the California Employee Handbook Table of Contents, FMLA: California, Paid Sick Leave: California, Jury Duty: California, Other Leaves: California, USERRA: California, Hours Worked: California, California Workplace Labor and Employment Law Posters and Does This Law Apply to My Organization in California? Federal requirements can be found in FMLA: Federal, Paid Sick Leave: Federal, Jury Duty: Federal, Other Leaves: Federal, USERRA: Federal and Hours Worked: Federal.

Health and Safety

Key California requirements impacting health and safety are:

Exhibit 1

Occupational Safety and Health

California operates its job safety and health programs covering the private sector under a state plan approved by the federal Occupational Safety and Health Administration (OSHA).

Under the California Occupational Safety and Health Act (Cal/OSH Act), a California employer must provide and maintain a safe and healthful workplace for employees and, to that end, is required to develop and maintain a written, effective Injury and Illness Prevention Program that includes, among other things, instruction on safe workplace practices.

Smoke-Free Workplace

California bans smoking, including the use of e-cigarettes, in enclosed spaces of places of employment. An employer needs to take reasonable steps to prevent smoking in the workplace, such as posting "no smoking" signs.

Safe Driving Practices

Drivers in California are prohibited from holding and operating a hand-held cell phone or electronic wireless communications device, but are permitted to use the voice-operated and hands-free functions on the phone or device. However, a driver may use a single swipe or tap of the finger to operate a hand-held phone or device that is mounted on the windshield, dashboard or center console.

Be aware that where there is overlap between federal, state and/or local law, complying with the law that offers the greatest rights or benefits to the employee will generally apply.

Additional information on health and safety practices in California can be found in the California Employee Handbook Table of Contents, HR and Workplace Safety: California, Drugs, Alcohol and Smoking: California, California Workplace Labor and Employment Law Posters and Does This Law Apply to My Organization in California? Federal requirements can be found in HR and Workplace Safety (OSHA Compliance): Federal and Drugs, Alcohol and Smoking: Federal.

Organizational Exit

Key California requirements impacting organizational exit are:

Final Pay

An employer must pay final wages immediately to an employee who is terminated and upon resignation to an employee who provides at least 72 hours' notice of the intent to resign. If an employee provides fewer than 72 hours' notice of the intent to resign, then an employer may generally mail final wages within 72 hours.

California law does not permit "use it or lose it" vacation policies. Vacation accruals may be capped, but may not be forfeited. Therefore, unused, accrued vacation must be paid out at the end of employment.

Wages owed to a deceased employee must be paid to the surviving spouse or conservator of the estate. Probate of the will need not have occurred before payment is made. The employer must pay up to $15,000 net for wages due for personal services and unused vacation time. The party requesting payment must present to the employer reasonable proof of identity and an affidavit or a declaration under penalty of perjury making certain statements of fact.

Exhibit 1

References

California law affords a qualified privilege to an employer who communicates about a former employee's job performance or qualifications to a prospective employer. The communication must be made in good faith.

Mass Layoff Notifications

The California Worker Adjustment and Retraining Notification Act (Cal-WARN Act) provides employees and their families time to prepare for a prospective job loss by requiring an employer to provide advance notice of a plant closing or mass layoff. While the state law is modeled after the federal Worker Adjustment and Retraining Notification Act (WARN Act), there are areas in which they differ, such as the definition of covered employer.

Be aware that where there is overlap between federal, state and/or local law, complying with the law that offers the greatest rights or benefits to the employee will generally apply.

Additional information on organizational exit practices in California can be found in the California Employee Handbook Table of Contents, Payment of Wages: California, Performance Appraisals: California, Involuntary Terminations: California and Does This Law Apply to My Organization in California? Federal requirements can be found in Payment of Wages: Federal, Performance Appraisals: Federal and Involuntary Terminations: Federal.

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SPECIAL PROVISIONS

PART E – PROJECT SPECIFIC REQUIREMENTS

SP-100 GENERAL REQUIREMENT FOR AIRPORT CONSTRUCTION

100-1.1 OVERVIEW. This section provides for construction safety in an Airport environment; limitations on construction operations; minimum requirements for construction management and scheduling; and site-specific information pertaining to potential impacts on construction activities. Unless otherwise noted, all costs associated with related work shall be included in the Contract pay item for Airfield Safety and Traffic Control.

100-1.2 CONSTRUCTION AND SAFETY PHASING PLAN (CSPP). A Construction Safety and Phasing Plan has been prepared for this project. Contractor shall comply with the CSPP included in Division 5. Included as part of the requirements of the CSPP is the Safety Plan Compliance Document (SPCD) to be completed by the Contractor. (Notice to Proceed for Construction will not be issued until SPCD is approved.)

100-1.3 SECURITY ACCESS. The Contractor shall be responsible for obtaining security gate badges for supervisory and any other necessary construction personnel from the Airport Administration Office. The security gate badge requirements and any costs shall be included in the bid item for Airfield Safety and Traffic Control.

Refer to the CSPP for specific requirements and training.

100-1.4 SUBMITTALS. All materials and equipment used to construct this work shall be submitted to the RPR for approval prior to ordering the equipment.

The data submitted shall be sufficient, in the opinion of the RPR, to determine compliance with the Drawings and Contract Documents. The RPR reserves the right to reject any and all equipment, materials or procedures, which, in the RPR's opinion, do not meet the system design and the standards and codes specified.

For items listed under 'a.' below – the Contractor shall provide the submittals at least five (5) working days prior to the pre-construction meeting. Issuance of a Notice to Proceed is dependent on the timelines and the proper level of detail of these submittals. Submittals shall be submitted to the RPR electronically.

Submittals shall include items as detailed in Attachment 1, Contractor's Materials and Equipment Submittal Checklist, and below, but are not limited to:

a. General Requirements
   Key Personnel, Telephone Numbers, and Emergency Telephone Numbers
   Project Construction Schedule (CPM)
b. Site Work - including but not limited to Attachment 1, Contractor's Materials and Equipment Submittal Checklist

Manufacturer's catalogs (or excerpts thereof) and affidavits of compliance with the Contract Documents shall be submitted for all materials to be used on the project. Alternate products may be approved by the RPR upon submittal of the following information and subject to the acceptance of the FAA.

Exhibit 1

The Agency will not consider an alternate product that does not have adequate demonstrated experience and meet all performance requirements of this specification.

Contractor shall allow a minimum of ten (10) working days for evaluation of requests for substitution or deviation from the Contract Documents.

100-1.5 SUBMITTAL PROCEDURES.

a. Submit electronic submittals via email as PDF electronic files.
b. Each submittal item shall be individually numbered accordingly to the checklist, so that approved and rejected submittals can be tracked.
c. Edit submittals so that the submittal specifically applies to only the equipment furnished. Neatly cross out all extraneous text, options, models, etc. that do not apply to the equipment being furnished, so that the information remaining is only applicable to the equipment furnished.
d. Present measurements in customary American units (feet, inches, pounds, etc.).
e. After the initial submittal package, a separate transmittal form shall be used for each subsequent submittal, specific item, or class of material or equipment for which a submittal is required. However, transmittal of a submittal of various items using a single transmittal form will be allowed when the items taken together constitute a "package" or are so functionally related that expediency dictates review of the package as a whole. A multiple-page submittal shall be collated into sets, and each set shall be stapled or bound, as appropriate, prior to transmittal to the RPR.
f. Each transmittal shall identify the specification section that relates to item being submitted.
g. After checking and verifying all field measurements, the Contractor shall thoroughly review each shop drawing for compliance and compatibility and stamp "APPROVED" and sign each shop drawing to indicate that a thorough review was made by the Contractor and that the Contractor has approved the shop drawing for the project prior to submission for the RPR's review.
    (1) Submittals shall bear a stamp or specific written indication that Contractor has satisfied its responsibilities under the Contract Documents with respect to the review of the submittal and have a signature by the Contractor.
    (2) Data shown shall be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to enable RPR to review the information.
    (3) Submittals shall specify by checking a box "Yes" or "No" as to whether the submittal meets the Buy American requirements. All submittals shall be accompanied with Buy American certifications or Buy American waivers. Only Third Party certified manufacturers, listed in AC 150/5345-53, Appendix 3 Addendum (as required) and meeting the BUY AMERICAN preference requirements can provide equipment and materials specified in the Contract Documents. Documentation certifying compliance with the BUY AMERICAN preference rules for Airport Improvement Program (AIP) cited in 49 USC §50101) shall be included with each equipment and material submittal.
h. Check the samples and accompany with specific written indication that Contractor has satisfied requirements under the Contact Documents with respect to review of submittals, and identify clearly as to material, supplier, pertinent data such as catalog numbers and the intended use.
i. Before submission of each submittal, determine and verify quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers, and similar data with respect thereto; review and coordinate each submittal with other submittals, requirements of work, and the Contract Documents.
j. Submittals shall specify by checking a box "Yes" or "No" as to whether the submittal contains variations to the Contract. At the time of each submission, give RPR specific written notice of each variation that the submittal may have from the requirements of the Contract Documents; in

Exhibit 1

addition, make specific notation on each shop drawing submitted to RPR for review and approval of each such variation.

k. The RPR will review up to two (2) submittals for each item. It is considered reasonable that the Contractor shall make a complete and acceptable submittal to the RPR by the second submission of a submittal item. All costs to review shop drawings submitted more than twice to receive a "Re-submittal Not Required" or other approval designation, shall be borne by the Contractor. The Agency reserves the right to withhold moneys due the Contractor to cover additional cost of the RPR's review beyond the second submittal.

l. The RPR's review is for general conformance to the Contract Documents and no check will be made to confirm dimensions, compatibility with other elements of the Work, or deviations from the Contract Documents which have not been specifically identified by the Contractor. Contractor is responsible for the installation of complete, functional improvements in accordance with the Contract Documents.

m. RPR's review will be only for conformance with the design concept of the project and for compliance with the information given in the Contract Documents, not extending to means, methods, techniques, sequences, or procedures of construction (except where a specific means, method, technique, sequence, or procedure of construction is indicated in or required by the Contract Documents) nor to safety precautions or programs incident thereto. The review of a separate item as such will not indicate the review of the assembly in which the item functions.

n. Where a shop drawing or sample is required by the Specifications, related work performed prior to RPR's review and approval of the pertinent submission shall be the sole expense and responsibility of Contractor.

o. Review, acceptance, or approval of substitutions, schedules, shop drawings, list of materials, and procedures submitted or requested by Contractor shall not add to the Contract amount, and additional costs which may result therefrom shall be solely the obligation of Contractor.

p. The Agency is not responsible to provide engineering or other services to protect Contractor from additional costs accruing from submittals.

q. Submittals processed by RPR do not become Contract Documents and are not Change Orders. The purpose of submittal review is to establish a reporting procedure and is intended to allow the RPR to monitor Contractor's progress and understanding of the design.

r. Delays caused by the need for re-submittal shall not constitute a basis for claim.

s. The Agency reserves the right to modify the procedures and requirements for submittals, as necessary to accomplish the specific purpose of each submittal. Direct inquiries regarding the procedure, purpose, or extent of any submittal shall be submitted to the RPR.

100-1.6 LINES, GRADES, AND SURVEY CONTROL. The Contractor shall provide construction and layout staking for the RPR to review and confirm prior to work being started. The use of GPS is allowed. The RPR will be given 48 hours' notice of pavement section layers, pavement marking, electrical facility layout, and pavement marking layout so it may be checked. Contractor is responsible for verifying the existing and tie-in locations for the improvements shown on the Plans. Any discrepancies shall be reported to the RPR immediately and prior to removal of existing pavement to determine if design modifications need to be addressed. RPR shall be allowed a minimum of 48 hours to render a decision.

Contractor shall notify the RPR immediately regarding any survey monuments, benchmarks, control points, stakes or marks, etc., that are in jeopardy of being disturbed or destroyed by construction, so that they may be relocated and perpetuated.

Construction Staking and Layout includes but is not limited to:

a. Clearing and Grubbing perimeter staking

Exhibit 1

b. Rough Grade slope stakes at 100-foot (30-m) stations
c. Drainage Swales slope stakes and flow line blue tops at 50-foot stations

Subgrade (top of lime treated subgrade) blue tops at 50-foot stations and 50-foot offset distance (maximum) for the following section locations:

a. Runway – minimum five (5) per station
b. Taxiways – minimum three (3) per station
c. Holding apron areas – minimum three (3) per station
d. Roadways – minimum three (3) per station

Base Course blue tops at 50-foot stations and 50-foot offset distance (maximum) for the following section locations:

a. Runway – minimum five (5) per station
b. Taxiways – minimum three (3) per station
c. Holding apron areas – minimum three (3) per station

Pavement areas:

a. Edge of Pavement hubs and tacks (for stringline by Contractor) at 100-foot stations.
b. Between Lifts at 50-foot stations for the following section locations:
    (1) Runways – each paving lane width
    (2) Taxiways – each paving lane width
    (3) Holding areas – each paving lane width
c. After finish paving operations at 50-foot stations:
    (1) All paved areas – Edge of each paving lane prior to next paving lot
    (2) Final survey of runway and taxiways shall include centerline, quarter point, and edge of pavement. Any areas that do not comply for elevation or width from centerline will need to be removed up to the nearest paving lane.
d. Shoulder and safety area blue tops at 50-foot stations and at all break points with maximum of 50-foot offsets.
e. Electrical and Communications System locations, lines and grades including but not limited to duct runs, connections, fixtures, signs, lights, Visual Approach Slope Indicators (VASIs), Precision Approach Path Indicators (PAPIs), Runway End Identifier Lighting (REIL), Wind Cones, Distance Markers (signs), pull boxes and manholes.
f. Post construction survey of all electrical facilities.
g. Drain lines, cut stakes and alignment on 50-foot stations, inlet and manholes.
h. Painting and Striping layout (pinned with 1.5 inch PK nails) marked for paint Contractor. (All nails shall be removed after painting).
i. Final survey of pavement markings at layout locations identified on the plans.
j. Laser, or other automatic control devices, shall be checked with temporary control point or grade hub at a minimum of once per 400 feet per pass (i.e., 400 feet per paving lane).

Surveys shall be performed by a Professional Land Surveyor. AutoCAD (version 2020) files and signed/sealed PDFs shall be provided to RPR for review.

The establishment of Survey Control and/or reestablishment of survey control shall be by a Licensed Land Surveyor in the State of California. Controls and stakes disturbed or suspect of having been disturbed shall be checked and/or reset as directed by the RPR without additional cost to the Owner. The Contractor shall include the associated costs in the Contract item for Construction Staking and Survey Layout.

100-1.7 RECORD DRAWINGS. The Contractor shall maintain Record Drawings of all work continuously as the job progresses. A separate set of prints, for this purpose only, shall be kept at the job site at all times. It shall be required that these Drawings be up to date and be reviewed by the field inspector at the time each progress bill is submitted. All deviations from the Drawings, exact locations and sizes of all utilities, mechanical and electrical lines, equipment details, and all stub outs and connections for future expansion, shall be incorporated. Fees for documentation of Record Drawings shall be included in other items of work and no separate payment will be made.

100-1.8 MATERIAL TESTING AND RETESTING. All Quality Control shall be performed by the Contractor per Item C-100, Contractor Quality Control Program. Contractor shall submit Quality Control reports to the RPR for review of test results and frequency of testing in conformance with Contract Documents. All acceptance testing will be performed by the RPR as necessary.

In the event the acceptance tests do not pass and the RPR is required to retest the area, the cost for each retest shall be borne by the Contractor at the cost of the work plus 25% markup.

100-1.9 SCHEDULE OF VALUES. A schedule of value(s) shall be provided for each lump sum bid item within 5 days of request. The schedule of values shall be in the form of a detailed, itemized cost breakdown of the lump sum amount that includes the profit and overhead costs for each item including a line-by-line breakdown of labor and materials. All work to be performed by subcontractors shall be listed. The schedule of values, once established, will serve as the basis for estimating or evaluating the percentage of lump sum work completed for progress payments. Progress payments on Unit Price Work will be based on the number of units completed. The schedule of values may also be used to evaluate the impact of unbalanced pricing.

100-1.10 TIME LIMITATIONS. The overall time of completion for this Project is as follows based on project award.

Contract Award	Pre-Construction Mobilization Element	Construction Element, Phase 1	Construction Element, Phase 2	Construction Element, Phase 3	Total
Schedule I	10 Calendar Days	28 Calendar Days	30 Calendar Days	20 Calendar Days	90 Calendar Days

Should this time schedule not be met, liquidated damages will be assessed. Refer to the CSPP for detailed time limitations for the specific work areas. A summary of contract time is divided as follows:

A. **MOBILIZATION ELEMENT.** Notice to Proceed with Mobilization shall be given immediately after award of Contract. All work included in Mobilization shall be completed within 10 calendar days.
B. **CONSTRUCTION ELEMENT.** Notice to Proceed with Construction shall be issued at the Agency's discretion after the Mobilization Element is complete. All work included in the Construction element shall be completed within the working days specified.

100-1.11 LIQUIDATED DAMAGES. Liquidated Damages will be assessed per Section 80-08 of the Contract Documents.

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100-1.12 BARRICADES AND DELINEATORS. The Contractor is responsible for providing, placing, and maintaining 8-foot, low-profile barricades, including batteries as needed; and shall provide two solar flashing lights for each of the barricades. Contractor is responsible for additional barricades needed during project.

Additionally, the Contractor shall provide plastic delineators as required to barricade hazardous areas. Unless otherwise approved by the RPR, delineators shall be 42-inch-high molded plastic. Delineators shall be four inches in diameter, florescent orange, supplied with a double-weighted base and reflective stripes. Lighting for delineators will be provided at night as approved by the RPR. All costs associated with this item shall be included in Airfield Safety and Traffic Control.

The Agency shall determine the appropriate locations for the low-profile barricades and the delineators with respect to the proximity to aircraft.

100-1.13 LIGHTED RUNWAY CLOSURE MARKERS. The Contractor shall provide one set of trailer-mounted closure crosses. The Contactor will be responsible for placing, fueling, lubricating, maintaining flashing lights, and removing closure crosses. Runway closure markers will be placed on runways whenever runways are closed. When erected on the runway, the lighted markers shall be a minimum 14 feet on a side, inclined toward the approach end of the runway, and lighted crosses will be on 24/7. During the project, the Contractor shall have, at a minimum, one spare closure cross as a contingency in the event one of the crosses fails to operate. The contractor shall be responsible for checking and replacing bulbs on a daily basis. The lighted markers shall be removed by the contractor prior to opening per the schedule approved by the RPR. All costs associated with this item shall be included in Airfield Safety and Traffic Control.

100-1.14 COVERINGS. The contractor shall provide, install and maintain covers for edge lighting and guidance signs as required by the CSPP and SPCD. All costs associated with this item shall be included in Airfield Safety and Traffic Control.

100-1.15 AVIATION RADIOS. The Contractor is to provide at least two hand-held aviation radios to be used in communications with the Air Traffic Control Tower (ATCT) as specified in the CSPP. Radios shall be ICOM A16 transceivers or an approved alternative, each supplied with battery pack, spare battery pack, whip antenna, desktop charger, and a 12V adaptor/charger. On completion of the Project the radios become the property of the Contractor. Providing the radios shall be included under the Contract price for Airfield Safety and Traffic Control.

100-1.16 ACCESS AND SECURITY.

A. **CONTRACTOR ACCESS.** Contractor access to the various work areas shall be via the closest access routes indicated on the Project Layout Plan. Additional haul routes on Airport property shall be approved by the Airport. All access routes and haul routes shall be kept clean and free of debris. Dust control shall be maintained. Where haul routes cross active runways, taxiways, or aprons, radio-equipped flaggers shall be provided by the Contractor as required to control movement of construction equipment and personnel.

B. **ACCESS SECURITY CONTROL.** The Contractor shall be responsible for maintaining Airport security at all gates designated for his use. Gates must be locked or manned by the Contractor's personnel to ensure no unauthorized access to the air operations area. All access gates shall be kept clear of equipment and material.

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100-1.17 WORK HOUR LIMITATIONS. See CSPP for work hours per area.

100-1.18 ADVERSE WEATHER CONDITIONS AS DETERMINED BY THE RPR. If, due to the onset of adverse weather as determined by the RPR, the Project cannot be satisfactorily completed, the Contractor may request the Agency to issue a notice to stop work. At that time, the Contractor shall perform that work necessary to winterize/prepare the Project as directed by the Agency. Contract time will stop on the date the notice is issued. The Contractor shall maintain the construction area as required over the severe weather conditions. When weather improves, another Notice to Proceed shall be issued and the Project shall then be completed. Additional payment will not be made in the event an adverse weather shutdown is necessary. The Contractor shall honor all bid prices when construction resumes.

100-1.19 CONSTRUCTION DELAY DUE TO COVID-19. Once the Mobilization Element is complete and materials have been procured or a firm schedule for procurement is established, the Contractor shall determine if lack of an adequate labor force, materials and/or supplies due to the COVID-19 outbreak may have an impact on commencing and completing Construction in a timely manner. The Contractor, County, and RPR will arrive at a mutual determination as to whether the Construction Element should be delayed as a result of the COVID-19 outbreak. Due to the nature and geometry of the Project, suspending work once it has started will result in an incomplete product and will be detrimental to Airport operations.

A Notice to Proceed will be issued once the conditions described herein are met, and the Contractor, County, and RPR determine the Project can be satisfactorily completed without an anticipated suspension due to COVID-19 factors. Additional payment will not be made in the event a delay of the Construction Element is necessary. The Contractor shall honor all bid prices when construction commences.

100-1.20 CONSTRUCTION WATER METER REQUIREMENTS. The Contractor is responsible for contacting the City of Oxnard to apply for a construction water meter. Please contact:

City of Oxnard – Water Service Division
305 West 3rd Street, Oxnard, California 93030
(805) 385-7816

The Contractor shall be responsible for all fees and charges to obtain construction water.

No separate measurement and payment will be made for construction water. All costs shall be included in other items of work.

Airport will specify the water location the contractor can utilize. Any other location will need to be approved in writing by the County.

100-1.21 HEARING PROTECTION. Due to the nearby aircraft operations, the Contractor shall provide all necessary hearing protection for workers.

100-1.22 CULTURAL RESOURCES ASSESSMENT. In the event that archaeological materials are encountered during construction, all construction work shall be halted, and a Ventura Agency certified archaeologist shall be consulted to determine the appropriate treatment of the discovery.

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In the event human remains are encountered, State Health and Safety Code – Section 7050.5 states that, no further disturbance shall occur until the Agency Coroner has made a determination of origin and disposition pursuant to Public Resources Code – Section 5097.98. The Agency Coroner must be notified of the find immediately.

If the remains are determined to be Native American, the Agency Coroner will notify the Native American Heritage Commission (NAHC), which will determine and notify a Most Likely Descendant (MLD). With the permission of the landowner or his/her authorized representative, the MLD may inspect the site of the discovery. The MLD shall complete the inspection within 48 hours of notification by the NAHC. The MLD will have the opportunity to offer recommendations for the disposition of the remains.

100-1.23 APPLICATION FOR PAYMENT AND REQUIRED ITEMS. Applications for payment shall follow the standard County format based on the schedule of items included in the proposal forms. The Contractor shall also supplement the pay application with amounts being paid to subcontractors and the amounts being paid to DBE firms. Subcontractor and DBE amounts shall be delineated by bid items in the proposal forms.

100-1.24 AIRPORT ACCESS AND HAUL ROUTE REPAIR. For repairs to the haul roads required at the end of the construction when hauling operations are complete. Repairs will be a result of construction activities and not by the Contractor's negligence. Contractor shall mill and place 2" of surface course P-401 asphalt in areas defined by the RPR. Field adjustments may need to be made to the scope of work, based on the severity of pavement failure. Nothing in this paragraph waives the Contractor's requirements to maintain haul roads and paved areas throughout the project.

100-1.25 IN-PLACE DRYING TECHNIQUES. This item covers in-place drying techniques for the areas of the Project improvements. Geotechnical Engineering Reports and Addendum were prepared by Earth Systems Pacific, dated July 10, 2020 and February 23, 2022 respectively for this Project and are included as Division 10. The results of the findings included moist and expansive soils.

While preparing the subgrade prior to lime treating, any material containing vegetable or organic matter such as muck, peat, organic silt, or sod shall be considered unsuitable for use in embankment construction. Unsuitable material is defined as material the RPR determines to be:

(1) Of such unstable nature as to be incapable of being compacted to specified density using ordinary methods at optimum moisture content; or
(2) Too wet to be properly compacted and circumstances prevent suitable in-place drying prior to in-corporation into the work.

The presence of excessive moisture in a material is not, by itself, sufficient cause for determining that the material is unsuitable. Immediate in-place drying techniques shall be employed prior to classifying the material as unsuitable. In-place drying techniques shall consist of ripping, windrowing, discing, and otherwise manipulating, twice daily, up to a 2-foot depth of material below the subgrade elevation, in 6 to 8-inch lifts for up to 2 consecutive working days (without rain) to achieve drying and compaction. Rubber-tired excavation and vibratory or steel drum compaction equipment shall not be used in unstable areas unless specifically approved by the RPR. The lower foot of the 2-depth of manipulated material should be compacted to 85% relative compaction, and the upper foot compacted to 90% compaction. Discing is mandatory.

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If these drying techniques fail (if unhealed by the lime-treating process or at the direction of the RPR) the material shall be removed as detailed herein or stabilized as detailed below. In-place drying techniques, if directed by the RPR, will be paid under its respective bid item.

100-1.26 SUBGRADE STABILIZATION, EXCAVATION BELOW SUBGRADE. The subsurface soils within the project limits contain expansive and moist native materials that become unstable when excessively wet. The Contractor shall give due diligence to subgrade moisture and avoid overwatering subgrade during compaction. Watered subgrade or base rock more than five percent (5%) above optimum moisture content shall be assumed to be overly wet and any instability that may occur shall be the responsibility of the Contractor to remedy with no additional payment. If, despite due care in watering, areas of subgrade become unstable or show unacceptable deflection during compaction after the lime treatment, they shall be dried as described above and subsequently stabilized as directed by the RPR as follows:

(1) The pumping area, as designated by the RPR, shall be over excavated to a depth of 24 inches below the grading plane and the excavated material shall be disposed of off-site.
(2) A multi-axial geogrid polymer fabric shall be placed in the bottom of the excavation and covered with 12 inches of asphalt millings and/or existing aggregate base material compacted to 85 percent relative compaction.
(3) Place layer of multi-axial geogrid polymer fabric below before filling the remaining 12 inches of excavation with asphalt millings and/or existing aggregate base material in 6-inch lifts. The lower lift shall be compacted to 90 percent relative compaction and the top lift compacted to 95 percent relative compaction. The multi-axial geogrid shall have an overlap of 2 feet at roll joints and shall be pinned to secure and shall be placed in accordance with manufacture's recommendations. Multi-axial geogrid shall meet the requirements detailed within this Specification.

The RPR reserves the right to require as much subgrade stabilization as necessary to satisfy site conditions. The significant change in character of work (work alteration and quantity variance) limitations of Section 40-02 shall not apply to this item.

No subbase, base, or surface course shall be placed on the subgrade until the subgrade has been approved by the RPR.

100-1.27 MULTI-AXIAL GEOGRID. Geogrid shall have the following properties:

Property	Test Reference	Specification
Aperture Shape	Observation	Triangular[1]
Radial Stiffness @ 0.5% strain lbs/ft, Min.	ASTM D6637[2]	15,340
Radial Stiffness Ratio, dimensionless	ASTM D6637[3]	>0.60
Junction Strength Efficiency (%)	ASTM D7737[4]	93
Ultraviolet Stability, @ 500 hrs (%)	ASTM D4355-05	70

(1) Multi-axial geogrid contains six or more intersecting ribs at each junction formed into a radially stable network of open equilateral triangular apertures.
(2) Minimum measured radial stiffness at 0.5% strain. Radial stiffness is measured on both the rib directions and the mid-rib directions (directions that bisect the angles between ribs).
(3) Ratio of the minimum to maximum MARV values of radial stiffness at 0.5% strain.
(4) Load transfer capability determined in accordance with ASTM D7737 and ASTM D6637 and expressed as a percentage.

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Geogrid shall be placed within the excavation as described in paragraph SP-100-1.27, if required by the RPR. No limitations on change of quantity shall apply to this item.

100-1.28 UNDERGROUND UTILITY INVESTIGATION AND POTHOLING. The Plans depict underground utilities derived from record drawings and field investigations. Not all utilities locations or depths are known. Within two weeks prior to the completion of the Mobilization Element, the Contractor shall coordinate for location services. As the first part of work in the Construction Element and prior to the installation of underground utility systems, the Contractor shall pothole utility locations and verify location and depth. Contractor shall verify electrical pullboxes labeled in the Existing Conditions Plan Sheets are empty. If cables are found, Contractor shall verify/find power source. All work shall be coordinated with and performed under the observation of the RPR or their designated representative. Excavations within pavement limits shall be backfilled and capped with asphalt concrete (cold patch is acceptable). Contractor will document locations, depth, and type of utility and provide information to the RPR prior to full production work.

100-1.29 INSTALL CHECKPOINT MARKERS. Prior to any work near existing Taxiway E (proposed Taxiway A5), the Contractor shall locate and survey existing ILS (LOC/GS) ground check point markers. Contractor shall install disturbed check point marker within the paving/grading work areas in conformance with the details and dimensions shown on the Plans.

100-1.30 EXCESS UNCLASSIFIED EXCAVATION STOCKPILE MANAGEMENT. This item shall consist of managing the excess unclassified excavation stockpile at the offsite location to the east of Oxnard Airport. The actual haul-off of excess unclassified excavation material shall be measured and paid for under Item P-152. Previous environmental investigations within the boundary of the Oxnard Airport have revealed the presence of very low concentrations of Perfluoroalkyl or Polyfluoroalkyl Substances (PFAS) within the soil. As such, there is potential for the excavated soil material from existing Taxiway F (proposed Taxiway A) and existing Taxiways A through E (proposed Taxiways A1 through A5) to contain PFAS compounds. While the reported concentrations of PFAS do not exceed regulatory screening levels for construction worker safety, they do exceed levels for the protection of groundwater. Thus, at the request of the Los Angeles County Waterboard and out of an abundance of caution, the Contractor will be required to haul all PFAS contaminated unclassified excavation material to the onsite stockpile within the Airport boundary at the location marked on Sheet G051. Stockpile management shall consist of furnishing and installing a 6-millimeter thick visqueen plastic sheeting and placing the excess unclassified excavation into a single, uniformly graded stockpile not to exceed eight feet in height. The stockpile shall then be covered with plastic sheeting that is weighed down and secured at the edges to prevent exposure to wind and rain. There shall be at least ten feet of clearance from the edge of the perimeter fence to the stockpile and the stockpile shall be maintained along the edges to allow access to and around the stockpile. Contractor shall inspect the liner daily when placing the unclassified excavation material, so that the placement does not compromise the integrity of the liner. The stockpile will be moistened to minimize dust emissions during stockpiling, as necessary, and configured in such a manner that surface water runoff from the stockpile and surrounding areas does not carry stockpile material and/or leachate beyond the stockpile perimeter berm. This Contractor shall also install a construction entrance following sediment control best management practices. A Health and Safety Plan shall be prepared in accordance with the federal and state OSHA HAXWOPER standards: 29 CFR 1910.120 and 8 CCR Section 5192.

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METHOD OF MEASUREMENT

100-2.1 Airfield Safety and Traffic Control, and all incidentals required to complete work described in this section will be measured as lump sum, as a percentage of the construction schedule.

100-2.2 Construction Staking and Survey Layout will be measured as a lump sum item as a percentage of the construction schedule.

100-2.3 Airport Access and Haul Route Repair, and all incidentals required to complete work described in this section, will be measured by the square yard.

100-2.4 In-place Drying Techniques will be measured by the square yard of material manipulated as described herein to a 2-foot depth, as directed by the RPR.

100-2.5 Subgrade Stabilization, Excavation Below Subgrade will be measured by the number of cubic yards to be replaced as directed by the RPR.

100-2.6 Multi-axial Geogrid will be measured by the number of square yards of ground covered as directed by the RPR. Overlap and edge anchoring will not be measured.

100-2.7 Underground Utility Investigation and Potholing will be measured per hour, rounded to the nearest quarter hour, as directed by the RPR.

100-2.8 Install Checkpoint Marker, and all incidentals required to complete work described in this section will be measured as a lump sum item. The number of checkpoint markers to be installed is expected not to be more than one.

100-2.9 Unclassified Excavation Stockpile Management will be measured per lump sum as a percentage of the construction schedule. The haul-off of uncontaminated excess unclassified excavation material shall be included under Item P-152a Unclassified Excavation and Haul-Off and stockpiling of contaminated excess unclassified excavation material shall be included under Item P-152d Unclassified Excavation and Stockpile Onsite.

BASIS OF PAYMENT

100-3.1 Airfield Safety and Traffic Control will be paid for at the Contract lump sum price. This price shall include full compensation for all labor, materials, tools, equipment, CSPP compliance, SPCD preparation and compliance, and incidentals necessary to complete the work as specified in this Specification and requirements shown on the Plans.

100-3.2 Construction Staking and Survey Layout will be paid for at the Contract lump sum price and shall include all staking and survey required to construct the Project to the lines and grades as indicated on the Plans to meet the specified tolerances.

100-3.3 Airport Access and Haul Route Repair will be paid for at the Contract price per square yard of mill and overlay. This price shall be full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the item. This item will not be paid for without prior authorization from the RPR for specific areas identified. Alterations of bid quantity greater than twenty-five (25%) percent will not result in change in unit bid price.

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100-3.4 In-Place Drying Techniques will be paid for at the Contract price per square yard of material manipulated as described herein to a 2-foot depth as directed by the RPR. This item will not be paid for without prior authorization from the RPR for specific areas identified. Alterations of bid quantity greater than twenty-five (25%) percent will not result in change in unit bid price.

100-3.5 Subgrade Stabilization, Excavation Below Subgrade will be paid for at the Contract price per cubic of material manipulated as described herein to a 2-foot depth as directed by the RPR. This item will not be paid for without prior authorization from the RPR for specific areas identified. Alterations of bid quantity greater than twenty-five (25%) percent will not result in change in unit bid price. Payment shall include excavation and backfilling with asphalt millings and/or existing aggregate base material and all work necessary including furnishing all labor, tools, equipment, and incidentals. Backfilling with asphalt millings and/or existing aggregate base shall be considered incidental and no separate payment shall be made. Geogrid shall be paid under the respective item.

100-3.6 Multi-axial Geogrid will be paid for at the Contract price per square yard of area covered and include all materials, equipment, and labor necessary to complete the item where specified. This item will not be paid for without prior authorization from the RPR for specific areas identified. Alterations of bid quantity greater than twenty-five (25%) percent will not result in change in unit bid price.

100-3.7 Underground Utility Investigation and Potholing field work, to verify location of existing underground utility services shall be performed and paid for on a unit price basis per hour and provided to the RPR. The hourly unit of measurement, rounded to the nearest quarter hour, shall include full compensation for all labor, material and equipment necessary to complete operations, including a superintendent, an operator, a laborer, and a backhoe (minimum 2 person crew with one piece of equipment). Cold patch and any materials necessary to perform the Underground Utility Investigation and Potholing will be incidental to the "per hour" costs. Any hours spent performing utility investigation beyond contract quantity shall be incidental to the items for which investigation is required.

100-3.8 Install Checkpoint Marker will be paid for at the Contract lump sum price. This price shall be full compensation for coordination, survey, furnishing and installing all materials, labor, equipment, tools, and incidentals necessary to complete the item.

100-3.9 Excess Unclassified Excavation Stockpile Management will be paid for at the Contract lump sum price. This price shall include full compensation for all labor, materials, tools, equipment, SWPPP and CSPP compliance, plastic sheeting, and incidentals necessary to complete the work as specified in this Specification and requirements shown on the Plans.

Payment will be made under:

Item SP-100a	Airfield Safety and Traffic Control – per lump sum
Item SP-100b	Construction Staking and Survey Layout – per lump sum
Item SP-100c	Airport Access and Haul Route Repair – per square yard
Item SP-100d	In-place Drying Techniques – per square yard
Item SP-100e	Subgrade Stabilization, Excavation Below Subgrade – per cubic yard
Item SP-100f	Multi-axial Geogrid – per square yard
Item SP-100g	Underground Utility Investigation and Potholing – per hour
Item SP-100h	Install Checkpoint Marker – per lump sum
Item SP-100i	Excess Unclassified Excavation Stockpile Management – per lump sum

****END OF ITEM SP-100****

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SP-102 WATER POLLUTION CONTROL, EROSION CONTROL, AND SWPPP

102-1.1 Erosion Control shall conform to the FAA and Ventura County Standard Specifications and shall consist of applying Erosion Control materials to the areas shown on the Plans, embankment and excavation slopes and other areas disturbed by construction activities and as directed by the RPR.

The Contractor will be responsible for the fees associated with submitting the Notice of Intent and SWPPP measures.

102-1.2 WATER POLLUTION CONTROL (FOR PROJECTS WITH OVER 1 ACRE OF DISTURBED AREA). Prior to any construction activity, the Contractor shall prepare, submit, pay Notice of Intent Fee, and obtain approval of a Stormwater Pollution Prevention Plan (SWPPP) in accordance with the NPDES General Construction Permit for stormwater and non-stormwater discharges associated with construction activities, entitled: "National Pollutant Discharge Elimination System (NPDES) Permit – Water Quality Order 2009-0009-DWQ. Approval of the SWPPP shall not relieve the Contractor of any liability for violations of State or Federal law relating to water pollution.

Approval of the NPDES permit that regulates this project, as referenced above, is hereafter collectively referred to as the "Permit."

This project shall conform to the Permit and modifications thereto. The Contractor shall maintain copies of the Permit at the project site and shall make the Permit available during construction.

The Contractor shall know and fully comply with applicable provisions of the Permit and all modifications thereto, and Federal, State, and local regulations and requirements that govern the Contractor's operations and stormwater and non-stormwater discharges from both the project site and areas of disturbance outside the project limits during construction.

The Permit shall apply to stormwater and certain permitted non-stormwater discharges from areas outside the project site which are directly related to construction activities for this contract including, but not limited to, asphalt batch plants, material borrow areas, concrete plants, staging areas, storage yards, and access roads. The Contractor shall comply with the Permit for those areas and shall implement, inspect, and maintain the required water pollution control practices. Installing, inspecting, and maintaining water pollution control practices on areas outside the right-of-way not specifically arranged and provided for by the Ventura County for the execution of this contract, will not be paid for.

The Contractor shall be responsible for penalties assessed or levied on the Contractor or the Ventura County as a result of the Contractor's failure to comply with the provisions in this section "Water Pollution Control" including, but not limited to, compliance with the applicable provisions of the Permit, and Federal, State, and local regulations and requirements as set forth therein.

Penalties as used in this section, "Water Pollution Control," shall include fines, penalties and damages, whether proposed, assessed, or levied against the County of Ventura or the Contractor, including those levied under the Federal Clean Water Act, State Fish & Wildlife Code, and the State Porter-Cologne Water Quality Control Act, by governmental agencies or as a result of citizen suits. Penalties shall also include payments made or costs incurred due to stop work orders, work suspension, scheduled days, and/or Contractor delays or in settlement for alleged violations of the Permit, or applicable laws,

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regulations, or requirements. Costs incurred could include sums spent instead of penalties, due to agency or County imposed mitigation or to remediate or correct violations, or damages resulting from stop work orders, work suspension, or scheduled days.

102-1.3 RETENTION OF FUNDS. Notwithstanding any other remedies authorized by law, the Ventura County may retain money due the Contractor under the contract, in an amount determined by Ventura County, up to and including the entire amount of Penalties proposed, assessed, or levied as a result of the Contractor's violation of the Permit, or Federal, State, or local law, regulations or requirements. Funds may be retained by the Ventura County until final disposition has been made as to the Penalties. The Contractor shall remain liable for the full amount of Penalties until such time as they are finally resolved with the entity seeking the Penalties.

Retention of funds for failure to conform to the provisions in this section, "Water Pollution Control," shall be in addition to the other retention amounts required by the contract. The amounts retained for the Contractor's failure to conform to provisions in this section will be released for payment on the next monthly estimate for partial payment following the date when an approved SWPPP has been implemented and maintained, and when water pollution has been adequately controlled, as determined by the RPR.

When the County or a regulatory agency identifies a failure to comply with the Permit and modifications thereto, or other Federal, State, or local requirements, the County will retain money due the Contractor, in the amount of 10 percent of the work done to date or any fine whichever is greater. This amount is in addition to the retention specified in Partial and Final Payment, subject to the following: the County will give the Contractor written notice of the County's intent to retain funds from partial payments which may become due to the Contractor prior to recording of the Notice of Completion.

During the first estimate period that the Contractor fails to conform to the provisions in this section, "Water Pollution Control," the Ventura County may retain an amount equal to 25 percent of the estimated value of the contract work performed.

The Contractor shall notify the RPR immediately upon request from the regulatory agencies to enter, inspect, sample, monitor, or otherwise access the project site or the Contractor's records pertaining to water pollution control work. The Contractor and the Ventura County shall provide copies of correspondence, notices of violation, enforcement actions, or proposed fines by regulatory agencies to the requesting regulatory agency.

102-1.4 STORMWATER POLLUTION PREVENTION PLAN (SWPPP) PREPARATION, APPROVAL, AND AMENDMENTS. As part of the water pollution control work, a SWPPP is required for this contract. The SWPPP shall conform to the provisions in this section, "Water Pollution Control," the requirements of the Permit, and these special provisions. Upon the RPR's approval of the SWPPP, the SWPPP shall be considered to fulfill the provisions of the contract bid item "Prepare Stormwater Pollution Prevention Plan."

Approval shall not constitute a finding that the SWPPP complies with applicable requirements of the Permit, the Manuals and applicable Federal, State, and local laws, regulations, permits, and requirements, nor does approval supersede the requirements and provisions of these special provisions, the Permit, or any other Federal, State, or local regulations or permit in the event of a conflict.

The SWPPP shall address stormwater run-off and run-on for all disturbed and affected areas of

construction, including temporary and permanent measures. The SWPPP submittal shall contain the complete SWPPP document, along with the following information identified separately:

(a) Latitude/longitude of project site
(b) Total project site size (acres)
(c) Total area to be disturbed (acres)
(d) Percent imperviousness before construction
(e) Percent imperviousness after construction
(f) Date construction will begin
(g) Date all grading will be complete
(h) Date project will be complete
(i) Risk Assessment including the R Factor Value, K Factor Value, LS Factor, site sediment risk factor, and Receiving Water Risk Factor.
(j) Name of receiving water and whether project site run-off drains directly, indirectly, or through the storm drain system.
(k) Name of QSD, QSD Certification Number, and QSD SMARTS user ID
(l) Name of QSP Certification Number, and QSP SMARTS user ID
(m) Contractor's site contact person, and their title, phone, and email address
(n) Contractor's designated Data Submitter and their SMARTS user ID

The SWPPP submittal shall be provided to the RPR for review and approval. The Contractor will prepare a Notice of Intent (NOI), pay the fee, and submit the SWPPP electronically to the State Water Resources Control Board (State) website, entitled Stormwater Multi Application Reporting and Tracking System (SMARTS). For the purposes of the Permit, the County is the owner of the Permit and the County is the Legally Responsible Person (LRP). The LRP will retain authority for assigning the Approved Signatories and Data Submitters in SMARTS. The Contractor's QSP and/or QSD will be designated as Data Submitters in SMARTS, including the responsibilities thereof, as required by the Permit. The Contractor will submit to the State and obtain a certified NOI and Waste Discharge Identification Number (WDID) for the project. The Contractor will be responsible for paying the associated fees.

The Contractor shall submit the SWPPP to the RPR within the Mobilization Element. The Contractor shall submit three (3) copies of the draft SWPPP to the RPR. The RPR will have five (5) working days to review the SWPPP. If revisions are required, as determined by the RPR, the Contractor shall revise and resubmit the SWPPP within five (5) working days of receipt of the RPR's comments. The RPR will have five (5) working days to review the revisions. Upon the RPR's approval of the SWPPP, four (4) approved hard copies and one (1) electronic copy of the SWPPP shall be submitted to the RPR. The electronic copy shall contain files no more than 50 megabytes in size. The Contractor will upload the SWPPP to the State SMARTS website. No ground disturbing work shall occur until the NOI is complete and the SWPPP has been uploaded to the State website, and a WDID number is obtained. The RPR will notify the Contractor in writing when the process is complete which will allow ground disturbing work to begin. In the event the RPR fails to complete the reviews within the time allowed, and if, in the opinion of the RPR, completion of the work is delayed or interfered with by reason of the RPR's delay in completing the review, an extension of time will be granted, in the same manner as provided for in the Standard Specifications.

The SWPPP shall apply to the areas within or immediately outside of the right-of-way that are directly related to all construction activities including, but not limited to, material borrow or disposal areas, staging areas, storage yards, and access roads, including those on-site areas developed by the Contractor with third parties for use during the project.

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The SWPPP shall incorporate water pollution control practices in the following categories:

(a) Soil stabilization.
(b) Sediment control.
(c) Wind erosion control.
(d) Tracking control.
(e) Non-stormwater management.
(f) Waste management and materials pollution control.

The Contractor shall develop a Water Pollution Control Schedule that describes the timing of grading or other work activities that could affect water pollution. The Water Pollution Control Schedule shall be updated by the Contractor to reflect changes in the Contractor's operations that would affect the necessary implementation of water pollution control practices.

Water pollution control practices include the "Minimum Requirements" and other Contractor-selected water pollution control practices from the "SWPPP" and the "Project-Specific Minimum Requirements."

The Contractor shall incorporate water pollution control practices into the SWPPP as defined in the CASQA or Caltrans handbooks. Water pollution control practices shall include Contractor-selected water pollution control practices and "Project-Specific Minimum Requirements."

The requirements described herein are considered minimum requirements to satisfy the Ventura County erosion control standards. Additional BMPs may be required to meet the requirements set forth in the SWPPP and the Permit. All BMPs shall be designed, installed, maintained, and otherwise managed pursuant to the provisions set forth in the California Department of Transportation (Caltrans) Stormwater Quality Handbook, Construction Site BMP Manual (latest edition) or the California Stormwater Quality Association (CASQA), California Stormwater BMP Handbook for Construction (latest edition). The Contractor and/or his preparer may recommend equivalent erosion control applications that provide equal or better performance for consideration and approval by the RPR. Approval of the SWPPP by the RPR/County shall not relieve the Contractor of any liability for violations of State or Federal water pollution control laws, Clean Water Act, Porter-Cologne Water Quality Control Act, Federal Endangered Species Act, State Fish and Wildlife Code, and other applicable laws and regulations.

The Contractor shall prepare an amendment to the SWPPP as required by the Permit, such as when there is a change in construction activities or operations which may affect the discharge of pollutants to surface waters, ground waters, storm drain systems; when the Contractor's activities or operations violate a condition of the Permit; when there is a change in the schedule that affects the discharge of pollutants; when there is a change in the schedule that affects the Risk Level required by the Permit; or when directed by the RPR. Amendments shall identify additional water pollution control practices or revised operations, including those areas or operations not identified in the initially approved SWPPP. Amendments to the SWPPP shall be prepared and submitted for review and approval within the time required by the Permit and approved by the RPR, but in no case longer than the time specified for the initial submittal and review of the SWPPP. Approved amendments shall be submitted electronically to the RPR within 24 hours of approval. At a minimum, the SWPPP shall be amended annually as required by the Permit, and an electronic copy submitted to the RPR.

The Contractor shall keep one copy of the approved SWPPP and approved amendments at the project site. The SWPPP shall be made available upon request by a representative of the Regional Water Quality

Exhibit 1

Control Board, State Water Resources Control Board, United States Environmental Protection Agency, or the County. Requests by the public shall be directed to the RPR.

The list below includes some of the items that might be required to meet the applicable requirements for water pollution control work required in the SWPPP. Refer to the Plans for specific details.

- Erosion Control (Temporary)
- Potable Water/Irrigation
- Sandbag Barrier
- Straw Mulch
- Vehicle and Equipment Fueling
- Storm Drain Inlet Protection
- Wood Mulching
- Material Delivery and Storage
- Stabilized Construction Entrance/Exit
- Outlet Protection/Velocity Dissipation Devices
- Stockpile Management
- Entrance/Outlet Tire Wash
- Silt Fence
- Solid Waste Management
- Dewatering Operations
- Sediment Trap
- Contaminated Soil Management
- Clear Water Diversion
- Fiber Rolls
- Sanitary/Septic Waste Management
- Liquid Waste Management
- Street Sweeping and Vacuuming
- Erosion Control (Permanent)
- Vehicle and Equipment Cleaning
- Straw Bale Barrier
- Geotextiles, Plastic Covers & Erosion Control Blankets/Mats
- Vehicle and Equipment Maintenance
- Wind Erosion Control
- Earth Dikes/Drainage Swales & Lined Ditches
- Material Use
- Stabilized Construction Roadway
- Slope Drains
- Spill Prevention and Control
- Water Conservation Practices
- Desilting Basin
- Hazardous Waste Management
- Paving and Grinding Operations
- Gravel Check Dam
- Concrete Waste Management
- Illicit Connection/Illegal Discharge Detection and Reporting
- Temporary Stream Crossing

102-1.5 SWPPP IMPLEMENTATION. If there is a discrepancy between the project Permit and these

special provisions, the Permit language shall supersede. If there is a discrepancy between the SWPPP and these special provisions, the special provisions shall supersede. Unless otherwise specified, upon approval of the SWPPP, the Contractor shall be responsible throughout the duration of the project for installing, constructing, inspecting, maintaining, replacing, removing, and disposing of temporary water pollution control practices; installing, constructing, inspecting, maintaining, and replacing permanent water pollution control practices specified in the SWPPP and in the amendments; and all reporting and monitoring. The duration of work includes that time period between initial mobilization to the site and acceptance of the work. Unless otherwise directed by the RPR, the Contractor's responsibility for SWPPP implementation shall continue throughout temporary suspensions of work. Requirements for installation, construction, inspection, reporting, monitoring, maintenance, replacement, removal, and disposal of water pollution control practices shall conform to the requirements in these special provisions and to project permits.

Installing, inspecting, and maintaining water-pollution control practices on areas outside the right-of-way (or designated work area) not specifically arranged and provided for by the Ventura County for the execution of this contract, will not be paid for.

If the Contractor or the RPR identifies a deficiency in the implementation of the approved SWPPP or amendments, the deficiency shall be corrected immediately unless requested by the Contractor and approved by the RPR in writing but shall be corrected prior to the onset of precipitation. If the Contractor fails to correct the identified deficiency by the date agreed or prior to the onset of precipitation, the project shall be in nonconformance with this section, "Water Pollution Control."

If the Contractor fails to conform to the provisions of this section, the RPR may order the suspension of construction operations and/or may hire a third party to correct the deficiency. All costs associated with such work will be deducted from the Contractor's retention.

Implementation of water pollution control practices may vary by season. These special provisions shall be followed for control practice selection of year-round, rainy season and non-rainy season water pollution control practices.

102-1.6 YEAR-ROUND IMPLEMENTATION REQUIREMENTS. The Contractor shall have a year-round program for implementing, inspecting and maintaining water pollution control practices for wind erosion control, tracking control, non-stormwater management, and waste management and materials pollution control.

The National Weather Service weather forecast shall be monitored and used by the Contractor on a daily basis. These Specifications require that if 30 percent or greater precipitation is predicted, the necessary water pollution control practices shall be deployed prior to the onset of the precipitation. If there is less than a 30 percent chance of precipitation, the Contractor shall still be responsible for ensuring the project site does not result in a discharge of pollutants off-site. Regardless of the chances of precipitation, the Contractor shall allow adequate time to properly install all required BMPs prior to precipitation.

Disturbed soil areas shall be considered active whenever the soil disturbing activities have occurred, continue to occur or will occur during the ensuing 14 days. Non-active areas shall be stabilized with water pollution control practice within 14 days of cessation of soil disturbing activities or prior to the onset of precipitation, whichever occurs first.

102-1.7 MAINTENANCE. To ensure the proper implementation and functioning of water pollution

control practices, the Contractor shall regularly inspect and maintain the construction site for the water pollution control practices identified in the SWPPP and as required by the Permit. The construction site shall be inspected by the Contractor as follows:

a. Prior to a forecast storm.
b. After a precipitation event which causes site runoff.
c. At 24-hour intervals during extended precipitation events.
d. Routinely, a minimum of once every week
e. Quarterly throughout the year

The Contractor shall use a Stormwater Quality Construction Site Inspection Checklist approved by the RPR. One copy of each site inspection record shall be submitted to the RPR within 48 hours of completing the inspection.

102-1.8 REPORTING AND MONITORING REQUIREMENTS. All reporting and monitoring efforts required by the Permit are the responsibility of the Contractor. Such activities include but are not limited to preparation and implementation of the Rain Event Action Plans (REAP), Annual Reports, water sampling, and storm event monitoring and reporting. Reports shall be uploaded to SMARTS as required by the Permit. Annual Reports shall be completed in SMARTS and the RPR notified when complete. The County will review and certify the Annual Report. The County will complete the Notice of Termination (NOT) upon completion of the project and after the project site is stabilized and protected from erosion. All Annual Reports must be completed and approved by the State prior to approval of the NOT.

If the Contractor identifies discharges from the project site, regardless of source, in a manner causing, or potentially causing, a condition of pollution in surface waters or drainage systems, the Contractor shall immediately inform the RPR. In addition, the Contractor shall submit a written Notice of Discharge report to the RPR within 24 hours of the discharge event. The report shall include the following information:

a. The date, time, location, nature of the operation, and type of discharge, including the cause or nature of the notice or order.
b. The water pollution control practices deployed before the discharge event. The date of deployment and type of water pollution control practices deployed after the discharge
c. event, including additional measures installed or planned to remediate and cleanup the discharge, and/or reduce or prevent reoccurrence.
d. An implementation and maintenance schedule for affected water pollution control practices.

102-1.9 REPORT OF FIRST-TIME NON-STORMWATER DISCHARGE. The Contractor shall notify the RPR at least 3 days in advance of first-time non-stormwater discharge events, excluding exempted discharges. The Contractor shall notify the RPR of the operations causing non-stormwater discharges and shall obtain field approval for first-time non-stormwater discharges. Non-stormwater discharges shall be monitored at first-time occurrences and routinely thereafter.

If the Contractor receives a written Notice, Order, or other non-compliance action letter from a regulatory agency as a result of stormwater or other discharges from the project site, the Contractor shall immediately notify the RPR. The Contractor shall be solely responsible for responding to and complying with the Notice, Order, or action letter, unless otherwise directed by the RPR.

The Contractor shall be responsible for submitting complete, accurate, and detailed reporting documents sufficient to satisfy all conditions of the Permit and regulatory agency requirements.

METHOD OF MEASUREMENT

102-2.1 Compliance with Pollution, Erosion, and Siltation Control, and all incidentals required to complete work described in this section will be measured as lump sum, as a percentage of the construction schedule.

BASIS OF PAYMENT

102-3.1 The contract lump sum price paid for "Compliance with Pollution, Erosion, and Siltation Control" shall include full compensation for preparation and implementation of the Stormwater Pollution Prevention Plan.

Preparation of the SWPPP shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals for doing all the work involved in developing, preparing, obtaining approval of, revising and amending the SWPPP as specified herein, and as directed by the RPR, and any fees associated with this item.

No additional payment will be made to correct deficiencies in the approved SWPPP or Amendments. Implementation of the SWPPP shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in implementing the SWPPP, installing, constructing, removing, and disposing of water pollution control practices, including non-stormwater management, and waste management and materials for water pollution control practices as provided for in the approved SWPPP, except those for which there is a contract item of work as specified in the Standard Specifications and these special provisions, and as directed by the RPR.

Full compensation for Permit reporting and compliance, including all monitoring, preparation of inspection reports, and stormwater sampling and analysis, and maintenance costs of Water Pollution Control Practices, Amendments, and Implementation of Amendments as specified in this section, "Water Pollution Control", shall be considered as included in the contract lump sum price and no additional compensation will be allowed therefor.

No additional payment will be made for Water Pollution Control Practices necessary to correct deficiencies in the approved SWPPP or Amendments. Water pollution control practices for which there is a contract item of work, will be measured and paid for as that contract item of work

Payments for "Compliance with Pollution, Erosion, and Siltation Control" will be made as follows:

a. Monthly progress payments for "Compliance with Pollution, Erosion, and Siltation Control" will be paid at the RPR's discretion will be based on the monthly project completion percentage.
b. The proposed final estimate payment will include the final balance of payment for this item of work.

Payment will be made under:

Item SP-102a Compliance with Pollution, Erosion, and Siltation Control – per lump sum

****END OF ITEM SP-102****

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ITEM SP-106 KEY PERSONNEL

106-1.1 OVERVIEW. This Project Requirement identifies Key Personnel required for the successful project completion, provides for the minimum qualifications for the Contractor's Key Personnel, and outlines the process for replacing Key Personnel.

If a member of the Key Personnel either resigns or becomes physically or mentally incapable of performing the duties required of the position, the Contractor shall be permitted to propose the résumés of candidates with equal or higher qualifications for review by and approval of the Resident Project Representative (RPR) to maintain continuity of services. Should the services of any Key Personnel no longer become available to the Contractor for the reasons cited above, the Contractor shall submit to the RPR for approval as soon as possible, but in no event later than seven (7) calendar days, prior to the departure of the incumbent Key Personnel. The proposed Key Personnel candidate shall be accepted or rejected based on the sole judgement of the RPR.

If, for any reason other than those cited above (for example, the Contractor removes a Key Personnel member to another project or for its own convenience), the RPR shall have the right to enforce liquidated damages as specified below. Furthermore, the RPR shall retain the sole right to accept or reject the proposed replacement candidate. The RPR approved Key Personnel replacement shall be subject to the same retention requirement of the originally approved Key Personnel and any further removal shall be subject to RPR approval and potential enforcement of liquidated damages.

The RPR shall have the right to request removal of any Key Personnel by providing timely and written notice to the Contractor.

106-1.2 KEY PERSONNEL. The Contractor was selected, in part, on the basis of the qualifications of the Key Personnel submitted by the Contractor during the bid submittal and selection process. Continuity and job familiarity of the Contractor's Key Personnel are considered to be critical factors for the successful and timely completion of the Work. Therefore, the Contractor is required to retain the Key Personnel on a full-time basis throughout the duration of the Project.

The positions listed below are designated as the Contractor's Key Personnel for this contract.

1. Contractor's Representative (Project Manager)
2. Project Superintendent
3. Asphalt Paving Superintendent
4. Airfield Electrical Superintendent
5. Quality Control (QC) Manager
6. Project Scheduler
7. Safety Manager

In order to communicate with the RPR, the Contractor's representative, superintendent, or person in charge of specific work shall be able to speak, read, and write fluently in the English language.

The RPR reserves the right to:

1. Disapprove any candidate named as the Contractor's Key Personnel or alternates who fail to meet the provisions set forth herein.
2. Remove, without any right to work on the Project, either the Contractor's Key Personnel or

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alternate, who in the sole opinion of RPR has demonstrated incompetence, lack of ability, or other unsuitability to perform supervision of the work; and that individual shall not, without permission of RPR, be re-employed on the Project.

a. CONTRACTOR'S REPRESENTATIVE (PROJECT MANAGER). As part of the bid submittal process, the Contractor, even if a joint venture, shall designate in writing one (1) representative who shall have complete authority to act for it and who shall have experience in the executive management of at least one complete project of similar scope, value and complexity, and using a substantially similar project delivery model. Contractor's Representative (Project Manager) shall be full time employee of the Contractor and have a minimum of ten (10) years construction experience, including at least five (5) years of experience in airport or general construction on projects of comparable size and scope as this contract. Contractor's Representative shall be dedicated to this project and shall be on-site on a full-time basis and may not manage or be responsible for any other construction project.

An alternative representative, meeting the minimum qualifications above, may be designated as well. The representative or alternate shall be present at the Project Site whenever work is in progress or whenever it is necessary to take measures to protect the work, persons, or property. Any order of communication given by the RPR to this representative shall be deemed delivered to the Contractor. In the absence of the Contractor's representative, instruction or directions shall be given by the RPR to the Contractor's Project Superintendent or person in charge of the specific work to which the order applies. Such order shall be complied with promptly and referred to the Contractor or its representative.

Failure to have the Contractor's representative or alternate representative present at the Project Site at all times while work under the Contract is in progress shall, at RPR's sole discretion, constitute suspension of the Work by the Contractor, until such time as said individual(s) is (are) again present at the Project Site.

No payment or any extension of time will be allowed for any work performed in the absence of the Contractor's Representative or alternate.

b. PROJECT SUPERINTENDENT. As part of the bid submittal process, the Contractor shall designate in writing one (1) project superintendent who shall have authority to direct the work in the field for all prime and sub-contractor work. Contractor's Project Superintendent shall be a full-time employee of the Contractor and have a minimum of ten (10) years construction experience including at least five (5) years of experience in airport or general construction projects of comparable size and scope as this contract. Contractor's Project Superintendent shall be dedicated to this project and shall be on-site on a full-time basis and may not manage or be responsible for any other construction projects.

An alternative project superintendent, meeting the minimum qualifications above, may be designated as well. The Project Superintendent or alternate shall be present at the Project Site whenever work is in progress or whenever it is necessary to take measures to protect the work, persons, or property. In the absence of the Contractor's Representative, instructions or direction shall be given by the RPR to the Contractor's Project Superintendent or person in charge of the specific work to which the order applies. Such order shall be complied with promptly and referred to the Contractor or its representative.

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Failure to have the Contractor's Project Superintendent or alternate representative present at the Project Site at all times while work under the Contract is in progress shall, at RPR's sole discretion, constitute suspension of the Work by the Contractor, until such time as said individual(s) is (are) again present at the Project Site.

No payment or any extension of time will be allowed for any work performed in the absence of the Contractor's Project Superintendent or alternate.

c. **ASPHALT PAVING SUPERINTENDENT.** As part of the bid submittal process, the Contractor shall designate in writing one (1) Asphalt Paving Superintendent who shall have authority to direct and coordinate all paving work. The Contractor's Asphalt Paving Superintendent shall be a full-time employee of the Contractor or sub-contractor and have a minimum of ten (10) years construction experience, including at least five (5) years of experience in airport or general construction on projects of comparable size and scope as this contract. Contractor's Asphalt Paving Superintendent shall be dedicated to this project and shall be on-site on a full-time basis during asphalt paving work.

An alternative Asphalt Paving Superintendent, meeting the minimum qualifications above, may be designated as well. The Asphalt Paving Superintendent or alternate shall be present at the Project Site whenever asphalt paving work is in progress or whenever it is necessary to take measures to protect the asphalt paving work, persons, or property. In the absence of the Project Superintendent, instructions or direction shall be given by the RPR to the Contractor's Asphalt Paving Superintendent or person in charge of the asphalt paving work. Such order shall be complied with promptly and referred to the Contractor or its representative.

Failure to have the Contractor's Asphalt Paving Superintendent or alternate representative present at the Project Site during asphalt paving work under the Contract is in progress shall at RPR's sole discretion constitute suspension of the Work by the Contractor, until such time as said individual(s) is (are) again present at the Project Site.

d. **AIRFIELD ELECTRICAL SUPERINTENDENT.** As part of the bid submittal process, the Contractor shall designate in writing one (1) Airfield Electrical Superintendent who shall have authority to direct and coordinate all electrical work. Contractor's Airfield Electrical Superintendent shall be a full-time employee of the Contractor or sub-contractor and have a minimum of ten (10) years construction experience, including at least five (5) years of experience in airport or general construction on projects of comparable size and scope as this contract. The Contractor's Airfield Electrical Superintendent shall be dedicated to this project and shall be on-site on a full-time basis during airfield electrical work.

An alternative Airfield Electrical Superintendent, meeting the minimum qualifications above, may be designated as well. The Airfield Electrical Superintendent or alternate shall be present at the Project Site whenever airfield electrical work is in progress or whenever it is necessary to take measures to protect the electrical work, persons, or property. In the absence of the Project Superintendent, instructions or direction shall be given by the RPR to the Contractor's Airfield Electrical Superintendent or person in charge of the airfield electrical work. Such order shall be complied with promptly and referred to the Contractor or its representative.

Failure to have the Contractor's Airfield Electrical Superintendent or alternate representative present at the Project Site during airfield electrical work under the Contract is in progress shall at RPR's sole

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discretion constitute suspension of the Work by the Contractor, until such time as said individual(s) is (are) again present at the Project Site.

e. **QUALITY CONTROL (QC) MANAGER.** As part of the bid submittal process, the Contractor shall designate in writing one (1) QC Manager who shall administer the Construction Quality Control Program and shall be a full-time employee of the Independent Inspection and/or Testing Company. The Contractor's QC Manager shall have a minimum of ten (10) years construction experience, including at least five (5) years of recent experience in airport or general construction on projects of comparable size and scope as this contract. Contractor's QC Manager shall be dedicated to this project and shall be on-site during QC activities.

An alternative QC Manager may be designated as well. The QC Manager or alternate shall be present at the Project Site whenever work is in progress or whenever it is necessary to take measures to protect the work, persons, or property. In the absence of the Project Superintendent, instructions or direction shall be given by the RPR to the Contractor's QC Manager or person in charge of the Quality Control Program. Such order shall be complied with promptly and referred to the Contractor or its representative. Failure to have the Contractor's QC Manager or alternate representative present at the Project Site while work under the Contract is in progress shall at RPR's sole discretion constitute suspension of the Work by the Contractor, until such time as said individual(s) is(are) again present at the Project Site.

f. **PROJECT SCHEDULER.** As part of the bid submittal process, the Contractor shall designate in writing one (1) Project Scheduler who shall prepare and maintain the Project Construction Schedule throughout the duration of the Project. Contractor's Project Scheduler shall have a minimum of ten (10) years construction experience, including at least five (5) years of recent experience in airport or general construction on projects of comparable size and scope as this contract. The Contractor's Project Scheduler shall be dedicated to this project. Additional Project Schedulers may be designated as well.

106-1.3 REPLACING KEY PERSONNEL. If the Contractor's representative or alternate leaves the employ of the Contractor, the Contractor will be required to replace the individual(s) within fifteen (15) days and to fulfill the requirements of this Subsection. In the interim, an "Acting Representative" for each key position described above must be named by the Contractor.

Failure of the Contractor to maintain key personnel will result in damages being sustained by Ventura County. The Contractor shall pay to Ventura County for each key personnel removed from the project without RPR approval the amount of Liquidated Damages as listed in the table of Liquidated Damages below:

Key Personnel	Amount (per event)
Project Manager	$50,000
Project Superintendent	$50,000
Asphalt Paving Superintendent	$25,000
Airfield Electrical Superintendent	$25,000
Quality Control Manager	$25,000
Project Scheduler	$10,000

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METHOD OF MEASUREMENT

106-2.1 No separate payment will be made as part of this Project Requirement. Therefore, no method of measurement is required.

BASIS OF PAYMENT

106-3.1 No separate payment will be made as part of this Project Requirement. The information provided will be used to evaluate the bidder's responsiveness.

****END OF ITEM SP-106****

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ITEM SP-107 SCHEDULING OF WORK

107-1.1 OVERVIEW. The scheduling and execution of the work in accordance with the contract documents are the responsibility of the contractor. Schedules shall represent a practical plan to complete the Work within the work completion time and shall convey the contractor's intent in the manner of prosecution and progress of the Work. Schedules shall be created using scheduling software appropriate for the work, subject to acceptance or approval by the Resident Project Representative (RPR) as described herein. The submittal of schedules shall be understood to be the contractor's representation that the schedule meets the requirements of the contract documents and that the work will be executed in the sequence and duration indicated in the schedule.

107-1.2 CONSTRUCTION SCHEDULE AND PRORESS SCHEDULE. A construction schedule and progress schedule shall be submitted to the RPR by the Contractor within five (5) working days prior to the preconstruction meeting. An Agency-approved schedule will be required prior to issuing a Notice to Proceed with the Construction Element.

Schedule shall be a Critical Path Method Baseline type. Schedule shall indicate complete sequence of each construction category, indicating a time bar for each major category or unit of work to be performed. Work shall be properly sequenced and indicate being fully completed within the scheduled time of completion or substantial completion.

Schedule shall be coordinated with all other Contractors, subcontractors, and material suppliers prior to submission. Contractor shall update the schedule for each weekly construction meeting or whenever there is a significant change in progress, whether in a particular phase or total job progress.

Progress schedule shall incorporate submittals, product data, and sample submissions. Schedule shall indicate preparation time, approval time, resubmissions, fabrications, delivery dates and installation time.

Prior to the contractor's Notice to Proceed, the following events need to occur. Anticipated dates for these actions are as follows:

Bid Opening: June 27, 2023
Recommendation of Award: June 30, 2023
Submission of Revised Grant Amount to FAA: July, 2023
County Receipt and Execution of Grant: September, 2023
Execution of Construction Contract: September, 2023
County Issue of NTP for Preconstruction Mobilization: April, 2024
NTP for Mobilization Schedule I Construction: April, 2024

The above dates are an estimated schedule. If delay of the FAA grant does not permit construction completion by the start of the FAA moratorium dates, the Project may not start until 2023 to avoid a suspension of work.

Contractor shall submit a draft Critical Path Method Schedule with their bid for award type using the Project elements identified on the CSPP.

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107-1.3 GENERAL SCHEDULE REQUIREMENTS.

1. Schedules shall be consistent with the time and work requirements of the Contract. Contractor shall execute the Work in the sequence indicated on the current approved schedule to permit the RPR to schedule its resources, inspections, consultants, and any other work accordingly. The RPR may, in its discretion, require that schedules and plan construction over the entire Work Completion Time be adhered to and that the Contractor shall have no claims if the RPR disallows the Contractor from finishing early.
2. The Contractor shall involve and coordinate with all subcontractors, third parties, and material suppliers in the development and updating of schedules.
3. Review, acceptance or approval of schedules by RPR shall not waive any contract requirements and shall not relieve the Contractor of any obligation or responsibility for submitting complete and accurate information.
4. If, after a schedule has been accepted or approved by the RPR, either the Contractor or RPR discovers that any aspect of the schedule has an error or omission, Contractor shall correct it on the next progress schedule.
5. Errors or omissions on schedules shall not relieve the Contractor from finishing all work within the Work Completion Time.
6. The Contractor shall adjust, add to, or clarify any portion of a schedule which the RPR determines to be insufficient for monitoring the Work or to be impractical for any reason.
7. Use of float suppression techniques such as preferential sequencing or logic, special lead/lag logic restraints and extended activity durations will be cause for rejection of schedule submittal.
8. The Construction Scheduler is required to be completely familiar with the contract and have first-hand knowledge of the Work from on-site periodic job walks and shall attend all meetings pertaining to scheduling and progress of Work, including weekly jobsite meeting as requested by the County.
9. The scheduling method to be used shall be a Critical Path Method schedule in the form of an activity on node Precedence Diagram Network (PDN) with capabilities of identifying the critical path and controlling operation. The principles and definitions of the terms used herein shall be as set forth in the Associated General Contractors of America (AGC) publication "Construction Planning and Scheduling," latest edition. To the extent there are any conflicts between the AGC publication and the Contract Documents, the Contract Documents shall govern.
10. The Schedule shall include activities, regardless of responsibility, that directly or indirectly relate to or have influence over planning and executing the scope of work in strict accordance with the contract documents, and shall include but not be limited to Engineering, procurement, the Contractor's submittals and their forecast approval dates, fabrication, shipment and deliveries of material and equipment (by the Contractor and by others), and all on-site activities including quality control, testing, training and the turnover of final reports, Operations and Maintenance Manuals, and as-built drawings.
11. It is expressly understood and agreed that the time of the beginning, the rate of progress, the interim Contract Milestones, and the time of the completion of the Work are of the essence to this Contract. The Work shall be executed with such progress as required to prevent any delay to other Contractors working on other contracts at Ventura County Airports and the general completion of the Contract.
    a. The Contractor has a contractual duty to take reasonable remedial action, in the most economical manner, to mitigate any and all delays to any milestone or the completion date.

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b. In all cases, when it is possible for the Contractor to eliminate the time impact of a delay without added cost to itself, the Contractor shall do so and shall not be entitled for a time extension under such circumstances.

c. The Schedule shall be prepared to include the completion date for the total Contract and the critical path shall be identified, including critical paths for interim milestone dates. Scheduled start or completion dates for activities imposed on the schedule by the Contractor shall be consistent with the Contract milestone dates. Milestone events shall be the schedule dates specified in the Contract and shall be prominently identified and connected to the appropriate element of the Work, denoting its start or completion.

107-1.4 CONTRACTOR'S PROJECT SCHEDULER.

1. The Project Scheduler is required to attend all meetings pertaining to scheduling and progress of the Work, including weekly job meetings. The Project Scheduler shall be available full time and, at the request of RPR, be available for any schedule related meeting. Failure to be available full time will constitute reason for termination of the Project Scheduler. If the Project Scheduler leaves the employ of the Contractor, the Contractor is required to fulfill the requirements of this subsection within thirty (30) days of the departure of the Contractor's Project Scheduler.
2. The number of schedulers required for timely completion of schedule deliverables will be determined by the Contractor. Any additional schedulers needed shall be hired by the Contractor to ensure all scheduled deliverables are submitted on time.

107-1.5 BASELINE SCHEDULE REQUIREMENTS.

1. The Contractor's Baseline Project Schedule shall show all Work and the sequence of all activities needed for the orderly performance and completion of all Work. The schedule shall reflect the Contractor's true plans for performing the Work. The Contractor shall be responsible for the means, methods, and duration. The Contractor's Baseline Project Schedule shall strictly follow all stage and/or phasing requirements as identified in the contract, engineering and construction phasing documents provided for reference. Any schedule showing a project completion duration other than that allowed in the Contract will not be approved.
2. The Contractor shall provide a written narrative accompanying the electronic version of the Contractor's Baseline Project Schedule submission. This narrative shall explain the Contractor's approach for meeting all milestones and project completion dates. It shall also include a clear description of the critical path activities from beginning to end and describe anticipated crew sizes, production rate, equipment requirements and anticipated problems of major activities along the critical path.
3. In the written narrative, the Contractor shall include the basis and assumptions (including activity duration basis), Critical Path analysis, historic project comparisons, and productivity and installation rates used to develop the Project Schedule. The Contractor shall include management staffing, non-manual and manual labor for engineering and construction, construction crew sizes, equipment requirements, and anticipated delivery dates; restraints; critical path activities; activities requiring overtime or additional shifts; activities that contain time contingencies for impacts to be expected from normal rainfall; holidays and other non-work calendar days; potential problem areas; permits; coordination required with Ventura County and third party agencies; and long lead delivery items requiring more than thirty (30) days from order to delivery.
4. A list of activities, showing the early and late start and finishes, duration, total float responsibility code, and predecessor and successor relationship, sorted by early start.
5. Non-manual labor staffing plan by department/position showing start and finish date (month and year) and number of each position per month. Include histograms showing staffing

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(incremental by month and cumulative) over the life of the Contract in terms of both headcount and job hours.

6. Manual labor staffing plan by craft (including Subcontractors) showing start and finish date (month and year) and number of craft per month. Include histograms showing staffing (incremental by month and cumulative) over the life of the Contract in terms of both headcount and job hours.
7. Activity durations shall be the total number of actual calendar days required to perform that activity including consideration of normal weather impact on completion of that activity. The activities included in the Contractor's Baseline Project Schedule shall be analyzed in detail to determine activity time durations in units of calendar days. Durations shall be based on anticipated production rates for labor (crafts), equipment and materials required to perform each activity on a normal workday basis.
8. The first activity in the Baseline Schedule shall represent the Notice to Proceed as a milestone and the data date of the Baseline Schedule shall be the Contract "Notice to Proceed" date.
9. Include at least one (1) predecessor and one (1) successor for each activity excluding the project start and finish milestones.
10. Define one calendar to include the Holidays listed under County of Ventura Standard Specifications. No activity impacting Airport Operations shall be performed on these days without written approval by RPR.
11. The Baseline Schedule shall not contain negative total float or negative lag for any activity.
12. The Critical Path and number of critical activities shall be no more than thirty percent (30%) of the total activities in the Contractor's Baseline Project Schedule.
13. The Project's Critical Path, for the purpose of acceptance of all schedule submittals, shall be determined by the longest path analysis.
14. All durations shall be the result of definitive labor and resource planning by the Contractor to perform the Work according to the Contract Documents. The labor to be assigned by craft, definition, equipment, and bid item designation shall be shown for each construction activity for the network on a tabular listing. All crafts necessary to execute an activity must be shown. No more than one (1) subcontractor may be assigned to a specific activity. If more crafts are required, then the activity in question must be broken down into additional activities.
15. Retained Logic shall be the method of calculation and the "Retained Logic" setting shall be used.
16. All Activity Names shall be clearly and uniquely named with a description of work readily identifiable to inspection staff. Each Activity shall have a narrative description consisting at a minimum of one verb or work function (i.e. form, pour, excavate, review, approved, cure, etc.), an object (i.e. slab, footing, wall, shop drawing, submittal, girder, etc.) and a location.
17. The RPR reserves the right to require that the Contractor modify, adjust, add to, or clarify any portion of the Project Baseline or Progress Schedule which may later be discovered to be insufficient or inaccurate for planning, monitoring or prosecuting the Work (Schedule Adjustments). The first of each type of schedule or schedule report submitted by the Contractor will be reviewed for format, as well as content. Once the format has been approved all subsequent Project schedules shall be submitted in the approved format. RPR may request format changes as the Contract progresses. No additional compensation shall be provided for such modifications, adjustments, additions, or clarifications.
18. Lags shall be used at a minimum and shall not exceed ten (10) days in duration. A lag report will identify all lags used in the Baseline Schedule and a specific reason for its use will be provided for each. If it is determined that an activity or activities may take the place of the lag, RPR reserves the right to request the activity be used in its place. Failure to do so may constitute grounds for rejection of the baseline.

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19. Early Completion: The Contractor may submit a Baseline or Progress Schedule showing an early scheduled completion date provided that the requirements of the Contract are met.
    a. The difference between the early completion date and the Work Completion Time is considered float. Float time shall not be for the exclusive benefit of either the Owner or the Contractor. Float shall be a resource available to both parties.
    b. Ventura County is not required to accept or approve a schedule with an early completion date.
    c. Contractor shall not be entitled to extra compensation in the event an agreement is reached on an early completion date and Contractor completes the Work, regardless of the reason, beyond the early completion date but within the Work Completion time.
20. A Calendar report shall be included with the Baseline Schedule Submittal. All calendars whether workday, seven-day, six-day, etc. shall have a basis of an eight (8) hour shift unless otherwise needed. Any calendar using more than an eight (8) hour shift shall be called out in the calendar report and a narrative explanation provided. The global calendar shall be seven (7) day / twenty-four (24) hour without any holidays or non-workdays.
21. In the case where construction crews experience adverse weather, the Contractor shall provide the RPR with a written request notice within three (3) days for any request for a time extension associated with adverse weather. Such delays must be clearly indicated by a fifty percent (50%) decrease in the field labor workforce hours on critical path activities on the day in question, as indicated by the Contractor's Daily reports from the day in question and the scheduled work days prior to the day in question.
    a. Inclement weather on non-scheduled work days shall not be granted as weather impact days. If the effects of inclement weather from a non-scheduled work day carry forward to a scheduled work day and impacts the Critical Path as noted above, then the scheduled work day will be considered impacted by adverse weather.
    b. All impacts occurring with regard to RPR approved adverse weather days will be a non-compensable time extension and may be granted pursuant to the contract documents as non-compensable to the Contractor.
22. The detailed breakdown of Project schedule activities may include:
    a. Type of Work to be performed, the sequences, and the labor trades involved and RPR approved WBS.
    b. All purchase, submittal, submittal review and necessary re-review, manufacturing, test, installation activities for all major materials and equipment, and a separate list of all major material items or items of equipment for which the Contractor intends to seek payment prior to installation.
    c. Preparation, submittal, and approval of shop and/or working drawings, and material samples showing the minimum timeframes for RPR's review of all submittals, or longer as identified in the Contract.
    d. Resource loading for cost, labor, material, and equipment. Include craft man-hours that add up to the total number of man-hours in the Contractor's estimate, quantities of materials that reconcile with the "Contract Pricing."
    e. All start up, testing, training, and assistance required under the Contract. (e.g. Punch list and final clean up).
    f. Identification of any labor, material, or equipment restrictions, as well as any activity requiring unusual shift Work.
    g. No activity shall have a duration over fourteen (14) days except non-construction activities such as submittals, submittal reviews, procurement and delivery of materials or equipment, and concrete curing without approval from RPR.

h. All construction activities shall be shown in their resource-loaded state to reflect labor, materials and equipment. All durations shall be the result of definitive labor and resource planning by the Contractor to perform the Work according to the Contract Documents.
i. Cost-Loading: Cost loading shall be made to all activities associated with all Contract Items identified in the "Contract Pricing" and sum of the total cost-loaded in the schedule shall equal the Total Contract Amount. The total cost-loading for all activities for a given Lump Sum Contract Item shall equal the bid amount listed in the "Contract Pricing."
j. All construction activities shall be loaded with all resources required for the prosecution of the activity. These resources shall include labor, materials and equipment.
k. Manpower availability shall not be allowed to drive the critical path at the sole discretion of the Contractor. Manpower limitations must be verifiable in writing by the Union's business agent before such resource-driven logic is incorporated into the Contractor's Baseline Project Schedule.
l. All major equipment valued over $100,000 in capital cost to be used shall be identified in the Contractor's Baseline Project Schedule either as a resource or as a 'Level of Effort' (LOE) activity.
m. Float or slack time is not for the exclusive use or benefit of Ventura County or the Contractor but is an expiring resource available to all parties as needed to meet the Contract Completion Date.
n. Pursuant to the float-sharing requirements of the Contract, use of float suppression techniques such as preferential sequencing, special lead/lag logic restraints, extended activity times or imposed dates (mandatory Constraints) break the CPM rules and shall be cause for rejection of the Contractor's Baseline Project Schedule and any revisions or updates. The use of "Start On or after" or "Start On or before" and "Finish On or after" or "Finish On or before" will be allowed. The use of float time disclosed or implied by the use of alternative float suppression techniques shall be shared as directed by RPR.
o. Contractor shall use base calendars which are appropriate with the work being performed. These should be tied into the requirements and restrictions of airport operations. Multiple calendars are acceptable for the Schedule.
p. The timeframe for third party (e.g. County, FAA, and Engineer of Record) submittal review should be identified in the Contractor's Baseline Project Schedule. Third party reviews may require additional time beyond the standard review period allowed for RPR Review. If necessary, additional time will be given to County and FAA.

23. Submit with the baseline schedule, a statement on subcontractor's letterhead, certifying that subcontractor has reviewed and concurs with the baseline schedule and that subcontractor's related schedule has been reasonably incorporated, including activity duration.

METHOD OF MEASUREMENT

107-2.1 Scheduling of the Work, and all incidentals required to complete work described in this section will not be separately measured, and no payment shall be made.

BASIS OF PAYMENT

107-3.1 Scheduling of the Work shall be considered incidental and no separate payment shall be made.

****END OF ITEM SP-107****

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ITEM SP-108 PARTNERING

108-1.1 OVERVIEW. It is Ventura County's intention to use a formal Partnering process on this project. The Contractor, their key subcontractors, designer and material suppliers, to the extent they are known, will be requested to attend an Executive Partnering Committee Workshop prior to the commencement of work on the project, and follow up Partnering Workshops. In these workshops, mechanisms will be developed to achieve extraordinary project success, mitigate and prevent disputes, and help create a collaborative team environment. Partnering is intended to establish an environment of cooperation between the parties and will affect the terms of the contract.

108-1.2 EXECUTIVE PARTNERNG COMMITTEE. The Executive Partnering Committee will be comprised of the Airport Director, Airport Project Manager, Engineer of Record, Resident Project Representative, Contractor's Representative Project Manager, and Contractor's Principal or similar position. The Executive Partnering Committee is responsible for developing a Project Partnering Charter.

108-1.3 PROJECT PARTNERING CHARTER. The Project Partnering Charter will identify Key Personnel from all parties who will participate in all Partnering activities, develop mechanisms for resolving project challenges, develop a conflict resolution hierarchy, and establish schedule for Partnering Workshops to evaluate the Project Team's progress towards achieving stated goals.

108-1.4 PROJECT TEAM. The Project Team will be comprised of Key Personnel from Airport Representatives, Contractor and Subcontractors, Construction Management, and Engineering Team. The Project Team will be empowered to set project objectives, identify challenges to reaching project objectives, propose and evaluate solutions to identified challenges, and arrive at preferred solutions that are in the best interest of the project.

108-1.5 PARTNERING WORKSHOPS. There will be a one to two-day workshop before the start of construction. The Executive Partnering Committee will meet first and the Project Team will meet after on the same day or following day. There will be an additional meeting in the middle of the construction to assess the Project Team's progress towards achieving stated goals and identify opportunities to improve project performance.

108-1.6 PROFESSIONAL PARTNERING FACILITATOR. The Contractor shall hire and pay for a third-party professional facilitator as designated by Ventura County.

METHOD OF MEASUREMENT

108-2.1 No separate measurement for payment shall be made for Project Partnering and Third-Party Facilitator. It shall be considered necessary and incidental to the work of this Contract.

BASIS OF PAYMENT

108-3.1 No payment will be made separately or directly for Project Partnering and/or a Third-Party Facilitator. Project Partnering and a Third-Party Facilitator shall be considered necessary and incidental to the work of this Contract.

****END OF ITEM SP-108****

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ITEM SP-126 REMOVING MISCELLANEOUS STRUCTURES

DESCRIPTION

126-1.1 This Work generally consists of removal and salvage or disposal of: concrete gutter, abandoned waterline, airport edge lighting, airfield guidance signs and foundations, base cans, junction boxes, cable and encountered conduit, and associated appurtenances.

CONSTRUCTION METHODS

126-2.1 DEMOLISH CONDUIT, CABLE, AND COUNTERPOISE. The Contractor shall remove existing and abandoned cable(s) from conduit, counterpoise inside and outside of conduit, and/or manholes as indicated in the Plans; and shall remove and plug any encountered conduit during execution of the work. Due to the phasing contained in the project, removal of cabling from a conduit may occur multiple times for the same conduit. The removal of cabling from a conduit will only be considered once per conduit, regardless of the amount of times cabling is removed from the conduit. In some instances, identification of cables needing to be removed along with all other cables routed in the same duct, handhole, manhole, or junction can will be required. All removed materials shall become property of the Contractor and be disposed of off-site or placed in the staging area as directed by the RPR for a period of 30 days for Airport to determine salvageable items. Any items deemed not salvageable by the Airport will become the property of the Contractor and shall be disposed of offsite.

126-2.2 REMOVE EXISTING CABLE AND COUNTERPOISE. The Contractor shall remove existing and abandoned cable(s) from conduit, counterpoise inside and outside of conduit, and/or manholes as indicated in the Plans; existing conduit to remain and to be reused during execution of the work. Due to the phasing contained in the project, removal of cabling from a conduit may occur multiple times for the same conduit. The removal of cabling from a conduit will only be considered once per conduit, regardless of the amount of times cabling is removed from the conduit. In some instances, identification of cables needing to be removed along with all other cables routed in the same duct, handhole, manhole, or junction can will be required. Cables that are to remain shall be meggered in the presence of the RPR prior to and after the removal of cable. Cables with lower megger results after cable removal shall be repaired or replaced until megger results are equal to or greater than the reading prior to cable removal. All removed materials shall become property of the Contractor and be disposed of off-site or placed in the staging area as directed by the RPR for a period of 30 days for Airport to determine salvageable items. Any items deemed not salvageable by the Airport will become the property of the Contractor and shall be disposed of offsite.

126-2.3 DEMOLISH ELECTRICAL PULLBOX. Demolish the existing pullbox (includes FAA pullboxes). Removal shall include removal and disposal of existing concrete, bases, lids, wiring, encountered conduit, reconnection of conduit, and any other items necessary for the complete removal of the item. Protect conduits and cables where specified on the Plans. All removed materials shall become property of the Contractor and be disposed of off-site or placed in the staging area as directed by the RPR for a period of 30 days for Airport to determine salvageable items. Excavations after removal shall be backfilled with material equal or better in quality than adjacent embankment. Backfilled and excavated areas must be compacted per Specification P-152.

126-2.4 DEMOLISH AIRFIELD SIGN AND PAD. The existing sign shall be removed and disposed of off-site or placed in the staging area as directed by the RPR for a period of 30 days for Airport to determine salvageable items. Conductor, cans, conduit, and sign foundation to be demolished. Debris

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resulting from the removals shall become property of the Contractor and shall be removed and disposed of off-site. For the concrete pad, remove existing PCC sign pad. Removal shall include removal and disposal of existing concrete bases, wiring, encountered conduit, and any other items necessary for the complete removal of the item. All remove materials shall be removed and disposed of off-site. Excavations after removal shall be backfilled with material equal or better in quality than adjacent embankment. Backfilled and excavated areas must be compacted per Specification P-152.

126-2.5 DEMOLISH ELEVATED TAXIWAY / RUNWAY EDGE LIGHT, SALVAGE EXISTING FIXTURE. Demolish existing elevated edge lights. Demolition shall include removal of can, cable, light fixture, and transformers. Debris resulting from the removals shall become property of the Contractor and shall be removed and disposed of offsite. Demolition debris shall not be used for fill or backfill. Fixtures and transformers shall be removed, salvaged, and stockpiled. The contractor shall indicate to the airport when salvaged items are stockpiled and allow the airport 30 days to salvage any items. Contractor shall dispose of any fixtures and transformers remaining after the 30-day salvage period identified in the plans.

126-2.6 DEMOLISH IN-PAVEMENT TAXIWAY / RUNWAY EDGE LIGHT AND CAN, SALVAGE EXISTING FIXTURE. Demolish existing in-pavement lights. Demolition shall include removal of can, cable, light fixture, and transformers. Debris resulting from the removals shall become property of the Contractor and shall be removed and disposed of off-site. Demolition debris shall not be used for fill or backfill. Fixtures and transformers shall be removed, salvaged and stockpiled. The contractor shall indicate to the airport when salvaged items are stockpiled and allow the airport 30 days to salvage any items. Contractor shall dispose of any fixtures and transformers remaining after the 30-day salvage period identified in the plans.

126-2.7 DEMOLISH ABANDONED WATERLINE, IF ENCOUNTERED. Demolish, within the limits shown if encountered, the existing abandoned water line, depth is unknown. Demolition shall include removal and disposal of existing waterline, capping or plugging the line at the removal limits with PCC, and any other items necessary for the complete removal of the item. The pipe material shall be legally disposed of off-site in a timely manner following removal. Trenches shall be backfilled with material equal to or better in quality than adjacent final embankment. Trenches under paved areas must be compacted to the requirements of the pavement section and P-152.

126-2.8 DEMOLISH CONCRETE VALLEY GUTTER. Demolish, within the limits shown, the existing PCC concrete gutter with reinforcement. Demolition shall include removal and disposal of existing concrete swale and any other items necessary for the complete removal of the item. All removed materials shall become property of the Contractor and be disposed of off-site.

126-2.9 BACKFILLING. Unless otherwise provided in the Contract, backfill and compact in accordance with Item P-152 all trenches, holes and pits resulting from breaking down or removal of items described in this Section. Backfill to the elevation of the natural ground utilizing granular backfill or select material from adjacent excavation. In areas where removals occur in vegetated areas, topsoil, fertilize, and seed in accordance with Item T-901 and Item T-905. In areas outside the pavement reconstruction limits where removal requires full depth pavement removal, asphalt shall be replaced at 1-inch greater thickness than the existing asphalt with aggregate base material placed and compacted at the depth of existing aggregate base.

126-2.10 RESTORATION. Restoration shall be incidental to the individual bid items.

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METHOD OF MEASUREMENT

126-3.1 Demolish Conduit, Cable, and Counterpoise, will be measured per linear foot measured along the conduit, completely removed, and accepted by the RPR, regardless of the number of cables contained in the conduit. The removal of conduit, regardless of the number of conduits in the duct bank, will only be measured once. This item shall include the identification of cable (s) needing to be removed along with all other cables routed in the same duct, handhole, manhole or junction can. The removal of cabling from a conduit, regardless of the number of times cabling is removed from that conduit, will only be measured once per conduit run. There is no separate measurement for removal of counterpoise; counterpoise removal is incidental to the cost of the conduit demolition, regardless of if the counterpoise is adjacent to or within the conduit.

126-3.2 Remove Cable and Counterpoise will be measured per linear foot measured along the conduit. This item shall include the identification of cable (s) needing to be removed along with all other cables routed in the same duct, handhole, manhole or junction can. The removal of cabling from a conduit, regardless of the number of times cabling is removed from that conduit, will only be measured once per conduit run. There is no separate measurement for removal of counterpoise; counterpoise removal is incidental to the cost of the cable removal, regardless of if the counterpoise is adjacent to or within the conduit.

126-3.3 Demolish Electrical Pullbox will be measured per each, completely removed, and accepted.

126-3.4 Demolish Airfield Sign and Pad will be measured per each, completely removed, and accepted.

126-3.5 Demolish Elevated Taxiway / Runway Edge Light, Salvage Existing Fixtures will be measured per each, completely removed, and accepted.

126-3.6 Demolish In-pavement Taxiway / Runway Edge Light and Can, Salvage Existing Fixtures will be measured per each, completely removed, and accepted.

126-3.7 Demolish Abandoned Waterline, if Encountered will be measured per liner foot. Alterations of bid quantity greater than twenty-five (25%) percent will not result in change in bid price.

126-3.8 Demolish Concrete Valley Gutter will be measured by linear foot.

126-3.9 Backfilling will not be separately measured, and no payment will be made, therefore, backfilling is incidental to the acceptable removal of the respective item. In areas requiring full depth pavement replacement, quantities of asphalt shall be measured and paid for as specified under Item P-401, and quantities of aggregate base shall be measured and paid for as specified under Item P-209.

BASIS OF PAYMENT

126-4.1 Demolish Conduit, Cable, and Counterpoise (and when present, concrete encasement) will be paid at the Contract unit price per linear foot completely removed and accepted by the RPR. This price shall be full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete this item. This price shall also include all testing and if necessary, cable repair or replacement due to damage caused by cable removal.

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126-4.2 Remove Cable and Counterpoise will be paid at the Contract unit price per linear foot completely removed and accepted by the RPR. This price shall be full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete this item. This price shall also include all testing and if necessary, cable repair or replacement due to damage caused by cable removal.

126-4.3 Demolish Electrical Pullbox will be paid at the unit price per each completely removed and accepted by the RPR. This price shall be full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete this item.

126-4.4 Demolish Airfield Sign and Pad will be paid for at the Contract unit price per each, which price will be payment in full for demolition and disposal of the existing sign, sign pad, and other appurtenances; any miscellaneous components to facilitate the complete demolition; backfilling; and furnishing all labor, tools, equipment, and incidentals necessary to complete the Work.

126-4.5 Demolish Taxiway Edge Light will be paid for at the Contract unit price per each, which price will be payment in full for demolition and disposal of the can, salvage or disposal of the light; any miscellaneous components to facilitate the complete demolition; backfilling; and furnishing all labor, tools, equipment, and incidentals necessary to complete the Work.

126-4.6 Demolish In-pavement Taxiway Edge Light will be paid for at the Contract unit price per each, which price will be payment in full for demolition and disposal of the can, salvage or disposal of the light; any miscellaneous components to facilitate the complete demolition; backfilling; and furnishing all labor, tools, equipment, and incidentals necessary to complete the Work.

126-4.7 Demolish Abandoned Waterline, if Encountered, will be paid for at the contract unit price linear foot, which price will be payment in full for removal of existing concrete and any other items required for complete removal, as well as the furnishing of all materials, labor, equipment, tools, and incidentals necessary to complete the work.

126-4.8 Demolish Concrete Valley Gutter, measured as provided above, will be paid for at the contract unit price linear foot, which price will be payment in full for removal of existing concrete and any other items required for complete removal, as well as the furnishing of all materials, labor, equipment, tools, and incidentals necessary to complete the work.

126-4.9 Backfilling will not be paid separately and shall be incidental to the acceptance of the removal of the respective item. Accepted quantities of asphalt shall be paid per Item P-401 and accepted quantities of crushed aggregate base per Item P-209.

Payment will be made under:

Item SP-126a	Demolish Conduit, Cable, and Counterpoise – per linear foot
Item SP-126b	Demolish Concrete Encased Conduit, Cable, and Counterpoise – per linear foot
Item SP-126c	Remove Existing Cable and Counterpoise – per each
Item SP-126d	Demolish Electrical Pullbox – per each
Item SP-126e	Demolish FAA Pullbox – per each
Item SP-126f	Demolish Airfield Sign and Pad – per each
Item SP-126g	Demolish Elevated Taxiway Edge Light and Can. Salvage Existing Fixture – per each

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Item SP-126h	Demolish In-pavement Taxiway Edge Light and Can. Salvage Existing Fixture – per each
Item SP-126i	Demolish Abandoned Waterline, if Encountered – per linear foot
Item SP-126j	Demolish Concrete Valley Gutter – per linear foot

****END OF ITEM SP-126****

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DIVISION 5

FAA ADVISORY CIRCULAR 150/5370-2
OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION

CONSTRUCTION SAFETY AND PHASING PLAN

U.S. Department
of Transportation
Federal Aviation
Administration

Advisory Circular

Subject: Operational Safety on Airports During Construction	**Date:** 12/13/2017 **Initiated By:** AAS-100	**AC No:** 150/5370-2G **Change:**

1 **Purpose.**

This AC sets forth guidelines for operational safety on airports during construction.

2 **Cancellation.**

This AC cancels AC 150/5370-2F, *Operational Safety on Airports during Construction*, dated September 29, 2011.

3 **Application.**

This AC assists airport operators in complying with Title 14 Code of Federal Regulations (CFR) Part 139, *Certification of Airports*. For those certificated airports, this AC provides one way, but not the only way, of meeting those requirements. The use of this AC is mandatory for those airport construction projects receiving funds under the Airport Improvement Program (AIP). See Grant Assurance No. 34, *Policies, Standards, and Specifications*. While we do not require non-certificated airports without grant agreements or airports using Passenger Facility Charge (PFC) Program funds for construction projects to adhere to these guidelines, we recommend that they do so to help these airports maintain operational safety during construction.

4 **Related Documents.**

ACs and Orders referenced in the text of this AC do not include a revision letter, as they refer to the latest version. Appendix A contains a list of reading material on airport construction, design, and potential safety hazards during construction, as well as instructions for obtaining these documents.

5 **Principal Changes.**

The AC incorporates the following principal changes:

1. Notification about impacts to both airport owned and FAA-owned NAVAIDs was added. See paragraph 2.13.5.3, NAVAIDs.

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2. Guidance for the use of orange construction signs was added. See paragraph 2.18.4.2, Temporary Signs.
3. Open trenches or excavations may be permitted in the taxiway safety area while the taxiway is open to aircraft operations, subject to restrictions. See paragraph 2.22.3.4, Excavations.
4. Guidance for temporary shortened runways and displaced thresholds has been enhanced. See Figure 2-1 and Figure 2-2.
5. Figures have been improved and a new Appendix F on the placement of orange construction signs has been added.

Hyperlinks (allowing the reader to access documents located on the internet and to maneuver within this document) are provided throughout this document and are identified with underlined text. When navigating within this document, return to the previously viewed page by pressing the "ALT" and " ←" keys simultaneously.

Figures in this document are schematic representations and are not to scale.

6 **Use of Metrics.**

Throughout this AC, U.S. customary units are used followed with "soft" (rounded) conversion to metric units. The U.S. customary units govern.

7 **Where to Find this AC.**

You can view a list of all ACs at http://www.faa.gov/regulations_policies/advisory_circulars/. You can view the Federal Aviation Regulations at http://www.faa.gov/regulations_policies/faa_regulations/.

8 **Feedback on this AC.**

If you have suggestions for improving this AC, you may use the Advisory Circular Feedback form at the end of this AC.

John R. Dermody
Director of Airport Safety and Standards

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CHAPTER 1. PLANNING AN AIRFIELD CONSTRUCTION PROJECT

1.1 Overview.

Airports are complex environments, and procedures and conditions associated with construction activities often affect aircraft operations and can jeopardize operational safety. Safety considerations are paramount and may make operational impacts unavoidable. However, careful planning, scheduling, and coordination of construction activities can minimize disruption of normal aircraft operations and avoid situations that compromise the airport's operational safety. The airport operator must understand how construction activities and aircraft operations affect one another to be able to develop an effective plan to complete the project. While the guidance in this AC is primarily used for construction operations, the concepts, methods and procedures described may also enhance the day-to-day airport maintenance operations, such as lighting maintenance and snow removal operations.

1.2 Plan for Safety.

Safety, maintaining aircraft operations, and construction costs are all interrelated. Since safety must not be compromised, the airport operator must strike a balance between maintaining aircraft operations and construction costs. This balance will vary widely depending on the operational needs and resources of the airport and will require early coordination with airport users and the FAA. As the project design progresses, the necessary construction locations, activities, and associated costs will be identified and their impact to airport operations must be assessed. Adjustments are made to the proposed construction activities, often by phasing the project, and/or to airport operations to maintain operational safety. This planning effort will ultimately result in a project Construction Safety and Phasing Plan (CSPP). The development of the CSPP takes place through the following five steps:

1.2.1 Identify Affected Areas.

The airport operator must determine the geographic areas on the airport affected by the construction project. Some, such as a runway extension, will be defined by the project. Others may be variable, such as the location of haul routes and material stockpiles.

1.2.2 Describe Current Operations.

Identify the normal airport operations in each affected area for each phase of the project. This becomes the baseline from which the impact on operations by construction activities can be measured. This should include a narrative of the typical users and aircraft operating within the affected areas. It should also include information related to airport operations: the Aircraft Approach Category (AAC) and Airplane Design Group (ADG) of the airplanes that operate on each runway; the ADG and Taxiway Design Group (TDG)[1] for each affected taxiway; designated approach visibility minimums;

[1] Find Taxiway Design Group information in AC 150/5300-13, *Airport Design.*

Exhibit 1

available approach and departure procedures; most demanding aircraft; declared distances; available air traffic control services; airport Surface Movement Guidance and Control System (SMGCS) plan; and others. The applicable seasons, days and times for certain operations should also be identified as applicable.

1.2.3 Allow for Temporary Changes to Operations.

To the extent practical, current airport operations should be maintained during the construction. In consultation with airport users, Aircraft Rescue and Fire Fighting (ARFF) personnel, and FAA Air Traffic Organization (ATO) personnel, the airport operator should identify and prioritize the airport's most important operations. The construction activities should be planned, through project phasing if necessary, to safely accommodate these operations. When the construction activities cannot be adjusted to safely maintain current operations, regardless of their importance, then the operations must be revised accordingly. Allowable changes include temporary revisions to approach procedures, restricting certain aircraft to specific runways and taxiways, suspension of certain operations, decreased weights for some aircraft due to shortened runways, and other changes. An example of a table showing temporary operations versus current operations is shown in Appendix E.

1.2.4 Take Required Measures to Revise Operations.

Once the level and type of aircraft operations to be maintained are identified, the airport operator must determine the measures required to safely conduct the planned operations during the construction. These measures will result in associated costs, which can be broadly interpreted to include not only direct construction costs, but also loss of revenue from impacted operations. Analysis of costs may indicate a need to reevaluate allowable changes to operations. As aircraft operations and allowable changes will vary widely among airports, this AC presents general guidance on those subjects.

1.2.5 Manage Safety Risk.

The FAA is committed to incorporating proactive safety risk management (SRM) tools into its decision-making processes. FAA Order 5200.11, *FAA Airports (ARP) Safety Management System (SMS)*, requires the FAA to conduct a Safety Assessment for certain triggering actions. Certain airport projects may require the airport operator to provide a Project Proposal Summary to help the FAA determine whether a Safety Assessment is required prior to FAA approval of the CSPP. The airport operator must coordinate with the appropriate FAA Airports Regional or District Office early in the development of the CSPP to determine the need for a Safety Risk Assessment. If the FAA requires an assessment, the airport operator must at a minimum:

1. Notify the appropriate FAA Airports Regional or District Office during the project "scope development" phase of any project requiring a CSPP.
2. Provide documents identified by the FAA as necessary to conduct SRM.
3. Participate in the SRM process for airport projects.
4. Provide a representative to participate on the SRM panel.

Exhibit 1

5. Ensure that all applicable SRM identified risks elements are recorded and mitigated within the CSPP.

1.3 Develop a Construction Safety and Phasing Plan (CSPP).

Development of an effective CSPP will require familiarity with many other documents referenced throughout this AC. See Appendix A for a list of related reading material.

1.3.1 List Requirements.

A CSPP must be developed for each on-airfield construction project funded by the Airport Improvement Program (AIP) or located on an airport certificated under Part 139. For on-airfield construction projects at Part 139 airports funded without AIP funds, the preparation of a CSPP represents an acceptable method the certificate holder may use to meet Part 139 requirements during airfield construction activity. As per FAA Order 5200.11, projects that require Safety Assessments do not include construction, rehabilitation, or change of any facility that is entirely outside the air operations area, does not involve any expansion of the facility envelope and does not involve construction equipment, haul routes or placement of material in locations that require access to the air operations area, increase the facility envelope, or impact line-of-sight. Such facilities may include passenger terminals and parking or other structures. However, extraordinary circumstances may trigger the need for a Safety Assessment and a CSPP. The CSPP is subject to subsequent review and approval under the FAA's Safety Risk Management procedures (see paragraph 1.2.5).

1.3.2 Prepare a Safety Plan Compliance Document (SPCD).

The Safety Plan Compliance Document (SPCD) details how the contractor will comply with the CSPP. Also, it will not be possible to determine all safety plan details (for example specific hazard equipment and lighting, contractor's points of contact, construction equipment heights) during the development of the CSPP. The successful contractor must define such details by preparing an SPCD that the airport operator reviews for approval prior to issuance of a notice-to-proceed. The SPCD is a subset of the CSPP, similar to how a shop drawing review is a subset to the technical specifications.

1.3.3 Assume Responsibility for the CSPP.

The airport operator is responsible for establishing and enforcing the CSPP. The airport operator may use the services of an engineering consultant to help develop the CSPP. However, writing the CSPP cannot be delegated to the construction contractor. Only those details the airport operator determines cannot be addressed before contract award are developed by the contractor and submitted for approval as the SPCD. The SPCD does not restate nor propose differences to provisions already addressed in the CSPP.

Exhibit 1

1.4 Who Is Responsible for Safety During Construction?

1.4.1 Establish a Safety Culture.

Everyone has a role in operational safety on airports during construction: the airport operator, the airport's consultants, the construction contractor and subcontractors, airport users, airport tenants, ARFF personnel, Air Traffic personnel, including Technical Operations personnel, FAA Airports Division personnel, and others, such as military personnel at any airport supporting military operations (e.g. national guard or a joint use facility). Close communication and coordination between all affected parties is the key to maintaining safe operations. Such communication and coordination should start at the project scoping meeting and continue through the completion of the project. The airport operator and contractor should conduct onsite safety inspections throughout the project and immediately remedy any deficiencies, whether caused by negligence, oversight, or project scope change.

1.4.2 Assess Airport Operator's Responsibilities.

An airport operator has overall responsibility for all activities on an airport, including construction. This includes the predesign, design, preconstruction, construction, and inspection phases. Additional information on the responsibilities listed below can be found throughout this AC. The airport operator must:

1.4.2.1 Develop a CSPP that complies with the safety guidelines of Chapter 2, Construction Safety and Phasing Plans, and Chapter 3, Guidelines for Writing a CSPP. The airport operator may develop the CSPP internally or have a consultant develop the CSPP for approval by the airport operator. For tenant sponsored projects, approve a CSPP developed by the tenant or its consultant.

1.4.2.2 Require, review and approve the SPCD by the contractor that indicates how it will comply with the CSPP and provides details that cannot be determined before contract award.

1.4.2.3 Convene a preconstruction meeting with the construction contractor, consultant, airport employees and, if appropriate, tenant sponsor and other tenants to review and discuss project safety before beginning construction activity. The appropriate FAA representatives should be invited to attend the meeting. See AC 150/5370-12, *Quality Management for Federally Funded Airport Construction Projects.* (Note "FAA" refers to the Airports Regional or District Office, the Air Traffic Organization, Flight Standards Service, and other offices that support airport operations, flight regulations, and construction/environmental policies.)

1.4.2.4 Ensure contact information is accurate for each representative/point of contact identified in the CSPP and SPCD.

1.4.2.5 Hold weekly or, if necessary, daily safety meetings with all affected parties to coordinate activities.

1.4.2.6 Notify users, ARFF personnel, and FAA ATO personnel of construction and conditions that may adversely affect the operational safety of the airport via Notices to Airmen (NOTAM) and other methods, as appropriate. Convene a meeting for review and discussion if necessary.

1.4.2.7 Ensure construction personnel know applicable airport procedures and changes to those procedures that may affect their work.

1.4.2.8 Ensure that all temporary construction signs are located per the scheduled list for each phase of the project.

1.4.2.9 Ensure construction contractors and subcontractors undergo training required by the CSPP and SPCD.

1.4.2.10 Ensure vehicle and pedestrian operations addressed in the CSPP and SPCD are coordinated with airport tenants, the airport traffic control tower (ATCT), and construction contractors.

1.4.2.11 At certificated airports, ensure each CSPP and SPCD is consistent with Part 139.

Exhibit 1

1.4.2.12 Conduct inspections sufficiently frequently to ensure construction contractors and tenants comply with the CSPP and SPCD and that there are no altered construction activities that could create potential safety hazards.

1.4.2.13 Take immediate action to resolve safety deficiencies.

1.4.2.14 At airports subject to 49 CFR Part 1542, *Airport Security*, ensure construction access complies with the security requirements of that regulation.

1.4.2.15 Notify appropriate parties when conditions exist that invoke provisions of the CSPP and SPCD (for example, implementation of low-visibility operations).

1.4.2.16 Ensure prompt submittal of a Notice of Proposed Construction or Alteration (Form 7460-1) for conducting an aeronautical study of potential obstructions such as tall equipment (cranes, concrete pumps, other), stock piles, and haul routes. A separate form may be filed for each potential obstruction, or one form may be filed describing the entire construction area and maximum equipment height. In the latter case, a separate form must be filed for any object beyond or higher than the originally evaluated area/height. The FAA encourages online submittal of forms for expediency at https://oeaaa.faa.gov/oeaaa/external/portal.jsp. The appropriate FAA Airports Regional or District Office can provide assistance in determining which objects require an aeronautical study.

1.4.2.17 Ensure prompt transmission of the Airport Sponsor Strategic Event Submission, FAA Form 6000-26, located at https://oeaaa.faa.gov/oeaaa/external/content/AIRPORT_SPONSOR_STRATEGIC_EVENT_SUBMISSION_FORM.pdf, to assure proper coordination for NAS Strategic Interruption per Service Level Agreement with ATO.

1.4.2.18 Promptly notify the FAA Airports Regional or District Office of any proposed changes to the CSPP prior to implementation of the change. Changes to the CSPP require review and approval by the airport operator and the FAA. The FAA Airports Regional or District office will determine if further coordination within the FAA is needed. Coordinate with appropriate local and other federal government agencies, such as Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA), Transportation Security Administration (TSA), and the state environmental agency.

1.4.3 Define Construction Contractor's Responsibilities.

The contractor is responsible for complying with the CSPP and SPCD. The contractor must:

Exhibit 1

1.4.3.1 Submit a Safety Plan Compliance Document (SPCD) to the airport operator describing how it will comply with the requirements of the CSPP and supply any details that could not be determined before contract award. The SPCD must include a certification statement by the contractor, indicating an understanding of the operational safety requirements of the CSPP and the assertion of compliance with the approved CSPP and SPCD unless written approval is granted by the airport operator. Any construction practice proposed by the contractor that does not conform to the CSPP and SPCD may impact the airport's operational safety and will require a revision to the CSPP and SPCD and re-coordination with the airport operator and the FAA in advance.

1.4.3.2 Have available at all times copies of the CSPP and SPCD for reference by the airport operator and its representatives, and by subcontractors and contractor employees.

1.4.3.3 Ensure that construction personnel are familiar with safety procedures and regulations on the airport. Provide a point of contact who will coordinate an immediate response to correct any construction-related activity that may adversely affect the operational safety of the airport. Many projects will require 24-hour coverage.

1.4.3.4 Identify in the SPCD the contractor's on-site employees responsible for monitoring compliance with the CSPP and SPCD during construction. At least one of these employees must be on-site when active construction is taking place.

1.4.3.5 Conduct sufficient inspections to ensure construction personnel comply with the CSPP and SPCD and that there are no altered construction activities that could create potential safety hazards.

1.4.3.6 Restrict movement of construction vehicles and personnel to permitted construction areas by flagging, barricading, erecting temporary fencing, or providing escorts, as appropriate, and as specified in the CSPP and SPCD.

1.4.3.7 Ensure that no contractor employees, employees of subcontractors or suppliers, or other persons enter any part of the air operations area (AOA) from the construction site unless authorized.

1.4.3.8 Ensure prompt submittal through the airport operator of Form 7460-1 for the purpose of conducting an aeronautical study of contractor equipment such as tall equipment (cranes, concrete pumps, and other equipment), stock piles, and haul routes when different from cases previously filed by the airport operator. The FAA encourages online submittal of forms for expediency at https://oeaaa.faa.gov/oeaaa/external/portal.jsp.

Exhibit 1

1.4.3.9 Ensure that all necessary safety mitigations are understood by all parties involved, and any special requirements of each construction phase will be fulfilled per the approved timeframe.

1.4.3.10 Participate in pre-construction meetings to review construction limits, safety mitigations, NOTAMs, and understand all special airport operational needs during each phase of the project.

1.4.4 Define Tenant's Responsibilities.

If planning construction activities on leased property, Airport tenants, such as airline operators, fixed base operators, and FAA ATO/Technical Operations sponsoring construction are strongly encouraged to:

1. Develop, or have a consultant develop, a project specific CSPP and submit it to the airport operator. The airport operator may forgo a complete CSPP submittal and instead incorporate appropriate operational safety principles and measures addressed in the advisory circular within their tenant lease agreements.
2. In coordination with its contractor, develop an SPCD and submit it to the airport operator for approval issued prior to issuance of a Notice to Proceed.
3. Ensure that construction personnel are familiar with safety procedures and regulations on the airport during all phases of the construction.
4. Provide a point of contact of who will coordinate an immediate response to correct any construction-related activity that may adversely affect the operational safety of the airport.
5. Identify in the SPCD the contractor's on-site employees responsible for monitoring compliance with the CSPP and SPCD during construction. At least one of these employees must be on-site when active construction is taking place.
6. Ensure that no tenant or contractor employees, employees of subcontractors or suppliers, or any other persons enter any part of the AOA from the construction site unless authorized.
7. Restrict movement of construction vehicles to construction areas by flagging and barricading, erecting temporary fencing, or providing escorts, as appropriate, as specified in the CSPP and SPCD.
8. Ensure prompt submittal through the airport operator of Form 7460-1 for conducting an aeronautical study of contractor equipment such as tall equipment (cranes, concrete pumps, other), stock piles, and haul routes. The FAA encourages online submittal of forms for expediency at https://oeaaa.faa.gov/oeaaa/external/portal.jsp.
9. Participate in pre-construction meetings to review construction limits, safety mitigations, NOTAMs, and understand all special airport operational needs during each phase of the project.

Exhibit 1

CHAPTER 2. CONSTRUCTION SAFETY AND PHASING PLANS

2.1 Overview.

Aviation safety is the primary consideration at airports, especially during construction. The airport operator's CSPP and the contractor's Safety Plan Compliance Document (SPCD) are the primary tools to ensure safety compliance when coordinating construction activities with airport operations. These documents identify all aspects of the construction project that pose a potential safety hazard to airport operations and outline respective mitigation procedures for each hazard. They must provide information necessary for the Airport Operations department to conduct airfield inspections and expeditiously identify and correct unsafe conditions during construction. All aviation safety provisions included within the project drawings, contract specifications, and other related documents must also be reflected in the CSPP and SPCD.

2.2 Assume Responsibility.

Operational safety on the airport remains the airport operator's responsibility at all times. The airport operator must develop, certify, and submit for FAA approval each CSPP. It is the airport operator's responsibility to apply the requirements of the FAA approved CSPP. The airport operator must revise the CSPP when conditions warrant changes and must submit the revised CSPP to the FAA for approval. The airport operator must also require and approve a SPCD from the project contractor.

2.3 Submit the CSPP.

Construction Safety and Phasing Plans should be developed concurrently with the project design. Milestone versions of the CSPP should be submitted for review and approval as follows. While these milestones are not mandatory, early submission will help to avoid delays. Submittals are preferred in 8.5 × 11 inch or 11 × 17 inch format for compatibility with the FAA's Obstruction Evaluation / Airport Airspace Analysis (OE / AAA) process.

2.3.1 Submit an Outline/Draft.

By the time approximately 25% to 30% of the project design is completed, the principal elements of the CSPP should be established. Airport operators are encouraged to submit an outline or draft, detailing all CSPP provisions developed to date, to the FAA for review at this stage of the project design.

2.3.2 Submit a CSPP.

The CSPP should be formally submitted for FAA approval when the project design is 80 percent to 90 percent complete. Since provisions in the CSPP will influence contract costs, it is important to obtain FAA approval in time to include all such provisions in the procurement contract.

Exhibit 1

2.3.3 Submit an SPCD.

The contractor should submit the SPCD to the airport operator for approval to be issued prior to the Notice to Proceed.

2.3.4 Submit CSPP Revisions.

All revisions to a previously approved CSPP must be re-submitted to the FAA for review and approval/disapproval action.

2.4 Meet CSPP Requirements.

2.4.1 To the extent possible, the CSPP should address the following as outlined in Chapter 3, Guidelines for Writing a CSPP. Details that cannot be determined at this stage are to be included in the SPCD.

1. Coordination.
   a. Contractor progress meetings.
   b. Scope or schedule changes.
   c. FAA ATO coordination.
2. Phasing.
   a. Phase elements.
   b. Construction safety drawings.
3. Areas and operations affected by the construction activity.
   a. Identification of affected areas.
   b. Mitigation of effects.
4. Protection of navigation aids (NAVAIDs).
5. Contractor access.
   a. Location of stockpiled construction materials.
   b. Vehicle and pedestrian operations.
6. Wildlife management.
   a. Trash.
   b. Standing water.
   c. Tall grass and seeds.
   d. Poorly maintained fencing and gates.
   e. Disruption of existing wildlife habitat.
7. Foreign Object Debris (FOD) management.
8. Hazardous materials (HAZMAT) management.
9. Notification of construction activities.

Exhibit 1

a. Maintenance of a list of responsible representatives/ points of contact.

b. NOTAM.

c. Emergency notification procedures.

d. Coordination with ARFF Personnel.

e. Notification to the FAA.

10. Inspection requirements.

a. Daily (or more frequent) inspections.

b. Final inspections.

11. Underground utilities.

12. Penalties.

13. Special conditions.

14. Runway and taxiway visual aids. Marking, lighting, signs, and visual NAVAIDs.

a. General.

b. Markings.

c. Lighting and visual NAVAIDs.

d. Signs, temporary, including orange construction signs, and permanent signs.

15. Marking and signs for access routes.

16. Hazard marking and lighting.

a. Purpose.

b. Equipment.

17. Work zone lighting for nighttime construction (if applicable).

18. Protection of runway and taxiway safety areas, object free areas, obstacle free zones, and approach/departure surfaces.

a. Runway Safety Area (RSA).

b. Runway Object Free Area (ROFA).

c. Taxiway Safety Area (TSA). Provide details for any adjustments to Taxiway Safety Area width to allow continued operation of smaller aircraft. See paragraph 2.22.3.

d. Taxiway Object Free Area (TOFA). Provide details for any continued aircraft operations while construction occurs within the TOFA. See paragraph 2.22.4.

e. Obstacle Free Zone (OFZ).

f. Runway approach/departure surfaces.

19. Other limitations on construction.

a. Prohibitions.

Exhibit 1

b. Restrictions.

2.4.2 The Safety Plan Compliance Document (SPCD) should include a general statement by the construction contractor that he/she has read and will abide by the CSPP. In addition, the SPCD must include all supplemental information that could not be included in the CSPP prior to the contract award. The contractor statement should include the name of the contractor, the title of the project CSPP, the approval date of the CSPP, and a reference to any supplemental information (that is, "I, (Name of Contractor), have read the (Title of Project) CSPP, approved on (Date), and will abide by it as written and with the following additions as noted:"). The supplemental information in the SPCD should be written to match the format of the CSPP indicating each subject by corresponding CSPP subject number and title. If no supplemental information is necessary for any specific subject, the statement, "No supplemental information," should be written after the corresponding subject title. The SPCD should not duplicate information in the CSPP:

1. Coordination. Discuss details of proposed safety meetings with the airport operator and with contractor employees and subcontractors.
2. Phasing. Discuss proposed construction schedule elements, including:
   a. Duration of each phase.
   b. Daily start and finish of construction, including "night only" construction.
   c. Duration of construction activities during:
      i. Normal runway operations.
      ii. Closed runway operations.
      iii. Modified runway "Aircraft Reference Code" usage.
3. Areas and operations affected by the construction activity. These areas and operations should be identified in the CSPP and should not require an entry in the SPCD.
4. Protection of NAVAIDs. Discuss specific methods proposed to protect operating NAVAIDs.
5. Contractor access. Provide the following:
   a. Details on how the contractor will maintain the integrity of the airport security fence (gate guards, daily log of construction personnel, and other).
   b. Listing of individuals requiring driver training (for certificated airports and as requested).
   c. Radio communications.
      i. Types of radios and backup capabilities.
      ii. Who will be monitoring radios.
      iii. Who to contact if the ATCT cannot reach the contractor's designated person by radio.

Exhibit 1

d. Details on how the contractor will escort material delivery vehicles.

6. Wildlife management. Discuss the following:

   a. Methods and procedures to prevent wildlife attraction.

   b. Wildlife reporting procedures.

7. Foreign Object Debris (FOD) management. Discuss equipment and methods for control of FOD, including construction debris and dust.

8. Hazardous Materials (HAZMAT) management. Discuss equipment and methods for responding to hazardous spills.

9. Notification of construction activities. Provide the following:

   a. Contractor points of contact.

   b. Contractor emergency contact.

   c. Listing of tall or other requested equipment proposed for use on the airport and the timeframe for submitting 7460-1 forms not previously submitted by the airport operator.

   d. Batch plant details, including 7460-1 submittal.

10. Inspection requirements. Discuss daily (or more frequent) inspections and special inspection procedures.

11. Underground utilities. Discuss proposed methods of identifying and protecting underground utilities.

12. Penalties. Penalties should be identified in the CSPP and should not require an entry in the SPCD.

13. Special conditions. Discuss proposed actions for each special condition identified in the CSPP.

14. Runway and taxiway visual aids. Including marking, lighting, signs, and visual NAVAIDs. Discuss proposed visual aids including the following:

   a. Equipment and methods for covering signage and airfield lights.

   b. Equipment and methods for temporary closure markings (paint, fabric, other).

   c. Temporary orange construction signs.

   d. Types of temporary Visual Guidance Slope Indicators (VGSI).

15. Marking and signs for access routes. Discuss proposed methods of demarcating access routes for vehicle drivers.

16. Hazard marking and lighting. Discuss proposed equipment and methods for identifying excavation areas.

17. Work zone lighting for nighttime construction (if applicable). Discuss proposed equipment, locations, aiming, and shielding to prevent interference with air traffic control and aircraft operations.

Exhibit 1

18. Protection of runway and taxiway safety areas, object free areas, obstacle free zones, and approach/departure surfaces. Discuss proposed methods of identifying, demarcating, and protecting airport surfaces including:
    a. Equipment and methods for maintaining Taxiway Safety Area standards.
    b. Equipment and methods to ensure the safe passage of aircraft where Taxiway Safety Area or Taxiway Object Free Area standards cannot be maintained.
    c. Equipment and methods for separation of construction operations from aircraft operations, including details of barricades.
19. Other limitations on construction should be identified in the CSPP and should not require an entry in the SPCD.

2.5 Coordination.

Airport operators, or tenants responsible for design, bidding and conducting construction on their leased properties, should ensure at all project developmental stages, such as predesign, prebid, and preconstruction conferences, they capture the subject of airport operational safety during construction (see AC 150/5370-12, *Quality Management for Federally Funded Airport Construction Projects*). In addition, the following should be coordinated as required:

2.5.1 Progress Meetings.

Operational safety should be a standing agenda item for discussion during progress meetings throughout the project developmental stages.

2.5.2 Scope or Schedule Changes.

Changes in the scope or duration at any of the project stages may require revisions to the CSPP and review and approval by the airport operator and the FAA (see paragraph 1.4.2.17).

2.5.3 FAA ATO Coordination.

Early coordination with FAA ATO is highly recommended during the design phase and is required for scheduling Technical Operations shutdowns prior to construction. Coordination is critical to restarts of NAVAID services and to the establishment of any special procedures for the movement of aircraft. Formal agreements between the airport operator and appropriate FAA offices are recommended. All relocation or adjustments to NAVAIDs, or changes to final grades in critical areas, should be coordinated with FAA ATO and may require an FAA flight inspection prior to restarting the facility. Flight inspections must be coordinated and scheduled well in advance of the intended facility restart. Flight inspections may require a reimbursable agreement between the airport operator and FAA ATO. Reimbursable agreements should be coordinated a minimum of 12 months prior to the start of construction. (See paragraph 2.13.5.3.2 for required FAA notification regarding FAA-owned NAVAIDs.)

Exhibit 1

2.6 Phasing.

Once it has been determined what types and levels of airport operations will be maintained, the most efficient sequence of construction may not be feasible. In this case, the sequence of construction may be phased to gain maximum efficiency while allowing for the required operations. The development of the resulting construction phases should be coordinated with local Air Traffic personnel and airport users. The sequenced construction phases established in the CSPP must be incorporated into the project design and must be reflected in the contract drawings and specifications.

2.6.1 Phase Elements.

For each phase the CSPP should detail:

- Areas closed to aircraft operations.
- Duration of closures.
- Taxi routes and/or areas of reduced TSA and TOFA to reflect reduced ADG use.
- ARFF access routes.
- Construction staging, disposal, and cleanout areas.
- Construction access and haul routes.
- Impacts to NAVAIDs.
- Lighting, marking, and signing changes.
- Available runway length and/or reduced RSA and ROFA to reflect reduced ADG use.
- Declared distances (if applicable).
- Required hazard marking, lighting, and signing.
- Work zone lighting for nighttime construction (if applicable).
- Lead times for required notifications.

2.6.2 Construction Safety Drawings.

Drawings specifically indicating operational safety procedures and methods in affected areas (i.e., construction safety drawings) should be developed for each construction phase. Such drawings should be included in the CSPP as referenced attachments and should also be included in the contract drawing package.

2.7 Areas and Operations Affected by Construction Activity.

Runways and taxiways should remain in use by aircraft to the maximum extent possible without compromising safety. Pre-meetings with the FAA ATO will support operational simulations. See Appendix E for an example of a table showing temporary operations versus current operations. The tables in Appendix E can be useful for coordination among all interested parties, including FAA Lines of Business.

Exhibit 1

2.7.1 Identification of Affected Areas.

Identifying areas and operations affected by the construction helps to determine possible safety problems. The affected areas should be identified in the construction safety drawings for each construction phase. (See paragraph 2.6.2.) Of particular concern are:

2.7.1.1 **Closing, or Partial Closing, of Runways, Taxiways and Aprons, and Displaced Thresholds.**

When a runway is partially closed, a portion of the pavement is unavailable for any aircraft operation, meaning taxiing, landing, or takeoff in either direction on that pavement is prohibited. A displaced threshold, by contrast, is established to ensure obstacle clearance and adequate safety area for landing aircraft. The pavement prior to the displaced threshold is normally available for take-off in the direction of the displacement and for landing and takeoff in the opposite direction. Misunderstanding this difference, may result in issuance of an inaccurate NOTAM, and can lead to a hazardous condition.

2.7.1.1.1 Partially Closed Runways.

The temporarily closed portion of a partially closed runway will generally extend from the threshold to a taxiway that may be used for entering and exiting the runway. If the closed portion extends to a point between taxiways, pilots will have to back-taxi on the runway, which is an undesirable operation. See Figure 2-1 for a desirable configuration.

2.7.1.1.2 Displaced Thresholds.

Since the portion of the runway pavement between the permanent threshold and a standard displaced threshold is available for takeoff and for landing in the opposite direction, the temporary displaced threshold need not be located at an entrance/exit taxiway. See Figure 2-2.

2.7.1.2 Closing of aircraft rescue and fire fighting access routes.

2.7.1.3 Closing of access routes used by airport and airline support vehicles.

2.7.1.4 Interruption of utilities, including water supplies for fire fighting.

2.7.1.5 Approach/departure surfaces affected by heights of objects.

2.7.1.6 Construction areas, storage areas, and access routes near runways, taxiways, aprons, or helipads.

Exhibit 1

Figure 2-1. Temporary Partially Closed Runway

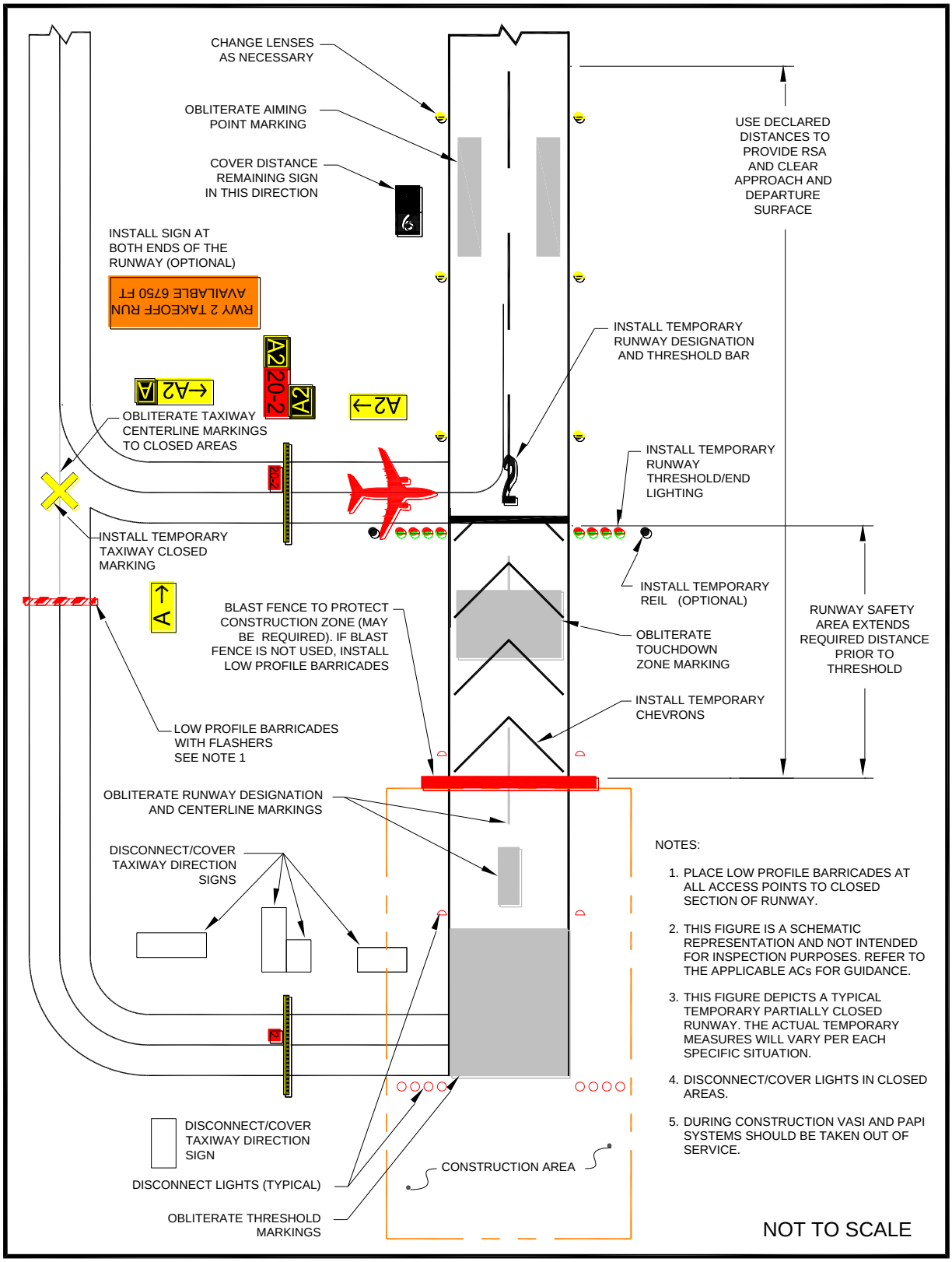
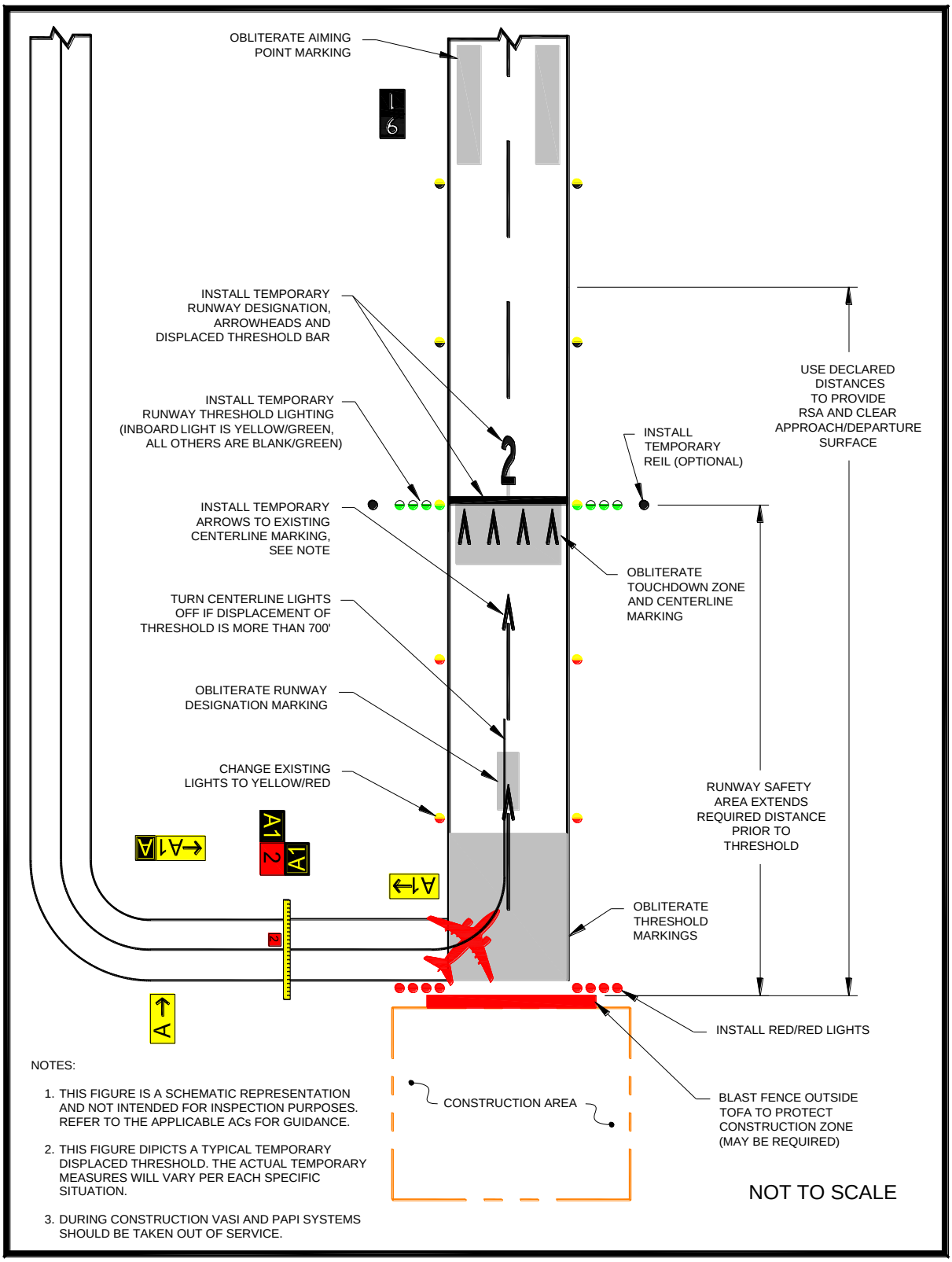


Exhibit 1

Figure 2-2. Temporary Displaced Threshold



Note: See paragraph 2.18.2.5.

Exhibit 1

2.7.2 Mitigation of Effects.

Establishment of specific procedures is necessary to maintain the safety and efficiency of airport operations. The CSPP must address:

2.7.2.1 Temporary changes to runway and/or taxi operations.

2.7.2.2 Detours for ARFF and other airport vehicles.

2.7.2.3 Maintenance of essential utilities.

2.7.2.4 Temporary changes to air traffic control procedures. Such changes must be coordinated with the ATO.

2.8 Navigation Aid (NAVAID) Protection.

Before commencing construction activity, parking vehicles, or storing construction equipment and materials near a NAVAID, coordinate with the appropriate FAA ATO/Technical Operations office to evaluate the effect of construction activity and the required distance and direction from the NAVAID. (See paragraph 2.13.5.3.) Construction activities, materials/equipment storage, and vehicle parking near electronic NAVAIDs require special consideration since they may interfere with signals essential to air navigation. If any NAVAID may be affected, the CSPP and SPCD must show an understanding of the "critical area" associated with each NAVAID and describe how it will be protected. Where applicable, the operational critical areas of NAVAIDs should be graphically delineated on the project drawings. Pay particular attention to stockpiling material, as well as to movement and parking of equipment that may interfere with line of sight from the ATCT or with electronic emissions. Interference from construction equipment and activities may require NAVAID shutdown or adjustment of instrument approach minimums for low visibility operations. This condition requires that a NOTAM be filed (see paragraph 2.13.2). Construction activities and materials/equipment storage near a NAVAID must not obstruct access to the equipment and instruments for maintenance. Submittal of a 7460-1 form is required for construction vehicles operating near FAA NAVAIDs. (See paragraph 2.13.5.3.)

2.9 Contractor Access.

The CSPP must detail the areas to which the contractor must have access, and explain how contractor personnel will access those areas. Specifically address:

2.9.1 Location of Stockpiled Construction Materials.

Stockpiled materials and equipment storage are not permitted within the RSA and OFZ, and if possible should not be permitted within the Object Free Area (OFA) of an operational runway. Stockpiling material in the OFA requires submittal of a 7460-1 form and justification provided to the appropriate FAA Airports Regional or District Office for approval. The airport operator must ensure that stockpiled materials and equipment adjacent to these areas are prominently marked and lighted during hours of restricted visibility or darkness. (See paragraph 2.18.2.) This includes determining and

Exhibit 1

verifying that materials are stabilized and stored at an approved location so as not to be a hazard to aircraft operations and to prevent attraction of wildlife and foreign object damage from blowing or tracked material. See paragraphs 2.10 and 2.11.

2.9.2 Vehicle and Pedestrian Operations.

The CSPP should include specific vehicle and pedestrian requirements. Vehicle and pedestrian access routes for airport construction projects must be controlled to prevent inadvertent or unauthorized entry of persons, vehicles, or animals onto the AOA. The airport operator should coordinate requirements for vehicle operations with airport tenants, contractors, and the FAA air traffic manager. In regard to vehicle and pedestrian operations, the CSPP should include the following, with associated training requirements:

2.9.2.1 **Construction Site Parking.**

Designate in advance vehicle parking areas for contractor employees to prevent any unauthorized entry of persons or vehicles onto the AOA. These areas should provide reasonable contractor employee access to the job site.

2.9.2.2 **Construction Equipment Parking.**

Contractor employees must park and service all construction vehicles in an area designated by the airport operator outside the OFZ and never in the safety area of an active runway or taxiway. Unless a complex setup procedure makes movement of specialized equipment infeasible, inactive equipment must not be parked on a closed taxiway or runway. If it is necessary to leave specialized equipment on a closed taxiway or runway at night, the equipment must be well lighted. Employees should also park construction vehicles outside the OFA when not in use by construction personnel (for example, overnight, on weekends, or during other periods when construction is not active). Parking areas must not obstruct the clear line of sight by the ATCT to any taxiways or runways under air traffic control nor obstruct any runway visual aids, signs, or navigation aids. The FAA must also study those areas to determine effects on airport design criteria, surfaces established by 14 CFR Part 77, Safe, Efficient Use, and Preservation of the Navigable Airspace (Part 77), and on NAVAIDs and Instrument Approach Procedures (IAP). See paragraph 2.13.1 for further information.

2.9.2.3 **Access and Haul Roads.**

Determine the construction contractor's access to the construction sites and haul roads. Do not permit the construction contractor to use any access or haul roads other than those approved. Access routes used by contractor vehicles must be clearly marked to prevent inadvertent entry to areas open to airport operations. Pay special attention to ensure that if construction traffic is to share or cross any ARFF routes that ARFF right of way is not impeded at any time, and that construction traffic on haul

Exhibit 1

roads does not interfere with NAVAIDs or approach surfaces of operational runways. Address whether access gates will be blocked or inoperative or if a rally point will be blocked or inaccessible.

2.9.2.4 Marking and lighting of vehicles in accordance with AC 150/5210-5, *Painting, Marking, and Lighting of Vehicles Used on an Airport.*

2.9.2.5 Description of proper vehicle operations on various areas under normal, lost communications, and emergency conditions.

2.9.2.6 Required escorts.

2.9.2.7 **Training Requirements for Vehicle Drivers to Ensure Compliance with the Airport Operator's Vehicle Rules and Regulations.**

Specific training should be provided to vehicle operators, including those providing escorts. See AC 150/5210-20, *Ground Vehicle Operations on Airports*, for information on training and records maintenance requirements.

2.9.2.8 **Situational Awareness.**

Vehicle drivers must confirm by personal observation that no aircraft is approaching their position (either in the air or on the ground) when given clearance to cross a runway, taxiway, or any other area open to airport operations. In addition, it is the responsibility of the escort vehicle driver to verify the movement/position of all escorted vehicles at any given time. At non-towered airports, all aircraft movements and flight operations rely on aircraft operators to self-report their positions and intentions. However, there is no requirement for an aircraft to have radio communications. Because aircraft do not always broadcast their positions or intentions, visual checking, radio monitoring, and situational awareness of the surroundings is critical to safety.

2.9.2.9 **Two-Way Radio Communication Procedures.**

2.9.2.9.1 General.

The airport operator must ensure that tenant and construction contractor personnel engaged in activities involving unescorted operation on aircraft movement areas observe the proper procedures for communications, including using appropriate radio frequencies at airports with and without ATCT. When operating vehicles on or near open runways or taxiways, construction personnel must understand the critical importance of maintaining radio contact, as directed by the airport operator, with:

1. Airport operations
2. ATCT

Exhibit 1

3. Common Traffic Advisory Frequency (CTAF), which may include UNICOM, MULTICOM.
4. Automatic Terminal Information Service (ATIS). This frequency is useful for monitoring conditions on the airport. Local air traffic will broadcast information regarding construction related runway closures and "shortened" runways on the ATIS frequency.

2.9.2.9.2 Areas Requiring Two-Way Radio Communication with the ATCT.

Vehicular traffic crossing active movement areas must be controlled either by two-way radio with the ATCT, escort, flagman, signal light, or other means appropriate for the particular airport.

2.9.2.9.3 Frequencies to be Used.

The airport operator will specify the frequencies to be used by the contractor, which may include the CTAF for monitoring of aircraft operations. Frequencies may also be assigned by the airport operator for other communications, including any radio frequency in compliance with Federal Communications Commission requirements. At airports with an ATCT, the airport operator will specify the frequency assigned by the ATCT to be used between contractor vehicles and the ATCT.

2.9.2.9.4 Proper radio usage, including read back requirements.

2.9.2.9.5 Proper phraseology, including the International Phonetic Alphabet.

2.9.2.9.6 Light Gun Signals.

Even though radio communication is maintained, escort vehicle drivers must also familiarize themselves with ATCT light gun signals in the event of radio failure. See the FAA safety placard "Ground Vehicle Guide to Airport Signs and Markings." This safety placard may be downloaded through the Runway Safety Program Web site at http://www.faa.gov/airports/runway_safety/publications/ (see "Signs & Markings Vehicle Dashboard Sticker") or obtained from the FAA Airports Regional Office.

2.9.2.10 **Maintenance of the secured area of the airport, including:**

2.9.2.10.1 Fencing and Gates.

Airport operators and contractors must take care to maintain security during construction when access points are created in the security fencing to permit the passage of construction vehicles or personnel. Temporary gates should be equipped so they can be securely closed and locked to prevent access by animals and unauthorized people. Procedures should be in place to ensure that only authorized persons and vehicles have access to the AOA and to prohibit "piggybacking" behind another person or vehicle. The Department of Transportation (DOT) document DOT/FAA/AR-

Exhibit 1

00/52, *Recommended Security Guidelines for Airport Planning and Construction*, provides more specific information on fencing. A copy of this document can be obtained from the Airport Consultants Council, Airports Council International, or American Association of Airport Executives.

2.9.2.10.2 Badging Requirements.

Airports subject to 49 CFR Part 1542, *Airport Security*, must meet standards for access control, movement of ground vehicles, and identification of construction contractor and tenant personnel.

2.10 Wildlife Management.

The CSPP and SPCD must be in accordance with the airport operator's wildlife hazard management plan, if applicable. See AC 150/5200-33, *Hazardous Wildlife Attractants On or Near Airports*, and CertAlert 98-05, *Grasses Attractive to Hazardous Wildlife*. Construction contractors must carefully control and continuously remove waste or loose materials that might attract wildlife. Contractor personnel must be aware of and avoid construction activities that can create wildlife hazards on airports, such as:

2.10.1 Trash.

Food scraps must be collected from construction personnel activity.

2.10.2 Standing Water.

2.10.3 Tall Grass and Seeds.

Requirements for turf establishment can be at odds with requirements for wildlife control. Grass seed is attractive to birds. Lower quality seed mixtures can contain seeds of plants (such as clover) that attract larger wildlife. Seeding should comply with the guidance in AC 150/5370-10, *Standards for Specifying Construction of Airports*, Item T-901, Seeding. Contact the local office of the United Sates Department of Agriculture Soil Conservation Service or the State University Agricultural Extension Service (County Agent or equivalent) for assistance and recommendations. These agencies can also provide liming and fertilizer recommendations.

2.10.4 Poorly Maintained Fencing and Gates.

See paragraph 2.9.2.10.1.

2.10.5 Disruption of Existing Wildlife Habitat.

While this will frequently be unavoidable due to the nature of the project, the CSPP should specify under what circumstances (location, wildlife type) contractor personnel should immediately notify the airport operator of wildlife sightings.

Exhibit 1

2.11 Foreign Object Debris (FOD) Management.

Waste and loose materials, commonly referred to as FOD, are capable of causing damage to aircraft landing gears, propellers, and jet engines. Construction contractors must not leave or place FOD on or near active aircraft movement areas. Materials capable of creating FOD must be continuously removed during the construction project. Fencing (other than security fencing) or covers may be necessary to contain material that can be carried by wind into areas where aircraft operate. See AC 150/5210-24, *Foreign Object Debris (FOD) Management.*

2.12 Hazardous Materials (HAZMAT) Management.

Contractors operating construction vehicles and equipment on the airport must be prepared to expeditiously contain and clean-up spills resulting from fuel or hydraulic fluid leaks. Transport and handling of other hazardous materials on an airport also requires special procedures. See AC 150/5320-15, *Management of Airport Industrial Waste.*

2.13 Notification of Construction Activities.

The CSPP and SPCD must detail procedures for the immediate notification of airport users and the FAA of any conditions adversely affecting the operational safety of the airport. It must address the notification actions described below, as applicable.

2.13.1 List of Responsible Representatives/points of contact for all involved parties, and procedures for contacting each of them, including after hours.

2.13.2 NOTAMs.

Only the airport operator may initiate or cancel NOTAMs on airport conditions, and is the only entity that can close or open a runway. The airport operator must coordinate the issuance, maintenance, and cancellation of NOTAMs about airport conditions resulting from construction activities with tenants and the local air traffic facility (control tower, approach control, or air traffic control center), and must either enter the NOTAM into NOTAM Manager, or provide information on closed or hazardous conditions on airport movement areas to the FAA Flight Service Station (FSS) so it can issue a NOTAM. The airport operator must file and maintain a list of authorized representatives with the FSS. Refer to AC 150/5200-28, *Notices to Airmen (NOTAMs) for Airport Operators,* for a sample NOTAM form. Only the FAA may issue or cancel NOTAMs on shutdown or irregular operation of FAA owned facilities. Any person having reason to believe that a NOTAM is missing, incomplete, or inaccurate must notify the airport operator. See paragraph 2.7.1.1 about issuing NOTAMs for partially closed runways versus runways with displaced thresholds.

2.13.3 Emergency notification procedures for medical, fire fighting, and police response.

2.13.4 Coordination with ARFF.

The CSPP must detail procedures for coordinating through the airport sponsor with ARFF personnel, mutual aid providers, and other emergency services if construction requires:

1. The deactivation and subsequent reactivation of water lines or fire hydrants, or
2. The rerouting, blocking and restoration of emergency access routes, or
3. The use of hazardous materials on the airfield.

2.13.5 Notification to the FAA.

2.13.5.1 **Part 77.**

Any person proposing construction or alteration of objects that affect navigable airspace, as defined in Part 77, must notify the FAA. This includes construction equipment and proposed parking areas for this equipment (i.e., cranes, graders, other equipment) on airports. FAA Form 7460-1, *Notice of Proposed Construction or Alteration*, can be used for this purpose and submitted to the appropriate FAA Airports Regional or District Office. See Appendix A to download the form. Further guidance is available on the FAA web site at oeaaa.faa.gov.

2.13.5.2 **Part 157.**

With some exceptions, Title 14 CFR Part 157, *Notice of Construction, Alteration, Activation, and Deactivation of Airports*, requires that the airport operator notify the FAA in writing whenever a non-Federally funded project involves the construction of a new airport; the construction, realigning, altering, activating, or abandoning of a runway, landing strip, or associated taxiway; or the deactivation or abandoning of an entire airport. Notification involves submitting FAA Form 7480-1, *Notice of Landing Area Proposal*, to the nearest FAA Airports Regional or District Office. See Appendix A to download the form.

2.13.5.3 **NAVAIDs.**

For emergency (short-notice) notification about impacts to both airport owned and FAA owned NAVAIDs, contact: 866-432-2622.

2.13.5.3.1 Airport Owned/FAA Maintained.

If construction operations require a shutdown of 24 hours or greater in duration, or more than 4 hours daily on consecutive days, of a NAVAID owned by the airport but maintained by the FAA, provide a 45-day minimum notice to FAA ATO/Technical Operations prior to facility shutdown, using Strategic Event Coordination (SEC) Form 6000.26 contained within FAA Order 6000.15, *General Maintenance Handbook for National Airspace System (NAS) Facilities*.

Exhibit 1

2.13.5.3.2 FAA Owned.

1. The airport operator must notify the appropriate FAA ATO Service Area Planning and Requirements (P&R) Group a minimum of 45 days prior to implementing an event that causes impacts to NAVAIDs, using SEC Form 6000.26.
2. Coordinate work for an FAA owned NAVAID shutdown with the local FAA ATO/Technical Operations office, including any necessary reimbursable agreements and flight checks. Detail procedures that address unanticipated utility outages and cable cuts that could impact FAA NAVAIDs. Refer to active Service Level Agreement with ATO for specifics.

2.14 Inspection Requirements.

2.14.1 Daily Inspections.

Inspections should be conducted at least daily, but more frequently if necessary to ensure conformance with the CSPP. A sample checklist is provided in Appendix D, Construction Project Daily Safety Inspection Checklist. See also AC 150/5200-18, *Airport Safety Self-Inspection.* Airport operators holding a Part 139 certificate are required to conduct self-inspections during unusual conditions, such as construction activities, that may affect safe air carrier operations.

2.14.2 Interim Inspections.

Inspections should be conducted of all areas to be (re)opened to aircraft traffic to ensure the proper operation of lights and signs, for correct markings, and absence of FOD. The contractor should conduct an inspection of the work area with airport operations personnel. The contractor should ensure that all construction materials have been secured, all pavement surfaces have been swept clean, all transition ramps have been properly constructed, and that surfaces have been appropriately marked for aircraft to operate safely. Only if all items on the list meet with the airport operator's approval should the air traffic control tower be notified to open the area to aircraft operations. The contractor should be required to retain a suitable workforce and the necessary equipment at the work area for any last minute cleanup that may be requested by the airport operator prior to opening the area.

2.14.3 Final Inspections.

New runways and extended runway closures may require safety inspections at certificated airports prior to allowing air carrier service. Coordinate with the FAA Airport Certification Safety Inspector (ACSI) to determine if a final inspection will be necessary.

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2.15 **Underground Utilities.**

The CSPP and/or SPCD must include procedures for locating and protecting existing underground utilities, cables, wires, pipelines, and other underground facilities in excavation areas. This may involve coordinating with public utilities and FAA ATO/Technical Operations. Note that "One Call" or "Miss Utility" services do not include FAA ATO/Technical Operations.

2.16 **Penalties.**

The CSPP should detail penalty provisions for noncompliance with airport rules and regulations and the safety plans (for example, if a vehicle is involved in a runway incursion). Such penalties typically include rescission of driving privileges or access to the AOA.

2.17 **Special Conditions.**

The CSPP must detail any special conditions that affect the operation of the airport and will require the activation of any special procedures (for example, low-visibility operations, snow removal, aircraft in distress, aircraft accident, security breach, Vehicle / Pedestrian Deviation (VPD) and other activities requiring construction suspension/resumption).

2.18 **Runway and Taxiway Visual Aids.**

This includes marking, lighting, signs, and visual NAVAIDs. The CSPP must ensure that areas where aircraft will be operating are clearly and visibly separated from construction areas, including closed runways. Throughout the duration of the construction project, verify that these areas remain clearly marked and visible at all times and that marking, lighting, signs, and visual NAVAIDs that are to continue to perform their functions during construction remain in place and operational. Visual NAVAIDs that are not serving their intended function during construction must be temporarily disabled, covered, or modified as necessary. The CSPP must address the following, as appropriate:

2.18.1 General.

Airport markings, lighting, signs, and visual NAVAIDs must be clearly visible to pilots, not misleading, confusing, or deceptive. All must be secured in place to prevent movement by prop wash, jet blast, wing vortices, and other wind currents and constructed of materials that will minimize damage to an aircraft in the event of inadvertent contact. Items used to secure such markings must be of a color similar to the marking.

2.18.2 Markings.

During the course of construction projects, temporary pavement markings are often required to allow for aircraft operations during or between work periods. During the design phase of the project, the designer should coordinate with the project manager,

airport operations, airport users, the FAA Airports project manager, and Airport Certification Safety Inspector for Part 139 airports to determine minimum temporary markings. The FAA Airports project manager will, wherever a runway is closed, coordinate with the appropriate FAA Flight Standards Office and disseminate findings to all parties. Where possible, the temporary markings on finish grade pavements should be placed to mirror the dimensions of the final markings. Markings must be in compliance with the standards of AC 150/5340-1, *Standards for Airport Markings*, except as noted herein. Runways and runway exit taxiways closed to aircraft operations are marked with a yellow X. The preferred visual aid to depict temporary runway closure is the lighted X signal placed on or near the runway designation numbers. (See paragraph 2.18.2.1.2.)

2.18.2.1 **Closed Runways and Taxiways.**

2.18.2.1.1 Permanently Closed Runways.

For runways, obliterate the threshold marking, runway designation marking, and touchdown zone markings, and place an X at each end and at 1,000-foot (300 m) intervals. For a multiple runway environment, if the lighted X on a designated number will be located in the RSA of an adjacent active runway, locate the lighted X farther down the closed runway to clear the RSA of the active runway. In addition, the closed runway numbers located in the RSA of an active runway must be marked with a flat yellow X.

2.18.2.1.2 Temporarily Closed Runways.

For runways that have been temporarily closed, place an X at each end of the runway directly on or as near as practicable to the runway designation numbers. For a multiple runway environment, if the lighted X on a designated number will be located in the RSA of an adjacent active runway, locate the lighted X farther down the closed runway to clear the RSA of the active runway. In addition, the closed runway numbers located in the RSA of an active runway must be marked with a flat yellow X. See Figure 2-3. See also paragraph 2.18.3.3.

2.18.2.1.3 Partially Closed Runways and Displaced Thresholds.

When threshold markings are needed to identify the temporary beginning of the runway that is available for landing, the markings must comply with AC 150/5340-1. An X is not used on a partially closed runway or a runway with a displaced threshold. See paragraph 2.7.1.1 for the difference between partially closed runways and runways with displaced thresholds. Because of the temporary nature of threshold displacement due to construction, it is not necessary to re-adjust the existing runway centerline markings to meet standard spacing for a runway with a visual approach. Some of the requirements below may be waived in the cases of low-activity airports and/or short duration changes that are measured in days rather than weeks. Consider whether the presence of an airport traffic

Exhibit 1

control tower allows for the development of special procedures. Contact the appropriate FAA Airports Regional or District Office for assistance.

Figure 2-3. Markings for a Temporarily Closed Runway

1. **Partially Closed Runways.** Pavement markings for temporary closed portions of the runway consist of a runway threshold bar, runway designation, and yellow chevrons to identify pavement areas that are unsuitable for takeoff or landing (see AC 150/5340-1). Obliterate or cover markings prior to the moved threshold. Existing touchdown zone markings beyond the moved threshold may remain in place. Obliterate aiming point markings. Issue appropriate NOTAMs regarding any nonstandard markings. See Figure 2-4.

2. **Displaced Thresholds.** Pavement markings for a displaced threshold consist of a runway threshold bar, runway designation, and white arrowheads with and without arrow shafts. These markings are required to identify the portion of the runway before the displaced threshold to provide centerline guidance for pilots during approaches, takeoffs, and landing rollouts from the opposite direction. See AC 150/5340-1. Obliterate markings prior to the displaced threshold. Existing touchdown zone markings beyond the displaced threshold may remain in place. Obliterate aiming point markings. Issue appropriate NOTAMs regarding any nonstandard markings. See Figure 2-2.

Exhibit 1

2.18.2.1.4 Taxiways.

1. **Permanently Closed Taxiways.** AC 150/5300-13 *Airport Design*, notes that it is preferable to remove the pavement, but for pavement that is to remain, place an X at the entrance to both ends of the closed section. Obliterate taxiway centerline markings, including runway leadoff lines, leading to the closed taxiway. See Figure 2-4.

Figure 2-4. Temporary Taxiway Closure

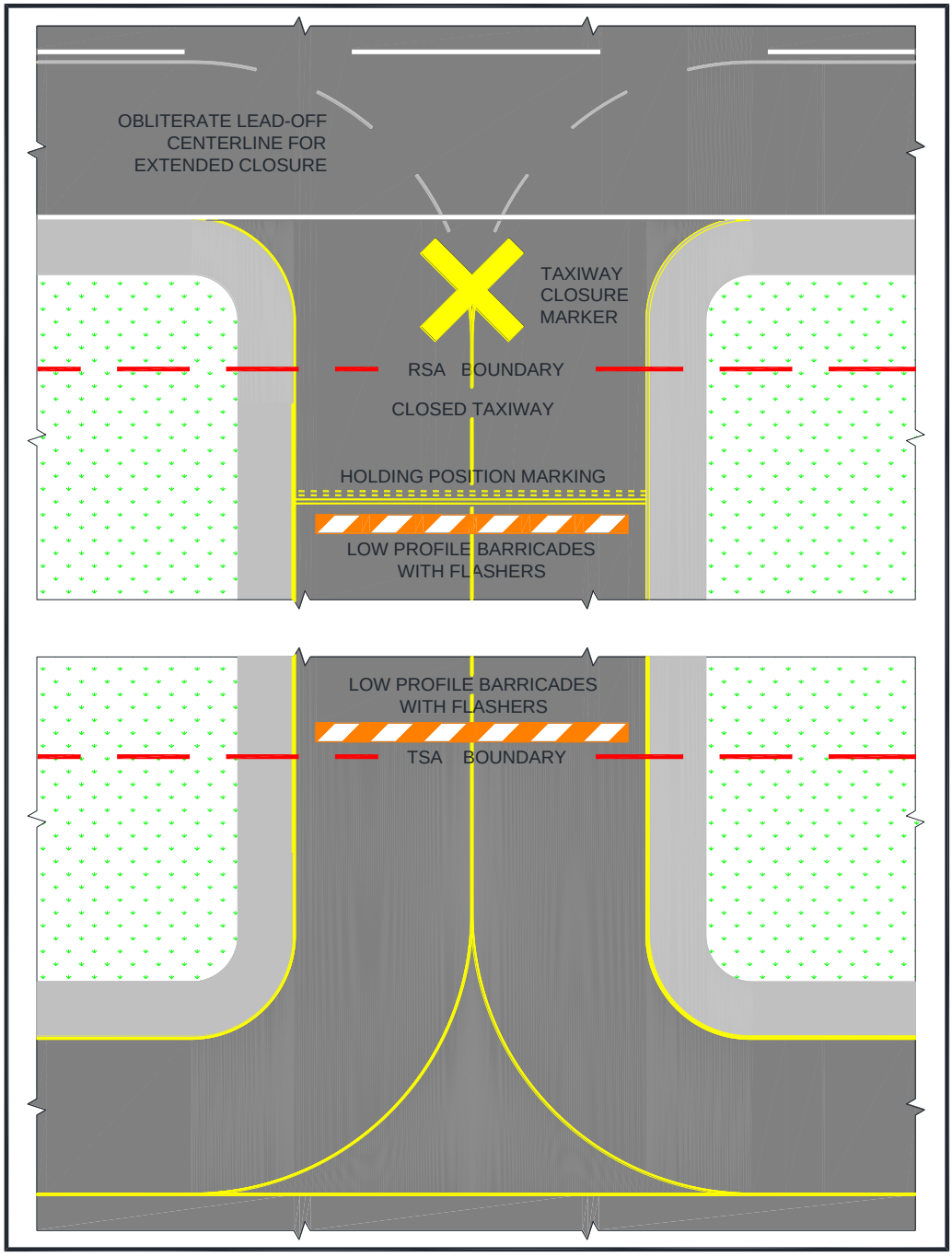

Exhibit 1

2. **Temporarily Closed Taxiways.** Place barricades outside the safety area of intersecting taxiways. For runway/taxiway intersections, place an X at the entrance to the closed taxiway from the runway. If the taxiway will be closed for an extended period, obliterate taxiway centerline markings, including runway leadoff lines and taxiway to taxiway turns, leading to the closed section. Always obliterate runway lead-off lines for high speed exits, regardless of the duration of the closure. If the centerline markings will be reused upon reopening the taxiway, it is preferable to paint over the marking. This will result in less damage to the pavement when the upper layer of paint is ultimately removed. See Figure 2-4.

2.18.2.1.5 Temporarily Closed Airport.

When the airport is closed temporarily, mark all the runways as closed.

2.18.2.2 If unable to paint temporary markings on the pavement, construct them from any of the following materials: fabric, colored plastic, painted sheets of plywood, or similar materials. They must be properly configured and appropriately secured to prevent movement by prop wash, jet blast, or other wind currents. Items used to secure such markings must be of a color similar to the marking.

2.18.2.3 It may be necessary to remove or cover runway markings, including but not limited to, runway designation markings, threshold markings, centerline markings, edge stripes, touchdown zone markings and aiming point markings, depending on the length of construction and type of activity at the airport. When removing runway markings, apply the same treatment to areas between stripes or numbers, as the cleaned area will appear to pilots as a marking in the shape of the treated area.

2.18.2.4 If it is not possible to install threshold bars, chevrons, and arrows on the pavement, “temporary outboard white threshold bars and yellow arrowheads”, see Figure 2-5, may be used. Locate them outside of the runway pavement surface on both sides of the runway. The dimensions must be as shown in Figure 2-5. If the markings are not discernible on grass or snow, apply a black background with appropriate material over the ground to ensure they are clearly visible.

2.18.2.5 The application rate of paint to mark a short-term temporary runway and taxiway markings may deviate from the standard (see Item P-620, “Runway and Taxiway Painting,” in AC 150/5370-10), but the dimensions must meet the existing standards. When applying temporary markings at night, it is recommended that the fast curing, Type II paint be used to help offset the higher humidity and cooler temperatures often experienced at night. Diluting the paint will substantially increase cure time and is not recommended. Glass beads are not recommended for temporary markings. Striated markings may also be used for certain temporary markings. AC

Exhibit 1

150/5340-1, *Standards for Airport Markings*, has additional guidance on temporary markings.

Figure 2-5. Temporary Outboard White Threshold Bars and Yellow Arrowheads

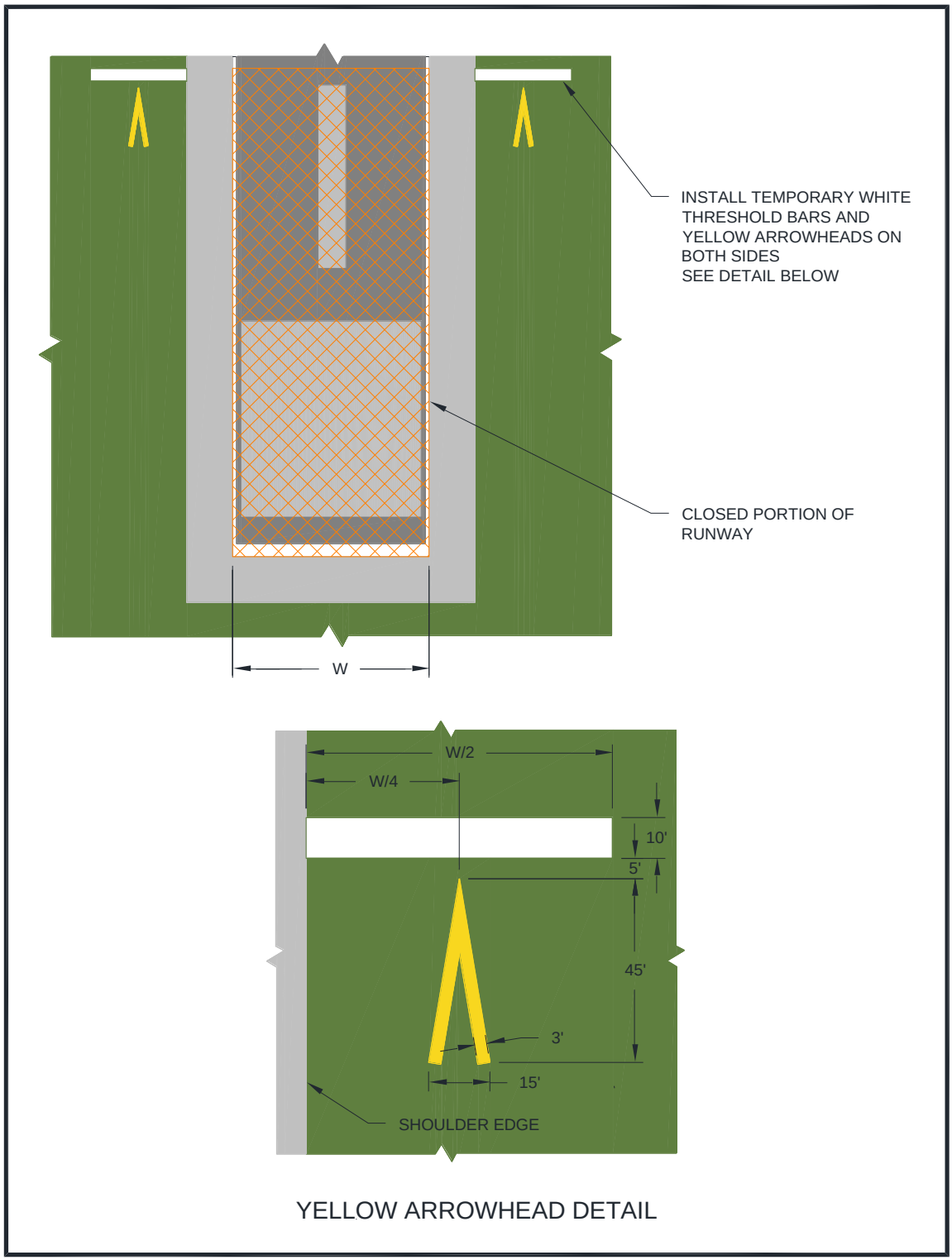

Exhibit 1

2.18.3 Lighting and Visual NAVAIDs.

This paragraph refers to standard runway and taxiway lighting systems. See below for hazard lighting. Lighting installation must be in conformance with AC 150/5340-30, *Design and Installation Details for Airport Visual Aids*, and fixture design in conformance with AC 150/5345-50, *Specification for Portable Runway and Taxiway Lights.* When disconnecting runway and taxiway lighting fixtures, disconnect the associated isolation transformers. See AC 150/5340-26, *Maintenance of Airport Visual Aid Facilities*, for disconnect procedures and safety precautions. Alternately, cover the light fixture in such a way as to prevent light leakage. Avoid removing the lamp from energized fixtures because an excessive number of isolation transformers with open secondaries may damage the regulators and/or increase the current above its normal value. Secure, identify, and place any above ground temporary wiring in conduit to prevent electrocution and fire ignition sources. Maintain mandatory hold signs to operate normally in any situation where pilots or vehicle drivers could mistakenly be in that location. At towered airports certificated under Part 139, holding position signs are required to be illuminated on open taxiways crossing to closed or inactive runways. If the holding position sign is installed on the runway circuit for the closed runway, install a jumper to the taxiway circuit to provide power to the holding position sign for nighttime operations. Where it is not possible to maintain power to signs that would normally be operational, install barricades to exclude aircraft. Figure 2-1, Figure 2-2, Figure 2-3, and Figure 2-4 illustrate temporary changes to lighting and visual NAVAIDs.

2.18.3.1 **Permanently Closed Runways and Taxiways.**

For runways and taxiways that have been permanently closed, disconnect the lighting circuits.

2.18.3.2 **Temporarily Closed Runways and New Runways Not Yet Open to Air Traffic.**

If available, use a lighted X, both at night and during the day, placed at each end of the runway on or near the runway designation numbers facing the approach. (Note that the lighted X must be illuminated at all times that it is on a runway.) The use of a lighted X is required if night work requires runway lighting to be on. See AC 150/5345-55, *Specification for L-893, Lighted Visual Aid to Indicate Temporary Runway Closure.* For runways that have been temporarily closed, but for an extended period, and for those with pilot controlled lighting, disconnect the lighting circuits or secure switches to prevent inadvertent activation. For runways that will be opened periodically, coordinate procedures with the FAA air traffic manager or, at airports without an ATCT, the airport operator. Activate stop bars if available. Figure 2-6 shows a lighted X by day. Figure 2-7 shows a lighted X at night.

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Figure 2-6. Lighted X in Daytime

Figure 2-7. Lighted X at Night

2.18.3.3 **Partially Closed Runways and Displaced Thresholds.**

When a runway is partially closed, a portion of the pavement is unavailable for any aircraft operation, meaning taxiing and landing or taking off in either direction. A displaced threshold, by contrast, is put in place to ensure obstacle clearance by landing aircraft. The pavement prior to the displaced threshold is available for takeoff in the direction of the displacement, and for landing and takeoff in the opposite direction. Misunderstanding this difference and issuance of a subsequently inaccurate NOTAM can result in a hazardous situation. For both partially

Exhibit 1

closed runways and displaced thresholds, approach lighting systems at the affected end must be placed out of service.

2.18.3.3.1 Partially Closed Runways.

Disconnect edge and threshold lights on that part of the runway at and behind the threshold (that is, the portion of the runway that is closed). Alternately, cover the light fixtures in such a way as to prevent light leakage. See Figure 2-1.

2.18.3.3.2 Temporary Displaced Thresholds.

Edge lighting in the area of the displacement emits red light in the direction of approach and yellow light (white for visual runways) in the opposite direction. If the displacement is 700 feet or less, blank out centerline lights in the direction of approach or place the centerline lights out of service. If the displacement is over 700 feet, place the centerline lights out of service. See AC 150/5340-30 for details on lighting displaced thresholds. See Figure 2-2.

2.18.3.3.3 Temporary runway thresholds and runway ends must be lighted if the runway is lighted and it is the intended threshold for night landings or instrument meteorological conditions.

2.18.3.3.4 A temporary threshold on an unlighted runway may be marked by retroreflective, elevated markers in addition to markings noted in paragraph 2.18.2.1.3. Markers seen by aircraft on approach are green. Markers at the rollout end of the runway are red. At certificated airports, temporary elevated threshold markers must be mounted with a frangible fitting (see 14 CFR Part 139.309). At non-certificated airports, the temporary elevated threshold markings may either be mounted with a frangible fitting or be flexible. See AC 150/5345-39, *Specification for L-853, Runway and Taxiway Retroreflective Markers.*

2.18.3.3.5 Temporary threshold lights and runway end lights and related visual NAVAIDs are installed outboard of the edges of the full-strength pavement only when they cannot be installed on the pavement. They are installed with bases at grade level or as low as possible, but not more than 3 inch (7.6 cm) above ground. (The standard above ground height for airport lighting fixtures is 14 inches (35 cm)). When any portion of a base is above grade, place properly compacted fill around the base to minimize the rate of gradient change so aircraft can, in an emergency, cross at normal landing or takeoff speeds without incurring significant damage. See AC 150/5370-10.

2.18.3.3.6 Maintain threshold and edge lighting color and spacing standards as described in AC 150/5340-30. Battery powered, solar, or portable lights that meet the criteria in AC 150/5345-50 may be used. These systems are intended primarily for visual flight rules (VFR) aircraft operations but may

Exhibit 1

be used for instrument flight rules (IFR) aircraft operations, upon individual approval from the Flight Standards Division of the applicable FAA Regional Office.

2.18.3.3.7 When runway thresholds are temporarily displaced, reconfigure yellow lenses (caution zone), as necessary, and place the centerline lights out of service.

2.18.3.3.8 Relocate the Visual Glide Slope Indicator (VGSI), such as Visual Approach Slope Indicator (VASI) and Precision Approach Path Indicator (PAPI); other airport lights, such as Runway End Identifier Lights (REIL); and approach lights to identify the temporary threshold. Another option is to disable the VGSI or any equipment that would give misleading indications to pilots as to the new threshold location. Installation of temporary visual aids may be necessary to provide adequate guidance to pilots on approach to the affected runway. If the FAA owns and operates the VGSI, coordinate its installation or disabling with the local ATO/Technical Operations Office. Relocation of such visual aids will depend on the duration of the project and the benefits gained from the relocation, as this can result in great expense. See FAA JO 6850.2, *Visual Guidance Lighting Systems*, for installation criteria for FAA owned and operated NAVAIDs.

2.18.3.3.9 Issue a NOTAM to inform pilots of temporary lighting conditions.

2.18.3.4 **Temporarily Closed Taxiways.**

If possible, deactivate the taxiway lighting circuits. When deactivation is not possible (for example other taxiways on the same circuit are to remain open), cover the light fixture in a way as to prevent light leakage.

2.18.4 Signs.

To the extent possible, signs must be in conformance with AC 150/5345-44, *Specification for Runway and Taxiway Signs*, and AC 150/5340-18, *Standard for Airport Sign Systems.*

2.18.4.1 **Existing Signs.**

Runway exit signs are to be covered for closed runway exits. Outbound destination signs are to be covered for closed runways. Any time a sign does not serve its normal function or would provide conflicting information, it must be covered or removed to prevent misdirecting pilots. Note that information signs identifying a crossing taxiway continue to perform their normal function even if the crossing taxiway is closed. For long term construction projects, consider relocating signs, especially runway distance remaining signs.

Exhibit 1

2.18.4.2 **Temporary Signs.**

Orange construction signs comprise a message in black on an orange background. Orange construction signs may help pilots be aware of changed conditions. The airport operator may choose to introduce these signs as part of a movement area construction project to increase situational awareness when needed. Locate signs outside the taxiway safety limits and ahead of construction areas so pilots can take timely action. Use temporary signs judiciously, striking a balance between the need for information and the increase in pilot workload. When there is a concern of pilot "information overload," the applicability of mandatory hold signs must take precedence over orange construction signs recommended during construction. Temporary signs must meet the standards for such signs in Engineering Brief 93, *Guidance for the Assembly and Installation of Temporary Orange Construction Signs*. Many criteria in AC 150/5345-44, *Specification for Runway and Taxiway Signs*, are referenced in the Engineering Brief. Permissible sign legends are:

1. CONSTRUCTION AHEAD,
2. CONSTRUCTION ON RAMP, and
3. RWY XX TAKEOFF RUN AVAILABLE XXX FT.

Phasing, supported by drawings and sign schedule, for the installation of orange construction signs must be included in the CSPP or SPCD.

2.18.4.2.1 Takeoff Run Available (TORA) signs.

Recommended: Where a runway has been shortened for takeoff, install orange TORA signs well before the hold lines, such as on a parallel taxiway prior to a turn to a runway hold position. See EB 93 for sign size and location.

2.18.4.2.2 Sign legends are shown in Figure F-1.

Note: See Figure E-1, Figure E-2, Figure E-3, Figure F-2, and Figure F-3 for examples of orange construction sign locations.

2.19 Marking and Signs for Access Routes.

The CSPP should indicate that pavement markings and signs for construction personnel will conform to AC 150/5340-18 and, to the extent practicable, with the Federal Highway Administration Manual on Uniform Traffic Control Devices (MUTCD) and/or State highway specifications. Signs adjacent to areas used by aircraft must comply with the frangibility requirements of AC 150/5220-23, *Frangible Connections*, which may require modification to size and height guidance in the MUTCD.

Exhibit 1

2.20 Hazard Marking, Lighting and Signing.

2.20.1 Hazard marking, lighting, and signing prevent pilots from entering areas closed to aircraft, and prevent construction personnel from entering areas open to aircraft. The CSPP must specify prominent, comprehensible warning indicators for any area affected by construction that is normally accessible to aircraft, personnel, or vehicles. Hazard marking and lighting must also be specified to identify open manholes, small areas under repair, stockpiled material, waste areas, and areas subject to jet blast. Also consider less obvious construction-related hazards and include markings to identify FAA, airport, and National Weather Service facilities cables and power lines; instrument landing system (ILS) critical areas; airport surfaces, such as RSA, OFA, and OFZ; and other sensitive areas to make it easier for contractor personnel to avoid these areas.

2.20.2 Equipment.

2.20.2.1 **Barricades.**

Low profile barricades, including traffic cones, (weighted or sturdily attached to the surface) are acceptable methods used to identify and define the limits of construction and hazardous areas on airports. Careful consideration must be given to selecting equipment that poses the least danger to aircraft but is sturdy enough to remain in place when subjected to typical winds, prop wash and jet blast. The spacing of barricades must be such that a breach is physically prevented barring a deliberate act. For example, if barricades are intended to exclude aircraft, gaps between barricades must be smaller than the wingspan of the smallest aircraft to be excluded; if barricades are intended to exclude vehicles, gaps between barricades must be smaller than the width of the excluded vehicles, generally 4 feet (1.2 meters). Provision must be made for ARFF access if necessary. If barricades are intended to exclude pedestrians, they must be continuously linked. Continuous linking may be accomplished through the use of ropes, securely attached to prevent FOD.

2.20.2.2 **Lights.**

Lights must be red, either steady burning or flashing, and must meet the luminance requirements of the State Highway Department. Batteries powering lights will last longer if lights flash. Lights must be mounted on barricades and spaced at no more than 10 feet (3 meters). Lights must be operated between sunset and sunrise and during periods of low visibility whenever the airport is open for operations. They may be operated by photocell, but this may require that the contractor turn them on manually during periods of low visibility during daytime hours.

2.20.2.3 **Supplement Barricades with Signs (for example) As Necessary.**

Examples are “No Entry” and “No Vehicles.” Be aware of the increased effects of wind and jet blast on barricades with attached signs.

Exhibit 1

2.20.2.4 **Air Operations Area – General.**

Barricades are not permitted in any active safety area or on the runway side of a runway hold line. Within a runway or taxiway object free area, and on aprons, use orange traffic cones, flashing or steady burning red lights as noted above, highly reflective collapsible barricades marked with diagonal, alternating orange and white stripes; and/or signs to separate all construction/maintenance areas from the movement area. Barricades may be supplemented with alternating orange and white flags at least 20 by 20 inch (50 by 50 cm) square and securely fastened to eliminate FOD. All barricades adjacent to any open runway or taxiway / taxilane safety area, or apron must be as low as possible to the ground, and no more than 18 inches high, exclusive of supplementary lights and flags. Barricades must be of low mass; easily collapsible upon contact with an aircraft or any of its components; and weighted or sturdily attached to the surface to prevent displacement from prop wash, jet blast, wing vortex, and other surface wind currents. If affixed to the surface, they must be frangible at grade level or as low as possible, but not to exceed 3 inch (7.6 cm) above the ground. Figure 2-8 and Figure 2-9 show sample barricades with proper coloring and flags.

Figure 2-8. Interlocking Barricades

Exhibit 1

Figure 2-9. Low Profile Barricades

2.20.2.5 **Air Operations Area – Runway/Taxiway Intersections.**

Use highly reflective barricades with lights to close taxiways leading to closed runways. Evaluate all operating factors when determining how to mark temporary closures that can last from 10 to 15 minutes to a much longer period of time. However, even for closures of relatively short duration, close all taxiway/runway intersections with barricades. The use of traffic cones is appropriate for short duration closures.

2.20.2.6 **Air Operations Area – Other.**

Beyond runway and taxiway object free areas and aprons, barricades intended for construction vehicles and personnel may be many different shapes and made from various materials, including railroad ties, sawhorses, jersey barriers, or barrels.

2.20.2.7 **Maintenance.**

The construction specifications must include a provision requiring the contractor to have a person on call 24 hours a day for emergency maintenance of airport hazard lighting and barricades. The contractor must file the contact person's information with the airport operator. Lighting should be checked for proper operation at least once per day, preferably at dusk.

2.21 Work Zone Lighting for Nighttime Construction.

Lighting equipment must adequately illuminate the work area if the construction is to be performed during nighttime hours. Refer to AC 150/5370-10 for minimum illumination levels for nighttime paving projects. Additionally, it is recommended that all support equipment, except haul trucks, be equipped with artificial illumination to safely

Exhibit 1

illuminate the area immediately surrounding their work areas. The lights should be positioned to provide the most natural color illumination and contrast with a minimum of shadows. The spacing must be determined by trial. Light towers should be positioned and adjusted to aim away from ATCT cabs and active runways to prevent blinding effects. Shielding may be necessary. Light towers should be removed from the construction site when the area is reopened to aircraft operations. Construction lighting units should be identified and generally located on the construction phasing plans in relationship to the ATCT and active runways and taxiways.

2.22 Protection of Runway and Taxiway Safety Areas.

Runway and taxiway safety areas, OFZs, OFAs, and approach surfaces are described in AC 150/5300-13. Protection of these areas includes limitations on the location and height of equipment and stockpiled material. An FAA airspace study may be required. Coordinate with the appropriate FAA Airports Regional or District Office if there is any doubt as to requirements or dimensions (see paragraph 2.13.5) as soon as the location and height of materials or equipment are known. The CSPP should include drawings showing all safety areas, object free areas, obstacle free zones and approach departure surfaces affected by construction.

2.22.1 Runway Safety Area (RSA).

A runway safety area is the defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway (see AC 150/5300-13). Construction activities within the existing RSA are subject to the following conditions:

2.22.1.1 No construction may occur within the existing RSA while the runway is open for aircraft operations. The RSA dimensions may be temporarily adjusted if the runway is restricted to aircraft operations requiring an RSA that is equal to the RSA width and length beyond the runway ends available during construction. (See AC 150/5300-13). The temporary use of declared distances and/or partial runway closures may provide the necessary RSA under certain circumstances. Coordinate with the appropriate FAA Airports Regional or District Office to have declared distances information published, and appropriate NOTAMs issued. See AC 150/5300-13 for guidance on the use of declared distances.

2.22.1.2 The airport operator must coordinate the adjustment of RSA dimensions as permitted above with the appropriate FAA Airports Regional or District Office and the local FAA air traffic manager and issue a NOTAM.

2.22.1.3 The CSPP and SPCD must provide procedures for ensuring adequate distance for protection from blasting operations, if required by operational considerations.

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2.22.1.4 **Excavations.**

2.22.1.4.1 Open trenches or excavations are not permitted within the RSA while the runway is open. Backfill trenches before the runway is opened. If backfilling excavations before the runway must be opened is impracticable, cover the excavations appropriately. Covering for open trenches must be designed to allow the safe operation of the heaviest aircraft operating on the runway across the trench without damage to the aircraft.

2.22.1.4.2 Construction contractors must prominently mark open trenches and excavations at the construction site with red or orange flags, as approved by the airport operator, and light them with red lights during hours of restricted visibility or darkness.

2.22.1.5 **Erosion Control.**

Soil erosion must be controlled to maintain RSA standards, that is, the RSA must be cleared and graded and have no potentially hazardous ruts, humps, depressions, or other surface variations, and capable, under dry conditions, of supporting snow removal equipment, aircraft rescue and fire fighting equipment, and the occasional passage of aircraft without causing structural damage to the aircraft.

2.22.2 Runway Object Free Area (ROFA).

Construction, including excavations, may be permitted in the ROFA. However, equipment must be removed from the ROFA when not in use, and material should not be stockpiled in the ROFA if not necessary. Stockpiling material in the OFA requires submittal of a 7460-1 form and justification provided to the appropriate FAA Airports Regional or District Office for approval.

2.22.3 Taxiway Safety Area (TSA).

2.22.3.1 A taxiway safety area is a defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an airplane unintentionally departing the taxiway. (See AC 150/5300-13.) Since the width of the TSA is equal to the wingspan of the design aircraft, no construction may occur within the TSA while the taxiway is open for aircraft operations. The TSA dimensions may be temporarily adjusted if the taxiway is restricted to aircraft operations requiring a TSA that is equal to the TSA width available during construction. Give special consideration to TSA dimensions at taxiway turns and intersections. (see AC 150/5300-13).

2.22.3.2 The airport operator must coordinate the adjustment of the TSA width as permitted above with the appropriate FAA Airports Regional or District Office and the FAA air traffic manager and issue a NOTAM.

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2.22.3.3 The CSPP and SPCD must provide procedures for ensuring adequate distance for protection from blasting operations.

2.22.3.4 **Excavations.**

1. Curves. Open trenches or excavations are not permitted within the TSA while the taxiway is open. Trenches should be backfilled before the taxiway is opened. If backfilling excavations before the taxiway must be opened is impracticable, cover the excavations appropriately. Covering for open trenches must be designed to allow the safe operation of the heaviest aircraft operating on the taxiway across the trench without damage to the aircraft.
2. Straight Sections. Open trenches or excavations are not permitted within the TSA while the taxiway is open for unrestricted aircraft operations. Trenches should be backfilled before the taxiway is opened. If backfilling excavations before the taxiway must be opened is impracticable, cover the excavations to allow the safe passage of ARFF equipment and of the heaviest aircraft operating on the taxiway across the trench without causing damage to the equipment or aircraft. In rare circumstances where the section of taxiway is indispensable for aircraft movement, open trenches or excavations may be permitted in the TSA while the taxiway is open to aircraft operations, subject to the following restrictions:
   a. Taxiing speed is limited to 10 mph.
   b. Appropriate NOTAMs are issued.
   c. Marking and lighting meeting the provisions of paragraphs 2.18 and 2.20 are implemented.
   d. Low mass, low-profile lighted barricades are installed.
   e. Appropriate temporary orange construction signs are installed.
3. Construction contractors must prominently mark open trenches and excavations at the construction site with red or orange flags, as approved by the airport operator, and light them with red lights during hours of restricted visibility or darkness.

2.22.3.5 **Erosion control.**

Soil erosion must be controlled to maintain TSA standards, that is, the TSA must be cleared and graded and have no potentially hazardous ruts, humps, depressions, or other surface variations, and capable, under dry conditions, of supporting snow removal equipment, aircraft rescue and firefighting equipment, and the occasional passage of aircraft without causing structural damage to the aircraft.

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2.22.4 Taxiway Object Free Area (TOFA).

Unlike the Runway Object Free Area, aircraft wings regularly penetrate the taxiway object free area during normal operations. Thus, the restrictions are more stringent. Except as provided below, no construction may occur within the taxiway object free area while the taxiway is open for aircraft operations.

2.22.4.1 The taxiway object free area dimensions may be temporarily adjusted if the taxiway is restricted to aircraft operations requiring a taxiway object free area that is equal to the taxiway object free area width available. Give special consideration to TOFA dimensions at taxiway turns and intersections.

2.22.4.2 Offset taxiway centerline and edge pavement markings (do not use glass beads) may be used as a temporary measure to provide the required taxiway object free area. Where offset taxiway pavement markings are provided, centerline lighting, centerline reflectors, or taxiway edge reflectors are required. Existing lighting that does not coincide with the temporary markings must be taken out of service.

2.22.4.3 Construction activity, including open excavations, may be accomplished without adjusting the width of the taxiway object free area, subject to the following restrictions:

2.22.4.3.1 Taxiing speed is limited to 10 mph.

2.22.4.3.2 NOTAMs issued advising taxiing pilots of hazard and recommending reduced taxiing speeds on the taxiway.

2.22.4.3.3 Marking and lighting meeting the provisions of paragraphs 2.18 and 2.20 are implemented.

2.22.4.3.4 If desired, appropriate orange construction signs are installed. See paragraph 2.18.4.2 and Appendix F.

2.22.4.3.5 Five-foot clearance is maintained between equipment and materials and any part of an aircraft (includes wingtip overhang). If such clearance can only be maintained if an aircraft does not have full use of the entire taxiway width (with its main landing gear at the edge of the usable pavement), then it will be necessary to move personnel and equipment for the passage of that aircraft.

2.22.4.3.6 Flaggers furnished by the contractor must be used to direct and control construction equipment and personnel to a pre-established setback distance for safe passage of aircraft, and airline and/or airport personnel. Flaggers must also be used to direct taxiing aircraft. Due to liability issues, the airport operator should require airlines to provide flaggers for directing taxiing aircraft.

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2.22.5 Obstacle Free Zone (OFZ).

In general, personnel, material, and/or equipment may not penetrate the OFZ while the runway is open for aircraft operations. If a penetration to the OFZ is necessary, it may be possible to continue aircraft operations through operational restrictions. Coordinate with the FAA through the appropriate FAA Airports Regional or District Office.

2.22.6 Runway Approach/Departure Areas and Clearways.

All personnel, materials, and/or equipment must remain clear of the applicable threshold siting surfaces, as defined in AC 150/5300-13. Objects that do not penetrate these surfaces may still be obstructions to air navigation and may affect standard instrument approach procedures. Coordinate with the FAA through the appropriate FAA Airports Regional or District Office.

2.22.6.1 Construction activity in a runway approach/departure area may result in the need to partially close a runway or displace the existing runway threshold. Partial runway closure, displacement of the runway threshold, as well as closure of the complete runway and other portions of the movement area also require coordination through the airport operator with the appropriate FAA air traffic manager (FSS if non-towered) and ATO/Technical Operations (for affected NAVAIDS) and airport users.

2.22.6.2 **Caution About Partial Runway Closures.**

When filing a NOTAM for a partial runway closure, clearly state that the portion of pavement located prior to the threshold is not available for landing and departing traffic. In this case, the threshold has been moved for both landing and takeoff purposes (this is different than a displaced threshold). There may be situations where the portion of closed runway is available for taxiing only. If so, the NOTAM must reflect this condition).

2.22.6.3 **Caution About Displaced Thresholds.**

Implementation of a displaced threshold affects runway length available for aircraft landing over the displacement. Depending on the reason for the displacement (to provide obstruction clearance or RSA), such a displacement may also require an adjustment in the landing distance available and accelerate-stop distance available in the opposite direction. If project scope includes personnel, equipment, excavation, or other work within the existing RSA of any usable runway end, do not implement a displaced threshold unless arrivals and departures toward the construction activity are prohibited. Instead, implement a partial closure.

2.23 Other Limitations on Construction.

The CSPP must specify any other limitations on construction, including but not limited to:

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2.23.1 Prohibitions.

2.23.1.1 No use of tall equipment (cranes, concrete pumps, and so on) unless a 7460-1 determination letter is issued for such equipment.

2.23.1.2 No use of open flame welding or torches unless fire safety precautions are provided and the airport operator has approved their use.

2.23.1.3 No use of electrical blasting caps on or within 1,000 feet (300 meters) of the airport property. See AC 150/5370-10.

2.23.2 Restrictions.

2.23.2.1 Construction suspension required during specific airport operations.

2.23.2.2 Areas that cannot be worked on simultaneously.

2.23.2.3 Day or night construction restrictions.

2.23.2.4 Seasonal construction restrictions.

2.23.2.5 Temporary signs not approved by the airport operator.

2.23.2.6 Grades changes that could result in unplanned effects on NAVAIDs.

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CHAPTER 3. GUIDELINES FOR WRITING A CSPP

3.1 General Requirements.

The CSPP is a standalone document written to correspond with the subjects outlined in paragraph 2.4. The CSPP is organized by numbered sections corresponding to each subject listed in paragraph 2.4, and described in detail in paragraphs 2.5 - 2.23. Each section number and title in the CSPP matches the corresponding subject outlined in paragraph 2.4 (for example, 1. Coordination, 2. Phasing, 3. Areas and Operations Affected by the Construction Activity, and so on). With the exception of the project scope of work outlined in Section 2. Phasing, only subjects specific to operational safety during construction should be addressed.

3.2 Applicability of Subjects.

Each section should, to the extent practical, focus on the specific subject. Where an overlapping requirement spans several sections, the requirement should be explained in detail in the most applicable section. A reference to that section should be included in all other sections where the requirement may apply. For example, the requirement to protect existing underground FAA ILS cables during trenching operations could be considered FAA ATO coordination (Coordination, paragraph 2.5.3), an area and operation affected by the construction activity (Areas and Operations Affected by the Construction Activity, paragraph 2.7.1.4), a protection of a NAVAID (Protection of Navigational Aids (NAVAIDs), paragraph 2.8), or a notification to the FAA of construction activities (Notification of Construction Activities, paragraph 2.13.5.3.2). However, it is more specifically an underground utility requirement (Underground Utilities, paragraph 2.15). The procedure for protecting underground ILS cables during trenching operations should therefore be described in 2.4.2.11: “The contractor must coordinate with the local FAA System Support Center (SSC) to mark existing ILS cable routes along Runway 17-35. The ILS cables will be located by hand digging whenever the trenching operation moves within 10 feet of the cable markings.” All other applicable sections should include a reference to 2.4.2.11: “ILS cables shall be identified and protected as described in 2.4.2.11” or “See 2.4.2.11 for ILS cable identification and protection requirements.” Thus, the CSPP should be considered as a whole, with no need to duplicate responses to related issues.

3.3 Graphical Representations.

Construction safety drawings should be included in the CSPP as attachments. When other graphical representations will aid in supporting written statements, the drawings, diagrams, and/or photographs should also be attached to the CSPP. References should be made in the CSPP to each graphical attachment and may be made in multiple sections.

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3.4 **Reference Documents.**

The CSPP must not incorporate a document by reference unless reproduction of the material in that document is prohibited. In that case, either copies of or a source for the referenced document must be provided to the contractor. Where this AC recommends references (e.g. as in paragraph 3.9) the intent is to include a reference to the corresponding section in the CSPP, not to this Advisory Circular.

3.5 **Restrictions.**

The CSPP should not be considered as a project design review document. The CSPP should also avoid mention of permanent ("as-built") features such as pavements, markings, signs, and lighting, except when such features are intended to aid in maintaining operational safety during the construction.

3.6 **Coordination.**

Include in this section a detailed description of conferences and meetings to be held both before and during the project. Include appropriate information from AC 150/5370-12. Discuss coordination procedures and schedules for each required FAA ATO Technical Operations shutdown and restart and all required flight inspections.

3.7 **Phasing.**

Include in this section a detailed scope of work description for the project as a whole and each phase of work covered by the CSPP. This includes all locations and durations of the work proposed. Attach drawings to graphically support the written scope of work. Detail in this section the sequenced phases of the proposed construction. Include a reference to paragraph 3.8, as appropriate.

3.8 **Areas and Operations Affected by Construction.**

Focus in this section on identifying the areas and operations affected by the construction. Describe corresponding mitigation that is not covered in detail elsewhere in the CSPP. Include references to paragraphs below as appropriate. Attach drawings as necessary to graphically describe affected areas and mechanisms proposed. See Appendix F for sample operational effects tables and figures.

3.9 **NAVAID Protection.**

List in this section all NAVAID facilities that will be affected by the construction. Identify NAVAID facilities that will be placed out of service at any time prior to or during construction activities. Identify individuals responsible for coordinating each shutdown and when each facility will be out of service. Include a reference to paragraph 3.6 for FAA ATO NAVAID shutdown, restart, and flight inspection coordination. Outline in detail procedures to protect each NAVAID facility remaining in service from interference by construction activities. Include a reference to paragraph 3.14 for the

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issuance of NOTAMs as required. Include a reference to paragraph 3.16 for the protection of underground cables and piping serving NAVAIDs. If temporary visual aids are proposed to replace or supplement existing facilities, include a reference to paragraph 3.19. Attach drawings to graphically indicate the affected NAVAIDS and the corresponding critical areas.

3.10 **Contractor Access.**

This will necessarily be the most extensive section of the CSPP. Provide sufficient detail so that a contractor not experienced in working on airports will understand the unique restrictions such work will require. Due to this extent, it should be broken down into subsections as described below:

3.10.1 Location of Stockpiled Construction Materials.

Describe in this section specific locations for stockpiling material. Note any height restrictions on stockpiles. Include a reference to paragraph 3.21 for hazard marking and lighting devices used to identify stockpiles. Include a reference to paragraph 3.11 for provisions to prevent stockpile material from becoming wildlife attractants. Include a reference to paragraph 3.12 for provisions to prevent stockpile material from becoming FOD. Attach drawings to graphically indicate the stockpile locations.

3.10.2 Vehicle and Pedestrian Operations.

While there are many items to be addressed in this major subsection of the CSPP, all are concerned with one main issue: keeping people and vehicles from areas of the airport where they don't belong. This includes preventing unauthorized entry to the AOA and preventing the improper movement of pedestrians or vehicles on the airport. In this section, focus on mechanisms to prevent construction vehicles and workers traveling to and from the worksite from unauthorized entry into movement areas. Specify locations of parking for both employee vehicles and construction equipment, and routes for access and haul roads. In most cases, this will best be accomplished by attaching a drawing. Quote from AC 150/5210-5 specific requirements for contractor vehicles rather than referring to the AC as a whole, and include special requirements for identifying HAZMAT vehicles. Quote from, rather than incorporate by reference, AC 150/5210-20 as appropriate to address the airport's rules for ground vehicle operations, including its training program. Discuss the airport's recordkeeping system listing authorized vehicle operators.

3.10.3 Two-Way Radio Communications.

Include a special section to identify all individuals who are required to maintain communications with Air Traffic (AT) at airports with active towers, or monitor CTAF at airports without or with closed ATCT. Include training requirements for all individuals required to communicate with AT. Individuals required to monitor AT frequencies should also be identified. If construction employees are also required to communicate by radio with Airport Operations, this procedure should be described in detail. Usage of vehicle mounted radios and/or portable radios should be addressed. Communication procedures for the event of disabled radio communication (that is, light

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signals, telephone numbers, others) must be included. All radio frequencies should by identified (Tower, Ground Control, CTAF, UNICOM, ATIS, and so on).

3.10.4 Airport Security.

Address security as it applies to vehicle and pedestrian operations. Discuss TSA requirements, security badging requirements, perimeter fence integrity, gate security, and other needs. Attach drawings to graphically indicate secured and/or Security Identification Display Areas (SIDA), perimeter fencing, and available access points.

3.11 Wildlife Management.

Discuss in this section wildlife management procedures. Describe the maintenance of existing wildlife mitigation devices, such as perimeter fences, and procedures to limit wildlife attractants. Include procedures to notify Airport Operations of wildlife encounters. Include a reference to paragraph 3.10 for security (wildlife) fence integrity maintenance as required.

3.12 FOD Management.

In this section, discuss methods to control and monitor FOD: worksite housekeeping, ground vehicle tire inspections, runway sweeps, and so on. Include a reference to paragraph 3.15 for inspection requirements as required.

3.13 HAZMAT Management.

Describe in this section HAZMAT management procedures: fuel deliveries, spill recovery procedures, Safety Data Sheet (SDS), Material Safety Data Sheet (MSDS) or Product Safety Data Sheet (PSDS) availability, and other considerations. Any specific airport HAZMAT restrictions should also be identified. Include a reference to paragraph 3.10 for HAZMAT vehicle identification requirements. Quote from, rather than incorporate by reference, AC 150/5320-15.

3.14 Notification of Construction Activities.

List in this section the names and telephone numbers of points of contact for all parties affected by the construction project. We recommend a single list that includes all telephone numbers required under this section. Include emergency notification procedures for all representatives of all parties potentially impacted by the construction. Identify individual representatives – and at least one alternate – for each party. List both on-duty and off-duty contact information for each individual, including individuals responsible for emergency maintenance of airport construction hazard lighting and barricades. Describe procedures to coordinate immediate response to events that might adversely affect the operational safety of the airport (such as interrupted NAVAID service). Explain requirements for and the procedures for the issuance of Notices to Airmen (NOTAMs), notification to FAA required by 14 CFR Part 77 and Part 157 and in the event of affected NAVAIDs. For NOTAMs, identify an individual, and at least one alternate, responsible for issuing and cancelling each specific type of Notice to

Airmen (NOTAM) required. Detail notification methods for police, fire fighting, and medical emergencies. This may include 911, but should also include direct phone numbers of local police departments and nearby hospitals. Identify the E911 address of the airport and the emergency access route via haul roads to the construction site. Require the contractor to have this information available to all workers. The local Poison Control number should be listed. Procedures regarding notification of Airport Operations and/or the ARFF Department of such emergencies should be identified, as applicable. If airport radio communications are identified as a means of emergency notification, include a reference to paragraph 3.10. Differentiate between emergency and nonemergency notification of ARFF personnel, the latter including activities that affect ARFF water supplies and access roads. Identify the primary ARFF contact person and at least one alternate. If notification is to be made through Airport Operations, then detail this procedure. Include a method of confirmation from the ARFF department.

3.15 Inspection Requirements.

Describe in this section inspection requirements to ensure airfield safety compliance. Include a requirement for routine inspections by the resident engineer (RE) or other airport operator's representative and the construction contractors. If the engineering consultants and/or contractors have a Safety Officer who will conduct such inspections, identify this individual. Describe procedures for special inspections, such as those required to reopen areas for aircraft operations. Part 139 requires daily airfield inspections at certificated airports, but these may need to be more frequent when construction is in progress. Discuss the role of such inspections on areas under construction. Include a requirement to immediately remedy any deficiencies, whether caused by negligence, oversight, or project scope change.

3.16 Underground Utilities.

Explain how existing underground utilities will be located and protected. Identify each utility owner and include contact information for each company/agency in the master list. Address emergency response procedures for damaged or disrupted utilities. Include a reference to paragraph 3.14 for notification of utility owners of accidental utility disruption as required.

3.17 Penalties.

Describe in this section specific penalties imposed for noncompliance with airport rules and regulations, including the CSPP: SIDA violations, VPD, and others.

3.18 Special Conditions.

Identify any special conditions that may trigger specific safety mitigation actions outlined in this CSPP: low visibility operations, snow removal, aircraft in distress, aircraft accident, security breach, VPD, and other activities requiring construction suspension/resumption. Include a reference to paragraph 3.10 for compliance with airport safety and security measures and for radio communications as required. Include

a reference to paragraph 3.14 for emergency notification of all involved parties, including police/security, ARFF, and medical services.

3.19 **Runway and Taxiway Visual Aids.**

Include marking, lighting, signs, and visual NAVAIDS. Detail temporary runway and taxiway marking, lighting, signs, and visual NAVAIDs required for the construction. Discuss existing marking, lighting, signs, and visual NAVAIDs that are temporarily, altered, obliterated, or shut down. Consider non-federal facilities and address requirements for reimbursable agreements necessary for alteration of FAA facilities and for necessary flight checks. Identify temporary TORA signs or runway distance remaining signs if appropriate. Identify required temporary visual NAVAIDs such as REIL or PAPI. Quote from, rather than incorporate by reference, AC 150/5340-1, *Standards for Airport Markings;* AC 150/5340-18, *Standards for Airport Sign Systems;* and AC 150/5340-30, as required. Attach drawings to graphically indicate proposed marking, lighting, signs, and visual NAVAIDs.

3.20 **Marking and Signs for Access Routes.**

Detail plans for marking and signs for vehicle access routes. To the extent possible, signs should be in conformance with the Federal Highway Administration MUTCD and/or State highway specifications, not hand lettered. Detail any modifications to the guidance in the MUTCD necessary to meet frangibility/height requirements.

3.21 **Hazard Marking and Lighting.**

Specify all marking and lighting equipment, including when and where each type of device is to be used. Specify maximum gaps between barricades and the maximum spacing of hazard lighting. Identify one individual and at least one alternate responsible for maintenance of hazard marking and lighting equipment in the master telephone list. Include a reference to paragraph 3.14. Attach drawings to graphically indicate the placement of hazard marking and lighting equipment.

3.22 **Work Zone Lighting for Nighttime Construction.**

If work is to be conducted at night, specify all lighting equipment, including when and where each type of device is to be used. Indicate the direction lights are to be aimed and any directions that aiming of lights is prohibited. Specify any shielding necessary in instances where aiming is not sufficient to prevent interference with air traffic control and aircraft operations. Attach drawings to graphically indicate the placement and aiming of lighting equipment. Where the plan only indicates directions that aiming of lights is prohibited, the placement and positioning of portable lights must be proposed by the Contractor and approved by the airport operator's representative each time lights are relocated or repositioned.

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3.23 **Protection of Runway and Taxiway Safety Areas.**

This section should focus exclusively on procedures for protecting all safety areas, including those altered by the construction: methods of demarcation, limit of access, movement within safety areas, stockpiling and trenching restrictions, and so on. Reference AC 150/5300-13, as required. Include a reference to paragraph 3.10 for procedures regarding vehicle and personnel movement within safety areas. Include a reference to paragraph 3.10 for material stockpile restrictions as required. Detail requirements for trenching, excavations, and backfill. Include a reference to paragraph 3.21 for hazard marking and lighting devices used to identify open excavations as required. If runway and taxiway closures are proposed to protect safety areas, or if temporary displaced thresholds and/or revised declared distances are used to provide the required Runway Safety Area, include a reference to paragraphs 3.14 and 3.19. Detail procedures for protecting the runway OFZ, runway OFA, taxiway OFA and runway approach surfaces including those altered by the construction: methods of demarcation, limit of cranes, storage of equipment, and so on. Quote from, rather than incorporate by reference, AC 150/5300-13, as required. Include a reference to paragraph 3.24 for height (i.e., crane) restrictions as required. One way to address the height of equipment that will move during the project is to establish a three-dimensional “box” within which equipment will be confined that can be studied as a single object. Attach drawings to graphically indicate the safety area, OFZ, and OFA boundaries.

3.24 **Other Limitations on Construction.**

This section should describe what limitations must be applied to each area of work and when each limitation will be applied: limitations due to airport operations, height (i.e., crane) restrictions, areas which cannot be worked at simultaneously, day/night work restrictions, winter construction, and other limitations. Include a reference to paragraph 3.7 for project phasing requirements based on construction limitations as required.

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APPENDIX A. RELATED READING MATERIAL

Obtain the latest version of the following free publications from the FAA on its Web site at http://www.faa.gov/airports/.

Table A-1. FAA Publications

Number	Title and Description
AC 150/5200-28	*Notices to Airmen (NOTAMs) for Airport Operators* Guidance for using the NOTAM System in airport reporting.
AC 150/5200-30	*Airport Field Condition Assessments and Winter Operations Safety* Guidance for airport owners/operators on the development of an acceptable airport snow and ice control program and on appropriate field condition reporting procedures.
AC 150/5200-33	*Hazardous Wildlife Attractants On or Near Airports* Guidance on locating certain land uses that might attract hazardous wildlife to public-use airports.
AC 150/5210-5	*Painting, Marking, and Lighting of Vehicles Used on an Airport* Guidance, specifications, and standards for painting, marking, and lighting vehicles operating in the airport air operations areas.
AC 150/5210-20	*Ground Vehicle Operations to include Taxiing or Towing an Aircraft on Airports* Guidance to airport operators on developing ground vehicle operation training programs.
AC 150/5300-13	*Airport Design* FAA standards and recommendations for airport design. Establishes approach visibility minimums as an airport design parameter, and contains the Object Free area and the obstacle free-zone criteria.
AC 150/5210-24	*Airport Foreign Object Debris (FOD) Management* Guidance for developing and managing an airport foreign object debris (FOD) program

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Number	Title and Description
AC 150/5320-15	*Management of Airport Industrial Waste* Basic information on the characteristics, management, and regulations of industrial wastes generated at airports. Guidance for developing a Storm Water Pollution Prevention Plan (SWPPP) that applies best management practices to eliminate, prevent, or reduce pollutants in storm water runoff with particular airport industrial activities.
AC 150/5340-1	*Standards for Airport Markings* FAA standards for the siting and installation of signs on airport runways and taxiways.
AC 150/5340-18	*Standards for Airport Sign Systems* FAA standards for the siting and installation of signs on airport runways and taxiways.
AC 150/5345-28	*Precision Approach Path Indicator (PAPI) Systems* FAA standards for PAPI systems, which provide pilots with visual glide slope guidance during approach for landing.
AC 150/5340-30	*Design and Installation Details for Airport Visual Aids* Guidance and recommendations on the installation of airport visual aids.
AC 150/5345-39	*Specification for L-853, Runway and Taxiway Retroreflective Markers*
AC 150/5345-44	*Specification for Runway and Taxiway Signs* FAA specifications for unlighted and lighted signs for taxiways and runways.
AC 150/5345-53	*Airport Lighting Equipment Certification Program* Details on the Airport Lighting Equipment Certification Program (ALECP).
AC 150/5345-50	*Specification for Portable Runway and Taxiway Lights* FAA standards for portable runway and taxiway lights and runway end identifier lights for temporary use to permit continued aircraft operations while all or part of a runway lighting system is inoperative.
AC 150/5345-55	*Specification for L-893, Lighted Visual Aid to Indicate Temporary Runway Closure*

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Number	Title and Description
AC 150/5370-10	*Standards for Specifying Construction of Airports* Standards for construction of airports, including earthwork, drainage, paving, turfing, lighting, and incidental construction.
AC 150/5370-12	*Quality Management for Federally Funded Airport Construction Projects*
EB 93	*Guidance for the Assembly and Installation of Temporary Orange Construction Signs*
FAA Order 5200.11	FAA Airports (ARP) Safety Management System (SMS) Basics for implementing SMS within ARP. Includes roles and responsibilities of ARP management and staff as well as other FAA lines of business that contribute to the ARP SMS.
FAA Certalert 98-05	*Grasses Attractive to Hazardous Wildlife* Guidance on grass management and seed selection.
FAA Form 7460-1	Notice of Proposed Construction or Alteration
FAA Form 7480-1	Notice of Landing Area Proposal
FAA Form 6000.26	National NAS Strategic Interruption Service Level Agreement, Strategic Events Coordination, Airport Sponsor Form

Obtain the latest version of the following free publications from the Electronic Code of Federal Regulations at http://www.ecfr.gov/.

Table A-2. Code of Federal Regulation

Number	Title
Title 14 CFR Part 77	Safe, Efficient Use and Preservation of the Navigable Airspace
Title 14 CFR Part 139	Certification of Airports
Title 49 CFR Part 1542	Airport Security

Obtain the latest version of the Manual on Uniform Traffic Control Devices from the Federal Highway Administration at http://mutcd.fhwa.dot.gov/.

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APPENDIX B. TERMS AND ACRONYMS

Table B-1. Terms and Acronyms

Term	Definition
Form 7460-1	Notice of Proposed Construction or Alteration. For on-airport projects, the form submitted to the FAA regional or airports division office as formal written notification of any kind of construction or alteration of objects that affect navigable airspace, as defined in 14 CFR Part 77, *Safe, Efficient Use, and Preservation of the Navigable Airspace*. (See guidance available on the FAA web site at https://oeaaa.faa.gov.) The form may be downloaded at http://www.faa.gov/airports/resources/forms/, or filed electronically at: https://oeaaa.faa.gov.
Form 7480-1	Notice of Landing Area Proposal. Form submitted to the FAA Airports Regional Division Office or Airports District Office as formal written notification whenever a project without an airport layout plan on file with the FAA involves the construction of a new airport; the construction, realigning, altering, activating, or abandoning of a runway, landing strip, or associated taxiway; or the deactivation or abandoning of an entire airport The form may be downloaded at http://www.faa.gov/airports/resources/forms/.
Form 6000-26	Airport Sponsor Strategic Event Submission Form
AC	Advisory Circular
ACSI	Airport Certification Safety Inspector
ADG	Airplane Design Group
AIP	Airport Improvement Program
ALECP	Airport Lighting Equipment Certification Program
ANG	Air National Guard
AOA	Air Operations Area, as defined in 14 CFR Part 107. Means a portion of an airport, specified in the airport security program, in which security measures are carried out. This area includes aircraft movement areas, aircraft parking areas, loading ramps, and safety areas, and any adjacent areas (such as general aviation areas) that are not separated by adequate security systems, measures, or procedures. This area does not include the secured area of the airport terminal building.
ARFF	Aircraft Rescue and Fire Fighting
ARP	FAA Office of Airports
ASDA	Accelerate-Stop Distance Available
AT	Air Traffic
ATCT	Airport Traffic Control Tower
ATIS	Automatic Terminal Information Service
ATO	Air Traffic Organization
Certificated Airport	An airport that has been issued an Airport Operating Certificate by the FAA under

Exhibit 1

Term	Definition
	the authority of 14 CFR Part 139, *Certification of Airports*.
CFR	Code of Federal Regulations
Construction	The presence of construction-related personnel, equipment, and materials in any location that could infringe upon the movement of aircraft.
CSPP	Construction Safety and Phasing Plan. The overall plan for safety and phasing of a construction project developed by the airport operator, or developed by the airport operator's consultant and approved by the airport operator. It is included in the invitation for bids and becomes part of the project specifications.
CTAF	Common Traffic Advisory Frequency
Displaced Threshold	A threshold that is located at a point on the runway other than the designated beginning of the runway. The portion of pavement behind a displaced threshold is available for takeoffs in either direction or landing from the opposite direction.
DOT	Department of Transportation
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FOD	Foreign Object Debris/Damage
FSS	Flight Service Station
GA	General Aviation
HAZMAT	Hazardous Materials
HMA	Hot Mix Asphalt
IAP	Instrument Approach Procedures
IFR	Instrument Flight Rules
ILS	Instrument Landing System
LDA	Landing Distance Available
LOC	Localizer antenna array
Movement Area	The runways, taxiways, and other areas of an airport that are used for taxiing or hover taxiing, air taxiing, takeoff, and landing of aircraft, exclusive of loading aprons and aircraft parking areas (reference 14 CFR Part 139).
MSDS	Material Safety Data Sheet
MUTCD	Manual on Uniform Traffic Control Devices
NAVAID	Navigation Aid
NAVAID Critical Area	An area of defined shape and size associated with a NAVAID that must remain clear and graded to avoid interference with the electronic signal.
Non-Movement Area	The area inside the airport security fence exclusive of the Movement Area. It is important to note that the non-movement area includes pavement traversed by aircraft.

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Term	Definition
NOTAM	Notices to Airmen
Obstruction	Any object/obstacle exceeding the obstruction standards specified by 14 CFR Part 77, subpart C.
OCC	Operations Control Center
OE / AAA	Obstruction Evaluation / Airport Airspace Analysis
OFA	Object Free Area. An area on the ground centered on the runway, taxiway, or taxi lane centerline provided to enhance safety of aircraft operations by having the area free of objects except for those objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes. (See AC 150/5300-13 for additional guidance on OFA standards and wingtip clearance criteria.)
OFZ	Obstacle Free Zone. The airspace below 150 ft (45 m) above the established airport elevation and along the runway and extended runway centerline that is required to be clear of all objects, except for frangible visual NAVAIDs that need to be located in the OFZ because of their function, in order to provide clearance protection for aircraft landing or taking off from the runway and for missed approaches. The OFZ is subdivided as follows: Runway OFZ, Inner Approach OFZ, Inner Transitional OFZ, and Precision OFZ. Refer to AC 150/5300-13 for guidance on OFZ.
OSHA	Occupational Safety and Health Administration
OTS	Out of Service
P&R	Planning and Requirements Group
NPI	NAS Planning & Integration
PAPI	Precision Approach Path Indicator
PFC	Passenger Facility Charge
PLASI	Pulse Light Approach Slope Indicator
Project Proposal Summary	A clear and concise description of the proposed project or change that is the object of Safety Risk Management.
RA	Reimbursable Agreement
RE	Resident Engineer
REIL	Runway End Identifier Lights
RNAV	Area Navigation
ROFA	Runway Object Free Area
RSA	Runway Safety Area. A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway, in accordance with AC 150/5300-13.
SDS	Safety Data Sheet
SIDA	Security Identification Display Area
SMS	Safety Management System

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Term	Definition
SPCD	Safety Plan Compliance Document. Details developed and submitted by a contractor to the airport operator for approval providing details on how the performance of a construction project will comply with the CSPP.
SRM	Safety Risk Management
SSC	System Support Center
Taxiway Safety Area	A defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an airplane unintentionally departing the taxiway, in accordance with AC 150/5300-13.
TDG	Taxiway Design Group
Temporary	Any condition that is not intended to be permanent.
Temporary Runway End	The beginning of that portion of the runway available for landing and taking off in one direction, and for landing in the other direction. Note the difference from a displaced threshold.
Threshold	The beginning of that portion of the runway available for landing. In some instances, the landing threshold may be displaced.
TODA	Takeoff Distance Available
TOFA	Taxiway Object Free Area
TORA	Takeoff Run Available. The length of the runway less any length of runway unavailable and/or unsuitable for takeoff run computations. See AC 150/5300-13 for guidance on declared distances.
TSA	Taxiway Safety Area, or Transportation Security Administration
UNICOM	A radio communications system of a type used at small airports.
VASI	Visual Approach Slope Indicator
VGSI	Visual Glide Slope Indicator. A device that provides a visual glide slope indicator to landing pilots. These systems include precision approach path indicator (PAPI), visual approach slope indicator (VASI), and pulse light approach slope indicator (PLASI).
VFR	Visual Flight Rules
VOR	Very High Frequency Omnidirectional Radio Range
VPD	Vehicle / Pedestrian Deviation

Exhibit 1

APPENDIX C. SAFETY AND PHASING PLAN CHECKLIST

This appendix is keyed to Chapter 2. In the electronic version of this AC, clicking on the paragraph designation in the Reference column will access the applicable paragraph. There may be instances where the CSPP requires provisions that are not covered by the list in this appendix.

This checklist is intended as an aid, not a required submittal.

Table C-1. CSPP Checklist

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
General Considerations					
Requirements for predesign, prebid, and preconstruction conferences to introduce the subject of airport operational safety during construction are specified.	2.5				
Operational safety is a standing agenda item for construction progress meetings.	2.5				
Scheduling of the construction phases is properly addressed.	2.6				
Any formal agreements are established.	2.5.3				
Areas and Operations Affected by Construction Activity					
Drawings showing affected areas are included.	2.7.1				
Closed or partially closed runways, taxiways, and aprons are depicted on drawings.	2.7.1.1				
Access routes used by ARFF vehicles affected by the project are addressed.	2.7.1.2				
Access routes used by airport and airline support vehicles affected by the project are addressed.	2.7.1.3				
Underground utilities, including water supplies for firefighting and drainage.	2.7.1.4				

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Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
Approach/departure surfaces affected by heights of temporary objects are addressed.	2.7.1.5				
Construction areas, storage areas, and access routes near runways, taxiways, aprons, or helipads are properly depicted on drawings.	2.7.1				
Temporary changes to taxi operations are addressed.	2.7.2.1				
Detours for ARFF and other airport vehicles are identified.	2.7.2.2				
Maintenance of essential utilities and underground infrastructure is addressed.	2.7.2.3				
Temporary changes to air traffic control procedures are addressed.	2.7.2.4				
NAVAIDs					
Critical areas for NAVAIDs are depicted on drawings.	2.8				
Effects of construction activity on the performance of NAVAIDS, including unanticipated power outages, are addressed.	2.8				
Protection of NAVAID facilities is addressed.	2.8				
The required distance and direction from each NAVAID to any construction activity is depicted on drawings.	2.8				
Procedures for coordination with FAA ATO/Technical Operations, including identification of points of contact, are included.	2.8, 2.13.1, 2.13.5.3.1, 2.18.1				
Contractor Access					
The CSPP addresses areas to which contractor will have access and how	2.9				

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Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
the areas will be accessed.					
The application of 49 CFR Part 1542 Airport Security, where appropriate, is addressed.	2.9				
The location of stockpiled construction materials is depicted on drawings.	2.9.1				
The requirement for stockpiles in the ROFA to be approved by FAA is included.	2.9.1				
Requirements for proper stockpiling of materials are included.	2.9.1				
Construction site parking is addressed.	2.9.2.1				
Construction equipment parking is addressed.	2.9.2.2				
Access and haul roads are addressed.	2.9.2.3				
A requirement for marking and lighting of vehicles to comply with AC 150/5210-5, *Painting, Marking and Lighting of Vehicles Used on an Airport*, is included.	2.9.2.4				
Proper vehicle operations, including requirements for escorts, are described.	2.9.2.5, 2.9.2.6				
Training requirements for vehicle drivers are addressed.	2.9.2.7				
Two-way radio communications procedures are described.	2.9.2.9				
Maintenance of the secured area of the airport is addressed.	2.9.2.10				
Wildlife Management					
The airport operator's wildlife management procedures are addressed.	2.10				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
Foreign Object Debris Management					
The airport operator's FOD management procedures are addressed.	2.11				
Hazardous Materials Management					
The airport operator's hazardous materials management procedures are addressed.	2.12				
Notification of Construction Activities					
Procedures for the immediate notification of airport user and local FAA of any conditions adversely affecting the operational safety of the airport are detailed.	2.13				
Maintenance of a list by the airport operator of the responsible representatives/points of contact for all involved parties and procedures for contacting them 24 hours a day, seven days a week is specified.	2.13.1				
A list of local ATO/Technical Operations personnel is included.	2.13.1				
A list of ATCT managers on duty is included.	2.13.1				
A list of authorized representatives to the OCC is included.	2.13.2				
Procedures for coordinating, issuing, maintaining and cancelling by the airport operator of NOTAMS about airport conditions resulting from construction are included.	2.8, 2.13.2, 2.18.3.3.9				
Provision of information on closed or hazardous conditions on airport movement areas by the airport operator to the OCC is specified.	2.13.2				
Emergency notification procedures for medical, fire fighting, and police	2.13.3				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
response are addressed.					
Coordination with ARFF personnel for non-emergency issues is addressed.	2.13.4				
Notification to the FAA under 14 CFR parts 77 and 157 is addressed.	2.13.5				
Reimbursable agreements for flight checks and/or design and construction for FAA owned NAVAIDs are addressed.	2.13.5.3.2				
Inspection Requirements					
Daily and interim inspections by both the airport operator and contractor are specified.	2.14.1, 2.14.2				
Final inspections at certificated airports are specified when required.	2.14.3				
Underground Utilities					
Procedures for protecting existing underground facilities in excavation areas are described.	2.15				
Penalties					
Penalty provisions for noncompliance with airport rules and regulations and the safety plans are detailed.	2.16				
Special Conditions					
Any special conditions that affect the operation of the airport or require the activation of any special procedures are addressed.	2.17				
Runway and Taxiway Visual Aids - Marking, Lighting, Signs, and Visual NAVAIDs					
The proper securing of temporary airport markings, lighting, signs, and visual NAVAIDs is addressed.	2.18.1				
Frangibility of airport markings, lighting, signs, and visual NAVAIDs is specified.	2.18.1, 2.18.3, 2.18.4.2, 2.20.2.4				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
The requirement for markings to be in compliance with AC 150/5340-1, *Standards for Airport Markings*, is specified.	2.18.2				
Detailed specifications for materials and methods for temporary markings are provided.	2.18.2				
The requirement for lighting to conform to AC 150/5340-30, *Design and Installation Details for Airport Visual Aids;* AC 150/5345-50, *Specification for Portable Runway and Taxiway Lights;* and AC 150/5345-53, *Airport Lighting Certification Program*, is specified.	2.18.3				
The use of a lighted X is specified where appropriate.	2.18.2.1.2, 2.18.3.2				
The requirement for signs to conform to AC 150/5345-44, *Specification for Runway and Taxiway Signs;* AC 50/5340-18, *Standards for Airport Sign Systems;* and AC 150/5345-53, *Airport Lighting Certification Program*, is specified.	2.18.4				
Marking and Signs For Access Routes					
The CSPP specifies that pavement markings and signs intended for construction personnel should conform to AC 150/5340-18 and, to the extent practicable, with the MUTCD and/or State highway specifications.	2.18.4.2				
Hazard Marking and Lighting					
Prominent, comprehensible warning indicators for any area affected by construction that is normally accessible to aircraft, personnel, or vehicles are specified.	2.20.1				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
Hazard marking and lighting are specified to identify open manholes, small areas under repair, stockpiled material, and waste areas.	2.20.1				
The CSPP considers less obvious construction-related hazards.	2.20.1				
Equipment that poses the least danger to aircraft but is sturdy enough to remain in place when subjected to typical winds, prop wash and jet blast is specified.	2.20.2.1				
The spacing of barricades is specified such that a breach is physically prevented barring a deliberate act.	2.20.2.1				
Red lights meeting the luminance requirements of the State Highway Department are specified.	2.20.2.2				
Barricades, temporary markers, and other objects placed and left in areas adjacent to any open runway, taxiway, taxi lane, or apron are specified to be as low as possible to the ground, and no more than 18 inch high.	2.20.2.3				
Barricades are specified to indicate construction locations in which no part of an aircraft may enter.	2.20.2.3				
Highly reflective barriers with lights are specified to barricade taxiways leading to closed runways.	2.20.2.5				
Markings for temporary closures are specified.	2.20.2.5				
The provision of a contractor's representative on call 24 hours a day for emergency maintenance of airport hazard lighting and barricades is specified.	2.20.2.7				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
Work Zone Lighting for Nighttime Construction					
If work is to be conducted at night, the CSPP identifies construction lighting units and their general locations and aiming in relationship to the ATCT and active runways and taxiways.	2.21				
Protection of Runway and Taxiway Safety Areas					
The CSPP clearly states that no construction may occur within a safety area while the associated runway or taxiway is open for aircraft operations.	2.22.1.1, 2.22.3.1				
The CSPP specifies that the airport operator coordinates the adjustment of RSA or TSA dimensions with the ATCT and the appropriate FAA Airports Regional or District Office and issues a local NOTAM.	2.22.1.2, 2.22.3.2				
Procedures for ensuring adequate distance for protection from blasting operations, if required by operational considerations, are detailed.	2.22.3.3				
The CSPP specifies that open trenches or excavations are not permitted within a safety area while the associated runway or taxiway is open, subject to approved exceptions.	2.22.1.4				
Appropriate covering of excavations in the RSA or TSA that cannot be backfilled before the associated runway or taxiway is open is detailed.	2.22.1.4				
The CSPP includes provisions for prominent marking of open trenches and excavations at the construction site.	2.22.1.4				
Grading and soil erosion control to maintain RSA/TSA standards are	2.22.3.5				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
addressed.					
The CSPP specifies that equipment is to be removed from the ROFA when not in use.	2.22.2				
The CSPP clearly states that no construction may occur within a taxiway safety area while the taxiway is open for aircraft operations.	2.22.3				
Appropriate details are specified for any construction work to be accomplished in a taxiway object free area.	2.22.4				
Measures to ensure that personnel, material, and/or equipment do not penetrate the OFZ or threshold siting surfaces while the runway is open for aircraft operations are included.	2.22.4.3.6				
Provisions for protection of runway approach/departure areas and clearways are included.	2.22.6				
Other Limitations on Construction					
The CSPP prohibits the use of open flame welding or torches unless adequate fire safety precautions are provided and the airport operator has approved their use.	2.23.1.2				
The CSPP prohibits the use of electrical blasting caps on or within 1,000 ft (300 m) of the airport property.	2.23.1.3				

APPENDIX D. CONSTRUCTION PROJECT DAILY SAFETY INSPECTION CHECKLIST

The situations identified below are potentially hazardous conditions that may occur during airport construction projects. Safety area encroachments, unauthorized and improper ground vehicle operations, and unmarked or uncovered holes and trenches near aircraft operating surfaces pose the most prevalent threats to airport operational safety during airport construction projects. The list below is one tool that the airport operator or contractor may use to aid in identifying and correcting potentially hazardous conditions. It should be customized as appropriate for each project including information such as the date, time and name of the person conducting the inspection.

Table D-1. Potentially Hazardous Conditions

Item	Action Required (Describe)	No Action Required (Check)
Excavation adjacent to runways, taxiways, and aprons improperly backfilled.		
Mounds of earth, construction materials, temporary structures, and other obstacles near any open runway, taxiway, or taxi lane; in the related Object Free area and aircraft approach or departure areas/zones; or obstructing any sign or marking.		
Runway resurfacing projects resulting in lips exceeding 3 inch (7.6 cm) from pavement edges and ends.		
Heavy equipment (stationary or mobile) operating or idle near AOA, in runway approaches and departures areas, or in OFZ.		
Equipment or material near NAVAIDs that may degrade or impair radiated signals and/or the monitoring of navigation and visual aids. Unauthorized or improper vehicle operations in localizer or glide slope critical areas, resulting in electronic interference and/or facility shutdown.		
Tall and especially relatively low visibility units (that is, equipment with slim profiles) — cranes, drills, and similar objects — located in critical areas, such as OFZ and		

Exhibit 1

Item	Action Required (Describe)	No Action Required (Check)
approach zones.		
Improperly positioned or malfunctioning lights or unlighted airport hazards, such as holes or excavations, on any apron, open taxiway, or open taxi lane or in a related safety, approach, or departure area.		
Obstacles, loose pavement, trash, and other debris on or near AOA. Construction debris (gravel, sand, mud, paving materials) on airport pavements may result in aircraft propeller, turbine engine, or tire damage. Also, loose materials may blow about, potentially causing personal injury or equipment damage.		
Inappropriate or poorly maintained fencing during construction intended to deter human and animal intrusions into the AOA. Fencing and other markings that are inadequate to separate construction areas from open AOA create aviation hazards.		
Improper or inadequate marking or lighting of runways (especially thresholds that have been displaced or runways that have been closed) and taxiways that could cause pilot confusion and provide a potential for a runway incursion. Inadequate or improper methods of marking, barricading, and lighting of temporarily closed portions of AOA create aviation hazards.		
Wildlife attractants — such as trash (food scraps not collected from construction personnel activity), grass seeds, tall grass, or standing water — on or near airports.		
Obliterated or faded temporary markings on active operational areas.		
Misleading or malfunctioning obstruction lights. Unlighted or unmarked obstructions in the approach to any open runway pose aviation hazards.		

Exhibit 1

Item	Action Required (Describe)	No Action Required (Check)
Failure to issue, update, or cancel NOTAMs about airport or runway closures or other construction related airport conditions.		
Failure to mark and identify utilities or power cables. Damage to utilities and power cables during construction activity can result in the loss of runway / taxiway lighting; loss of navigation, visual, or approach aids; disruption of weather reporting services; and/or loss of communications.		
Restrictions on ARFF access from fire stations to the runway / taxiway system or airport buildings.		
Lack of radio communications with construction vehicles in airport movement areas.		
Objects, regardless of whether they are marked or flagged, or activities anywhere on or near an airport that could be distracting, confusing, or alarming to pilots during aircraft operations.		
Water, snow, dirt, debris, or other contaminants that temporarily obscure or derogate the visibility of runway/taxiway marking, lighting, and pavement edges. Any condition or factor that obscures or diminishes the visibility of areas under construction.		
Spillage from vehicles (gasoline, diesel fuel, oil) on active pavement areas, such as runways, taxiways, aprons, and airport roadways.		
Failure to maintain drainage system integrity during construction (for example, no temporary drainage provided when working on a drainage system).		

Exhibit 1

Item	Action Required (Describe)	No Action Required (Check)
Failure to provide for proper electrical lockout and tagging procedures. At larger airports with multiple maintenance shifts/workers, construction contractors should make provisions for coordinating work on circuits.		
Failure to control dust. Consider limiting the amount of area from which the contractor is allowed to strip turf.		
Exposed wiring that creates an electrocution or fire ignition hazard. Identify and secure wiring, and place it in conduit or bury it.		
Site burning, which can cause possible obscuration.		
Construction work taking place outside of designated work areas and out of phase.		

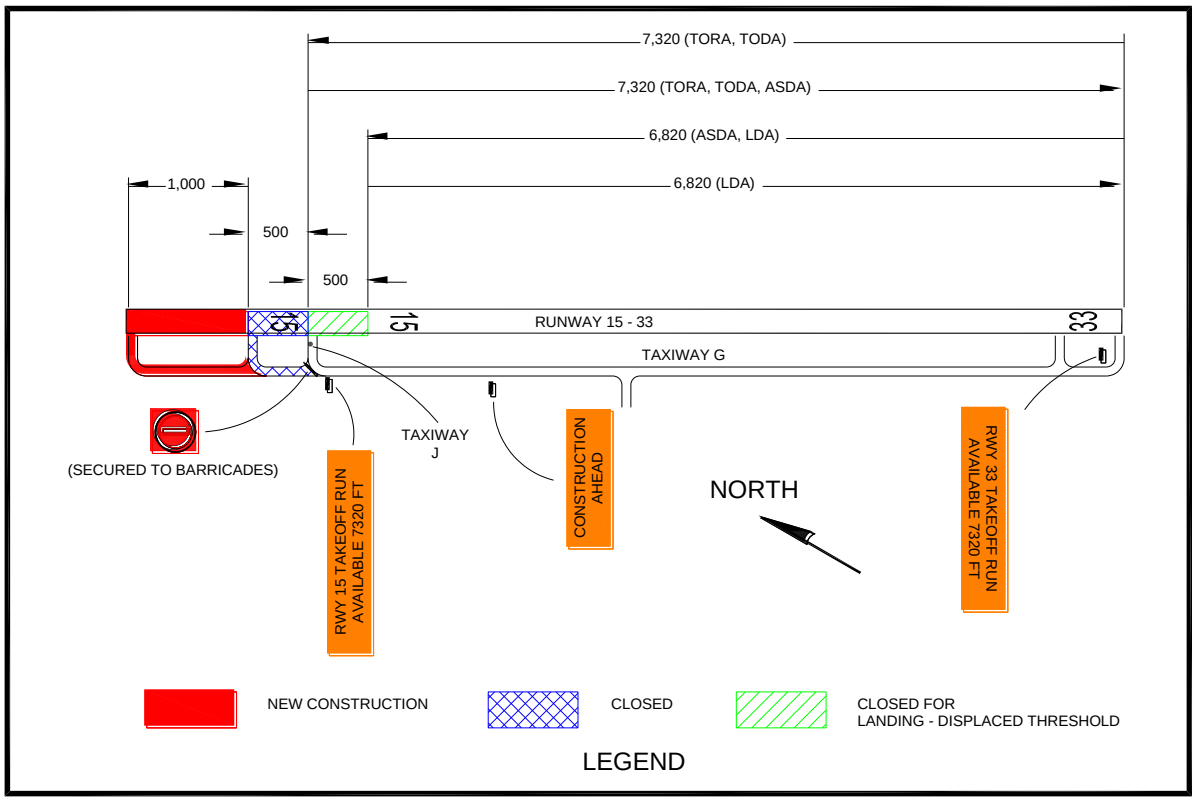
APPENDIX E. SAMPLE OPERATIONAL EFFECTS TABLE

E.1 **Project Description.**

Runway 15-33 is currently 7820 feet long, with a 500 foot stopway on the north end. This project will remove the stopway and extend the runway 1000 feet to the north and 500 feet to the south. Finally, the existing portion of the runway will be repaved. The runway 33 glide slope will be relocated. The new runway 33 localizer has already been installed by FAA Technical Operations and only needs to be switched on. Runway 15 is currently served only by a localizer, which will remain in operation as it will be beyond the future RSA. Appropriate NOTAMS will be issued throughout the project.

E.1.1 During Phase I, the runway 15 threshold will be displaced 1000 feet to keep construction equipment below the approach surface. The start of runway 15 takeoff and the departure end of runway 33 will also be moved 500 feet to protect workers from jet blast. Declared distances for runway 33 will be adjusted to provide the required RSA and applicable departure surface. Excavation near Taxiway G will require its ADG to be reduced from IV to III. See Figure E-1.

Figure E-1. Phase I Example



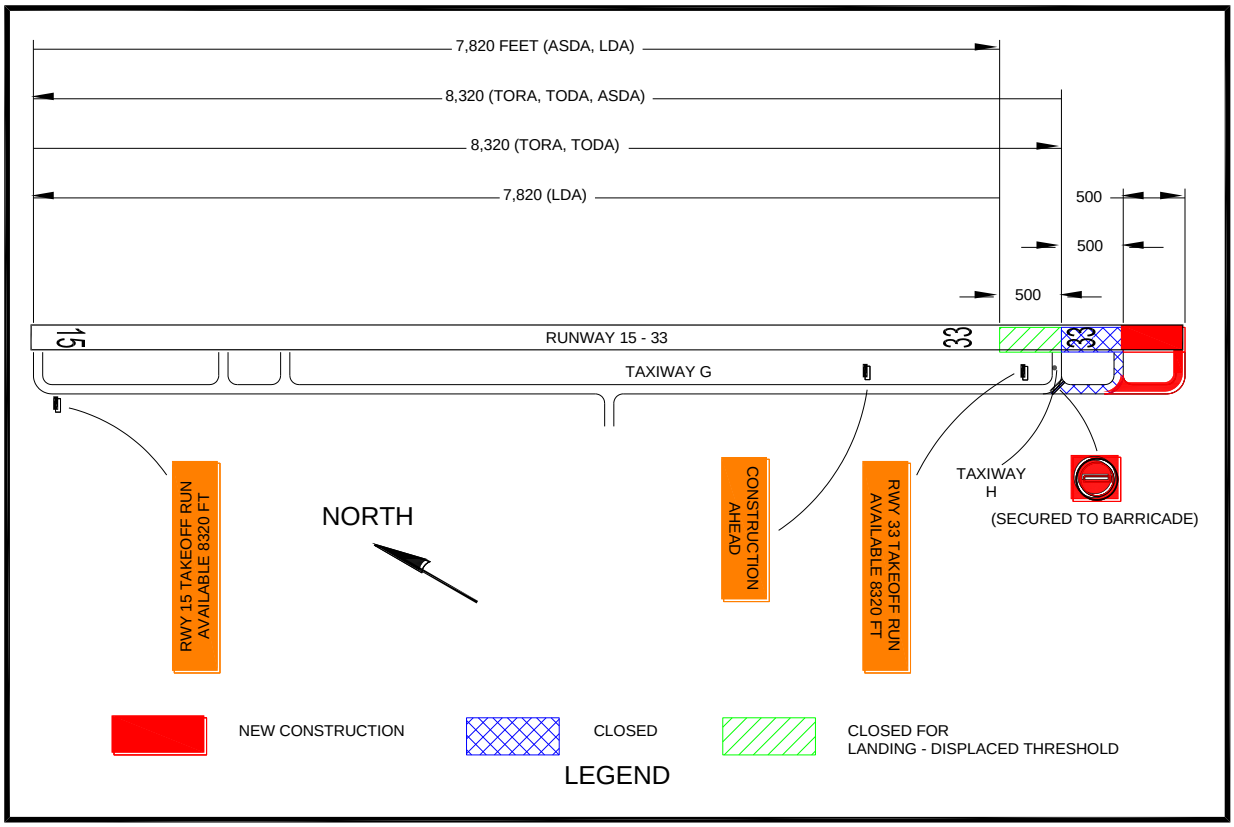
Note 1: Where hold signs are installed on both sides of a taxiway, install the TORA sign on the left side of the taxiway before the final turn to the runway intersection.

Note 2: Based on the declared distances for Runway 33 departures, the maximum equipment height in the construction area is 12.5 feet (500/40 = 12.5).

Exhibit 1

E.2 During Phase II, the runway 33 threshold will be displaced 1000 feet to keep construction equipment below the approach surface. The start of runway 33 takeoff and the departure end of runway 15 will also be moved 500 feet to protect workers from jet blast. Declared distances for runway 15 will be adjusted to provide the required RSA and applicable departure surface. See Figure E-2.

Figure E-2. Phase II Example



Note 1: Where hold signs are installed on both sides of a taxiway, install the TORA sign on the left side of the taxiway before the final turn to the runway intersection.

Note 2: Based on the declared distances for Runway 15 departures, the maximum equipment height in the construction area is 12.5 feet (500/40 = 12.5).

Exhibit 1

E.3 During Phase III, the existing portion of the runway will be repaved with Hot Mix Asphalt (HMA) and the runway 33 glide slope will be relocated. Construction will be accomplished between the hours of 8:00 pm and 5:00 am, during which the runway will be closed to operations.

Figure E-3. Phase III Example

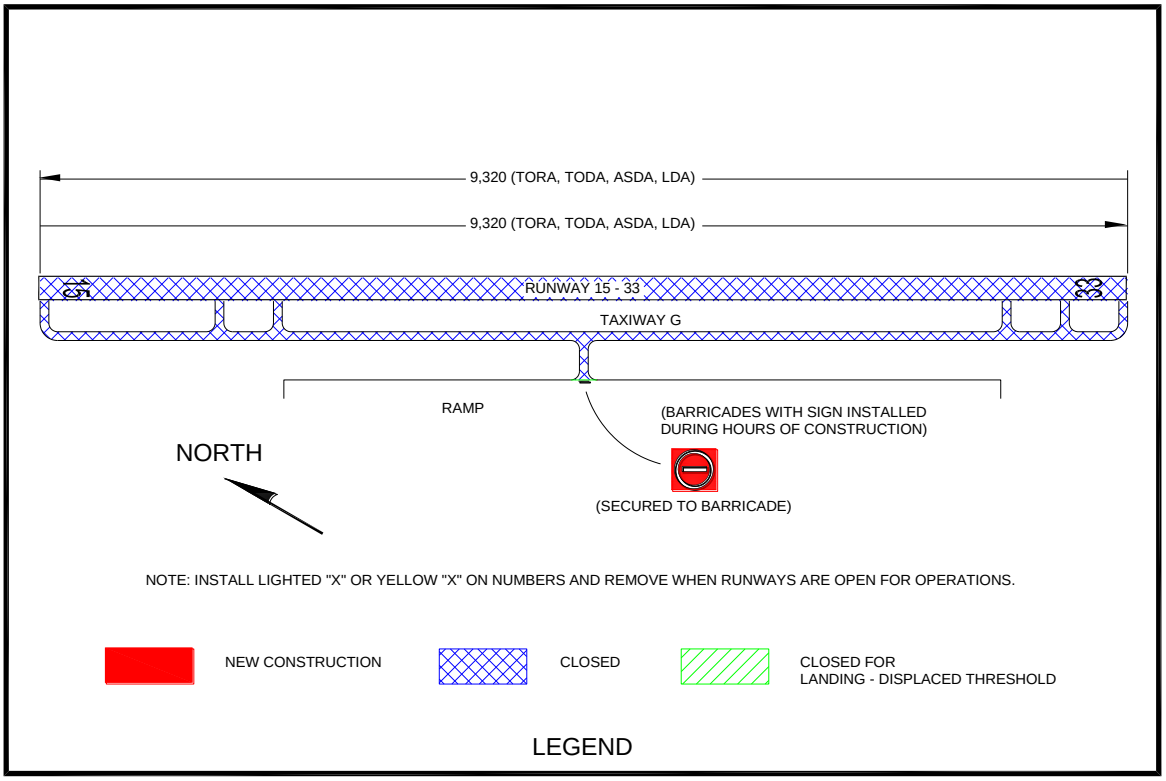


Exhibit 1

Table E-1. Operational Effects Table

Project	**Runway 15-33 Extension and Repaving**			
Phase	**Normal (Existing)**	**Phase I: Extend Runway 15 End**	**Phase II: Extend Runway 33 End**	**Phase III: Repave Runway**
Scope of Work	N/A	Extend Runway 15-33 1,000 ft on north end with Hot Mix Asphaltic Concrete (HMA).	Extend Runway 15-33 500 ft on south end with Hot Mix Asphaltic Concrete (HMA).	Repave existing runway with HMA Relocate Runway 33 Glide Slope
Effects of Construction Operations	N/A	Existing North 500 ft closed	Existing South 500 ft closed	Runway closed between 8:00 pm and 5:00 am Edge lighting out of service
Construction Phase	N/A	Phase I (Anticipated)	Phase II (Anticipated)	Phase III (Anticipated)
Runway 15 Average Aircraft Operations	Carrier: 52 /day GA: 26 /day Military: 11 /day	Carrier: 40 /day GA: 26 /day Military: 0 /day	Carrier: 45 /day GA: 26 /day Military: 5 /day	Carrier: 45 / day GA: 20 / day Military: 0 /day
Runway 33 Average Aircraft Operations	Carrier: 40 /day GA: 18 /day Military: 10 /day	Carrier: 30 /day GA: 18 /day Military: 0 /day	Carrier: 25 /day GA: 18 /day Military: 5 /day	Carrier: 20 /day GA: 5 /day Military: 0 /day
Runway 15-33 Aircraft Category	C-IV	C-IV	C-IV	C-IV
Runway 15 Approach Visibility Minimums	1 mile	1 mile	1 mile	1 mile
Runway 33 Approach Visibility Minimums	¾ mile	¾ mile	¾ mile	1 mile

Note: Proper coordination with Flight Procedures group is necessary to maintain instrument approach procedures during construction.

Exhibit 1

Project		**Runway 15-33 Extension and Repaving**			
Phase		**Normal (Existing)**	**Phase I: Extend Runway 15 End**	**Phase II: Extend Runway 33 End**	**Phase III: Repave Runway**
Runway 15 Declared Distances	**TORA**	7,820	7,320	8,320	9,320
	TODA	7,820	7,320	8,320	9,320
	ASDA	7,820	7,320	7,820	9,320
	LDA	7,820	6,820	7,820	9,320
Runway 33 Declared Distances	**TORA**	7,820	7,320	8,320	9,320
	TODA	7,820	7,320	8,320	9,320
	ASDA	8,320	6,820	8,320	9,320
	LDA	7,820	6,820	7,820	9,320
Runway 15 Approach Procedures		LOC only	LOC only	LOC only	LOC only
		RNAV	RNAV	RNAV	RNAV
		VOR	VOR	VOR	VOR
Runway 33 Approach Procedures		ILS	ILS	ILS	LOC only
		RNAV	RNAV	RNAV	RNAV
		VOR	VOR	VOR	VOR
Runway 15 NAVAIDs		LOC	LOC	LOC	LOC
Runway 33 NAVAIDs		ILS, MALSR	ILS, MALSR	ILS, MALSR	LOC, MALSR
Taxiway G ADG		IV	III	IV	IV
Taxiway G TDG		4	4	4	4
ATCT (hours open)		24 hours	24 hours	24 hours	0500 - 2000
ARFF Index		D	D	D	D

Exhibit 1

Project	**Runway 15-33 Extension and Repaving**			
Phase	**Normal (Existing)**	**Phase I: Extend Runway 15 End**	**Phase II: Extend Runway 33 End**	**Phase III: Repave Runway**
Special Conditions	Air National Guard (ANG) military operations	All military aircraft relocated to alternate ANG Base	Some large military aircraft relocated to alternate ANG Base	All military aircraft relocated to alternate ANG Base
Information for NOTAMs		Refer above for applicable declared distances. Taxiway G limited to 118 ft wingspan	Refer above for applicable declared distances.	Refer above for applicable declared distances. Airport closed 2000 – 0500. Runway 15 glide slope OTS.

Note: This table is one example. It may be advantageous to develop a separate table for each project phase and/or to address the operational status of the associated NAVAIDs per construction phase.

Complete the following chart for each phase to determine the area that must be protected along the runway and taxiway edges:

Table E-2. Runway and Taxiway Edge Protection

Runway/Taxiway	**Aircraft Approach Category*** **A, B, C, or D**	**Airplane Design Group*** **I, II, III, or IV**	**Safety Area Width in Feet Divided by 2***

*See AC 150/5300-13 to complete the chart for a specific runway/taxiway.

Exhibit 1

Complete the following chart for each phase to determine the area that must be protected before the runway threshold:

Table E-3. Protection Prior to Runway Threshold

Runway End Number	Airplane Design Group* I, II, III, or IV	Aircraft Approach Category* A, B, C, or D	Minimum Safety Area Prior to the Threshold*	Minimum Distance to Threshold Based on Required Approach Slope*	
			ft	ft	: 1
			ft	ft	: 1
			ft	ft	: 1
			ft	ft	: 1

*See AC 150/5300-13 to complete the chart for a specific runway.

Exhibit 1

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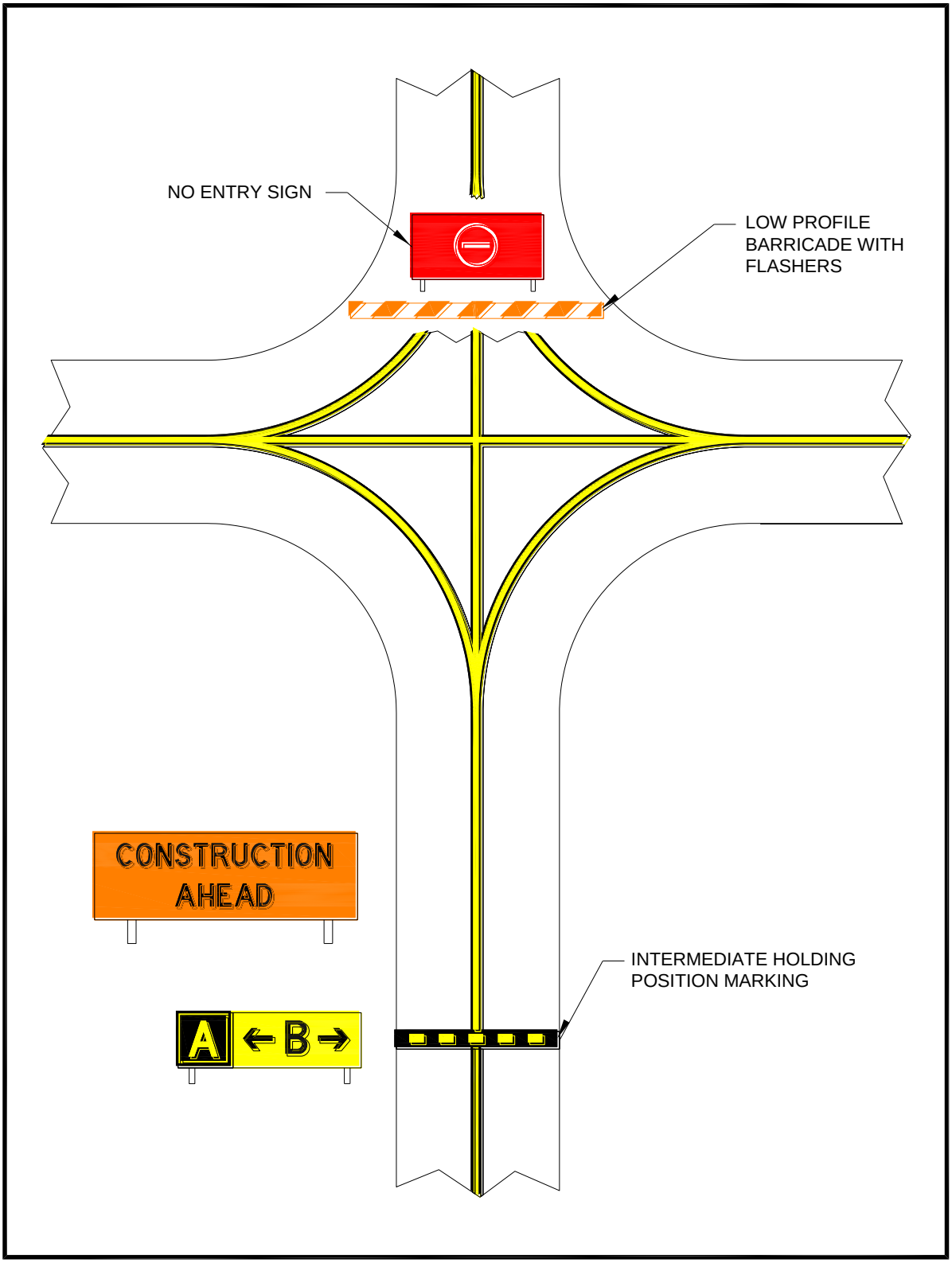
APPENDIX F. ORANGE CONSTRUCTION SIGNS

Figure F-1. Approved Sign Legends

Exhibit 1

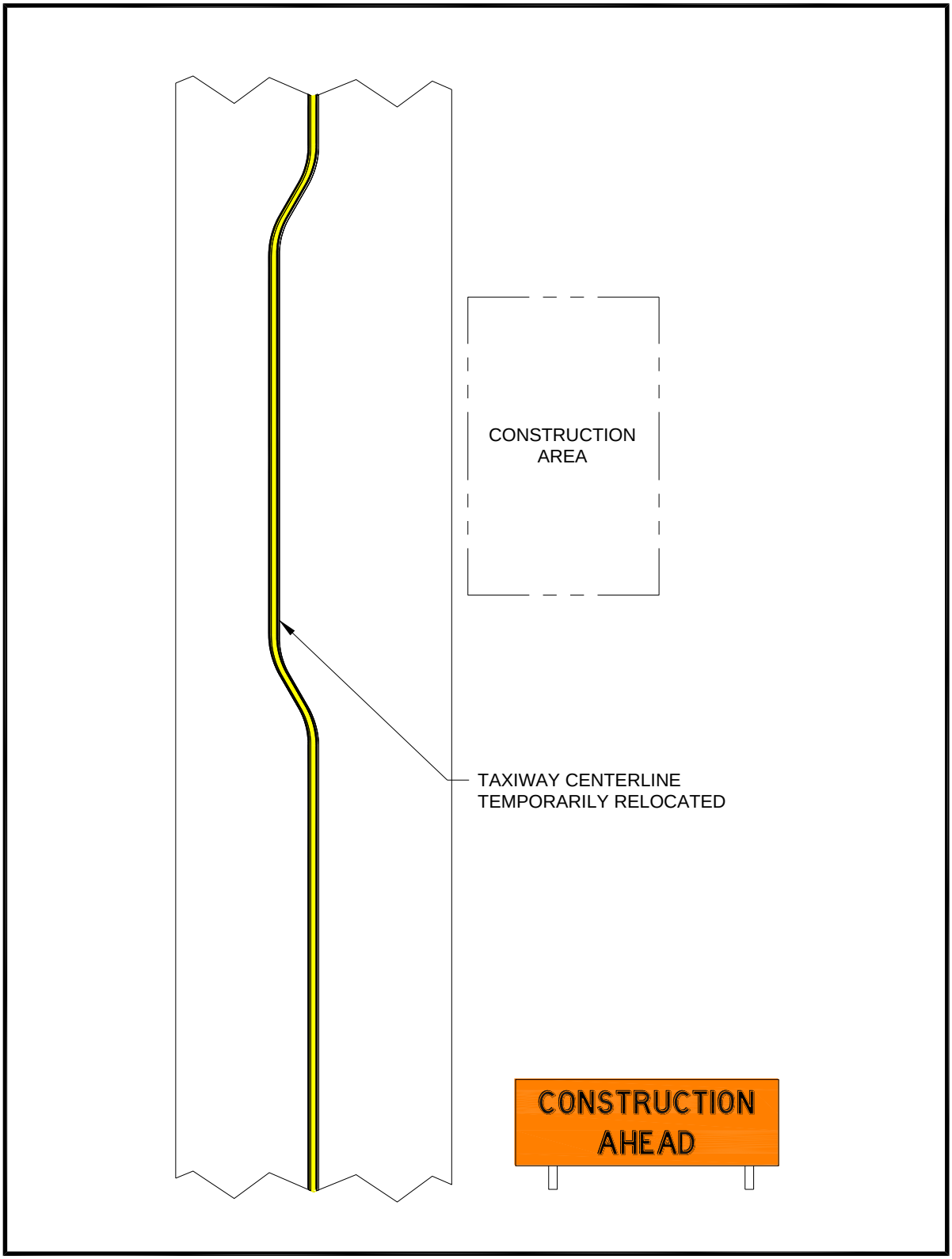
Figure F-2. Orange Construction Sign Example 1



Note: For proper placement of signs, refer to EB 93.

Exhibit 1

Figure F-3. Orange Construction Sign Example 2



Note: For proper placement of signs, refer to EB 93.

Exhibit 1

CONSTRUCTION SAFETY AND PHASING PLAN

Schedule I
Reconstruction of Taxiway F

FAA Design AIP Project No. 3-06-0179-043-2023
County of Ventura, Department of Airports Specification No. DOA 23-03
County of Ventura, Department of Airports Project No. OXR-150

Oxnard Airport

COUNTY of VENTURA
Department of Airports

Oxnard, California

Sponsored By:

County of Ventura, California

Federal Aviation Administration
California Department of Transportation Aviation Division

Issued for Bid
May 25, 2023

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1. COORDINATION

During construction, airport operational safety is of paramount importance. Coordination of project information with all individuals involved with the project is essential for ensuring safe operations are maintained at all times. In order to minimize potential for incidents during construction, it is imperative that all individuals involved with the project and/or airport users be kept informed of any and all changes to operations. Discussions of operational safety will need to take place throughout the entire life of the project, including design, bidding, pre-construction, and construction. Meetings between the Resident Engineer, Oxnard Airport (Airport), Contractor, sub-contractors, airport tenants and airport users will be required to discuss specific project related impacts to operations. The Airport staff is ultimately responsible for the safety at the airport. Notice to users of operational changes due to construction will be issued via NOTAMs by the airport. No closures will be permitted without the pertinent NOTAM in place for each specific closure. Emergency access for both airport (ARFF) and off-airport (Police, Fire, and EMT) based emergency service shall be maintained at all times. Routing for such traffic shall be determined and made known to all supervisor personnel involved in the construction project. Coordination of this access will be proposed by the Contractor and approved by the Resident Engineer and the Airport Operations Manager.

A pre-construction meeting will be held after the project has been awarded and prior to the Contractor beginning work or staging major construction material and equipment on-site. The Airport, the Contractor's on-site supervisory staff, and representatives from the Engineer shall be present. Safety, this document, and the Safety Plan Compliance Document (SPCD) prepared by the Contractor, will be a significant topic on the agenda. Additionally, operational safety during construction will be a main topic of discussion at the pre-construction and weekly progress meetings.

A. CONTRACTOR PROGRESS MEETINGS

The Contractor is required to have weekly construction progress meetings to discuss all relevant construction topics including safety reminders, scheduling, and general construction issues. Attendance of the Contractor, Resident Engineer, Airport, and any other pertinent personnel are required at these meetings. Operational safety will be a standing agenda item for discussion during these progress meetings. A review of the Contractor's adherence to the project's Construction Safety and Phasing Plan (CSPP) and Safety Plan Compliance Document (SPCD) will be made at each meeting. Immediate correction of any deficiencies or violations will be required. The location and time of the weekly meetings will be determined during the pre-construction meeting. Where operational safety is concerned, the Contractor shall update the Resident Engineer overseeing construction on daily basis or more frequently if needed, of any changes or Contractor concerns.

B. SCOPE OR SCHEDULE CHANGES

In the event of a scope or schedule change, the Contractor shall notify the Resident Engineer and the Oxnard Airport Operations Manager immediately. All parties involved will need to evaluate the impact(s) of the change and will determine what measures will need to be taken to maintain a safe construction site. Change in the scope or duration of the project may necessitate revisions to the Construction Safety and Phase Plan (CSPP).

Exhibit 1

C. FAA ATO COORDINATION

The FAA Air Traffic Organization (ATO) will need to be notified immediately of any changes that affect aircraft movement within the airport which include airway facility shutdowns and restarts. The Resident Project Representative will coordinate all associated activities with the Airport Manager and Airport Traffic Control Tower (ATCT) in order to ensure the appropriate local NOTAMs are issued whenever personnel or equipment are adjacent to the runway or other movement areas. The Airport will be responsible for coordinating any changes including the issuance of NOTAMs to the FAA ATO. This includes coordinating shutdowns of FAA owned equipment and NAVAIDS.

2. PHASING

In order to minimize disruptions to airport operations during construction, construction will be broken up by areas to limit the amount of aircraft operational areas affected at any given time. Maintaining continual access to the runway, terminal building, FBO and tenant hangars is mandatory during all phases of construction to allow the aircraft to operate during construction. The phasing plan proposed was developed with help from the Airport and is considered to be the most effective way of maintaining the required aircraft access, while imposing the least amount of impact on construction operations, and without sacrificing safety. The phasing for this project is presented below, and is also visually depicted in the Construction Safety Drawings Sheets 050 through G055 attached Appendix A.

This project will be completed in one schedule having multiple phases. Each of the phases is discussed in further detail in the Construction Safety Drawing plan sheets included at the end of this document.

The taxiway identification for Taxiway F and Taxiway Connectors A through E will be changed during the Reconstruction of Taxiway A through E Project in the Summer, 2023. Taxiway F will be renamed to Taxiway A and the Taxiway Connectors A through E will be renamed to Taxiway A1 through A5 respectively.

A. PHASE ELEMENTS

I. Schedule I, Preconstruction Mobilization Phase

The Contractor will be given **10** calendar days to complete Schedule I, Preconstruction Mobilization. The purpose for Schedule I, Preconstruction Mobilization is to allow the contractor to mobilize construction equipment and materials to the project site prior to construction. In addition, the contractor will be allowed to verify utility locations that are pertinent to this project and complete preconstruction survey.

During this phase, the Contractor will be given nighttime access for 2 of the 10 calendar days to complete Schedule I, Preconstruction Mobilization utility location verification and survey within the Runway 7/25 safety area. The closure will begin no earlier than 2200 and will end no later than 0600 on the following day. Contractor work hours will be from 2200 to 0600 to allow time for cleanup, airport inspection and to ensure that Runway 7/25 is ready for daytime operations and that all Runway 7/25 NAVAIDs are operational.

Exhibit 1

Coordination with the FAA will be required to implement night closures. No work requiring runway closure will be permitted during the FAA moratorium dates.

Prior to beginning night work during this phase, the Contractor shall have runway and taxiway closure markers and barricades in place in accordance with the plans and shall coordinate with the Resident Project Representative /Airport to ensure that all pertinent NOTAM's are in place. During daytime Contractor operations, all areas of the airport shall remain open and unobstructed.

Work will include, but is not limited to, the following:

a) Processing of all submittals required for Project startup, including but not limited to the following:
   (1) The Contractor's baseline construction schedule
   (2) Preparation and submission of the SPCD
   (3) Airfield safety and traffic control submittals
   (4) Erosion control submittals
   (5) Earthwork and subgrade stabilization submittals
b) Prequalification testing, review, and approval for subgrade stabilization materials.
c) Airfield Safety Devices delivered/prepared at the site (construction flags, low profile barricades, airport radios, runway closure markers).
d) Materials and equipment for airfield safety and traffic control, erosion control, earthwork and subgrade stabilization delivered to
e) All preliminary work required to commence construction will be finalized during the Preconstruction Mobilization Phase to minimize delays during construction.

II. Schedule I, Phase 1 – Reconstruction of existing Taxiway F (proposed Taxiway A) and Transition on Existing Taxiways A and B (proposed Taxiways A1 and A2)

The Contractor will be given **28** calendar days to complete Schedule I, Phase 1. The purpose for Schedule I, Phase 1 is to reconstruct existing Taxiway F (proposed Taxiway A) and the transition along existing Taxiways A and B (proposed Taxiways A1 and A2). The Contractor will have 12 hour access to these approved areas from 0700 to 1900. Existing Taxiways A and B (proposed Taxiways A1 and A2) will be closed during the entire phase. Removal of paint and installation of pavement markings outside the new pavement boundary of existing Taxiway F (proposed Taxiway A) shall be conducted at nighttime on a pullback basis. The proposed construction will include the full depth reconstruction of asphalt pavement, including subgrade stabilization and crushed aggregate base course placement. Additional work completed with Schedule I, Phase 1 will include the removal and installation of existing storm drain and underdrain infrastructure, as well as removal of existing and installation of new taxiway edge lights, guidance signs and pavement markings.

Prior to beginning work on this phase, the Contractor shall have taxiway closure markers and barricades in place in accordance with the plans and shall coordinate with the Resident Project Representative /Airport to ensure that all pertinent NOTAMs are in place.

Exhibit 1

III. Schedule I, Phase 2 – Reconstruction of Existing Taxiway F (Proposed Taxiway A) and Transition on Existing Taxiways C and D (Proposed Taxiway A3 and A4)

The Contractor will be given **32** calendar days to complete Schedule I, Phase 2. The purpose for Schedule I, Phase 2 is to reconstruct existing Taxiway F (proposed Taxiway A) and the transition along existing Taxiways C and D (proposed Taxiways A3 and A4). The Contractor will have 12 hour access to these approved areas from 0700 to 1900. Existing Taxiways C and D (proposed Taxiways A3 and A4) will be closed during the entire phase. Removal of paint and installation of pavement markings outside the new pavement boundary of existing Taxiway F (proposed Taxiway A) shall be conducted at nighttime on a pullback basis. The proposed construction will include the full depth reconstruction of asphalt pavement, including subgrade stabilization and crushed aggregate base course placement. Additional work completed with Schedule I, Phase 2 will include the removal and installation of existing storm drain and underdrain infrastructure, as well as removal of existing and installation of new taxiway edge lights, guidance signs and pavement markings.

Prior to beginning work on this phase, the Contractor shall have runway and taxiway closure markers and barricades in place in accordance with the plans and shall coordinate with the Resident Project Representative /Airport to ensure that all pertinent NOTAMs are in place.

IV. Schedule I, Phase 3 –Reconstruction of Existing Taxiway F (Proposed Taxiway A) and Transition on Existing Taxiway E (Proposed Taxiway A5)

The Contractor will be given **20** calendar days to complete Schedule I, Phase 3. The purpose for Schedule I, Phase 3 is to reconstruct existing Taxiway F (proposed Taxiway A) and the transition along existing Taxiway E (proposed Taxiway A5). The Contractor will have 12 hour access to these approved areas from 0700 to 1900. Existing Taxiway E (proposed Taxiway A5) will be closed during the entire phase. The proposed construction will include the full depth reconstruction of asphalt pavement, including subgrade stabilization and crushed aggregate base course placement. Additional work completed with Schedule I, Phase 3 will include the removal and installation of existing storm drain and underdrain infrastructure, as well as removal of existing and installation of new taxiway edge lights, guidance signs and pavement markings.

Prior to beginning work on this phase, the Contractor shall have runway and taxiway closure markers and barricades in place in accordance with the plans and shall coordinate with the Resident Project Representative /Airport to ensure that all pertinent NOTAMs are in place.

B. CONSTRUCTION SAFETY DRAWINGS

The Construction Safety Drawings Sheets G050 through G055 are located in Appendix A to show the phasing requirements for this project. Along with the phasing information, those attached drawings also show aircraft access routes, ARFF access routes, contractor haul routes, and contractor operation limits to help assist with airport operations and maintaining safety during this project.

Exhibit 1

3. AREAS AND OPERATIONS AFFECTED BY THE CONSTRUCTION ACTIVITY

All work within the Airport Operations Area shall be accomplished in conformance to Advisory Circular 150/5370-2G, Operational Safety on Airports During Construction. The contract drawings include information regarding requirements for operational safety on the airport during construction.

The Contractor shall prepare a detailed Safety Plan Compliance Document (SPCD) as stated in the Advisory Circular 150-5370-2G. The Contractor's SPCD shall identify specific methods, sequencing, phasing that he/she intends to use to accomplish the project work. The SPCD shall be submitted by the Contractor to the Engineer for approval prior to the pre-construction conference for the project. The Engineer will review the SPCD with the Sponsor/Owner and supply any changes or revisions to the Contractor for incorporation into the plan. The final SPCD shall be the result of a coordinated effort between the Owner/Sponsor, the Engineer and the Contractor.

The Contractor shall adhere to the approved SPCD as agreed upon by Airport Staff, Engineer, and Contractor. Modifications or deviations from the approved safety plan shall be submitted to the Engineer for review and approval prior to implementation.

A. IDENTIFICATION OF AFFECTED AREAS

Areas affected by construction activities associated with this project are identified on the Construction Safety Drawings. Construction activities associated with Schedule I will primarily take place along existing Taxiway F (proposed Taxiway A) and the transitions along existing Taxiways A through E (proposed Taxiways A1 through A5). During construction activities associated with Schedule I, aircraft operations on existing Taxiway F (proposed Taxiway A) and existing Taxiways A through E (proposed Taxiways A1 through A5) will be affected, as described in greater detail in the attached project phasing sheets. Several NOTAMs will be required to be issued during this project, closing portions of existing Taxiway F (proposed Taxiway A) and existing Taxiways A through E (proposed Taxiways A1 through A5) during the phase work hours, to modify specific sections of these pavement areas. Section 13 – Special Conditions of this document and the attached Construction Safety Drawings describe in detail which areas are affected and for what durations.

B. MITIGATION OF EFFECTS

To mitigate the effects of the construction activities associated with the project; alternative routes have been established for emergency and ARFF vehicles, aircraft taxiway movements have been considered and phasing plans have been created. Because the phasing for this project is critical to maintaining safety and operations at the airport during construction, adhering to the requirements as laid out in the attached phasing sheets is imperative. To help assist all individuals with this process, it is important that all airport personnel, air traffic operation personnel, contractor personnel, and engineering personnel discuss current and upcoming phases during the required weekly construction progress meetings as mentioned in Section 1 of this document.

4. PROTECTION OF NAVIGATION AIDS (NAVAIDS)

The Contractor should be aware of the location of all NAVAID equipment as haul roads are being established to ensure that this equipment will be protected for the duration of the project.

Exhibit 1

Should any haul road pass near existing airport NAVAID equipment, the Contractor shall protect these structures from damage. Any damage to any airport NAVAID equipment due to construction activities shall be repaired by the Contractor to the satisfaction of the Engineer at no additional cost to the Sponsor. The FAA NAVAIDs consisting of the Runway 25 MALSF, Runway 25 Localizer, Runway 25 Glideslope, Runway 25 PAPI, and Runway 7 PAPI will be turned off by the FAA for the two-night closure during the pre-construction mobilization phase. The FAA Runway 25 Glideslope will be turned off by the FAA for the duration of Schedule I, Phase 1 while within the glideslope critical area.

5. CONTRACTOR ACCESS

The Contractor will be required to submit to Airport staff prior to the commencement of construction, evidence in the form of a certification letter that all of their employees who will have unescorted access to the SIDA have been checked for employment, security, and criminal history for the last ten years. The letter will also certify that these employees meet all security regulations as required by the Sponsor's security program.

During the course of the construction operations, the Contractor will be allowed to utilize a maximum of two (2) airport access "Security Gates" as entrance to the airfield and construction site and one (1) airport access gate to access the maintenance yard for quality assurance/quality control/engineer field trailers. Only vehicular access is permitted through the access gates into the construction area; pedestrian access through the access gates is not allowed. The airport shall designate this gate and the associated haul roads. The gate may be opened only for authorized vehicle traffic flow. During times of infrequent construction traffic, the gate shall be closed, even when a gate guard is present. At times that a gate guard is not present at a gate, it shall be closed and securely locked. Key construction superintendents and any other personnel deemed necessary by the Airport shall be required to complete the driver's construction training and application to obtain an electronic entry card for gate access. The designated construction personnel will be responsible for escorting non-trained construction personnel who will be working within the airfield environment. During daylight hours, all authorized vehicles and construction equipment must display either a three-foot-by-three-foot flag with international orange and white 12-inch squares displayed in full view above the vehicles or lighted rotating beacons. During nighttime operations only lighted rotating beacons are acceptable. Passengers in any authorized vehicles shall be the responsibility of the Contractor. The "gate guard" shall allow no unauthorized vehicle or person to enter the "air operations" side of the airport without the above stipulated "security clearance." The Contractor and the Contractor's "security gate guard" shall be held duly responsible to uphold the above security stipulations at all times during the progress of the construction project. No deviations from these security measures shall be allowed at any time. Penalties associated with deviations from these security provisions are identified in Section 12 of this document.

A. LOCATION OF STOCKPILED CONSTRUCTION MATERIALS

The Contractor's staging area is shown on the Construction Safety Overall Phasing Plan Sheet G051 and is located inside the AOA adjacent to the aircraft apron on the west end of the Airport. Any stockpiling activities shall be conducted outside of the runway/taxiway object free areas as well. The unclassified excavation material that is required to be stockpiled per Section 9 shall be stockpiled at the location marked on Sheet G051 in the northwest corner of the airport

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per SP-100-1.30. Stockpiles shall be identified and lighted in accordance with Section 16. Stockpiles shall be maintained in such manner that they are not a wildlife attractant in accordance with Section 6 and they do not generate FOD that could be tracked onto active pavement surfaces in accordance with Section 7.

B. VEHICLE AND PEDESTRIAN OPERATIONS

I. Construction Site Parking

Construction employee parking will be inside of the airport perimeter fence within the staging area. No vehicles or equipment shall be parked within ten feet of the Airport's security fence.

II. Construction Equipment Parking

Construction equipment parking will be allowed at the contractor's staging area in the location as shown on the Construction Safety Overall Phasing Plan Sheet G051, or at a location approved by the Resident Project Representative. If the equipment must be parked in an Airport Operations Area (AOA), the equipment must be lighted with a beacon per AC 150/5370-2G. No equipment or material shall be parked or stored in any runway or taxiway safety area or object free area.

III. Access and Haul Roads

The access points to the project are depicted on Sheet G050 to G055. The contractor shall keep all access gates closed and locked when not in use. When a gate is open, it shall be appropriately guarded by the contractor to ensure that no unauthorized vehicles or personnel enter airport property.

The Contractor shall obtain approval from the Engineer prior to establishing haul roads within the airport property. Once established, the haul roads shall be utilized for all equipment traffic, and the equipment shall not be allowed to stray or wander away from the established routes. Any modification to haul routes shown in the phasing sheets require environmental clearance prior to establishment of the modification. The haul roads shall be the responsibility of the Contractor and shall always be maintained and kept in good order. When required, water shall be applied at the locations and in the amounts necessary to minimize dust and dirt in the air operations area. Since construction operations will be within active airport operation areas, the airport will require additional dust control measures be used on haul roads and the work area in order not to interfere with airport operations. Haul roads that cross any active taxiway, movement areas, non-movement areas or active areas of the ramp shall be kept clean, free of FOD and in good order at all times. The Contractor shall always be prepared to repair any damage caused by the movement of equipment on any of the haul roads at the direction of the Engineer, whether in designated or undesignated areas. After completion of the project, the Contractor shall be required to regrade any unpaved portions of the haul route and to reseed the area with local native grasses to match the existing conditions of the area. The performance of any work as specified by this provision, including watering, maintenance, seeding and repair of the haul routes and associated pavements, shall not be measured nor

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paid for directly, but shall be considered as necessary and incidental to the work. Each day prior to beginning hauling operations the Contractor shall notify the Engineer and Airport Operations of their proposed hauling schedule. Therefore, the Contractor is required to give Airport Operations, through the Resident Project Representative, 72 hours' notice prior to beginning hauling operations, so that the Airport can issue the appropriate NOTAMs.

Establishment of haul roads off of Airport property shall be the sole responsibility of the Contractor.

Contractor movement shall be restricted to the pre-determined access routes as shown on the attached Construction Safety Drawings and within the work area. Work areas shall be delineated with barricades as shown on the phasing drawings. The Contractor shall not operate outside of these areas without approval of the Resident Project Representative or Airport Operations Manager. The Resident Project Representative will provide proper coordination and management oversight throughout all phases of the project to address any construction equipment access to the movement area. The Contractor's operators shall be aware the haul route is also utilized as a perimeter road and will be shared with Airport Operation and FAA vehicles.

IV. Marking and Lighting of Vehicles

All vehicles operating within the AOA and in the movement/non-movement areas must clearly identify themselves for control purposes. The identification symbols should be a minimum 8-inch block-type characters of a contrasting color and easy to read. They may be applied either by using tape or a water-soluble paint to facilitate removal. Magnetic signs are also acceptable.

To operate within the AOA during daylight hours, the vehicle must have a flag (day only) or yellow flashing light (day or night) attached to it. Any vehicle operation within the AOA during hours of darkness or reduced visibility must be equipped with a yellow flashing light. Flashing lights must be mounted on the uppermost part of the vehicle structure. Flags shall be at least 3-foot by 3-foot square having a checkered pattern of international orange and white squares at least 1 foot on each side. All flashing lights and/or flags shall be kept in good condition and immediately replaced if requested by the Engineer or Airport Operations.

V. Description of Proper Vehicle Operations

Proper vehicle operations are described as confirming to all rules and regulation for driving as directed by the Airport. Key construction superintendents and any other personnel deemed necessary by the Airport shall be required to complete the driver's construction training and application to obtain an electronic entry card for gate access. The designated construction personnel will be responsible for escorting non-trained construction personnel who will be working within the airfield environment. Access shall be restricted to established haul routes and work areas.

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VI. Required Escorts

The only vehicle operators allowed to enter the AOA unescorted are ones that have satisfactorily completed Oxnard Airport's Air Operations Area Driver Training Course; all other vehicle operators require an escort. When any vehicle, other than one that has prior approval from the airport operator, must travel over any portion of an aircraft movement area, the vehicle will be escorted and properly identified. To operate in those area during daylight hours, the vehicle must have a flag (day only) or beacon (day or night) attached to it. Any vehicle operation on the movement areas during hours of darkness or reduced visibility must be equipped with a flashing dome-type light.

VII. Training Requirements of Vehicle Drivers

To ensure compliance with Oxnard Airport's vehicle rules and regulations, key construction superintendents and any other personnel deemed necessary by the Contractor/Airport shall be required to complete the driver's construction training and application to obtain an electronic entry card for gate access to the AOA. The Contractor shall designate construction personnel (minimum of 5) to receive training on movement around the Airport during the construction project. The designated trained personnel will be responsible for escorting non-trained construction personnel who will be working within the airfield environment. The designated construction personnel will attend an airfield orientation/driver training class conducted by Airport Operations as part of the requirements to obtain authorization to operate on the airfield. The Contractor will contact the RPR or Operations Supervisor, a minimum of 48 hours in advance, to schedule a training class for the select construction personnel. No training classes will be available on Saturdays or Sundays. Training classes will be limited to ten (10) people maximum, per class. The approximate duration of the training class is thirty (30) minutes (Airfield Orientation/Driver).

VIII. Situational Awareness

Vehicle drivers must confirm by personal observation that no aircraft is approaching their position (either in the air or on the ground) when given clearance to cross a runway, taxiway, or any other area open to airport operations. In addition, it is the responsibility of the escort vehicle driver to verify movement/position of all escorted vehicles at any given time.

IX. Two-way Radio Communication Procedures

The Contractor's superintendent and, if required, flagmen/haul route monitors shall be required to monitor transceiver radios tuned to the Oxnard Ground frequency 121.9 MHz at all times, unless the tower is closed from the hours of 9:00 p.m. to 7:00 a.m., then the Contractor will monitor and communicate through the Unicom frequency 134.95 MHz. The Contractor shall supply radios. Such radios shall be used to obtain proper clearance regarding the movement of equipment, trucks, etc., within the movement area.

When any construction activities are required on active pavements, a flagman, who is monitoring a radio, shall be positioned within the work area in such a manner that they

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can clear construction men and equipment across the active pavement. Any use of a flagman must be coordinated with Airport Operations prior to utilization.

Further, any unusual occurrences in the flight pattern of approaching or departing aircraft shall be acknowledged by all concerned so that operation of the airport and the construction work can be safely carried on at all times.

X. Maintenance of the Secured Area of the Airport

Airport operators and contractors must take care to maintain security during construction when access points are created in the security fencing to permit the passage of construction vehicles or personnel. Throughout the duration of construction, it is anticipated that there will be two access points for construction personnel. These access points will consist of an automatic gate located within the existing perimeter fence as shown in the Construction Layout and Phasing Plans. During hauling activities, a gate guard will be positioned at the gate. The gate guard shall always be in possession of a current stop list. The stop list can be obtained from the Airport Administration Offices during normal business times. During times of infrequent hauling the gate shall be closed, even when the gate guard is present.

In addition, all personnel must either complete the Airport training or be escorted while working in the AOA. Escorted personnel must stay nearby the designated trained personnel at all times to ensure that security at the Airport is maintained.

Because the Airport is subject to 49 CFR Part 1542, *Airport Security*, even during construction, the Airport must meet standards for access control, movement of ground vehicles, and identification of construction contractor and tenant personnel.

XI. Construction Site Safety

All personnel working on the construction site, including gate guards, are recommended to have personal protective equipment on at all times. This includes but is not limited to vests, hard hats, hearing protection, eye protection, and radios.

6. WILDLIFE MANAGEMENT

All wildlife management within the Airport Operations Area shall be accomplished in conformance to Advisory Circular 150/5200-33, *Hazardous Wildlife Attractants On or Near Airports*, and Certalert 98-05, *Grasses Attractive to Hazardous Wildlife*. In general, the Contractor must carefully control and continuously remove waste or loose material that might attract wildlife.

A. TRASH

The Contractor is responsible to complete a daily inspection or more frequently, if deemed necessary by the Resident Engineer, of the construction site (including the Contractor's Staging Area) for any trash or objects that might attract wildlife.

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B. STANDING WATER

Because standing water can attract wildlife, the Contractor is responsible to complete a daily inspection of the construction site for any standing water. With the discretion of the Resident Engineer, the Contractor shall remove this hazard.

C. TALL GRASS AND SEEDS

The Contractor will install soil, seeding and hydromulch as specified in the *T-901 Seeding* specification for this project or as directed by the Engineer.

D. POORLY MAINTAINED FENCING AND GATES

The Contractor shall be required to maintain all fences and gates throughout the duration of the project, to the satisfaction of the Resident Engineer.

E. DISRUPTION OF EXISTING WILDLIFE HABITAT

The Contractor shall notify the Resident Engineer when a wildlife sighting has occurred on the project site to mitigate any disruption to the existing wildlife habitat.

7. FOREIGN OBJECT DEBRIS (FOD) MANAGEMENT

The presence of FOD on the apron is a significant safety concern, as debris can be ingested into an aircraft's engine causing extensive damage, or can be launched across the apron by jet blast, potentially causing bodily injury or damaging other aircraft. Materials capable of creating FOD must be continuously removed during the construction project. The Contractor is required to keep all taxiways and aprons, open to aircraft free from FOD at all times. The Contractor is required to maintain FOD control continually and to the satisfaction of the Resident Project Engineer. FOD Control measures shall include the use of power brooms, FOD boss, and manual removal as well as any other means deemed necessary. Prior to opening any pavement to aircraft, the Contractor shall conduct a sweep of the pavement to verify that it is FOD free. The apron area at existing Taxiway F (proposed Taxiway A) to the south of the limits of construction as well as the active taxiway connectors will be a high priority area during this project as commercial aircraft will be in the vicinity of this area daily throughout most of the construction process. The contractor shall provide dust abatement as necessary to prevent dust from becoming a nuisance due to their activities at and around the airport. The Contractor shall be prepared to provide dust abatement throughout the life of the contract including weekends and holidays. Dust abatement shall be completed at the Contractor's expense**.**

8. HAZARDOUS MATERIAL (HAZMAT) MANAGEMENT

Although hazardous material is not anticipated to be present on this project, if hazardous material is encountered, the Contractor shall inform the Resident Project Engineer and ARFF immediately. Additionally, the Contractor shall always have available Material Safety Data Sheets or Product Safety Data Sheets for all Hazardous Materials utilized on-site, such as fuel, and readily available. Immediate notification of ARFF is required for any Hazardous Material Spill.

Moreover, previous environmental investigations within the boundary of the Oxnard Airport have revealed the presence of very low concentrations of Perfluoroalkyl or Polyfluoroalkyl Substances (PFAS) within the soil. As such, there is potential for the excavated soil material from existing Taxiway A (proposed Taxiway F) and existing Taxiways A through E (proposed Taxiways A1 through A5) to

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contain PFAS compounds. While the reported concentrations of PFAS do not exceed regulatory screening levels for construction worker safety, they do exceed levels for the protection of groundwater. Thus, testing will be completed by the Owner prior to construction to determine whether PFAS is within the unclassified excavation material within the existing Taxiway F (proposed Taxiway A) project boundary. The PFAS contaminated soils will be required to be stockpiled within the Airport boundary at the location marked on Sheet G051 while the cleared uncontaminated soils will be hauled offsite. The contaminated soil will be placed onto a 6-millimeter thick visqueen plastic sheeting and uniformly graded into a single stockpile not to exceed five feet in height; and covered with plastic sheeting that is weighed down and secured at the edges to prevent exposure to wind and rain per SP-100-1.30. The stockpile will be moistened to minimize dust emissions during stockpiling, as necessary, and configured in such a manner that surface water runoff from the stockpile and surrounding areas does not carry stockpile material and/or leachate beyond the stockpile perimeter berm. A Health and Safety Plan shall be prepared in accordance with the federal and state OSHA HAZWOPER standards: 29 CFR 1910.120 and 8 CCR Section 5192.

9. NOTIFICATION OF CONSTRUCTION ACTIVITIES

Prior to commencing any construction activities as well as prior to beginning a new construction phase the Contractor shall notify the Resident Engineer and Airport Operations 72 hours in advance. During construction activities the Contractor shall immediately notify the Resident Project Representative and Airport Operations of any conditions that may adversely affect the operational safety of the Airport.

A. LIST OF RESPONSIBLE REPRESENTATIVES/POINTS OF CONTACT

Agency Name	Type of Agency	Telephone No.
Airport Operations	Airport Operations	(805) 947-6804
Ventura County Director of Airports, Keith Freitas	Director of Airports	(805) 388-4200
Ventura County Deputy Director of Airports, Dave Nafie	Deputy Director of Airports	(805) 388-4201
Ventura County Projects Manager, Erin Powers	Ventura County Project Management	(805) 388-4205 Office (805) 947-6800 Cell
Ventura County Airport Operations Supervisor, Sean Herder	Ventura County Airport Operations Supervisor	(805) 382-3024 Office (805) 947-6798 Cell
Ventura County Airport Operations, Luis Ortiz	Ventura County Airport Operations	(805) 382-3024 Office (805) 402-9971 Cell
FAA Air Traffic Manager, Lee Westfall	FAA Air Traffic Manager	(805) 984-2014
Jviation, a Woolpert Company, Amanda Gross	Deputy Project Manager	(720) 454-2076 Cell
Jviation, a Woolpert Company, Matt Gilbreath	Project Manager	(720) 951-5317 Cell

B. NOTICES TO AIR MISSIONS (NOTAM)

Only the airport operations staff may initiate or cancel NOTAMs on airport conditions, and is the only entity that can close or open a runway or taxiway. The operations staff must coordinate the issuance, maintenance, and cancellation of NOTAMs about airport conditions resulting from

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construction activities and must provide information on closed or hazardous conditions on airport movement areas to the FAA Flight Service Station (FSS) so it can issue a NOTAM. The Contractor must notify the Resident Engineer and Operations Manager when scheduling/scoping for the project has changed that would require a modification to the NOTAM's.

C. EMERGENCY NOTIFICATION PROCEDURES

In an event of an emergency, the Contractor shall notify the Resident Engineer and Airport staff. If necessary, the Contractor shall contact 911 and Airport Emergency.

Agency Name	Type of Agency	Telephone No.
Emergency	Emergency	911
Department of Airports Emergency Line	Aircraft Rescue and Fire Fighting	(805) 947-6804
Los Angeles Air Route Traffic Control Center	Air Route Traffic Control Center	(661) 575-2052
ATCT Radio Emergency	ATCT Radio Emergency	(805) 382-1570 (Emergency use only)
Oxnard Police Department	Police Department	(805) 385-7600 Or 911
Oxnard Fire Department	Fire Department	(805) 385-7722
Ventura County Medical Center	Hospital	(805) 652-6000 Or 911
Community Memorial	Hospital	(805) 278-0511 Or 911
California Poison Center	Poison Center	(800) 222-1222

D. COORDINATION WITH ARFF PERSONNEL

In an event that the Contractor must coordinate construction activities with ARFF Personnel, the Contractor will notify Airport staff or Resident Engineer. The Airport staff or Resident Engineer will be responsible to notify the event to ARFF Personnel. There are no planned interruptions to water lines associated with this project.

E. NOTIFICATION TO THE FAA

Any person proposing construction or alteration of objects that affect navigable airspace, as defined in Part 77, must notify the FAA. This includes construction equipment and proposed parking areas for this equipment.

Coordination with the FAA will be required to implement night closures. No work requiring runway closure will be permitted during the FAA moratorium dates. The Resident Project Representative will coordinate all associated activities with the Airport Manager and Airport Traffic Control Tower (ATCT) in order to ensure that the appropriate local NOTAMs are issued whenever personnel or equipment are adjacent to the runway or other movement areas.

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Regarding any NAVAID's damage, the Airport shall contact 1-866-432-2622.

During the entire duration of Schedule I, Phase 1 of the project, the FAA Runway 25 Glideslope will need to be turned off while within the glideslope critical area. The FAA NAVAIDs consisting of the Runway 25 MALSF, Runway 25 Localizer, Runway 25 Glideslope, Runway 25 PAPI, and Runway 7 PAPI will be turned off by the FAA for the two days of Runway 7-25 closure during preconstruction mobilization. The Contractor will be responsible for any damage to any other NAVAIDS. If a shutdown of a NAVAID is required of more than 24 hours or more than 4 hours daily on consecutive days a minimum notice of 45 days must be given to the FAA ATO/Technical Operations prior to the shutdown commencing.

10. INSPECTION REQUIREMENTS

A. DAILY (OR MORE FREQUENT) INSPECTIONS

Inspections shall be conducted daily and more frequently if necessary, by the Contractor and the Resident Project Representative to ensure conformance with this document. The checklist provided at the end of this report was copied from FAA AC 150/5370-2G Appendix D, *Construction Project Daily Safety Inspection Checklist*. This checklist shall be completed by the Contractor to the Engineer's satisfaction and the Contractor shall submit a copy of all the completed checklists to the Engineer and the Airport Operations Manager. The Contractor should fill out this checklist everyday construction operations occur on this project. Any deficiencies identified during inspection or otherwise shall be remedied immediately.

B. FINAL INSPECTIONS

Final inspections shall be conducted after every construction phase is complete as detailed in Section 2 of this document. The final inspection should be completed with the Contractor, Resident Project Representative, and Airport Operations Manager.

11. UNDERGROUND UTILITIES

Prior to beginning excavation activities, the Contractor shall notify the Resident Project Representative and Airport Operations at least 3 working days prior to the scheduled excavation. The FAA shall attempt to locate all of their underground cables that are located in the vicinity of the work areas, prior to construction in the area. The Contractor shall attempt to locate the Sponsor's underground cables and other sub-surface utilities prior to construction. Damage to the underground cables, whether FAA's or Sponsor's, through negligence on the part of the Contractor will require replacement by the Contractor at no cost to the Sponsor. Any splicing or replacing of damaged cable shall meet current FAA specifications. Damage to other underground utilities through Contractor's negligence shall be repaired according to the relevant utility's standards and at no cost to the Sponsor. Additionally, prior to beginning excavation activities the Contractor shall notify California 811 to coordinate any underground locates of public services. In the event of an accidental utility disruption OXR Airport Operations and/or ARFF will be contacted at the numbers listed in Section 9.A.

12. PENALTIES

All penalties are specified under the Contract Documents for this project. The Contractor is responsible for any penalties that the Airport may distribute.

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13. SPECIAL CONDITIONS

The contractor shall provide the necessary dust control to ensure that dust from the haul routes and construction areas is kept to a minimum.

14. RUNWAY AND TAXIWAY VISUAL AIDS

A. GENERAL

Incremental sections of transitions along existing Taxiways A through E (proposed Taxiways A1 through A5) and existing Taxiway F (proposed Taxiway A) will be closed during this project. The Contractor will need to install approved lighted, low-profile barricades to close off the various construction areas. In addition to the barricades, the Contractor will need to cover the taxiway lights/signs with an approved method along the closed section of taxiway.

B. MARKING

The procedure to close off the apron/taxiway for construction shall consist of placing barricades and flashers on the perimeter of the construction. A closed taxiway "X" and low-profile barricades located outside of the TSA of existing Taxiway F (proposed Taxiway A) will be utilized during Schedule I as shown in the phasing plan sheets at the end of this document and as directed by the Engineer.

C. LIGHTING AND VISUAL NAVAIDS

Incremental sections of transitions along existing Taxiways A through E (proposed Taxiways A1 through A5) and existing Taxiway F (proposed Taxiway A) will be closed during this project. The Contractor will need to install approved lighted, low-profile barricades during the various phases of work. In addition to the barricades, the contractor will need to cover the taxiway lights with an approved method along the closed section of existing Taxiway F (proposed Taxiway A).

D. SIGNS, TEMPORARY, INCLUDING ORANGE CONSTRUCTION SIGNS, AND PERMANENT SIGNS

In addition to erecting barricades and covering lights, the Contractor will need to cover any taxiway and/or runway directional signs that lead to closed pavements during construction.

15. MARKING AND SIGNS FOR ACCESS ROUTES

All required signs and markings shall conform to Advisory Circular 150/5340-18, *Standard for Airport Sign Systems*, and to the Federal Highway Administration Manual on Uniform Traffic Control Devices (MUTCD), to the extent possible. Signs adjacent to areas used by aircraft must comply with the frangible requirements as stated in Advisory Circular, *Frangible Connections*. The location and design of any signs will be directed by the Engineer or Airport Operations Manager and the signs shall be provided and installed by the Contractor.

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16. HAZARD MARKINGS AND LIGHTINGS

A. PURPOSE

The hazard marking and lighting prevents pilots from entering areas closed to aircraft, and prevents construction personnel from entering areas open to aircraft. Prior to construction on or adjacent to any taxiway or apron, the Contractor shall, upon approval by the Engineer, close the taxiway and/or apron, in accordance with the specific phasing plan associated with that phase, prior to beginning work. The Contractor shall be responsible for clearly marking and defining the closed taxiways by use of warning lights, barricades, flags and closed taxiway or runway markings in conformance with Advisory Circular 150/5370-2G. The Contractor shall be responsible for maintaining these barricades and keeping them clearly visible at all times. The Contractor's individuals responsible, as well as their contact information, for the maintenance of the hazard marking and lighting equipment are listed in Section 9 A. of this document.

Specific marking and lighting equipment details, location and other pertinent information regarding hazard marking materials including low-profile barricades are shown on the Construction Safety Drawings, attached to the back of this document. Please note that each phase may have unique details. Additionally, prior to any deviations in location or type of hazard marking materials shall be coordinated with the Resident Engineer and Airport Operations.

B. EQUIPMENT

Approved low-profile barricades are to identify and define the limits of construction and hazardous areas on airports. Physical requirements and spacing of the barricades are specified in the construction drawings for this project. The barricades must be weighted down per the manufacturer's recommendations to prevent the barricades from moving due to wind or jet blast.

The flashing lights on the approved barricades must meet the luminance requirement of the State Highway Department. The flashing lights must be red or an approved equal. Orange flags shall be utilized on the opposite end of the barricades as well.

17. PROTECTION OF RUNWAY AND TAXIWAY AREAS

A. RUNWAY SAFETY AREA (RSA)

The Airport defines the Safety Area for Runway 7/25 as the area that is within 75 feet from the centerline of Runway 7/25 ends. During the construction process, construction personnel must not enter into any active Runway Safety Areas unless required by the project phasing and approved by the Airport.

B. RUNWAY OBJECT FREE AREA (ROFA)

The Airport defines the ROFA for Runway 7/25 as the area that is within 250 feet from the centerline of Runway 7/25. Construction personnel shall not enter active ROFAs unless required by the project phasing and approved by the Airport. Equipment must be removed from the ROFA when not in use and no material shall be stockpiled inside the ROFA. Any embankments in the ROFA would require submitting the 7460-1 form and justification provided to the appropriate FAA Airports Regional or District Office for approval.

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C. TAXIWAY SAFETY AREA (TSA)

The Airport defines the Safety Area for existing Taxiway F (proposed Taxiway A) as the area that is within 39.5 feet from the centerline of existing Taxiway F (proposed Taxiway A). During the construction process, construction personnel must not enter into any active Taxiway Safety Areas unless required by the project phasing and approved by the Airport.

Open trenches and excavations are not permitted within the TSA while the taxiway is open. If possible, backfill trenches before the taxiway is opened. If the taxiway must be opened before excavations are backfilled, cover the excavations appropriately. No open trenches within any taxiway safety areas are anticipated during this project.

Soil erosion must be controlled to maintain TSA standards, that is, the TSA must be cleared and graded and have no potentially hazardous ruts, humps, depressions, or other surface variations, and capable, under dry conditions, of supporting aircraft rescue and firefighting equipment, snow removal equipment, and the occasional passage of aircraft without causing structural damage to the aircraft.

D. TAXIWAY OBJECT FREE AREA (TOFA)

The Airport defines the Object Free Area for existing Taxiway F (proposed Taxiway A) as the area that is within 62 feet from the centerline of existing Taxiway F (proposed Taxiway A). Signs/embankments/equipment within the TOFA must comply with the frangible requirements as stated in Advisory Circular, *Frangible Connections*.

Construction personnel shall not enter active TOFAs unless required by the project phasing and approved by the Airport. Prior to beginning work with the Taxiway Object Free Area coordination with the Airport will be completed. Coordination will include the issuance of a NOTAM advising taxiing pilots of the hazard and recommending reducing the taxiing speed to a maximum of 10 mph. A 10-foot clearance will be maintained between equipment and materials and any part of the aircraft. The Contractor will be required to furnish flaggers to direct and control construction equipment and construction personnel. The Contractor will monitor radio communications to predict aircraft movements and all equipment and personnel will be directed to clear the Taxiway Object Free area prior to the arrival of aircraft.

E. OBSTACLE FREE ZONE (OFZ)

The Airport defines the Obstacle Free Zone for Runway 7/25 as the area that is within 200 feet from the centerline of Runway 7/25. Personnel, material, and/or equipment may not penetrate the OFZ while the runway is open for aircraft operations. If it is necessary to enter the OFZ, it would be necessary to coordinate with the FAA.

F. RUNWAY APPROACH/DEPARTURE SURFACES

All personnel, materials, and/or equipment must remain clear of the applicable threshold siting surfaces, as defined in Appendix 2, "Threshold Siting Requirement," of Advisory Circular 150/5300-13.

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18. OTHER LIMITATIONS ON CONSTRUCTION

A. PROHIBITIONS

The use of open flame welding or torches is prohibited unless adequate fire safety precautions are provided and the Airport Operations Manager has approved their use. The use of flare pots within the AOA is prohibited at all times. The use of electrical blasting caps is prohibited on or within 1,000 feet of the Airport property.

During times of low visibility or as directed by Airport Operations, hauling operations to the concrete rubble/waste area will be suspended. If applicable, areas that cannot be worked on simultaneously, work hour restrictions and/or seasonal restrictions are identified on the construction phasing documents.

B. RESTRICTIONS

Construction suspension may be required during specific Airport operations. Project areas may be worked on simultaneously only if approved by the Resident Engineer and Airport Operations Manager. Night construction may only be performed if approved by the Resident Engineer and Airport Operations Manager. Construction operations shall only be allowed in weather conditions compliant with the project specifications.

19. DUST CONTROL

The Contractor is responsible for controlling dust from the construction site at all times. The Contractor shall have a water truck and operator available 24 hours a day to control dust since the project's locations is near active runways, taxiways, and aprons. It is critical for the contractor to keep dust to an absolute minimum both during construction and after construction until the exposed surfaces contain suitable vegetation. The Contractor shall provide the Resident Project Representative and Airport Operations with a contact for 24-hour dust control.

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APPENDIX A

CONSTRUCTION SAFETY DRAWINGS

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1. COORDINATION

ALL COORDINATION WILL TAKE PLACE THROUGH THE RESIDENT ENGINEER, OXNARD AIRPORT (OXR) OPERATIONS MANAGER, AND COUNTY OF VENTURA DEPARTMENT OF AIRPORTS PROJECT ADMINISTRATOR. NO CLOSURES WITHIN THE MOVEMENT AREAS WILL BE PERMITTED WITHOUT A NOTAM IN PLACE FOR EACH SPECIFIC CLOSURE. PRIOR TO COMMENCEMENT OF ANY WORK, THE CONTRACTOR SHALL GIVE 72 HOURS ADVANCE NOTICE TO THE RESIDENT ENGINEER AND AIRPORT OPERATIONS FOR FILING OF ALL NOTAMS.

A WEEKLY CONSTRUCTION PROGRESS MEETING WILL BE REQUIRED TO DISCUSS ALL OPERATIONAL SAFETY TOPICS THAT HAVE BEEN AFFECTED OR WILL BE AFFECTED IN THE NEAR FUTURE. IN ATTENDANCE WILL BE THE CONTRACTOR, ENGINEER, AND OXR PERSONNEL.

ANY CHANGES TO SCOPE OR SCHEDULE MUST BE NOTIFIED TO THE ENGINEER, OXNARD AIRPORT (OXR) OPERATIONS MANAGER, AND COUNTY OF VENTURA DEPARTMENT OF AIRPORTS PROJECT ADMINISTRATOR. ALL PARTIES WILL EVALUATE THE IMPACT OF THE CHANGE AND WILL DETERMINE THE MEASURES NEEDED TO MAINTAIN A SAFE CONSTRUCTION SITE.

THE FAA AIR TRAFFIC OPERATORS WILL BE NOTIFIED IMMEDIATELY IF ANY CHANGES AFFECT AIRCRAFT MOVEMENT. ALL COMMUNICATIONS WITH THE FAA TOWER WILL BY HANDLED BY AIRPORT OPERATIONS.

AIRPORT RUNWAYS AND TAXIWAYS SHOULD REMAIN IN USE BY AIRCRAFT TO THE MAXIMUM EXTENT POSSIBLE.

AIRCRAFT USE OF AREAS NEAR THE CONTRACTOR'S WORK SHOULD BE CONTROLLED TO MINIMIZE DISTURBANCE TO THE CONTRACTOR'S OPERATION.

CONSTRUCTION THAT IS WITHIN THE SAFETY AREA OF AN ACTIVE RUNWAY, TAXIWAY, OR APRON MUST BE PERFORMED WHEN THE RUNWAY, TAXIWAY, OR APRON IS CLOSED OR USE-RESTRICTED AND INITIATED ONLY WITH PRIOR PERMISSION FROM THE AIRPORT OPERATOR AND WITH PROPER NOTAMS IN PLACE.

THE CONTRACTING OFFICER, AIRPORT OPERATOR, OR OTHER DESIGNATED AIRPORT REPRESENTATIVE MAY ORDER THE CONTRACTOR TO SUSPEND OPERATIONS; MOVE PERSONNEL, EQUIPMENT, AND MATERIALS TO A SAFE LOCATION; BARRICADE ANY OPEN TRENCHES AND STAND BY UNTIL AIRCRAFT USE IS COMPLETED.

2. PHASING

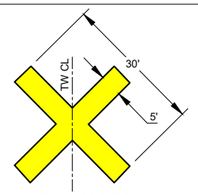
THIS PROJECT CONSISTS OF ONE SCHEDULE WORK AND THREE PHASES. SEE CONSTRUCTION SAFETY DRAWINGS FOR PHASING REQUIREMENTS.

CONTRACTOR TO NOTIFY ENGINEER, OXNARD AIRPORT (OXR) OPERATIONS MANAGER, AND COUNTY OF VENTURA DEPARTMENT OF AIRPORTS PROJECT ADMINISTRATOR IF A CHANGE IN SCHEDULE IS NEEDED.

3. AREAS AND OPERATIONS AFFECTED BY CONSTRUCTION ACTIVITY

ALL WORK WITHIN AIRPORT OPERATIONS AREA (AOA) SHALL CONFORM TO ADVISORY CIRCULAR 150/5370-2G, OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION.

CONTRACTOR SHALL ADHERE TO REQUIREMENTS AS MENTIONED ON THIS SHEET, THE CONSTRUCTION SAFETY AND PHASING PLAN (CSPP), AND CONSTRUCTION SAFETY DRAWINGS. THESE REQUIREMENTS INCLUDE, BUT ARE NOT LIMITED TO, LIFE & SAFETY ACCESS ROUTES, AIRCRAFT ROUTES, PEDESTRIAN ROUTES, CONSTRUCTION ACCESS ROUTES, CONSTRUCTION LIMITS, AND BARRICADE LOCATIONS.



CONSTRUCT CLOSED TAXIWAY "X" WITH ANY OF THE FOLLOWING: DOUBLE-LAYERED PAINTED SNOW FENCE, COLORED PLASTIC, PAINTED SHEETS OF PLYWOOD OR SIMILAR MATERIALS. CONTRACTOR TO ENSURE THAT MATERIALS ARE PROPERLY CONFIGURED AND SECURED TO PREVENT MOVEMENT FROM JET BLAST OR WIND. CLOSED TAXIWAY "X" SHALL BE LESS THAN 3-INCHES THICK.

1 TAXIWAY CLOSURE "X" DETAIL

NOT TO SCALE

1. THE CONTRACTOR SHALL OBTAIN THREE (INCLUDES 1 SPARE) LIGHTED RUNWAY CLOSURE MARKERS (RCM'S). THE RCM'S SHALL BE CERTIFIED TO MEET THE REQUIREMENT TO SCALE OF FAA SPECIFICATION L-893. ACCEPTANCE OF THE RCM'S SHALL BE MADE BY THE ENGINEER UPON DELIVERY TO THE PROJECT. DURING CONSTRUCTION, THE CONTRACTOR SHALL PLACE THE MARKERS OVER RUNWAY DESIGNATION NUMBERS AT ALL TIMES WHEN THE RUNWAYS ARE CLOSED TO AIR TRAFFIC. THE CONTRACTOR SHALL FURNISH ALL ALL DIESEL FUELS, OIL CHANGES, FILTERS, LAMPS MAINTENANCE AND REPAIRS ENCOUNTERED DURING THE PROJECT. ANY DAMAGE WHICH RESULTS FROM THE CONTRACTOR'S NEGLIGENCE, SHALL BE REPAIRED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE AIRPORT. RCM'S SHALL BE TRANSFERRED AND STORED ON AN IMPROVED SURFACE. ALL COSTS ASSOCIATED WITH THE PROCUREMENT/RENTAL DELIVERY. USE, OPERATION, AND MAINTENANCE OF RCM'S SHALL BE INCLUDED IN ITEM SP-100a.
2. RCM'S SHALL BE PORTABLE, TRAILER MOUNTED, GENERATOR POWERED UNIT, CAPABLE OF PRODUCING A LIGHTED, FLASHING CROSS, MANUFACTURED BY SHERWIN INDUSTRIES, OR AN APPROVED EQUAL.
3. CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO THE RCMS CAUSED BY CONTRACTOR OPERATIONS.

2 LIGHTED RUNWAY CLOSURE "X" NOTE

NOT TO SCALE

4. PROTECTION OF NAVIGATION AIDS (NAVAIDS)

NAVIGATIONAL AIDS INCLUDE INSTRUMENT LANDING SYSTEM (ILS) COMPONENTS, MEDIUM INTENSITY APPROACH LIGHTING SYSTEM (MALSF), PRECISION APPROACH PATH INDICATORS (PAPI) AND AIRPORT SURVEILLANCE RADAR. SUCH RESTRICTED AREAS ARE DEPICTED ON CONSTRUCTION PLANS. DURING CONSTRUCTION, NO NAVAID EQUIPMENT WILL BE RELOCATED. THE CONTRACTOR WILL BE RESPONSIBLE FOR ANY DAMAGE TO THE EXISTING NAVAIDS AND WILL BE REPAIRED BY THE CONTRACTOR AT NO COST TO THE AIRPORT.

5. CONTRACTOR ACCESS

CONTRACTOR HAS ACCESS TO TWO (2) GATES TO ENTER THE AIRPORT AND ONE (1) GATE TO ACCESS THE QA/QC TRAILERS. SEE CONSTRUCTION SAFETY DRAWINGS FOR GATE LOCATION. CONTRACTOR SHALL PROVIDE A GATE GUARD AT THIS GATE AT ALL TIMES WHEN GATE IS NOT CLOSED AND LOCKED.

CONTRACTOR MOVEMENT SHALL BE RESTRICTED TO THE PRE-DETERMINED ACCESS ROUTES AS SHOWN ON CONSTRUCTION SAFETY DRAWINGS.

ALL VEHICLES AND EQUIPMENT OPERATING IN THE AOA MUST BE IDENTIFIED CLEARLY WITH 8-INCH (MINIMUM) BLOCK-TYPE CHARACTERS OF A CONTRASTING COLOR AND EASY TO READ. IN ADDITION, VEHICLES MUST DISPLAY IDENTIFICATION MEDIA, AS SPECIFIED IN THE APPROVED AIRPORT SECURITY PLAN.

ALL VEHICLES AND EQUIPMENT OPERATING IN THE AOA MUST HAVE FLAG (DAY ONLY) OR BEACON (DAY AND NIGHT) ATTACHED TO THE VEHICLE.

CONTRACTOR IS REQUIRED TO ADHERE TO ALL RULES AND REGULATIONS AS SET BY OXR AND ADVISORY CIRCULAR 150/5370-2G, OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION.

ALL APPROVED DRIVERS MUST ATTEND THE AIRPORT DRIVING CLASS. THIS TRAINING IS REQUIRED FOR ALL PERSONNEL THAT ARE REQUIRED TO OPERATE A VEHICLE IN THE AOA WITHOUT AN ESCORT.

VEHICLE TRAFFIC LOCATED IN OR CROSSING AN ACTIVE MOVEMENT AREA MUST BE ESCORTED BY THE RESIDENT PROJECT REPRESENTATIVE OR A KEY CONTRACTOR PERSONNEL WHO HAS ATTENDED THE AIRPORT DRIVER DRAINING WHO WILL BE IN RADIO CONTACT WITH THE TOWER. THE DRIVER, THROUGH PERSONAL OBSERVATION, SHOULD CONFIRM THAT NO AIRCRAFT IS APPROACHING THE VEHICLE POSITION. CONTRACTOR PERSONNEL MAY OPERATE IN THE MOVEMENT AREA WITHOUT TWO-WAY RADIO COMMUNICATION PROVIDED A NOTAM IS ISSUED CLOSING THE AREA AND THE AREA IS PROPERLY MARKED TO PREVENT INCURSIONS.

5. CONTRACTOR ACCESS (CONTINUED)

CONTINUOUS MONITORING IS REQUIRED ONLY WHEN EQUIPMENT MOVEMENT IS NECESSARY IN CERTAIN AREAS. CONTRACTOR SHALL NOT COMMUNICATE DIRECTLY WITH THE TOWER OR CTAF. ALL TOWER COMMUNICATION SHALL BE PERFORMED BY AIRPORT OPERATIONS.

CONTRACTOR IS REQUIRED TO NOTIFY AND COORDINATE WITH THE RESIDENT ENGINEER AND AIRPORT OPERATIONS PRIOR TO ENTERING ANY ACTIVE SURFACE SAFETY AREAS OR OBJECT FREE AREAS.

CONTRACTOR, SUBCONTRACTOR, AND SUPPLIER EMPLOYEES OR ANY UNAUTHORIZED PERSONS ARE RESTRICTED FROM ENTERING AN AIRPORT AREA THAT WOULD BE HAZARDOUS.

6. WILDLIFE MANAGEMENT

CONTRACTOR SHALL ADHERE TO ALL WILDLIFE MANAGEMENT PRACTICES AS STATED IN ADVISORY CIRCULAR 150/5200-33 (LATEST EDITION), HAZARDOUS WILDLIFE ATTRACTIONS ON OR NEAR AIRPORTS, AND CERTALERT 98-08, GRASSES ATTRACTIVE TO HAZARDOUS WILDLIFE.

CONTRACTOR IS RESPONSIBLE FOR COMPLETING A DAILY INSPECTION FOR TRASH, FOREIGN OBJECTS, AND STANDING WATER ON THE CONSTRUCTION SITE THAT MIGHT ATTRACT WILDLIFE.

CONTRACTOR SHALL MAINTAIN ALL FENCES AND GATES THROUGHOUT THE PROJECT TO THE SATISFACTION OF THE RESIDENT ENGINEER.

CONTRACTOR SHALL NOTIFY THE RESIDENT ENGINEER WHEN A WILDLIFE SIGHTING HAS OCCURRED ON THE PROJECT SITE.

7. FOREIGN OBJECT DEBRIS (FOD) MANAGEMENT

CONTRACTOR SHALL KEEP ALL PAVEMENTS IN THE AOA INCLUDING APRONS, TAXIWAYS, AND RUNWAYS FREE FROM FOD AT ALL TIMES TO PREVENT ANY DEBRIS FROM BEING INGESTED INTO AN AIRCRAFT'S ENGINE OR ANY DEBRIS FROM BEING LAUNCHED DUE TO JET BLAST.

CONTRACTOR IS REQUIRED TO CONTINUOUSLY MONITOR AND MAINTAIN FOD TO THE SATISFACTION OF THE RESIDENT ENGINEER.

PRIOR TO OPENING ANY PAVEMENT TO AIRCRAFT, THE CONTRACTOR, RESIDENT ENGINEER, AND AIRPORT OPERATIONS SHALL CONDUCT A SWEEP OF THE PAVEMENT TO VERIFY THAT THE PAVEMENT IS FREE FROM FOD.

THE CONTRACTOR IS ADVISED THAT DUST CONTROL, CLEANUP OF ACTIVE PAVEMENTS, TRACKING DEBRIS ONTO ACTIVE PAVEMENT AND GENERAL JOBSITE CLEANLINESS IS A SERIOUS SAFETY CONCERN. FOREIGN OBJECT DEBRIS (FOD) IS CONSIDERED AS ANY ITEM THAT COULD POSSIBLY IMPACT THE OPERATIONS OF AN AIRPORT OR ROADWAY. FOD COULD CAUSE INJURY OR DEATH THROUGH INGESTION IN MOVING AIRCRAFT ENGINES. SPECIFIC ITEMS OF CONCERN INCLUDE, BUT ARE NOT LIMITED TO; ANY PACKAGING FROM MATERIAL INSTALLATION, GRAVEL LEFT ON ACTIVE PAVEMENTS, DUST TRACKED ONTO ACTIVE PAVEMENTS, HAND TOOLS, HARDWARE DROPPED, ETC.

8. HAZARDOUS MATERIAL (HAZMAT) MANAGEMENT

CONTRACTOR SHALL NOTIFY RESIDENT ENGINEER AND AIRPORT EMERGENCY PERSONNEL IF HAZARDOUS MATERIALS ARE ENCOUNTERED ON THIS PROJECT.

9. NOTIFICATION OF CONSTRUCTION ACTIVITIES

AGENCY NAME	AGENCY TYPE	TELEPHONE
AIRPORT EMERGENCY	AIRCRAFT RESCUE AND FIRE FIGHTING	(805) 947-6804 OR 911
OXNARD POLICE DEPARTMENT	POLICE DEPARTMENT	(805) 385-7600 OR 911
OXNARD FIRE DEPARTMENT	FIRE RESCUE	911
VENTURA COUNTY MEDICAL CENTER	HOSPITAL	(805) 652-6000 OR 911
AIRPORT OPERATIONS	AIRPORT OPERATIONS	(805) 947-6804
JVIATION CONSTRUCTION MANAGER	CONSTRUCTION MANAGEMENT	TBD

BEFORE BEGINNING ANY CONSTRUCTION ACTIVITY, THE CONTRACTOR MUST, THROUGH THE RESIDENT ENGINEER AND AIRPORT OPERATIONS, GIVE NOTICE USING THE NOTICE TO AIR MISSIONS (NOTAM) SYSTEM OF PROPOSED LOCATION, TIME, AND DATE OF COMMENCEMENT OF CONSTRUCTION. THE NOTAM SHOULD STATE THAT, "PERSONNEL AND EQUIPMENT ARE WORKING ADJACENT TO RUNWAY 7/25 AND ASSOCIATED TAXIWAY CONNECTORS." ALL NOTAMS SHALL BE ISSUED BY OXR . UPON COMPLETION OF WORK AND RETURN OF ALL SUCH AREAS TO STANDARD CONDITIONS, THE CONTRACTOR MUST COORDINATE WITH THE RESIDENT ENGINEER AND VERIFY THE CANCELLATION OF ALL NOTICES ISSUED VIA THE NOTAM SYSTEM. THROUGHOUT THE PROJECT DURATION, THE CONTRACTOR MUST:

9. NOTIFICATION OF CONSTRUCTION ACTIVITIES (CONTINUED)

A. BE AWARE OF AND UNDERSTAND THE SAFETY PROBLEMS AND HAZARDS DESCRIBED IN ADVISORY CIRCULAR 150/5370-2G, OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION.
B. CONDUCT ACTIVITIES SO AS NOT TO VIOLATE ANY SAFETY STANDARDS CONTAINED IN ADVISORY CIRCULAR 150/5370-2G OR ANY OF THE REFERENCES THEREIN.
C. INSPECT ALL CONSTRUCTION AND STORAGE AREAS AS OFTEN AS NECESSARY TO BE AWARE OF CONDITIONS.
D. PROMPTLY TAKE ALL ACTIONS NECESSARY TO PREVENT OR REMEDY ANY UNSAFE OR POTENTIALLY UNSAFE CONDITIONS AS SOON AS THEY ARE DISCOVERED.
E. THE CONTRACTOR SHALL ADHERE TO THE REQUIREMENTS, PROVISIONS, AND PROCEDURES OUTLINED IN CONSTRUCTION SAFETY PHASING PLAN (SEE DIV. 6 OF THE CONTRACT DOCUMENTS).

ANY CHANGES TO SCOPE OR SCHEDULE MUST BE NOTIFIED TO THE RESIDENT ENGINEER AND OXNARD AIRPORT OPERATIONS MANAGER SO THAT NOTAMS CAN BE ISSUED, MAINTAINED, AND CANCELED. IN AN EVENT OF AN EMERGENCY, CONTRACTOR SHALL NOTIFY THE RESIDENT ENGINEER, OXNARD AIRPORT OPERATIONS MANAGER, AND AIRPORT EMERGENCY.

10. INSPECTION REQUIREMENTS

CONTRACTOR SHALL COMPLETE A DAILY INSPECTION FOR SAFETY ON THE PROJECT SITE BY COMPLETING THE CHECKLIST PROVIDED IN ADVISORY CIRCULAR 150/5370-2G, APPENDIX D, CONSTRUCTION PROJECT DAILY SAFETY INSPECTION CHECKLIST.

THE CONTRACTOR, RESIDENT ENGINEER AND AIRPORT OPERATOR MUST PERFORM ONSITE INSPECTIONS THROUGHOUT THE PROJECT, WITH IMMEDIATE REMEDY OF ANY DEFICIENCIES, WHETHER CAUSED BY NEGLIGENCE, OVERSIGHT, OR SCOPE CHANGE.

CONTRACTOR SHALL COMPLETE A FINAL INSPECTION FOR SAFETY ON THE PROJECT SITE AT THE END OF EACH PHASE.

11. RUNWAY AND TAXIWAY VISUAL AIDS

FLASHER BARRICADES, CLOSED 'X' MARKINGS AND RUNWAY CLOSURE MARKERS (RCMS) ARE TO BE PLACED AS DETAILED IN THE PLANS AND IN ALL DESIGNATED AREAS AS SHOWN ON THE CONSTRUCTION SAFETY DRAWINGS.

APPROVED FLASHER BARRICADES SHALL BE PROVIDED AND MAINTAINED BY THE CONTRACTOR.

CLOSED 'X' MARKINGS AND RCMS SHALL BE PROVIDED BY THE CONTRACTOR AND MAINTAINED BY THE CONTRACTOR.

CONTRACTOR TO COVER ALL TAXIWAY EDGE LIGHTS, TAXIWAY SIGNS, RUNWAY SIGNS, AND APRON EDGE LIGHTS FOR AREAS CLOSED BY NOTAM TO THE APPROVAL OF THE RESIDENT ENGINEER.

12. MARKING AND SIGNS FOR ACCESS ROUTES

ALL REQUIRED SIGNS AND MARKINGS SHALL CONFORM TO ADVISORY CIRCULAR 150/5340-18 (LATEST EDITION), STANDARD FOR AIRPORT SIGN SYSTEMS, OR THE FEDERAL HIGHWAY ADMINISTRATION MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).

ALL SIGNS ADJACENT TO AREAS USED BY AIRCRAFT MUST COMPLY WITH THE FRANGIBLE REQUIREMENTS AS STATED IN ADVISORY CIRCULAR 150/5220-23, FRANGIBLE CONNECTIONS.

13. HAZARD MARKINGS AND LIGHTING

PRIOR TO CLOSING ANY AREAS IN THE AOA TO AIRCRAFT OR EMERGENCY TRAFFIC, CONTRACTOR MUST CLEARLY DEFINE CLOSED AREAS WITH WARNING LIGHTS, BARRICADES, CLOSED 'X' MARKINGS, RCMS, AND FLAGS TO THE APPROVAL OF THE RESIDENT ENGINEER. CONTRACTOR TO REFER TO CONSTRUCTION SAFETY DRAWINGS.

HAZARDOUS AREAS ON THE MOVEMENT AREA WILL BE MARKED WITH FLASHER BARRICADES. THESE BARRICADES RESTRICT ACCESS AND MAKE HAZARDS OBVIOUS TO AIRCRAFT, PERSONNEL, AND VEHICLES. DURING PERIODS OF LOW VISIBILITY AND AT NIGHT, IDENTIFY HAZARDOUS AREAS WITH RED FLASHING LIGHTS.

OPEN TRENCHES AND EXCAVATIONS MUST BE PROMINENTLY MARKED WITH RED OR ORANGE FLAGS AND LIGHTS AS APPROVED BY THE RESIDENT ENGINEER.

14. PROTECTION OF RUNWAY AND TAXIWAY AREAS

SAFETY AREAS - CONTRACTOR SHALL NOT IMPEDE ON THE SAFETY AREAS WITHOUT A CLOSURE OF THE RUNWAY/TAXIWAY BY MEANS OF A NOTAM.

OBJECT FREE AREAS - CONTRACTOR SHALL NOT PLACE EQUIPMENT, MATERIAL, OR STOCKPILES IN THIS AREA. ALL OBJECTS OR MATERIALS ADJACENT TO THIS AREA SHALL BE PROPERLY MARKED/LIT PER ADVISORY CIRCULAR 150/5370-2G. CONTRACTOR CANNOT WORK IN ACTIVE TAXIWAY OBJECT FREE AREA WITHOUT WING WALKERS TO MAINTAIN A 5' CLEARANCE FROM THE WINGSPAN OF THE AIRCRAFT TO CONSTRUCTION EQUIPMENT OR MATERIAL.

OBSTACLE FREE ZONE- CONTRACTOR TO PREVENT PERSONNEL, MATERIAL, AND/OR EQUIPMENT FROM PENETRATING THE OBSTACLE FREE ZONE AS DEFINED IN ADVISORY CIRCULAR 150/5300-13B.

15. AIRPORT SECURITY

CONTRACTOR SHALL ADHERE TO AIRPORT SECURITY REQUIREMENTS AT ALL TIMES. KEY CONSTRUCTION SUPERINTENDENTS AND ANY OTHER PERSONNEL DEEMED NECESSARY BY THE AIRPORT/CONTRACTOR SHALL ATTEND THE DRIVER CONSTRUCTION TRAINING TO OBTAIN AN AIRPORT ELECTRONIC ENTRY CARD AT THE EXPENSE OF THE CONTRACTOR PRIOR TO CONSTRUCTION. ALL OTHER CONSTRUCTION PERSONNEL SHALL BE ESCORTED AT ALL TIMES DURING AIRSIDE CONSTRUCTION.

16. OTHER LIMITATIONS ON CONSTRUCTION

PROHIBITING OPEN-FLAME WELDING OR TORCH CUTTING OPERATIONS UNLESS ADEQUATE FIRE SAFETY PRECAUTIONS ARE PROVIDED AND THESE OPERATIONS HAVE BEEN AUTHORIZED BY THE AIRPORT OPERATOR (AS TAILORED TO CONFORM TO LOCAL REQUIREMENTS AND RESTRICTIONS).

PROMINENTLY MARKING OPEN TRENCHES, EXCAVATIONS, AND STOCKPILED MATERIALS AT THE CONSTRUCTION AND LIGHTING THESE OBSTACLES DURING HOURS OF RESTRICTED VISIBILITY AND DARKNESS.

MARKING AND LIGHTING CLOSED, DECEPTIVE, AND HAZARDOUS AREAS ON AIRPORTS, AS APPROPRIATE. CONSTRAINING STOCKPILED MATERIAL TO PREVENT ITS MOVEMENT AS A RESULT OF THE MAXIMUM ANTICIPATED AIRCRAFT BLAST AND FORECAST WIND CONDITIONS.

NO USE OF TALL EQUIPMENTS (CRANES, CONCRETE PUMPS, AND SO ON) UNLESS A FAA 7460-1 DETERMINATION LETTER IS ISSUED FOR SUCH EQUIPMENT.

NO USE OF ELECTRICAL BLASTING CAPS ON OR WITHIN 1,000' OF THE AIRPORT PROPERTY.

NO USE OF FLARE POTS WITHIN THE AOA.

17. DUST CONTROL

CONTRACTOR IS RESPONSIBLE FOR CONTROLLING DUST FROM THE CONSTRUCTION SITE AT ALL TIMES. CONTRACTOR SHALL HAVE A WATER TRUCK AND OPERATOR AVAILABLE 24 HOURS A DAY TO CONTROL DUST. THE PROJECT'S LOCATION IS NEAR ACTIVE RUNWAYS AND HIGHWAYS AND IS IN A LOCATION THAT EXPERIENCES HIGH WIND. IT IS CRITICAL FOR THE CONTRACTOR TO KEEP DUST TO AN ABSOLUTE MINIMUM BOTH DURING CONSTRUCTION, AND AFTER CONSTRUCTION UNTIL THE EXPOSED SURFACES CONTAIN SUSTAINABLE VEGETATION. CONTRACTOR SHALL PROVIDE THE RESIDENT ENGINEER AND AIRPORT OPERATIONS WITH A CONTACT FOR 24 HOUR DUST CONTROL.

ISSUED FOR BID

THESE DRAWINGS ARE FOR DESIGN REVIEW AND ARE NOT INTENDED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES. THEY WERE PREPARED BY OR UNDER THE SUPERVISION OF:

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION® A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF TAXIWAY F

CONSTRUCTION SAFETY NOTES & DETAILS

AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

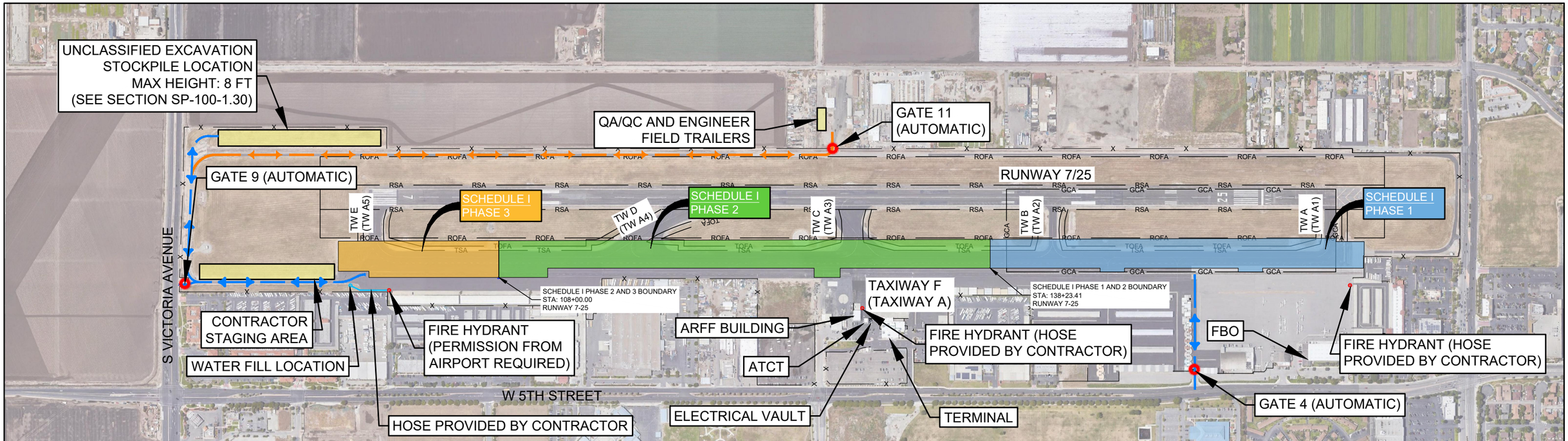
SHEET NAME G050

SHEET NO. 13 of 89

DRAWING NO. 1598-DOA

Plotted May 24, 2023 @ 3:26 PM by: Gross, Amanda
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\000-OXR-043-G050-SAFE.dwg

Exhibit 1



MOBILIZATION AND CONSTRUCTION SCHEDULE - 90 CALENDAR DAYS

SCHEDULE / PHASE	DURATION
SCHEDULE I	90 CALENDAR DAYS
SCHEDULE I, PRECONSTRUCTION MOBILIZATION	10 CALENDAR DAYS
SCHEDULE I, PHASE 1	28 CALENDAR DAYS
SCHEDULE I, PHASE 2	32 CALENDAR DAYS
SCHEDULE I, PHASE 3	20 CALENDAR DAYS

0 20 40 60 80 100 120

PHASING LEGEND

- CONTRACTOR HAUL ROUTE
- QC/QA TRAILER ACCESS ROUTE
- RSA — RUNWAY SAFETY AREA
- ROFA — RUNWAY OBJECT FREE AREA
- TSA — TAXIWAY SAFETY AREA (PROPOSED)
- TOFA — TAXIWAY OBJECT FREE AREA (PROPOSED)
- RPZ — RUNWAY PROTECTION ZONE
- GCA — GLIDE SLOPE CRITICAL AREA
- NAVAID CRITICAL AREA
- X — AOA FENCE
- CONTRACTOR GATE ACCESS
- FLAG PERSONNEL / GATE GUARD
- TAXIWAY TEMPORARY CLOSURE "X" (MATERIAL PER DETAIL 1/G050)
- RUNWAY CLOSURE LIGHTED "X"

SAFETY & OBJECT FREE AREAS

RUNWAY 7/25 - ADG B-II	
RUNWAY SAFETY AREA (RSA)	75' FROM RW CENTERLINE
RUNWAY OBJECT FREE AREA (ROFA)	250' FROM RW CENTERLINE
TAXIWAYS - TDG 2	
TAXIWAY SAFETY AREA (TSA)	39.5' FROM TW CENTERLINE
TAXIWAY OBJECT FREE AREA (TOFA)	62' FROM TW CENTERLINE

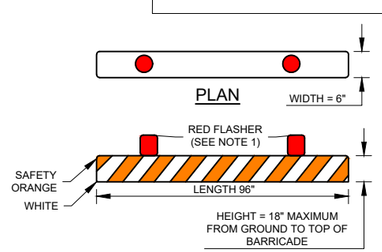
TAXIWAY NAME CHANGES

EXISTING DESIGNATOR*	PROPOSED DESIGNATOR
TAXIWAY F	TAXIWAY A
TAXIWAY A	TAXIWAY A1
TAXIWAY B	TAXIWAY A2
TAXIWAY C	TAXIWAY A3
TAXIWAY D	TAXIWAY A4
TAXIWAY E	TAXIWAY A5

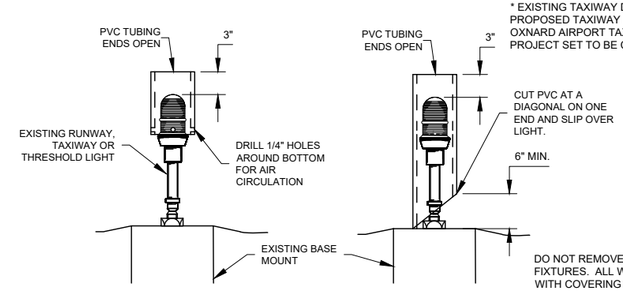
* EXISTING TAXIWAY DESIGNATORS WILL CHANGE TO PROPOSED TAXIWAY DESIGNATORS AS PART OF THE OXNARD AIRPORT TAXIWAY A-E RECONSTRUCTION PROJECT SET TO BE COMPLETED BY AUGUST, 2023.

GRAPHIC SCALE
300 0 300 600
(IN FEET)

1. FLASHER BARRICADES SHALL HAVE SOLAR FLASHING LIGHTS PER SP-100-1.12 AND WILL BE PROVIDED AND MAINTAINED BY THE CONTRACTOR AT ALL TIMES. CONTRACTOR SHALL ALSO PROVIDE SPARE BARRICADES, BATTERIES, AND LIGHT BULBS FOR MAINTENANCE DURING NIGHTTIME HOURS.
2. LOW-PROFILE BARRICADES TO BE PLACED AT 4' INTERVALS ADJACENT TO CONSTRUCTION, AS DIRECTED BY THE ENGINEER AND AS SHOWN ON THE PHASING SHEETS.
3. BARRICADES ARE TO BE PLACED IN LOCATIONS SHOWN ON THE PLANS AND AS DIRECTED BY THE ENGINEER THROUGHOUT ALL PHASES OF THE PROJECT. THE BARRICADE LOCATIONS PROVIDED ON THIS SHEET SHALL REMAIN THROUGHOUT CONSTRUCTION. ADDITIONAL BARRICADES WILL BE REQUIRED ACROSS PHASE SPECIFIC AREAS OF CLOSED PAVEMENT, AND ARE SHOWN ON PHASING SHEETS.
4. FLASHER BARRICADES WILL BE REQUIRED ALONG THE EDGE OF ANY VERTICAL DROP OFF GREATER THAN 3". AIRPORT OPERATIONS WILL ISSUE NOTAM TO ADVISE AIRCRAFT OF THIS CONDITION.
5. FLASHER BARRICADES ARE TO BE ADEQUATELY WEIGHTED SO THEY WILL REMAIN IN PLACE DURING TIMES OF HIGH WINDS OR AS APPROVED BY THE ENGINEER.



1 FLASHER BARRICADE DETAIL
NOT TO SCALE



2 TYPICAL COVERED LIGHT DETAILS
NTS

DO NOT REMOVE LIGHT BULBS FROM FIXTURES. ALL WORK ASSOCIATED WITH COVERING LIGHT FIXTURES SHALL BE CONSIDERED INCIDENTAL TO CONSTRUCTION OPERATIONS.

LOCATIONS OF COVERED LIGHT FIXTURES ARE LOCATED WITHIN THE CLOSURES ASSOCIATED WITH THE PHASING PLANS AND AS DIRECTED BY THE RPR OR AIRPORT.

ISSUED FOR BID

THESE DRAWINGS ARE FOR DESIGN REVIEW AND ARE NOT INTENDED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES. THEY WERE PREPARED BY OR UNDER THE SUPERVISION OF:

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

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OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA Department of Airports

DES: T.A.R.
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APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF TAXIWAY F

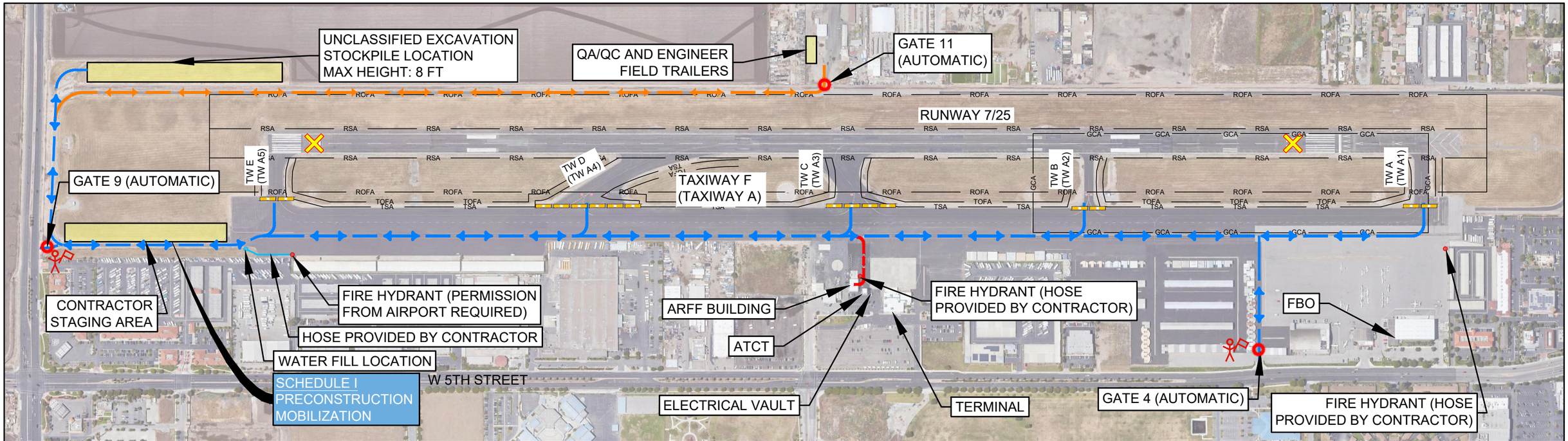
CONSTRUCTION SAFETY OVERALL PHASING PLAN

AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME G051
SHEET NO. 14 of 89
DRAWING NO. 1599-DOA

Plotted May 24, 2023 @ 3:27 PM by: Gross, Amanda
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\000-OXR-043-G051-CLPN.dwg

Exhibit 1



CONSTRUCTION PHASING NOTES

SCHEDULE 1 - PRECONSTRUCTION MOBILIZATION

DURATION
10 CALENDAR DAYS WITH 2 NIGHT CLOSURES DURING THIS PHASE

CONTRACTOR ACCESS TIMES (DAYTIME OPERATIONS)

- 24 HOUR ACCESS TO STAGING AREAS
- ALL AIRPORT OPERATION AREAS SHALL BE OPEN AND UNAFFECTED DURING THIS PHASE EXCEPT FOR NIGHTTIME WORK

CONTRACTOR ACCESS TIMES (NIGHTTIME OPERATIONS)

- NIGHTTIME ACCESS TO APPROVED WORK AREAS. THE CLOSURE WILL BEGIN NO EARLIER THAN 2200 AND WILL END NO LATER THAN 0600 ON THE FOLLOWING DAY. CONTRACTOR WORK HOURS WILL BE FROM 2200 TO 0600 TO ALLOW TIME FOR CLEANUP, AIRPORT INSPECTION AND TO ENSURE THAT RUNWAY 7/25 IS READY FOR DAYTIME OPENING AND ALL NAVAIDS ARE OPERATIONAL. THE CONTRACTOR MUST BE COMPLETELY OFF RUNWAY 7/25 AND ALL TRENCHES FILLED BY 0600.
- ALL AIRPORT OPERATION AREAS SHALL BE CLOSED DURING NIGHT TIME CLOSURES.
- TAXIWAY CONNECTOR BARRICADES SHALL BE REMOVED PRIOR TO OPENING THE RUNWAY EACH MORNING.

MAJOR WORK TO BE COMPLETED

MOBILIZATION

1. CONSTRUCTION EQUIPMENT AND MATERIAL MOBILIZATION

UTILITY

1. UTILITY POTHOLING

IMPACTS ON OPERATIONS

1. THE CONTRACTOR SHALL GIVE RIGHT OF WAY TO ALL AIRCRAFT AND EMERGENCY VEHICLES AT ALL TIMES.
2. THE CONTRACTOR SHALL MAINTAIN EMERGENCY VEHICLE ACCESS TO THE RUNWAY AT ALL TIMES.
3. IF AN EMERGENCY SITUATION ARISES REQUIRING AN AIRCRAFT TO UTILIZE THE RUNWAY AND/OR TAXIWAY DURING CONSTRUCTION, ALL EQUIPMENT AND PERSONNEL SHALL IMMEDIATELY EXIT THE RUNWAY AND/OR TAXIWAY AND STAGE OUTSIDE THE OBJECT FREE AREA.
4. NO WORK, OPEN EXCAVATIONS, EQUIPMENT, STOCKPILES, OR PERSONNEL ARE ALLOWED IN THE SAFETY AREAS OR OBJECT FREE AREAS FOR ANY ACTIVE TAXIWAY OR SAFETY AREAS FOR AN ACTIVE RUNWAY WHEN THE AIRPORT IS OPEN AND OPERATIONAL.
5. PRIOR TO OPENING THE RUNWAY OR TAXIWAY EACH MORNING TO AIRCRAFT, ALL AIRFIELD PAVEMENT WHERE WORK HAS OCCURRED OR EQUIPMENT HAS TRAVERSED SHALL BE SWEPT OR CLEARED WITH APPROVED EQUIPMENT TO REMOVE ANY FOD. ALL EXCAVATIONS AND TRENCHES IN THE SAFETY AREAS SHALL BE BACKFILLED AND COMPACTED TO P-152 SPECIFICATIONS. GRADING WITHIN THE SAFETY AREA SHALL CONFORM TO AC 150/5300-13 (CURRENT VERSION), CHAPTER 3. NO DROPS GREATER THAN 3-INCHES ARE ALLOWED IN THE RUNWAY SAFETY AREA. IF AREAS ARE FOUND TO BE DEFICIENT, THE CONTRACTOR MUST IMMEDIATELY CORRECT THE DEFICIENCY TO THE SATISFACTION OF THE RPR OR OXR STAFF. APPROVAL TO REOPEN TO AIRCRAFT TRAFFIC WILL BE PROVIDED BY AIRPORT OPERATIONS OR THE RPR.
6. AIRPORT PERIMETER SECURITY SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE QUALIFIED GATE GUARDS ALONG CONSTRUCTION ACCESS POINTS AT AIRPORT PERIMETER GATE LOCATIONS. GATES SHALL BE SECURELY CLOSED OR LOCKED AT ALL TIMES IF GATE GUARD IS NOT PRESENT OR GATES ARE NOT IN USE.
7. CONTRACTOR TO PROVIDE RUNWAY CLOSURE MARKERS (RCM's). CONTRACTOR SHALL INSTALL RUNWAY CLOSURE MARKERS ON THE "7" AND "25" RUNWAY DESIGNATIONS FOR THE DURATION OF EACH SCHEDULED RUNWAY CLOSURE. CONTRACTOR IS RESPONSIBLE FOR FUEL AND MAINTENANCE OF RUNWAY X'S.
8. CONSTRUCTION MARKERS, BARRICADES, AND RUNWAY CLOSURE MARKERS SHALL BE INSTALLED PER PHASING PLANS AND AS REQUIRED BY AC 150/5370-2 (CURRENT VERSION) OR AS DIRECTED BY THE RPR.
9. ALL STOCKPILES OR EQUIPMENT ADJACENT TO OBJECT FREE AREAS SHALL BE MARKED AND LIGHTED PER AC 150/5370-2 (CURENT VERSION).
10. THE CONTRACTOR SHALL HAVE A SWEEPER OR VACUUM TRUCK ON SITE AT ALL TIMES TO CLEAN DEBRIS FROM HAUL ROUTES, CONSTRUCTION ACCESS POINTS, OR AREAS ADJACENT TO CONSTRUCTION.
11. THE CONTRACTOR SHALL KEEP ALL CONSTRUCTION TRAFFIC LIMITED TO THE APPROVED HAUL ROUTES AS SHOWN ON THE PLANS OR AS APPROVED BY THE RPR. THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE CAUSED ALONG THE HAUL ROUTES OR CONSTRUCTION ACCESS ROUTES TO THE PROJECT SITE. HAUL ROADS WILL BE MAINTAINED AND RESTORED TO THEIR ORIGINAL CONDITION BY THE CONTRACTOR AT NO EXPENSE TO THE SPONSOR.
12. THE CONTRACTOR SHALL MINIMIZE DISTURBANCE IN AND AROUND FAA NAVIGATIONAL AIDS.
13. CONTRACTOR SHALL PARK ALL EQUIPMENT AND VEHICLES IN THE STAGING AREA AT NIGHT AND DURING PERIODS WHEN NO CONSTRUCTION ACTIVITIES ARE TAKING PLACE. NO EQUIPMENT SHALL BE LEFT UNATTENDED WITHIN THE RUNWAY OBJECT FREE AREA (ROFA).

OTHER NOTES

1. AIRPORT MANAGEMENT PERSONNEL WILL ISSUE NOTAM FOR ANY CONTRACTOR SCHEDULED ACTIVITIES AT LEAST 72 HOURS IN ADVANCE OF SAID ACTIVITY.
2. CONSTRUCTION EQUIPMENT THAT MAY DAMAGE AIRFIELD PAVEMENT WHILE CROSSING IT TO ACCESS WORK AREAS, SUCH AS THOSE WITH TRACKS, SHALL PROTECT THE PAVEMENT USING A METHOD APPROVED BY THE RPR.
3. OXR ATCT OPERATION HOURS: 7:00 AM - 9:00 PM LOCAL TIME MONITOR OXR GROUND - 121.9 MHZ.

   OXR ATCT CLOSURE HOURS: 9:00 PM TO 7:00 AM LOCAL TIME MONITOR OXR CTAF - 134.95 MHZ.
4. CONTRACTOR SHALL PROTECT ALL FAA COMMUNICATION LINES AND ESPECIALLY WHEN WORKING WITHIN EXISTING STORM DRAIN INFRASTRUCTURE. NOTIFY ENGINEER IMMEDIATELY IF DAMAGE OCCURS BY CONTRACTOR OPERATIONS.

PHASING LEGEND

- CONTRACTOR HAUL ROUTE
- QA/QC ACCESS ROUTE
- LIFE & SAFETY ROUTE
- AIRCRAFT TAXI ROUTE
- RSA — RUNWAY SAFETY AREA
- ROFA — RUNWAY OBJECT FREE AREA
- TSA — TAXIWAY SAFETY AREA (PROPOSED)
- TOFA — TAXIWAY OBJECT FREE AREA (PROPOSED)
- GCA — GLIDE SLOPE CRITICAL AREA
- FLASHER BARRICADE
- FLAG PERSONNEL / GATE GUARD
- CONTRACTOR GATE ACCESS
- RUNWAY CLOSURE LIGHTED "X"
- TAXIWAY TEMPORARY CLOSURE "X" (MATERIAL PER AC 150/5370-2 CURRENT EDITION)

N

GRAPHIC SCALE
250 0 250 500
(IN FEET)

ISSUED FOR BID

THESE DRAWINGS ARE FOR DESIGN REVIEW AND ARE NOT INTENDED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES. THEY WERE PREPARED BY OR UNDER THE SUPERVISION OF:

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF TAXIWAY F

CONSTRUCTION SAFETY AND PHASING PLAN
SCHEDULE I PRECONSTRUCTION MOBILIZATION

AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

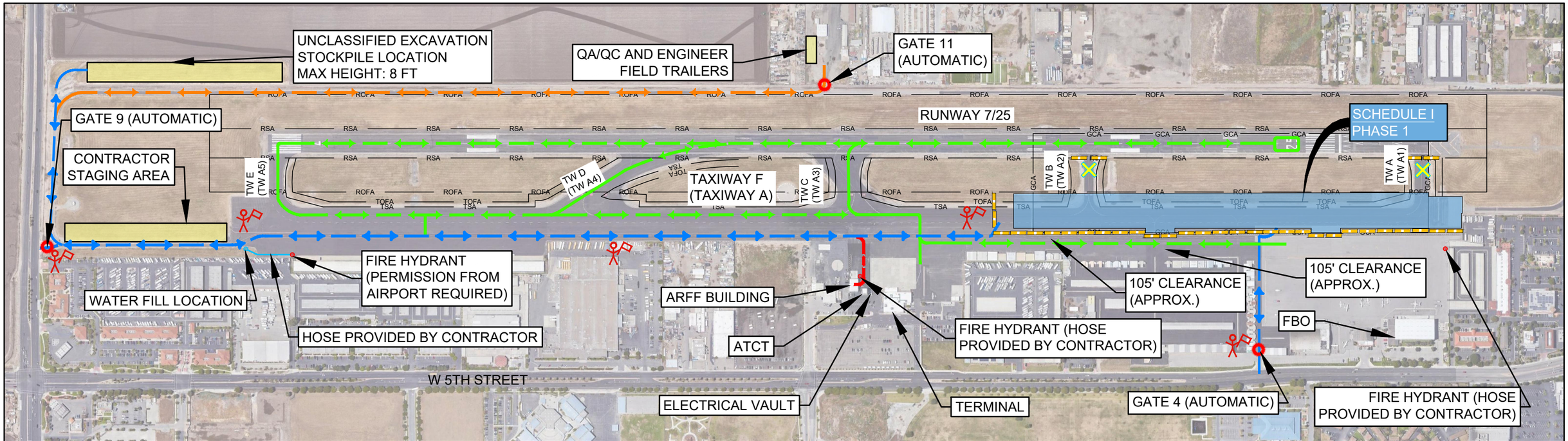
SHEET NAME
G052

SHEET NO.
15 of 89

DRAWING NO.
1600-DOA

Plotted May 24, 2023 @ 3:27 PM by: Gross, Amanda
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\000-OXR-043-G052-PHAS.dwg

Exhibit 1



CONSTRUCTION PHASING NOTES

SCHEDULE I - PHASE 1

DURATION
28 CALENDAR DAYS

CONTRACTOR ACCESS TIMES

- ACCESS TO APPROVED AREAS FROM 0700 TO 1900 EACH DAY.
- ALL AIRPORT OPERATION AREAS SHALL BE OPEN AND UNAFFECTED DURING THIS PHASE EXCEPT FOR THE PORTION OF TAXIWAY F AND CONNECTOR TAXIWAYS SHOWN TO BE CLOSED DURING THIS PHASE.

MAJOR WORK TO BE COMPLETED

SITE PREPARATION

1. EROSION CONTROL MEASURES
2. FULL DEPTH PAVEMENT REMOVALS
3. PARTIAL DEPTH PAVEMENT REMOVALS
4. EXCAVATE FOR PAVEMENT SECTION
5. ELECTRICAL REMOVALS
6. UNDERDRAIN AND STRUCTURE REMOVALS
7. STORM DRAIN REMOVALS

UTILITY

1. INSTALL UNDERDRAIN PIPE, CLEANOUTS, AND MANHOLES
2. CONNECT UNDERDRAIN PIPE TO EXISTING OUTFALLS
3. INSTALLATION OF LIGHT FIXTURES, GUIDANCE SIGNS, INFORMATIONAL SIGN, DUCT BANKS, AND CABLES
4. INSTALL STORM DRAIN PIPE

EARTHWORK

1. UNCLASSIFIED EXCAVATION
2. EMBANKMENT

PAVEMENT SECTION

1. AGGREGATE BASE COURSE
2. LIME AND CEMENT TREATED SUBGRADE
3. ASPHALT PAVING
4. PAVEMENT MARKINGS

SITE RECLAMATION

1. SEEDING WITH HYDROMULCH
2. TOPSOIL
3. EROSION CONTROL MEASURES

IMPACTS ON OPERATIONS

1. THE CONTRACTOR SHALL GIVE RIGHT OF WAY TO ALL AIRCRAFT AND EMERGENCY VEHICLES AT ALL TIMES.
2. THE CONTRACTOR SHALL MAINTAIN EMERGENCY VEHICLE ACCESS TO THE RUNWAY AT ALL TIMES.
3. IF AN EMERGENCY SITUATION ARISES REQUIRING AN AIRCRAFT TO UTILIZE THE RUNWAY AND/OR TAXIWAY DURING CONSTRUCTION, ALL EQUIPMENT AND PERSONNEL SHALL IMMEDIATELY EXIT THE RUNWAY AND/OR TAXIWAY AND STAGE OUTSIDE THE OBJECT FREE AREA.
4. NO WORK, OPEN EXCAVATIONS, EQUIPMENT, STOCKPILES, OR PERSONNEL ARE ALLOWED IN THE SAFETY AREAS OR OBJECT FREE AREAS FOR ANY ACTIVE TAXIWAY OR SAFETY AREAS FOR AN ACTIVE RUNWAY WHEN THE AIRPORT IS OPEN AND OPERATIONAL.
5. AIRPORT PERIMETER SECURITY SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE QUALIFIED GATE GUARDS ALONG CONSTRUCTION ACCESS POINTS AT AIRPORT PERIMETER GATE LOCATIONS. GATES SHALL BE SECURELY CLOSED OR LOCKED AT ALL TIMES IF GATE GUARD IS NOT PRESENT OR GATES ARE NOT IN USE.
6. CONSTRUCTION MARKERS, BARRICADES, AND TAXIWAY CLOSURE MARKERS SHALL BE INSTALLED PER PHASING PLANS AND AS REQUIRED BY AC 150/5370-2 (CURRENT VERSION) OR AS DIRECTED BY THE RPR.
7. ALL STOCKPILES OR EQUIPMENT ADJACENT TO OBJECT FREE AREAS SHALL BE MARKED AND LIGHTED PER AC 150/5370-2 (CURENT VERSION).
8. THE CONTRACTOR SHALL HAVE A SWEEPER OR VACUUM TRUCK ON SITE AT ALL TIMES TO CLEAN DEBRIS FROM HAUL ROUTES, CONSTRUCTION ACCESS POINTS, OR AREAS ADJACENT TO CONSTRUCTION.
9. THE CONTRACTOR SHALL KEEP ALL CONSTRUCTION TRAFFIC LIMITED TO THE APPROVED HAUL ROUTES AS SHOWN ON THE PLANS OR AS APPROVED BY THE RPR. THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE CAUSED ALONG THE HAUL ROUTES OR CONSTRUCTION ACCESS ROUTES TO THE PROJECT SITE. HAUL ROADS WILL BE MAINTAINED AND RESTORED TO THEIR ORIGINAL CONDITION BY THE CONTRACTOR AT NO EXPENSE TO THE SPONSOR.
10. THE CONTRACTOR SHALL MINIMIZE DISTURBANCE IN AND AROUND FAA NAVIGATIONAL AIDS.
11. CONTRACTOR SHALL PARK ALL EQUIPMENT AND VEHICLES IN THE STAGING AREA AT NIGHT AND DURING PERIODS WHEN NO CONSTRUCTION ACTIVITIES ARE TAKING PLACE. NO EQUIPMENT SHALL BE LEFT UNATTENDED WITHIN THE RUNWAY OBJECT FREE AREA (ROFA).
12. ALL LIGHTS AND/OR GUIDANCE SIGNS LEADING TO AND WITHIN CLOSED AREAS SHALL BE DEACTIVATED OR COVERED.

OTHER NOTES

1. AIRPORT MANAGEMENT PERSONNEL WILL ISSUE NOTAM FOR ANY CONTRACTOR SCHEDULED ACTIVITIES AT LEAST 72 HOURS IN ADVANCE OF SAID ACTIVITY.
2. CONSTRUCTION EQUIPMENT THAT MAY DAMAGE AIRFIELD PAVEMENT WHILE CROSSING IT TO ACCESS WORK AREAS, SUCH AS THOSE WITH TRACKS, SHALL PROTECT THE PAVEMENT USING A METHOD APPROVED BY THE RPR.
3. OXR ATCT OPERATION HOURS: 7:00 AM - 9:00 PM LOCAL TIME
   MONITOR OXR GROUND - 121.9 MHZ.

   OXR ATCT CLOSURE HOURS: 9:00 PM TO 7:00 AM LOCAL TIME
   MONITOR OXR CTAF - 134.95 MHZ.
4. CONTRACTOR SHALL PROTECT ALL FAA COMMUNICATION LINES AND ESPECIALLY WHEN WORKING WITHIN EXISTING STORM DRAIN INFRASTRUCTURE. NOTIFY ENGINEER IMMEDIATELY IF DAMAGE OCCURS BY CONTRACTOR OPERATIONS.

PHASING LEGEND

- CONTRACTOR HAUL ROUTE
- QA/QC ACCESS ROUTE
- LIFE & SAFETY ROUTE
- AIRCRAFT TAXI ROUTE
- RSA — RUNWAY SAFETY AREA
- ROFA — RUNWAY OBJECT FREE AREA
- TSA — TAXIWAY SAFETY AREA (PROPOSED)
- TOFA — TAXIWAY OBJECT FREE AREA (PROPOSED)
- GCA — GLIDE SLOPE CRITICAL AREA
- FLASHER BARRICADE
- FLAG PERSONNEL / GATE GUARD
- CONTRACTOR GATE ACCESS
- TAXIWAY TEMPORARY CLOSURE "X" (MATERIAL PER AC 150/5370-2 CURRENT EDITION)

N

GRAPHIC SCALE
250 0 250 500
(IN FEET)

ISSUED FOR BID

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NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

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OXNARD AIRPORT
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DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF TAXIWAY F

CONSTRUCTION SAFETY AND PHASING PLAN
SCHEDULE I, PHASE 1

AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

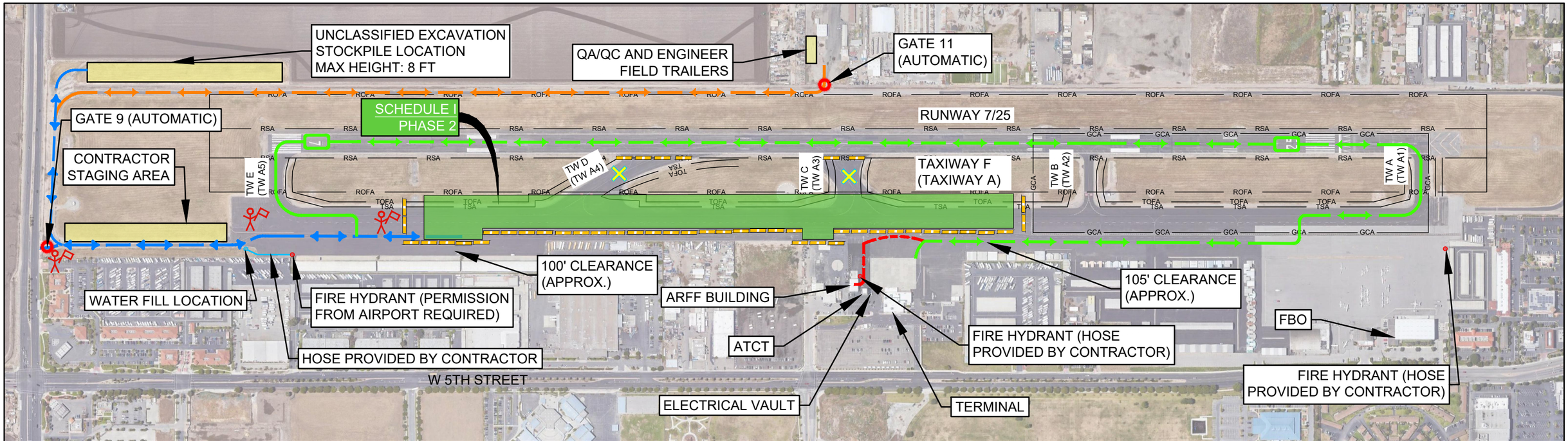
SHEET NAME
G053

SHEET NO.
16 of 89

DRAWING NO.
1601-DOA

Plotted May 24, 2023 @ 3:27 PM by: Gross, Amanda
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\000-OXR-043-G053-PHAS.dwg

Exhibit 1



CONSTRUCTION PHASING NOTES

SCHEDULE I - PHASE 2

DURATION
32 CALENDAR DAYS

CONTRACTOR ACCESS TIMES

- ACCESS TO APPROVED AREAS FROM 0700 TO 1900 EACH DAY.
- ALL AIRPORT OPERATION AREAS SHALL BE OPEN AND UNAFFECTED DURING THIS PHASE EXCEPT FOR THE PORTION OF TAXIWAY F AND CONNECTOR TAXIWAYS SHOWN TO BE CLOSED DURING THIS PHASE.

MAJOR WORK TO BE COMPLETED

SITE PREPARATION

1. EROSION CONTROL MEASURES
2. FULL DEPTH PAVEMENT REMOVALS
3. PARTIAL DEPTH PAVEMENT REMOVALS
4. EXCAVATE FOR PAVEMENT SECTION
5. ELECTRICAL REMOVALS
6. UNDERDRAIN AND STRUCTURE REMOVALS
7. STORM DRAIN REMOVALS

UTILITY

1. INSTALL UNDERDRAIN PIPE, CLEANOUTS, AND MANHOLES
2. CONNECT UNDERDRAIN PIPE TO EXISTING OUTFALLS
3. INSTALLATION OF LIGHT FIXTURES, GUIDANCE SIGNS, INFORMATIONAL SIGN, DUCT BANKS, AND CABLES
4. INSTALL STORM DRAIN PIPE

EARTHWORK

1. UNCLASSIFIED EXCAVATION
2. EMBANKMENT

PAVEMENT SECTION

1. AGGREGATE BASE COURSE
2. LIME AND CEMENT TREATED SUBGRADE
3. ASPHALT PAVING
4. PAVEMENT MARKINGS

SITE RECLAMATION

1. SEEDING WITH HYDROMULCH
2. TOPSOIL
3. EROSION CONTROL MEASURES

IMPACTS ON OPERATIONS

1. THE CONTRACTOR SHALL GIVE RIGHT OF WAY TO ALL AIRCRAFT AND EMERGENCY VEHICLES AT ALL TIMES.
2. THE CONTRACTOR SHALL MAINTAIN EMERGENCY VEHICLE ACCESS TO THE RUNWAY AT ALL TIMES.
3. IF AN EMERGENCY SITUATION ARISES REQUIRING AN AIRCRAFT TO UTILIZE THE RUNWAY AND/OR TAXIWAY DURING CONSTRUCTION, ALL EQUIPMENT AND PERSONNEL SHALL IMMEDIATELY EXIT THE RUNWAY AND/OR TAXIWAY AND STAGE OUTSIDE THE OBJECT FREE AREA.
4. NO WORK, OPEN EXCAVATIONS, EQUIPMENT, STOCKPILES, OR PERSONNEL ARE ALLOWED IN THE SAFETY AREAS OR OBJECT FREE AREAS FOR ANY ACTIVE TAXIWAY OR SAFETY AREAS FOR AN ACTIVE RUNWAY WHEN THE AIRPORT IS OPEN AND OPERATIONAL.
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12. ALL LIGHTS AND/OR GUIDANCE SIGNS LEADING TO AND WITHIN CLOSED AREAS SHALL BE DEACTIVATED OR COVERED.

OTHER NOTES

1. AIRPORT MANAGEMENT PERSONNEL WILL ISSUE NOTAM FOR ANY CONTRACTOR SCHEDULED ACTIVITIES AT LEAST 72 HOURS IN ADVANCE OF SAID ACTIVITY.
2. CONSTRUCTION EQUIPMENT THAT MAY DAMAGE AIRFIELD PAVEMENT WHILE CROSSING IT TO ACCESS WORK AREAS, SUCH AS THOSE WITH TRACKS, SHALL PROTECT THE PAVEMENT USING A METHOD APPROVED BY THE RPR.
3. OXR ATCT OPERATION HOURS: 7:00 AM - 9:00 PM LOCAL TIME
   MONITOR OXR GROUND - 121.9 MHZ.

   OXR ATCT CLOSURE HOURS: 9:00 PM TO 7:00 AM LOCAL TIME
   MONITOR OXR CTAF - 134.95 MHZ.
4. CONTRACTOR SHALL PROTECT ALL FAA COMMUNICATION LINES AND ESPECIALLY WHEN WORKING WITHIN EXISTING STORM DRAIN INFRASTRUCTURE. NOTIFY ENGINEER IMMEDIATELY IF DAMAGE OCCURS BY CONTRACTOR OPERATIONS.

PHASING LEGEND

- CONTRACTOR HAUL ROUTE
- QA/QC ACCESS ROUTE
- LIFE & SAFETY ROUTE
- AIRCRAFT TAXI ROUTE
- RSA — RUNWAY SAFETY AREA
- ROFA — RUNWAY OBJECT FREE AREA
- TSA — TAXIWAY SAFETY AREA (PROPOSED)
- TOFA — TAXIWAY OBJECT FREE AREA (PROPOSED)
- GCA — GLIDE SLOPE CRITICAL AREA
- FLASHER BARRICADE
- FLAG PERSONNEL / GATE GUARD
- CONTRACTOR GATE ACCESS
- TAXIWAY TEMPORARY CLOSURE "X" (MATERIAL PER AC 150/5370-2 CURRENT EDITION)

N

GRAPHIC SCALE
250 0 250 500
(IN FEET)

ISSUED FOR BID

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NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

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OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF TAXIWAY F

CONSTRUCTION SAFETY AND PHASING PLAN
SCHEDULE I, PHASE 2

AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

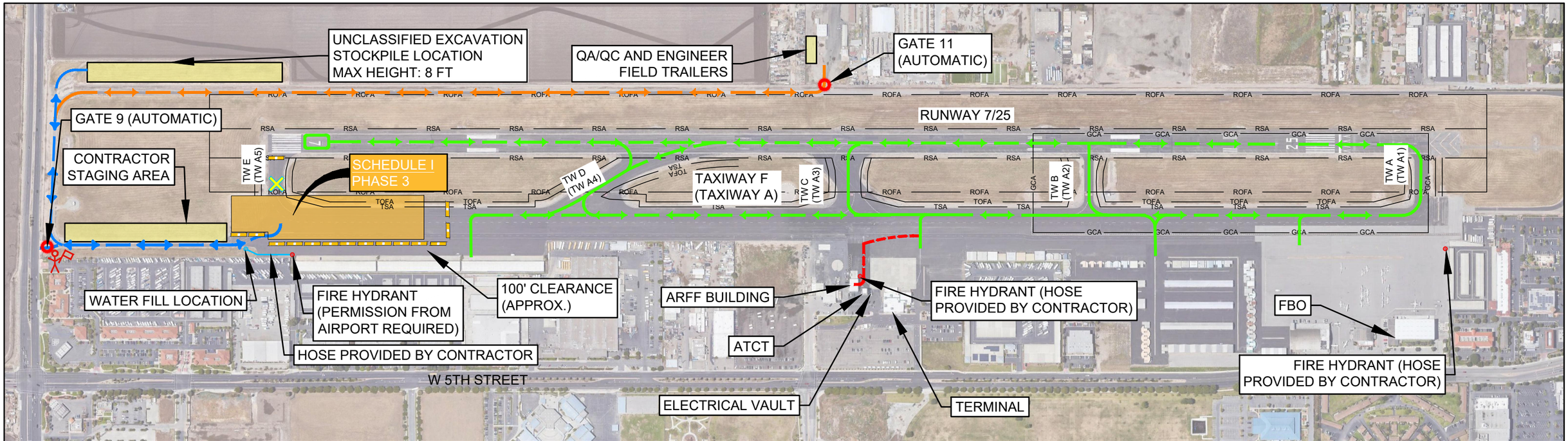
SHEET NAME
G054

SHEET NO.
17 of 89

DRAWING NO.
1602-DOA

Plotted May 24, 2023 @ 3:27 PM by: Gross, Amanda
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\000-OXR-043-G054-PHAS.dwg

Exhibit 1



CONSTRUCTION PHASING NOTES

SCHEDULE I - PHASE 3

DURATION
20 CALENDAR DAYS

CONTRACTOR ACCESS TIMES

- ACCESS TO APPROVED AREAS FROM 0700 TO 1900 EACH DAY.
- ALL AIRPORT OPERATION AREAS SHALL BE OPEN AND UNAFFECTED DURING THIS PHASE EXCEPT FOR THE PORTION OF TAXIWAY F AND CONNECTOR TAXIWAYS SHOWN TO BE CLOSED DURING THIS PHASE.

MAJOR WORK TO BE COMPLETED

SITE PREPARATION

1. EROSION CONTROL MEASURES
2. FULL DEPTH PAVEMENT REMOVALS
3. PARTIAL DEPTH PAVEMENT REMOVALS
4. EXCAVATE FOR PAVEMENT SECTION
5. ELECTRICAL REMOVALS
6. UNDERDRAIN AND STRUCTURE REMOVALS
7. STORM DRAIN REMOVALS

UTILITY

1. INSTALL UNDERDRAIN PIPE, CLEANOUTS, AND MANHOLES
2. CONNECT UNDERDRAIN PIPE TO EXISTING OUTFALLS
3. INSTALLATION OF LIGHT FIXTURES, GUIDANCE SIGNS, INFORMATIONAL SIGN, DUCT BANKS, AND CABLES
4. INSTALL STORM DRAIN PIPE

EARTHWORK

1. UNCLASSIFIED EXCAVATION
2. EMBANKMENT
3. SUBGRADE PREPARATION

PAVEMENT SECTION

1. AGGREGATE BASE COURSE
2. LIME AND CEMENT TREATED SUBGRADE
3. ASPHALT PAVING
4. PAVEMENT MARKINGS

SITE RECLAMATION

1. SEEDING WITH HYDROMULCH
2. TOPSOIL
3. EROSION CONTROL MEASURES

IMPACTS ON OPERATIONS

1. THE CONTRACTOR SHALL GIVE RIGHT OF WAY TO ALL AIRCRAFT AND EMERGENCY VEHICLES AT ALL TIMES.
2. THE CONTRACTOR SHALL MAINTAIN EMERGENCY VEHICLE ACCESS TO THE RUNWAY AT ALL TIMES.
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4. NO WORK, OPEN EXCAVATIONS, EQUIPMENT, STOCKPILES, OR PERSONNEL ARE ALLOWED IN THE SAFETY AREAS OR OBJECT FREE AREAS FOR ANY ACTIVE TAXIWAY OR SAFETY AREAS FOR AN ACTIVE RUNWAY WHEN THE AIRPORT IS OPEN AND OPERATIONAL.
5. AIRPORT PERIMETER SECURITY SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE QUALIFIED GATE GUARDS ALONG CONSTRUCTION ACCESS POINTS AT AIRPORT PERIMETER GATE LOCATIONS. GATES SHALL BE SECURELY CLOSED OR LOCKED AT ALL TIMES IF GATE GUARD IS NOT PRESENT OR GATES ARE NOT IN USE.
6. CONSTRUCTION MARKERS, BARRICADES, AND TAXIWAY CLOSURE MARKERS SHALL BE INSTALLED PER PHASING PLANS AND AS REQUIRED BY AC 150/5370-2 (CURRENT VERSION) OR AS DIRECTED BY THE RPR.
7. ALL STOCKPILES OR EQUIPMENT ADJACENT TO OBJECT FREE AREAS SHALL BE MARKED AND LIGHTED PER AC 150/5370-2 (CURENT VERSION).
8. THE CONTRACTOR SHALL HAVE A SWEEPER OR VACUUM TRUCK ON SITE AT ALL TIMES TO CLEAN DEBRIS FROM HAUL ROUTES, CONSTRUCTION ACCESS POINTS, OR AREAS ADJACENT TO CONSTRUCTION.
9. THE CONTRACTOR SHALL KEEP ALL CONSTRUCTION TRAFFIC LIMITED TO THE APPROVED HAUL ROUTES AS SHOWN ON THE PLANS OR AS APPROVED BY THE RPR. THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE CAUSED ALONG THE HAUL ROUTES OR CONSTRUCTION ACCESS ROUTES TO THE PROJECT SITE. HAUL ROADS WILL BE MAINTAINED AND RESTORED TO THEIR ORIGINAL CONDITION BY THE CONTRACTOR AT NO EXPENSE TO THE SPONSOR.
10. THE CONTRACTOR SHALL MINIMIZE DISTURBANCE IN AND AROUND FAA NAVIGATIONAL AIDS.
11. CONTRACTOR SHALL PARK ALL EQUIPMENT AND VEHICLES IN THE STAGING AREA AT NIGHT AND DURING PERIODS WHEN NO CONSTRUCTION ACTIVITIES ARE TAKING PLACE. NO EQUIPMENT SHALL BE LEFT UNATTENDED WITHIN THE RUNWAY OBJECT FREE AREA (ROFA).
12. ALL LIGHTS AND/OR GUIDANCE SIGNS LEADING TO AND WITHIN CLOSED AREAS SHALL BE DEACTIVATED OR COVERED.

OTHER NOTES

1. AIRPORT MANAGEMENT PERSONNEL WILL ISSUE NOTAM FOR ANY CONTRACTOR SCHEDULED ACTIVITIES AT LEAST 72 HOURS IN ADVANCE OF SAID ACTIVITY.
2. CONSTRUCTION EQUIPMENT THAT MAY DAMAGE AIRFIELD PAVEMENT WHILE CROSSING IT TO ACCESS WORK AREAS, SUCH AS THOSE WITH TRACKS, SHALL PROTECT THE PAVEMENT USING A METHOD APPROVED BY THE RPR.
3. OXR ATCT OPERATION HOURS: 7:00 AM - 9:00 PM LOCAL TIME
   MONITOR OXR GROUND - 121.9 MHZ.

   OXR ATCT CLOSURE HOURS: 9:00 PM TO 7:00 AM LOCAL TIME
   MONITOR OXR CTAF - 134.95 MHZ.
4. CONTRACTOR SHALL PROTECT ALL FAA COMMUNICATION LINES AND ESPECIALLY WHEN WORKING WITHIN EXISTING STORM DRAIN INFRASTRUCTURE. NOTIFY ENGINEER IMMEDIATELY IF DAMAGE OCCURS BY CONTRACTOR OPERATIONS.

PHASING LEGEND

- CONTRACTOR HAUL ROUTE
- QA/QC ACCESS ROUTE
- LIFE & SAFETY ROUTE
- AIRCRAFT TAXI ROUTE
- RSA — RUNWAY SAFETY AREA
- ROFA — RUNWAY OBJECT FREE AREA
- TSA — TAXIWAY SAFETY AREA (PROPOSED)
- TOFA — TAXIWAY OBJECT FREE AREA (PROPOSED)
- GCA — GLIDE SLOPE CRITICAL AREA
- FLASHER BARRICADE
- FLAG PERSONNEL / GATE GUARD
- CONTRACTOR GATE ACCESS
- TAXIWAY TEMPORARY CLOSURE "X" (MATERIAL PER AC 150/5370-2 CURRENT EDITION)

N

GRAPHIC SCALE
250 0 250 500
(IN FEET)

ISSUED FOR BID

THESE DRAWINGS ARE FOR DESIGN REVIEW AND ARE NOT INTENDED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES. THEY WERE PREPARED BY OR UNDER THE SUPERVISION OF:

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF TAXIWAY F

CONSTRUCTION SAFETY AND PHASING PLAN
SCHEDULE I, PHASE 3

AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME
G055

SHEET NO.
18 of 89

DRAWING NO.
1603-DOA

Plotted May 24, 2023 @ 3:27 PM by: Gross, Amanda
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\000-OXR-043-G055-PHAS.dwg

Exhibit 1

APPENDIX B

CONSTRUCTION PROJECT DAILY SAFETY INSPECTION CHECKLIST

Exhibit 1

Exhibit 1

NOTE: This Appendix D. Construction Project Daily Safety Inspection Checklist was copied from FAA Advisory Circular 150/5370-2G (dated December 13, 2017) and formatted for use with individual projects.

Airport: **Oxnard Airport**
AIP Project No.: **3-06-0179-043-2023**
Project Name: **Reconstruction of Taxiway F**
Date: _____

Appendix D. Construction Project Daily Safety Inspection Checklist

The situations identified below are potentially hazardous conditions that may occur during airport construction projects. Safety area encroachments, unauthorized and improper ground vehicle operations, and unmarked or uncovered holes and trenches near aircraft operating surfaces pose the most prevalent threats to airport operational safety during airport construction projects. The list below is one tool that the airport operator or contractor may use to aid in identifying and correcting potentially hazardous conditions. It should be customized as appropriate for each project including information such as the date, time and name of the person conducting the inspection.

Table D-1. Potentially Hazardous Conditions

Item	Action Required (Describe)	No Action Required (Check)
Excavation adjacent to runways, taxiways, and aprons improperly backfilled.		☐
Mounds of earth, construction materials, temporary structures, and other obstacles near any open runway, taxiway, or taxi lane; in the related Object Free area and aircraft approach or departure areas/zones; or obstructing any sign or marking.		☐
Runway resurfacing projects resulting in lips exceeding 3 inch (7.6 cm) from pavement edges and ends.		☐
Heavy equipment (stationary or mobile) operating or idle near AOA, in runway approaches and departures areas, or in OFZ.		☐
Equipment or material near NAVAIDs that may degrade or impair radiated signals and/or the monitoring of navigation and visual aids. Unauthorized or improper vehicle operations in localizer or glide slope critical areas, resulting in electronic interference and/or facility shutdown.		☐
Tall and especially relatively low visibility units (that is, equipment with slim profiles) — cranes, drills, and similar objects — located in critical areas, such as OFZ and approach zones.		☐

Improperly positioned or malfunctioning lights or unlighted airport hazards, such as holes or excavations, on any apron, open taxiway, or open taxi lane or in a related safety, approach, or departure area.		☐
Obstacles, loose pavement, trash, and other debris on or near AOA. Construction debris (gravel, sand, mud, paving materials) on airport pavements may result in aircraft propeller, turbine engine, or tire damage. Also, loose materials may blow about, potentially causing personal injury or equipment damage.		☐
Inappropriate or poorly maintained fencing during construction intended to deter human and animal intrusions into the AOA. Fencing and other markings that are inadequate to separate construction areas from open AOA create aviation hazards.		☐
Improper or inadequate marking or lighting of runways (especially thresholds that have been displaced or runways that have been closed) and taxiways that could cause pilot confusion and provide a potential for a runway incursion. Inadequate or improper methods of marking, barricading, and lighting of temporarily closed portions of AOA create aviation hazards.		☐
Wildlife attractants — such as trash (food scraps not collected from construction personnel activity), grass seeds, tall grass, or standing water — on or near airports.		☐
Obliterated or faded temporary markings on active operational areas.		☐
Misleading or malfunctioning obstruction lights. Unlighted or unmarked obstructions in the approach to any open runway pose aviation hazards.		☐
Failure to issue, update, or cancel NOTAMs about airport or runway closures or other construction related airport conditions.		☐
Failure to mark and identify utilities or power cables. Damage to utilities and power cables during construction activity can result in the loss of runway / taxiway lighting; loss of navigation, visual, or approach aids; disruption of weather reporting services; and/or loss of communications.		☐
Restrictions on ARFF access from fire stations to the runway / taxiway system or airport buildings.		☐
Lack of radio communications with construction vehicles in airport movement areas.		☐

Objects, regardless of whether they are marked or flagged, or activities anywhere on or near an airport that could be distracting, confusing, or alarming to pilots during aircraft operations.		☐
Water, snow, dirt, debris, or other contaminants that temporarily obscure or derogate the visibility of runway/taxiway marking, lighting, and pavement edges. Any condition or factor that obscures or diminishes the visibility of areas under construction.		☐
Spillage from vehicles (gasoline, diesel fuel, oil) on active pavement areas, such as runways, taxiways, aprons, and airport roadways.		☐
Failure to maintain drainage system integrity during construction (for example, no temporary drainage provided when working on a drainage system).		☐
Failure to provide for proper electrical lockout and tagging procedures. At larger airports with multiple maintenance shifts/workers, construction contractors should make provisions for coordinating work on circuits.		☐
Failure to control dust. Consider limiting the amount of area from which the contractor is allowed to strip turf.		☐
Exposed wiring that creates an electrocution or fire ignition hazard. Identify and secure wiring, and place it in conduit or bury it.		☐
Site burning, which can cause possible obscuration.		☐
Construction work taking place outside of designated work areas and out of phase.		☐

Exhibit 1

DIVISION 6

CALIFORNIA PREVAILING WAGE RATES
FEDERAL PREVAILING WAGE RATES

Exhibit 1

CALIFORNIA PREVAILING WAGE RATES

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

Craft: Driver (On/Off-Hauling To/From Construction Site)

Determination:
C-DT-830-261-6-2021-1

Issue Date:
February 22, 2021

Expiration date of determination:
March 31, 2021* Effective until superseded by a new determination issued by the Director of Industrial Relations. Contact the Office of the Director – Research Unit at (415) 703-4774 for the new rates after 10 days from the expiration date, if no subsequent determination is issued.

Localities:
All localities within Kern, Monterey, San Luis Obispo, Santa Barbara, and Ventura Counties.

Wages and Employer Payments:

Classification	Basic Hourly Rate	Health and Welfare	Pension	Vacation and Holiday	Training	Other	Hours	Total Hourly Rate	Daily Overtime Hourly Rate (1 ½ X)	Sunday/ Holiday Overtime Hourly Rate (1 ½ X)
Driver: Dump Truck	$16.76	$3.04[a]	$2.75	$0.90[b]	$0.64	$0.00	8.0	$24.09	$32.47[c]	$32.47

Recognized holidays:
Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Director's General Prevailing Wage Determinations Website (http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm). Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

Travel and/or subsistence payment:
In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Director's General Prevailing Wage Determinations Website (http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm). Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

Exhibit 1

* There is no predetermined increase applicable to this determination.

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[a] The contribution applies to all hours until $526.19 is paid for the month.
[b] $1.22 after 2 years of service. $1.55 after 10 years of service.
[c] Rate applies to work in excess of eight (8) hours daily and forty (40) hours weekly.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

Craft: DRIVER (ON/OFF-HAULING TO/FROM CONSTRUCTION SITE)

Determination:
C-MT-261-X-258-2022-1

Issue Date:
August 22, 2022

Expiration date of determination:
June 30, 2023** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director - Research Unit for specific rates at (415) 703-4774.

Localities:
All localities within Los Angeles, Orange, and Ventura Counties.

Wages and Employer Payments:

Classification	Basic Hourly Rate	Health and Welfare	Pension	Vacation and Holiday	Training	Other	Hours	Total Hourly Rate	Daily Overtime Hourly Rate (1 ½ X)	Saturday /Holiday Overtime Hourly Rate (1 ½ X)	Sunday Overtime Hourly Rate (2 X)[a]
Driver: Mixer Truck (After 4 years of service)	$30.05	$9.72[b]	$3.64	$2.08[cd]	$0.00	$0.00	8.0	$45.49	$60.515	$60.515	$75.54
Driver: Mixer Truck (After 3 years of service)	$29.05	$9.72[b]	$3.64	$2.01[e]	$0.00	$0.00	8.0	$44.42	$58.945	$58.945	$73.47
Driver: Mixer Truck (After 2 years of service)	$28.05	$9.72[b]	$3.64	$1.94[f]	$0.00	$0.00	8.0	$43.35	$57.375	$57.375	$71.40
Driver: Mixer Truck (After 1 year of service)	$27.05	$9.72[b]	$3.64	$1.35[g]	$0.00	$0.00	8.0	$41.76	$55.285	$55.285	$68.81
Driver: Mixer Truck (Less than 1 year of service)	$26.05	$9.72[b]	$3.64	$0.00[h]	$0.00	$0.00	8.0	$39.41	$52.435	$52.435	$65.46

Exhibit 1

Recognized holidays:
Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Director's General Prevailing Wage Determinations Website (http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm). Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

Travel and/or subsistence payment:
In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Director's General Prevailing Wage Determinations Website (http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm). Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

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[a] Emergency work and breakdown on Sundays shall be paid at time and one-half (1½x) the straight time rate.
[b] The contribution applies to all hours until $1684.50 is paid for the month.
[c] $2.66 after 8 years of service. $3.24 after 15 years of service.
[d] Includes $0.92 for Holidays, which would be deducted from the Vacation/Holiday rate if you choose to adopt the paid days off enumerated in the Holiday Provisions.
[e] Includes $0.89 for Holidays, which would be deducted from the Vacation/Holiday rate if you choose to adopt the paid days off enumerated in the Holiday Provisions.
[f] Includes $0.86 for Holidays, which would be deducted from the Vacation/Holiday rate if you choose to adopt the paid days off enumerated in the Holiday Provisions.
[g] Includes $0.83 for Holidays, which would be deducted from the Vacation/Holiday rate if you choose to adopt the paid days off enumerated in the Holiday Provisions.
[h] In addition, $0.80 for Holidays after four (4) months, which would be deducted from the Vacation/Holiday rate if you choose to adopt the paid days off enumerated in the Holiday Provisions.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: BUILDING/CONSTRUCTION INSPECTOR AND FIELD SOILS AND MATERIAL TESTER#

Determination:
SC-23-63-2-2023-1D

Issue Date:
February 22, 2023

Expiration date of determination:
June 30, 2023** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director - Research Unit for specific rates at (415) 703-4774.

Localities:
All localities within Imperial, Inyo, Kern, Los Angeles, Mono, Orange, Riverside, San Bernardino, San Luis Obispo, Santa Barbara and Ventura Counties.

Wages and Employer Payments:

Classification[a] (Journeyperson)	Basic Hourly Rate	Health and Welfare	Pension[b]	Vacation and Holiday[c]	Training	Other	Hours	Total Hourly Rate	Daily Overtime Hourly Rate[d] (1½ x)	Saturday Overtime Hourly Rate[e] (1½ x)	Sunday/ Holiday Overtime Hourly Rate (2 x)
Group 1	$54.68	$12.35	$13.15	$3.85	$1.05	$0.39	8	$85.47	$112.810	$112.810	$140.150
Group 2	$56.46	$12.35	$13.15	$3.85	$1.05	$0.39	8	$87.25	$115.480	$115.480	$143.710
Group 3	$58.46	$12.35	$13.15	$3.85	$1.05	$0.39	8	$89.25	$118.480	$118.480	$147.710

Exhibit 1

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: BUILDING/CONSTRUCTION INSPECTOR AND FIELD SOILS AND MATERIAL TESTER[#]
(SPECIAL SHIFT)

Determination:
SC-23-63-2-2023-1D

Issue Date:
February 22, 2023

Expiration date of determination:
June 30, 2023** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director - Research Unit for specific rates at (415) 703-4774.

Localities:
All localities within Imperial, Inyo, Kern, Los Angeles, Mono, Orange, Riverside, San Bernardino, San Luis Obispo, Santa Barbara and Ventura Counties.

Wages and Employer Payments:

Classification[a] (Journeyperson)	Basic Hourly Rate	Health and Welfare	Pension[b]	Vacation and Holiday[c]	Training	Other	Hours	Total Hourly Rate	Daily Overtime Hourly Rate[d] (1½ x)	Saturday Overtime Hourly Rate[e] (1½ x)	Sunday/ Holiday Overtime Hourly Rate (2 x)
Group 1	$55.68	$12.35	$13.15	$3.85	$1.05	$0.39	8	$86.47	$114.310	$114.310	$142.150
Group 2	$57.46	$12.35	$13.15	$3.85	$1.05	$0.39	8	$88.25	$116.980	$116.980	$145.710
Group 3	$59.46	$12.35	$13.15	$3.85	$1.05	$0.39	8	$90.25	$119.980	$119.980	$149.710

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: BUILDING/CONSTRUCTION INSPECTOR AND FIELD SOILS AND MATERIAL TESTER #
(MULTI-SHIFT)

Determination:
SC-23-63-2-2023-1D

Issue Date:
February 22, 2023

Expiration date of determination:
June 30, 2023**The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director - Research Unit for specific rates at (415) 703-4774.

Localities:
All localities within Imperial, Inyo, Kern, Los Angeles, Mono, Orange, Riverside, San Bernardino, San Luis Obispo, Santa Barbara and Ventura Counties.

Wages and Employer Payments:

Classification [a] (Journeyperson)	Basic Hourly Rate	Health and Welfare	Pension [b]	Vacation and Holiday [c]	Training	Other	Hours[f]	Total Hourly Rate	Daily Overtime Hourly Rate [d] (1½ x)	Saturday Overtime Hourly Rate [e] (1½ x)	Sunday/ Holiday Overtime Hourly Rate (2 x)
Group 1	$55.68	$12.35	$13.15	$3.85	$1.05	$0.39	8	$86.47	114.310	114.310	$142.150
Group 2	$57.46	$12.35	$13.15	$3.85	$1.05	$0.39	8	$88.25	116.980	116.980	$145.710
Group 3	$59.46	$12.35	$13.15	$3.85	$1.05	$0.39	8	$90.25	119.980	119.980	$149.710

Recognized holidays:
Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Director's General Prevailing Wage Determinations Website (http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm). Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

Exhibit 1

Travel and/or subsistence payment:
In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Director's General Prevailing Wage Determinations Website (http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm). Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

Classifications:

Group 1
Field Soils and Materials Tester
Field Asphaltic Concrete (Soils and Materials Tester)
Field Earthwork (Grading Excavation and Filling)
Roof Inspector
Water Proofer

Group 2
AWS-CWI Welding Inspector
Building/Construction Inspector
Licensed Grading Inspector
Reinforcing Steel
Reinforced Concrete
Pre-Tension Concrete
Post-Tension Concrete
Structural Steel and Welding Inspector
Glue-Lam and truss Joints
Truss-Type Joint Construction
Shear Wall and Floor System used as diaphragms
Concrete batch Plant
Spray-Applied Fireproofing
Structural masonry

Group 3
Nondestructive Testing (NDT)
Unmanned Aircraft Systems (UAS Drones) Operator (when used in conjunction with field soils and material testing – building/construction inspection

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[#] Indicates an apprenticeable craft. The current apprentice wage rates are available on the Prevailing Wage Apprentice Determinations Website (http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp).
[a] For classifications within each group, see Page 4.
[b] Includes an amount for Annuity.
[c] Includes an amount withheld for supplemental dues.
[d] Rate applies to the first 4 overtime hours. All other daily overtime is paid at the Sunday rate.
[e] Rate applies to the first 12 hours worked. All other time is paid at the Sunday rate.
[f] The Third Shift shall work 6.5 hours, exclusive of meal period, for which 8 hours straight-time shall be paid at the non-shift rate, Monday through Friday.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

Craft: Cement Mason#

Determination:
SC-23-203-2-2022-1

Issue Date:
August 22, 2022

Expiration date of determination:
June 30, 2023** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director - Research Unit for specific rates at (415) 703-4774.

Localities:
All localities within Imperial, Inyo, Kern, Los Angeles, Mono, Orange, Riverside, San Bernardino, San Luis Obispo, Santa Barbara, and Ventura Counties.

Wages and Employer Payments:

Classification (Journeyperson)	Basic Hourly Rate	Health and Welfare	Pension	Vacation and Holiday [a]	Training	Other	Hours	Total Hourly Rate	Daily Overtime Hourly Rate (1 ½ X) [b]	Saturday Overtime Hourly Rate (1 ½ X) [b] [c]	Sunday/ Holiday Overtime Hourly Rate (2 X)
Cement Mason, Curb and Gutter Machine Operator; Clary and Similar Type of Screed Operator (Cement only); Grinding Machine Operator (all types); Jackson Vibratory, Texas Screed and Similar Type Screed Operator; Scoring Machine Operator	$42.00	$8.43	$10.48	$7.31	$0.64	$0.24	8.0	$69.10	$90.10	$90.10	$111.10
Magnesite, magnesite-terrazzo and mastic composition, Epoxy, Urethanes and exotic coatings, Dex-O-Tex	$42.12	$8.43	$10.48	$7.31	$0.64	$0.24	8.0	$69.22	$90.28	$90.28	$111.34

Exhibit 1

Classification (Journeyperson)	Basic Hourly Rate	Health and Welfare	Pension	Vacation and Holiday [a]	Training	Other	Hours	Total Hourly Rate	Daily Overtime Hourly Rate (1 ½ X) [b]	Saturday Overtime Hourly Rate (1 ½ X) [b] [c]	Sunday/ Holiday Overtime Hourly Rate (2 X)
Floating and Troweling Machine Operator	$42.25	$8.43	$10.48	$7.31	$0.64	$0.24	8.0	$69.35	$90.475	$90.475	$111.60

Recognized holidays:
Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Director's General Prevailing Wage Determinations Website (http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm). Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

Travel and/or subsistence payment:
In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Director's General Prevailing Wage Determinations Website (http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm). Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

[#] Indicates an apprenticeable craft. The current apprentice wage rates are available on the Prevailing Wage Apprentice Determinations Website (http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp).
[a] Includes an amount for supplemental dues.
[b] Rate applies to the first 4 daily overtime hours and the first 12 hours worked on Saturday. All other time is paid at the double time (2X) rate.
[c] Saturday in the same work week may be worked at straight-time rate, up to 8 hours on Saturday or when the employee has worked a total of 40 hours in the work week, if it is not reasonably possible for any individual employee on a particular job site to complete 40 hours of work on a 8 hour day, Monday through Friday, due to inclement weather or similar act of God or a situation beyond the control of the contractor.

GENERAL PREVAILING WAGE APPRENTICE RATES

Apprentice Prevailing Wage Rates are paid only to apprentices registered with the State of California, Division of Apprenticeship Standards, for work the registered apprentice performs in his/her specific craft or trade. You may check whether an Apprentice is registered at the Division of Apprenticeship Standards Website (https://www.dir.ca.gov/DAS/appcertpw/AppCertSearch.asp)

Determination: 2023-1

Issue Date: 08-22-2022

Expire Date: 06-30-2023 **

Craft/Classification: Cement Mason

Counties: Imperial, Inyo, Kern, Los Angeles, Mono, Orange, Riverside, San Bernardino, San Luis Obispo, Santa Barbara, Ventura

Period	Duration Months	OJT Hours	Basic Hourly Rate	Health & Welfare	Pension	Vacation/ Holiday	Training	Other	Total Hourly Rate
1	6	N/A	$21.000	$8.430	$.000	$2.410	$.640	$.240	$32.720
2	6	N/A	$23.100	$8.430	$.000	$2.410	$.640	$.240	$34.820
3	6	N/A	$25.200	$8.430	$.000	$2.410	$.640	$.240	$36.920
4	6	N/A	$27.300	$8.430	$.000	$7.310	$.640	$.240	$43.920
5	6	N/A	$29.400	$8.430	$10.480	$7.310	$.640	$.240	$56.500
6	6	N/A	$31.500	$8.430	$10.480	$7.310	$.640	$.240	$58.600
7	6	N/A	$33.600	$8.430	$10.480	$7.310	$.640	$.240	$60.700
8	6	N/A	$37.800	$8.430	$10.480	$7.310	$.640	$.240	$64.900

FOOTNOTE(S)

Vacation - includes an amount for supplemental dues.

Other - includes amounts for Industry Advancement, Contract Administration, and Labor-Management Cooperation Committee Trust.

**Journeyman Predetermined Increases

Exhibit 1

Effective 7/1/2023 - an increase of $2.25 to be allocated: $0.15 to Pension, and $2.10 to wages and/or fringes.

Effective 7/1/2024 - an increase of $2.15 to be allocated: $0.15 to Pension, and $2.00 to wages and/or fringes.

There may be corresponding predetermined increase(s) to the apprentices associated with this journeyman craft/classification. Please email a request to statistics@dir.ca.gov or send to the following address:

Department of Industrial Relations

Office of the Director - Research Unit

P.O. Box 420603

San Francisco, CA 94142-0603

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

Craft: Laborer and Related Classifications #

Determination:
SC-23-102-2-2022-1

Issue Date:
August 22, 2022

Expiration date of determination:
June 30, 2023** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director - Research Unit for specific rates at (415) 703-4774.

Localities:
All localities within Imperial, Inyo, Kern, Los Angeles, Mono, Orange, Riverside, San Bernardino, San Luis Obispo, Santa Barbara, and Ventura counties.

Wages and Employer Payments:

Classification[a] (Journeyperson)	Basic Hourly Rate	Health and Welfare	Pension	Vacation and Holiday [b]	Training	Other	Hours	Total Hourly Rate	Daily Overtime Hourly Rate (1 ½ X) [c]	Saturday Overtime Hourly Rate (1 ½ X) [cd]	Sunday/ Holiday Overtime Hourly Rate (2 X)
Group 1	$39.23	$8.75	$10.82	$5.02	$0.70	$0.67	8.0	$65.19	$84.805	$84.805	$104.420
Group 2	$39.78	$8.75	$10.82	$5.02	$0.70	$0.67	8.0	$65.74	$85.630	$85.630	$105.520
Group 3	$40.33	$8.75	$10.82	$5.02	$0.70	$0.67	8.0	$66.29	$86.455	$86.455	$106.620
Group 4	$41.88	$8.75	$10.82	$5.02	$0.70	$0.67	8.0	$67.84	$88.780	$88.780	$109.720
Group 5	$42.23	$8.75	$10.82	$5.02	$0.70	$0.67	8.0	$68.19	$89.305	$89.305	$110.420

Exhibit 1

Group 1

Boring Machine Helper (Outside)
Certified Confined Space Laborer
Cleaning and Handling of Panel Forms
Concrete Screeding for Rough Strike-Off
Concrete, Water Curing
Demolition Laborer, the cleaning of brick if performed by an employee performing any other phase of demolition work, and the cleaning of lumber
Fiberoptic Installation, Blowing, Splicing, and Testing Technician on public right-of-way only
Fire Watcher, Limbers, Brush Loaders, Pilers and Debris Handlers
Flagman
Gas, Oil and/or Water Pipeline Laborer
Laborer, Asphalt-Rubber Material Loader
Laborer, General or Construction
Laborer, General Cleanup
Laborer, Jetting
Laborer, Temporary Water and Air Lines
Plugging, Filling of Shee-Bolt Holes; Dry Packing of Concrete and Patching
Post Hole Digger (Manual)
Railroad Maintenance, Repair Trackman and Road Beds; Streetcar and Railroad Construction Track Laborers
Rigging and Signaling
Scaler
Slip Form Raisers
Tarman and Mortar Man
Tool Crib or Tool House Laborer
Traffic Control by any method
Water Well Driller Helper
Window Cleaner
Wire Mesh Pulling - All Concrete Pouring Operations

Group 2

Asphalt Shoveler
Cement Dumper (on 1 yard or larger mixer and handling bulk cement)
Cesspool Digger and Installer
Chucktender
Chute Man, pouring concrete, the handling of the chute from readymix trucks, such as walls, slabs, decks, floors, foundations, footings, curbs, gutters and sidewalks
Concrete Curer-Impervious Membrane and Form Oiler
Cutting Torch Operator (Demolition)
Fine Grader, Highways and Street Paving, Airport, Runways, and similar type heavy construction
Gas, Oil and/or Water Pipeline Wrapper-Pot Tender and Form Man
Guinea Chaser
Headerboard Man-Asphalt
Installation of all Asphalt Overlay Fabric and Materials used for Reinforcing Asphalt
Laborer, Packing Rod Steel and Pans
Membrane Vapor Barrier Installer
Power Broom Sweepers (small)
Riprap, Stonepaver, placing stone or wet sacked concrete
Roto Scraper and Tiller
Sandblaster (Pot Tender)
Septic Tank Digger and Installer (leadman)
Tank Scaler and Cleaner
Tree Climber, Faller, Chain Saw Operator, Pittsburgh Chipper and similar type Brush Shredders
Underground Laborer, including Caisson Bellower

Group 3

Asphalt Installation of all fabrics
Buggymobile Man
Compactor (all types including Tampers, Barko, Wacker)
Concrete Cutting Torch
Concrete Pile Cutter
Driller, Jackhammer, 2 1/2 ft. drill steel or longer
Dri Pak-it Machine
Gas, Oil and/or Water Pipeline Wrapper - 6-inch pipe and over by any method, inside and out
Impact Wrench, Multi-Plate
Kettlemen, Potmen and Men applying asphalt, lay-kold, creosote, lime caustic and similar type materials
Laborer, Fence Erector
Material Hoseman (Walls, Slabs, Floors and Decks)
Operators of Pneumatic, Gas, Electric Tools, Vibrating Machines, Pavement Breakers, Air Blasting, Come-Alongs, and similar mechanical tools not separately classified herein; operation of remote controlled robotic tools in connection with Laborers work
Pipelayer's backup man, coating, grouting, making of joints, sealing, caulking, diapering and including rubber gasket joints, pointing and any and all other services
Power Post Hole Digger
Rock Slinger
Rotary Scarifier or Multiple Head Concrete Chipping Scarifier
Steel Headerboard Man and Guideline Setter
Trenching Machine, Hand Propelled

Group 4

Any Worker Exposed to Raw Sewage
Asphalt Raker, Luteman, Ironer, Asphalt Dumpman, and Asphalt Spreader Boxes (all types)
Concrete Core Cutter (walls, floors or ceilings), Grinder or Sander
Concrete Saw Man, Cutting Walls or Flat Work, Scoring old or new concrete
Cribber, Shorer, Lagging, Sheeting and Trench Bracing, Hand-Guided Lagging Hammer
Head Rock Slinger
High Scaler (including drilling of same)
Laborer, Asphalt-Rubber Distributor Bootman
Laser Beam in connection with Laborer's work
Oversize Concrete Vibrator Operator, 70 pounds and over
Pipelayer
Prefabricated Manhole Installer
Sandblaster (Nozzleman), Water Blasting, Porta Shot-Blast
Subsurface Imaging Laborer
Traffic Lane Closure, certified

Group 5

Blasters Powderman
Driller
Toxic Waste Removal
Welding, certified or otherwise in connection with Laborers' work

Recognized holidays:
Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Director's General Prevailing Wage Determinations Website (http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm). Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

Travel and/or subsistence payment:
In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Director's General Prevailing Wage Determinations Website (http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm). Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

[#] Indicates an apprenticeable craft. The current apprentice wage rates are available on the Prevailing Wage Apprentice Determinations Website (http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp).
[a] For classification within each group, see next page.
[b] Includes an amount per hour worked for supplemental dues.
[c] Any hours worked over 12 hours in a single workday are double (2) time.
[d] Saturdays in the same work week may be worked at straight-time if job is shut down during work week due to inclement weather or similar Act of God, or a situation beyond the employer's control.

GENERAL PREVAILING WAGE APPRENTICE RATES

Apprentice Prevailing Wage Rates are paid only to apprentices registered with the State of California, Division of Apprenticeship Standards, for work the registered apprentice performs in his/her specific craft or trade. You may check whether an Apprentice is registered at the Division of Apprenticeship Standards Website (https://www.dir.ca.gov/DAS/appcertpw/AppCertSearch.asp)

Determination: 2023-1

Issue Date: 08-22-2022

Expire Date: 06-30-2023 **

Craft/Classification: Laborer

Counties: Imperial, Inyo, Kern, Los Angeles, Mono, Orange, Riverside, San Bernardino, San Luis Obispo, Santa Barbara, Ventura

Period	Duration Months	OJT Hours	Basic Hourly Rate	Health & Welfare	Pension	Vacation/ Holiday	Training	Other	Total Hourly Rate
1	N/A	500	$21.120	$6.130	$3.560	$3.510	$.700	$.670	$35.690
2	N/A	500	$23.230	$6.130	$3.560	$3.510	$.700	$.670	$37.800
3	N/A	500	$25.340	$6.130	$3.560	$3.510	$.700	$.670	$39.910
4	N/A	500	$29.560	$6.130	$3.560	$3.510	$.700	$.670	$44.130
5	N/A	500	$33.780	$6.130	$3.560	$3.510	$.700	$.670	$48.350
6	N/A	500	$35.900	$6.130	$3.560	$3.510	$.700	$.670	$50.470

FOOTNOTE(S)

Note: Apprentice rates are based on JM Laborer Group V rates.

Vacation -- Includes an amount for supplemental dues.

Other -- Includes amounts for Center for Contract Compliance, Industry Fund, and Administrative Trust Fund, Contract Administration Fund and Partnership for Jobs Industry Advancement Fund.

JOURNEYMAN PREDETERMINED INCREASES:

Exhibit 1

Effective 7/1/2023, there will be an increase of $3.20 to be allocated to wages and or employer payments.

Effective 7/1/2024, there will be an increase of $3.30 to be allocated to wages and or employer payments.

Effective 7/1/2025, there will be an increase of $3.40 to be allocated to wages and or employer payments.

There may be corresponding predetermined increase(s) to the apprentices associated with this journeyman craft/classification. Please e-mail a request to statistics@dir.ca.gov or send to the following address:

Department of Industrial Relations

Office of the Director - Research Unit

P.O. Box 420603

San Francisco, CA 94142-0603

GENERAL PREVAILING WAGE DETERMINATION MADE BY
THE DIRECTOR OF INDUSTRIAL RELATIONS PURSUANT TO CALIFORNIA LABOR CODE
PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: OPERATING ENGINEER#

Determination:
SC-23-63-2-2023-1

Issue Date:
February 22, 2023

Expiration date of determination:
June 30, 2023** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director - Research Unit for specific rates at (415) 703-4774.

Localities:
All localities within Imperial, Inyo, Kern, Los Angeles, Mono, Orange, Riverside, San Bernardino, San Luis Obispo, Santa Barbara and Ventura Counties.

Wages and total hourly rates (including employer payments):

Classification[a] (Journeyperson)	Basic Hourly Rate	Hours	Total Hourly Rate	Daily Overtime Hourly Rate[b] (1½ x)	Saturday Overtime Hourly Rate[c] (1½ x)	Sunday/Holiday Overtime Hourly Rate (2 x)
Group 1	$53.90	8	$84.69	$111.640	$111.640	$138.590
Group 2	$54.68	8	$85.47	$112.810	$112.810	$140.150
Group 3	$54.97	8	$85.76	$113.245	$113.245	$140.730
Group 4	$56.46	8	$87.25	$115.480	$115.480	$143.710
Group 6	$56.68	8	$87.47	$115.810	$115.810	$144.150
Group 8	$56.79	8	$87.58	$115.975	$115.975	$144.370
Group 10	$56.91	8	$87.70	$116.155	$116.155	$144.610
Group 12	$57.08	8	$87.87	$116.410	$116.410	$144.950
Group 13	$57.18	8	$87.97	$116.560	$116.560	$145.150
Group 14	$57.21	8	$88.00	$116.605	$116.605	$145.210
Group 15	$57.29	8	$88.08	$116.725	$116.725	$145.370
Group 16	$57.41	8	$88.20	$116.905	$116.905	$145.610
Group 17	$57.58	8	$88.37	$117.160	$117.160	$145.950
Group 18	$57.68	8	$88.47	$117.310	$117.310	$146.150
Group 19	$57.79	8	$88.58	$117.475	$117.475	$146.370
Group 20	$57.91	8	$88.70	$117.655	$117.655	$146.610
Group 21	$58.08	8	$88.87	$117.910	$117.910	$146.950
Group 22	$58.18	8	$88.97	$118.060	$118.060	$147.150
Group 23	$58.29	8	$89.08	$118.225	$118.225	$147.370
Group 24	$58.41	8	$89.20	$118.405	$118.405	$147.610
Group 25	$58.58	8	$89.37	$118.660	$118.660	$147.950

Employer Payments:

Type of Fund	Amount per Hour
Health and Welfare	$12.35
Pension[d]	$13.15
Vacation and Holiday[e]	$3.85
Training	$1.05
Other	$0.39

Recognized holidays:
Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Director's General Prevailing Wage Determinations Website (http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm). Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

Travel and/or subsistence payment:
In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Director's General Prevailing Wage Determinations Website (http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm). Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY
THE DIRECTOR OF INDUSTRIAL RELATIONS PURSUANT TO CALIFORNIA LABOR CODE
PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: OPERATING ENGINEER (SPECIAL SHIFT) #

Determination:
SC-23-63-2-2023-1

Issue Date:
February 22, 2023

Expiration date of determination:
June 30, 2023** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director - Research Unit for specific rates at (415) 703-4774.

Localities:
All localities within Imperial, Inyo, Kern, Los Angeles, Mono, Orange, Riverside, San Bernardino, San Luis Obispo, Santa Barbara and Ventura Counties.

Wages and total hourly rates (including employer payments):

Classification[a] (Journeyperson)	Basic Hourly Rate	Hours	Total Hourly Rate	Daily Overtime Hourly Rate[b] (1½ x)	Saturday Overtime Hourly Rate[c] (1½ x)	Sunday/Holiday Overtime Hourly Rate (2 x)
Group 1	$54.90	8	$85.69	$113.140	$113.140	$140.590
Group 2	$55.68	8	$86.47	$114.310	$114.310	$142.150
Group 3	$55.97	8	$86.76	$114.745	$114.745	$142.730
Group 4	$57.46	8	$88.25	$116.980	$116.980	$145.710
Group 6	$57.68	8	$88.47	$117.310	$117.310	$146.150
Group 8	$57.79	8	$88.58	$117.475	$117.475	$146.370
Group 10	$57.91	8	$88.70	$117.655	$117.655	$146.610
Group 12	$58.08	8	$88.87	$117.910	$117.910	$146.950
Group 13	$58.18	8	$88.97	$118.060	$118.060	$147.150
Group 14	$58.21	8	$89.00	$118.105	$118.105	$147.210
Group 15	$58.29	8	$89.08	$118.225	$118.225	$147.370
Group 16	$58.41	8	$89.20	$118.405	$118.405	$147.610
Group 17	$58.58	8	$89.37	$118.660	$118.660	$147.950
Group 18	$58.68	8	$89.47	$118.810	$118.810	$148.150
Group 19	$58.79	8	$89.58	$118.975	$118.975	$148.370
Group 20	$58.91	8	$89.70	$119.155	$119.155	$148.610
Group 21	$59.08	8	$89.87	$119.410	$119.410	$148.950
Group 22	$59.18	8	$89.97	$119.560	$119.560	$149.150
Group 23	$59.29	8	$90.08	$119.725	$119.725	$149.370
Group 24	$59.41	8	$90.20	$119.905	$119.905	$149.610
Group 25	$59.58	8	$90.37	$120.160	$120.160	$149.950

Employer Payments:

Type of Fund	Amount per Hour
Health and Welfare	$12.35
Pension[d]	$13.15
Vacation and Holiday[e]	$3.85
Training	$1.05
Other	$0.39

Recognized holidays:
Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Director's General Prevailing Wage Determinations Website (http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm). Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

Travel and/or subsistence payment:
In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Director's General Prevailing Wage Determinations Website (http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm). Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY
THE DIRECTOR OF INDUSTRIAL RELATIONS PURSUANT TO CALIFORNIA LABOR CODE
PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: OPERATING ENGINEER (MULTI-SHIFT)#

Determination:
SC-23-63-2-2023-1

Issue Date:
February 22, 2023

Expiration date of determination:
June 30, 2023** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director - Research Unit for specific rates at (415) 703-4774.

Localities:
All localities within Imperial, Inyo, Kern, Los Angeles, Mono, Orange, Riverside, San Bernardino, San Luis Obispo, Santa Barbara and Ventura Counties.

Wages and total hourly rates (including employer payments):

Classification[a] (Journeyperson)	Basic Hourly Rate	Hours[f]	Total Hourly Rate	Daily Overtime Hourly Rate[b] (1½ x)	Saturday Overtime Hourly Rate[c] (1½ x)	Sunday/Holiday Overtime Hourly Rate (2 x)
Group 1	$54.90	8	$85.69	$113.140	$113.140	$140.590
Group 2	$55.68	8	$86.47	$114.310	$114.310	$142.150
Group 3	$55.97	8	$86.76	$114.745	$114.745	$142.730
Group 4	$57.46	8	$88.25	$116.980	$116.980	$145.710
Group 5	$57.56	8	$88.35	$117.130	$117.130	$145.910
Group 6	$57.68	8	$88.47	$117.310	$117.310	$146.150
Group 7	$57.78	8	$88.57	$117.460	$117.460	$146.350
Group 8	$57.79	8	$88.58	$117.475	$117.475	$146.370
Group 9	$57.89	8	$88.68	$117.625	$117.625	$146.570
Group 10	$57.91	8	$88.70	$117.655	$117.655	$146.610
Group 11	$58.01	8	$88.80	$117.805	$117.805	$146.810
Group 12	$58.08	8	$88.87	$117.910	$117.910	$146.950
Group 13	$58.18	8	$88.97	$118.060	$118.060	$147.150
Group 14	$58.21	8	$89.00	$118.105	$118.105	$147.210
Group 15	$58.29	8	$89.08	$118.225	$118.225	$147.370
Group 16	$58.41	8	$89.20	$118.405	$118.405	$147.610
Group 17	$58.58	8	$89.37	$118.660	$118.660	$147.950
Group 18	$58.68	8	$89.47	$118.810	$118.810	$148.150
Group 19	$58.79	8	$89.58	$118.975	$118.975	$148.370
Group 20	$58.91	8	$89.70	$119.155	$119.155	$148.610
Group 21	$59.08	8	$89.87	$119.410	$119.410	$148.950
Group 22	$59.18	8	$89.97	$119.560	$119.560	$149.150
Group 23	$59.29	8	$90.08	$119.725	$119.725	$149.370
Group 24	$59.41	8	$90.20	$119.905	$119.905	$149.610

Classification[a] (Journeyperson)	Basic Hourly Rate	Hours[f]	Total Hourly Rate	Daily Overtime Hourly Rate[b] (1½ x)	Saturday Overtime Hourly Rate[c] (1½ x)	Sunday/Holiday Overtime Hourly Rate (2 x)
Group 25	$59.58	8	$90.37	$120.160	$120.160	$149.950

Employer Payments:

Type of Fund	Amount per Hour
Health and Welfare	$12.35
Pension[d]	$13.15
Vacation and Holiday[e]	$3.85
Training	$1.05
Other	$0.39

Recognized holidays:
Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Director's General Prevailing Wage Determinations Website (http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm). Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

Travel and/or subsistence payment:
In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Director's General Prevailing Wage Determinations Website (http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm). Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

Classifications:

Group 1
Bargeman
Brakeman
Compressor Operator
Ditchwitch, with seat or similar type equipment
Elevator Operator - Inside
Engineer Oiler
Forklift Operator (includes loed, lull or similar types – under 5 tons)
Generator Operator
Generator, Pump or Compressor Plant Operator
Heavy Duty Repairman Helper
Inertial Profiler Operator
Pump Operator
Signalman
Switchman

Group 2
Asphalt-Rubber Plant Operator (Nurse Tank Operator)
Coil Tubing Rig Operator
Concrete Mixer Operator – Skip Type
Conveyor Operator
Fireman
Forklift Operator (includes loed, lull or similar types – over 5 tons)
Hydrostatic Pump Operator
Oiler Crusher (Asphalt or Concrete Plant)
Petromat Laydown Machine
PJU Side Dump Jack
Rotary Drill Helper (Oilfield)
Screening and Conveyor Machine Operator (or similar types)
Skiploader (Wheel type up to ¾ yd. without attachment)
Tar Pot Fireman
Temporary Heating Plant Operator
Trenching Machine Oiler

Group 3
Asphalt Rubber Blend Operator
Bobcat or similar type (Skid Steer, with all attachments)
Equipment Greaser (rack)
Ford Ferguson (with dragtype attachments)
Helicopter Radioman (ground)
Stationary Pipe Wrapping and Cleaning Machine Operator

Group 4
Asphalt Plant Fireman
Backhoe Operator (mini-max or similar type)
Boring Machine Operator
Boring System Electronic Tracking Locator
Boxman or Mixerman (asphalt or concrete)
Chip Spreading Machine Operator
Concrete Cleaning Decontamination Machine Operator
Concrete Pump Operator (small portable)
Drilling Machine Operator, Small Auger types (Texoma Super Economatic, or similar types – Hughes 100 or 200, or similar types – drilling depth of 30 maximum)
Equipment Greaser (grease truck)
Excavator Track/Rubber-Tired-with all attachments (Operating weight under 21,000 lbs)
Guard Rail Post Driver Operator
Highline Cableway Signalman
Hydra-Hammer-Aero Stomper
Hydraulic Casing Oscillator Operator – drilling depth of 30’ maximum
Micro Tunneling Operator (above ground tunnel)
Power Concrete Curing Machine Operator
Power Concrete Saw Operator
Power – Driver Jumbo Form Setter Operator
Power Sweeper Operator
Rock Wheel Saw/Trencher
Roller Operator (compacting)
Screed Operator (asphalt or concrete)
Trenching Machine Operator (up to 6 ft.)
Vacuum or Muck Truck

Group 5 (for multi-shift rate, see Pages 5 and 6)
Equipment Greaser (Grease Truck/Multi-Shift)

Group 6
Articulating Material Hauler
Asphalt Plant Engineer
Batch Plant Operator
Bit Sharpener
Concrete Joint Machine Operator (canal and similar type)
Concrete Placer Operator
Concrete Planer Operator

Dandy Digger
Deck Engine Operator
Deck Engineer
Derrickman (oilfield type)
Drilling Machine Operator, Bucket or Auger types (Calweld 100 bucker or similar types – Watson 1000 auger or similar types – Texoma 330, 500 or 600 auger or similar types – drilling depth of 45' maximum)
Drilling Machine Operator (including water wells)
Forced Feed Loader
Hydraulic Casing Oscillator Operator – drilling depth of 45' maximum
Hydro Seeder Machine Operator (straw, pulp or seed)
Jackson Track Maintainer, or similar type
Kalamazoo Switch Tamper, or similar type
Machine Tool Operator
Maginnis Internal Full Slab Vibrator
Mechanical Berm, Curb or Gutter (concrete or asphalt)
Mechanical Finisher Operator (concrete, Clary-Johnson-Bidwell or similar)
Micro Tunnel System Operator (below ground)
Pavement Breaker Operator
Railcar Mover
Road Oil Mixing Machine Operator
Roller Operator (asphalt or finish)
Rubber-Tired Earthmoving Equipment (single engine, up to and including 25 yds. struck)
Self-Propelled Tar Pipelining Machine Operator
Skiploader Operator (crawler and wheel type, over ¾ yds. and up to and including 1½ yds.)
Slip Form Pump Operator (power driven hydraulic lifting device for concrete forms)
Tractor Operator – Bulldozer, Tamper-Scraper (single engine, up to 100 H.P. flyweel and similar types, up to and including D-5 and similar types)
Tugger Hoist Operator (1 drum)
Ultra High Pressure Waterjet Cutting Tool System Operator
Vacuum Blasting Machine Operator
Volumetric Mixer Operator
Welder - General

Group 7 (for multi-shift rate, see Pages 5 and 6)
Welder - General (Multi-Shift)

Group 8
Asphalt or Concrete Spreading Operator (tamping or finishing)
Asphalt Paving Machine Operator (barber greene or similar type, one (1) Screedman)
Asphalt-Rubber Distributor Operator
Backhoe Operator (up to and including ¾ yds.) small ford, case or similar types
Backhoe Operator (over ¾ yd. and up to 5 cu. yds. M.R.C.)
Barrier Rail Mover (BTM Series 200 or similar types)
Cast in Place Pipe Laying Machine Operator
Cold Foamed Asphalt Recycler
Combination Mixer and Compressor Operator (gunite work)
Compactor Operator – Self Propelled
Concrete Mixer Operator – Paving
Crushing Plant Operator
Drill Doctor
Drilling Machine Operator, Bucket or Auger types (Calweld 150 bucker or similar types – Watson 1500, 2000, 2500 auger or similar types – Texoma 700, 800 auger or similar types – drilling depth of 60' maximum)
Elevating Grader Operator
Excavator Track/Rubber-Tired with all attachments (Operating Weight 21,000 lbs – 100,000 lbs)
Global Positioning System/GPS (or Technician)
Grade Checker
Gradall Operator
Grouting Machine Operator
Heavy Duty Repairman/Pump Installer
Heavy Equipment Robotics Operator
Hydraulic Casing Oscillator Operator – drilling depth of 60' maximum
Hydraulic Operated Grout Plant (excludes hand loading)
Kalamazoo Ballast Regulator or similar type
Klemm Drill Operator or similar types
Kolman Belt Loader and similar type
Le Tourneau Blob Compactor or similar type
Lo Drill
Loader Operator (Athey, Euclid, Sierra and similar types)
Master Environmental Maintenance Mechanic
Mobark Chipper or similar types
Ozzie Padder or similar types
P.C. 490 Slot Saw

Pneumatic Concrete Placing Machine Operator (Hackley-Presswell or similar type)
Prentice 721E Hydro-Ax
Pumpcrete Gun Operator
Rock Drill or Similar Types (see Miscellaneous Provision #4 for additional information regarding this classification)
Rotary Drill Operator (excluding caison type)
Rubber-Tired Earth Moving Equipment Operator (single engine, caterpillar, euclid, athey wagon, and similar types with any and all attachments over 25 yds. and up to and including 50 cu yds. struck)
Rubber-Tired Earth Moving Equipment Operator (multiple engine – up to and including 25 yds. struck)
Rubber-Tired Scraper Operator (self-loading paddle wheel type – John Deere, 1040 and similar single unit)
Self-Propelled Curb and Gutter Machine Operator
Shuttle Buggy
Skiploader Operator (crawler and wheel type over 1 ½ yds. up to and including 6 ½ yds.)
Soil Remediation Plant Operator (CMI, Envirotech or Similar)
Soil Stabilizer and Reclaimer (WR-2400)
Somero SXP Laser Screed
Speed Swing Operator
Surface Heaters and Planer Operator
Tractor Compressor Drill Combination Operator
Tractor Operator (any type larger than D-5 – 100 flyweel H.P. and over, or similar – bulldozer, tamper, scraper and push tractor, single engine)
Tractor Operator (boom attachments)
Traveling Pipe Wrapping, Cleaning and Bending Machine Operator)
Trenching Machine Operator (over 6 ft. depth capacity, manufacturer's rating)
Trenching Machine with Road Miner Attachment (over 6ft. depth capacity, manufacturer's rating – Oiler or Journeyman Trainee required)
Ultra High Pressure Waterjet Cutting Tool System Mechanic
Water Pull (compaction)

Group 9 (for multi-shift rate, see Pages 5 and 6)
Heavy Duty Repairman (Multi-Shift)

Group 10
Backhoe Operator (over 5 cu. yds. M.R.C.)
Drilling Machine Operator, Bucket or Auger types (Calweld 200 B bucket or similar types – Watson 3000 or 5000 auger or similar types – Texoma 900 auger or similar types – drilling depth of 105' maximum)
Dual Drum Mixer
Dynamic Compactor LDC350 or similar types
Heavy Duty Repairman-Welder combination
Hydraulic Casing Oscillator Operator – drilling depth of 105' maximum
Monorail Locomotive Operator (diesel, gas or electric)
Motor Patrol – Blade Operator (single engine)
Multiple Engine Tractor Operator (euclid and similar type – except quad 9 cat.)
Pneumatic Pipe Ramming Tool and similar types
Pre-stressed Wrapping Machine Operator (2 Operators required)
Rubber – Tired Earth Moving Equipment Operator (single engine, over 50 yds. struck)
Rubber – Tired Earth Moving Equipment Operator (multiple engine, euclid caterpillar and similar – over 25 yds. and up to 50 yds. struck)
Tower Crane Repairman
Tractor Loader Operator (crawler and wheel-type over 6 ½ yds.)
Unmanned Aircraft Systems (UAS Drones) Operator (when used in conjunction with hoisting and placing materials)
Welder – Certified
Woods Mixer Operator (and similar pugmill equipment)

Group 11 (for multi-shift rate, see Pages 5 and 6)
Heavy Duty Repairman – Welder Combination (Multi-Shift)
Welder – Certified (Multi-Shift)

Group 12
Auto Grader Operator
Automatic Slip Form Operator
Backhoe Operator (over 7 cu. yds. M.R.C.)
Drilling Machine Operator, Bucket or Auger types (Calweld, auger 200 CA or similar types – Watson, auger 6000 or similar types – hughes super duty, auger 200 or similar types – drilling depth of 175' maximum)

Excavator Track/Rubber Tired- with all attachments (Operating Weight 100,000 lbs. – 200,000 lbs.)
Hoe Ram or similar with compressor
Hydraulic Casing Oscillator Operator – drilling depth of 175' maximum
Mass Excavator Operator – less than 750 cu. yds.
Mechanical Finishing Machine Operator
Mobile Form Traveler Operator
Motor Patrol Operator (multi-engine)
Pipe Mobile Machine Operator
Rubber-Tired Earth Moving Equipment Operator (multiple engine, euclid, caterpillar and similar type, over 50 cu. yds. struck)
Rubber-Tired Self-Loading Scraper Operator (paddle-wheel-auger type self-loading – (two (2) or more units)

Group 13
Rubber-Tired Earth Moving Equipment Operator, Operating Equipment with the Push-Pull System (single engine, up to and including 25 yds. struck)

Group 14
Canal Liner Operator
Canal Trimmer Operator
Drilling Machine Operator, Bucket or Auger types (Calweld, auger 200 CA or similar types – watson, auger 6000 or similar types – hughes super duty, auger 200 or similar types – drilling depth of 300' maximum)
Remote Controlled Earth Moving Operator ($1.00 per hour additional to base rate)
Wheel Excavator Operator (over 750 cu. yds. per hour)

Group 15
Rubber-Tired Earth Moving Equipment Operator, Operating Equipment with the Push-Pull System (single engine, caterpillar, euclid, athey wagon, and similar types with any and all attachments over 25 and up to and including 50 cu. yds. struck)
Rubber-Tired Earth Moving Equipment Operator, Operating Equipment with the Push-Pull System (multiple engine - up to and including 25 yds. struck)

Group 16
Excavator Track/Rubber Tired – with all attachments (Operating Weight exceeding 200,000 lbs.)
Rubber-Tired Earth Moving Equipment Operator, Operating Equipment with the Push-Pull System (single engine, over 50 yds. struck)
Rubber-Tired Earth Moving Equipment Operator, Operating Equipment with the Push-Pull System (multiple engine, euclid, caterpillar, and similar, over 25 yds. and up to 50 yds. struck)

Group 17
Rubber-Tired Earth Moving Equipment Operator, Operating Equipment with the Push-Pull System (multiple engine, euclid, caterpillar, and similar type, over 50 cu. yds. struck)
Tandem Tractor Operator (operating crawler type tractors in tandem – Quad 9 and similar type)

Group 18
Rubber-Tired Earth Moving Equipment Operator, Operating in Tandem (scrapers, belly dumps, and similar types in any combination, excluding compaction units - single engine, up to and including 25 yds. struck)

Group 19
Rotex Concrete Belt Operator
Rubber-Tired Earth Moving Equipment Operator, Operating in Tandem (scrapers, belly dumps, and similar types in any combination, excluding compaction units - single engine, caterpillar, euclid, athey wagon, and similar types with any and all attachments over 25 yds. and up to and including 50 cu. yds. struck)
Rubber-Tired Earth Moving Equipment Operator, Operating in Tandem (scrapers, belly dumps, and similar types in any combination, excluding compaction units - multiple engines, up to and including 25 yds. struck)

Group 20
Rubber-Tired Earth Moving Equipment Operator, Operating in Tandem (scrapers, belly dumps, and similar types in any combination, excluding compaction units - single engine, over 50 yds. struck)
Rubber-Tired Earth Moving Equipment Operator, Operating in Tandem (scrapers, belly dumps, and similar types in any combination, excluding compaction units - multiple engine, euclid, caterpillar and similar, over 25 yds. and up to 50 yds. struck)

Group 21
Rubber-Tired Earth Moving Equipment Operator, Operating in Tandem (scrapers, belly dumps, and similar types in any combination, excluding compaction units - multiple engine, euclid, caterpillar and similar type, over 50 cu. yds. struck)

Group 22
Rubber-Tired Earth Moving Equipment Operator, Operating Equipment with the Tandem Push-Pull System (single engine, up to and including 25 yds. struck)

Group 23
Rubber-Tired Earth Moving Equipment Operator, Operating Equipment with the Tandem Push-Pull System (single engine, caterpillar, euclid, athey wagon, and similar types with any and all attachments over 25 yds. and up to and including 50 cu. yds. struck)

Rubber-Tired Earth Moving Equipment Operator, Operating Equipment with the Tandem Push-Pull System (multiple engine, up to and including 25 yds. struck)

Group 24
Rubber-Tired Earth Moving Equipment Operator, Operating Equipment with the Tandem Push-Pull System (single engine, over 50 yds. Struck)
Rubber-Tired Earth Moving Equipment Operator, Operating Equipment with the Tandem Push-Pull System (multiple engine, euclid, caterpillar and similar, over 25 yds. and up to 50 yds. struck)

Group 25
Concrete Pump Operator-Truck Mounted
Pedestal Concrete Pump Operator
Rubber-Tired Earth Moving Equipment Operator, Operating Equipment with the Tandem Push-Pull System (multiple engine, euclid, caterpillar and similar over 50 cu. yds struck

MISCELLANEOUS PROVISIONS:

1. Operators on hoists with three drums shall receive fifty cents (50¢) per hour additional pay to the regular rate of pay. The additional pay shall be added to the regular rate and become the base rate for the entire shift.

2. All heavy duty repairman and heavy duty combination shall receive one dollar ($1.00) per hour tool allowance in addition to their regular rate of pay and this shall become their base rate of pay.

3. Employees required to suit up and work in a hazardous material environment, shall receive Two Dollars ($2.00) per hour in addition to their regular rate of pay, and that rate shall become the basic hourly rate of pay.

4. A review of rock drilling is currently pending. The minimum acceptable rate of pay for this classification or type of work on public works projects is Laborer and Related Classifications/Group 5 (Driller) as published in the Director's General Prevailing Wage Determinations. However, the published rate for the craft/classification of Operating Engineer/Group 8 (Rock Drill or Similar Types) may be used by contractors to perform rock drilling on public works projects.

[#] Indicates an apprenticeable craft. The current apprentice wage rates are available on the Prevailing Wage Apprentice Determinations Website (http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp).
[a] For classifications within each group, see Pages 7 through 11.
[b] Rate applies to the first 4 overtime hours. All other daily overtime is paid at the Sunday rate.
[c] Rate applies to the first 12 hours worked. All other time is paid at the Sunday rate.
[d] Includes an amount for Annuity.
[e] Includes an amount withheld for supplemental dues.
[f] The Third Shift shall work 6.5 hours, exclusive of meal period, for which 8 hours straight-time shall be paid at the non-shift rate, Monday through Friday.

GENERAL PREVAILING WAGE APPRENTICE RATES

Apprentice Prevailing Wage Rates are paid only to apprentices registered with the State of California, Division of Apprenticeship Standards, for work the registered apprentice performs in his/her specific craft or trade. You may check whether an Apprentice is registered at the Division of Apprenticeship Standards Website (https://www.dir.ca.gov/DAS/appcertpw/AppCertSearch.asp)

Determination: 2023-1

Expire Date: 06-30-2023 **

Shift: 1

Issue Date: 02-22-2023

Craft/Classification: Operating Engineer

Counties: Imperial, Inyo, Kern, Los Angeles, Mono, Orange, Riverside, San Bernardino, San Luis Obispo, Santa Barbara, Ventura

Period	Duration Months	OJT Hours	Basic Hourly Rate	Health & Welfare	Pension	Vacation/ Holiday	Training	Other	Total Hourly Rate
1	N/A	1,000	$34.010	$12.350	$3.500	$3.850	$1.050	$.390	$55.150
2	N/A	1,000	$36.840	$12.350	$3.500	$3.850	$1.050	$.390	$57.980
3	N/A	1,000	$39.680	$12.350	$13.150	$3.850	$1.050	$.390	$70.470
4	N/A	1,000	$42.510	$12.350	$13.150	$3.850	$1.050	$.390	$73.300
5	N/A	1,000	$45.340	$12.350	$13.150	$3.850	$1.050	$.390	$76.130
6	N/A	1,000	$51.010	$12.350	$13.150	$3.850	$1.050	$.390	$81.800

FOOTNOTE(S)

Operating Engineers Group 13 through 25 apprentice wage rates are based on the applicable journeyman's wage rates for that group.

Pension: Includes an amount for Annuity.

Vacation & Holiday: Includes an amount for Supplemental Dues.

Other: Includes amounts for Industry Fund, Engineers Contract Compliance Committee (ECCC), Contract Administration Fund, and Southern California Partnership for Jobs Fund.

Exhibit 1

Rates above also apply to crafts:

Tunnel Operating Engineer

Crane, Pile Driver, and Hoisting Equipment Operating Engineer

** JOURNEYMAN PREDETERMINED INCREASES:

7-1-2023: $4.00 to be allocated to wages and/or fringes.

7-1-2024: $4.00 to be allocated to wages and/or fringes.

There may be corresponding predetermined increase(s) to the apprentices associated with this journeyman craft/classification. Please e-mail a request to statistics@dir.ca.gov or send to the following address:

Department of Industrial Relations

Office of the Director - Research Unit

P.O. Box 420603

San Francisco, CA 94142-0603

Determination: 2023-1

Expire Date: 06-30-2023 **

Indentured/Other: Special Shift

Counties: Imperial, Inyo, Kern, Los Angeles, Mono, Orange, Riverside, San Bernardino, San Luis Obispo, Santa Barbara, Ventura

Issue Date: 02-22-2023

Craft/Classification: Operating Engineer

Shift: 2

Period	Duration Months	OJT Hours	Basic Hourly Rate	Health & Welfare	Pension	Vacation/ Holiday	Training	Other	Total Hourly Rate
1	N/A	1,000	$35.010	$12.350	$3.500	$3.850	$1.050	$.390	$56.150
2	N/A	1,000	$37.840	$12.350	$3.500	$3.850	$1.050	$.390	$58.980
3	N/A	1,000	$40.680	$12.350	$13.150	$3.850	$1.050	$.390	$71.470
4	N/A	1,000	$43.510	$12.350	$13.150	$3.850	$1.050	$.390	$74.300

Exhibit 1

Period	Duration Months	OJT Hours	Basic Hourly Rate	Health & Welfare	Pension	Vacation/ Holiday	Training	Other	Total Hourly Rate
5	N/A	1,000	$46.340	$12.350	$13.150	$3.850	$1.050	$.390	$77.130
6	N/A	1,000	$52.010	$12.350	$13.150	$3.850	$1.050	$.390	$82.800

FOOTNOTE(S)

Special Shift Rates

Operating Engineers Group 13 through 25 apprentice wage rates are based on the applicable journeyman's wage rates for that group.

Pension: Includes an amount for Annuity.

Vacation & Holiday: Includes an amount for Supplemental Dues.

Other: Includes amounts for Industry Fund, Engineers Contract Compliance Committee (ECCC), Contract Administration Fund, and Southern California Partnership for Jobs Fund.

Rates above also apply to crafts:

Tunnel Operating Engineer

Crane, Pile Driver, and Hoisting Equipment Operating Engineer

**JOURNEYMAN PREDETERMINED INCREASES:

7-1-2023: $4.00 to be allocated to wages and/or fringes.

7-1-2024: $4.00 to be allocated to wages and/or fringes.

There may be corresponding predetermined increase(s) to the apprentices associated with this journeyman craft/classification. Please e-mail a request to statistics@dir.ca.gov or send to the following address:

Department of Industrial Relations

Office of the Director - Research Unit

P.O. Box 420603

San Francisco, CA 94142-0603

Exhibit 1

Determination: 2023-1

Issue Date: 02-22-2023

Expire Date: 06-30-2023 **

Craft/Classification: Operating Engineer

Indentured/Other: Multi-shift

Shift: 3

Counties: Imperial, Inyo, Kern, Los Angeles, Mono, Orange, Riverside, San Bernardino, San Luis Obispo, Santa Barbara, Ventura

Period	Duration Months	OJT Hours	Basic Hourly Rate	Health & Welfare	Pension	Vacation/ Holiday	Training	Other	Total Hourly Rate
1	N/A	1,000	$35.010	$12.350	$3.500	$3.850	$1.050	$.390	$56.150
2	N/A	1,000	$37.840	$12.350	$3.500	$3.850	$1.050	$.390	$58.980
3	N/A	1,000	$40.680	$12.350	$13.150	$3.850	$1.050	$.390	$71.470
4	N/A	1,000	$43.510	$12.350	$13.150	$3.850	$1.050	$.390	$74.300
5	N/A	1,000	$46.340	$12.350	$13.150	$3.850	$1.050	$.390	$77.130
6	N/A	1,000	$52.010	$12.350	$13.150	$3.850	$1.050	$.390	$82.800

FOOTNOTE(S)

Rates above are for Multi-shift

Operating Engineers Group 13 through 25 apprentice wage rates are based on the applicable journeyman's wage rates for that group.

Pension: Includes an amount for Annuity

Vacation & Holiday: Includes an amount for Supplemental Dues.

Other: Includes amounts for Industry Fund, Engineers Contract Compliance Committee (ECCC), Contract Administration Fund, and Southern California Partnership for Jobs Fund.

Rates above also apply to crafts:

Tunnel Operating Engineer

Crane, Pile Driver, and Hoisting Equipment Operating Engineer

Exhibit 1

** JOURNEYMAN PREDETERMINED INCREASES:

7-1-2023: $4.00 to be allocated to wages and/or fringes.

7-1-2024: $4.00 to be allocated to wages and/or fringes.

There may be corresponding predetermined increase(s) to the apprentices associated with this journeyman craft/classification. Please e-mail a request to statistics@dir.ca.gov or send to the following address:

Department of Industrial Relations

Office of the Director - Research Unit

P.O. Box 420603

San Francisco, CA 94142-0603

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

Craft: Parking and Highway Improvement (Striping, Slurry and Seal Coat Operations-Laborer)#

Determination:
SC-23-102-6-2023-1

Issue Date:
February 22, 2023

Expiration date of determination:
June 30, 2023** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director - Research Unit for specific rates at (415) 703-4774.

Localities:
All localities within Imperial, Inyo, Kern, Los Angeles, Mono, Orange, Riverside, San Bernardino, San Diego, San Luis Obispo, Santa Barbara and Ventura Counties.

Wages and Employer Payments:

Classification[a] (Journeyperson)	Basic Hourly Rate	Health and Welfare	Pension	Vacation/ Holiday[b]	Training	Other	Hours[c]	Total Hourly Rate	Daily Overtime Hourly Rate (1 ½ X)	6th & 7th Day Overtime Hourly Rate[d] (1½ x)	Holiday Overtime Hourly Rate (2 X)
Group 1	$41.90	$8.75	$7.77	$5.26	$1.37	$0.56	8.0	$65.61	$86.560	$86.560	$107.51
Group 2	$43.20	$8.75	$7.77	$5.26	$1.37	$0.56	8.0	$66.91	$88.510	$88.510	$110.11
Group 3	$45.21	$8.75	$7.77	$5.26	$1.37	$0.56	8.0	$68.92	$91.525	$91.525	$114.13
Group 4	$46.95	$8.75	$7.77	$5.26	$1.37	$0.56	8.0	$70.66	$94.135	$94.135	$117.61

Recognized holidays:
Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Director's General Prevailing Wage Determinations Website (http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm). Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

Travel and/or subsistence payment:
In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Director's General Prevailing Wage Determinations Website (http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm). Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

CLASSIFICATION GROUPS:

Group 1
Protective coating, Pavement sealing (repairs and filling of cracks by any method to parking lots, game courts and playgrounds, and tracks, whether indoor or outdoor)
Truck Mounted Attenuator
Automatous Truck Mounted Attenuator
Installation of carstops
Traffic Control Person & Serviceman; including work of installing and protecting utility covers, traffic delineating devices, posting of no parking and notifications for public convenience
Asphalt Repair
Equipment Repair Technician
Truncated Dome Assitant
Decorative Asphalt Surfacing Applicator Assistant

Group 2
Traffic Surface Abrasive Blaster
Pot Tender
Traffic Control Person/Certified Traffic Control Person
Repairing and filling of cracks and surface cleaning on streets, highways, and airports by any means, and other work not directly connected with the application of slurry seal
Slurry Seal Squeegeeman (finisher)
Bob Cat/Skid Steer
Seal Roller
Forklift

Group 3
Traffic Delineating Device Applicator
Traffic Protective System Installer
Pavement Marking Applicator
Slurry Seal Applicator Operator (Line Driver-including self-contained distribution units, aggregate spreader truck)
Shuttleman (loader/slurry machine operations) operation of all related machinery and equipment; handling of related materials
Truncated Dome Technician
Decorative Asphalt Surfacing Applicator

Group 4
Traffic Striping Applicator
Slurry Seal Mixer Operator
Power Broom Sweeper (operation of all related trucks, machinery and equipment; Handling of related materials)

[#] Indicates an apprenticeable craft. The current apprentice wage rates are available on the Prevailing Wage Apprentice Determinations Website (http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp).
[a] For classifications within each group, see Page 2.
[b] Includes an amount per hour worked for Supplemental Dues.
[c] Straight-time hours: 8 consecutive hours per day. 40 hours over 5 consecutive days, Monday through Sunday shall constitute a week's work at straight time.
[d] The sixth consecutive day in the same work week may be worked at straight-time if job is shut down during work week due to inclement weather.

GENERAL PREVAILING WAGE APPRENTICE RATES

Apprentice Prevailing Wage Rates are paid only to apprentices registered with the State of California, Division of Apprenticeship Standards, for work the registered apprentice performs in his/her specific craft or trade. You may check whether an Apprentice is registered at the Division of Apprenticeship Standards Website (https://www.dir.ca.gov/DAS/appcertpw/AppCertSearch.asp)

Determination: 2023-1

Issue Date: 02-22-2023

Expire Date: 06-30-2023 **

Craft/Classification: Parking and Highway Improvement (Striper-Laborer)

Shift: 1

Counties: Imperial, Inyo, Kern, Los Angeles, Mono, Orange, Riverside, San Bernardino, San Diego, San Luis Obispo, Santa Barbara, Ventura

Period	Duration Months	OJT Hours	Basic Hourly Rate	Health & Welfare	Pension	Vacation/ Holiday	Training	Other	Total Hourly Rate
1	N/A	800	$26.580	$6.130	$3.560	$2.630	$.550	$.000	$39.450
2	N/A	1,000	$31.100	$6.130	$3.560	$2.630	$.550	$.000	$43.970
3	N/A	1,000	$33.910	$7.000	$4.160	$3.680	$1.370	$.500	$50.620
4	N/A	1,000	$36.170	$7.000	$4.160	$3.680	$1.370	$.500	$52.880

FOOTNOTE(S)

Apprentice Wage & Benefit Rates are calculated based on Group 3 Journeyman rates.

Vacation/Holiday - Includes amount for supplemental dues

Other - Includes amount for Center for Contract Compliance, Industry Fund, and Contract Administration Fund.

** Journeyman Predetermined Increases

Effective 7/1/2023, an increase of $3.25 to be allocated to wages and/or fringes

Effective 7/1/2024, an increase of $3.35 to be allocated to wages and/or fringes

Exhibit 1

Effective 7/1/2025, an increase of $3.45 to be allocated to wages and/or fringes

There may be corresponding predetermined increase(s) to the apprentices associated with this journeyman craft/classification. Please e-mail a request to statistics@dir.ca.gov or send to the following address:

Department of Industrial Relations

Office of the Director - Research Unit

P.O. Box 420603

San Francisco, CA 94142-0603

GENERAL PREVAILING WAGE DETERMINATION MADE BY
THE DIRECTOR OF INDUSTRIAL RELATIONS PURSUANT TO CALIFORNIA LABOR CODE
PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: #TEAMSTER (APPLIES ONLY TO WORK ON THE CONSTRUCTION SITE)

Determination:
SC-23-261-2-2022-1

Issue Date:
August 22, 2022

Expiration date of determination:
June 30, 2023** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director – Research Unit for specific rates at (415) 703-4774.

Localities:
All localities within Imperial, Inyo, Kern, Los Angeles, Mono, Orange, Riverside, San Bernardino, San Luis Obispo, Santa Barbara and Ventura Counties.

Wages and total hourly rates (including employer payments):

Classification[a] (Journeyperson)	Basic Hourly Rate	Hours	Total Hourly Rate	Daily Overtime Hourly Rate[b] (1½ x)	Saturday Overtime Hourly Rate[b] (1½ x)	Sunday/Holiday Overtime Hourly Rate (2 x)
Group I	$36.19	8	$68.73	$86.825	$86.825	$104.92
Group II	$36.34	8	$68.88	$87.05	$87.05	$105.22
Group III	$36.47	8	$69.01	$87.245	$87.245	$105.48
Group IV	$36.66	8	$69.20	$87.53	$87.53	$105.86
Group V	$36.69	8	$69.23	$87.575	$87.575	$105.92
Group VI	$36.72	8	$69.26	$87.62	$87.62	$105.98
Group VII	$36.97	8	$69.51	$87.995	$87.995	$106.48
Group VIII	$37.22	8	$69.76	$88.37	$88.37	$106.98
Group IX	$37.42	8	$69.96	$88.67	$88.67	$107.38
Group X	$37.72	8	$70.26	$89.12	$89.12	$107.98
Group XI	$38.22	8	$70.76	$89.87	$89.87	$108.98

Employer Payments:

Type of Fund	Amount per Hour
Health and Welfare	$20.12
Pension	$7.00
Vacation and Holiday[c]	$3.15
Training	$1.82
Other	$0.45

Wages and total hourly rates (including employer payments):

Classification[d] (Subjourneyman)	Basic Hourly Rate	Hours	Total Hourly Rate	Daily Overtime Hourly Rate[b] (1½ x)	Saturday Overtime Hourly Rate[b] (1½x)	Sunday/Holiday Overtime Hourly Rate (2 x)
0-2000 hours	$22.40	8	$53.79	$64.99	$64.99	$76.19
2001-4000 hours	$24.40	8	$56.04	$68.24	$68.24	$80.44
4001-6000 hours	$26.40	8	$58.29	$71.49	$71.49	$84.69

Over 6000 hours and thereafter at journeyman rates.

Employer Payments:

Type of Fund	Amount per Hour
Health and Welfare	$20.12
Pension	$7.00
Vacation and Holiday[c]	$2.00 ($2.25 for 2001-4000 hours; $2.50 for 4001-6000 hours)
Training	$1.82
Other	$0.45

Recognized holidays:
Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Director's General Prevailing Wage Determinations Website (http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm). Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

Travel and/or subsistence payment:
In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Director's General Prevailing Wage Determinations Website (http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm). Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY
THE DIRECTOR OF INDUSTRIAL RELATIONS PURSUANT TO CALIFORNIA LABOR CODE
PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: #TEAMSTER (SPECIAL SHIFT)
(APPLIES ONLY TO WORK ON THE CONSTRUCTION SITE)

Determination:
SC-23-261-2-2022-1

Issue Date:
August 22, 2022

Expiration date of determination:
June 30, 2023** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director – Research Unit for specific rates at (415) 703-4774.

Localities:
All localities within Imperial, Inyo, Kern, Los Angeles, Mono, Orange, Riverside, San Bernardino, San Luis Obispo, Santa Barbara and Ventura Counties.

Wages and total hourly rates (including employer payments):

Classification[a] (Journeyperson)	Basic Hourly Rate	Hours	Total Hourly Rate	Daily Overtime Hourly Rate[b] (1½ x)	Saturday Overtime Hourly Rate[b] (1½ x)	Sunday/Holiday Overtime Hourly Rate (2 x)
Group I	$37.19	8	$69.73	$88.325	$88.325	$106.92
Group II	$37.34	8	$69.88	$88.55	$88.55	$107.22
Group III	$37.47	8	$70.01	$88.745	$88.745	$107.48
Group IV	$37.66	8	$70.20	$89.03	$89.03	$107.86
Group V	$37.69	8	$70.23	$89.075	$89.075	$107.92
Group VI	$37.72	8	$70.26	$89.12	$89.12	$107.98
Group VII	$37.97	8	$70.51	$89.495	$89.495	$108.48
Group VIII	$38.22	8	$70.76	$89.87	$89.87	$108.98
Group IX	$38.42	8	$70.96	$90.17	$90.17	$109.38
Group X	$38.72	8	$71.26	$90.62	$90.62	$109.98
Group XI	$39.22	8	$71.76	$91.37	$91.37	$110.98

Employer Payments:

Type of Fund	Amount per Hour
Health and Welfare	$20.12
Pension	$7.00
Vacation and Holiday[c]	$3.15
Training	$1.82
Other	$0.45

Wages and total hourly rates (including employer payments):

Classification[d] (Subjourneyman)	Basic Hourly Rate	Hours	Total Hourly Rate	Daily Overtime Hourly Rate[b] (1½ x)	Saturday Overtime Hourly Rate[b] (1½x)	Sunday/Holiday Overtime Hourly Rate (2 x)
0-2000 hours	$22.40	8	$53.79	$64.99	$64.99	$76.19
2001-4000 hours	$24.40	8	$56.04	$68.24	$68.24	$80.44
4001-6000 hours	$26.40	8	$58.29	$71.49	$71.49	$84.69

Over 6000 hours and thereafter at journeyman rates.

Employer Payments:

Type of Fund	Amount per Hour
Health and Welfare	$20.12
Pension	$7.00
Vacation and Holiday[c]	$2.00 ($2.25 for 2001-4000 hours; $2.50 for 4001-6000 hours)
Training	$1.82
Other	$0.45

Recognized holidays:
Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Director's General Prevailing Wage Determinations Website (http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm). Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

Travel and/or subsistence payment:
In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Director's General Prevailing Wage Determinations Website (http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm). Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY
THE DIRECTOR OF INDUSTRIAL RELATIONS PURSUANT TO CALIFORNIA LABOR CODE
PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: #TEAMSTER (SECOND SHIFT)
(APPLIES ONLY TO WORK ON THE CONSTRUCTION SITE)

Determination:
SC-23-261-2-2022-1

Issue Date:
August 22, 2022

Expiration date of determination:
June 30, 2023** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director – Research Unit for specific rates at (415) 703-4774.

Localities:
All localities within Imperial, Inyo, Kern, Los Angeles, Mono, Orange, Riverside, San Bernardino, San Luis Obispo, Santa Barbara and Ventura Counties.

Wages and total hourly rates (including employer payments):

Classification[a] (Journeyperson)	Basic Hourly Rate	Hours[e]	Total Hourly Rate	Daily Overtime Hourly Rate[b] (1½ x)	Saturday Overtime Hourly Rate[b] (1½ x)	Sunday/Holiday Overtime Hourly Rate (2 x)
Group I	$38.19	8	$70.73	$89.825	$89.825	$108.92
Group II	$38.34	8	$70.88	$90.05	$90.05	$109.22
Group III	$38.47	8	$71.01	$90.245	$90.245	$109.48
Group IV	$38.66	8	$71.20	$90.53	$90.53	$109.86
Group V	$38.69	8	$71.23	$90.575	$90.575	$109.92
Group VI	$38.72	8	$71.26	$90.62	$90.62	$109.98
Group VII	$38.97	8	$71.51	$90.995	$90.995	$110.48
Group VIII	$39.22	8	$71.76	$91.37	$91.37	$110.98
Group IX	$39.42	8	$71.96	$91.67	$91.67	$111.38
Group X	$39.72	8	$72.26	$92.12	$92.12	$111.98
Group XI	$40.22	8	$72.76	$92.87	$92.87	$112.98

Employer Payments:

Type of Fund	Amount per Hour
Health and Welfare	$20.12
Pension	$7.00
Vacation and Holiday[c]	$3.15
Training	$1.82
Other	$0.45

Wages and total hourly rates (including employer payments):

Classification[d] (Subjourneyman)	Basic Hourly Rate	Hours[e]	Total Hourly Rate	Daily Overtime Hourly Rate[b] (1½ x)	Saturday Overtime Hourly Rate[b] (1½x)	Sunday/Holiday Overtime Hourly Rate (2 x)
0-2000 hours	$22.40	8	$53.79	$64.99	$64.99	$76.19
2001-4000 hours	$24.40	8	$56.04	$68.24	$68.24	$80.44
4001-6000 hours	$26.40	8	$58.29	$71.49	$71.49	$84.69

Over 6000 hours and thereafter at journeyman rates.

Employer Payments:

Type of Fund	Amount per Hour
Health and Welfare	$20.12
Pension	$7.00
Vacation and Holiday[c]	$2.00 ($2.25 for 2001-4000 hours; $2.50 for 4001-6000 hours)
Training	$1.82
Other	$0.45

Recognized holidays:
Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Director's General Prevailing Wage Determinations Website (http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm). Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

Travel and/or subsistence payment:
In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Director's General Prevailing Wage Determinations Website (http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm). Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

Classifications:

Group I
Warehouseman and Teamster

Group II
Driver of Vehicle or Combination of Vehicles - 2 axles
Traffic Control Pilot Car, excluding moving heavy equipment permit load
Truck Mounted Power Broom

Group III
Driver of Vehicle or Combination of Vehicles - 3 axles
Bootman
Cement Mason Distribution Truck
Fuel Truck Driver
Water Truck - 2 axles
Dump Truck of less than 16 yards water level
Erosion Control Driver

Group IV
Driver of Transit Mix Truck-Under 3 yds
Dumpcrete Truck Less than 6½ yards water level
Truck Repairman Helper

Group V
Water Truck 3 or more axles
Warehouseman Clerk
Slurry Truck Driver

Group VI
Driver of Transit Mix Truck - 3 yds or more
Dumpcrete Truck 6½ yds water level and over
Driver of Vehicle or Combination of Vehicles - 4 or more axles
Driver of Oil Spreader Truck
Dump Truck 16 yds to 25 yds water level
Side Dump Trucks
Flow Boy Dump Trucks

Group VII
A Frame, Swedish Crane or Similar
Forklift Driver
Ross Carrier Driver

Group VIII
Dump Truck of 25 yds to 49 yards water level
Truck Repairman
Water Pull Single Engine
Welder

Group IX
Truck Repairman Welder
Low Bed Driver, 9 axles or over

Group X
Working Truck Driver
Truck Greaser and Tireman - $0.50 additional for Tireman
Pipeline and Utility Working Truck Driver, including Winch Truck and Plastic Fusion, limited to Pipeline and Utility Work
Dump Truck and Articulating - 50 yards or more water level
Water Pull Single Engine with attachment

Group XI
Water Pull Twin Engine
Water Pull Twin Engine with attachments
Winch Truck Driver - $0.25 additional when operating a Winch or similar special attachment

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[#] Indicates an apprenticeable craft. The current apprentice wage rates are available on the Prevailing Wage Apprentice Determinations Website (http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp).
[a] For classifications within each group, see Page 7.
[b] Rate applies to the first 4 daily overtime hours on weekdays and the first 12 hours on Saturday. All other overtime is paid at the Sunday/Holiday double-time rate.
[c] Includes an amount for Supplemental Dues.
[d] Subjourneyman may be employed at a ratio of one subjourneyman for every five journeyman.
[e] The third shift shall work 6.5 hours, exclusive of meal period, for which 8-hours straight time shall be paid at the non-shift rate, Monday through Friday.

GENERAL PREVAILING WAGE APPRENTICE RATES

Apprentice Prevailing Wage Rates are paid only to apprentices registered with the State of California, Division of Apprenticeship Standards, for work the registered apprentice performs in his/her specific craft or trade. You may check whether an Apprentice is registered at the Division of Apprenticeship Standards Website (https://www.dir.ca.gov/DAS/appcertpw/AppCertSearch.asp)

Determination: 2023-1

Issue Date: 08-22-2022

Expire Date: 06-30-2023 **

Craft/Classification: Teamster

Counties: Imperial, Inyo, Kern, Los Angeles, Mono, Orange, Riverside, San Bernardino, San Luis Obispo, Santa Barbara, Ventura

Period	Duration Months	OJT Hours	Basic Hourly Rate	Health & Welfare	Pension	Vacation/ Holiday	Training	Other	Total Hourly Rate
1	N/A	600	$19.990	$15.060	$3.000	$1.450	$1.820	$.450	$41.770
2	N/A	600	$22.630	$15.060	$3.000	$1.450	$1.820	$.450	$44.410
3	N/A	600	$25.650	$15.060	$3.000	$1.450	$1.820	$.450	$47.430
4	N/A	600	$28.290	$15.060	$3.000	$1.450	$1.820	$.450	$50.070
5	N/A	600	$32.060	$15.060	$3.000	$1.450	$1.820	$.450	$53.840
6	N/A	600	$35.830	$15.060	$3.000	$1.450	$1.820	$.450	$57.610

FOOTNOTE(S)

Vacation & Holiday - Includes Amount for Supplemental Dues.

Apprentice rates based on Group X Journeyman Rates.

** Journeyman Predetermined Increases

Effective July 1, 2023, there will be an increase of $3.15 to be allocated to wages and/or employer payments.

Effective July 1, 2024, there will be an increase of $3.30 to be allocated to wages and/or employer payments.

Exhibit 1

There may be corresponding predetermined increase(s) to the apprentices associated with this journeyman craft/classification. Please e-mail a request to statistics@dir.ca.gov or send to the following address:

Department of Industrial Relations

Office of the Director - Research Unit

P.O. Box 420603

San Francisco, CA 94142-0603

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1 FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

LOCALITY: VENTURA COUNTY

DETERMINATION: VEN-2023-1

CRAFT	CLASSIFICATION	CRAFT FOOTNOTE	ISSUE DATE	EXPIRATION DATE	BASIC HOURLY RATE	BASIC HOURLY RATE FOOTNOTE	HEALTH AND WELFARE	HEALTH AND WELFARE FOOTNOTE	PENSION	PENSION FOOTNOTE	VACATION/ HOLIDAY	VACATION/ HOLIDAY FOOTNOTE	TRAINING	TRAINING FOOTNOTE
#BRICKLAYER:	BRICKLAYER, CEMENT BLOCKLAYER, POINTER, CAULKER, CLEANER		02/22/2023	04/30/2023**	$45.120	A	$9.250		$9.480		$0.000		$1.160	B
#BRICKLAYER:	STONEMASON, MARBLE MASON		02/22/2023	04/30/2023**	$45.120	A	$9.250		$9.480		$0.000		$1.160	B
#BRICKLAYER:	MASON FINISHER		02/22/2023	04/30/2023**	$40.610	A	$9.250		$9.480		$0.000		$1.110	B
#BRICK TENDER		E	08/22/2022	06/30/2023**	$37.320		$8.750		$9.330	F	$4.400	G	$0.700	
#BRICK TENDER	FORKLIFT OPERATOR		08/22/2022	06/30/2023**	$37.770		$8.750		$9.330	F	$4.400	G	$0.700	
#CARPET, LINOLEUM,	RESILIENT TILE LAYER		02/22/2023	12/31/2023**	$41.600	H	$7.780		$5.550		$2.420		$0.630	
CARPET, LINOLEUM,	MATERIAL HANDLER	J	02/22/2023	12/31/2023**	$16.640	H	$7.780		$1.940		$0.920		$0.630	
#DRYWALL FINISHER			08/22/2022	08/31/2023**	$46.280	H	$8.850		$8.730		$5.070		$0.870	
#ELECTRICIAN:	SOUND INSTALLER		02/22/2023	06/25/2023**	$43.220		$9.410		$4.720	M	$0.000		$0.650	
#ELECTRICIAN:	INSIDE WIREMAN	P	02/22/2023	07/30/2023**	$45.860	Q	$10.710		$16.640	R	$0.000	S	$1.150	
#ELECTRICIAN:	CABLE SPLICER	P	02/22/2023	07/30/2023**	$50.450	Q	$10.710		$16.640	R	$0.000	S	$1.150	
#ELECTRICIAN:	TRANSPORTATION SYSTEMS WIREMAN	P	02/22/2023	07/30/2023**	$45.860	Q	$10.710		$16.640	R	$0.000	S	$1.150	
#ELECTRICIAN:	TRANSPORTATION SYSTEMS TECHNICIAN	P	02/22/2023	07/30/2023**	$34.400	Q	$10.710		$16.640	R	$0.000	S	$1.150	
#FIELD SURVEYOR:	CHIEF OF PARTY (018.167-010)	U	02/22/2023	09/30/2023**	$59.510		$12.350		$13.150		$5.070	G	$1.150	
#FIELD SURVEYOR:	INSTRUMENTMAN (018.167-034)	U	02/22/2023	09/30/2023**	$54.860		$12.350		$13.150		$4.900	G	$1.150	
#FIELD SURVEYOR:	CHAINMAN/RODMAN (869.567-010)	U	02/22/2023	09/30/2023**	$54.280		$12.350		$13.150		$4.850	G	$1.150	
#GLAZIER			02/22/2023	05/31/2023**	$53.000	V	$8.250	W	$14.850		$0.000	X	$0.770	
#MARBLE FINISHER			02/22/2023	05/31/2023**	$38.600	Z	$9.000		$4.270		$0.000		$0.880	

Exhibit 1

CRAFT	CLASSIFICATION	CRAFT FOOTNOTE	ISSUE DATE	EXPIRATION DATE	BASIC HOURLY RATE	BASIC HOURLY RATE FOOTNOTE	HEALTH AND WELFARE	HEALTH AND WELFARE FOOTNOTE	PENSION	PENSION FOOTNOTE	VACATION/ HOLIDAY	VACATION/ HOLIDAY FOOTNOTE	TRAINING	TRAINING FOOTNOTE
#PAINTER:	PAINTER, LEAD ABATEMENT	AD	02/22/2023	06/30/2023**	$34.340	Q	$9.000		$5.440		$2.990		$0.750	
#PAINTER:	INDUSTRIAL PAINTER	AD	02/22/2023	06/30/2023**	$39.070	Q	$9.000		$5.440		$3.350		$0.850	
PAINTER:	GRAFFITI REMOVAL WORKER JOURNEYMAN (APPLIES ONLY TO PAINT-OVER METHOD)	AF	02/22/2023	01/31/2024*	$25.000	Z	$8.500		$1.000		$0.000		$0.750	
PAINTER:	GRAFFITI REMOVAL WORKER 1 (APPLIES ONLY TO PAINT-OVER METHOD)	AG	02/22/2023	01/31/2024*	$17.500	Z	$8.500		$1.000		$0.000		$0.750	
PAINTER:	GRAFFITI REMOVAL WORKER 2 (APPLIES ONLY TO PAINT-OVER METHOD)	AH	02/22/2023	01/31/2024*	$18.370	Z	$8.500		$1.000		$0.000		$0.750	
#PLASTERER			08/22/2022	07/31/2023**	$40.430		$9.380		$9.020		$6.940	AI	$1.240	
#PLASTER TENDER		AL	08/22/2022	08/01/2023**	$41.470		$8.750		$10.220		$5.300	AM	$1.100	
PLASTER TENDER	PLASTER CLEAN-UP LABORER		08/22/2022	08/01/2023**	$38.920		$8.750		$10.220		$5.300	AM	$1.100	
#PLUMBER:	PLUMBER, INDUSTRIAL AND GENERAL PIPEFITTER		08/22/2022	08/31/2023**	$55.180	AP	$9.260		$14.200	AQ	$0.000	AR	$2.800	
#PLUMBER:	SEWER AND STORM DRAIN PIPELAYER		08/22/2022	08/31/2023**	$42.290	AP	$9.150		$11.350	AQ	$0.000	AR	$2.530	
PLUMBER:	SEWER AND STORM DRAIN PIPE TRADESMAN	AU	08/22/2022	08/31/2023**	$20.880	AV	$9.400		$0.380		$0.000		$1.610	
#PLUMBER:	SERVICE AND REPAIR		08/22/2022	08/31/2023**	$53.510	AP	$9.260		$13.890	AQ	$0.000	AR	$2.130	
#PLUMBER:	LANDSCAPE/IRRIGATION FITTER		08/22/2022	08/31/2023**	$38.200	Z	$9.260		$14.200	AQ	$0.000	AR	$2.190	
PLUMBER:	LANDSCAPE/IRRIGATION TRADESMAN	AY	08/22/2022	08/31/2023**	$16.670	Z	$3.000		$1.160	AQ	$0.000		$0.100	
#PLUMBER:	REFRIGERATION SERVICE HVACR		02/22/2023	09/03/2023**	$47.760	H	$9.260		$8.050	AZ	$0.000	S	$1.580	
PLUMBER:	REFRIGERATION SERVICE TRADESMAN HVACR		02/22/2023	09/03/2023*	$15.880	H	$9.260		$0.530		$0.000	S	$1.580	
#PLUMBER:	FIRE SPRINKLER FITTER (PROTECTION AND CONTROL SYSTEMS, OVERHEAD AND UNDERGROUND)	BC	02/22/2023	12/31/2023**	$43.250		$11.450		$15.360	BD	$0.000		$0.520	
#PLUMBER:	FIRE SPRINKLER FITTER (PROTECTION AND CONTROL SYSTEMS, OVERHEAD AND UNDERGROUND)	BE	02/22/2023	08/31/2023**	$52.610		$11.450		$18.200		$0.000	S	$1.600	

Exhibit 1

CRAFT	CLASSIFICATION	CRAFT FOOTNOTE	ISSUE DATE	EXPIRATION DATE	BASIC HOURLY RATE	BASIC HOURLY RATE FOOTNOTE	HEALTH AND WELFARE	HEALTH AND WELFARE FOOTNOTE	PENSION	PENSION FOOTNOTE	VACATION/ HOLIDAY	VACATION/ HOLIDAY FOOTNOTE	TRAINING	TRAINING FOOTNOTE
#ROOFER			08/22/2022	07/31/2023*	$43.470	BH	$8.560		$10.370	F	$0.000	BI	$0.530	
#ROOFER	PITCH WORK		08/22/2022	07/31/2023*	$45.220	BH	$8.560		$10.370	F	$0.000	BI	$0.530	
#ROOFER	PREPARER		08/22/2022	07/31/2023*	$44.470	BH	$8.560		$10.370	F	$0.000	BI	$0.530	
#SHEET METAL WORKER (HVAC)			08/22/2022	07/31/2023*	$50.660	H	$10.600		$20.520	BL	$0.000	S	$1.730	
#TERRAZZO FINISHER			02/22/2023	08/31/2023**	$38.370	H	$9.000		$4.350		$0.000	S	$0.780	
#TERRAZZO WORKER			02/22/2023	08/31/2023**	$46.490	H	$9.000		$4.610		$0.000	S	$1.050	
#TILE FINISHER			02/22/2023	05/31/2023**	$33.170	Z	$9.000		$2.750		$0.000		$0.810	
#TILE LAYER			02/22/2023	05/31/2023**	$46.030	Z	$9.000		$8.350		$0.000		$1.000	

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FOOTNOTES

* EFFECTIVE UNTIL SUPERSEDED BY A NEW DETERMINATION ISSUED BY THE DIRECTOR OF INDUSTRIAL RELATIONS. CONTACT THE OFFICE OF THE DIRECTOR - RESEARCH UNIT AT (415) 703-4774 FOR THE NEW RATES AFTER TEN DAYS AFTER THE EXPIRATION DATE IF NO SUBSEQUENT DETERMINATION IS ISSUED.

** THE RATE TO BE PAID FOR WORK PERFORMED AFTER THIS DATE HAS BEEN DETERMINED. IF WORK WILL EXTEND PAST THIS DATE, THE NEW RATE MUST BE PAID AND SHOULD BE INCORPORATED IN CONTRACTS ENTERED INTO NOW. CONTACT THE OFFICE OF THE DIRECTOR RESEARCH UNIT FOR SPECIFIC RATES AT (415) 703-4774.

\# INDICATES AN APPRENTICEABLE CRAFT. THE CURRENT APPRENTICE WAGE RATES ARE AVAILABLE ON THE INTERNET @ HTTP://WWW.DIR.CA.GOV/OPRL/PWAPPWAGE/PWAPPWAGESTART.ASP.

& THE BASIC HOURLY RATE AND EMPLOYER PAYMENTS ARE NOT TAKEN FROM A COLLECTIVE BARGAINING AGREEMENT FOR THIS CRAFT OR CLASSIFICATION.

A INCLUDES AMOUNT WITHHELD FOR DUES CHECK OFF AND CONTRACT COMPLIANCE.

B INCLUDES AN AMOUNT FOR IMI TRAINING FUND.

C SATURDAYS IN THE SAME WORK WEEK MAY BE WORKED AT STRAIGHT-TIME IF JOB IS SHUT DOWN DURING THE NORMAL WORKWEEK DUE TO INCLEMENT WEATHER, OR REASONS BEYOND THE CONTROL OF THE EMPLOYER.

D RATE APPLIES TO THE FIRST 2 DAILY OVERTIME HOURS AND THE FIRST 10 HOURS ON SATURDAY; ALL OTHER TIME IS PAID AT THE SUNDAY AND HOLIDAY OVERTIME HOURLY RATE.

E THE RATIO OF BRICK TENDERS TO BRICKLAYERS SHALL BE AS FOLLOWS: ONE (1) BRICK TENDER TO NO MORE THAN THREE (3) BRICKLAYERS DURING THE INSTALLATION OF BLOCK ON A TYPICAL MASONRY PROJECT.

F INCLUDES AN AMOUNT PER HOUR WORKED FOR ANNUITY TRUST FUND.

G INCLUDES AN AMOUNT PER HOUR WORKED FOR SUPPLEMENTAL DUES.

H INCLUDES AMOUNT WITHHELD FOR DUES CHECK OFF.

I RATE APPLIES TO THE FIRST 12 HOURS WORKED ON SATURDAY, ALL OTHER TIME IS PAID AT DOUBLE TIME. SATURDAY MAY BE WORKED AT THE STRAIGHT-TIME HOURLY RATE FOR THE FIRST 8 HOURS IF INCLEMENT WEATHER FORCES A SYNTHETIC/ARTIFICIAL TURF PROJECT TO SHUT DOWN DURING THE REGULAR WORK WEEK (MONDAY THOUGH FRIDAY).

Exhibit 1

J A MATERIAL HANDLER MAY BE UTILIZED IN RATIO OF ONE (1) MATERIAL HANDLER WITH ANY FIVE (5) JOURNEYMEN ON ANY GIVEN PROJECT.

K RATE APPLIES TO THE FIRST 12 HOURS ON SATURDAY, ALL OTHER TIME IS PAID AT DOUBLE TIME.

L RATE APPLIES TO FIRST 8 HOURS ONLY. DOUBLE TIME THEREAFTER. SATURDAYS IN THE SAME WORK WEEK MAY BE WORKED AT STRAIGHT-TIME IF JOB IS SHUT DOWN DURING THE NORMAL WORK WEEK DUE TO INCLEMENT WEATHER.

M IN ADDITION, AN AMOUNT EQUAL TO 3% OF THE BASIC HOURLY RATE IS ADDED TO THE TOTAL HOURLY RATE AND OVERTIME HOURLY RATES FOR THE NATIONAL EMPLOYEES BENEFIT BOARD.

N INCLUDES AN AMOUNT FOR THE NATIONAL LABOR-MANAGEMENT COOPERATION FUND AND THE ADMINISTRATIVE MAINTENANCE FUND.

O RATE APPLIES TO THE FIRST 4 DAILY OVERTIME HOURS AND THE FIRST 12 HOURS WORKED ON SATURDAY; ALL OTHER TIME IS PAID AT THE SUNDAY AND HOLIDAY OVERTIME HOURLY RATE.

P ZONE 2 CONSISTS OF ALL AREAS OUTSIDE OF 32 ROAD MILES FROM THE CITIES OF CAMARILLO, OXNARD, SANTA PAULA, VENTURA AND OAK VIEW. ALL WORKERS PERFORMING WORK IN ZONE 2 SHALL RECEIVE $5.00 PER HOUR ABOVE THE ZONE 1 BASIC HOURLY RATE. RATES FOR ELECTRICAL WORKERS WORKING IN COMPRESSED AIR AS WELL AS THEIR SUPPORT CLASSIFICATIONS ARE AVAILABLE BY REQUEST. PLEASE CONTACT THE OFFICE OF THE DIRECTOR - RESEARCH UNIT AT (415) 703-4774.

Q INCLUDES AMOUNT WITHHELD FOR WORKING DUES.

R PENSION IS FACTORED AT THE APPLICABLE OVERTIME MULTIPLIER. IN ADDITION, AN AMOUNT EQUAL TO 3% OF THE BASIC HOURLY RATE IS ADDED TO THE TOTAL HOURLY RATE AND OVERTIME HOURLY RATES FOR THE NATIONAL EMPLOYEES BENEFIT BOARD AND IS FACTORED AT THE APPLICABLE OVERTIME MULTIPLIER. PURSUANT TO LABOR CODE SECTIONS 1773.1 AND 1773.8, THE AMOUNT PAID FOR THIS EMPLOYER PAYMENT MAY VARY RESULTING IN A LOWER TAXABLE BASIC HOURLY WAGE RATE, BUT THE TOTAL HOURLY RATES FOR STRAIGHT TIME AND OVERTIME MAY NOT BE LESS THAN THE GENERAL PREVAILING RATE OF PER DIEM WAGES.

S INCLUDED IN STRAIGHT-TIME HOURLY RATE.

T RATE APPLIES TO THE FIRST 4 DAILY OT HOURS AND THE FIRST 12 OT HOURS ON SATURDAY. ALL OTHER OT IS PAID AT 2X.

U DICTIONARY OF OCCUPATIONAL TITLES, FOURTH EDITION, 1977, U.S. DEPARTMENT OF LABOR.

V INCLUDES AMOUNT WITHHELD FOR DUES CHECKOFF, WHICH IS FACTORED IN THE OVERTIME RATES. INCLUDES $5.00 FOR VACATION THAT IS NOT FACTORED IN THE OVERTIME RATES.

W INCLUDES AN AMOUNT PER HOUR WORKED OR PAID TO DISABILITY FUND.

X INCLUDED IN STRAIGHT-TIME HOURLY RATE WHICH IS NOT FACTORED IN THE OVERTIME RATES.

Y RATE APPLIES TO THE FIRST 2 OVERTIME HOURS MONDAY THROUGH FRIDAY AND THE FIRST 8 HOURS WORKED ON SATURDAY. ALL OTHER TIME IS PAID AT THE SUNDAY AND HOLIDAY OVERTIME RATE.

Z INCLUDES AMOUNT WITHHELD FOR ADMINISTRATIVE DUES.

AA RATE APPLIES TO FIRST TWO DAILY OVERTIME HOURS WORKED; ALL OTHER OVERTIME IS PAID AT THE HOLIDAY OVERTIME HOURLY RATE.

AB RATE APPLIES TO THE FIRST 8 HOURS WORKED ON A SIXTH OR SEVENTH CONSECUTIVE DAY DURING ANY ONE CALENDAR WEEK UP TO 50 HOURS IN ANY ONE CALENDAR WEEK. ALL HOURS IN EXCESS OF 10 HOURS DAILY OR 50 HOURS WEEKLY ARE PAID AT THE HOLIDAY RATE. SATURDAYS IN THE SAME WORK WEEK MAY BE WORKED AT STRAIGHT-TIME IF JOB IS SHUT DOWN DURING THE NORMAL WORKWEEK DUE TO INCLEMENT WEATHER.

AC RATE APPLIES TO WORK ON HOLIDAYS ONLY; SUNDAYS ARE PAID AT THE SATURDAY OVERTIME HOURLY RATE.

AD AN ADDITIONAL $0.25 PER HOUR WILL BE ADDED TO THE BASIC HOURLY RATE WHEN PERFORMING PAPERHANGING WORK.

AE DOUBLE TIME SHALL BE PAID FOR ALL HOURS WORKED OVER 12 HOURS IN ANY ONE DAY.

AF RATE APPLIES AFTER 36 MONTHS OF EXPERIENCE

AG RATE APPLIES TO FIRST 12 MONTHS OF EXPERIENCE

AH RATE APPLIES AFTER 12 MONTHS THROUGH 36 MONTHS EXPERIENCE

AI INCLUDES AN AMOUNT PER HOUR WORKED OR PAID FOR DUES CHECK OFF

Exhibit 1

AJ SATURDAY IN THE SAME WORKWEEK MAY BE WORKED AT THE STRAIGHT-TIME HOURLY RATE IF IT IS NOT POSSIBLE TO COMPLETE FORTY HOURS OF WORK MONDAY THROUGH FRIDAY WHEN THE JOB IS SHUT DOWN DUE TO INCLEMENT WEATHER OR SIMILAR ACT OF GOD, OR BEYOND THE CONTRACTOR'S CONTROL.

AK RATE APPLIES TO THE FIRST 8 HOURS WORKED; ALL OTHER TIME IS PAID AT THE SUNDAY AND HOLIDAY OVERTIME HOURLY RATE.

AL THE RATIO OF PLASTER TENDERS TO PLASTERERS SHALL BE AS FOLLOWS: THERE SHALL BE A PLASTER TENDER ON THE JOBSITE WHENEVER THERE IS A PLASTERER PERFORMING WORK ON THE JOBSITE, EXCEPT ON SMALL PATCH WORK WHERE ONLY ONE PLASTERER IS PERFORMING WORK. FOR INSIDE BROWN COATINGS THERE SHALL BE 2 PLASTER TENDERS FOR UP TO EVERY 3 PLASTERERS. FOR INSIDE FINISH COATINGS THERE SHALL BE 1 PLASTER TENDER FOR UP TO EVERY 3 PLASTERERS. ON OUTSIDE FINISH AND BROWN COATINGS AND FOR ALL OTHER WORK, THERE SHALL BE 1 PLASTER TENDER FOR UP TO EVERY 2 PLASTERERS.

AM INCLUDES AN AMOUNT PER HOUR WORKED OR PAID FOR SUPPLEMENTAL DUES.

AN ALL WORK PERFORMED AFTER TWELVE (12) HOURS IN A DAY SHALL BE PAID AT THE SUNDAY/HOLIDAY RATE.

AO RATE APPLIES TO THE FIRST EIGHT HOURS ON SATURDAY. ALL OTHER TIME IS PAID AT THE SUNDAY AND HOLIDAY OVERTIME RATE. SATURDAY WORK MAY BE PAID AT THE STRAIGHT TIME RATE IF THE JOB IS SHUT DOWN DURING THE NORMAL WORK WEEK DUE TO INCLEMENT WEATHER.

AP INCLUDES AN AMOUNT WITHHELD FOR ADMINISTRATIVE DUES WHICH IS NOT FACTORED INTO OVERTIME AND AN AMOUNT FOR VACATION WHICH IS FACTORED AT 1.5 TIMES FOR ALL OVERTIME.

AQ INCLUDES AMOUNT FOR NATIONAL PENSION AND RETIREE'S X-MAS FUND.

AR AMOUNT INCLUDED IN BASIC HOURLY RATE AND FACTORED AT 1.5 TIMES FOR ALL OVERTIME.

AS INCLUDES AN AMOUNT FOR THE P.I.P.E. LABOR MANAGEMENT COOPERATION COMMITTEE AND THE CONTRACTOR EDUCATION & DEVELOPMENT FUND.

AT SATURDAYS IN THE SAME WORK WEEK MAY BE WORKED AT STRAIGHT-TIME IF JOB IS SHUT DOWN DURING THE NORMAL WORKWEEK DUE TO INCLEMENT WEATHER.

AU PIPE TRADESMEN SHALL NOT BE PERMITTED ON ANY JOB WITHOUT A JOURNEYMAN.

AV INCLUDES AN AMOUNT WITHHELD FOR ADMINISTRATIVE DUES WHICH IS NOT FACTORED IN THE OVERTIME RATES.

AW SATURDAY MAY BE WORKED AT STRAIGHT-TIME RATE, PROVIDED THAT THE HOURS DO NOT EXCEED 8 HOURS PER DAY OR 40 HOURS PER WEEK.

AX DOUBLE TIME SHALL BE PAID FOR NEW YEAR'S DAY, EASTER SUNDAY, LABOR DAY, THANKSGIVING DAY, AND CHRISTMAS.

AY TRADESMEN SHALL ONLY BE USED IF THE FIRST WORKER ON THE JOB IS A LANDSCAPE/IRRIGATION FITTER, SECOND WORKER MUST BE A LANDSCAPE/IRRIGATION FITTER OR APPRENTICE LANDSCAPE/IRRIGATION FITTER. THE 3RD AND 4TH MAY BE A TRADESMAN. THE 5TH MUST BE A LANDSCAPE/IRRIGATION FITTER AND THEREAFTER TRADESMEN WILL BE REFERRED ON A 50-50 BASIS, TO JOURNEYMAN OR APPRENTICE.

AZ INCLUDES AN AMOUNT FOR 401A PLAN.

BA INCLUDES AN AMOUNT FOR THE P.I.P.E. LABOR MANAGEMENT COOPERATION COMMITTEE TRUST FUND AND FOR PROMOTION FUND.

BB SATURDAY MAY BE PAID AT STRAIGHT TIME IF THE WORK WEEK IS TUESDAY THROUGH SATURDAY.

BC RATE APPLIES TO REMAINDER OF COUNTY.

BD INCLUDES AN AMOUNT FOR SUPPLEMENTAL PENSION FUND.

BE RATE APPLIES TO VENTURA COUNTY EXCEPT FOR THE FOLLOWING CITIES OR COMMUNITIES: CASITAS SPRINGS, COLONIA, EL RIO, FARIA, FOSTER PARK, HOLLYWOOD BEACH, LA CONCHITA, LIVE OAK ACRES, LOCKWOOD VALLEY, MEINERS OAKS, MIRAMONTE, MONTALVO, OAK VIEW, OJAI, OXNARD, PIERPONT BAY, SAN BUENAVENTURA, SATICOY, SEACLIFF, SOLIMAR BEACH, SUMMIT, VENTURA AND WHEELER SPRINGS.

BF AMOUNT IS FOR INDUSTRY PROMOTION FUND AND P.I.P.E. FUND.

BG RATE APPLIES TO THE FIRST 4 DAILY OVERTIME HOURS AND THE FIRST 10 HOURS ON SATURDAY; ALL OTHER TIME IS PAID AT THE SUNDAY AND HOLIDAY OVERTIME HOURLY RATE.

BH INCLUDE AMOUNTS FOR DUES CHECK OFF AND VACATION/HOLIDAY, WHICH ARE NOT FACTORED INTO OVERTIME.

BI INCLUDED IN BASIC HOURLY RATE. VACATION IS NOT FACTORED INTO OVERTIME.

BJ INCLUDE AMOUNTS FOR ADMINISTRATIVE FUND, COMPLIANCE FUND, INDUSTRY FUND, AND RESEARCH AND EDUCATION TRUST FUND.

Exhibit 1

BK RATE APPLIES TO THE FIRST 2 DAILY OVERTIME HOURS AND THE FIRST 10 HOURS ON SATURDAY; SUNDAY AND HOLIDAY OVERTIME HOURLY RATE WILL BE PAID AFTER 10 HOURS PER DAY AND ALL HOURS WORKED OVER 55 HOURS PER WEEK.

BL INCLUDES AN AMOUNT PER HOUR WORKED FOR COLA FUND.

BM RATE APPLIES TO THE FIRST 4 DAILY OVERTIME HOURS AND THE FIRST 8 HOURS WORKED ON SATURDAY. ALL OTHER TIME IS PAID AT THE SUNDAY AND HOLIDAY OVERTIME RATE.

BN RATE APPLIES TO THE FIRST 8 HOURS WORKED ON A SIXTH OR SEVENTH CONSECUTIVE DAY DURING ANY ONE CALENDAR WEEK UP TO 50 HOURS IN ANY ONE CALENDAR WEEK. ALL OTHER TIME IS PAID AT THE HOLIDAY RATE.

RECOGNIZED HOLIDAYS: HOLIDAYS UPON WHICH THE GENERAL PREVAILING HOURLY WAGE RATE FOR HOLIDAY WORK SHALL BE PAID, SHALL BE ALL HOLIDAYS IN THE COLLECTIVE BARGAINING AGREEMENT, APPLICABLE TO THE PARTICULAR CRAFT, CLASSIFICATION, OR TYPE OF WORKER EMPLOYED ON THE PROJECT, WHICH IS ON FILE WITH THE DIRECTOR OF INDUSTRIAL RELATIONS. IF THE PREVAILING RATE IS NOT BASED ON A COLLECTIVELY BARGAINED RATE, THE HOLIDAYS UPON WHICH THE PREVAILING RATE SHALL BE PAID SHALL BE AS PROVIDED IN SECTION 6700 OF THE GOVERNMENT CODE. YOU MAY OBTAIN THE HOLIDAY PROVISIONS FOR THE CURRENT DETERMINATIONS ON THE INTERNET AT HTTP://WWW.DIR.CA.GOV/OPRL/DPreWageDetermination.htm. HOLIDAY PROVISIONS FOR THE CURRENT OR SUPERSEDED DETERMINATIONS MAY BE OBTAINED BY CONTACTING THE OFFICE OF THE DIRECTOR - RESEARCH UNIT AT (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE: IN ACCORDANCE WITH LABOR CODE SECTIONS 1773.1 AND 1773.9, CONTRACTORS SHALL MAKE TRAVEL AND/OR SUBSISTENCE PAYMENTS TO EACH WORKER TO EXECUTE THE WORK. YOU MAY OBTAIN THE TRAVEL AND/OR SUBSISTENCE PROVISIONS FOR THE CURRENT DETERMINATIONS ON THE INTERNET AT HTTP://WWW.DIR.CA.GOV/OPRL/DPreWageDetermination.htm. TRAVEL AND/OR SUBSISTENCE REQUIREMENTS FOR CURRENT OR SUPERSEDED DETERMINATIONS MAY BE OBTAINED BY CONTACTING THE OFFICE OF THE DIRECTOR - RESEARCH UNIT AT (415) 703-4774.

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GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1 FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

LOCALITY: VENTURA COUNTY

DETERMINATION: VEN-2023-1

CRAFT	CLASSIFICATION	CRAFT FOOTNOTE	ISSUE DATE	EXPIRATION DATE	BASIC HOURLY RATE	BASIC HOURLY RATE FOOTNOTE	HEALTH AND WELFARE	HEALTH AND WELFARE FOOTNOTE	PENSION	PENSION FOOTNOTE	VACATION/ HOLIDAY	VACATION/ HOLIDAY FOOTNOTE	TRAINING	TRAINING FOOTNOT
#CARPET, LINOLEUM,	RESILIENT TILE LAYER - SECOND SHIFT		02/22/2023	12/31/2023**	$49.920	A	$7.780		$5.550		$2.420		$0.630	
CARPET, LINOLEUM,	MATERIAL HANDLER - SECOND SHIFT	B	02/22/2023	12/31/2023**	$19.970	A	$7.780		$1.940		$0.920		$0.630	
#ELECTRICIAN:	SOUND INSTALLER 2ND SHIFT		02/22/2023	06/25/2023**	$50.700		$9.410		$4.720	C	$0.000		$0.650	
#ELECTRICIAN:	SOUND INSTALLER 3RD SHIFT		02/22/2023	06/25/2023**	$56.790		$9.410		$4.720	C	$0.000		$0.650	
#ELECTRICIAN:	INSIDE WIREMAN - ZONE A, 2ND SHIFT	H	02/22/2023	07/30/2023**	$53.790	I	$10.710		$16.640	J	$0.000	K	$1.150	
#ELECTRICIAN:	CABLE SPLICER - ZONE A, 2ND SHIFT	H	02/22/2023	07/30/2023**	$59.180	I	$10.710		$16.640	J	$0.000	K	$1.150	
#ELECTRICIAN:	TRANSPORTATION SYSTEMS WIREMAN - ZONE A, 2ND SHIFT	H	02/22/2023	07/30/2023**	$53.790	I	$10.710		$16.640	J	$0.000	K	$1.150	
#ELECTRICIAN:	TRANSPORTATION SYSTEMS TECHNICIAN - ZONE A, 2ND SHIFT	H	02/22/2023	07/30/2023**	$40.350	I	$10.710		$16.640	J	$0.000	K	$1.150	
#ELECTRICIAN:	INSIDE WIREMAN - ZONE A, 3RD SHIFT	H	02/22/2023	07/30/2023**	$60.260	I	$10.710		$16.640	J	$0.000	K	$1.150	
#ELECTRICIAN:	CABLE SPLICER - ZONE A, 3RD SHIFT	H	02/22/2023	07/30/2023**	$66.290	I	$10.710		$16.640	J	$0.000	K	$1.150	
#ELECTRICIAN:	TRANSPORTATION SYSTEMS WIREMAN - ZONE A, 3RD SHIFT	H	02/22/2023	07/30/2023**	$60.260	I	$10.710		$16.640	J	$0.000	K	$1.150	
#ELECTRICIAN:	TRANSPORTATION SYSTEMS TECHNICIAN - ZONE A, 3RD SHIFT	H	02/22/2023	07/30/2023**	$45.200	I	$10.710		$16.640	J	$0.000	K	$1.150	
#PAINTER:	PAINTER, LEAD ABATEMENT (2ND SHIFT)	M	02/22/2023	06/30/2023**	$38.630	I	$9.000		$5.440		$2.990		$0.750	
#PAINTER:	INDUSTRIAL PAINTER (2ND SHIFT)	M	02/22/2023	06/30/2023**	$43.950	I	$9.000		$5.440		$3.350		$0.850	
#PLUMBER:	PLUMBER, INDUSTRIAL AND GENERAL PIPEFITTER (2ND SHIFT)		08/22/2022	08/31/2023**	$62.960	O	$9.260		$14.200	P	$0.000	Q	$2.800	

Exhibit 1

CRAFT	CLASSIFICATION	CRAFT FOOTNOTE	ISSUE DATE	EXPIRATION DATE	BASIC HOURLY RATE	BASIC HOURLY RATE FOOTNOTE	HEALTH AND WELFARE	HEALTH AND WELFARE FOOTNOTE	PENSION	PENSION FOOTNOTE	VACATION/ HOLIDAY	VACATION/ HOLIDAY FOOTNOTE	TRAINING	TRAINING FOOTNOTE
#PLUMBER:	SEWER AND STORM DRAIN PIPELAYER (2ND SHIFT)		08/22/2022	08/31/2023**	$48.440	O	$9.150		$11.400	P	$0.000	Q	$2.530	
PLUMBER:	SEWER AND STORM DRAIN PIPE TRADESMAN (2ND SHIFT)	U	08/22/2022	08/31/2023**	$24.010	V	$9.400		$0.380		$0.000		$1.610	
#PLUMBER:	SERVICE AND REPAIR (2ND SHIFT)		08/22/2022	08/31/2023**	$61.040	O	$9.260		$13.890	P	$0.000	Q	$2.130	
#PLUMBER:	LANDSCAPE/IRRIGATION FITTER SECOND SHIFT		08/22/2022	08/31/2023**	$43.520	Y	$9.260		$14.200	P	$0.000	Q	$2.190	
PLUMBER:	LANDSCAPE/IRRIGATION TRADESMAN SECOND SHIFT	Z	08/22/2022	08/31/2023**	$19.170	Y	$3.000		$1.160	P	$0.000		$0.100	
#PLUMBER:	REFRIGERATION SERVICE HVACR- 2ND SHIFT		02/22/2023	09/03/2023**	$54.220	A	$9.260		$8.050	AA	$0.000	K	$1.580	
#PLUMBER:	FIRE SPRINKLER FITTER (PROTECTION AND CONTROL SYSTEMS, OVERHEAD AND UNDERGROUND)- 2ND SHIFT	AE	02/22/2023	08/31/2023**	$60.500		$11.450		$18.200		$0.000	K	$1.600	
#SHEET METAL WORKER (HVAC):	SHEET METAL WORKER (SPECIAL SHIFT)		08/22/2022	07/31/2023*	$55.730	A	$10.600		$20.520	AH	$0.000	K	$1.730	

Go to increase page

FOOTNOTES

* EFFECTIVE UNTIL SUPERSEDED BY A NEW DETERMINATION ISSUED BY THE DIRECTOR OF INDUSTRIAL RELATIONS. CONTACT THE OFFICE OF THE DIRECTOR - RESEARCH UNIT AT (415) 703-4774 FOR THE NEW RATES AFTER TEN DAYS AFTER THE EXPIRATION DATE IF NO SUBSEQUENT DETERMINATION IS ISSUED.

** THE RATE TO BE PAID FOR WORK PERFORMED AFTER THIS DATE HAS BEEN DETERMINED. IF WORK WILL EXTEND PAST THIS DATE, THE NEW RATE MUST BE PAID AND SHOULD BE INCORPORATED IN CONTRACTS ENTERED INTO NOW. CONTACT THE OFFICE OF THE DIRECTOR RESEARCH UNIT FOR SPECIFIC RATES AT (415) 703-4774.

\# INDICATES AN APPRENTICEABLE CRAFT. THE CURRENT APPRENTICE WAGE RATES ARE AVAILABLE ON THE INTERNET @ HTTP://WWW.DIR.CA.GOV/OPRL/PWAPPWAGE/PWAPPWAGESTART.ASP.

& THE BASIC HOURLY RATE AND EMPLOYER PAYMENTS ARE NOT TAKEN FROM A COLLECTIVE BARGAINING AGREEMENT FOR THIS CRAFT OR CLASSIFICATION.

A INCLUDES AMOUNT WITHHELD FOR DUES CHECK OFF.

B A MATERIAL HANDLER MAY BE UTILIZED IN RATIO OF ONE (1) MATERIAL HANDLER WITH ANY FIVE (5) JOURNEYMEN ON ANY GIVEN PROJECT.

C IN ADDITION, AN AMOUNT EQUAL TO 3% OF THE BASIC HOURLY RATE IS ADDED TO THE TOTAL HOURLY RATE AND OVERTIME HOURLY RATES FOR THE NATIONAL EMPLOYEES BENEFIT BOARD.

D INCLUDES AN AMOUNT FOR THE NATIONAL LABOR-MANAGEMENT COOPERATION FUND AND THE ADMINISTRATIVE MAINTENANCE FUND.

E RATE APPLIES TO THE FIRST 4 DAILY OVERTIME HOURS; ALL OTHER TIME IS PAID AT THE SUNDAY AND HOLIDAY NON-SHIFT DIFFERENTIAL OVERTIME HOURLY RATE.

Exhibit 1

F DISREGARD THIS RATE. FOR THE FIRST 12 HOURS OF WORK PERFORMED ON SATURDAY, USE THE SATURDAY NON-SHIFT DIFFERENTIAL RATE FOR THIS CLASSIFICATION AS PUBLISHED IN THE DIRECTOR'S GENERAL PREVAILING WAGE DETERMINATIONS.

G DISREGARD THIS RATE. USE THE SUNDAY AND HOLIDAY NON-SHIFT DIFFERENTIAL RATE FOR THIS CLASSIFICATION AS PUBLISHED IN THE DIRECTOR'S GENERAL PREVAILING WAGE DETERMINATIONS.

H ZONE 2 CONSISTS OF ALL AREAS OUTSIDE OF 32 ROAD MILES FROM THE CITIES OF CAMARILLO, OXNARD, SANTA PAULA, VENTURA AND OAK VIEW. ALL WORKERS PERFORMING WORK IN ZONE 2 SHALL RECEIVE $5.00 PER HOUR ABOVE THE ZONE 1 BASIC HOURLY RATE. RATES FOR ELECTRICAL WORKERS WORKING IN COMPRESSED AIR AS WELL AS THEIR SUPPORT CLASSIFICATIONS ARE AVAILABLE BY REQUEST. PLEASE CONTACT THE OFFICE OF THE DIRECTOR - RESEARCH UNIT AT (415) 703-4774.

I INCLUDES AMOUNT WITHHELD FOR WORKING DUES.

J PENSION IS FACTORED AT THE APPLICABLE OVERTIME MULTIPLIER. IN ADDITION, AN AMOUNT EQUAL TO 3% OF THE BASIC HOURLY RATE IS ADDED TO THE TOTAL HOURLY RATE AND OVERTIME HOURLY RATES FOR THE NATIONAL EMPLOYEES BENEFIT BOARD AND IS FACTORED AT THE APPLICABLE OVERTIME MULTIPLIER. PURSUANT TO LABOR CODE SECTIONS 1773.1 AND 1773.8, THE AMOUNT PAID FOR THIS EMPLOYER PAYMENT MAY VARY RESULTING IN A LOWER TAXABLE BASIC HOURLY WAGE RATE, BUT THE TOTAL HOURLY RATES FOR STRAIGHT TIME AND OVERTIME MAY NOT BE LESS THAN THE GENERAL PREVAILING RATE OF PER DIEM WAGES.

K INCLUDED IN STRAIGHT-TIME HOURLY RATE.

L RATE APPLIES TO THE FIRST 4 DAILY OVERTIME HOURS AND THE FIRST 12 HOURS WORKED ON SATURDAY; ALL OTHER TIME IS PAID AT THE SUNDAY AND HOLIDAY NON-SHIFT OVERTIME HOURLY RATE.

M AN ADDITIONAL $0.25 PER HOUR WILL BE ADDED TO THE BASIC HOURLY RATE WHEN PERFORMING PAPERHANGING WORK.

N DOUBLE TIME SHALL BE PAID FOR ALL HOURS WORKED OVER 12 HOURS IN ANY ONE DAY.

O INCLUDES AN AMOUNT WITHHELD FOR ADMINISTRATIVE DUES WHICH IS NOT FACTORED INTO OVERTIME AND AN AMOUNT FOR VACATION WHICH IS FACTORED AT 1.5 TIMES FOR ALL OVERTIME.

P INCLUDES AMOUNT FOR NATIONAL PENSION AND RETIREE'S X-MAS FUND.

Q AMOUNT INCLUDED IN BASIC HOURLY RATE AND FACTORED AT 1.5 TIMES FOR ALL OVERTIME.

R INCLUDES AN AMOUNT FOR THE P.I.P.E. LABOR MANAGEMENT COOPERATION COMMITTEE AND THE CONTRACTOR EDUCATION & DEVELOPMENT FUND.

S RATE APPLIES TO THE FIRST 2 DAILY OVERTIME HOURS AND THE FIRST 10 HOURS ON SATURDAY; ALL OTHER TIME IS PAID AT THE SUNDAY AND HOLIDAY OVERTIME HOURLY RATE.

T SATURDAYS IN THE SAME WORK WEEK MAY BE WORKED AT STRAIGHT-TIME IF JOB IS SHUT DOWN DURING THE NORMAL WORKWEEK DUE TO INCLEMENT WEATHER.

U PIPE TRADESMEN SHALL NOT BE PERMITTED ON ANY JOB WITHOUT A JOURNEYMAN.

V INCLUDES AN AMOUNT WITHHELD FOR ADMINISTRATIVE DUES WHICH IS NOT FACTORED IN THE OVERTIME RATES.

W SATURDAY MAY BE WORKED AT STRAIGHT-TIME RATE, PROVIDED THAT THE HOURS DO NOT EXCEED 8 HOURS PER DAY OR 40 HOURS PER WEEK.

X DOUBLE TIME SHALL BE PAID FOR NEW YEAR'S DAY, EASTER SUNDAY, LABOR DAY, THANKSGIVING DAY, AND CHRISTMAS.

Y INCLUDES AMOUNT WITHHELD FOR ADMINISTRATIVE DUES.

Z TRADESMEN SHALL ONLY BE USED IF THE FIRST WORKER ON THE JOB IS A LANDSCAPE/IRRIGATION FITTER, SECOND WORKER MUST BE A LANDSCAPE/IRRIGATION FITTER OR APPRENTICE LANDSCAPE/IRRIGATION FITTER. THE 3RD AND 4TH MAY BE A TRADESMAN. THE 5TH MUST BE A LANDSCAPE/IRRIGATION FITTER AND THEREAFTER TRADESMEN WILL BE REFERRED ON A 50-50 BASIS, TO JOURNEYMAN OR APPRENTICE.

AA INCLUDES AN AMOUNT FOR 401A PLAN.

AB INCLUDES AN AMOUNT FOR THE P.I.P.E. LABOR MANAGEMENT COOPERATION COMMITTEE TRUST FUND AND FOR PROMOTION FUND.

AC SATURDAY MAY BE PAID AT STRAIGHT TIME IF THE WORK WEEK IS TUESDAY THROUGH SATURDAY.

AD RATE APPLIES TO WORK ON HOLIDAYS ONLY; SUNDAYS ARE PAID AT THE SATURDAY OVERTIME HOURLY RATE.

AE RATE APPLIES TO VENTURA COUNTY EXCEPT FOR THE FOLLOWING CITIES OR COMMUNITIES: CASITAS SPRINGS, COLONIA, EL RIO, FARIA, FOSTER PARK, HOLLYWOOD BEACH, LA CONCHITA, LIVE OAK ACRES, LOCKWOOD VALLEY, MEINERS OAKS, MIRAMONTE, MONTALVO, OAK VIEW, OJAI, OXNARD, PIERPONT BAY, SAN BUENAVENTURA, SATICOY, SEACLIFF, SOLIMAR BEACH, SUMMIT, VENTURA AND WHEELER SPRINGS.

Exhibit 1

AF AMOUNT IS FOR INDUSTRY PROMOTION FUND AND P.I.P.E. FUND.

AG RATE APPLIES TO THE FIRST 4 DAILY OVERTIME HOURS AND THE FIRST 10 HOURS ON SATURDAY; ALL OTHER TIME IS PAID AT THE SUNDAY AND HOLIDAY OVERTIME HOURLY RATE.

AH INCLUDES AN AMOUNT PER HOUR WORKED FOR COLA FUND.

AI RATE APPLIES TO THE FIRST 4 DAILY OVERTIME HOURS AND THE FIRST 8 HOURS WORKED ON SATURDAY. ALL OTHER TIME IS PAID AT THE SUNDAY AND HOLIDAY OVERTIME RATE.

RECOGNIZED HOLIDAYS: HOLIDAYS UPON WHICH THE GENERAL PREVAILING HOURLY WAGE RATE FOR HOLIDAY WORK SHALL BE PAID, SHALL BE ALL HOLIDAYS IN THE COLLECTIVE BARGAINING AGREEMENT, APPLICABLE TO THE PARTICULAR CRAFT, CLASSIFICATION, OR TYPE OF WORKER EMPLOYED ON THE PROJECT, WHICH IS ON FILE WITH THE DIRECTOR OF INDUSTRIAL RELATIONS. IF THE PREVAILING RATE IS NOT BASED ON A COLLECTIVELY BARGAINED RATE, THE HOLIDAYS UPON WHICH THE PREVAILING RATE SHALL BE PAID SHALL BE AS PROVIDED IN SECTION 6700 OF THE GOVERNMENT CODE. YOU MAY OBTAIN THE HOLIDAY PROVISIONS FOR THE CURRENT DETERMINATIONS ON THE INTERNET AT HTTP://WWW.DIR.CA.GOV/OPRL/DPreWageDetermination.htm. HOLIDAY PROVISIONS FOR THE CURRENT OR SUPERSEDED DETERMINATIONS MAY BE OBTAINED BY CONTACTING THE OFFICE OF THE DIRECTOR - RESEARCH UNIT AT (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE: IN ACCORDANCE WITH LABOR CODE SECTIONS 1773.1 AND 1773.9, CONTRACTORS SHALL MAKE TRAVEL AND/OR SUBSISTENCE PAYMENTS TO EACH WORKER TO EXECUTE THE WORK. YOU MAY OBTAIN THE TRAVEL AND/OR SUBSISTENCE PROVISIONS FOR THE CURRENT DETERMINATIONS ON THE INTERNET AT HTTP://WWW.DIR.CA.GOV/OPRL/DPreWageDetermination.htm. TRAVEL AND/OR SUBSISTENCE REQUIREMENTS FOR CURRENT OR SUPERSEDED DETERMINATIONS MAY BE OBTAINED BY CONTACTING THE OFFICE OF THE DIRECTOR - RESEARCH UNIT AT (415) 703-4774.

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FEDERAL PREVAILING WAGE RATES

"General Decision Number: CA20230015 03/17/2023

Superseded General Decision Number: CA20220015

State: California

Construction Types: Building, Heavy (Heavy and Dredging) and Highway

County: Ventura County in California.

BUILDING, DREDGING (does not incldue hopper dredge work), HEAVY (does not include water well drilling), AND HIGHWAY CONSTRUCTION PROJECTS

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60).

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:	. Executive Order 14026 generally applies to the contract. . The contractor must pay all covered workers at least $16.20 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2023.
If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:	. Executive Order 13658 generally applies to the contract. . The contractor must pay all covered workers at least $12.15 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2023.

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at http://www.dol.gov/whd/govcontracts.

Exhibit 1

Modification Number	Publication Date
0	01/06/2023
1	01/13/2023
2	02/10/2023
3	03/03/2023
4	03/17/2023

ASBE0005-002 07/04/2022

	Rates	Fringes
Asbestos Workers/Insulator (Includes the application of all insulating materials, protective coverings, coatings, and finishes to all types of mechanical systems)	$ 49.58	25.27
Fire Stop Technician (Application of Firestopping Materials for wall openings and penetrations in walls, floors, ceilings and curtain walls)	$ 32.09	19.66

ASBE0005-004 07/04/2022

	Rates	Fringes
Asbestos Removal worker/hazardous material handler (Includes preparation, wetting, stripping, removal, scrapping, vacuuming, bagging and disposing of all insulation materials from mechanical systems, whether they contain asbestos or not)	$ 23.52	13.37

BOIL0092-003 01/01/2021

	Rates	Fringes
BOILERMAKER	$ 46.03	38.81

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* BRCA0004-012 05/01/2020

	Rates	Fringes
BRICKLAYER; MARBLE SETTER	$ 41.39	18.81

*The wage scale for prevailing wage projects performed in Blythe, China lake, Death Valley, Fort Irwin, Twenty-Nine Palms, Needles and 1-15 corridor (Barstow to the Nevada State Line) will be Three Dollars ($3.00) above the standard San Bernardino/Riverside County hourly wage rate

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BRCA0018-004 06/01/2022

	Rates	Fringes
MARBLE FINISHER	$ 37.87	14.13
TILE FINISHER	$ 32.44	12.54
TILE LAYER	$ 45.05	18.33

Exhibit 1

BRCA0018-010 09/01/2022

	Rates	Fringes
TERRAZZO FINISHER	$ 38.37	14.13
TERRAZZO WORKER/SETTER	$ 46.49	14.66

CARP0213-001 07/01/2021

	Rates	Fringes
CARPENTER		
(1) Carpenter, Cabinet Installer, Insulation Installer, Hardwood Floor Worker and acoustical installer	$ 51.60	16.28
(2) Millwright	$ 52.10	16.48
(3) Piledrivermen/Derrick Bargeman, Bridge or Dock Carpenter, Heavy Framer, Rock Bargeman or Scowman, Rockslinger, Shingler (Commercial)	$ 51.73	16.28
(4) Pneumatic Nailer, Power Stapler	$ 51.85	16.28
(5) Sawfiler	$ 51.69	16.28
(6) Scaffold Builder	$ 42.80	16.28
(7) Table Power Saw Operator	$ 51.70	16.28

FOOTNOTE: Work of forming in the construction of open cut sewers or storm drains, on operations in which horizontal lagging is used in conjunction with steel H-Beams driven or placed in pre- drilled holes, for that portion of a lagged trench against which concrete is poured, namely, as a substitute for back forms (which work is performed by piledrivers): $0.13 per hour additional.

CARP0213-002 07/01/2021

	Rates	Fringes
Diver		
(1) Wet	$ 834.40	16.28
(2) Standby	$ 445.84	16.28
(3) Tender	$ 437.84	16.28
(4) Assistant Tender	$ 413.84	16.28

Amounts in ""Rates' column are per day

CARP0213-004 07/01/2021

	Rates	Fringes
Drywall		
DRYWALL INSTALLER/LATHER	$ 51.60	16.28
STOCKER/SCRAPPER	$ 22.16	8.62

CARP0721-001 07/01/2021

	Rates	Fringes

Exhibit 1

Modular Furniture Installer.....$ 21.85 7.15

ELEC0952-001 12/26/2022

	Rates	Fringes
Electricians: (All work within 32 road miles from the nearest base point)		
Cable Splicer.....	$ 50.45	30.01
Electrician Transportation Systems Technician Journeyman Wireman - Street Lighting & Traffic Signals.....	$ 45.86	29.88
Transportation Systems Technician - Street Lighting & Traffic Signals..	$ 34.40	29.53

ALL WORK MORE THAN 32 ROAD MILES FROM NEAREST BASE POINT: Add $5.00 to the basic hourly rate. BASE POINTS: the main Post Office in the cities of Camarillo, Oak View, Oxnard, Santa Paula and Ventura.

ELEC0952-003 12/26/2022

COMMUNICATIONS AND SYSTEMS WORK

	Rates	Fringes
Communications System		
Installer.....	$ 43.22	16.08
Technician.....	$ 30.10	12.78

SCOPE OF WORK:
Installation, testing, service and maintenance of systems utilizing the transmission and/or transference of voice, sound, vision and digital for commercial, educational, security and entertainment purposes for the following: TV monitoring and surveillance, background-foreground music, intercom and telephone interconnect, inventory control systems, microwave transmission, multi-media, multiplex, nurse call systems, radio page, school intercom and sound, burglar alarms, fire alarm (see last paragraph below) and low voltage master clock systems in commercial buildings. Communication Systems that transmit or receive information and/or control systems that are intrinsic to the above listed systems; inclusion or exclusion of terminations and testings of conductors determined by their function; excluding all other data systems or multiple systems which include control function or power supply; excluding installation of raceway systems, conduit systems, line voltage work, and energy management systems. Does not cover work performed at China Lake Naval Ordnance Test Station. Fire alarm work shall be performed at the current inside wireman total cost package.

ELEV0018-001 01/01/2023

	Rates	Fringes
ELEVATOR MECHANIC.....	$ 63.95	37.335+a+b

Exhibit 1

FOOTNOTE:
a. PAID VACATION: Employer contributes 8% of regular hourly rate as vacation pay credit for employees with more than 5 years of service, and 6% for 6 months to 5 years of service.

b. PAID HOLIDAYS: New Year's Day, Memorial Day, Independence Day, Labor Day, Veterans' Day, Thanksgiving Day, Friday after Thanksgiving, and Christmas Day.

ENGI0012-003 07/01/2022

	Rates	Fringes
OPERATOR: Power Equipment (All Other Work)		
GROUP 1	$ 51.90	30.70
GROUP 2	$ 52.68	30.70
GROUP 3	$ 52.97	30.70
GROUP 4	$ 54.46	30.70
GROUP 5	$ 48.96	25.25
GROUP 6	$ 54.68	30.70
GROUP 8	$ 54.79	30.70
GROUP 9	$ 49.29	25.25
GROUP 10	$ 54.91	30.70
GROUP 11	$ 49.41	25.25
GROUP 12	$ 55.08	30.70
GROUP 13	$ 55.18	30.70
GROUP 14	$ 55.21	30.70
GROUP 15	$ 55.29	30.70
GROUP 16	$ 55.41	30.70
GROUP 17	$ 55.58	30.70
GROUP 18	$ 55.68	30.70
GROUP 19	$ 55.79	30.70
GROUP 20	$ 55.91	30.70
GROUP 21	$ 56.08	30.70
GROUP 22	$ 56.18	30.70
GROUP 23	$ 56.29	30.70
GROUP 24	$ 56.41	30.70
GROUP 25	$ 56.58	30.70
OPERATOR: Power Equipment (Cranes, Piledriving & Hoisting)		
GROUP 1	$ 53.25	30.70
GROUP 2	$ 54.03	30.70
GROUP 3	$ 54.32	30.70
GROUP 4	$ 54.46	30.70
GROUP 5	$ 54.68	30.70
GROUP 6	$ 54.79	30.70
GROUP 7	$ 54.91	30.70
GROUP 8	$ 55.08	30.70
GROUP 9	$ 55.25	30.70
GROUP 10	$ 56.25	30.70
GROUP 11	$ 57.25	30.70
GROUP 12	$ 58.25	30.70
GROUP 13	$ 59.25	30.70
OPERATOR: Power Equipment (Tunnel Work)		
GROUP 1	$ 54.53	30.70
GROUP 2	$ 54.82	30.70
GROUP 3	$ 54.96	30.70
GROUP 4	$ 55.18	30.70
GROUP 5	$ 55.29	30.70
GROUP 6	$ 55.41	30.70
GROUP 7	$ 55.71	30.70

Exhibit 1

PREMIUM PAY:

$3.75 per hour shall be paid on all Power Equipment Operator work on the followng Military Bases: China Lake Naval Reserve, Vandenberg AFB, Point Arguello, Seely Naval Base, Fort Irwin, Nebo Annex Marine Base, Marine Corp Logistics Base Yermo, Edwards AFB, 29 Palms Marine Base and Camp Pendleton

Workers required to suit up and work in a hazardous material environment: $2.00 per hour additional. Combination mixer and compressor operator on gunite work shall be classified as a concrete mobile mixer operator.

SEE ZONE DEFINITIONS AFTER CLASSIFICATIONS

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1: Bargeman; Brakeman; Compressor operator; Ditch Witch, with seat or similar type equipment; Elevator operator-inside; Engineer Oiler; Forklift operator (includes loed, lull or similar types under 5 tons; Generator operator; Generator, pump or compressor plant operator; Pump operator; Signalman; Switchman

GROUP 2: Asphalt-rubber plant operator (nurse tank operator); Concrete mixer operator-skip type; Conveyor operator; Fireman; Forklift operator (includes loed, lull or similar types over 5 tons; Hydrostatic pump operator; oiler crusher (asphalt or concrete plant); Petromat laydown machine; PJU side dum jack; Screening and conveyor machine operator (or similar types); Skiploader (wheel type up to 3/4 yd. without attachment); Tar pot fireman; Temporary heating plant operator; Trenching machine oiler

GROUP 3: Asphalt-rubber blend operator; Bobcat or similar type (Skid steer); Equipment greaser (rack); Ford Ferguson (with dragtype attachments); Helicopter radioman (ground); Stationary pipe wrapping and cleaning machine operator

GROUP 4: Asphalt plant fireman; Backhoe operator (mini-max or similar type); Boring machine operator; Boxman or mixerman (asphalt or concrete); Chip spreading machine operator; Concrete cleaning decontamination machine operator; Concrete Pump Operator (small portable); Drilling machine operator, small auger types (Texoma super economatic or similar types - Hughes 100 or 200 or similar types - drilling depth of 30' maximum); Equipment greaser (grease truck); Guard rail post driver operator; Highline cableway signalman; Hydra-hammer-aero stomper; Micro Tunneling (above ground tunnel); Power concrete curing machine operator; Power concrete saw operator; Power-driven jumbo form setter operator; Power sweeper operator; Rock Wheel Saw/Trencher; Roller operator (compacting); Screed operator (asphalt or concrete); Trenching machine operator (up to 6 ft.); Vacuum or much truck

GROUP 5: Equipment Greaser (Grease Truck/Multi Shift).

GROUP 6: Articulating material hauler; Asphalt plant engineer; Batch plant operator; Bit sharpener; Concrete joint machine operator (canal and similar type); Concrete planer operator; Dandy digger; Deck engine operator; Derrickman (oilfield type); Drilling machine operator, bucket or auger types (Calweld 100 bucket or similar types

Exhibit 1

- Watson 1000 auger or similar types - Texoma 330, 500 or 600 auger or similar types - drilling depth of 45' maximum); Drilling machine operator; Hydrographic seeder machine operator (straw, pulp or seed), Jackson track maintainer, or similar type; Kalamazoo Switch tamper, or similar type; Machine tool operator; Maginnis internal full slab vibrator, Mechanical berm, curb or gutter(concrete or asphalt); Mechanical finisher operator (concrete, Clary-Johnson-Bidwell or similar); Micro tunnel system (below ground); Pavement breaker operator (truck mounted); Road oil mixing machine operator; Roller operator (asphalt or finish), rubber-tired earth moving equipment (single engine, up to and including 25 yds. struck); Self-propelled tar pipelining machine operator; Skiploader operator (crawler and wheel type, over 3/4 yd. and up to and including 1-1/2 yds.); Slip form pump operator (power driven hydraulic lifting device for concrete forms); Tractor operator-bulldozer, tamper-scraper (single engine, up to 100 h.p. flywheel and similar types, up to and including D-5 and similar types); Tugger hoist operator (1 drum); Ultra high pressure waterjet cutting tool system operator; Vacuum blasting machine operator

GROUP 8: Asphalt or concrete spreading operator (tamping or finishing); Asphalt paving machine operator (Barber Greene or similar type); Asphalt-rubber distribution operator; Backhoe operator (up to and including 3/4 yd.), small ford, Case or similar; Cast-in-place pipe laying machine operator; Combination mixer and compressor operator (gunite work); Compactor operator (self-propelled); Concrete mixer operator (paving); Crushing plant operator; Drill Doctor; Drilling machine operator, Bucket or auger types (Calweld 150 bucket or similar types - Watson 1500, 2000 2500 auger or similar types - Texoma 700, 800 auger or similar types - drilling depth of 60' maximum); Elevating grader operator; Grade checker; Gradall operator; Grouting machine operator; Heavy-duty repairman; Heavy equipment robotics operator; Kalamazoo balliste regulator or similar type; Kolman belt loader and similar type; Le Tourneau blob compactor or similar type; Loader operator (Athey, Euclid, Sierra and similar types); Mobark Chipper or similar; Ozzie padder or similar types; P.C. slot saw; Pneumatic concrete placing machine operator (Hackley-Presswell or similar type); Pumpcrete gun operator; Rock Drill or similar types; Rotary drill operator (excluding caisson type); Rubber-tired earth-moving equipment operator (single engine, caterpillar, Euclid, Athey Wagon and similar types with any and all attachments over 25 yds. up to and including 50 cu. yds. struck); Rubber-tired earth-moving equipment operator (multiple engine up to and including 25 yds. struck); Rubber-tired scraper operator (self-loading paddle wheel type-John Deere, 1040 and similar single unit); Self-propelled curb and gutter machine operator; Shuttle buggy; Skiploader operator (crawler and wheel type over 1-1/2 yds. up to and including 6-1/2 yds.); Soil remediation plant operator; Surface heaters and planer operator; Tractor compressor drill combination operator; Tractor operator (any type larger than D-5 - 100 flywheel h.p. and over, or similar-bulldozer, tamper, scraper and push tractor single engine); Tractor operator (boom attachments), Traveling pipe wrapping, cleaning and bendng machine operator; Trenching machine operator (over 6 ft. depth capacity, manufacturer's rating); trenching Machine with Road Miner attachment (over 6 ft depth capacity): Ultra high pressure waterjet cutting tool system mechanic; Water pull

Exhibit 1

(compaction) operator

GROUP 9: Heavy Duty Repairman

GROUP 10: Drilling machine operator, Bucket or auger types (Calweld 200 B bucket or similar types-Watson 3000 or 5000 auger or similar types-Texoma 900 auger or similar types-drilling depth of 105' maximum); Dual drum mixer, dynamic compactor LDC350 (or similar types); Monorail locomotive operator (diesel, gas or electric); Motor patrol-blade operator (single engine); Multiple engine tractor operator (Euclid and similar type-except Quad 9 cat.); Rubber-tired earth-moving equipment operator (single engine, over 50 yds. struck); Pneumatic pipe ramming tool and similar types; Prestressed wrapping machine operator; Rubber-tired earth-moving equipment operator (single engine, over 50 yds. struck); Rubber tired earth moving equipment operator (multiple engine, Euclid, caterpillar and similar over 25 yds. and up to 50 yds. struck), Tower crane repairman; Tractor loader operator (crawler and wheel type over 6-1/2 yds.); Woods mixer operator (and similar Pugmill equipment)

GROUP 11: Heavy Duty Repairman - Welder Combination, Welder - Certified.

GROUP 12: Auto grader operator; Automatic slip form operator; Drilling machine operator, bucket or auger types (Calweld, auger 200 CA or similar types - Watson, auger 6000 or similar types - Hughes Super Duty, auger 200 or similar types - drilling depth of 175' maximum); Hoe ram or similar with compressor; Mass excavator operator less tha 750 cu. yards; Mechanical finishing machine operator; Mobile form traveler operator; Motor patrol operator (multi-engine); Pipe mobile machine operator; Rubber-tired earth- moving equipment operator (multiple engine, Euclid, Caterpillar and similar type, over 50 cu. yds. struck); Rubber-tired self- loading scraper operator (paddle-wheel-auger type self-loading - two (2) or more units)

GROUP 13: Rubber-tired earth-moving equipment operator operating equipment with push-pull system (single engine, up to and including 25 yds. struck)

GROUP 14: Canal liner operator; Canal trimmer operator; Remote- control earth-moving equipment operator (operating a second piece of equipment: $1.00 per hour additional); Wheel excavator operator (over 750 cu. yds.)

GROUP 15: Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (single engine, Caterpillar, Euclid, Athey Wagon and similar types with any and all attachments over 25 yds. and up to and including 50 yds. struck); Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (multiple engine-up to and including 25 yds. struck)

GROUP 16: Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (single engine, over 50 yds. struck); Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (multiple engine, Euclid, Caterpillar and similar, over 25 yds. and up to 50 yds. struck)

GROUP 17: Rubber-tired earth-moving equipment operator,

operating equipment with push-pull system (multiple engine, Euclid, Caterpillar and similar, over 50 cu. yds. struck); Tandem tractor operator (operating crawler type tractors in tandem - Quad 9 and similar type)

GROUP 18: Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps and similar types in any combination, excluding compaction units - single engine, up to and including 25 yds. struck)

GROUP 19: Rotex concrete belt operator (or similar types); Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps and similar types in any combination, excluding compaction units - single engine, Caterpillar, Euclid, Athey Wagon and similar types with any and all attachments over 25 yds.and up to and including 50 cu. yds. struck); Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps and similar types in any combination, excluding compaction units - multiple engine, up to and including 25 yds. struck)

GROUP 20: Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps and similar types in any combination, excluding compaction units - single engine, over 50 yds. struck); Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps, and similar types in any combination, excluding compaction units - multiple engine, Euclid, Caterpillar and similar, over 25 yds. and up to 50 yds. struck)

GROUP 21: Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps and similar types in any combination, excluding compaction units - multiple engine, Euclid, Caterpillar and similar type, over 50 cu. yds. struck)

GROUP 22: Rubber-tired earth-moving equipment operator, operating equipment with the tandem push-pull system (single engine, up to and including 25 yds. struck)

GROUP 23: Rubber-tired earth-moving equipment operator, operating equipment with the tandem push-pull system (single engine, Caterpillar, Euclid, Athey Wagon and similar types with any and all attachments over 25 yds. and up to and including 50 yds. struck); Rubber-tired earth-moving equipment operator, operating with the tandem push-pull system (multiple engine, up to and including 25 yds. struck)

GROUP 24: Rubber-tired earth-moving equipment operator, operating equipment with the tandem push-pull system (single engine, over 50 yds. struck); Rubber-tired earth-moving equipment operator, operating equipment with the tandem push-pull system (multiple engine, Euclid, Caterpillar and similar, over 25 yds. and up to 50 yds. struck)

GROUP 25: Concrete pump operator-truck mounted; Rubber-tired earth-moving equipment operator, operating equipment with the tandem push-pull system (multiple engine, Euclid, Caterpillar and similar type, over 50 cu. yds. struck)

CRANES, PILEDRIVING AND HOISTING EQUIPMENT CLASSIFICATIONS

Exhibit 1

GROUP 1: Engineer oiler; Fork lift operator (includes loed, lull or similar types)

GROUP 2: Truck crane oiler

GROUP 3: A-frame or winch truck operator; Ross carrier operator (jobsite)

GROUP 4: Bridge-type unloader and turntable operator; Helicopter hoist operator

GROUP 5: Hydraulic boom truck; Stinger crane (Austin-Western or similar type); Tugger hoist operator (1 drum)

GROUP 6: Bridge crane operator; Cretor crane operator; Hoist operator (Chicago boom and similar type); Lift mobile operator; Lift slab machine operator (Vagtborg and similar types); Material hoist and/or manlift operator; Polar gantry crane operator; Self Climbing scaffold (or similar type); Shovel, backhoe, dragline, clamshell operator (over 3/4 yd. and up to 5 cu. yds. mrc); Tugger hoist operator

GROUP 7: Pedestal crane operator; Shovel, backhoe, dragline, clamshell operator (over 5 cu. yds. mrc); Tower crane repair; Tugger hoist operator (3 drum)

GROUP 8: Crane operator (up to and including 25 ton capacity); Crawler transporter operator; Derrick barge operator (up to and including 25 ton capacity); Hoist operator, stiff legs, Guy derrick or similar type (up to and including 25 ton capacity); Shovel, backhoe, dragline, clamshell operator (over 7 cu. yds., M.R.C.)

GROUP 9: Crane operator (over 25 tons and up to and including 50 tons mrc); Derrick barge operator (over 25 tons up to and including 50 tons mrc); Highline cableway operator; Hoist operator, stiff legs, Guy derrick or similar type (over 25 tons up to and including 50 tons mrc); K-crane operator; Polar crane operator; Self erecting tower crane operator maximum lifting capacity ten tons

GROUP 10: Crane operator (over 50 tons and up to and including 100 tons mrc); Derrick barge operator (over 50 tons up to and including 100 tons mrc); Hoist operator, stiff legs, Guy derrick or similar type (over 50 tons up to and including 100 tons mrc), Mobile tower crane operator (over 50 tons, up to and including 100 tons M.R.C.); Tower crane operator and tower gantry

GROUP 11: Crane operator (over 100 tons and up to and including 200 tons mrc); Derrick barge operator (over 100 tons up to and including 200 tons mrc); Hoist operator, stiff legs, Guy derrick or similar type (over 100 tons up to and including 200 tons mrc); Mobile tower crane operator (over 100 tons up to and including 200 tons mrc)

GROUP 12: Crane operator (over 200 tons up to and including 300 tons mrc); Derrick barge operator (over 200 tons up to and including 300 tons mrc); Hoist operator, stiff legs, Guy derrick or similar type (over 200 tons, up to and including 300 tons mrc); Mobile tower crane operator (over 200 tons, up to and including 300 tons mrc)

GROUP 13: Crane operator (over 300 tons); Derrick barge operator (over 300 tons); Helicopter pilot; Hoist operator,

stiff legs, Guy derrick or similar type (over 300 tons); Mobile tower crane operator (over 300 tons)

TUNNEL CLASSIFICATIONS

GROUP 1: Skiploader (wheel type up to 3/4 yd. without attachment)

GROUP 2: Power-driven jumbo form setter operator

GROUP 3: Dinkey locomotive or motorperson (up to and including 10 tons)

GROUP 4: Bit sharpener; Equipment greaser (grease truck); Slip form pump operator (power-driven hydraulic lifting device for concrete forms); Tugger hoist operator (1 drum); Tunnel locomotive operator (over 10 and up to and including 30 tons)

GROUP 5: Backhoe operator (up to and including 3/4 yd.); Small Ford, Case or similar; Drill doctor; Grouting machine operator; Heading shield operator; Heavy-duty repairperson; Loader operator (Athey, Euclid, Sierra and similar types); Mucking machine operator (1/4 yd., rubber-tired, rail or track type); Pneumatic concrete placing machine operator (Hackley-Presswell or similar type); Pneumatic heading shield (tunnel); Pumpcrete gun operator; Tractor compressor drill combination operator; Tugger hoist operator (2 drum); Tunnel locomotive operator (over 30 tons)

GROUP 6: Heavy Duty Repairman

GROUP 7: Tunnel mole boring machine operator

ENGINEERS ZONES

$1.00 additional per hour for all of IMPERIAL County and the portions of KERN, RIVERSIDE & SAN BERNARDINO Counties as defined below:

That area within the following Boundary: Begin in San Bernardino County, approximately 3 miles NE of the intersection of I-15 and the California State line at that point which is the NW corner of Section 1, T17N,m R14E, San Bernardino Meridian. Continue W in a straight line to that point which is the SW corner of the northwest quarter of Section 6, T27S, R42E, Mt. Diablo Meridian. Continue North to the intersection with the Inyo County Boundary at that point which is the NE corner of the western half of the northern quarter of Section 6, T25S, R42E, MDM. Continue W along the Inyo and San Bernardino County boundary until the intersection with Kern County, as that point which is the SE corner of Section 34, T24S, R40E, MDM. Continue W along the Inyo and Kern County boundary until the intersection with Tulare County, at that point which is the SW corner of the SE quarter of Section 32, T24S, R37E, MDM. Continue W along the Kern and Tulare County boundary, until that point which is the NW corner of T25S, R32E, MDM. Continue S following R32E lines to the NW corner of T31S, R32E, MDM. Continue W to the NW corner of T31S, R31E, MDM. Continue S to the SW corner of T32S, R31E, MDM. Continue W to SW corner of SE quarter of Section 34, T32S, R30E, MDM. Continue S to SW corner of T11N, R17W, SBM. Continue E along south boundary of T11N, SBM to SW corner of T11N, R7W, SBM. Continue S to SW corner of T9N, R7W, SBM. Continue E along south boundary of T9N, SBM to SW corner of T9N, R1E, SBM.

Exhibit 1

Continue S along west boundary of R1E, SMB to Riverside County line at the SW corner of T1S, R1E, SBM. Continue E along south boundary of T1s, SBM (Riverside County Line) to SW corner of T1S, R10E, SBM. Continue S along west boundary of R10E, SBM to Imperial County line at the SW corner of T8S, R10E, SBM. Continue W along Imperial and Riverside county line to NW corner of T9S, R9E, SBM. Continue S along the boundary between Imperial and San Diego Counties, along the west edge of R9E, SBM to the south boundary of Imperial County/California state line. Follow the California state line west to Arizona state line, then north to Nevada state line, then continuing NW back to start at the point which is the NW corner of Section 1, T17N, R14E, SBM

$1.00 additional per hour for portions of SAN LUIS OBISPO, KERN, SANTA BARBARA & VENTURA as defined below:

That area within the following Boundary: Begin approximately 5 miles north of the community of Cholame, on the Monterey County and San Luis Obispo County boundary at the NW corner of T25S, R16E, Mt. Diablo Meridian. Continue south along the west side of R16E to the SW corner of T30S, R16E, MDM. Continue E to SW corner of T30S, R17E, MDM. Continue S to SW corner of T31S, R17E, MDM. Continue E to SW corner of T31S, R18E, MDM. Continue S along West side of R18E, MDM as it crosses into San Bernardino Meridian numbering area and becomes R30W. Follow the west side of R30W, SBM to the SW corner of T9N, R30W, SBM. Continue E along the south edge of T9N, SBM to the Santa Barbara County and Ventura County boundary at that point whch is the SW corner of Section 34.T9N, R24W, SBM, continue S along the Ventura County line to that point which is the SW corner of the SE quarter of Section 32, T7N, R24W, SBM. Continue E along the south edge of T7N, SBM to the SE corner to T7N, R21W, SBM. Continue N along East side of R21W, SBM to Ventura County and Kern County boundary at the NE corner of T8N, R21W. Continue W along the Ventura County and Kern County boundary to the SE corner of T9N, R21W. Continue North along the East edge of R21W, SBM to the NE corner of T12N, R21W, SBM. Continue West along the north edge of T12N, SBM to the SE corner of T32S, R21E, MDM. [T12N SBM is a think strip between T11N SBM and T32S MDM]. Continue North along the East side of R21E, MDM to the Kings County and Kern County border at the NE corner of T25S, R21E, MDM, continue West along the Kings County and Kern County Boundary until the intersection of San Luis Obispo County. Continue west along the Kings County and San Luis Obispo County boundary until the intersection with Monterey County. Continue West along the Monterey County and San Luis Obispo County boundary to the beginning point at the NW corner of T25S, R16E, MDM.

$2.00 additional per hour for INYO and MONO Counties and the Northern portion of SAN BERNARDINO County as defined below:

That area within the following Boundary: Begin at the intersection of the northern boundary of Mono County and the California state line at the point which is the center of Section 17, T10N, R22E, Mt. Diablo Meridian. Continue S then SE along the entire western boundary of Mono County, until it reaches Inyo County at the point which is the NE corner of the Western half of the NW quarter of Section 2, T8S, R29E, MDM. Continue SSE along the entire western boundary of Inyo County, until the intersection with Kern County at the point which is the SW corner of the SE 1/4 of Section 32, T24S, R37E, MDM. Continue E along the Inyo and Kern County boundary until the

intersection with San Bernardino County at that point which is the SE corner of section 34, T24S, R40E, MDM. Continue E along the Inyo and San Bernardino County boundary until the point which is the NE corner of the Western half of the NW quarter of Section 6, T25S, R42E, MDM. Continue S to that point which is the SW corner of the NW quarter of Section 6, T27S, R42E, MDM. Continue E in a straight line to the California and Nevada state border at the point which is the NW corner of Section 1, T17N, R14E, San Bernardino Meridian. Then continue NW along the state line to the starting point, which is the center of Section 18, T10N, R22E, MDM.

REMAINING AREA NOT DEFINED ABOVE RECIEVES BASE RATE

ENGI0012-004 08/01/2022

	Rates	Fringes
OPERATOR: Power Equipment (DREDGING)		
(1) Leverman	$ 61.60	32.50
(2) Dredge dozer	$ 55.63	32.50
(3) Deckmate	$ 55.52	32.50
(4) Winch operator (stern winch on dredge)	$ 54.97	32.50
(5) Fireman-Oiler, Deckhand, Bargeman, Leveehand	$ 54.43	32.50
(6) Barge Mate	$ 55.04	32.50

IRON0433-006 01/01/2023

	Rates	Fringes
IRONWORKER		
Fence Erector	$ 41.28	25.66
Ornamental, Reinforcing and Structural	$ 46.20	34.30

PREMIUM PAY:

$6.00 additional per hour at the following locations:

China Lake Naval Test Station, Chocolate Mountains Naval Reserve-Niland,
Edwards AFB, Fort Irwin Military Station, Fort Irwin Training Center-Goldstone, San Clemente Island, San Nicholas Island, Susanville Federal Prison, 29 Palms - Marine Corps, U.S. Marine Base - Barstow, U.S. Naval Air Facility - Sealey, Vandenberg AFB

$4.00 additional per hour at the following locations:

Army Defense Language Institute - Monterey, Fallon Air Base, Naval Post Graduate School - Monterey, Yermo Marine Corps Logistics Center

$2.00 additional per hour at the following locations:

Port Hueneme, Port Mugu, U.S. Coast Guard Station - Two Rock

LABO0300-005 08/01/2022

Exhibit 1

	Rates	Fringes
Asbestos Removal Laborer	$ 39.23	23.28

SCOPE OF WORK: Includes site mobilization, initial site cleanup, site preparation, removal of asbestos-containing material and toxic waste, encapsulation, enclosure and disposal of asbestos- containing materials and toxic waste by hand or with equipment or machinery; scaffolding, fabrication of temporary wooden barriers and assembly of decontamination stations.

LABO0345-001 07/01/2022

	Rates	Fringes
LABORER (GUNITE)		
GROUP 1	$ 48.50	21.37
GROUP 2	$ 47.55	21.37
GROUP 3	$ 44.01	21.37

FOOTNOTE: GUNITE PREMIUM PAY: Workers working from a Bosn'n's Chair or suspended from a rope or cable shall receive 40 cents per hour above the foregoing applicable classification rates. Workers doing gunite and/or shotcrete work in a tunnel shall receive 35 cents per hour above the foregoing applicable classification rates, paid on a portal-to-portal basis. Any work performed on, in or above any smoke stack, silo, storage elevator or similar type of structure, when such structure is in excess of 75'-0"" above base level and which work must be performed in whole or in part more than 75'-0"" above base level, that work performed above the 75'-0"" level shall be compensated for at 35 cents per hour above the applicable classification wage rate.

GUNITE LABORER CLASSIFICATIONS

GROUP 1: Rodmen, Nozzlemen

GROUP 2: Gunmen

GROUP 3: Reboundmen

LABO0585-001 07/01/2022

	Rates	Fringes
LABORER (TUNNEL)		
GROUP 1	$ 45.68	23.30
GROUP 2	$ 46.00	23.30
GROUP 3	$ 46.46	23.30
GROUP 4	$ 47.15	23.30
LABORER		
GROUP 1	$ 36.39	21.04
GROUP 2	$ 36.94	21.04
GROUP 3	$ 37.49	21.04
GROUP 4	$ 39.04	21.04
GROUP 5	$ 39.39	21.04

LABORER CLASSIFICATIONS

GROUP 1: Cleaning and handling of panel forms; Concrete screeding for rough strike-off; Concrete, water curing; Demolition laborer, the cleaning of brick if performed by a worker performing any other phase of demolition work, and the cleaning of lumber; Fire watcher, limber, brush loader, piler and debris handler; Flag person; Gas, oil and/or water pipeline laborer; Laborer, asphalt-rubber material loader; Laborer, general or construction; Laborer, general clean-up; Laborer, landscaping; Laborer, jetting; Laborer, temporary water and air lines; Material hose operator (walls, slabs, floors and decks); Plugging, filling of shee bolt holes; Dry packing of concrete; Railroad maintenance, repair track person and road beds; Streetcar and railroad construction track laborers; Rigging and signaling; Scaler; Slip form raiser; Tar and mortar; Tool crib or tool house laborer; Traffic control by any method; Window cleaner; Wire mesh pulling - all concrete pouring operations

GROUP 2: Asphalt shoveler; Cement dumper (on 1 yd. or larger mixer and handling bulk cement); Cesspool digger and installer; Chucktender; Chute handler, pouring concrete, the handling of the chute from readymix trucks, such as walls, slabs, decks, floors, foundation, footings, curbs, gutters and sidewalks; Concrete curer, impervious membrane and form oiler; Cutting torch operator (demolition); Fine grader, highways and street paving, airport, runways and similar type heavy construction; Gas, oil and/or water pipeline wrapper - pot tender and form person; Guinea chaser; Headerboard person - asphalt; Laborer, packing rod steel and pans; Membrane vapor barrier installer; Power broom sweeper (small); Riprap stonepaver, placing stone or wet sacked concrete; Roto scraper and tiller; Sandblaster (pot tender); Septic tank digger and installer(lead); Tank scaler and cleaner; Tree climber, faller, chain saw operator, Pittsburgh chipper and similar type brush shredder; Underground laborer, including caisson bellower

GROUP 3: Buggymobile person; Concrete cutting torch; Concrete pile cutter; Driller, jackhammer, 2-1/2 ft. drill steel or longer; Dri-pak-it machine; Gas, oil and/or water pipeline wrapper, 6-in. pipe and over, by any method, inside and out; High scaler (including drilling of same); Hydro seeder and similar type; Impact wrench multi-plate; Kettle person, pot person and workers applying asphalt, lay-kold, creosote, lime caustic and similar type materials (""applying"" means applying, dipping, brushing or handling of such materials for pipe wrapping and waterproofing); Operator of pneumatic, gas, electric tools, vibrating machine, pavement breaker, air blasting, come-alongs, and similar mechanical tools not separately classified herein; Pipelayer's backup person, coating, grouting, making of joints, sealing, caulking, diapering and including rubber gasket joints, pointing and any and all other services; Rock slinger; Rotary scarifier or multiple head concrete chipping scarifier; Steel headerboard and guideline setter; Tamper, Barko, Wacker and similar type; Trenching machine, hand-propelled

GROUP 4: Asphalt raker, lute person, ironer, asphalt dump person, and asphalt spreader boxes (all types); Concrete core cutter (walls, floors or ceilings), grinder or sander; Concrete saw person, cutting walls or flat work, scoring old or new concrete; Cribber, shorer, lagging, sheeting and trench bracing, hand-guided lagging hammer; Head rock slinger; Laborer, asphalt- rubber distributor boot person;

Laser beam in connection with laborers' work; Oversize concrete vibrator operator, 70 lbs. and over; Pipelayer performing all services in the laying and installation of pipe from the point of receiving pipe in the ditch until completion of operation, including any and all forms of tubular material, whether pipe, metallic or non-metallic, conduit and any other stationary type of tubular device used for the conveying of any substance or element, whether water, sewage, solid gas, air, or other product whatsoever and without regard to the nature of material from which the tubular material is fabricated; No-joint pipe and stripping of same; Prefabricated manhole installer; Sandblaster (nozzle person), water blasting, Porta Shot-Blast

GROUP 5: Blaster powder, all work of loading holes, placing and blasting of all powder and explosives of whatever type, regardless of method used for such loading and placing; Driller: All power drills, excluding jackhammer, whether core, diamond, wagon, track, multiple unit, and any and all other types of mechanical drills without regard to the form of motive power; Toxic waste removal

TUNNEL LABORER CLASSIFICATIONS

GROUP 1: Batch plant laborer; Changehouse person; Dump person; Dump person (outside); Swamper (brake person and switch person on tunnel work); Tunnel materials handling person; Nipper; Pot tender, using mastic or other materials (for example, but not by way of limitation, shotcrete, etc.)

GROUP 2: Chucktender, cabletender; Loading and unloading agitator cars; Vibrator person, jack hammer, pneumatic tools (except driller); Bull gang mucker, track person; Concrete crew, including rodder and spreader

GROUP 3: Blaster, driller, powder person; Chemical grout jet person; Cherry picker person; Grout gun person; Grout mixer person; Grout pump person; Jackleg miner; Jumbo person; Kemper and other pneumatic concrete placer operator; Miner, tunnel (hand or machine); Nozzle person; Operating of troweling and/or grouting machines; Powder person (primer house); Primer person; Sandblaster; Shotcrete person; Steel form raiser and setter; Timber person, retimber person, wood or steel; Tunnel Concrete finisher

GROUP 4: Diamond driller; Sandblaster; Shaft and raise work

LABO0585-003 07/01/2022

	Rates	Fringes
Brick Tender	$ 37.32	21.45

LABO1184-001 07/01/2022

	Rates	Fringes
Laborers: (HORIZONTAL DIRECTIONAL DRILLING)		
(1) Drilling Crew Laborer	$ 40.69	18.25
(2) Vehicle Operator/Hauler	$ 40.86	18.25
(3) Horizontal Directional Drill Operator	$ 42.71	18.25

Exhibit 1

(4) Electronic Tracking
Locator.....$ 44.71 18.25
Laborers: (STRIPING/SLURRY
SEAL)
GROUP 1.....$ 41.90 21.32
GROUP 2.....$ 43.20 21.32
GROUP 3.....$ 45.21 21.32
GROUP 4.....$ 46.95 21.32

LABORERS - STRIPING CLASSIFICATIONS

GROUP 1: Protective coating, pavement sealing, including repair and filling of cracks by any method on any surface in parking lots, game courts and playgrounds; carstops; operation of all related machinery and equipment; equipment repair technician

GROUP 2: Traffic surface abrasive blaster; pot tender - removal of all traffic lines and markings by any method (sandblasting, waterblasting, grinding, etc.) and preparation of surface for coatings. Traffic control person: controlling and directing traffic through both conventional and moving lane closures; operation of all related machinery and equipment

GROUP 3: Traffic delineating device applicator: Layout and application of pavement markers, delineating signs, rumble and traffic bars, adhesives, guide markers, other traffic delineating devices including traffic control. This category includes all traffic related surface preparation (sandblasting, waterblasting, grinding) as part of the application process. Traffic protective delineating system installer: removes, relocates, installs, permanently affixed roadside and parking delineation barricades, fencing, cable anchor, guard rail, reference signs, monument markers; operation of all related machinery and equipment; power broom sweeper

GROUP 4: Striper: layout and application of traffic stripes and markings; hot thermo plastic; tape traffic stripes and markings, including traffic control; operation of all related machinery and equipment

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LABO1414-001 08/03/2022

Rates Fringes

LABORER
PLASTER CLEAN-UP LABORER....$ 38.92 23.32
PLASTER TENDER.....$ 41.47 23.32

Work on a swing stage scaffold: $1.00 per hour additional.

PAIN0036-007 07/01/2019

Rates Fringes

Painters:
(1) Repaint Including Lead
Abatement.....$ 25.40 15.87
(2) High Iron & Steel.....$ 32.12 16.03
(3) Journeyman Painter
including Lead Abatement....$ 30.04 16.03
(4) Industrial.....$ 34.02 16.49

Exhibit 1

(5) All other work.....$ 30.04 16.03

REPAINT of any previously painted structure. Exceptions: work involving the aerospace industry, breweries, commercial recreational facilities, hotels which operate commercial establishments as part of hotel service, and sports facilities.

HIGH IRON & STEEL:
Aerial towers, towers, radio towers, smoke stacks, flag poles (any flag poles that can be finished from the ground with a ladder excluded), elevated water towers, steeples and domes in their entirety and any other extremely high and hazardous work, cooning steel, bos'n chair, or other similar devices, painting in other high hazardous work shall be classified as high iron & steel

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PAIN0036-008 09/01/2022

	Rates	Fringes
DRYWALL FINISHER/TAPER	$ 46.28	23.52

PAIN0036-015 01/01/2020

	Rates	Fringes
GLAZIER	$ 43.45	23.39

FOOTNOTE: Additional $1.25 per hour for work in a condor, from the third (3rd) floor and up Additional $1.25 per hour for work on the outside of the building from a swing stage or any suspended contrivance, from the ground up

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* PAIN1247-002 01/01/2023

	Rates	Fringes
SOFT FLOOR LAYER	$ 41.60	16.38

PLAS0200-009 08/03/2022

	Rates	Fringes
PLASTERER	$ 47.37	19.64

PLAS0500-002 07/01/2020

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER	$ 38.50	25.91

PLUM0016-001 09/01/2022

	Rates	Fringes
PLUMBER/PIPEFITTER Work ONLY on new additions and remodeling of bars, restaurant, stores and commercial buildings not to exceed 5,000 sq. ft. of floor space	$ 53.51	25.28

Exhibit 1

Work ONLY on strip malls, light commercial, tenant improvement and remodel work.....$ 40.95 23.61

All other work except work on new additions and remodeling of bars, restaurant, stores and commercial buildings not to exceed 5,000 sq. ft. of floor space and work on strip malls, light commercial, tenant improvement and remodel work.....$ 55.18 26.26

PLUM0345-001 09/01/2022

	Rates	Fringes
PLUMBER		
Landscape/Irrigation Fitter	$ 38.20	25.65
Sewer & Storm Drain Work	$ 42.29	23.03

ROOF0036-002 08/01/2022

	Rates	Fringes
ROOFER	$ 43.47	19.52

FOOTNOTE: Pitch premium: Work on which employees are exposed to pitch fumes or required to handle pitch, pitch base or pitch impregnated products, or any material containing coal tar pitch, the entire roofing crew shall receive $1.75 per hour ""pitch premium"" pay.

SFCA0669-010 04/01/2022

DOES NOT INCLUDE PORT HUENEME, PORT MUGU, THE CITY OF SANTA PAULA, AND THAT PART OF VENTURA COUNTY WITHIN 25 MILES OF THE CITY LIMITS OF LOS ANGELES:

	Rates	Fringes
SPRINKLER FITTER (FIRE)	$ 43.25	26.77

SFCA0709-001 01/01/2021

PORT HUENEME, PORT MUGU, THE CITY OF SANTA PAULA, AND THAT PART OF VENTURA COUNTY WITHIN 25 MILES OF THE CITY LIMITS OF LOS ANGELES:

	Rates	Fringes
SPRINKLER FITTER (Fire)	$ 48.71	29.15

SHEE0273-002 08/01/2019

	Rates	Fringes
SHEET METAL WORKER	$ 45.48	30.05

Exhibit 1

HOLIDAYS: New Year's Day, Martin Luther King Day, President's Day, Good Friday, Memorial Day, Indepdendence Day, Labor Day, Veterans Day,Thankisgiving Day & Friday after, Christmas Day

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TEAM0011-002 07/01/2022

	Rates	Fringes
TRUCK DRIVER		
GROUP 1	$ 36.19	32.54
GROUP 2	$ 36.34	32.54
GROUP 3	$ 36.47	32.54
GROUP 4	$ 36.66	32.54
GROUP 5	$ 36.69	32.54
GROUP 6	$ 36.72	32.54
GROUP 7	$ 36.97	32.54
GROUP 8	$ 37.22	32.54
GROUP 9	$ 37.42	32.54
GROUP 10	$ 37.72	32.54
GROUP 11	$ 38.22	32.54
GROUP 12	$ 38.65	32.54

WORK ON ALL MILITARY BASES:
PREMIUM PAY: $3.00 per hour additional.
[29 palms Marine Base, Camp Roberts, China Lake, Edwards AFB, El Centro Naval Facility, Fort Irwin, Marine Corps Logistics Base at Nebo & Yermo, Mountain Warfare Training Center, Bridgeport, Point Arguello, Point Conception, Vandenberg AFB]

TRUCK DRIVERS CLASSIFICATIONS

GROUP 1: Truck driver

GROUP 2: Driver of vehicle or combination of vehicles - 2 axles; Traffic control pilot car excluding moving heavy equipment permit load; Truck mounted broom

GROUP 3: Driver of vehicle or combination of vehicles - 3 axles; Boot person; Cement mason distribution truck; Fuel truck driver; Water truck - 2 axle; Dump truck, less than 16 yds. water level; Erosion control driver

GROUP 4: Driver of transit mix truck, under 3 yds.; Dumpcrete truck, less than 6-1/2 yds. water level

GROUP 5: Water truck, 3 or more axles; Truck greaser and tire person ($0.50 additional for tire person); Pipeline and utility working truck driver, including winch truck and plastic fusion, limited to pipeline and utility work; Slurry truck driver

GROUP 6: Transit mix truck, 3 yds. or more; Dumpcrete truck, 6-1/2 yds. water level and over; Vehicle or combination of vehicles - 4 or more axles; Oil spreader truck; Dump truck, 16 yds. to 25 yds. water level

GROUP 7: A Frame, Swedish crane or similar; Forklift driver; Ross carrier driver

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GROUP 8: Dump truck, 25 yds. to 49 yds. water level; Truck repair person; Water pull - single engine; Welder

GROUP 9: Truck repair person/welder; Low bed driver, 9 axles or over

GROUP 10: Dump truck - 50 yds. or more water level; Water pull - single engine with attachment

GROUP 11: Water pull - twin engine; Water pull - twin engine with attachments; Winch truck driver - $1.25 additional when operating winch or similar special attachments

GROUP 12: Boom Truck 17K and above

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at https://www.dol.gov/agencies/whd/government-contracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example:

PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

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On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour National Office because National Office has responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISIO"

Exhibit 1

DIVISION 7

TECHNICAL SPECIFICATIONS

Exhibit 1

TECHNICAL SPECIFICATIONS
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ITEM P-101 PREPARATION/REMOVAL OF EXISTING PAVEMENTS

DESCRIPTION

101-1.1 This item shall consist of preparation of existing pavement surfaces for overlay, surface treatments, removal of existing pavement, and other miscellaneous items. The work shall be accomplished in accordance with these specifications and the applicable plans.

EQUIPMENT AND MATERIALS

101-2.1 All equipment and materials shall be specified here and in the following paragraphs or approved by the Resident Project Representative (RPR). The equipment shall not cause damage to the pavement to remain in place.

CONSTRUCTION

101-3.1 REMOVAL OF EXISTING PAVEMENT.

The Contractor's removal operation shall be controlled to not damage adjacent pavement structure, and base material, cables, utility ducts, pipelines, or drainage structures which are to remain under the pavement.

a. **Concrete pavement removal.** Not used

b. **Asphalt pavement removal.** Asphalt pavement to be removed shall be cut to the full depth of the asphalt pavement around the perimeter of the area to be removed. If the material is to be wasted on the airport, it shall be broken to a maximum size of **2** inches.

c. **Repair or removal of Base, Subbase, and/or Subgrade.** All failed material including surface, base course, subbase course, and subgrade shall be removed and repaired as shown on the plans or as directed by the RPR. Materials and methods of construction shall comply with the applicable sections of these specifications. Any damage caused by Contractor's removal process shall be repaired at the Contractor's expense.

101-3.2 PREPARATION OF JOINTS AND CRACKS PRIOR TO OVERLAY/SURFACE TREATMENT. Remove all vegetation and debris from cracks to a minimum depth of 1 inch. If extensive vegetation exists, treat the specific area with a concentrated solution of a water-based herbicide approved by the RPR. Fill all cracks greater than 1/4 inch wide with a crack sealant per ASTM D6690. The crack sealant, preparation, and application shall be compatible with the surface treatment/overlay to be used. To minimize contamination of the asphalt with the crack sealant, underfill the crack sealant a minimum of 1/8 inch, not to exceed ¼ inch. Any excess joint or crack sealer shall be removed from the pavement surface.

Wider cracks (over 1-1/2 inch wide), along with soft or sunken spots, indicate that the pavement or the pavement base should be repaired or replaced as stated below.

Cracks and joints may be filled with a mixture of emulsified asphalt and aggregate. The aggregate shall consist of limestone, volcanic ash, sand, or other material that will cure to form a hard substance. The combined gradation shall be as shown in the following table.

Sieve Size	Percent Passing
No. 4 (4.75 mm)	100
No. 8 (2.36 mm)	90-100
No. 16 (1.18 mm)	65-90
No. 30 (600 μm)	40-60
No. 50 (300 μm)	25-42
No. 100 (150 μm)	15-30
No. 200 (75 μm)	10-20

Up to 3% cement can be added to accelerate the set time. The mixture shall not contain more than 20% natural Gradation sand without approval in writing from the RPR.

The proportions of asphalt emulsion and aggregate shall be determined in the field and may be varied to facilitate construction requirements. Normally, these proportions will be approximately one part asphalt emulsion to five parts aggregate by volume. The material shall be poured or placed into the joints or cracks and compacted to form a voidless mass. The joint or crack shall be filled to within +0 to -1/8 inches of the surface. Any material spilled outside the width of the joint shall be removed from the pavement surface prior to constructing the overlay. Where concrete overlays are to be constructed, only the excess joint material on the pavement surface and vegetation in the joints need to be removed.

101-3.3 REMOVAL OF FOREIGN SUBSTANCES/CONTAMINATES PRIOR TO OVERLAY, SEAL-COAT OR REMARKING. Removal of foreign substances/contaminates from existing pavement that will affect the bond of the new treatment shall consist of removal of rubber, fuel spills, oil, crack sealer, at least 90% of paint, and other foreign substances from the surface of the pavement. Areas that require removal are designated on the plans and as directed by the RPR in the field during construction.

High-pressure water or cold milling may be used. If chemicals are used, they shall comply with the state's environmental protection regulations. Removal methods used shall not cause major damage to the pavement, or to any structure or utility within or adjacent to the work area. Major damage is defined as changing the properties of the pavement, removal of asphalt causing the aggregate to ravel, or removing pavement over 1/8 inch deep. If it is deemed by the RPR that damage to the existing pavement is caused by operational error, such as permitting the application method to dwell in one location for too long, the Contractor shall repair the damaged area without compensation and as directed by the RPR.

Removal of foreign substances shall not proceed until approved by the RPR. Water used for high-pressure water equipment shall be provided by the Contractor at the Contractor's expense. No material shall be deposited on the pavement shoulders. All wastes shall be disposed of in areas indicated in this specification or shown on the plans.

101-3.4 CONCRETE SPALL OR FAILED ASPHALTIC CONCRETE PRAVEMENT REPAIR.

a. **Repair of concrete spalls in areas to be overlaid with asphalt.** Not used.

b. **Asphalt pavement repair.** Not used.

101-3.5 COLD MILLING. Milling shall be performed with a power-operated milling machine or grinder, capable of producing a uniform finished surface. The milling machine or grinder shall operate without tearing or gouging the underlaying surface. The milling machine or grinder shall be equipped with grade and slope controls, and a positive means of dust control. All millings shall be removed and disposed off Airport property. If the Contractor mills or grinds deeper or wider than the plans specify, the Contractor shall replace the material removed with new material at the Contractor's Expense.

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a. Patching. The milling machine shall be capable of cutting a vertical edge without chipping or spalling the edges of the remaining pavement and it shall have a positive method of controlling the depth of cut. The RPR shall layout the area to be milled with a straightedge in increments of 1-foot widths. The area to be milled shall cover only the failed area. Any excessive area that is milled because the Contractor doesn't have the appropriate milling machine, or areas that are damaged because of his negligence, shall be repaired by the Contractor at the Contractor's Expense.

b. Profiling, grade correction, or surface correction. The milling machine shall have a minimum width of 7 feet and it shall be equipped with electronic grade control devices that will cut the surface to the grade specified. The tolerances shall be maintained within +0 inch and -1/4 inch of the specified grade. The machine must cut vertical edges and have a positive method of dust control. The machine must have the ability to remove the millings or cuttings from the pavement and load them into a truck. All millings shall be removed and disposed of off the airport.

c. Clean-up. The Contractor shall sweep the milled surface daily and immediately after the milling until all residual materials are removed from the pavement surface. Prior to paving, the Contractor shall wet down the milled pavement and thoroughly sweep and/or blow the surface to remove loose residual material. Waste materials shall be collected and removed from the pavement surface and adjacent areas by sweeping or vacuuming. Waste materials shall be removed and disposed off Airport property.

101-3.6. PREPARATION OF ASPHALT PAVEMENT SURFACES PRIOR TO SURFACE TREATMENT. Existing asphalt pavements to be treated with a surface treatment shall be prepared as follows:

a. Patch asphalt pavement surfaces that have been softened by petroleum derivatives or have failed due to any other cause. Remove damaged pavement to the full depth of the damage and replace with new asphalt pavement similar to that of the existing pavement in accordance with paragraph 101-3.4b.

b. Repair joints and cracks in accordance with paragraph 101-3.2.

c. Remove oil or grease that has not penetrated the asphalt pavement by scrubbing with a detergent and washing thoroughly with clean water. After cleaning, treat these areas with an oil spot primer.

d. Clean pavement surface immediately prior to placing the surface treatment so that it is free of dust, dirt, grease, vegetation, oil or any type of objectionable surface film.

101-3.7 MAINTENANCE. The Contractor shall perform all maintenance work necessary to keep the pavement in a satisfactory condition until the full section is complete and accepted by the RPR. The surface shall be kept clean and free from foreign material. The pavement shall be properly drained at all times. If cleaning is necessary or if the pavement becomes disturbed, any work repairs necessary shall be performed at the Contractor's expense.

101-3.8 PREPARATION OF JOINTS IN RIGID PAVEMENT PRIOR TO RESEALING. Not used.

101-3.8.1 REMOVAL OF EXISTING JOINT SEALANT. Not used.

101-3.8.2 CLEANING PRIOR TO SEALING. No used.

101-3.8.3 JOINT SEALANT. Not used.

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101-3.9 PREPARATION OF CRACKS IN FLEXIBLE PAVEMENT PRIOR TO SEALING. Prior to application of sealant material, clean and dry the joints of all scale, dirt, dust, old sealant, curing compound, moisture and other foreign matter. The Contractor shall demonstrate, in the presence of the RPR, that the method used cleans the cracks and does not damage the pavement.

101-3.9.1 PREPARATION OF CRACK. Widen crack with router by removing a minimum of 1/16 inch from each side of crack. Immediately before sealing, cracks will be blown out with a hot air lance combined with oil and water-free compressed air.

101-3.9.2 REMOVAL OF EXISTING CRACK SEALANT. Existing sealants will be removed by routing. Following routing any remaining debris will be removed by use of a hot lance combined with oil and water-free compressed air.

101-3.9.3 CRACK SEALANT. Crack sealant material and installation will be in accordance with Item P-605.

101-3.9.4 REMOVAL OF PIPE AND OTHER BURIED STRUCTURES.

a. **Removal of Existing Pipe Material.** Remove the types of pipe as indicated on the plans. The pipe material shall be legally disposed of off-site in a timely manner following removal. Trenches shall be backfilled with material equal to or better in quality than adjacent embankment. Trenches under paved areas must be compacted per P-152.

b. **Removal of Inlets/Manholes.** Where indicated on the plans or as directed by the RPR, inlets and/or manholes shall be removed and legally disposed of off-site in a timely fashion after removal. Excavations after removal shall be backfilled with material equal or better in quality than adjacent embankment. When under paved areas must be compacted per P-152 for embankments under pavements, when outside of paved areas must be compacted to P-152 for embankments outside of pavements.

METHOD OF MEASUREMENT

101-4.1 PAVEMENT REMOVAL. The unit of measurement for pavement removal shall be the number of square yards removed by the Contractor. Any pavement removed outside the limits of removal because the pavement was damaged by negligence on the part of the Contractor shall not be included in the measurement for payment. No direct measurement or payment shall be made for saw cutting. Saw cutting shall be incidental to pavement removal. Dowel bar installation shall be incidental to pavement removal.

101-4.2 CRACK REPAIR. The unit of measurement for joint and crack repair shall be the linear foot (meter) of joint.

101-4.3 REMOVAL OF FOREIGN SUBSTANCES/CONTAMINATES. The unit of measurement for foreign Substances/contaminates removal shall be the square foot. No direct payment shall be made for the removal of foreign substances / contaminates. Removal of foreign substances / contaminates shall be considered a subsidiary obligation of the Contractor.

101-4.7 REMOVAL OF PIPE AND OTHER BURIED STRUCTURES. The unit of measurement for removal of pipe and other buried structures will be made at the contract unit price for each completed and accepted item. This price shall be full compensation for all labor, equipment, tools, and incidentals necessary to complete this item in accordance with paragraph 101-3.9.4.

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BASIS OF PAYMENT

101-5.1 PAYMENT. Payment shall be made at contract unit price for the unit of measurement as specified above. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

Item P 101a	Demolish Asphalt Pavement – per square yard
Item P 101b	Asphalt Carack Repair (under 1.5" width) – per linear foot
Item P 101c	Asphalt Crack Repair (over 1.5" width) – per square foot
Item P-101d	Cold Mill, Variable Depth (2 inches maximum)-per square yard
Item P-101e	Removal of Existing Underdrain Pipe, Complete – per linear foot
Item P-101f	Removal of Underdrain Cleanout, Complete – per each
Item P-101g	Removal of Underdrain Inspection Pit, Complete – per each

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Advisory Circulars (AC)

AC 150/5380-6	Guidelines and Procedures for Maintenance of Airport Pavements.

ASTM International (ASTM)

ASTM D6690	Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements

****END OF ITEM P-101****

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ITEM P-151 CLEARING AND GRUBBING

DESCRIPTION

151-1.1 This item shall consist of clearing or clearing and grubbing, including the disposal of materials, for all areas within the limits designated on the plans or as required by the Resident Project Representative (RPR).

a. **Clearing** Not used.

b. **Clearing and grubbing** shall consist of clearing the surface of the ground of the designated areas of all trees, stumps, down timber, logs, snags, brush, undergrowth, hedges, heavy growth of grass or weeds, fences, structures, debris, and rubbish of any nature, natural obstructions or such material which in the opinion of the RPR is unsuitable for the foundation of strips, pavements, or other required structures, including the grubbing of stumps, roots, matted roots, foundations, and the disposal from the project of all spoil materials resulting from clearing and grubbing.

c. **Tree Removal.** Not used.

CONSTRUCTION METHODS

151-2.1 GENERAL. The areas denoted on the plans to be cleared and grubbed shall be staked on the ground by the Contractor as indicated on the plans.

The removal of existing structures and utilities required to permit orderly progress of work shall be accomplished by local agencies, unless otherwise shown on the plans. Whenever a telephone pole, pipeline, conduit, sewer, roadway, or other utility is encountered and must be removed or relocated, the Contractor shall advise the RPR who will notify the proper local authority or owner to secure prompt action.

151-2.1.1 DISPOSAL. All materials removed by clearing or by clearing and grubbing shall be disposed of outside the Airport's limits at the Contractor's responsibility, except when otherwise directed by the RPR. As far as practicable, waste concrete and masonry shall be placed on slopes of embankments or channels. When embankments are constructed of such material, this material shall be placed in accordance with requirements for formation of embankments. Any broken concrete or masonry that cannot be used in construction and all other materials not considered suitable for use elsewhere, shall be disposed of by the Contractor. In no case, shall any discarded materials be left in windrows or piles adjacent to or within the airport limits. The manner and location of disposal of materials shall be subject to the approval of the RPR and shall not create an unsightly or objectionable view. When the Contractor is required to locate a disposal area outside the airport property limits, the Contractor shall obtain and file with the RPR permission in writing from the property owner for the use of private property for this purpose.

151-2.1.2 BLASTING. Blasting shall not be allowed**.**

151-2.2 CLEARING. The Contractor shall clear the staked or indicated area of all materials as indicated on the plans. Trees unavoidably falling outside the specified clearing limits must be cut up, removed, and disposed of in a satisfactory manner. To minimize damage to trees that are to be left standing, trees shall be felled toward the center of the area being cleared. The Contractor shall preserve and protect from injury all trees not to be removed. The trees, stumps, and brush shall be cut flush with the original ground surface. The grubbing of stumps and roots will not be required.

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Fences shall be removed and disposed of as directed by the RPR. Fence wire shall be neatly rolled and the wire and posts stored on the airport if they are to be used again, or stored at a location designated by the RPR if the fence is to remain the property of a local owner or authority.

151-2.3 CLEARING AND GRUBBING. In areas designated to be cleared and grubbed, all stumps, roots, buried logs, brush, grass, and other unsatisfactory materials as indicated on the plans, shall be removed, except where embankments exceeding 3-1/2 feet in depth will be constructed outside of paved areas. For embankments constructed outside of paved areas, all unsatisfactory materials shall be removed, but sound trees, stumps, and brush can be cut off flush with the original ground and allowed to remain. Tap roots and other projections over 1-1/2 inches in diameter shall be grubbed out to a depth of at least 18 inches below the finished subgrade or slope elevation.

Any buildings and miscellaneous structures that are shown on the plans to be removed shall be demolished or removed, and all materials shall be disposed of by removal from the site. The cost of removal is incidental to this item. The remaining or existing foundations, wells, cesspools, and like structures shall be destroyed by breaking down the materials of which the foundations, wells, cesspools, etc., are built to a depth at least 2 feet below the existing surrounding ground. Any broken concrete, blocks, or other objectionable material that cannot be used in backfill shall be removed and disposed of at the Contractor's expense. The holes or openings shall be backfilled with acceptable material and properly compacted.

All holes in embankment areas remaining after the grubbing operation shall have the sides of the holes flattened to facilitate filling with acceptable material and compacting as required in Item P-152. The same procedure shall be applied to all holes remaining after grubbing in areas where the depth of holes exceeds the depth of the proposed excavation.

METHOD OF MEASUREMENT

151-3.1 No Separate measurement of clearing and grubbing will be made. Work shall be considered incidental to the project.

BASIS OF PAYMENT

151-4.1 No Separate payment for clearing and grubbing will be made. Work shall be considered incidental to the project.

****END OF ITEM P-151****

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ITEM P-152 EXCAVATION, SUBGRADE, AND EMBANKMENT

DESCRIPTION

152-1.1 This item covers excavation, disposal, placement, and compaction of all materials within the limits of the work required to construct safety areas, runways, taxiways, aprons, and intermediate areas as well as other areas for drainage, building construction, parking, or other purposes in accordance with these specifications and in conformity to the dimensions and typical sections shown on the plans.

152-1.2 CLASSIFICATION. All material excavated shall be classified as defined below:

a. Unclassified excavation. Unclassified excavation shall consist of the excavation and disposal of all material, regardless of its nature.

152-1.3 UNSUITABLE EXCAVATION. Unsuitable material shall be disposed in designated waste areas as shown on the plans. Materials containing vegetable or organic matter, such as muck, peat, organic silt, or sod shall be considered unsuitable for use in embankment construction. Material suitable for topsoil may be used on the embankment slope when approved by the RPR.

CONSTRUCTION METHODS

152-2.1 GENERAL. Before beginning excavation, grading, and embankment operations in any area, the area shall be cleared or cleared and grubbed in accordance with Item P-151.

The suitability of material to be placed in embankments shall be subject to approval by the RPR. All unsuitable material shall be disposed of in waste areas as shown on the plans. All waste areas shall be graded to allow positive drainage of the area and adjacent areas. The surface elevation of waste areas shall be specified on the plans or approved by the RPR.

When the Contractor's excavating operations encounter artifacts of historical or archaeological significance, the operations shall be temporarily discontinued and the RPR notified per Section 70, paragraph 70-20. At the direction of the RPR, the Contractor shall excavate the site in such a manner as to preserve the artifacts encountered and allow for their removal. Such excavation will be paid for as extra work.

Areas outside the limits of the pavement areas where the top layer of soil has become compacted by hauling or other Contractor activities shall be scarified and disked to a depth of 4 inches, to loosen and pulverize the soil. Stones or rock fragments larger than 4 inches in their greatest dimension will not be permitted in the top 6 inches of the subgrade.

If it is necessary to interrupt existing surface drainage, sewers or under-drainage, conduits, utilities, or similar underground structures, the Contractor shall be responsible for and shall take all necessary precautions to preserve them or provide temporary services. When such facilities are encountered, the Contractor shall notify the RPR, who shall arrange for their removal if necessary. The Contractor, at their own expense, shall satisfactorily repair or pay the cost of all damage to such facilities or structures that may result from any of the Contractor's operations during the period of the contract.

a. Blasting. Blasting shall not be allowed.

152-2.2 EXCAVATION. No excavation shall be started until the work has been staked out by the Contractor and the RPR has obtained from the Contractor, the survey notes of the elevations and measurements of the ground surface. The Contractor and RPR shall agree that the original ground lines

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shown on the original topographic mapping are accurate, or agree to any adjustments made to the original ground lines.

Digital terrain model (DTM) files of the existing surfaces, finished surfaces and other various surfaces were used to develop the design plans.

Volumetric quantities were calculated by comparing DTM files of the applicable design surfaces and generating Triangle Volume Reports. Electronic copies of DTM files and a paper copy of the original topographic map will be issued to the successful bidder.

Existing grades on the design cross sections or DTM's, where they do not match the locations of actual spot elevations shown on the topographic map, were developed by computer interpolation from those spot elevations. Prior to disturbing original grade, Contractor shall verify the accuracy of the existing ground surface by verifying spot elevations at the same locations where original field survey data was obtained as indicated on the topographic map. Contractor shall recognize that, due to the interpolation process, the actual ground surface at any particular location may differ somewhat from the interpolated surface shown on the design cross sections or obtained from the DTM's. Contractor's verification of original ground surface, however, shall be limited to verification of spot elevations as indicated herein, and no adjustments will be made to the original ground surface unless the Contractor demonstrates that spot elevations shown are incorrect. For this purpose, spot elevations which are within 0.1 footof the stated elevations for ground surfaces, or within 0.04 foot for hard surfaces (pavements, buildings, foundations, structures, etc.) shall be considered "no change". Only deviations in excess of these will be considered for adjustment of the original ground surface. If Contractor's verification identifies discrepancies in the topographic map, Contractor shall notify the RPR in writing at least two weeks before disturbance of existing grade to allow sufficient time to verify the submitted information and make adjustments to the design cross sections or DTM's. Disturbance of existing grade in any area shall constitute acceptance by the Contractor of the accuracy of the original elevations shown on the topographic map for that area.

All areas to be excavated shall be stripped of vegetation and topsoil. Topsoil shall be stockpiled for future use in areas designated on the plans or by the RPR. All suitable excavated material shall be used in the formation of embankment, subgrade, or other purposes as shown on the plans. All unsuitable material shall be disposed of as shown on the plans.

The grade shall be maintained so that the surface is well drained at all times.

When the volume of the excavation exceeds that required to construct the embankments to the grades as indicated on the plans, the excess shall be used to grade the areas of ultimate development or disposed as directed by the RPR. When the volume of excavation is not sufficient for constructing the embankments to the grades indicated, the deficiency shall be obtained from borrow areas.

a. **Selective grading.** When selective grading is indicated on the plans, the more suitable material designated by the RPR shall be used in constructing the embankment or in capping the pavement subgrade. If, at the time of excavation, it is not possible to place this material in its final location, it shall be stockpiled in approved areas until it can be placed. The more suitable material shall then be placed and compacted as specified. Selective grading shall be considered incidental to the work involved. The cost of stockpiling and placing the material shall be included in the various pay items of work involved.

b. **Undercutting.** Rock, shale, hardpan, loose rock, boulders, or other material unsatisfactory for safety areas, subgrades, roads, shoulders, or any areas intended for turf shall be excavated to a minimum depth of 12 inches below the subgrade or to the depth specified by the RPR. Muck, peat, matted roots, or other yielding material, unsatisfactory for subgrade foundation, shall be

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removed to the depth specified. Unsuitable materials shall be disposed off the airport. The cost is incidental to this item. This excavated material shall be paid for at the contract unit price per cubic yard for unclassified excavation. The excavated area shall be backfilled with suitable material obtained from the grading operations or borrow areas and compacted to specified densities. The necessary backfill will constitute a part of the embankment. Where rock cuts are made, backfill with select material. Any pockets created in the rock surface shall be drained in accordance with the details shown on the plans. Undercutting will be paid as unclassified excavation.

c. **Over-break.** Over-break, including slides, is that portion of any material displaced or loosened beyond the finished work as planned or authorized by the RPR. All over-break shall be graded or removed by the Contractor and disposed of as directed by the RPR. The RPR shall determine if the displacement of such material was unavoidable and their own decision shall be final. Payment will not be made for the removal and disposal of over-break that the RPR determines as avoidable. Unavoidable over-break will be classified as "Unclassified Excavation."

d. **Removal of utilities.** The removal of existing structures and utilities required to permit the orderly progress of work will be accomplished by the Contractor as indicated on the plans. All existing foundations shall be excavated at least 2 feet below the top of subgrade or as indicated on the plans, and the material disposed of as directed by the RPR. All foundations thus excavated shall be backfilled with suitable material and compacted as specified for embankment or as shown on the plans.

152-2.3 Borrow excavation. There are no borrow sources within the boundaries of the airport property. The Contractor shall locate and obtain borrow sources, subject to the approval of the RPR. The Contractor shall notify the RPR at least 15 days prior to beginning the excavation so necessary measurements and tests can be made by the RPR. All borrow pits shall be opened to expose the various strata of acceptable material to allow obtaining a uniform product. Borrow areas shall be drained and left in a neat, presentable condition with all slopes dressed uniformly. Borrow areas shall not create a hazardous wildlife attractant.

152-2.4 DRAINAGE EXCAVATION. Drainage excavation shall consist of excavating drainage ditches including intercepting, inlet, or outlet ditches; or other types as shown on the plans. The work shall be performed in sequence with the other construction. Ditches shall be constructed prior to starting adjacent excavation operations. All satisfactory material shall be placed in embankment fills; unsuitable material shall be placed in designated waste areas or as directed by the RPR. All necessary work shall be performed true to final line, elevation, and cross-section. The Contractor shall maintain ditches constructed on the project to the required cross-section and shall keep them free of debris or obstructions until the project is accepted.

152-2.5 PREPARATION OF CUT AREAS OR AREAS WHERE EXISTING PAVEMENT HAS BEEN REMOVED. In those areas on which a subbase or base course is to be placed, the top 12 inches of subgrade shall be compacted to not less than 100 % of maximum density for non-cohesive soils, and 95% of maximum density for cohesive soils as determined by ASTM 1557. As used in this specification, "non-cohesive" shall mean those soils having a plasticity index (PI) of less than 3 as determined by ASTM D4318.

152-2.6 PREPARATION OF EMBANKMENT AREA. All sod and vegetative matter shall be removed from the surface upon which the embankment is to be placed. The cleared surface shall be broken up by plowing or scarifying to a minimum depth of 6 inches and shall then be compacted per paragraph 152-2.10.

Sloped surfaces steeper than one (1) vertical to four (4) horizontal shall be plowed, stepped, benched, or broken up so that the fill material will bond with the existing material. When the subgrade is part fill and part excavation or natural ground, the excavated or natural ground portion shall be scarified to a depth of 12 inches and compacted as specified for the adjacent fill.

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No direct payment shall be made for the work performed under this section. The necessary clearing and grubbing and the quantity of excavation removed will be paid for under the respective items of work.

152-2.7 CONTROL STRIP. The first half-day of construction of subgrade and/or embankment shall be considered as a control strip for the Contractor to demonstrate, in the presence of the RPR, that the materials, equipment, and construction processes meet the requirements of this specification. The sequence and manner of rolling necessary to obtain specified density requirements shall be determined. The maximum compacted thickness may be increased to a maximum of 12 inches upon the Contractor's demonstration that approved equipment and operations will uniformly compact the lift to the specified density. The RPR must witness this demonstration and approve the lift thickness prior to full production.

Control strips that do not meet specification requirements shall be reworked, re-compacted, or removed and replaced at the Contractor's expense. Full operations shall not begin until the control strip has been accepted by the RPR. The Contractor shall use the same equipment, materials, and construction methods for the remainder of construction, unless adjustments made by the Contractor are approved in advance by the RPR.

152-2.8 FORMATION OF EMBANKMENTS. The material shall be constructed in lifts as established in the control strip, but not less than 6 inches nor more than 12 inches of compacted thickness.

When more than one lift is required to establish the layer thickness shown on the plans, the construction procedure described here shall apply to each lift. No lift shall be covered by subsequent lifts until tests verify that compaction requirements have been met. The Contractor shall rework, re-compact and retest any material placed which does not meet the specifications.

The lifts shall be placed, to produce a soil structure as shown on the typical cross-section or as directed by the RPR. Materials such as brush, hedge, roots, stumps, grass and other organic matter, shall not be incorporated or buried in the embankment.

Earthwork operations shall be suspended at any time when satisfactory results cannot be obtained due to rain, freezing, or other unsatisfactory weather conditions in the field. Frozen material shall not be placed in the embankment nor shall embankment be placed upon frozen material. Material shall not be placed on surfaces that are muddy, frozen, or contain frost. The Contractor shall drag, blade, or slope the embankment to provide surface drainage at all times.

The material in each lift shall be within ±2% of optimum moisture content before rolling to obtain the prescribed compaction. The material shall be moistened or aerated as necessary to achieve a uniform moisture content throughout the lift. Natural drying may be accelerated by blending in dry material or manipulation alone to increase the rate of evaporation.

The Contractor shall make the necessary corrections and adjustments in methods, materials or moisture content to achieve the specified embankment density.

The contractor will take samples of excavated materials which will be used in embankment for testing and develop a Moisture-Density Relations of Soils Report (Proctor) in accordance with ASTM D 1557. A new Proctor shall be developed for each soil type based on visual classification.

Density tests will be taken by the Contractor for every 3,000 square yards of compacted embankment for each lift which is required to be compacted, or other appropriate frequencies as determined by the RPR.

If the material has greater than 30% retained on the 3/4-inch sieve, follow AASHTO T-180 Annex Correction of maximum dry density and optimum moisture for oversized particles.

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Rolling operations shall be continued until the embankment is compacted to not less than 100% of maximum density for non-cohesive soils, and 95% of maximum density for cohesive soils as determined by ASTM 1557. Under all areas to be paved, the embankments shall be compacted full depth and to a density of not less than 100% of maximum for non-cohesive soils, and 95% of maximum density for cohesive soils as determined by ASTM 1557. As used in this specification, "non-cohesive" shall mean those soils having a plasticity index (PI) of less than 3 as determined by ASTM D4318.

On all areas outside of the pavement areas, no compaction will be required on the top 4 inches which shall be prepared for a seedbed in accordance with Item T-901.

The in-place field density shall be determined in accordance with ASTM 6938 using Procedure A, the direct transmission method, and ASTM D6938 shall be used to determine the moisture content of the material. The machine shall be calibrated in accordance with ASTM D6938.

The Contractor's laboratory shall perform all density tests in the RPR's presence and provide the test results upon completion to the RPR for acceptance. If the specified density is not attained, the area represented by the test or as designated by the RPR shall be reworked and/or re-compacted and additional random tests made. This procedure shall be followed until the specified density is reached.

Compaction areas shall be kept separate, and no lift shall be covered by another lift until the proper density is obtained.

During construction of the embankment, the Contractor shall route all construction equipment evenly over the entire width of the embankment as each lift is placed. Lift placement shall begin in the deepest portion of the embankment fill. As placement progresses, the lifts shall be constructed approximately parallel to the finished pavement grade line.

When rock, concrete pavement, asphalt pavement, and other embankment material are excavated at approximately the same time as the subgrade, the material shall be incorporated into the outer portion of the embankment and the subgrade material shall be incorporated under the future paved areas. Stones, fragmentary rock, and recycled pavement larger than 4 inches in their greatest dimensions will not be allowed in the top 12 inches of the subgrade. Rockfill shall be brought up in lifts as specified or as directed by the RPR and the finer material shall be used to fill the voids forming a dense, compact mass. Rock, cement concrete pavement, asphalt pavement, and other embankment material shall not be disposed of except at places and in the manner designated on the plans or by the RPR.

When the excavated material consists predominantly of rock fragments of such size that the material cannot be placed in lifts of the prescribed thickness without crushing, pulverizing or further breaking down the pieces, such material may be placed in the embankment as directed in lifts not exceeding 2 feet in thickness. Each lift shall be leveled and smoothed with suitable equipment by distribution of spalls and finer fragments of rock. The lift shall not be constructed above an elevation 4 feet below the finished subgrade.

There will be no separate measurement of payment for compacted embankment. All costs incidental to placing in lifts, compacting, discing, watering, mixing, sloping, and other operations necessary for construction of embankments will be included in the contract price for excavation, borrow, or other items.

152-2.9 PROOF ROLLING. The purpose of proof rolling the subgrade is to identify any weak areas in the subgrade and not for compaction of the subgrade. Before start of embankment, and after compaction is completed, the subgrade area shall be proof rolled with a 20 ton Tandem axle Dual Wheel Dump Truck loaded to the legal limit with tires inflated to 80/100/150 in the presence of the RPR. Apply a minimum of 25% coverage, or as specified by the RPR, under pavement areas. A coverage is defined as the application of one tire print over the designated area. Soft areas of subgrade that deflect more than 1 inch or show

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permanent deformation greater than 1 inch shall be removed and replaced with suitable material or reworked to conform to the moisture content and compaction requirements in accordance with these specifications. Removal and replacement of soft areas is incidental to this item.

152-2.10 COMPACTION REQUIREMENTS. The subgrade under areas to be paved shall be compacted to a depth of 12 inches and to a density of not less than 100 percent of the maximum dry density for non-cohesive soils, and 95 percent of the maximum dry density for cohesive soils, as determined by ASTM D1557**.** The subgrade in areas outside the limits of the pavement areas shall be compacted to a depth of 12 inches and to a density of not less than 95 percent of the maximum density as determined by ASTM D1557.

The material to be compacted shall be within ±2% of optimum moisture content before being rolled to obtain the prescribed compaction (except for expansive soils). When the material has greater than 30 percent retained on the ¾ inch (19.0 mm) sieve, follow the methods in ASTM D1557**.** Tests for moisture content and compaction will be taken at a minimum of 3,000 S.Y. of subgrade. All quality assurance testing shall be done by the Contractor's laboratory in the presence of the RPR, and density test results shall be furnished upon completion to the RPR for acceptance determination.

In pavement areas where the plans call out lime and/or cement treated subgrade, shall be constructed and tested per P-155 and/or P-156.

The in-place field density shall be determined in accordance with ASTM D6938 using Procedure A, the direct transmission method, and ASTM D6938 shall be used to determine the moisture content of the material. The machine shall be calibrated in accordance with ASTM D6938 within 12 months prior to its use on this contract. The gage shall be field standardized daily**.**

Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

If the specified density is not attained, the entire lot shall be reworked and/or re-compacted and additional random tests made. This procedure shall be followed until the specified density is reached.

All cut-and-fill slopes shall be uniformly dressed to the slope, cross-section, and alignment shown on the plans or as directed by the RPR and the finished subgrade shall be maintained.

152-2.11 FINISHING AND PROTECTION OF SUBGRADE. Finishing and protection of the subgrade is incidental to this item. Grading and compacting of the subgrade shall be performed so that it will drain readily. All low areas, holes or depressions in the subgrade shall be brought to grade. Scarifying, blading, rolling and other methods shall be performed to provide a thoroughly compacted subgrade shaped to the lines and grades shown on the plans. All ruts or rough places that develop in the completed subgrade shall be graded, re-compacted, and retested. The Contractor shall protect the subgrade from damage and limit hauling over the finished subgrade to only traffic essential for construction purposes.

The Contractor shall maintain the completed course in satisfactory condition throughout placement of subsequent layers. No subbase, base, or surface course shall be placed on the subgrade until the subgrade has been accepted by the RPR.

152-2.12 HAUL. All hauling will be considered a necessary and incidental part of the work. The Contractor shall include the cost in the contract unit price for the pay of items of work involved. No payment will be made separately or directly for hauling on any part of the work.

The Contractor's equipment shall not cause damage to any excavated surface, compacted lift or to the subgrade as a result of hauling operations. Any damage caused as a result of the Contractor's hauling operations shall be repaired at the Contractor's expense.

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The Contractor shall be responsible for providing, maintaining and removing any haul roads or routes within or outside of the work area, and shall return the affected areas to their former condition, unless otherwise authorized in writing by the Owner. No separate payment will be made for any work or materials associated with providing, maintaining and removing haul roads or routes.

152-2.13 SURFACE TOLERANCEs. In those areas on which a subbase or base course is to be placed, the surface shall be tested for smoothness and accuracy of grade and crown. Any portion lacking the required smoothness or failing in accuracy of grade or crown shall be scarified to a depth of at least 3 inches, reshaped and re-compacted to grade until the required smoothness and accuracy are obtained and approved by the RPR. The Contractor shall perform all final smoothness and grade checks in the presence of the RPR. Any deviation in surface tolerances shall be corrected by the Contractor at the Contractor's expense.

a. Smoothness. The finished surface shall not vary more than +/- ½ inch when tested with a 12-foot straightedge applied parallel with and at right angles to the centerline. The straightedge shall be moved continuously forward at half the length of the 12-foot straightedge for the full length of each line on a 50-foot grid.

b. Grade. The grade and crown shall be measured on a 50-foot grid and shall be within +/-0.05 feet of the specified grade.

On safety areas, turfed areas and other designated areas within the grading limits where no subbase or base is to placed, grade shall not vary more than 0.10 feet from specified grade. Any deviation in excess of this amount shall be corrected by loosening, adding or removing materials, and reshaping.

152-2.14 TOPSOIL. When topsoil is specified or required as shown on the plans or under Item T-905, it shall be salvaged from stripping or other grading operations. The topsoil shall meet the requirements of Item T-905. If, at the time of excavation or stripping, the topsoil cannot be placed in its final section of finished construction, the material shall be stockpiled at approved locations. Stockpiles shall be located as shown on the plans and the approved CSPP, and shall not be placed on areas that subsequently will require any excavation or embankment fill. If, in the judgment of the RPR, it is practical to place the salvaged topsoil at the time of excavation or stripping, the material shall be placed in its final position without stockpiling or further re-handling.

Upon completion of grading operations, stockpiled topsoil shall be handled and placed as shown on the plans and as required in Item T-905. Topsoil shall be paid for as provided in Item T-905. No direct payment will be made for topsoil under Item P-152.

METHOD OF MEASUREMENT

152-3.1 Measurement for payment specified by the cubic yard shall be computed by the comparison of digital terrain model (DTM) surfaces for computation. Contractor shall provide topographical survey of the ground prior to excavation, after excavation and after embankment activities are complete.

152-3.2 The quantity of unclassified excavation to be paid for shall be the number of cubic yards measured in its original position. Measurement shall not include the quantity of materials excavated without authorization beyond normal slope lines, or the quantity of material used for purposes other than those directed.

152-3.3 The quantity of embankment in place shall be the number of cubic yards (cubic meters) measured in its final position.

152-3.4 Subgrade preparation shall be paid for by the square yard for scarifying, proof-rolling, recompacting, building, and shaping the native subgrade to conform to the typical sections, lines, and grades as shown on

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the plans for the areas beneath the areas shown for crushed aggregate base shoulders, outside of the stabilized subgrade.

152-3.5 Stockpiled material shall not be measured for payment in the stockpiled position.

BASIS OF PAYMENT

152-4.1 Unclassified excavation payment shall be made at the contract unit price per cubic yard. This price shall be full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the item.

152-4.2 For embankment in place, payment shall be made at the contract unit price per cubic yard. This price shall be full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the item.

152-4.3 For subgrade preparation, payment shall be made at the contract unit price per square yard for the subgrade preparation of areas beneath the areas shown for crushed aggregate base shoulders, outside of the stabilized subgrade. The price shall be full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the item including scarifying, watering, proof rolling, compacting, and finish grading the subgrade surface to the elevations as shown on the plans.

Payment will be made under:

Item P-152a	Unclassified Excavation - per cubic yard
Item P-152b	Embankment in Place – per cubic yard
Item P-152c	Subgrade Preparation – per square yard
Item P-152d	Unclassified Excavation and Stockpile Onsite – per cubic yard

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

American Association of State Highway and Transportation Officials (AASHTO)

AASHTO T-180	Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop

ASTM International (ASTM)

ASTM D698	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3))
ASTM D1556	Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D1557	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 (2700 kN-m/m^3))
ASTM D6938	Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

Advisory Circulars (AC)

AC 150/5370-2	Operational Safety on Airports During Construction Software

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Software

FAARFIELD – FAA Rigid and Flexible Iterative Elastic Layered Design

U.S. Department of Transportation

FAA RD-76-66 Design and Construction of Airport Pavements on Expansive Soils

****END OF ITEM P-152****

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Item P-153 Controlled Low-Strength Material (CLSM) 3721

DESCRIPTION

153-1.1 This item shall consist of furnishing, transporting, and placing a controlled low-strength material (CLSM) as flowable backfill in trenches or at other locations shown on the plans or as directed by the Resident Project Representative (RPR).

MATERIALS

153-2.1 Materials.

a. **Cement.** Cement shall conform to the requirements of ASTM C150 Type, Types I, II, or V.

b. **Fly ash.** Fly ash shall conform to ASTM C618, Class C or F.

c. **Fine aggregate (sand).** Fine aggregate shall conform to the requirements of ASTM C33 except for aggregate gradation. Any aggregate gradation which produces the specified performance characteristics of the CLSM and meets the following requirements, will be accepted.

Sieve Size	Percent Passing by weight
3/4 inch (19.0 mm)	100
No. 200 (75 μm)	0 - 12

d. **Water.** Water used in mixing or curing shall be from potable water sources. Other sources shall be tested in accordance with ASTM C1602 prior to use.

MIX DESIGN

153-3.1 Proportions. The Contractor shall submit, to the RPR, a mix design including the proportions and source of aggregate, fly ash, cement, water, and approved admixtures. No CLSM mixture shall be produced for payment until the RPR has given written approval of the proportions. The proportions shall be prepared by a laboratory and shall remain in effect for the duration of the project. The proportions shall establish a single percentage or weight for aggregate, fly ash, cement, water, and any admixtures proposed. Laboratory costs are incidental to this item.

a. **Compressive strength.** CLSM shall be designed to achieve a 28-day compressive strength of 100 to 200 psi when tested in accordance with ASTM D4832, with no significant strength gain after 28 days.

b. **Consistency.** Design CLSM to achieve a consistency that will produce an approximate 8-inch diameter circular-type spread without segregation. CLSM consistency shall be determined per ASTM D6103.

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CONSTRUCTION METHODS

153-4.1 Placement.

a. **Placement.** CLSM may be placed by any reasonable means from the mixing unit into the space to be filled. Agitation is required during transportation and waiting time. Placement shall be performed so structures or pipes are not displaced from their final position and intrusion of CLSM into unwanted areas is avoided. The material shall be brought up uniformly to the fill line shown on the plans or as directed by the RPR. Each placement of CLSM shall be as continuous an operation as possible. If CLSM is placed in more than one lift, the base lift shall be free of surface water and loose foreign material prior to placement of the next lift.

b. **Contractor Quality Control**. The Contractor shall collect all batch tickets to verify the CLSM delivered to the project conforms to the mix design. The Contractor shall verify daily that the CLSM is consistent with 153-3.1a and 153-3.1b. Adjustments shall be made as necessary to the proportions and materials as needed. The Contractor shall provide all batch tickets to the RPR.

c. **Limitations of placement.** CLSM shall not be placed on frozen ground. Mixing and placing may begin when the air or ground temperature is at least 35°F (2°C) and rising. Mixing and placement shall stop when the air temperature is 40°F (4°C) and falling or when the anticipated air or ground temperature will be 35°F (2°C) or less in the 24-hour period following proposed placement. At the time of placement, CLSM shall have a temperature of at least 40°F (4°C).

153-4.2 Curing and protection

a. **Curing.** The air in contact with the CLSM shall be maintained at temperatures above freezing for a minimum of 72 hours. If the CLSM is subjected to temperatures below 32°F (0°C), the material may be rejected by the RPR if damage to the material is observed.

b. **Protection.** The CLSM shall not be subject to loads and shall remain undisturbed by construction activities for a period of 48 hours or until a compressive strength of 15 psi (105 kPa) is obtained. The Contractor shall be responsible for providing evidence to the RPR that the material has reached the desired strength. Acceptable evidence shall be based upon compressive tests made in accordance with paragraph 153-3.1a.

153-4.3 Quality Assurance (QA) Acceptance. CLSM QA acceptance shall be based upon batch tickets provided by the Contractor to the RPR to confirm that the delivered material conforms to the mix design.

METHOD OF MEASUREMENT

153-5.1 Measurement.

No separate measurement for payment shall be made for controlled low strength material (CLSM). CLSM shall be considered necessary and incidental to the work of this Contract.

BASIS OF PAYMENT

153-6.1 Payment.

No payment will be made separately or directly for controlled low strength material (CLSM). CLSM shall be considered necessary and incidental to the work of this Contract.

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REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM C33	Standard Specification for Concrete Aggregates
ASTM C150	Standard Specification for Portland Cement
ASTM C618	Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
ASTM C595	Standard Specification for Blended Hydraulic Cements
ASTM D4832	Standard Test Method for Preparation and Testing of Controlled Low-Strength Material (CLSM) Test Cylinders

****END OF ITEM P-153****

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ITEM P-155 LIME-TREATED SUBGRADE

DESCRIPTION

155-1.1 This item shall be used for soil modification that require strength gain to a specific level. This item shall consist of constructing one or more courses of a mixture of soil, lime, and water in accordance with this specification, and in conformity with the lines, grades, thicknesses, and typical cross-sections shown on the plans.

MATERIALS

155-2.1 LIME. Quicklime, hydrated lime, and either high-calcium dolomitic, or magnesium lime, as defined by ASTM C51, shall conform to the requirements of ASTM C977. Lime not produced from calcining limestone is not permitted.

155-2.2 COMMERCIAL LIME SLURRY. Not used.

a. Chemical composition. Not used.

b. Residue. Not used.

c. Grade. Not used.

155-2.3 WATER. Water used in mixing or curing shall be from potable water sources. Other sources shall be tested in accordance with ASTM C1602 prior to use.

155-2.4 SOIL. The soil for this work shall consist of on-site materials free of roots, sod, weeds, and stones larger than 2-1/2 inches and have a sulfate content of less than 0.3%.

COMPOSITION

155-3.1 SOIL-LIME MIXTURE. Lime shall be applied at 3 % dry unit weight for cohesive soil and 1% for non-cohesive soil for of soil for the depth of subgrade treatment as shown on the plans. There will be a minimum of two treatments per P-155-6.2 to mitigate against sulfate heave.

155-3.2 TOLERANCES. At final compaction, the lime and water content for each course of subgrade treatment shall conform to the following tolerances:

Tolerances

Material	Tolerance
Lime	+ 0.5%
Water	+ 2%, -0%

[1]Limt is based on both applications. The total Lime shall not exceed 0.5% of the percentage specified in Section P-155-3.1.

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WEATHER LIMITATIONS

155-4.1 WEATHER LIMITATION. Subgrade shall not be constructed when weather conditions detrimentally affect the quality of the materials. Lime shall not be applied unless the air temperature is at least 40°F (4°C) and rising. Lime shall not be applied to soils that are frozen or contain frost. Protect completed lime-treated areas by approved methods against the detrimental effects of freezing if the air temperature falls below 35°F (2°C). Remove and replace any damaged portion of the completed soil-lime treated area with new soil-lime material in accordance with this specification.

EQUIPMENT

155-5.1 EQUIPMENT. All equipment necessary to grade, scarify, spread, mix and compact the material shall be provided. The Resident Project Representative (RPR) must approve the Contractor's proposed equipment prior to the start of the treatment.

CONSTRUCTION METHODS

155-6.1 GENERAL. This specification is to construct a subgrade consisting of a uniform lime mixture which shall be free from loose or segregated areas. The subgrade shall be of uniform density and moisture content, well mixed for its full depth, and have a smooth surface suitable for placing subsequent lifts. The Contractor shall be responsible to meet the above requirements.

Prior to any treatment, the subgrade shall be constructed as specified in Item P-152, Excavation, Subgrade and Embankment, and shaped to conform to the typical sections, lines, and grades as shown on the plans.

The mixing equipment must give visible indication at all times that it is cutting, pulverizing and mixing the material uniformly to the proper depth over the full width of the cut.

155-6.2 APPLICATION. Lime shall be uniformly spread only over an area where the initial mixing operations can be completed during the same work day. Lime shall not be applied when wind conditions are detrimental to proper application. A motor grader shall not be used to spread the lime. Adequate moisture shall be added to the cement/soil mixture to maintain the proper moisture content. Materials shall be handled, stored, and applied in accordance with all federal, state, and local requirements.

155-6.3 MIXING. The mixing procedure shall be as described below:

a. **Preliminary mixing.** The full depth of the treated subgrade shall be mixed with an approved mixing machine. Lime shall not be left exposed for more than six (6) hours. The mixing machine shall make two coverages. Water shall be added to the subgrade during mixing to provide a moisture content approximately 4% to 5% above the optimum moisture of the material and to ensure chemical reaction of the lime and subgrade. After mixing, the subgrade shall be lightly rolled to seal the surface and help prevent evaporation of moisture. The initial treatment requires a minimum of a two (2) day mellowing period for non-cohesive soils and a minimum of a four (4) day mellowing period for cohesive soils. During this mellowing period, the treated soil shall be re-mixed a minimum of three (3) additional times at least two (2) days after the initial mixing procedures. After each re-mixing, the subgrade shall be lightly rolled to seal the surface and help prevent evaporation of moisture. In addition, soil moisture content shall be checked frequently, by the Contractor, and additional moisture added to maintain optimum moisture content.

b. **Soluble Sulfate Verification**. After the required mellowing time and prior to final mixing, samples of treated soil shall be obtained every 5,000 square feet of treated soil area. Samples shall be tested by the Contractor to verify remaining soluble sulfate levels in the soil. If any test has

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remaining soluble sulfates exceeding 3,000 ppm, a second treatment, similar to the first treatment, shall be made according to P-155-6.3a with additional lime at a rate approved by the RPR, for the area between adjacent passing sulfate tests. Areas re-worked due to sulfate concentration shall be resampled after a second treatment and mellowing time.

c. **Final mixing.** After the required mellowing time, the material shall be uniformly mixed by approved methods. Any clods shall be reduced in size by blading, discing, harrowing, scarifying, or by the use of other approved pulverization methods. After curing, pulverize lime treated material until 100% of soil particles pass a one-inch (25.0 mm) sieve and 60% pass the No. 4 (4.75 mm) sieve when tested dry by laboratory sieves. If resultant mixture contains clods, reduce their size by scarifying, remixing, or pulverization to meet specified gradation.

155-6.4 CONTROL STRIP. The first half-day of construction shall be considered the control strip. The Contractor shall demonstrate, in the presence of the RPR, that the materials, equipment, and construction processes meet the requirements of the specification. The sequence and manner of rolling necessary to obtain specified density requirements shall be determined. Control strips that do not meet specification requirements shall be reworked, re-compacted, or removed and replaced at the Contractor's expense. Full operations shall not continue until the control strip has been accepted by the RPR. Upon acceptance of the control strip by the RPR, the Contractor shall use the same equipment, materials, and construction methods for the remainder of construction, unless adjustments made by the Contractor are approved in advance by the RPR.

155-6.5 TREATMENT APPLICATION AND DEPTH CHECKS. The depth and amount of stabilization shall be measured by the Contractor with no less than 2 tests per day of material placed; test shall be witnessed by the RPR. Measurements shall be made in test holes excavated to show the full depth of mixing and the pH checked by spraying the side of the test hole with a pH indicator such as phenolphthalein. Phenolphthalein changes from clear to red between pH 8.3 and 10. The color change indicates the location of the bottom of the mixing zone. pH indicators other than phenolphthalein can be used to measure pH levels. If the pH is not at least 8.3 and/or if the depth of the treated subgrade is more than 1/2 inch (12 mm) deficient, additional lime treatment shall be added and the material remixed. The Contractor shall correct all such areas in a manner satisfactory to the RPR.

155-6.6 COMPACTION. Compaction of the mixture shall immediately follow the final mixing operation with the mixture compacted within 1 to 4 hours after final mixing. The material shall be at the moisture content specified in paragraph 155-3.2 during compaction. The field density of the compacted mixture shall be at least 95% of the maximum density as specified in paragraph 155-6.10. Perform in-place density test to determine degree of compaction between 24 and 72 hours after final compaction and the 24-hour moist cure period. If the material fails to meet the density requirements, it shall be reworked to meet the density requirements. Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

155-6.7 FINISHING AND CURING. After the final lift or course of lime-treated subgrade has been compacted, it shall be brought to the required lines and grades in accordance with the typical sections. The completed section shall then be finished by rolling, as directed by the RPR, with a pneumatic or other suitable roller sufficiently light to prevent hairline cracking. The finished surface shall not vary more than 1/2-inch when tested with a 12-foot straightedge applied parallel with and at right angles to the pavement centerline. Any variations in excess of this tolerance shall be corrected by the Contractor at the Contractor's expense in a manner satisfactory to the RPR.

The completed section shall be moist-cured for a minimum of seven (7) days before further courses are added or any traffic is permitted, unless otherwise directed by the RPR. The final lift should not be exposed for more than 14 days without protection or the placement of a base course material.

155-6.8 MAINTENANCE. The Contractor shall protect and maintain the lime-treated subgrade from yielding until the lime-treated subgrade is covered by placement of the next lift. When material has been exposed to excessive rain, snow, or freeze-thaw conditions, prior to placement of additional material, the Contractor shall verify that materials still meets all specification requirements. The maintenance cost shall be incidental to this item.

155-6.9 SURFACE TOLERANCE. In those areas on which a subbase or base course is to be placed, the surface shall be tested for smoothness and accuracy of grade and crown. Any portion lacking the required smoothness or failing in accuracy of grade or crown shall be scarified to a depth of at least 3 inches, reshaped and re-compacted to grade until the required smoothness and accuracy are obtained and approved by the RPR. The Contractor shall perform all final smoothness and grade checks in the presence of the RPR. Any deviation in surface tolerances shall be corrected by the Contractor at the Contractor's expense.

a. Smoothness. The finished surface shall not vary more than +/- ½ inch when tested with a 12-foot straightedge applied parallel with and at right angles to the centerline. The straightedge shall be moved continuously forward at half the length of the 12-foot straightedge for the full length of each line on a 50-foot grid.

b. Grade. The grade and crown shall be measured on a 50-foot grid and shall be within +/-0.05 feet of the specified grade.

155-6.10 ACCEPTANCE SAMPLING AND TESTING. The lime treated subgrade shall be accepted for density and thickness on an area basis. Testing frequency shall be a minimum of one compaction and thickness test per 1000 square yards of lime treated subgrade, but not less than four (4) tests per day of production. Sampling locations will be determined on a random basis per ASTM D3665.

a. Density. All testing shall be done by the Contractor's laboratory in the presence of the RPR and density test results shall be furnished upon completion to the RPR for acceptance determination.

The field density of the compacted mixture shall be at least 95% of the maximum density of laboratory specimens prepared from samples taken from the material in place. The specimens shall be compacted and tested in accordance with ASTM D698 to determine maximum density and optimum moisture content. The in-place field density shall be determined in accordance with ASTM D6938, Procedure A, direct transmission method. If the material fails to meet the density requirements, the area represented by the failed test shall be reworked to meet the density requirements. Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

b. Thickness. The thickness of the course shall be within +0 and -1/2 inch of the specified thickness as determined by depth tests taken by the Contractor in the presence of the RPR for each area. Where the thickness is deficient by more than 1/2-inch, the Contractor shall correct such areas at no additional cost. The Contractor shall replace, at his expense, material where depth tests have been taken.

155-6.11 HANDLING AND SAFETY. The Contractor shall obtain and enforce the lime supplier's instructions for proper safety and handling of the lime to prevent physical eye or skin contact with lime during transport or application.

METHOD OF MEASUREMENT

155-7.1 Lime-treated subgrade shall be paid for by the square yard in the completed and accepted work.

155-7.2 Lime shall be paid by the number of tons of Hydrated Lime applied at the application rate specified in paragraph 155-3.1.

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a. Hydrated lime delivered to the project in dry form will be measured according to the actual tonnage either spread on the subgrade or batched on site into a slurry, whichever is applicable.

b. Quicklime delivered to the project in dry form will be measured for payment on the basis of the tons of equivalent hydrated lime using the following formula:

Equivalent Hydrated Lime ($Ca(OH)_2$) = Total Quicklime (CaO) × 1.32

BASIS OF PAYMENT

155-8.1 Payment shall be made at the contract unit price per square yard (square meter) for the lime-treated subgrade at the thickness specified. The price shall be full compensation for furnishing all material, except the lime, and for all preparation, delivering, placing and mixing these materials, and all labor, equipment, tools and incidentals necessary to complete this item.

155-8.2 Payment shall be made at the contract unit price per ton (kg). This price shall be full compensation for furnishing, delivery, and placing this material.

Payment will be made under:

Item P-155a	Lime Treated Subgrade, 16-Inch Depth - per square yard
Item P-155b	Lime - per ton

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM C51	Standard Terminology Relating to Lime and Limestone (as used by the Industry)
ASTM C977	Standard Specification for Quicklime and Hydrated Lime for Soil Stabilization
ASTM C1602	Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
ASTM D698	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3) (600 kN-m/m^3)
ASTM D1556	Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D2487	Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D6938	Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

Software

FAARFIELD – FAA Rigid and Flexible Iterative Elastic Layered Design

****END OF ITEM P-155****

Exhibit 1

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ITEM P-156 CEMENT TREATED SUBGRADE

DESCRIPTION

156-1.1 This item shall consist of constructing one or more courses of a mixture of soil, stabilizer, and water in accordance with this specification, and in conformity with the lines, grades, thickness, and typical cross-sections shown on the plans.

MATERIALS

156-2.1 CEMENT. Cement shall conform to the requirements of ASTM C150, Type I, IA, II, or IIA or ASTM C595, Type IS, IL, IP, or IS(A).

156-2.2 WATER. Water used in mixing or curing shall be from potable water sources. Other sources shall be tested in accordance with ASTM C1602 prior to use.

156-2.3 SOIL. The soil for this work shall consist of on-site materials free of roots, sod, weeds, and stones larger than 2-1/2 inches and have a sulfate content of less than 0.3%.

COMPOSITION

156-3.1 SOIL-CEMENT MIXTURE. Cement shall be added at an application rate of 2 ½ percent for non-cohesive soils and 2 percent for cohesive soils of dry unit weight of soil.

156-3.2 TOLERANCES. At final compaction, the cement and water content for each course of subgrade treatment shall conform to the following tolerances:

Tolerances

Material/Properties	Target	Tolerance	Specifications
Cement	2 to 2.5%	0 to +1%	% Total Dry Materials
Moisture Content	Optimum +2%	0 to +1%	ASTM D558

WEATHER LIMITATIONS

156-4.1 WEATHER LIMITATIONS. Do not construct subgrade when weather conditions detrimentally affect the quality of the materials. Do not apply cement unless the air temperature is at least 40°F (4°C) and rising. Do not apply cement to soils that are frozen or contain frost. Do not apply cement when conditions are too windy to allow even distribution of the cement to the subgrade. If the air temperature falls below 35°F (2°C), protect completed treated areas against freezing. Remove and replace any damaged portion of the completed treated area with new material in accordance with this specification.

EQUIPMENT

156-5.1 EQUIPMENT. All equipment necessary to grade, scarify, spread, mix and compact the material shall be provided. The Resident Project Representative (RPR) must approve the Contractor's proposed equipment prior to the start of the treatment.

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CONSTRUCTION METHODS

156-6.1 GENERAL. This specification is to construct a subgrade consisting of a uniform cement mixture which shall be free from loose or segregated areas. The subgrade shall be of uniform density and moisture content, well mixed for its full depth and have a smooth surface suitable for placing subsequent courses. The Contractor shall be responsible for meeting the above requirements.

Prior to any treatment, the subgrade shall be constructed as specified in Item P-152, Excavation, Subgrade and Embankment, and shaped to conform to the typical sections, lines, and grades as shown on the plans.

The mixing machine must give visible indication at all times that it is cutting, pulverizing and mixing the material uniformly to the proper depth over the full width of the cut.

156-6.2 APPLICATION. Cement shall be uniformly spread only over an area where the initial mixing operations and compaction can be completed during the same workday. The cement shall not be applied when wind conditions are detrimental to proper application. A motor grader shall not be used to spread the lime. Adequate moisture shall be added to the cement/soil mixture to maintain the proper moisture content. Materials shall be handled, stored, and applied in accordance with all federal, state, and local requirements.

156-6.3 MIXING PROCEDURE. The full depth of the treated subgrade shall be mixed with equipment as approved by the RPR. Cement shall not be left exposed for more than one (1) hour after distribution. Mixing and pulverization shall continue until the soil cement mixture contains no clods greater than 1-1/2 inches in size. Final moisture content of the mix shall be determined by the Contractor immediately prior to compaction in accordance with ASTM D2216 or ASTM D4959.

156-6.4 CONTROL STRIP. The first half-day of construction shall be considered the control strip. The Contractor shall demonstrate, in the presence of the RPR, that the materials, equipment, and construction processes meet the requirements of the specification. The sequence and manner of rolling necessary to obtain specified density requirements shall be determined. Control strips that do not meet specification requirements shall be reworked, re-compacted, or removed and replaced at the Contractor's expense. Full operations shall not continue until the control strip has been accepted by the RPR. Upon acceptance of the control strip by the RPR, the Contractor shall use the same equipment, materials, and construction methods for the remainder of construction, unless adjustments made by the Contractor are approved in advance by the RPR.

156-6.5 TREAMENT APPLICATION AND DEPTH CHECKS. The amount of cement applied shall be monitored by the Contractor to assure that no less than the amount of cement required by the mix design is applied. The depth of stabilization shall be measured by the Contractor no less than 2 tests per day of material placed; test shall be witnessed by the RPR. Measurements shall be made in test holes excavated to show the full depth of mixing.

156-6.6 COMPACTION. The moisture content shall be within the tolerance as specified in paragraph 156-3.2. The field density of the compacted mixture shall be at least 95% of the maximum density as specified in paragraph 156-6.10. Compaction of the soil/cement mixture shall begin within 30 minutes after mixing the cement into the subgrade. All compaction operations shall be completed within 2 hours from the start of mixing.

Perform in-place density test immediately after completion of compaction to determine degree of compaction. If the material fails to meet the density requirements, compaction shall continue or the material shall be removed and replaced. Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

156-6.7 FINISHING AND CURING. After the final lift or course of treated subgrade has been compacted, it shall be brought to the required lines and grades in accordance with the typical sections. Finished portions of treated subgrade shall be protected to prevent equipment from marring, permanently deforming, or damaging completed work.

Not later than 24 hours after completion of final finishing, the surface shall be cured by application of an curing compound or other moisture retention methods as approved by the RPR.

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If compaction operations of the overlying P-209 material are not started within 72-hours of the treatment of the P-156 material the surface of the P-156 material shall be microcracked by applying 3 single passes with a 12-ton vibratory steel drum roller at maximum amplitude travelling from 2 to 3 miles per hour, between 48 to 72 hours following the compaction of the P-156 material.

Sufficient protection from freezing shall be provided for at least 7 days after its construction or as approved by the RPR.

156-6.8 MAINTENANCE. The Contractor shall maintain the entire treated subgrade in good condition from the start of work until all the work has been completed, cured, and accepted by the RPR. When material has been exposed to excessive rain, snow, or freeze-thaw conditions, prior to placement of additional material, the Contractor shall verify that materials still meets all specification requirements. The cost shall be incidental to this item.

156-6.9 SURFACE TOLERANCE. In those areas on which a subbase or base course is to be placed, the surface shall be tested for smoothness and accuracy of grade and crown. Any portion lacking the required smoothness or failing in accuracy of grade or crown shall be scarified to a depth of at least 3 inches, reshaped and re-compacted to grade until the required smoothness and accuracy are obtained and approved by the RPR. The Contractor shall perform all final smoothness and grade checks in the presence of the RPR. Any deviation in surface tolerances shall be corrected by the Contractor at the Contractor's expense.

a. **Smoothness**. The finished surface shall not vary more than +/- ½ inch when tested with a 12-foot straightedge applied parallel with and at right angles to the centerline. The straightedge shall be moved continuously forward at half the length of the 12-foot straightedge for the full length of each line on a 50-foot grid.

b. **Grade.** The grade and crown shall be measured on a 50-foot grid and shall be within +/-0.05 feet of the specified grade.

156-6.10 ACCEPTANCE SAMPLING AND TESTING. Stabilized subgrade shall be accepted for density and thickness on an area basis. Testing frequency shall be a minimum of one (1) compaction and thickness test per 1,000 square yards of stabilized subgrade, but not less than four (4) tests per day of production. Sampling locations will be determined on a random basis per ASTM D3665.

a. **Density.** All testing shall be done by the Contractor's laboratory in the presence of the RPR and density test results shall be furnished upon completion to the RPR for acceptance determination.

The field density of the compacted mixture shall be at least 95% of the maximum density as determined by ASTM D558. The in-place field density shall be determined in accordance with ASTM D1556 or ASTM D6938, Procedure A, direct transmission method. The in-place moisture content shall be determined in accordance with ASTM D2216. If the material fails to meet the density requirements, compaction shall continue, or the material shall be removed and replaced. Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

b. **Thickness**. The thickness of the stabilized subgrade shall be within +0 and -1/2 inch of the specified thickness as determined by depth tests taken by the Contractor in the presence of the RPR for each sublot. Where the thickness is deficient by more than 1/2-inch, the material shall be removed to full depth and replaced, at Contractor's expense.

METHOD OF MEASUREMENT

156-7.1 The amount of cement treated subgrade shall be based on the number of square yards complete and accepted.

The amount of cement used is based upon an application rate as specified in paragraph 156-3.1. The amount of cement shall be paid by the number of tons of cement used in the completed and accepted work.

Exhibit 1

BASIS OF PAYMENT

156-8.1 Payment for cement treated subgrade placement shall be made at the contract unit price per square yard for the cement treated subgrade for the thickness specified. The price shall be full compensation for all preparation, delivering, placing and mixing these materials, establishing surface tolerances as specified in P-156-6.9 and all labor, equipment, tools and incidentals necessary to complete this item.

Payment for cement shall be made at the contract unit price per ton for the cement. The price shall be full compensation for all preparation, delivering, placing and mixing these materials, and all labor, equipment, tools and incidentals, including but not limited to materials for curing and their application, necessary to complete this item.

Payment will be made under:

Item P 156a	Cement Treated Subgrade, 16-Inch Depth – per square yard
Item P-156b	Cement - per ton

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM C150	Standard Specification for Portland Cement
ASTM C595	Standard Specification for Blended Hydraulic Cements
ASTM C1602	Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
ASTM D558	Standard Test Methods for Moisture-Density (Unit Weight) Relations of Soil-Cement Mixtures
ASTM D1556	Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D1557	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 (2,700 kN-m/m^3))
ASTM D1663	Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders
ASTM D2216	Test Methods for Laboratory Determination of Water (Moisture) Soil and Rock by Mass
ASTM D2487	Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D4318	Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils
ASTM D4959	Standard Test Method for Determination of Water Content of Soil by Direct Heating
ASTM D6938	Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

****END OF ITEM P-156****

Exhibit 1

ITEM P-209 CRUSHED AGGREGATE BASE COURSE

DESCRIPTION

209-1.1 This item consists of a base course composed of crushed aggregate base constructed on a prepared course in accordance with these specifications and in conformity to the dimensions and typical cross-sections shown on the plans.

MATERIALS

209-2.1 CRUSHED AGGREGATE BASE. Crushed aggregate shall consist of clean, sound, durable particles of crushed stone, crushed gravel, and shall be free from coatings of clay, silt, organic material, clay lumps or balls or other deleterious materials or coatings. The method used to produce the crushed gravel shall result in the fractured particles in the finished product as consistent and uniform as practicable. Fine aggregate portion, defined as the portion passing the No. 4 (4.75 mm) sieve shall consist of fines from the coarse aggregate crushing operation. The fine aggregate shall be produced by crushing stone, gravel, that meet the coarse aggregate requirements for wear and soundness. Aggregate base material requirements are listed in the following table.

Crushed Aggregate Base Material Requirements

Material Test	Requirement	Standard
Coarse Aggregate		
Resistance to Degradation	Loss: 45% maximum	ASTM C131
Soundness of Aggregates by Use of Sodium Sulfate **or** Magnesium Sulfate	Loss after 5 cycles: 12% maximum using Sodium sulfate - or - 18% maximum using magnesium sulfate	ASTM C88
Percentage of Fractured Particles	Minimum 90% by weight of particles with at least two fractured faces and 98% with at least one fractured face[1]	ASTM D5821
Flat Particles, Elongated Particles, or Flat and Elongated Particles	10% maximum, by weight, of flat, elongated, or flat and elongated particles [2]	ASTM D4791
Clay lumps and friable particles	Less than or equal to 3 percent	ASTM C142
Fine Aggregate		
Liquid limit	Less than or equal to 25	ASTM D4318
Plasticity Index	Not more than five (5)	ASTM D4318

[1]The area of each face shall be equal to at least 75% of the smallest mid-sectional area of the piece. When two fractured faces are contiguous, the angle between the planes of fractures shall be at least 30 degrees to count as two fractured faces.

[2]A flat particle is one having a ratio of width to thickness greater than five (5); an elongated particle is one having a ratio of length to width greater than five (5).

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209-2.2 GRADATION REQUIREMENTS. The gradation of the aggregate base material shall meet the requirements of the gradation given in the following table when tested per ASTM C117 and ASTM C136. The gradation shall be well graded from coarse to fine and shall not vary from the lower limit on one sieve to the high limit on an adjacent sieve or vice versa.

Gradation of Aggregate Base

Sieve Size	Design Range Percentage by Weight passing	Contractor's Final Gradation	Job Control Grading Band Tolerances[1] (Percent)
2 inch (50 mm)	100		0
1-1/2 inch (37.5 mm)	95-100		±5
1 inch (25.0 mm)	70-95		±8
3/4 inch (19.0 mm)	55-85		±8
No. 4 (4.75 mm)	30-60		±8
No. 40 (425 µm)	10-30		±5
No. 200 (75 µm)	0-10		±3

[1]The "Job Control Grading Band Tolerances for Contractor's Final Gradation" in the table shall be applied to "Contractor's Final Gradation" to establish a job control grading band. The full tolerance still applies if application of the tolerances results in a job control grading band outside the design range.

[2] The fraction of material passing the No 200 (75 µm) sieve shall not exceed two-thirds the fraction passing the No 40 (425 µm) sieve.

209-2.3 SAMPLING AND TESTING.

a. **Aggregate base materials.** The Contractor shall take samples of the aggregate base in accordance with ASTM D75 to verify initial aggregate base requirements and gradation. Material shall meet the requirements in paragraph 209-2.1. This sampling and testing will be the basis for approval of the aggregate base quality requirements.

b. **Gradation requirements.** The Contractor shall take at least two aggregate base samples per day in the presence of the Resident Project Representative (RPR) to check the final gradation. Sampling shall be per ASTM D75. Material shall meet the requirements in paragraph 209-2.2. The samples shall be taken from the in-place, un-compacted material at sampling points and intervals designated by the RPR.

209-2.4 SEPARATION GEOTEXTILE. Not used.

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CONSTRUCTION METHODS

209-3.1 CONTROL STRIP. The first half-day of construction shall be considered the control strip. The Contractor shall demonstrate, in the presence of the RPR, that the materials, equipment, and construction processes meet the requirements of the specification. The sequence and manner of rolling necessary to obtain specified density requirements shall be determined. The maximum compacted thickness may be increased to a maximum of 12 inches upon the Contractor's demonstration that approved equipment and operations will uniformly compact the lift to the specified density. The RPR must witness this demonstration and approve the lift thickness prior to full production.

Control strips that do not meet specification requirements shall be reworked, re-compacted or removed and replaced at the Contractor's expense. Full operations shall not continue until the control strip has been accepted by the RPR. The Contractor shall use the same equipment, materials, and construction methods for the remainder of construction, unless adjustments made by the Contractor are approved by the RPR.

209-3.2 PREPARING UNDERLYING SUBGRADE AND/OR SUBBASE. The underlying subgrade and/or subbase shall be checked and accepted by the RPR before base course placing and spreading operations begin. Re-proof rolling of the subgrade or proof rolling of the subbase in accordance with Item P-152, at the Contractor's expense, may be required by the RPR if the Contractor fails to ensure proper drainage or protect the subgrade and/or subbase. Any ruts or soft, yielding areas due to improper drainage conditions, hauling, or any other cause, shall be corrected before the base course is placed. To ensure proper drainage, the spreading of the base shall begin along the centerline of the pavement on a crowned section or on the high side of the pavement with a one-way slope.

209-3.3 PRODUCTION. The aggregate shall be uniformly blended and, when at a satisfactory moisture content per paragraph 209-3.5, the approved material may be transported directly to the placement.

209-3.4 PLACEMENT. The aggregate shall be placed and spread on the prepared underlying layer by spreader boxes or other devices as approved by the RPR, to a uniform thickness and width. The equipment shall have positive thickness controls to minimize the need for additional manipulation of the material. Dumping from vehicles that require re-handling shall not be permitted. Hauling over the uncompacted base course shall not be permitted.

The aggregate shall meet gradation and moisture requirements prior to compaction. The base course shall be constructed in lifts as established in the control strip, but not less than 4 inches nor more than 12 inches of compacted thickness.

When more than one lift is required to establish the layer thickness shown on the plans, the construction procedure described here shall apply to each lift. No lift shall be covered by subsequent lifts until tests verify that compaction requirements have been met. The Contractor shall rework, re-compact and retest any material placed which does not meet the specifications at the Contractor's expense.

209-3.5 COMPACTION. Immediately after completion of the spreading operations, compact each layer of the base course, as specified, with approved compaction equipment. The number, type, and weight of rollers shall be sufficient to compact the material to the required density within the same day that the aggregate is placed on the subgrade.

The field density of each compacted lift of material shall be at least 100% of the maximum density of laboratory specimens prepared from samples of the base material delivered to the jobsite. The laboratory specimens shall be compacted and tested in accordance with ASTM D1557. The moisture content of the material during placing operations shall be within ±2 percentage points of the optimum moisture content as

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determined by ASTM **1557**. Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

209-3.6 WEATHER LIMITATIONS. Material shall not be placed unless the ambient air temperature is at least 40°F (4°C) and rising. Work on base course shall not be conducted when the subgrade or subbase is wet or frozen or the base material contains frozen material.

209-3.7 MAINTENANCE. The base course shall be maintained in a condition that will meet all specification requirements. When material has been exposed to excessive rain, snow, or freeze-thaw conditions, prior to placement of additional material, the Contractor shall verify that materials still meet all specification requirements. Equipment may be routed over completed sections of base course, provided that no damage results and the equipment is routed over the full width of the completed base course. Any damage resulting to the base course from routing equipment over the base course shall be repaired by the Contractor at the Contractor's expense.

209-3.8 SURFACE TOLERANCES. After the course has been compacted, the surface shall be tested for smoothness and accuracy of grade and crown. Any portion lacking the required smoothness or failing in accuracy of grade or crown shall be scarified to a depth of at least 3 inches, reshaped and recompacted to grade until the required smoothness and accuracy are obtained and approved by the RPR. Any deviation in surface tolerances shall be corrected by the Contractor at the Contractor's expense. The smoothness and accuracy requirements specified here apply only to the top layer when base course is constructed in more than one layer.

a. Smoothness. The finished surface shall not vary more than 3/8-inch when tested with a 12-foot straightedge applied parallel with and at right angles to the centerline. The straightedge shall be moved continuously forward at half the length of the 12-foot straightedge for the full length of each line on a 50-foot grid.

b. Grade. The grade and crown shall be measured on a 50-foot grid and shall be within +0 and -1/2 inch of the specified grade.

209-3.9 ACCEPTANCE SAMPLING AND TESTING. Crushed aggregate base course shall be accepted for density and thickness on an area basis. Two tests shall be made for density and thickness for each 1200 square yds. Sampling locations will be determined on a random basis per ASTM D3665

a. Density. The Contractor's laboratory shall perform all density tests in the RPR's presence and provide the test results upon completion to the RPR for acceptance.

Each area shall be accepted for density when the field density is at least 100% of the maximum density of laboratory specimens compacted and tested per ASTM 1557. The in-place field density shall be determined per ASTM D6938 using Procedure A, the direct transmission method, and ASTM D6938 shall be used to determine the moisture content of the material. The machine shall be calibrated in accordance with ASTM D6938. If the specified density is not attained, the area represented by the failed test must be reworked and/or recompacted and two additional random tests made. This procedure shall be followed until the specified density is reached. Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

b. Thickness. Depth tests shall be made by test holes at least 3 inches in diameter that extend through the base. The thickness of the base course shall be within +0 and -1/2 inch of the specified thickness as determined by depth tests taken by the Contractor in the presence of the

Exhibit 1

RPR for each area. Where the thickness is deficient by more than 1/2-inch, the Contractor shall correct such areas at no additional cost by scarifying to a depth of at least 3 inches, adding new material of proper gradation, and the material shall be blended and recompacted to grade. The Contractor shall replace, at his expense, base material where depth tests have been taken.

METHOD OF MEASUREMENT

209-4.1 The quantity of crushed aggregate base course will be determined by measurement of the number of cubic yards of material actually constructed and accepted by the RPR as complying with the plans and specifications. Base materials shall not be included in any other excavation quantities.

BASIS OF PAYMENT

209-5.1 Payment shall be made at the contract unit price per cubic yard for crushed aggregate base course. This price shall be full compensation for furnishing all materials, for preparing and placing these materials, and for all labor, equipment tools, and incidentals necessary to complete the item.

Payment will be made under:

Item P-209a	Crushed Aggregate Base Course - per cubic yard

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM C29	Standard Test Method for Bulk Density ("Unit Weight") and Voids in Aggregate
ASTM C88	Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
ASTM C117	Standard Test Method for Materials Finer than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C131	Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C142	Standard Test Method for Clay Lumps and Friable Particles in Aggregates
ASTM D75	Standard Practice for Sampling Aggregates
ASTM D698	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3))
ASTM D1556	Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D1557	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 (2700 kN-m/m^3))
ASTM D2167	Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method
ASTM D2419	Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate
ASTM D3665	Standard Practice for Random Sampling of Construction Materials

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ASTM D4318	Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D4491	Standard Test Methods for Water Permeability of Geotextiles by Permittivity
ASTM D4643	Standard Test Method for Determination of Water Content of Soil and Rock by Microwave Oven Heating
ASTM D4751	Standard Test Methods for Determining Apparent Opening Size of a Geotextile
ASTM D4791	Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate
ASTM D5821	Standard Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate
ASTM D6938	Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
ASTM D7928	Standard Test Method for Particle-Size Distribution (Gradation) of Fine-Grained Soils Using the Sedimentation (Hydrometer) Analysis
	American Association of State Highway and Transportation Officials (AASHTO)
M288	Standard Specification for Geosynthetic Specification for Highway Applications

****END OF ITEM P-209****

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ITEM P-401 ASPHALT MIX PAVEMENT

DESCRIPTION

401-1.1 This item shall consist of pavement courses composed of mineral aggregate and asphalt binder mixed in a central mixing plant and placed on a prepared base or stabilized course in accordance with these specifications and shall conform to the lines, grades, thicknesses, and typical cross-sections shown on the plans. Each course shall be constructed to the depth, typical section, and elevation required by the plans and shall be rolled, finished, and approved before the placement of the next course.

MATERIALS

401-2.1 AGGREGATE. Aggregates shall consist of crushed stone, crushed gravel, crushed slag, screenings, natural sand, and mineral filler, as required. The aggregates should have no known history of detrimental pavement staining due to ferrous sulfides, such as pyrite. Coarse aggregate is the material retained on the No. 4 (4.75 mm) sieve. Fine aggregate is the material passing the No. 4 (4.75 mm) sieve.

a. Coarse aggregate. Coarse aggregate shall consist of sound, tough, durable particles, free from films of matter that would prevent thorough coating and bonding with the asphalt material and free from organic matter and other deleterious substances. Coarse aggregate material requirements are given in the table below.

Coarse Aggregate Material Requirements

Material Test	Requirement	Standard
Resistance to Degradation	Loss: 40% maximum	ASTM C131
Soundness of Aggregates by Use of Sodium Sulfate **or** Magnesium Sulfate	Loss after 5 cycles: 12% maximum using Sodium sulfate - or - 18% maximum using magnesium sulfate	ASTM C88
Clay lumps and friable particles	1.0% maximum	ASTM C142
Percentage of Fractured Particles	For pavements designed for aircraft gross weights of 60,000 pounds (27200 kg) or more: Minimum 75% by weight of particles with at least two fractured faces and 85% with at least one fractured face[1]	ASTM D5821
Flat, Elongated, or Flat and Elongated Particles	8% maximum, by weight, of flat, elongated, or flat and elongated particles at 5:1 [2]	ASTM D4791
Bulk density of slag [3]	Weigh not less than 70 pounds per cubic foot (1.12 Mg/cubic meter)	ASTM C29.

[1] The area of each face shall be equal to at least 75% of the smallest mid-sectional area of the piece. When two fractured faces are contiguous, the angle between the planes of fractures shall be at least 30 degrees to count as two fractured faces.

[2] A flat particle is one having a ratio of width to thickness greater than five (5); an elongated particle is one having a ratio of length to width greater than five (5).

[3] Only required if slag is specified.

b. Fine aggregate. Fine aggregate shall consist of clean, sound, tough, durable, angular shaped particles produced by crushing stone, slag, or gravel and shall be free from coatings of clay, silt, or other objectionable matter. Natural (non-manufactured) sand may be used to obtain the

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gradation of the fine aggregate blend or to improve the workability of the mix. Fine aggregate material requirements are listed in the table below.

Fine Aggregate Material Requirements

Material Test	Requirement	Standard
Liquid limit	25 maximum	ASTM D4318
Plasticity Index	4 maximum	ASTM D4318
Soundness of Aggregates by Use of Sodium Sulfate **or** Magnesium Sulfate	Loss after 5 cycles: 10% maximum using Sodium sulfate - or - 15% maximum using magnesium sulfate	ASTM C88
Clay lumps and friable particles	1.0% maximum	ASTM C142
Sand equivalent	45 minimum	ASTM D2419
Natural Sand	0% to 15% maximum by weight of total aggregate	ASTM D1073

c. Sampling. ASTM D75 shall be used in sampling coarse and fine aggregate.

401-2.2 MINERAL FILLER. Mineral filler (baghouse fines) may be added in addition to material naturally present in the aggregate. Mineral filler shall meet the requirements of ASTM D242.

Mineral Filler Requirements

Material Test	Requirement	Standard
Plasticity Index	4 maximum	ASTM D4318

401-2.3 ASPHALT BINDER. Asphalt binder shall conform to ASTM D6373 Performance Grade (PG) **70-10**.

401-2.4 ANTI-STRIPPING AGENT. Any anti-stripping agent or additive (anti-strip) shall be heat stable and shall not change the asphalt binder grade beyond specifications. Anti-strip shall be an approved material of the Department of Transportation of the State in which the project is located.

COMPOSITION

401-3.1 COMPOSITION OF MIXTURE(S). The asphalt mix shall be composed of a mixture of aggregates, filler and anti-strip agent if required, and asphalt binder. The aggregate fractions shall be sized, handled in separate size groups, and combined in such proportions that the resulting mixture meets the grading requirements of the job mix formula (JMF).

401-3.2 JOB MIX FORMULA (JMF) LABORATORY. The laboratory used to develop the JMF shall possess a current certificate of accreditation, listing D3666 from a national accrediting authority and all test methods required for developing the JMF; and be listed on the accrediting authority's website. A copy of the laboratory's current accreditation and accredited test methods shall be submitted to the Resident Project Representative (RPR) prior to start of construction.

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401-3.3 JOB MIX FORMULA (JMF). No asphalt mixture shall be placed until an acceptable mix design has been submitted to the RPR for review and accepted in writing. The RPR's review shall not relieve the Contractor of the responsibility to select and proportion the materials to comply with this section.

When the project requires asphalt mixtures of differing aggregate gradations and/or binders, a separate JMF shall be submitted for each mix. Add anti-stripping agent to meet tensile strength requirements.

The JMF shall be prepared by an accredited laboratory that meets the requirements of paragraph 401-3.2. The asphalt mixture shall be designed using procedures contained in Asphalt Institute MS-2 Mix Design Manual, 7th Edition. Samples shall be prepared and compacted using a Marshall compactor in accordance with ASTM D6926.

Should a change in sources of materials be made, a new JMF must be submitted to the RPR for review and accepted in writing before the new material is used. After the initial production JMF has been approved by the RPR and a new or modified JMF is required for whatever reason, the subsequent cost of the new or modified JMF, including a new control strip when required by the RPR, will be borne by the Contractor.

The RPR may request samples at any time for testing, prior to and during production, to verify the quality of the materials and to ensure conformance with the applicable specifications.

The JMF shall be submitted in writing by the Contractor at least 30 days prior to the start of paving operations. The JMF shall be developed within the same construction season using aggregates proposed for project use.

The JMF shall be dated, and stamped or sealed by the responsible professional Engineer of the laboratory and shall include the following items as a minimum:

- Manufacturer's Certificate of Analysis (COA) for the asphalt binder used in the JMF in accordance with paragraph 401-2.3. Certificate of asphalt performance grade is with modifier already added, if used and must indicate compliance with ASTM D6373. For plant modified asphalt binder, certified test report indicating grade certification of modified asphalt binder.

- Manufacturer's Certificate of Analysis (COA) for the anti-stripping agent if used in the JMF in accordance with paragraph 401-2.4.

- Certified material test reports for the course and fine aggregate and mineral filler in accordance with paragraphs 401-2.1.

- Percent passing each sieve size for individual gradation of each aggregate cold feed and/or hot bin; percent by weight of each cold feed and/or hot bin used; and the total combined gradation in the JMF.

- Specific Gravity and absorption of each coarse and fine aggregate.

- Percent natural sand.

- Percent fractured faces.

- Percent by weight of flat particles, elongated particles, and flat and elongated particles (and criteria).

- Percent of asphalt.

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- Number of blows.
- Laboratory mixing and compaction temperatures.
- Supplier-recommended field mixing and compaction temperatures.
- Plot of the combined gradation on a 0.45 power gradation curve.
- Graphical plots of air voids, voids in the mineral aggregate (VMA), and unit weight versus asphalt content. To achieve minimum VMA during production, the mix design needs to account for material breakdown during production.
- Tensile Strength Ratio (TSR).
- Type and amount of Anti-strip agent when used.
- Asphalt Pavement Analyzer (APA) results.
- Date the JMF was developed. Mix designs that are not dated or which are from a prior construction season shall not be accepted.

Table 1. Asphalt Design Criteria

Test Property	Value	Test Method
Number of blows	75	
Air voids (%)	3.5	ASTM D3203
Percent voids in mineral aggregate (VMA), minimum	See Table 2	ASTM D6995
Tensile Strength Ratio (TSR)[1]	not less than 80 at a saturation of 70-80%	ASTM D4867
Asphalt Pavement Analyzer (APA)[2]	Less than 10 mm @ 4000 passes	AASHTO T340 at 250 psi hose pressure at 64°C test temperature

[1] Test specimens for TSR shall be compacted at 7 ± 1.0 % air voids. In areas subject to freeze-thaw, use freeze-thaw conditioning in lieu of moisture conditioning per ASTM D4867.

[2] AASHTO T340 at 100 psi hose pressure at 64°C test temperature may be used in the interim. If this method is used the required Value shall be less than 5 mm @ 8000 passes

[3] Where APA not available, use Hamburg Wheel test (AASHTO T-324) 10mm @ 20,000 passes at 50 degree C.

The mineral aggregate shall be of such size that the percentage composition by weight, as determined by laboratory sieves, will conform to the gradation or gradations specified in Table 2 when tested in accordance with ASTM C136 and ASTM C117.

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The gradations in Table 2 represent the limits that shall determine the suitability of aggregate for use from the sources of supply; be well graded from coarse to fine and shall not vary from the low limit on one sieve to the high limit on the adjacent sieve, or vice versa.

Table 2. Aggregate - Asphalt Pavements

Sieve Size	Percentage by Weight Passing Sieve
1 inch (25.0 mm)	*
3/4 inch (19.0 mm)	100
1/2 inch (12.5 mm)	90-100
3/8 inch (9.5 mm)	72-88
No. 4 (4.75 mm)	53-73
No. 8 (2.36 mm)	38-60
No. 16 (1.18 mm)	26-48
No. 30 (600 μm)	18-38
No. 50 (300 μm)	11-27
No. 100 (150 μm)	6-18
No. 200 (75 μm)	3-6
Minimum Voids in Mineral Aggregate (VMA)[1]	15.0
Asphalt Percent:	
Stone or gravel	5.0-7.5
Slag	6.5-9.5
Recommended Minimum Construction Lift Thickness	2 inch

[1]To achieve minimum VMA during production, the mix design needs to account for material breakdown during production.

The aggregate gradations shown are based on aggregates of uniform specific gravity. The percentages passing the various sieves shall be corrected when aggregates of varying specific gravities are used, as indicated in the Asphalt Institute MS-2 Mix Design Manual, 7th Edition.

401-3.4 RECLAIMED ASPHALT PAVEMENT (RAP). RAP shall not be used.

401-3.5 CONTROL STRIP. Full production shall not begin until an acceptable control strip has been constructed and accepted in writing by the RPR. The Contractor shall prepare and place a quantity of asphalt according to the JMF. The underlying grade or pavement structure upon which the control strip is to be constructed shall be the same as the remainder of the course represented by the control strip.

The Contractor will not be allowed to place the control strip until the Contractor quality control program (CQCP), showing conformance with the requirements of paragraph 401-5.1, has been accepted, in writing, by the RPR.

The control strip will consist of at least 250 tons or 1/2 sublot, whichever is greater. The control strip shall be placed in two lanes of the same width and depth to be used in production with a longitudinal cold joint. The cold joint must be cut back in accordance with paragraph 401-4.14 using the same procedure that will be used

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during production. The cold joint for the control strip will be an exposed construction joint at least four (4) hours old or when the mat has cooled to less than 160°F (71°C). The equipment used in construction of the control strip shall be the same type, configuration and weight to be used on the project.

The control strip will be considered acceptable by the RPR if the gradation, asphalt content, and VMA are within the action limits specified in paragraph 401-5.5a; and Mat density greater than or equal to 94.5%, air voids 3.5% +/- 1%, and joint density greater than or equal to 92.5%.

If the control strip is unacceptable, necessary adjustments to the JMF, plant operation, placing procedures, and/or rolling procedures shall be made and another control strip shall be placed. Unacceptable control strips shall be removed at the Contractor's expense.

The control strip will be considered one lot for payment based upon the average of a minimum of 3 samples (no sublots required for control strip). Payment will only be made for an acceptable control strip in accordance with paragraph 401-8.1 using a lot pay factor equal to 100.

CONSTRUCTION METHODS

401-4.1 WEATHER LIMITATIONS. The asphalt shall not be placed upon a wet surface or when the surface temperature of the underlying course is less than specified in Table 4. The temperature requirements may be waived by the RPR, if requested; however, all other requirements including compaction shall be met.

Table 4. Surface Temperature Limitations of Underlying Course

Mat Thickness	Base Temperature (Minimum)	
	°F	°C
3 inches (7.5 cm) or greater	40 [1]	4
Greater than 2 inches (50 mm) but less than 3 inches (7.5 cm)	45	7

401-4.2 ASPHALT PLANT. Plants used for the preparation of asphalt shall conform to the requirements of American Association of State Highway and Transportation Officials (AASHTO) M156 including the following items.

a. **Inspection of plant.** The RPR, or RPR's authorized representative, shall have access, at all times, to all areas of the plant for checking adequacy of equipment; inspecting operation of the plant: verifying weights, proportions, and material properties; and checking the temperatures maintained in the preparation of the mixtures.

b. **Storage bins and surge bins.** The asphalt mixture stored in storage and/or surge bins shall meet the same requirements as asphalt mixture loaded directly into trucks. Asphalt mixture shall not be stored in storage and/or surge bins for a period greater than twelve (12) hours. If the RPR determines there is an excessive heat loss, segregation, or oxidation of the asphalt mixture due to temporary storage, temporary storage shall not be allowed.

401-4.3 AGGREGATE STOCKPILE MANAGEMENT. Aggregate stockpiles shall be constructed in a manner that prevents segregation and intermixing of deleterious materials. Aggregates from different sources shall be stockpiled, weighed and batched separately at the asphalt batch plant. Aggregates that have become segregated or mixed with earth or foreign material shall not be used.

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A continuous supply of materials shall be provided to the work to ensure continuous placement.

401-4.4 HAULING EQUIPMENT. Trucks used for hauling asphalt shall have tight, clean, and smooth metal beds. To prevent the asphalt from sticking to the truck beds, the truck beds shall be lightly coated with a minimum amount of paraffin oil, lime solution, or other material approved by the RPR. Petroleum products shall not be used for coating truck beds. Each truck shall have a suitable cover to protect the mixture from adverse weather. When necessary, to ensure that the mixture will be delivered to the site at the specified temperature, truck beds shall be insulated or heated and covers shall be securely fastened.

401-4.4.1 MATERIAL TRANSFER VEHICLE (MTV). Material transfer vehicles used to transfer the material from the hauling equipment to the paver, shall use a self-propelled, material transfer vehicle with a swing conveyor that can deliver material to the paver without making contact with the paver. The MTV shall be able to move back and forth between the hauling equipment and the paver providing material transfer to the paver, while allowing the paver to operate at a constant speed. The Material Transfer Vehicle will have remixing and storage capability to prevent physical and thermal segregation.

401-4.5 ASPHALT PAVERS. Asphalt pavers shall be self-propelled with an activated heated screed, capable of spreading and finishing courses of asphalt that will meet the specified thickness, smoothness, and grade. The paver shall have sufficient power to propel itself and the hauling equipment without adversely affecting the finished surface. The asphalt paver shall be equipped with a control system capable of automatically maintaining the specified screed grade and elevation.

If the spreading and finishing equipment in use leaves tracks or indented areas, or produces other blemishes in the pavement that are not satisfactorily corrected by the scheduled operations, the use of such equipment shall be discontinued.

The paver shall be capable of paving to a minimum width specified in paragraph 401-4.12.

401-4.6 ROLLERS. The number, type, and weight of rollers shall be sufficient to compact the asphalt to the required density while it is still in a workable condition without crushing of the aggregate, depressions or other damage to the pavement surface. Rollers shall be in good condition, clean, and capable of operating at slow speeds to avoid displacement of the asphalt. All rollers shall be specifically designed and suitable for compacting asphalt concrete and shall be properly used. Rollers that impair the stability of any layer of a pavement structure or underlying soils shall not be used.

401-4.7 DENSITY DEVICE. The Contractor shall have on site a density gauge during all paving operations in order to assist in the determination of the optimum rolling pattern, type of roller and frequencies, as well as to monitor the effect of the rolling operations during production paving. The Contractor shall supply a qualified technician during all paving operations to calibrate the gauge and obtain accurate density readings for all new asphalt. These densities shall be supplied to the RPR upon request at any time during construction. No separate payment will be made for supplying the density gauge and technician.

401-4.8 PREPARATION OF ASPHALT BINDER. The asphalt binder shall be heated in a manner that will avoid local overheating and provide a continuous supply of the asphalt binder to the mixer at a uniform temperature. The temperature of unmodified asphalt binder delivered to the mixer shall be sufficient to provide a suitable viscosity for adequate coating of the aggregate particles, but shall not exceed 325°F (160°C) when added to the aggregate. The temperature of modified asphalt binder shall be no more than 350°F (175°C) when added to the aggregate.

401-4.9 PREPARATION OF MINERAL AGGREGATE. The aggregate for the asphalt shall be heated and dried. The maximum temperature and rate of heating shall be such that no damage occurs to the aggregates. The temperature of the aggregate and mineral filler shall not exceed 350°F (175°C) when the asphalt binder is

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added. Particular care shall be taken that aggregates high in calcium or magnesium content are not damaged by overheating. The temperature shall not be lower than is required to obtain complete coating and uniform distribution on the aggregate particles and to provide a mixture of satisfactory workability.

401-4.10 PREPARATION OF ASPHALT MIXTURE. The aggregates and the asphalt binder shall be weighed or metered and mixed in the amount specified by the JMF. The combined materials shall be mixed until the aggregate obtains a uniform coating of asphalt binder and is thoroughly distributed throughout the mixture. Wet mixing time shall be the shortest time that will produce a satisfactory mixture, but not less than 25 seconds for batch plants. The wet mixing time for all plants shall be established by the Contractor, based on the procedure for determining the percentage of coated particles described in ASTM D2489, for each individual plant and for each type of aggregate used. The wet mixing time will be set to achieve 95% of coated particles. For continuous mix plants, the minimum mixing time shall be determined by dividing the weight of its contents at operating level by the weight of the mixture delivered per second by the mixer. The moisture content of all asphalt upon discharge shall not exceed 0.5%.

401-4.11 APPLICATION OF PRIME AND TACK COAT. Immediately before placing the asphalt mixture, the underlying course shall be cleaned of all dust and debris.

A tack coat shall be applied in accordance with Item P-603 to all vertical and horizontal asphalt and concrete surfaces prior to placement of the first and each subsequent lift of asphalt mixture.

401-4.12 LAYDOWN PLAN, TRANSPORTING, PLACING, AND FINISHING. Prior to the placement of the asphalt, the Contractor shall prepare a laydown plan with the sequence of paving lanes and width to minimize the number of cold joints; the location of any temporary ramps; laydown temperature; and estimated time of completion for each portion of the work (milling, paving, rolling, cooling, etc.). The laydown plan and any modifications shall be approved by the RPR.

Deliveries shall be scheduled so that placing and compacting of asphalt is uniform with minimum stopping and starting of the paver. Hauling over freshly placed material shall not be permitted until the material has been compacted, as specified, and allowed to cool to approximately ambient temperature. The Contractor, at their expense, shall be responsible for repair of any damage to the pavement caused by hauling operations.

Contractor shall survey each lift of asphalt surface course and certify to RPR that every lot of each lift meets the grade tolerances of paragraph 401-6.2d before the next lift can be placed.

Edges of existing asphalt pavement abutting the new work shall be saw cut and the cut off material and laitance removed. Apply a tack coat in accordance with P-603 before new asphalt material is placed against it.

The speed of the paver shall be regulated to eliminate pulling and tearing of the asphalt mat. Placement of the asphalt mix shall begin along the centerline of a crowned section or on the high side of areas with a one way slope unless shown otherwise on the laydown plan as accepted by the RPR. The asphalt mix shall be placed in consecutive adjacent lanes having a minimum width of 10 feet except where edge lanes require less width to complete the area. Additional screed sections attached to widen the paver to meet the minimum lane width requirements must include additional auger sections to move the asphalt mixture uniformly along the screed extension.

The longitudinal joint in one course shall offset the longitudinal joint in the course immediately below by at least one foot; however, the joint in the surface top course shall be at the centerline of crowned pavements. Transverse joints in one course shall be offset by at least 10 feet from transverse joints in the previous course. Transverse joints in adjacent lanes shall be offset a minimum of 10 feet. On areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impractical, the asphalt may be spread and luted by hand tools.

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The RPR may at any time, reject any batch of asphalt, on the truck or placed in the mat, which is rendered unfit for use due to contamination, segregation, incomplete coating of aggregate, or overheated asphalt mixture. Such rejection may be based on only visual inspection or temperature measurements. In the event of such rejection, the Contractor may take a representative sample of the rejected material in the presence of the RPR, and if it can be demonstrated in the laboratory, in the presence of the RPR, that such material was erroneously rejected, payment will be made for the material at the contract unit price.

Areas of segregation in the surface course, as determined by the RPR, shall be removed and replaced at the Contractor's expense. The area shall be removed by saw cutting and milling a minimum of the construction lift thickness as specified in paragraph 401-3.3, Table 2 for the approved mix design. The area to be removed and replaced shall be a minimum width of the paver and a minimum of 10 feet long.

401-4.13 COMPACTION OF ASPHALT MIXTURE. After placing, the asphalt mixture shall be thoroughly and uniformly compacted by self-propelled rollers. The surface shall be compacted as soon as possible when the asphalt has attained sufficient stability so that the rolling does not cause undue displacement, cracking or shoving. The sequence of rolling operations and the type of rollers used shall be at the discretion of the Contractor. The speed of the roller shall, at all times, be sufficiently slow to avoid displacement of the hot mixture and be effective in compaction. Any surface defects and/or displacement occurring as a result of the roller, or from any other cause, shall be corrected at the Contractor's expense.

Sufficient rollers shall be furnished to handle the output of the plant. Rolling shall continue until the surface is of uniform texture, true to grade and cross-section, and the required field density is obtained. To prevent adhesion of the asphalt to the roller, the wheels shall be equipped with a scraper and kept moistened with water as necessary.

In areas not accessible to the roller, the mixture shall be thoroughly compacted with approved power tampers.

Any asphalt that becomes loose and broken, mixed with dirt, contains check-cracking, or in any way defective shall be removed and replaced with fresh hot mixture and immediately compacted to conform to the surrounding area. This work shall be done at the Contractor's expense. Skin patching shall not be allowed.

401-4.14 JOINTS. The formation of all joints shall be made to ensure a continuous bond between the courses and obtain the required density. All joints shall have the same texture as other sections of the course and meet the requirements for smoothness and grade.

The roller shall not pass over the unprotected end of the freshly laid asphalt except when necessary to form a transverse joint. When necessary to form a transverse joint, it shall be made by means of placing a bulkhead or by tapering the course. The tapered edge shall be cut back to its full depth and width on a straight line to expose a vertical face prior to placing the adjacent lane. In both methods, all contact surfaces shall be coated with an asphalt tack coat before placing any fresh asphalt against the joint.

Longitudinal joints which have been left exposed for more than four (4) hours; the surface temperature has cooled to less than 175°F (80°C); or are irregular, damaged, uncompacted or otherwise defective shall be cut back with a cutting wheel or pavement saw a maximum of 3 inches (75 mm) to expose a clean, sound, uniform vertical surface for the full depth of the course. All cutback material and any laitance produced from cutting joints shall be removed from the project. Asphalt tack coat in accordance with P-603 shall be applied to the clean, dry joint prior to placing any additional fresh asphalt against the joint. The cost of this work shall be considered incidental to the cost of the asphalt.

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401-4.15 SAW-CUT GROOVING. Saw-cut grooves shall be provided at locations shown on the plans and as specified in Item P-621.

401-4.16 DIAMOND GRINDING. Diamond grinding shall be completed prior to pavement grooving. Diamond grinding shall be accomplished by sawing with saw blades impregnated with industrial diamond abrasive.

Diamond grinding shall be performed with a machine designed specifically for diamond grinding capable of cutting a path at least 3 feet wide. The saw blades shall be 1/8-inch wide with a sufficient number of blades to create grooves between 0.090 and 0.130 inches wide; and peaks and ridges approximately 1/32 inch higher than the bottom of the grinding cut. The actual number of blades will be determined by the Contractor and depend on the hardness of the aggregate. Equipment or grinding procedures that cause ravels, aggregate fractures, spalls or disturbance to the pavement will not be permitted. Contractor shall demonstrate to the RPR that the grinding equipment will produce satisfactory results prior to making corrections to surfaces. Grinding will be tapered in all directions to provide smooth transitions to areas not requiring grinding. The slurry resulting from the grinding operation shall be continuously removed and the pavement left in a clean condition. The Contractor shall apply a surface treatment per P-608 to all areas that have been subject to grinding.

401-4.17 NIGHTTIME PAVING REQUIREMENTS. The Contractor shall provide adequate lighting during any nighttime construction. A lighting plan shall be submitted by the Contractor and approved by the RPR prior to the start of any nighttime work. All work shall be in accordance with the approved CSPP and lighting plan.

CONTRACTOR QUALITY CONTROL (CQC)

401-5.1 GENERAL. The Contractor shall develop a Contractor Quality Control Program (CQCP) in accordance with Item C-100. No partial payment will be made for materials without an approved CQCP.

401-5.2 CONTRACTOR QUALITY CONTROL (QC) FACILITIES. The Contractor shall provide or contract for testing facilities in accordance with Item C-100. The RPR shall be permitted unrestricted access to inspect the Contractor's QC facilities and witness QC activities. The RPR will advise the Contractor in writing of any noted deficiencies concerning the QC facility, equipment, supplies, or testing personnel and procedures. When the deficiencies are serious enough to be adversely affecting the test results, the incorporation of the materials into the work shall be suspended immediately and will not be permitted to resume until the deficiencies are satisfactorily corrected.

401-5.3 CONTRACTOR QC TESTING. The Contractor shall perform all QC tests necessary to control the production and construction processes applicable to these specifications and as set forth in the approved CQCP. The testing program shall include, but not necessarily be limited to, tests for the control of asphalt content, aggregate gradation, temperatures, aggregate moisture, field compaction, and surface smoothness. A QC Testing Plan shall be developed as part of the CQCP.

a. **Asphalt content.** A minimum of two tests shall be performed per day in accordance with ASTM D6307 or ASTM D2172 for determination of asphalt content. When using ASTM D6307, the correction factor shall be determined as part of the first test performed at the beginning of plant production; and as part of every tenth test performed thereafter. The asphalt content for the day will be determined by averaging the test results.

b. **Gradation.** Aggregate gradations shall be determined a minimum of twice per day from mechanical analysis of extracted aggregate in accordance with ASTM D5444, ASTM C136, and ASTM C117.

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c. Moisture content of aggregate. The moisture content of aggregate used for production shall be determined a minimum of once per day in accordance with ASTM C566.

d. Moisture content of asphalt. The moisture content shall be determined once per day in accordance with AASHTO T329 or ASTM D1461.

e. Temperatures. Temperatures shall be checked, at least four times per day, at necessary locations to determine the temperatures of the dryer, the asphalt binder in the storage tank, the asphalt at the plant, and the asphalt at the job site.

f. In-place density monitoring. The Contractor shall conduct any necessary testing to ensure that the specified density is being achieved. A nuclear gauge may be used to monitor the pavement density in accordance with ASTM D2950.

g. Smoothness for Contractor Quality Control.

The Contractor shall perform smoothness testing in transverse and longitudinal directions daily to verify that the construction processes are producing pavement with variances less than ¼ inch in 12 feet, identifying areas that may pond water which could lead to hydroplaning of aircraft. If the smoothness criteria is not met, appropriate changes and corrections to the construction process shall be made by the Contractor before construction continues

The Contractor may use a 12-foot "straightedge, a rolling inclinometer meeting the requirements of ASTM E2133 or rolling external reference device that can simulate a 12-foot straightedge approved by the RPR. Straight-edge testing shall start with one-half the length of the straightedge at the edge of pavement section being tested and then moved ahead one-half the length of the straightedge for each successive measurement. Testing shall be continuous across all joints. The surface irregularity shall be determined by placing the freestanding (unleveled) straightedge on the pavement surface and allowing it to rest upon the two highest spots covered by its length, and measuring the maximum gap between the straightedge and the pavement surface in the area between the two high points. If the rolling inclinometer or external reference device is used, the data may be evaluated using the FAA profile program, ProFAA or FHWA ProVal, using the 12-foot straightedge simulation function.

Smoothness readings shall not be made across grade changes or cross slope transitions. The transition between new and existing pavement shall be evaluated separately for conformance with the plans.

(1) Transverse measurements. Transverse measurements shall be taken for each day's production placed. Transverse measurements shall be taken perpendicular to the pavement centerline each 50 feet or more often as determined by the RPR. The joint between lanes shall be tested separately to facilitate smoothness between lanes.

(2) Longitudinal measurements. Longitudinal measurements shall be taken for each day's production placed. Longitudinal tests shall be parallel to the centerline of paving; at the center of paving lanes when widths of paving lanes are less than 20 feet; and at the third points of paving lanes when widths of paving lanes are 20 ft or greater. When placement abuts previously placed material the first measurement shall start with one half the length of the straight edge on the previously placed material.

Exhibit 1

Deviations on the final surface course in either the transverse or longitudinal direction that will trap water greater than 1/4 inch shall be corrected with diamond grinding per paragraph 401-4.16 or by removing and replacing the surface course to full depth. Grinding shall be tapered in all directions to provide smooth transitions to areas not requiring grinding. All areas in which diamond grinding has been performed shall be subject to the final pavement thickness tolerances specified in paragraph 401-6.1d(3). Areas that have been ground shall be sealed with a surface treatment in accordance with Item P-608. To avoid the surface treatment creating any conflict with runway or taxiway markings, it may be necessary to seal a larger area.

Control charts shall be kept to show area of each day's placement and the percentage of corrective grinding required. Corrections to production and placement shall be initiated when corrective grinding is required. If the Contractor's machines and/or methods produce significant areas that need corrective actions in excess of 10 percent of a day's production, production shall be stopped until corrective measures are implemented by the Contractor.

h. Grade. Grade shall be evaluated daily to allow adjustments to paving operations when grade measurements do not meet specifications. As a minimum, grade shall be evaluated prior to and after the placement of the first lift and after placement of the surface lift.

Measurements will be taken at appropriate gradelines (as a minimum at center and edges of paving lane) and longitudinal spacing as shown on cross-sections and plans. The final surface of the pavement will not vary from the gradeline elevations and cross-sections shown on the plans by more than 1/2 inch vertically. The documentation will be provided by the Contractor to the RPR within 24 hours.

Areas with humps or depressions that exceed grade or smoothness criteria and that retain water on the surface must be ground off provided the course thickness after grinding is not more than 1/2 inch less than the thickness specified on the plans. Grinding shall be in accordance with paragraph 401-4.16.

The Contractor shall repair low areas or areas that cannot be corrected by grinding by removal of deficient areas to the depth of the final course plus ½ inch and replacing with new material. Skin patching is not allowed.

401-5.4 SAMPLING. When directed by the RPR, the Contractor shall sample and test any material that appears inconsistent with similar material being sampled, unless such material is voluntarily removed and replaced or deficiencies corrected by the Contractor. All sampling shall be in accordance with standard procedures specified.

401-5.5 CONTROL CHARTS. The Contractor shall maintain linear control charts for both individual measurements and range (i.e. difference between highest and lowest measurements) for aggregate gradation, asphalt content, and VMA. The VMA for each day will be calculated and monitored by the QC laboratory.

Control charts shall be posted in a location satisfactory to the RPR and kept current. As a minimum, the control charts shall identify the project number, the contract item number, the test number, each test parameter, the Action and Suspension Limits applicable to each test parameter, and the Contractor's test results. The Contractor shall use the control charts as part of a process control system for identifying potential problems and assignable causes before they occur. If the Contractor's projected data during production indicates a problem and the Contractor is not taking satisfactory corrective action, the RPR may suspend production or acceptance of the material.

Exhibit 1

a. Individual measurements. Control charts for individual measurements shall be established to maintain process control within tolerance for aggregate gradation, asphalt content, and VMA. The control charts shall use the job mix formula target values as indicators of central tendency for the following test parameters with associated Action and Suspension Limits:

Control Chart Limits for Individual Measurements

Sieve	Action Limit	Suspension Limit
3/4 inch (19.0 mm)	±6%	±9%
1/2 inch (12.5 mm)	±6%	±9%
3/8 inch (9.5 mm)	±6%	±9%
No. 4 (4.75 mm)	±6%	±9%
No. 16 (1.18 mm)	±5%	±7.5%
No. 50 (300 µm)	±3%	±4.5%
No. 200 (75 µm)	±2%	±3%
Asphalt Content	±0.45%	±0.70%
Minimum VMA	-0.5%	-1.0%

b. Range. Control charts shall be established to control gradation process variability. The range shall be plotted as the difference between the two test results for each control parameter. The Suspension Limits specified below are based on a sample size of n = 2. Should the Contractor elect to perform more than two tests per lot, the Suspension Limits shall be adjusted by multiplying the Suspension Limit by 1.18 for n = 3 and by 1.27 for n = 4.

Control Chart Limits Based on Range

Sieve	Suspension Limit
1/2 inch (12.5 mm)	11%
3/8 inch (9.5 mm)	11%
No. 4 (4.75 mm)	11%
No. 16 (1.18 mm)	9%
No. 50 (300 µm)	6%
No. 200 (75 µm)	3.5%
Asphalt Content	0.8%

c. Corrective Action. The CQCP shall indicate that appropriate action shall be taken when the process is believed to be out of tolerance. The Plan shall contain rules to gauge when a process is out of control and detail what action will be taken to bring the process into control. As a minimum, a process shall be deemed out of control and production stopped and corrective action taken, if:

(1) One point falls outside the Suspension Limit line for individual measurements or range; or

(2) Two points in a row fall outside the Action Limit line for individual measurements.

Exhibit 1

401-5.6 QC REPORTS. The Contractor shall maintain records and shall submit reports of QC activities daily , in accordance with Item C-100.

MATERIAL ACCEPTANCE

401-6.1 ACCEPTANCE SAMPLING AND TESTING. Unless otherwise specified, all acceptance sampling and testing necessary to determine conformance with the requirements specified in this section will be performed by the RPR at no cost to the Contractor except that coring as required in this section shall be completed and paid for by the Contractor.

a. Quality assurance (QA) testing laboratory. The QA testing laboratory performing these acceptance tests will be accredited in accordance with ASTM D3666. The QA laboratory accreditation will be current and listed on the accrediting authority's website. All test methods required for acceptance sampling and testing will be listed on the lab accreditation.

b. Lot size. A standard lot will be equal to one day's production divided into approximately equal sublots of between 400 to 600 tons. When only one or two sublots are produced in a day's production, the sublots will be combined with the production lot from the previous or next day.

Where more than one plant is simultaneously producing asphalt for the job, the lot sizes will apply separately for each plant.

c. Asphalt air voids. Plant-produced asphalt will be tested for air voids on a sublot basis.

(1) Sampling. Material from each sublot shall be sampled in accordance with ASTM D3665. Samples shall be taken from material deposited into trucks at the plant or at the job site in accordance with ASTM D979. The sample of asphalt may be put in a covered metal tin and placed in an oven for not less than 30 minutes nor more than 60 minutes to maintain the material at or above the compaction temperature as specified in the JMF.

(2) Testing. Air voids will be determined for each sublot in accordance with ASTM D3203 for a set of three compacted specimens prepared in accordance with ASTM D6926.

d. In-place asphalt mat and joint density. Each sublot will be tested for in-place mat and joint density as a percentage of the theoretical maximum density (TMD).

(1) Sampling. The Contractor will cut minimum 5 inch diameter samples in accordance with ASTM D5361. The Contractor shall furnish all tools, labor, and materials for cleaning, and filling the cored pavement. Laitance produced by the coring operation shall be removed immediately after coring, and core holes shall be filled within one day after sampling in a manner acceptable to the RPR.

(2) Bond. Each lift of asphalt shall be bonded to the underlying layer. If cores reveal that the surface is not bonded, additional cores shall be taken as directed by the RPR to determine the extent of unbonded areas. Unbonded areas shall be removed by milling and replaced at no additional cost as directed by the RPR.

(3) Thickness. Thickness of each lift of surface course will be evaluated by the RPR for compliance to the requirements shown on the plans after any necessary corrections for grade. Measurements of thickness will be made using the cores extracted for each sublot for density measurement. The maximum allowable deficiency at any point will not be more than 1/4 inch less than the thickness indicated for the lift. Average thickness of lift, or combined

Exhibit 1

lifts, will not be less than the indicated thickness. Where the thickness tolerances are not met, the lot or sublot shall be corrected by the Contractor at his expense by removing the deficient area and replacing with new pavement. The Contractor, at his expense, may take additional cores as approved by the RPR to circumscribe the deficient area.

(4) **Mat density**. One core shall be taken from each sublot. Core locations will be determined by the RPR in accordance with ASTM D3665. Cores for mat density shall not be taken closer than one foot from a transverse or longitudinal joint. The bulk specific gravity of each cored sample will be determined in accordance with ASTM D2726. The percent compaction (density) of each sample will be determined by dividing the bulk specific gravity of each sublot sample by the TMD for that sublot.

(5) **Joint density**. One core centered over the longitudinal joint shall be taken for each sublot that has a longitudinal joint. Core locations will be determined by the RPR in accordance with ASTM D3665. The bulk specific gravity of each core sample will be determined in accordance with ASTM D2726. The percent compaction (density) of each sample will be determined by dividing the bulk specific gravity of each joint density sample by the average TMD for the lot. The TMD used to determine the joint density at joints formed between lots will be the lower of the average TMD values from the adjacent lots.

401-6.2 ACCEPTANCE CRITERIA.

a. **General.** Acceptance will be based on the implementation of the Contractor Quality Control Program (CQCP) and the following characteristics of the asphalt and completed pavements: air voids, mat density, joint density, and grade**.**

b. **Air Voids and Mat density.** Acceptance of each lot of plant produced material for mat density and air voids will be based on the percentage of material within specification limits (PWL). If the PWL of the lot equals or exceeds 90%, the lot will be acceptable. Acceptance and payment will be determined in accordance with paragraph 401-8.1.

c. **Joint density.** Acceptance of each lot of plant produced asphalt for joint density will be based on the PWL. If the PWL of the lot is equal to or exceeds 90%, the lot will be considered acceptable. If the PWL is less than 90%, the Contractor shall evaluate the reason and act accordingly. If the PWL is less than 80%, the Contractor shall cease operations and until the reason for poor compaction has been determined. If the PWL is less than 71%, the pay factor for the lot used to complete the joint will be reduced by five (5) percentage points. This lot pay factor reduction will be incorporated and evaluated in accordance with paragraph 401-8.1.

d. **Grade.** The final finished surface of the pavement shall be surveyed to verify that the grade elevations and cross-sections shown on the plans do not deviate more than 1/2 inch vertically.

Cross-sections of the pavement shall be taken at a minimum 50-foot longitudinal spacing and at all longitudinal grade breaks, and at start and end of each lane placed. Minimum cross-section grade points shall include grade at centerline, ± 10 feet of centerline, and edge of taxiway pavement.

The survey and documentation shall be stamped and signed by a licensed surveyor. Payment for sublots that do not meet grade for over 25% of the sublot shall not be more than 95%.

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e. Profilograph roughness for QA Acceptance. The final profilograph shall be the full length of the project to facilitate testing of roughness between lots. The Contractor, in the presence of the RPR shall perform a profilograph roughness test on the completed project with a profilograph meeting the requirements of ASTM E1274 or a Class I inertial profiler meeting ASTM E950. Data and results shall be provided within 48 hrs of profilograph roughness tests.

The pavement shall have an average profile index less than 15 inches per mile per 1/10 mile. The equipment shall utilize electronic recording and automatic computerized reduction of data to indicate "must grind" bumps and the Profile Index for the pavement using a 0.2-inch (5 mm) blanking band. The bump template must span one inch (25 mm) with an offset of 0.4 inches (10 mm). The profilograph must be calibrated prior to use and operated by a factory or State DOT approved, trained operator. Profilograms shall be recorded on a longitudinal scale of one inch (25 mm) equals 25 feet (7.5 m) and a vertical scale of one inch (25 mm) equals one inch (25 mm). Profilograph shall be performed one foot right and left of project centerline and 15 feet (4.5 m) right and left of project centerline. Any areas that indicate "must grind" shall be corrected with diamond grinding per paragraph 401-4.16 or by removing and replacing full depth of surface course. as directed by the RPR. Where corrections are necessary, a second profilograph run shall be performed to verify that the corrections produced an average profile index of 15 inches per mile per 1/10 mile or less.

401-6.3 PERCENTAGE OF MATERIAL WITHIN SPECIFICATION LIMITS (PWL). The PWL will be determined in accordance with procedures specified in Item C-110. The specification tolerance limits (L) for lower and (U) for upper are contained in Table 5.

Table 5. Acceptance Limits for Air Voids and Density

Test Property	Pavements Specification Tolerance Limits	
	L	**U**
Air Voids Total Mix (%)	2.0	5.0
Surface Course Mat Density (%)	92.8	-
Base Course Mat Density (%)	92.0	-
Joint density (%)	90.5	--

a. Outliers. All individual tests for mat density and air voids will be checked for outliers (test criterion) in accordance with ASTM E178, at a significance level of 5%. Outliers will be discarded, and the PWL will be determined using the remaining test values. The criteria in Table 5 is based on production processes which have a variability with the following standard deviations: Surface Course Mat Density (%), 1.30; Base Course Mat Density (%), 1.55; Joint Density (%), 1.55.

The Contractor should note that (1) 90 PWL is achieved when consistently producing a surface course with an average mat density of at least 94.5% with 1.30% or less variability, (2) 90 PWL is achieved when consistently producing a base course with an average mat density of at least 94.0% with 1.55% or less variability, and (3) 90 PWL is achieved when consistently producing joints with an average joint density of at least 92.5% with 1.55% or less variability.

401-6.4 RESAMPLING PAVEMENT FOR MAT DENSITY.

Exhibit 1

a. General. Resampling of a lot of pavement will only be allowed for mat density, and then, only if the Contractor requests same, in writing, within 48 hours after receiving the written test results from the RPR. A retest will consist of all the sampling and testing procedures contained in paragraphs 401-6.1d and 401-6.2b. Only one resampling per lot will be permitted.

(1) A redefined PWL will be calculated for the resampled lot. The number of tests used to calculate the redefined PWL will include the initial tests made for that lot plus the retests.

(2) The cost for resampling and retesting shall be borne by the Contractor.

b. Payment for resampled lots. The redefined PWL for a resampled lot will be used to calculate the payment for that lot in accordance with Table 6.

c. Outliers. Check for outliers in accordance with ASTM E178, at a significance level of 5%.

401-6.5 LEVELING COURSE. The leveling course is the first variable thickness lift placed to correct surface irregularities prior to placement of subsequent courses. The leveling course shall meet the aggregate gradation in Table 2, paragraph 401-3.3. The leveling course shall meet the requirements of paragraph 401-3.3, 401-6.2b for air voids, but shall not be subject to the density requirements of paragraph 401-6.2b for mat density and 401-6.2c for joint density. The leveling course shall be compacted with the same effort used to achieve density of the control strip. The leveling course shall not exceed the lift thickness associated with each gradation in Table 2, paragraph 401-3.3.

METHOD OF MEASUREMENT

401-7.1 MEASUREMENT. Asphalt shall be measured by the number of tons of asphalt used in the accepted work. Batch weights or truck scale weights will be used to determine the basis for the tonnage.

BASIS OF PAYMENT

401-8.1 PAYMENT. Payment for a lot of asphalt meeting all acceptance criteria as specified in paragraph 401-6.2 shall be made based on results of tests for mat density and air voids. Payment for acceptable lots shall be adjusted according to paragraph 401-8.1c for mat density and air voids; and paragraph 401-6.2c for joint density, subject to the limitation that:

a. The total project payment for plant mix asphalt pavement shall not exceed 100 percent of the product of the contract unit price and the total number of tons (kg) of asphalt used in the accepted work.

b. The price shall be compensation for furnishing all materials, for all preparation, mixing, and placing of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

c. Basis of adjusted payment. The pay factor for each individual lot shall be calculated in accordance with Table 6. A pay factor shall be calculated for both mat density and air voids. The lot pay factor shall be the higher of the two values when calculations for both mat density and air voids are 100% or higher. The lot pay factor shall be the product of the two values when only one of the calculations for either mat density or air voids is 100% or higher. The lot pay factor shall be the lower of the two values when calculations for both mat density and air voids are less than 100%. If PWL for joint density is less than 71% then the lot pay factor shall be reduced by 5% but be no higher than 95%.

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For each lot accepted, the adjusted contract unit price shall be the product of the lot pay factor for the lot and the contract unit price. Payment shall be subject to the total project payment limitation specified in paragraph 401-8.1a. Payment in excess of 100% for accepted lots of asphalt shall be used to offset payment for accepted lots of asphalt pavement that achieve a lot pay factor less than 100%.

Payment for sublots which do not meet grade in accordance with paragraph 401-6.2d after correction for over 25% of the sublot shall be reduced by 5%.

Table 6. Price adjustment schedule[1]

Percentage of material within specification limits (PWL)	Lot pay factor (percent of contract unit price)
96 – 100	106
90 – 95	PWL + 10
75 – 89	0.5 PWL + 55
55 – 74	1.4 PWL – 12
Below 55	Reject [2]

[1] Although it is theoretically possible to achieve a pay factor of 106% for each lot, actual payment above 100% shall be subject to the total project payment limitation specified in paragraph 401-8.1a.

[2] The lot shall be removed and replaced. However, the RPR may decide to allow the rejected lot to remain. In that case, if the RPR and Contractor agree in writing that the lot shall not be removed, it shall be paid for at 50% of the contract unit price and the total project payment shall be reduced by the amount withheld for the rejected lot.

d. Profilograph Roughness. The Contractor will receive full payment when the profilograph average profile index is in accordance with paragraph 401-6.2e. When the final average profile index for the entire length of pavement does not exceed 15 inches per mile per 1/10 mile, payment will be made at the contract unit price for the completed pavement.

401-8.1 PAYMENT.

Payment will be made under:

Item P-401a Asphalt Surface Course (PG 70-10) - per ton

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM C29 Standard Test Method for Bulk Density ("Unit Weight") and Voids in Aggregate

ASTM C88 Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate

ASTM C117 Standard Test Method for Materials Finer than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing

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ASTM C127	Standard Test Method for Density, Relative Density (Specific Gravity) and Absorption of Coarse Aggregate
ASTM C131	Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C142	Standard Test Method for Clay Lumps and Friable Particles in Aggregates
ASTM C566	Standard Test Method for Total Evaporable Moisture Content of Aggregate by Drying
ASTM D75	Standard Practice for Sampling Aggregates
ASTM D242	Standard Specification for Mineral Filler for Bituminous Paving Mixtures
ASTM D946	Standard Specification for Penetration-Graded Asphalt Cement for Use in Pavement Construction
ASTM D979	Standard Practice for Sampling Asphalt Paving Mixtures
ASTM D1073	Standard Specification for Fine Aggregate for Asphalt Paving Mixtures
ASTM D1188	Standard Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Coated Samples
ASTM D2172	Standard Test Method for Quantitative Extraction of Bitumen from Asphalt Paving Mixtures
ASTM D1461	Standard Test Method for Moisture or Volatile Distillates in Asphalt Paving Mixtures
ASTM D2041	Standard Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
ASTM D2419	Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate
ASTM D2489	Standard Practice for Estimating Degree of Particle Coating of Bituminous-Aggregate Mixtures
ASTM D2726	Standard Test Method for Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures
ASTM D2950	Standard Test Method for Density of Bituminous Concrete in Place by Nuclear Methods
ASTM D3203	Standard Test Method for Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures
ASTM D3381	Standard Specification for Viscosity-Graded Asphalt Cement for Use in Pavement Construction
ASTM D3665	Standard Practice for Random Sampling of Construction Materials
ASTM D3666	Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials
ASTM D4318	Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D4552	Standard Practice for Classifying Hot-Mix Recycling Agents
ASTM D4791	Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate
ASTM D4867	Standard Test Method for Effect of Moisture on Asphalt Concrete Paving Mixtures
ASTM D5361	Standard Practice for Sampling Compacted Asphalt Mixtures for Laboratory Testing
ASTM D5444	Standard Test Method for Mechanical Size Analysis of Extracted Aggregate
ASTM D5821	Standard Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate
ASTM D6084	Standard Test Method for Elastic Recovery of Bituminous Materials by Ductilometer

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ASTM D6307	Standard Test Method for Asphalt Content of Hot Mix Asphalt by Ignition Method
ASTM D6373	Standard Specification for Performance Graded Asphalt Binder
ASTM D6752	Standard Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Automatic Vacuum Sealing Method
ASTM D6925	Standard Test Method for Preparation and Determination of the Relative Density of Hot Mix Asphalt (HMA) Specimens by Means of the SuperPave Gyratory Compactor.
ASTM D6926	Standard Practice for Preparation of Bituminous Specimens Using Marshall Apparatus
ASTM D6927	Standard Test Method for Marshall Stability and Flow of Bituminous Mixtures
ASTM D6995	Standard Test Method for Determining Field VMA based on the Maximum Specific Gravity of the Mix (Gmm)
ASTM E11	Standard Specification for Woven Wire Test Sieve Cloth and Test Sieves
ASTM E178	Standard Practice for Dealing with Outlying Observations
ASTM E1274	Standard Test Method for Measuring Pavement Roughness Using a Profilograph
ASTM E950	Standard Test Method for Measuring the Longitudinal Profile of Traveled Surfaces with an Accelerometer Established Inertial Profiling Reference
ASTM E2133	Standard Test Method for Using a Rolling Inclinometer to Measure Longitudinal and Transverse Profiles of a Traveled Surface

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO M156	Standard Specification for Requirements for Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures.
AASHTO T329	Standard Method of Test for Moisture Content of Hot Mix Asphalt (HMA) by Oven Method
AASHTO T324	Standard Method of Test for Hamburg Wheel-Track Testing of Compacted Asphalt Mixtures
AASHTO T 340	Standard Method of Test for Determining the Rutting Susceptibility of Hot Mix Asphalt (APA) Using the Asphalt Pavement Analyzer (APA)

ASPHALT INSTITUTE (AI)

Asphalt Institute Handbook MS-26, Asphalt Binder
Asphalt Institute MS-2 Mix Design Manual, 7th Edition
AI State Binder Specification Database

FEDERAL HIGHWAY ADMINISTRATION (FHWA)

Long Term Pavement Performance Binder Program

ADVISORY CIRCULARS (AC)

AC 150/5320-6	Airport Pavement Design and Evaluation

FAA ORDERS

5300.1	Modifications to Agency Airport Design, Construction, and Equipment Standards

SOFTWARE

FAARFIELD

****END OF ITEM P-401****

Exhibit 1

ITEM P-603 EMULSIFIED ASPHALT TACK COAT

DESCRIPTION

603-1.1 This item shall consist of preparing and treating an asphalt or concrete surface with asphalt material in accordance with these specifications and in reasonably close conformity to the lines shown on the plans.

MATERIALS

603-2.1 ASPHALT MATERIALS. The asphalt material shall be an emulsified asphalt as specified in ASTM D3628 as an asphalt application for tack coat appropriate to local conditions. The emulsified asphalt shall not be diluted. The Contractor shall provide a copy of the manufacturer's Certificate of Analysis (COA) for the asphalt material to the Resident Project Representative (RPR) before the asphalt material is applied for review and acceptance. The furnishing of COA for the asphalt material shall not be interpreted as a basis for final acceptance. The manufacturer's COA may be subject to verification by testing the material delivered for use on the project.

CONSTRUCTION METHODS

603-3.1 WEATHER LIMITATIONS. The tack coat shall be applied only when the existing surface is dry and the atmospheric temperature is 50°F (10°C) or above; the temperature has not been below 35°F (2°C) for the 12 hours prior to application; and when the weather is not foggy or rainy. The temperature requirements may be waived when directed by the RPR.

603-3.2 EQUIPMENT. The Contractor shall provide equipment for heating and applying the emulsified asphalt material. The emulsion shall be applied with a manufacturer-approved computer rate-controlled asphalt distributor. The equipment shall be in good working order and contain no contaminants or diluents in the tank. Spray bar tips must be clean, free of burrs, and of a size to maintain an even distribution of the emulsion. Any type of tip or pressure source is suitable that will maintain predetermined flow rates and constant pressure during the application process with application speeds under eight (8) miles per hour or seven hundred (700) feet per minute.

The equipment will be tested under pressure for leaks and to ensure proper set-up before use to verify truck set-up (via a test-shot area), including but not limited to, nozzle tip size appropriate for application, spray-bar height and pressure and pump speed, evidence of triple-overlap spray pattern, lack of leaks, and any other factors relevant to ensure the truck is in good working order before use.

The distributor truck shall be equipped with a minimum 12-foot spreader spray bar with individual nozzle control with computer-controlled application rates. The distributor truck shall have an easily accessible thermometer that constantly monitors the temperature of the emulsion, and have an operable mechanical tank gauge that can be used to cross-check the computer accuracy. If the distributor is not equipped with an operable quick shutoff valve, the prime operations shall be started and stopped on building paper.

The distributor truck shall be equipped to effectively heat and mix the material to the required temperature prior to application as required. Heating and mixing shall be done in accordance with the manufacturer's recommendations. Do not overheat or over mix the material.

The distributor shall be equipped with a hand sprayer.

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Asphalt distributors must be calibrated annually in accordance with ASTM D2995. The Contractor must furnish a current calibration certification for the asphalt distributor truck from any State or other agency as approved by the RPR.

A power broom and/or power blower suitable for cleaning the surfaces to which the asphalt tack coat is to be applied shall be provided.

603-3.3 Application of emulsified asphalt material. The emulsified asphalt shall not be diluted. Immediately before applying the emulsified asphalt tack coat, the full width of surface to be treated shall be swept with a power broom and/or power blower to remove all loose dirt and other objectionable material.

The emulsified asphalt material shall be uniformly applied with an asphalt distributor at the rates appropriate for the conditions and surface specified in the table below. The type of asphalt material and application rate shall be approved by the RPR prior to application.

Emulsified Asphalt

Surface Type	Residual Rate, gal/SY (L/square meter)	Emulsion Application Bar Rate, gal/SY (L/square meter)
New asphalt	0.02-0.05 (0.09-0.23)	0.03-0.07 (0.13-0.32)
Existing asphalt	0.04-0.07 (0.18-0.32)	0.06-0.11 (0.27-0.50)
Milled Surface	0.04-0.08 (0.18-0.36)	.0.06-0.12 (0.27-0.54)
Concrete	0.03-0.05 (0.13-0.23)	0.05-0.08 (0.23-0.36)

After application of the tack coat, the surface shall be allowed to cure without being disturbed for the period of time necessary to permit drying and setting of the tack coat. This period shall be determined by the RPR. The Contractor shall protect the tack coat and maintain the surface until the next course has been placed. When the tack coat has been disturbed by the Contractor, tack coat shall be reapplied at the Contractor's expense.

603-3.4 FREIGHT AND WAYBILLS. The Contractor shall submit waybills and delivery tickets, during progress of the work. Before the final statement is allowed, file with the RPR certified waybills and certified delivery tickets for all emulsified asphalt materials used in the construction of the pavement covered by the contract. Do not remove emulsified asphalt material from storage until the initial outage and temperature measurements have been taken. The delivery or storage units will not be released until the final outage has been taken.

METHOD OF MEASUREMENT

603-4.1 No separate measurement will be made. Tack is incidental to the court of paving and related items.

BASIS OF PAYMENT

603.5-1 No Separate payment will be made. Tack is incidental to the cost of paving and related items.

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM D1250 Standard Guide for Use of the Petroleum Measurement Tables

Exhibit 1

ASTM D2995	Standard Practice for Estimating Application Rate and Residual Application Rate of Bituminous Distributors
ASTM D3628	Standard Practice for Selection and Use of Emulsified Asphalts

****END ITEM P-603****

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ITEM P-605 JOINT SEALANTS FOR PAVEMENTS

DESCRIPTION

605-1.1 This item shall consist of providing and installing a resilient and adhesive joint sealing material capable of effectively sealing joints in pavement; joints between different types of pavements; and cracks in existing pavement.

MATERIALS

605-2.1 JOINT SEALANTS. Joint sealant materials shall meet the requirements of ASTM D6690 for asphalt cracks, or ASTM D5893 for PCC joints.

Each lot or batch of sealant shall be delivered to the jobsite in the manufacturer's original sealed container. Each container shall be marked with the manufacturer's name, batch or lot number, the safe heating temperature, and shall be accompanied by the manufacturer's certification stating that the sealant meets the requirements of this specification.

605-2.2 BACKER ROD. The material furnished shall be a compressible, non-shrinking, non-staining, non-absorbing material that is non-reactive with the joint sealant in accordance with ASTM D5249. The backer-rod material shall be 25% ± 5 % larger in diameter than the nominal width of the joint.

605-2.3 BOND BREAKING TAPES. Provide a bond breaking tape or separating material that is a flexible, non-shrinkable, non-absorbing, non-staining, and non-reacting adhesive-backed tape. The material shall have a melting point at least 5°F (3°C) greater than the pouring temperature of the sealant being used when tested in accordance with ASTM D789. The bond breaker tape shall be approximately 1/8 inch (3 mm) wider than the nominal width of the joint and shall not bond to the joint sealant.

CONSTRUCTION METHODS

605-3.1 TIME OF APPLICATION. Joints shall be sealed as soon after completion of the curing period as feasible and before the pavement is opened to traffic, including construction equipment. The pavement temperature shall be 50°F (10°C) and rising at the time of application of the poured joint sealing material. Do not apply sealant if moisture is observed in the joint.

605-3.2 EQUIPMENT. Machines, tools, and equipment used in the performance of the work required by this section shall be approved before the work is started and maintained in satisfactory condition at all times. Submit a list of proposed equipment to be used in performance of construction work including descriptive data, 7 days prior to use on the project.

a. **Tractor-mounted routing tool**. Provide a routing tool, used for removing old sealant from the joints, of such shape and dimensions and so mounted on the tractor that it will not damage the sides of the joints. The tool shall be designed so that it can be adjusted to remove the old material to varying depths as required. The use of V-shaped tools or rotary impact routing devices will not be permitted. Hand-operated spindle routing devices may be used to clean and enlarge random cracks.

b. **Concrete saw.** Provide a self-propelled power saw, with water-cooled diamond or abrasive saw blades, for cutting joints to the depths and widths specified.

c. **Sandblasting equipment.** Sandblasting is not allowed.

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d. Waterblasting equipment. The Contractor must demonstrate waterblasting equipment including the pumps, hose, guide and nozzle size, under job conditions, before approval in accordance with paragraph 605-3.3. The Contractor shall demonstrate, in the presence of the RPR, that the method cleans the joint and does not damage the joint.

e. Hand tools. Hand tools may be used, when approved, for removing defective sealant from a crack and repairing or cleaning the crack faces. Hand tools should be carefully evaluated for potential spalling effects prior to approval for use.

f. Hot-poured sealing equipment. The unit applicators used for heating and installing ASTM D6690 joint sealant materials shall be mobile and shall be equipped with a double-boiler, agitator-type kettle with an oil medium in the outer space for heat transfer; a direct-connected pressure-type extruding device with a nozzle shaped for inserting in the joint to be filled; positive temperature devices for controlling the temperature of the transfer oil and sealant; and a recording type thermometer for indicating the temperature of the sealant. The applicator unit shall be designed so that the sealant will circulate through the delivery hose and return to the inner kettle when not in use.

g. Cold-applied, single-component sealing equipment. The equipment for installing ASTM D5893 single component joint sealants shall consist of an extrusion pump, air compressor, following plate, hoses, and nozzle for transferring the sealant from the storage container into the joint opening. The dimension of the nozzle shall be such that the tip of the nozzle will extend into the joint to allow sealing from the bottom of the joint to the top. Maintain the initially approved equipment in good working condition, serviced in accordance with the supplier's instructions, and unaltered in any way without obtaining prior approval. Small hand-held air-powered equipment (i.e., caulking guns) may be used for small applications.

605-3.3 PREPARATION OF JOINTS. Pavement joints for application of material in this specification must be dry, clean of all scale, dirt, dust, curing compound, and other foreign matter. The Contractor shall demonstrate, in the presence of the RPR, that the method cleans the joint and does not damage the joint.

a. Sawing. All joints shall be sawed in accordance with specifications and plan details. Immediately after sawing the joint, the resulting slurry shall be completely removed from joint and adjacent area by flushing with a jet of water, and by use of other tools as necessary.

b. Sealing. Immediately before sealing, the joints shall be thoroughly cleaned of all remaining laitance, curing compound, filler, protrusions of hardened concrete, old sealant and other foreign material from the sides and upper edges of the joint space to be sealed. Cleaning shall be accomplished by tractor-mounted routing equipment**,** concrete saw, and waterblaster as specified in paragraph 605-3.2. The newly exposed concrete joint faces and the pavement surface extending a minimum of 1/2 inch from the joint edge shall be clean. After final cleaning and immediately prior to sealing, blow out the joints with compressed air and leave them completely free of debris and water. The joint faces shall be surface dry when the seal is applied.

b. Backer Rod. When the joint opening is of a greater depth than indicated for the sealant depth, plug or seal off the lower portion of the joint opening using a backer rod in accordance with paragraph 605-2.2 to prevent the entrance of the sealant below the specified depth. Take care to ensure that the backer rod is placed at the specified depth and is not stretched or twisted during installation.

c. Bond-breaking tape. Where inserts or filler materials contain bitumen, or the depth of the joint opening does not allow for the use of a backup material, insert a bond-separating tape breaker in accordance with paragraph 605-2.3 to prevent incompatibility with the filler materials and three-

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sided adhesion of the sealant. Securely bond the tape to the bottom of the joint opening so it will not float up into the new sealant.

605-3.4 INSTALLATION OF SEALANTS. Joints shall be inspected for proper width, depth, alignment, and preparation, and shall be approved by the RPR before sealing is allowed. Sealants shall be installed in accordance with the following requirements:

Immediately preceding, but not more than 50 feet ahead of the joint sealing operations, perform a final cleaning with compressed air. Fill the joints from the bottom up to ¼ inch ±1/16 inch below the top of pavement surface; or bottom of groove for grooved pavement. Remove and discard excess or spilled sealant from the pavement by approved methods. Install the sealant in such a manner as to prevent the formation of voids and entrapped air. In no case shall gravity methods or pouring pots be used to install the sealant material. Traffic shall not be permitted over newly sealed pavement until authorized by the RPR. When a primer is recommended by the manufacturer, apply it evenly to the joint faces in accordance with the manufacturer's instructions. Check the joints frequently to ensure that the newly installed sealant is cured to a tack-free condition within the time specified.

605-3.5 INSPECTION. The Contractor shall inspect the joint sealant for proper rate of cure and set, bonding to the joint walls, cohesive separation within the sealant, reversion to liquid, entrapped air and voids. Sealants exhibiting any of these deficiencies at any time prior to the final acceptance of the project shall be removed from the joint, wasted, and replaced as specified at no additional cost to the airport.

605-3.6 CLEAN-UP. Upon completion of the project, remove all unused materials from the site and leave the pavement in a clean condition.

METHOD OF MEASUREMENT

605-4.1 No separate measurement will be made for joint sealing. Joint sealing shall be incidental to the item requiring it.

BASIS OF PAYMENT

605-5.1 Payment for joint sealing material shall be incidental to the item requiring it.

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM D789	Standard Test Method for Determination of Relative Viscosity of Polyamide (PA)
ASTM D5249	Standard Specification for Backer Material for Use with Cold- and Hot-Applied Joint Sealants in Portland-Cement Concrete and Asphalt Joints
ASTM D5893	Standard Specification for Cold Applied, Single Component, Chemically Curing Silicone Joint Sealant for Portland Cement Concrete Pavements

Exhibit 1

ASTM D6690	Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt

Advisory Circulars (AC)

AC 150/5340-30	Design and Installation Details for Airport Visual Aids

****END ITEM P-605****

ITEM P-606 ADHESIVE COMPOUNDS, TWO-COMPONENT FOR SEALING WIRE AND LIGHTS IN PAVEMENT

DESCRIPTION

606-1.1 This specification covers two types of material; a liquid suitable for sealing electrical wire in saw cuts in pavement and for sealing light fixtures or bases in pavement, and a paste suitable for embedding light fixtures in the pavement. Both types of material are two-component filled formulas with the characteristics specified in paragraph 606-2.4. Materials supplied for use with asphalt and/or concrete pavements must be formulated so they are compatible with the asphalt and/or concrete.

MATERIALS

606-2.1 Curing. When pre-warmed to 77°F (25°C), mixed, and placed in accordance with manufacturer's directions, the materials shall cure at temperatures of 45°F (7°C) or above without the application of external heat.

606-2.2 Storage. The adhesive components shall not be stored at temperatures over 86°F (30°C), unless otherwise specified by the manufacturer.

606-2.3 Caution. Installation and use shall be in accordance with the manufacturer's recommended procedures. Avoid prolonged or repeated contact with skin. In case of contact, wash with soap and flush with water. If taken internally, call doctor. Keep away from heat or flame. Avoid vapor. Use in well-ventilated areas. Keep in cool place. Keep away from children.

606-2.4 Characteristics. When mixed and cured in accordance with the manufacturer's directions, the materials shall have the following properties shown in Table 1.

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Table 1. Property Requirements

Physical or Electrical Property	Minimum	Maximum	ASTM Method
Tensile			
Portland cement concrete	1,000 psi (70 kg/sq cm)		D 638
Asphalt concrete	500 psi (35 kg/sq cm)		
Elongation			
Portland cement concrete		See note [1]	D 638
Asphalt concrete	50%		D 638
Coef. of cub. exp. cu. cm/cu. cm/°C	0.00090	0.00120	D 1168
Coef. of lin. exp. cm/cm/°C	0.000030	0.000040	D 1168
Dielectric strength, short time test	350 volts/mil.		D 149
Arc resistance	125 sec		
Pull-off			
Adhesion to steel	1,000 psi (70 kg/sq cm)		
Adhesion to Portland cement concrete	200 psi (14 kg/sq cm)		
Adhesion to asphalt concrete	No test available.		
Adhesion to aluminum	250 psi		

[1] 20% or more (without filler) for formulations to be supplied for areas subject to freezing.

SAMPLING, INSPECTION, AND TEST PROCEDURES

606-3.1 Tensile properties. Tests for tensile strength and elongation shall be conducted in accordance with ASTM D638.

606-3.2 Expansion. Tests for coefficients of linear and cubical expansion shall be conducted in accordance with, Method B, except that mercury shall be used instead of glycerine. The test specimen shall be mixed in the proportions specified by the manufacturer, and cured in a glass tub approximately 2 inch (50 mm) long by 3/8 inch (9 mm) in diameter. The interior of the tube shall be precoated with a silicone mold release agent. The hardened sample shall be removed from the tube and aged at room temperature for one (1) week before conducting the test. The test temperature range shall be from 35°F (2°C) to 140°F (60°C).

606-3.3 Test for dielectric strength. Test for dielectric strength shall be conducted in accordance with ASTM D149 for sealing compounds to be furnished for sealing electrical wires in pavement.

606-3.4 Test for arc resistance. Test for arc resistance shall be conducted for sealing compounds to be furnished for sealing electrical wires in pavement.

606-3.5 Test for adhesion to steel. The ends of two smooth, clean, steel specimens of convenient size (1 inch by 1 inch by 6 inch) (25 mm by 25 mm by 150 mm) would be satisfactory when bonded together with

Exhibit 1

adhesive mixture and allowed to cure at room temperature for a period of time to meet formulation requirements and then tested to failure on a Riehle (or similar) tensile tester. The thickness of adhesive to be tested shall be 1/4 inch (6 mm).

606-3.6 Adhesion to Portland Cement Concrete

a. Concrete test block preparation. The aggregate grading shall be as shown in Table 2. The coarse aggregate shall consist of crushed rock having a minimum of 75% of the particles with at least one fractured face and having a water absorption of not more than 1.5%. The fine aggregate shall consist of crushed sand manufactured from the same parent rock as the coarse aggregate. The concrete shall have a water-cement ratio of 5.5 gallons (21 liters) of water per bag of cement, a cement factor of 6, ±0.5, bags of cement per cubic yard (0.76 cubic meter) of concrete, and a slump of 2-1/2 inch (60 mm), ±1/2 inch (60 mm ±12 mm). The ratio of fine aggregate to total aggregate shall be approximately 40% by solid volume. The air content shall be 5.0%, ±0.5%, and it shall be obtained by the addition to the batch of an air-entraining admixture such as Vinsol® resin. The mold shall be of metal and shall be provided with a metal base plate.

Means shall be provided for securing the base plate to the mold. The assembled mold and base plate shall be watertight and shall be oiled with mineral oil before use. The inside measurement of the mold shall be such that several one inch (25 mm) by 2-inch (75 mm) by 3-inch (25 mm by 50 mm by 75 mm) test blocks can be cut from the specimen with a concrete saw having a diamond blade. The concrete shall be prepared and cured in accordance with ASTM C192.

Table 2. Aggregate for Bond Test Blocks

Type	Sieve Size	Percent Passing
Coarse Aggregate	3/4 inch (19.0 mm)	97 to 100
	1/2 inch (12.5 mm)	63 to 69
	3/8 inch (9.5 mm)	30 to 36
	No. 4 (4.75 mm)	0 to 3
Fine Aggregate	No. 4 (4.75 mm)	100
	No. 8 (2.36 mm)	82 to 88
	No. 16 (1.18 mm)	60 to 70
	No. 30 (600 µm)	40 to 50
	No. 50 (300 µm)	16 to 26
	No. 100 (150 µm)	5 to 9

b. Bond test. Prior to use, oven-dry the test blocks to constant weight at a temperature of 220°F to 230°F (104°C to 110°C), cool to room temperature, 73.4°F ±3°F (23°C ±1.6°C), in a desiccator, and clean the surface of the blocks of film or powder by vigorous brushing with a stiff-bristled fiber brush. Two test blocks shall be bonded together on the one inch by 3 inch (25 mm by 75 mm) sawed face with the adhesive mixture and allowed to cure at room temperature for a period of time to meet formulation requirements and then tested to failure in a Riehle (or similar) tensile tester. The thickness of the adhesive to be tested shall be 1/4 inch (6 mm).

606-3.7 Compatibility with asphalt mix. Test for compatibility with asphalt in accordance with ASTM D5329.

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606-3.8 Adhesive compounds - Contractor's responsibility. The Contractor shall furnish the vendor's certified test reports for each batch of material delivered to the project. The report shall certify that the material meets specification requirements and is suitable for use with the respective concrete and asphalt pavements. The report shall be provided to and accepted by the Resident Project Representative (RPR) before use of the material. In addition, the Contractor shall obtain a statement from the supplier or manufacturer that guarantees the material for one year. The supplier or manufacturer shall furnish evidence that the material has performed satisfactorily on other projects.

606-3.9 Application. Adhesive shall be applied on a dry, clean surface, free of grease, dust, and other loose particles. The method of mixing and application shall be in strict accordance with the manufacturer's recommendations. When used with Item P-605, such as light can installation, Item P-605 shall not be applied until the Item P-606 has fully cured. A manufacturer's representative shall be present during the initial installation of the material to ensure the installation procedures are in accordance with the manufacturer's directions.

METHOD OF MEASUREMENT

606-4.1 No measurement will be made for this item or portion thereof. The cost of furnishing and installing this item shall be considered as a subsidiary obligation by the Contractor in the completion of the installation of other respective and associated work items as shown in the plans**.**

BASIS OF PAYMENT

606-5.1 No separate payment will be made for this item or portion thereof. The cost for furnishing all materials, for all preparation, delivering, and placing of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item shall be included in the Contractor's price for the respective and associated work items as shown in the plans.

Payment will be made under:

No pay items under P-606.

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.
ASTM International (ASTM)

ASTM C192	Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory
ASTM D149	Standard Test Method for Dielectric Breakdown Voltage and Dielectric Strength of Solid Electrical Insulating Materials at Commercial Power Frequencies
ASTM D638	Standard Test Method for Tensile Properties of Plastics
ASTM D5329	Standard Test Methods for Sealants and Fillers, Hot-applied, for Joints and Cracks in Asphaltic and Portland Cement Concrete Pavements

****END OF ITEM P-606****

Exhibit 1

ITEM P-608 EMULSIFIED ASPHALT SEAL COAT

DESCRIPTION

608-1.1 This item shall consist of the application of a emulsified asphalt surface treatment composed of an emulsion of natural and refined asphalt materials, water and a polymer additive, for taxiways and runways with the application of a suitable aggregate to maintain adequate surface friction; and airfield secondary and tertiary pavements including low-speed taxiways, shoulders, overruns, roads, parking areas, and other general applications with or without aggregate applied as designated on the plans. The terms seal coat, asphalt sealer, and asphalt material are interchangeable throughout this specification. The term emulsified asphalt means an emulsion of natural and refined asphalt materials.

MATERIALS

608-2.1 AGGREGATE. Aggregate is not required.

608-2.2 ASPHALT EMULSION. The asphalt emulsion shall meet the properties in the following table:

Concentrated Asphalt Emulsion Properties

Properties	Specification	Limits
Viscosity, Saybolt Furol at 77°F (25°C)	ASTM D7496	20 – 100 seconds
Residue by Distillation or Evaporation	ASTM D6997 or ASTM D6934	57% minimum
Sieve Test	ASTM D6933	0.1% maximum
24-hour Stability	ASTM D6930	1% maximum
5-day Settlement Test	ASTM D6930	5.0% maximum
Particle Charge [1]	ASTM D7402	Positive 6.5 maximum pH

[1] pH may be used in lieu of the particle charge test which is sometimes inconclusive in slow setting, asphalt emulsions.

The asphalt material base residue shall contain not less than 20% gilsonite, or uintaite and shall not contain any tall oil pitch or coal tar material and shall contain no less than one percent (1%) polymer.

Tests on Residue from Distillation or Evaporation

Properties	Specification	Limits
Viscosity at 275°F (135°C)	ASTM D4402	1750 cts maximum
Solubility in 1, 1, 1 trichloroethylene	ASTM D2042	97.5% minimum
Penetration	ASTM D5	50 dmm maximum
Asphaltenes	ASTM D2007	15% minimum
Saturates	ASTM D2007	15% maximum
Polar Compounds	ASTM D2007	25% minimum
Aromatics	ASTM D2007	15% minimum

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The asphalt emulsion, when diluted in the volumetric proportion of one part concentrated asphalt material to one part hot water shall have the following properties:

One-to-One Dilution Emulsion Properties

Properties	Specification	Limits
In Ready-to-Apply Form, one part concentrate to one part water, by volume		
Viscosity, Saybolt Furol at 77°F (25°C)	ASTM D7496	5 – 50 seconds
Residue by Distillation or Evaporation	ASTM D6997 or ASTM D6934	28.5% minimum
Pumping Stability [1]		Pass

[1] Pumping stability is tested by pumping one pint (475 ml) of seal coat diluted one (1) part concentrate to one (1) part water, at 77°F (25°C), through a 1/4-inch (6 mm) gear pump operating 1750 rpm for 10 minutes with no significant separation or coagulation.

The Contractor shall provide a copy of the manufacturer's Certificate of Analysis (COA) for the emulsified asphalt delivered to the project. If the asphalt emulsion is diluted at other than the manufacturer's facility, the Contractor shall provide a supplemental COA from an independent laboratory verifying the asphalt emulsion properties.

The COA shall be provided to and approved by the RPR before the emulsified asphalt is applied. The furnishing of the vendor's certified test report for the asphalt material shall not be interpreted as a basis for final acceptance. The manufacturer's COA may be subject to verification by testing the material delivered for use on the project.

The asphalt material storage and handling temperature shall be between 50°F - 160°F (10°C - 70°C) and the material shall be protected from freezing, or whenever outside temperature drops below 40°F (4°C) for prolonged time periods.

Contractor shall provide a list of airport pavement projects, exposed to similar climate conditions, where this product has been successfully applied within at least 5 years of the project.

608-2.3 WATER. Water used in mixing or curing shall be from potable water sources. Other sources shall be tested in accordance with ASTM C1602 prior to use. Water used in making and diluting the emulsion shall be potable, with a maximum hardness of 90ppm calcium and 15ppm magnesium; deleterious iron, sulfates, and phosphates maximum 7ppm, and less than 1ppm of organic byproducts. Water shall be a minimum of 140°F (60°C) prior to adding to emulsion.

608-2.4 POLYMER. The polymer shall meet the properties in the following table:

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Polymer Properties

Properties	Limits
Solids Content	47% to 65%, Percent by Weight
Weight	8.0 to 9.0 pounds/gallon
pH	3.0 to 8.0
Particle Charge	Nonionic/Cationic
Mechanical Stability	Excellent
Film Forming Temperature, °C	+5°C, minimum
Tg, °C	22°C, maximum

The manufacturer shall provide a copy of the Certificate of Analysis (COA) for the polymer used in the seal coat; and the Contractor shall include the COA with the emulsified asphalt COA when submitting to the RPR.

608-2.5 SEAL COAT WITH AGGREGATE. Not Applicable.

COMPOSITION AND APPLICATION RATE

608-3.1 APPLICATION RATE. The approximate amounts of materials per square yard for the asphalt surface treatment shall be as provided in the table for the treatment area(s) at the specified dilution rate(s) as noted on the plans. The actual application rates will vary within the range specified to suit field conditions and will be recommended by the manufacturer's representative and approved by the RPR from the test area/sections evaluation.

Application Rate

Dilution Rate	Quantity of Emulsion gal/yd²	Quantity of Aggregate lb/yd²
1:1	0.10-0.17 (0.45-0.77)	0.20-0.50 (0.11-0.27)

608-3.2 CONTROL AREAS AND CONTROL STRIPS. No Control Strip is required.

CONSTRUCTION METHODS

608-4.1 WORKER SAFETY. The Contractor shall obtain a Safety Data Sheet (SDS) for both the asphalt emulsion product and sand and require workmen to follow the manufacturer's recommended safety precautions.

608-4.2 WEATHER LIMITATIONS. The asphalt emulsion shall be applied only when the existing pavement surface is dry and when the weather is not foggy, rainy, or when the wind velocity will prevent the uniform application of the material. No material shall be applied in strong winds that interfere with the uniform application of the material(s), or when dust or sand is blowing or when rain is anticipated within eight (8) hours of application completion. The atmospheric temperature and the pavement surface temperature shall both be at, or above 60°F (16°C) and rising. Seal coat shall not be applied when pavement temperatures are expected to exceed 130°F within the subsequent 72 hours if traffic will be opened on pavement within those 72 hours. During application, account for wind drift. Cover existing buildings, structures, runway edge lights, taxiway

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edge lights, informational signs, retro-reflective marking and in-pavement duct markers as necessary to protect against overspray before applying the emulsion. Should emulsion get on any light or marker fixture, promptly clean the fixture. If cleaning is not satisfactory to the RPR, the Contractor shall replace any light, sign or marker with equivalent equipment at no cost to the Owner.

608-4.3 EQUIPMENT AND TOOLS. The Contractor shall furnish all equipment, tools, and machinery necessary for the performance of the work.

a. Pressure distributor. The emulsion shall be applied with a manufacturer-approved computer rate-controlled asphalt distributor. The equipment shall be in good working order and contain no contaminants or diluents in the tank. Spray bar tips must be clean, free of burrs, and of a size to maintain an even distribution of the emulsion. Any type of tip or pressure source is suitable that will maintain predetermined flow rates and constant pressure during the application process with application speeds under eight (8) miles per hour (13 km per hour) or seven hundred (700) feet per minute (213 m per minute). The equipment will be tested under pressure for leaks and to ensure proper set-up before use. The Contractor will provide verification of truck set-up (via a test-shot area), including but not limited to, nozzle tip size appropriate for application per nozzle manufacturer, spray-bar height and pressure and pump speed appropriate for the viscosity and temperature of sealer material, evidence of triple-overlap spray pattern, lack of leaks, and any other factors relevant to ensure the truck is in good working order before use.

The distributor truck shall be equipped with a 12-foot (3.7-m), minimum, spray bar with individual nozzle control. The distributor truck shall be capable of specific application rates in the range of 0.05 to 0.25 gallons per square yard (0.15 to 0.80 liters per square meter). These rates shall be computer-controlled rather than mechanical. The distributor truck shall have an easily accessible thermometer that constantly monitors the temperature of the emulsion, and have an operable mechanical tank gauge that can be used to cross-check the computer accuracy.

The distributor truck shall effectively heat and mix the material to the required temperature prior to application in accordance with the manufacturer's recommendations.

The distributor shall be equipped with a hand sprayer to spray the emulsion in areas not accessible to the distributor truck.

b. Aggregate spreader. Not Applicable

c. Power broom/blower. A power broom and/or blower shall be provided for removing loose material from the surface to be treated.

d. Equipment calibration. Asphalt distributors must be calibrated within the same construction season in accordance with ASTM D2995. The Contractor must furnish a current calibration certification for the asphalt distributor truck from any State or other agency as approved by the RPR.

608-4.4 PREPARATION OF ASPHALT PAVEMENT SURFACES. Clean pavement surface immediately prior to placing the seal coat so that it is free of dust, dirt, grease, vegetation, oil or any type of objectionable surface film. Remove oil or grease from the asphalt pavement by scrubbing with a detergent, washing thoroughly with clean water, and then treat these areas with a spot primer. Any additional surface preparation, such as crack repair, shall be in accordance with Item P-101, paragraph 101-3.6.

a. NEW ASPHALT PAVEMENT SURFACES. Allow new asphalt pavement surfaces to cure so that there is no concentration of oils on the surface. A period of at least 30 days at 70°F daytime

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temperatures should elapse between the placement of a hot mixed asphalt concrete surface course and the application of the surface treatment.

Perform a water-break-free test to confirm that the surface oils have degraded and dissipated. (Cast approximately one gallon of clean water out over the surface. The water should sheet out and wet the surface uniformly without crawling or showing oil rings.) If signs of crawling or oil rings are apparent on the pavement surface, additional time must be allowed for additional curing and retesting of the pavement surface prior to treatment.

608-4.5 EMULSION MIXING. The application emulsion shall be obtained by blending asphalt material concentrate, water and polymer, if specified. Always add heated water to the asphalt material concentrate, never add asphalt material concentrate to heated water. Mix one part heated water to one part asphalt material concentrate, by volume.

Add 1% polymer, by volume, to the emulsion mix. If the polymer is added to the emulsion mix at the plant, submit weight scale tickets to the RPR. As an option, the polymer may be added to the emulsion mix at the job site provided the polymer is added slowly while the asphalt distributor truck circulating pump is running. The mix must be agitated for a minimum of 15 minutes or until the polymer is mixed to the satisfaction of the RPR.

608-4.6 APPLICATION OF ASPHALT EMULSION. The asphalt emulsion shall be applied using a pressure distributor upon the properly prepared, clean and dry surface at the application rate recommended by the manufacturer's representative and approved by the RPR from the test area/sections evaluation for each designated treatment area. The asphalt emulsion should be applied at a temperature between 130°F (54°C) and 160°F (70°C) or in accordance with the manufacturer's recommendation.

If low spots and depressions greater than 1/2 inch in depth in the pavement surface cause ponding or puddling of the applied materials, the pavement surface shall be lightly broomed with a broom or brush type squeegee until the pavement surface is free of any pools of excess material.

During all applications, the surfaces of adjacent structures shall be protected to prevent their being spattered or marred.

608-4.7 APPLICATION OF AGGREGATE MATERIAL. Not Applicable.

QUALITY CONTROL (QC)

608-5.1 MANUFACTURER'S REPRESENTATION. The manufacturer's representative knowledgeable of the material, procedures, and equipment described in the specification is responsible to assist the Contractor and RPR in determining the appropriate application rates of the emulsion and aggregate, as well as recommendations for proper preparation and start-up of seal coat application.

608-5.2 CONTRACTOR QUALIFICATIONS. The Contractor shall provide documentation to the RPR that the seal coat Contractor is qualified to apply the seal coat, including personnel, and equipment, and has made at least three (3) applications similar to this project in the past two (2) years.

MATERIAL ACCEPTANCE

608-6.1 APPLICATION RATE. The rate of application of the asphalt emulsion shall be verified at least twice per day.

608-6.2 FRICTION TESTS. Not Applicable.

Exhibit 1

METHOD OF MEASUREMENT

608-7.1 ASPHALT SURFACE TREATMENT. The quantity of asphalt surface treatment shall be measured by the square yards of material applied in accordance with the plans and specifications and accepted by the RPR.

The Contractor must furnish the RPR with the certified weigh bills when materials are received for the asphalt material used under this contract. The Contractor must not remove material from the tank car or storage tank until initial amounts and temperature measurements have been verified.

BASIS OF PAYMENT

608-8.1 No payment shall be made for work associated with this specification.

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM C117	Standard Test Method for Materials Finer than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C136	Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C1602	Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
ASTM D5	Standard Test Method for Penetration of Asphalt Materials
ASTM D244	Standard Test Methods and Practices for Emulsified Asphalts
ASTM D2007	Standard Test Method for Characteristic Groups in Rubber Extender and Processing Oils and Other Petroleum-Derived Oils by the Clay-Gel Absorption Chromatographic Method
ASTM D2042	Standard Test Method for Solubility of Asphalt Materials in Trichloroethylene
ASTM D2995	Standard Practice for Estimating Application Rate of Bituminous Distributors
ASTM D4402	Standard Test Method for Viscosity Determination of Asphalt at Elevated Temperatures Using a Rotational Viscometer
ASTM D5340	Standard Test Method for Airport Pavement Condition Index Surveys

Advisory Circulars (AC)

AC 150/5320-12	Measurement, Construction, and Maintenance of Skid-Resistant Airport Pavement Surfaces

Exhibit 1

AC 150/5320-17	Airfield Pavement Surface Evaluation and Rating (PASER) Manuals
AC 150/5380-6	Guidelines and Procedures for Maintenance of Airport Pavements

****END ITEM P-608****

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P-610 CONCRETE FOR MISCELLANEOUS STRUCTURES

DESCRIPTION

610-1.1 This item shall consist of concrete and reinforcement, as shown on the plans, prepared and constructed in accordance with these specifications. This specification shall be used for all concrete other than airfield pavement which are cast-in-place.

MATERIALS

610-2.1 GENERAL. Only approved materials, conforming to the requirements of these specifications, shall be used in the work. Materials may be subject to inspection and tests at any time during their preparation or use. The source of all materials shall be approved by the Resident Project Representative (RPR) before delivery or use in the work. Representative preliminary samples of the materials shall be submitted by the Contractor, when required, for examination and test. Materials shall be stored and handled to ensure preservation of their quality and fitness for use and shall be located to facilitate prompt inspection. All equipment for handling and transporting materials and concrete must be clean before any material or concrete is placed in them.

The use of pit-run aggregates shall not be permitted unless the pit-run aggregate has been screened and washed, and all fine and coarse aggregates stored separately and kept clean. The mixing of different aggregates from different sources in one storage stockpile or alternating batches of different aggregates shall not be permitted.

a. **Reactivity.** Fine aggregate and coarse aggregates to be used in all concrete shall have been tested separately within six months of the project in accordance with ASTM C1260. Test results shall be submitted to the RPR. The aggregate shall be considered innocuous if the expansion of test specimens, tested in accordance with ASTM C1260, does not exceed 0.08% at 14 days (16 days from casting). If the expansion either or both test specimen is greater than 0.08% at 14 days, but less than 0.20%, a minimum of 25% of Type F fly ash, or between 40% and 55% of slag cement shall be used in the concrete mix. If expansion of either the coarse or fine aggregate exceeds 0.08% at 14 days, limit the alkali of the concrete to be less than or equal to 3.0 lb per cubic yard (1.8 kg per cubic meter), calculated in accordance with EB 106.

If the expansion is greater than 0.20%, the aggregates shall not be used, and test results for other aggregates must be submitted for evaluation; or aggregates that meet P-501 reactivity test requirements may be utilized.

610-2.2 COARSE AGGREGATE. The coarse aggregate for concrete shall meet the requirements of ASTM C33 and the requirements of Table 4, Class Designation 5S; and the grading requirements shown below, as required for the project.

Coarse Aggregate Grading Requirements

Maximum Aggregate Size	ASTM C33, Table 3 Grading Requirements (Size No.)
1 1/2 inch (37.5 mm)	467 or 4 and 67
1 inch (25 mm)	57
¾ inch (19 mm)	67
½ inch (12.5 mm)	7

Exhibit 1

610-2.2.1 COARSE AGGREGATE SUSCEPTIBILITY TO DURABILITY (D) CRACKING. Not used.

610-2.3 FINE AGGREGATE. The fine aggregate for concrete shall meet all fine aggregate requirements of ASTM C33.

610-2.4 CEMENT. Cement shall conform to the requirements of ASTM C150 Type I, II, or V.

610-2.5 CEMENTITIOUS MATERIALS.

a. **Fly ash.** Fly ash shall meet the requirements of ASTM C618, with the exception of loss of ignition, where the maximum shall be less than 6%. Fly ash shall have a Calcium Oxide (CaO) content of less than 15% and a total available alkali content less than 3% per ASTM C311. Fly ash produced in furnace operations using liming materials or soda ash (sodium carbonate) as an additive shall not be acceptable. The Contractor shall furnish the previous three most recent, consecutive ASTM C618 reports for each source of fly ash proposed in the concrete mix, and shall furnish each additional report as they become available during the project. The reports can be used for acceptance or the material may be tested independently by the RPR.

b. **Slag cement (ground granulated blast furnace (GGBF)).** Slag cement shall conform to ASTM C989, Grade 100 or Grade 120. Slag cement shall be used only at a rate between 25% and 55% of the total cementitious material by mass.

610-2.6 WATER. Water used in mixing or curing shall be from potable water sources. Other sources shall be tested in accordance with ASTM C1602 prior to use.

610-2.7 ADMIXTURES. The Contractor shall submit certificates indicating that the material to be furnished meets all of the requirements indicated below. In addition, the RPR may require the Contractor to submit complete test data from an approved laboratory showing that the material to be furnished meets all of the requirements of the cited specifications. Subsequent tests may be made of samples taken by the RPR from the supply of the material being furnished or proposed for use on the work to determine whether the admixture is uniform in quality with that approved.

a. **Air-entraining admixtures**. Air-entraining admixtures shall meet the requirements of ASTM C260 and shall consistently entrain the air content in the specified ranges under field conditions. The air-entrainment agent and any water reducer admixture shall be compatible.

b. **Water-reducing admixtures**. Water-reducing admixture shall meet the requirements of ASTM C494, Type A, B, or D. ASTM C494, Type F and G high range water reducing admixtures and ASTM C1017 flowable admixtures shall not be used.

c. **Other chemical admixtures**. The use of set retarding, and set-accelerating admixtures shall be approved by the RPR. Retarding shall meet the requirements of ASTM C494, Type A, B, or D and set-accelerating shall meet the requirements of ASTM C494, Type C. Calcium chloride and admixtures containing calcium chloride shall not be used.

610-2.8 PREMOLDED JOINT MATERIAL. Premolded joint material for expansion joints shall meet the requirements of ASTM D1751.

610-2.9 JOINT FILLER. The filler for joints shall meet the requirements of Item P-605, unless otherwise specified.

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610-2.10 STEEL REINFORCEMENT. Reinforcing shall conform to the requirements listed below:

Steel Reinforcement

Reinforcing Steel	**ASTM A615, ASTM A706, ASTM A775, ASTM A934**
Welded Steel Wire Fabric	**ASTM A1064, ASTM A884**
Welded Deformed Steel Fabric	**ASTM A1064**
Bar Mats	**ASTM A184 or ASTM A704**

610-2.11 MATERIALS FOR CURING CONCRETE. Curing materials shall conform to the requirements listed below:

Materials for Curing

White-pigmented Liquid Membrane-Forming Compound, Type 2, Class B	**ASTM C309**

CONSTRUCTION METHODS

610-3.1 GENERAL. The Contractor shall furnish all labor, materials, and services necessary for, and incidental to, the completion of all work as shown on the drawings and specified here. All machinery and equipment used by the Contractor on the work, shall be of sufficient size to meet the requirements of the work. All work shall be subject to the inspection and approval of the RPR.

610-3.2 CONCRETE MIXTURE. The concrete shall develop a compressive strength of 4000 psi in 28 days as determined by test cylinders made in accordance with ASTM C31 and tested in accordance with ASTM C39. The concrete shall contain not less than 470 pounds of cementitious material per cubic yard. The water cementitious ratio shall not exceed 0.45 by weight. The air content of the concrete shall be 5% +/- 1.2% as determined by ASTM C231 and shall have a slump of not more than 4 inches as determined by ASTM C143.

610-3.3 MIXING. Concrete may be mixed at the construction site, at a central point, or wholly or in part in truck mixers. The concrete shall be mixed and delivered in accordance with the requirements of ASTM C94 or ASTM C685.

The concrete shall be mixed only in quantities required for immediate use. Concrete shall not be mixed while the air temperature is below 40°F (4°C) without the RPRs approval. If approval is granted for mixing under such conditions, aggregates or water, or both, shall be heated and the concrete shall be placed at a temperature not less than 50°F (10°C) nor more than 100°F (38°C). The Contractor shall be held responsible for any defective work, resulting from freezing or injury in any manner during placing and curing, and shall replace such work at his expense.

Retempering of concrete by adding water or any other material is not permitted.

The rate of delivery of concrete to the job shall be sufficient to allow uninterrupted placement of the concrete.

610-3.4 FORMS. Concrete shall not be placed until all the forms and reinforcements have been inspected and approved by the RPR. Forms shall be of suitable material and shall be of the type, size, shape, quality, and strength to build the structure as shown on the plans. The forms shall be true to line and grade and shall be mortar-tight and sufficiently rigid to prevent displacement and sagging between supports. The surfaces of forms shall be smooth and free from irregularities, dents, sags, and holes. The Contractor shall be responsible for their adequacy.

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The internal form ties shall be arranged so no metal will show in the concrete surface or discolor the surface when exposed to weathering when the forms are removed. All forms shall be wetted with water or with a non-staining mineral oil, which shall be applied immediately before the concrete is placed. Forms shall be constructed so they can be removed without injuring the concrete or concrete surface.

610-3.5 PLACING REINFORCEMENT. All reinforcement shall be accurately placed, as shown on the plans, and shall be firmly held in position during concrete placement. Bars shall be fastened together at intersections. The reinforcement shall be supported by approved metal chairs. Shop drawings, lists, and bending details shall be supplied by the Contractor when required.

610-3.6 EMBEDDED ITEMS. Before placing concrete, all embedded items shall be firmly and securely fastened in place as indicated. All embedded items shall be clean and free from coating, rust, scale, oil, or any foreign matter. The concrete shall be spaded and consolidated around and against embedded items. The embedding of wood shall not be allowed.

610-3.7 CONCRETE CONSISTENCY. The Contractor shall monitor the consistency of the concrete delivered to the project site; collect each batch ticket; check temperature; and perform slump tests on each truck at the project site in accordance with ASTM C143.

610-3.8 PLACING CONCRETE. All concrete shall be placed during daylight hours, unless otherwise approved. The concrete shall not be placed until the depth and condition of foundations, the adequacy of forms and falsework, and the placing of the steel reinforcing have been approved by the RPR. Concrete shall be placed as soon as practical after mixing, but in no case later than one (1) hour after water has been added to the mix. The method and manner of placing shall avoid segregation and displacement of the reinforcement. Troughs, pipes, and chutes shall be used as an aid in placing concrete when necessary. The concrete shall not be dropped from a height of more than 5 feet. Concrete shall be deposited as nearly as practical in its final position to avoid segregation due to rehandling or flowing. Do not subject concrete to procedures which cause segregation. Concrete shall be placed on clean, damp surfaces, free from running water, or on a properly consolidated soil foundation.

610-3.9 VIBRATION. Vibration shall follow the guidelines in American Concrete Institute (ACI) Committee 309R, Guide for Consolidation of Concrete.

610-3.10 JOINTS. Joints shall be constructed as indicated on the plans.

610-3.11 FINISHING. All exposed concrete surfaces shall be true, smooth, and free from open or rough areas, depressions, or projections. All concrete horizontal plane surfaces shall be brought flush to the proper elevation with the finished top surface struck-off with a straightedge and floated.

610-3.12 CURING AND PROTECTION. All concrete shall be properly cured in accordance with the recommendations in American Concrete Institute (ACI) 308R, Guide to External Curing of Concrete. The concrete shall be protected from damage until project acceptance.

610-3.13 COLD WEATHER PLACING. When concrete is placed at temperatures below 40°F (4°C), follow the cold weather concreting recommendations found in ACI 306R, Cold Weather Concreting.

610-3.14 HOT WEATHER PLACING. When concrete is placed in hot weather greater than 85ºF (30 ºC), follow the hot weather concreting recommendations found in ACI 305R, Hot Weather Concreting.

Exhibit 1

QUALITY ASSURANCE (QA)

610-4.1 QUALITY ASSURANCE SAMPLING AND TESTING. Concrete for each day's placement will be accepted on the basis of the compressive strength specified in paragraph 610-3.2. The RPR will sample the concrete in accordance with ASTM C172; test the slump in accordance with ASTM C143; make and cure compressive strength specimens in accordance with ASTM C31; and test in accordance with ASTM C39. The QA testing agency will meet the requirements of ASTM C1077.

The Contractor shall provide adequate facilities for the initial curing of cylinders.

610-4.2 DEFECTIVE WORK. Any defective work that cannot be satisfactorily repaired as determined by the RPR, shall be removed and replaced at the Contractor's expense. Defective work includes, but is not limited to, uneven dimensions, honeycombing and other voids on the surface or edges of the concrete.

METHOD OF MEASUREMENT

610-5.1 Concrete shall be considered incidental and no separate measurement shall be made of concrete complete in place and accepted.

BASIS OF PAYMENT

610-6.1 Concrete shall be considered incidental and no separate payment shall be made.

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM A184	Standard Specification for Welded Deformed Steel Bar Mats for Concrete Reinforcement
ASTM A615	Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM A704	Standard Specification for Welded Steel Plain Bar or Rod Mats for Concrete Reinforcement
ASTM A706	Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement
ASTM A775	Standard Specification for Epoxy-Coated Steel Reinforcing Bars
ASTM A884	Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement
ASTM A934	Standard Specification for Epoxy-Coated Prefabricated Steel Reinforcing Bars
ASTM A1064	Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete

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ASTM C31	Standard Practice for Making and Curing Concrete Test Specimens in the Field
ASTM C33	Standard Specification for Concrete Aggregates
ASTM C39	Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C94	Standard Specification for Ready-Mixed Concrete
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C114	Standard Test Methods for Chemical Analysis of Hydraulic Cement
ASTM C136	Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C143	Standard Test Method for Slump of Hydraulic-Cement Concrete
ASTM C150	Standard Specification for Portland Cement
ASTM C171	Standard Specification for Sheet Materials for Curing Concrete
ASTM C172	Standard Practice for Sampling Freshly Mixed Concrete
ASTM C231	Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C260	Standard Specification for Air-Entraining Admixtures for Concrete
ASTM C309	Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C311	Standard Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use in Portland-Cement Concrete
ASTM C494	Standard Specification for Chemical Admixtures for Concrete
ASTM C618	Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
ASTM C666	Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing
ASTM C685	Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing
ASTM C989	Standard Specification for Slag Cement for Use in Concrete and Mortars
ASTM C1017	Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete

Exhibit 1

ASTM C1077	Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation
ASTM C1157	Standard Performance Specification for Hydraulic Cement
ASTM C1260	Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)
ASTM C1365	Standard Test Method for Determination of the Proportion of Phases in Portland Cement and Portland-Cement Clinker Using X-Ray Powder Diffraction Analysis
ASTM C1602	Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
ASTM D1751	Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Asphalt Types)
ASTM D1752	Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction

American Concrete Institute (ACI)

ACI 305R	Hot Weather Concreting
ACI 306R	Cold Weather Concreting
ACI 308R	Guide to External Curing of Concrete
ACI 309R	Guide for Consolidation of Concrete

****END OF ITEM P-610****

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ITEM P-620 RUNWAY AND TAXIWAY MARKING

DESCRIPTION

620-1.1 This item shall consist of the preparation and painting of numbers, markings, and stripes on the surface of runways, taxiways, and aprons, in accordance with these specifications and at the locations shown on the plans, or as directed by the Resident Project Representative (RPR). The terms "paint" and "marking material" as well as "painting" and "application of markings" are interchangeable throughout this specification.

MATERIALS

620-2.1 MATERIALS ACCEPTANCE. The Contractor shall furnish manufacturer's certified test reports, for materials shipped to the project. The certified test reports shall include a statement that the materials meet the specification requirements. This certification along with a copy of the paint manufacturer's surface preparation; marking materials, including adhesion, flow promoting and/or floatation additive; and application requirements must be submitted and approved by the Resident Project Representative (RPR) prior to the initial application of markings. The reports can be used for material acceptance or the RPR may perform verification testing. The reports shall not be interpreted as a basis for payment. The Contractor shall notify the RPR upon arrival of a shipment of materials to the site. All material shall arrive in sealed containers that are easily quantifiable for inspection by the RPR.

620-2.2 MARKING MATERIALS.

TABLE 1. MARKING MATERIALS

Paint[1]					Glass Beads[2]	
Type	Color	Coat	Fed. Std. 595 Number	Application Rate (Maximum)	Type	Application Rate (Minimum)
II	White	First	37925	115 ft^2/gal	III	10 lb/gal
II	White	Second	37925	115 ft^2/gal	III	10 lb/gal
II	Red	First	31136	115 ft^2/gal	I	5 lb/gal
II	Red	Second	31136	115 ft^2/gal	I	5 lb/gal
II	Yellow	First	33538 or 33655	115 ft^2/gal	III	10 lb/gal
II	Yellow	Second	33538 or 33655	115 ft^2/gal	III	10 lb/gal
II	Yellow	First	33538 or 33655	115 ft^2/gal	N/A	N/A
II	Yellow	Second	33538 or 33655	115 ft^2/gal	N/A	N/A
II	Black	First	37038	115 ft^2/gal	N/A	N/A
II	Green	First	34108	115 ft^2/gal	N/A	N/A

[1] **See paragraph 620-2.2a**
[2] **See paragraph 620-2.**

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a. Paint. Paint shall be waterborne in accordance with the requirements of this paragraph. Paint colors shall comply with Federal Standard No. 595.

i) Waterborne. Paint shall meet the requirements of Federal Specification TT-P-1952F, Type II The non-volatile portion of the vehicle for all paint types shall be composed of a 100% acrylic polymer as determined by infrared spectral analysis.

b. Reflective media. Glass beads for white and yellow paint shall meet the requirements for Federal Specification TT-B-1325D Type III.

i) Glass beads for red and pink paint shall meet the requirements for Type I, Gradation A.
ii) Glass beads shall be treated with all compatible coupling agents recommended by the manufacturers of the paint and reflective media to ensure adhesion and embedment.
iii) Glass beads shall not be used in black and green paint.
iv) Type III glass beads shall not be used in red and pink paint.

CONSTRUCTION METHODS

620-3.1 WEATHER LIMITATIONS. Painting shall only be performed when the surface is dry, and the ambient temperature and the pavement surface temperature meet the manufacturer's recommendations in accordance with paragraph 620-2.1. Painting operations shall be discontinued when the ambient or surface temperatures does not meet the manufacturer's recommendations. Markings shall not be applied when the wind speed exceeds 10 mph unless windscreens are used to shroud the material guns. Markings shall not be applied when weather conditions are forecasts to not be within the manufacturers' recommendations for application and dry time.

620-3.2 EQUIPMENT. Equipment shall include the apparatus necessary to properly clean the existing surface, a mechanical marking machine, a bead dispensing machine, and such auxiliary hand-painting equipment as may be necessary to satisfactorily complete the job.

The mechanical marker shall be an atomizing spray-type or airless type marking machine with automatic glass bead dispensers suitable for application of traffic paint. It shall produce an even and uniform film thickness and appearance of both paint and glass beads at the required coverage and shall apply markings of uniform cross-sections and clear-cut edges without running or spattering and without over spray. The marking equipment for both paint and beads shall be calibrated daily.

620-3.3 PREPARATION OF SURFACES. Immediately before application of the paint, the surface shall be dry and free from dirt, grease, oil, laitance, or other contaminates that would reduce the bond between the paint and the pavement. Use of any chemicals or impact abrasives during surface preparation shall be approved in advance by the RPR. After the cleaning operations, sweeping, blowing, or rinsing with pressurized water shall be performed to ensure the surface is clean and free of grit or other debris left from the cleaning process.

a. Preparation of new pavement surfaces. The area to be painted shall be cleaned by broom, blower, water blasting, or by other methods approved by the RPR to remove all contaminants, including PCC curing compounds, minimizing damage to the pavement surface.

b. Preparation of pavement to remove existing markings. Existing pavement markings shall be removed by rotary grinding, water blasting, or by other methods approved by the RPR minimizing damage to the pavement surface. The removal area may need to be larger than the area of the

Exhibit 1

markings to eliminate ghost markings. After removal of markings on asphalt pavements, apply a fog seal or seal coat to 'block out' the removal area to eliminate 'ghost' markings.

c. **Preparation of pavement markings prior to remarking.** Prior to remarking existing markings, loose existing markings must be removed minimizing damage to the pavement surface, with a method approved by the RPR. After removal, the surface shall be cleaned of all residue or debris.

Prior to the application of markings, the Contractor shall certify in writing that the surface is dry and free from dirt, grease, oil, laitance, or other foreign material that would prevent the bond of the paint to the pavement or existing markings. This certification along with a copy of the paint manufactures application and surface preparation requirements must be submitted to the RPR prior to the initial application of markings.

620-3.4 LAYOUT OF MARKINGS. The proposed markings shall be laid out in advance of the paint application. The locations of markings to receive glass beads shall be shown on the plans.

620-3.5 APPLICATION. A period of **30** days shall elapse between placement of surface course or seal coat and application of the permanent paint markings. Paint shall be applied at the locations and to the dimensions and spacing shown on the plans. Paint shall not be applied until the layout and condition of the surface has been approved by the RPR.

The edges of the markings shall not vary from a straight line more than 1/2 inch in 50 feet, and marking dimensions and spacing shall be within the following tolerances:

MARKING DIMENSIONS AND SPACING TOLERANCE

Dimension and Spacing	Tolerance
36 inch or less	±1/2 inch
greater than 36 inch to 6 feet	±1 inch
greater than 6 feet to 60 feet	±2 inch
greater than 60 feet	±3 inch

The paint shall be mixed in accordance with the manufacturer's instructions and applied to the pavement with a marking machine at the rate shown in Table 1. The addition of thinner will not be permitted.

Glass beads shall be distributed upon the marked areas at the locations shown on the plans to receive glass beads immediately after application of the paint. A dispenser shall be furnished that is properly designed for attachment to the marking machine and suitable for dispensing glass beads. Glass beads shall be applied at the rate shown in Table 1. Glass beads shall not be applied to black paint or green paint. Glass beads shall adhere to the cured paint or all marking operations shall cease until corrections are made. Different bead types shall not be mixed. Regular monitoring of glass bead embedment and distribution should be performed.

620-3.6 APPLICATION--PREFORMED THERMOPLASTIC AIRPORT PAVEMENT MARKINGS.

Preformed thermoplastic pavement markings not used.

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620-3.7 CONTROL STRIP. Prior to the full application of airfield markings, the Contractor shall prepare a control strip in the presence of the RPR. The Contractor shall demonstrate the surface preparation method and all striping equipment to be used on the project. The marking equipment must achieve the prescribed application rate of paint and population of glass beads (per Table 1) that are properly embedded and evenly distributed across the full width of the marking. Prior to acceptance of the control strip, markings must be evaluated during darkness to ensure a uniform appearance.

620-3.8 RETRO-REFLECTANCE. Reflectance shall be measured with a portable retro-reflectometer meeting ASTM E1710 (or equivalent). A total of 6 reading shall be taken over a 6 square foot area with 3 readings taken from each direction. The average shall be equal to or above the minimum levels of all readings which are within 30% of each other.

MINIMUM RETRO-REFLECTANCE VALUES

Material	Retro-reflectance mcd/m²/lux		
	White	Yellow	Red
Initial Type I	300	175	35
Initial Type III	600	300	35
Initial Thermoplastic	225	100	35
All materials, remark when less than[1]	100	75	10

[1]Prior to remarking determine if removal of contaminants on markings will restore retro-reflectance.

620-3.9 PROTECTION AND CLEANUP. After application of the markings, all markings shall be protected from damage until dry. All surfaces shall be protected from excess moisture and/or rain and from disfiguration by spatter, splashes, spillage, or drippings. The Contractor shall remove from the work area all debris, waste, loose reflective media, and by-products generated by the surface preparation and application operations to the satisfaction of the RPR. The Contractor shall dispose of these wastes in strict compliance with all applicable state, local, and federal environmental statutes and regulations.

METHOD OF MEASUREMENT

620-4.1a No separate measurement will be made for pavement preparation. Pavement preparation is incidental to the measurement of marking and will not be paid separately.

620-4.1b The quantity of markings shall be paid for shall be measured by the number of square feet of painting**.**

620-4.1c The quantity of reflective media shall be incidental to the measurement of marking and will not be paid separately.

620-4.1d The quantity of runway and taxiway marking obliteration to be paid for shall be the number of square feet of obliteration performed in accordance with the specifications and accepted by the Engineer.

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BASIS OF PAYMENT

620-5.1 This price shall be full compensation for furnishing all materials and for all labor, equipment, tools, and incidentals necessary to complete the item complete in place and accepted by the RPR in accordance with these specifications.

620-5.1a No separate payment will be made for pavement preparation.

620-5.1b Payment for markings shall be made at the contract price for the number of square feet. For markings requiring 2 coats, the first coat will be paid at 75% of the contract unit price. The second coat will be paid for at the remaining 25% of the contract unit price.

620-5.1c No separate payment will be made for reflective media.

620-5.1d Payment shall be made at the respective contract price per square foot for runway and taxiway marking obliteration. This price shall be full compensation for furnishing all materials and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item P-620a	Surface Preparation (Obliteration) – per Square Foot
Item P-620b	Marking, 2 Coats with Beads (All Colors) – per Square Foot
Item P-620c	Marking, Single Coat with No Beads (All Colors) – per Square Foot
Item P-620d	Marking, Single Coat with Beads (All Colors) – per Square Foot
Item P-620e	12-Foot Single Designation Surface Painted Holding Position Signs – per Each
Item P-620f	9-Foot Double Designation Surface Painted Holding Position Signs – per Each
Item P-620g	12-Foot Double Designation Surface Painted Holding Position Signs – per Each

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

<u>ASTM International (ASTM)</u>

ASTM D476	Standard Classification for Dry Pigmentary Titanium Dioxide Products
ASTM D968	Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive
ASTM D1652	Standard Test Method for Epoxy Content of Epoxy Resins
ASTM D2074	Standard Test Method for Total, Primary, Secondary, and Tertiary Amine Values of Fatty Amines by Alternative Indicator Method
ASTM D2240	Standard Test Method for Rubber Property - Durometer Hardness
ASTM D7585	Standard Practice for Evaluating Retroreflective Pavement Markings Using Portable Hand-Operated Instruments
ASTM E303	Standard Test Method for Measuring Surface Frictional Properties Using the British Pendulum Tester

Exhibit 1

ASTM E1710	Standard Test Method for Measurement of Retroreflective Pavement Marking Materials with CEN-Prescribed Geometry Using a Portable Retroreflectometer
ASTM E2302	Standard Test Method for Measurement of the Luminance Coefficient Under Diffuse Illumination of Pavement Marking Materials Using a Portable Reflectometer
ASTM G154	Standard Practice for Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Nonmetallic Materials

Code of Federal Regulations (CFR)

40 CFR Part 60, Appendix A-7, Method 24	Determination of volatile matter content, water content, density, volume solids, and weight solids of surface coatings
29 CFR Part 1910.1200	Hazard Communication

Federal Specifications (FED SPEC)

FED SPEC TT-B-1325D	Beads (Glass Spheres) Retro-Reflective
FED SPEC TT-P-1952F	Paint, Traffic and Airfield Marking, Waterborne
FED STD 595	Colors used in Government Procurement

Commercial Item Description

A-A-2886B	Paint, Traffic, Solvent Based

Advisory Circulars (AC)

AC 150/5340-1	Standards for Airport Markings
AC 150/5320-12	Measurement, Construction, and Maintenance of Skid Resistant Airport Pavement Surfaces

**** END OF ITEM P-620 ****

Exhibit 1

ITEM P-621 SAW-CUT GROOVES

DESCRIPTION

621-1.1 This item consists of constructing saw-cut grooves to minimize hydroplaning during wet weather, providing a skid resistant surface in accordance with these specifications and at the locations shown on the plans, or as directed by the Resident Project Representative (RPR).

CONSTRUCTION METHODS

621-2.1 PROCEDURES. The Contractor shall submit to the RPR the grooving sequence and method of placing guide lines to control grooving operation. Transverse grooves saw-cut in the pavement must form a 1/4 inch (+1/16 inch, -0 inch) wide by 1/4 inch (±1/16 inch) deep by 1-1/2 inch (-1/8 inch, +0 inch) center-to-center configuration. The grooves must be continuous for the entire runway length. They must be saw-cut transversely (perpendicular to centerline) in the runway and high-speed taxiway pavement to not less than 10 feet (3 m) from the runway pavement edge to allow adequate space for equipment operation.

The saw-cut grooves must meet the following tolerances. The tolerances apply to each day's production and to each piece of grooving equipment used for production. The Contractor is responsible for all controls and process adjustments necessary to meet these tolerances. The Contractor shall routinely spot check for compliance each time the equipment aligns for a grooving pass.

a. Alignment tolerance.

The grooves shall not vary more than ±1-1/2 inch in alignment for 75 feet along the runway length, allowing for realignment every 500 feet along the runway length.

b. Groove tolerance.

(1) Depth. The standard depth is 1/4 inch. At least 90% of the grooves must be at least 3/16 inch, at least 60% of the grooves must be at least 1/4 inch, and not more than 10% of the grooves may exceed 5/16 inch.

(2) Width. The standard width is 1/4 inch. At least 90% of the grooves must be at least 3/16 inch, at least 60% of the grooves must be at least 1/4 inch, and not more than 10% of the grooves may exceed 5/16 inch.

(3) Center-to-center spacing. The standard spacing is 1-1/2 inch. Minimum spacing 1-3/8 inch. Maximum spacing 1-1/2 inch.

Saw-cut grooves must not be closer than 3 inches or more than 9 inches from transverse joints in concrete pavements. Grooves must not be closer than 6 inches and no more than 18 inches from in-pavement light fixtures. Grooves may be continued through longitudinal construction joints. Where neoprene compression seals have been installed and the compression seals are recessed sufficiently to prevent damage from the grooving operation, grooves may be continued through the longitudinal joints. Where neoprene compression seals have been installed and the compression seals are not recessed sufficiently to prevent damage from the grooving operation, grooves must not be closer than 3 inches or more than 5 inches from the longitudinal joints. Where lighting cables are installed, grooving through longitudinal or diagonal saw kerfs shall not be allowed.

Exhibit 1

621-2.2 ENVIRONMENTAL REQUIREMENTS. Grooving operations will not be permitted when freezing conditions prevent the immediate removal of debris and/or drainage of water from the grooved area. Discharge and disposal of waste slurry shall be the Contractor's responsibility.

621-2.3 CONTROL STRIP. Groove a control strip in an area of the pavement outside of the trafficked area, as approved by the RPR. The area shall be 50 feet long by two lanes wide. Demonstrate the setup and alignment process, the grooving operation, and the waste slurry disposal.

621-2.4 EXISTING PAVEMENTS. Bumps, depressed areas, bad or faulted joints, and badly cracked and/or spalled areas in the pavement shall not be grooved until such areas are adequately repaired or replaced.

621-2.5 NEW PAVEMENTS. New asphalt and Portland cement concrete pavements shall be allowed to cure for a minimum of 30 days before grooving, to allow the material to become stable enough to prevent closing of the grooves under normal use. If it can be demonstrated that grooves are stable, and can be installed with no spalling, tearing or raveling of the groove edge, grooving may occur sooner that 30 days with approval of the RPR. All grade corrections must be completed prior to grooving. Spalling along or tearing or raveling of the groove edges shall not be allowed.

621-2.6 GROOVING MACHINE. Provide a grooving machine that is power driven, self-propelled, specifically designed and manufactured for pavement grooving, and has a self-contained and integrated continuous slurry vacuum system as the primary method for removing waste slurry. The grooving machine shall be equipped with diamond-saw cutting blades, and capable of making at least 18 inches (0.5 m) in width of multiple parallel grooves in one pass of the machine. Thickness of the cutting blades shall be capable of making the required width and depth of grooves in one pass of the machine. The cutting head shall not contain a mixture of new and worn blades or blades of unequal wear or diameter. Match the blade type and configuration with the hardness of the existing airfield pavement. The wheels on the grooving machine shall be of a design that will not scar or spall the pavement. Provide the machine with devices to control depth of groove and alignment.

621-2.7 WATER SUPPLY. Water for the grooving operation shall be provided by the Contractor.

621-2.8 CLEAN-UP. During and after installation of saw-cut grooves, the Contractor must remove from the pavement all debris, waste, and by-products generated by the operations to the satisfaction of the RPR. Cleanup of waste material must be continuous during the grooving operation. Flush debris produced by the machine to the edge of the grooved area or pick it up as it forms. The dust coating remaining shall be picked up or flushed to the edge of the area if the resultant accumulation is not detrimental to the vegetation or storm drainage system. Accomplish all flushing operations in a manner to prevent erosion on the shoulders or damage to vegetation. Waste material must be disposed of in an approved manner. Waste material must not be allowed to enter the airport storm sewer system. The Contractor must dispose of these wastes in strict compliance with all applicable state, local, and federal environmental statutes and regulations

621-2.9 REPAIR OF DAMAGED PAVEMENT. Grooving must be stopped and damaged pavement repaired at the Contractor's expense when directed by the RPR.

ACCEPTANCE

621-3.1 ACCEPTANCE TESTING. Grooves will be accepted based on results of zone testing. All acceptance testing necessary to determine conformance with the groove tolerances specified will be performed by the RPR.

Exhibit 1

Instruments for measuring groove width and depth must have a range of at least 0.5 inch and a resolution of at least 0.005 inch. Gauge blocks or gauges machined to standard grooves width, depth, and spacing may be used.

Instruments for measuring center-to-center spacing must have a range of at least 3 inches and a resolution of at least 0.02 inch.

The RPR will measure grooves in five zones across the pavement width. Measurements will be made at least three times during each day's production. Measurements in all zones will be made for each cutting head on each piece of grooving equipment used for each day's production.

The five zones are as follows:

Zone 1	Centerline to 5 feet left or right of the centerline.
Zone 2	5 feet to 25 feet left of the centerline.
Zone 3	5 feet 25 feet right of the centerline.
Zone 4	25 feet to edge of grooving left of the centerline.
Zone 5	25 feet to edge of grooving right of the centerline.

At a random location within each zone, five consecutive grooves sawed by each cutting head on each piece of grooving equipment will be measured for width, depth, and spacing. The five consecutive measurements must be located about the middle blade of each cutting head ±4 inches. Measurements will be made along a line perpendicular to the grooves.

- Width or depth measurements less than 0.170 inch shall be considered less than 3/16 inch.
- Width or depth measurements more than 0.330 inch shall be considered more than 5/16 inch.
- Width or depth measurements more than 0.235 inch shall be considered more than 1/4 inch.

Production must be adjusted when more than one groove on a cutting head fails to meet the standard depth, width, or spacing in more than one zone.

METHOD OF MEASUREMENT

621-4.1 The quantity of grooving to be paid for shall be the number of square yards of grooving performed in accordance with the specifications and accepted by the RPR per paragraph 621-3.1.

BASIS OF PAYMENT

621-5.1 PAYMENT FOR SAW-CUT GROOVING. Payment for saw-cut grooving will be made at the contract unit price per square yard for saw-cut grooving. This price shall be full compensation for furnishing all materials, and for all preparation, delivering, and application of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item P-621a	Grooving - per square yard

Exhibit 1

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Advisory Circulars (AC)

AC 150/5320-12	Measurement, Construction, and Maintenance of Skid Resistant Airport Pavement Surfaces

END OF ITEM P-621

ITEM D-701 PIPE FOR STORM DRAINS AND CULVERTS

DESCRIPTION

701-1.1 This item shall consist of the construction of pipe culverts and storm drains in accordance with these specifications and in reasonably close conformity with the lines and grades shown on the plans.

MATERIALS

701-2.1 Materials shall meet the requirements shown on the plans and specified below. Underground piping and components used in drainage systems for terminal and aircraft fueling ramp drainage shall be noncombustible and inert to fuel in accordance with National Fire Protection Association (NFPA) 415.

701-2.2 PIPE. The pipe shall be of the type called for on the plans or in the proposal and shall be in accordance with the following appropriate requirements:

ASTM C76	Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
ASTM C655	Standard Specification for Reinforced Concrete D-Load Culvert, Storm Drain, and Sewer Pipe
ASTM C1479	Standard Practice for Installation of Precast Concrete Sewer, Storm Drain, and Culvert Pipe Using Standard Installations
ASTM C1840	Standard Practice for Inspection and Acceptance of Installed Reinforced Concrete Culvert, Storm Drain, and Storm Sewer Pipe

701-2.3 CONCRETE. Concrete for pipe cradles shall have a minimum compressive strength of 2000 psi at 28 days and conform to the requirements of ASTM C94.

701-2.4 RUBBER GASKETS. Rubber gaskets for rigid pipe shall conform to the requirements of ASTM C443. Rubber gaskets for PVC pipe, polyethylene, and polypropylene pipe shall conform to the requirements of ASTM F477. Rubber gaskets for zinc-coated steel pipe and precoated galvanized pipe shall conform to the requirements of ASTM D1056, for the "RE" closed cell grades. Rubber gaskets for steel reinforced thermoplastic ribbed pipe shall conform to the requirements of ASTM F477.

701-2.5 JOINT MORTAR. Pipe joint mortar shall consist of one part Portland cement and two parts sand. The Portland cement shall conform to the requirements of ASTM C150, Type I. The sand shall conform to the requirements of ASTM C144.

701-2.6 JOINT FILLERS. Not used.

701-2.7 PLASTIC GASKETS. Not used.

Exhibit 1

701-2.8. CONTROLLED LOW-STRENGTH MATERIAL (CLSM). Controlled low-strength material shall conform to the requirements of Item P-153. When CLSM is used, all joints shall have gaskets.

701-2.9 PRECAST BOX CULVERTS. Manufactured in accordance with and conforming to ASTM C1433.

701-2.10 PRECAST CONCRETE PIPE. Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or American Concrete Pipe Association QCast Plant Certification program.

CONSTRUCTION METHODS

701-3.1 EXCAVATION. The width of the pipe trench shall be sufficient to permit satisfactory jointing of the pipe and thorough tamping of the bedding material under and around the pipe, but it shall not be less than the external diameter of the pipe plus 12 inches (300 mm) on each side. The trench walls shall be approximately vertical.

The Contractor shall comply with all current federal, state and local rules and regulations governing the safety of men and materials during the excavation, installation and backfilling operations. Specifically, the Contractor shall observe that all requirements of the Occupational Safety and Health Administration (OSHA) relating to excavations, trenching and shoring are strictly adhered to. The width of the trench shall be sufficient to permit satisfactorily jointing of the pipe and thorough compaction of the bedding material under the pipe and backfill material around the pipe, but it shall not be greater than the widths shown on the plans trench detail.

Where rock, hardpan, or other unyielding material is encountered, the Contractor shall remove it from below the foundation grade for a depth of at least 8 inch (200 mm) or 1/2 inch (12 mm) for each foot of fill over the top of the pipe (whichever is greater) but for no more than three-quarters of the nominal diameter of the pipe. The excavation below grade should be filled with granular material to form a uniform foundation.

Where a firm foundation is not encountered at the grade established, due to soft, spongy, or other unstable soil, the unstable soil shall be removed and replaced with approved granular material for the full trench width. The RPR shall determine the depth of removal necessary. The granular material shall be compacted to provide adequate support for the pipe.

The excavation for pipes placed in embankment fill shall not be made until the embankment has been completed to a height above the top of the pipe as shown on the plans.

701-3.2 BEDDING. The bedding surface for the pipe shall provide a foundation of uniform density to support the pipe throughout its entire length.

a. Rigid pipe. The pipe bedding shall be constructed uniformly for the full length of the pipe barrel, as required on the plans. The maximum aggregate size shall be 1 in when the bedding thickness is less than 6 inches, and 1-1/2 in when the bedding thickness is greater than 6 inches. Bedding shall be loosely placed uncompacted material under the middle third of the pipe prior to placement of the pipe.

Exhibit 1

b. Flexible pipe. For flexible pipe, the bed shall be roughly shaped to fit the pipe, and a bedding blanket of sand or fine granular material shall be provided as follows:

Flexible Pipe Bedding

Pipe Corrugation Depth		Minimum Bedding Depth	
inch	**mm**	**inch**	**mm**
1/2	12	1	25
1	25	2	50
2	50	3	75
2-1/2	60	3-1/2	90

c. Other pipe materials. For PVC, polyethylene, polypropylene, or fiberglass pipe, the bedding material shall consist of coarse sands and gravels with a maximum particle size of 3/4 inches (19 mm). For pipes installed under paved areas, no more than 12% of the material shall pass the No. 200 (0.075 mm) sieve. For all other areas, no more than 50% of the material shall pass the No. 200 (0.075 mm) sieve. The bedding shall have a thickness of at least 6 inches (150 mm) below the bottom of the pipe and extend up around the pipe for a depth of not less than 50% of the pipe's vertical outside diameter.

701-3.3 LAYING PIPE. The pipe laying shall begin at the lowest point of the trench and proceed upgrade. The lower segment of the pipe shall be in contact with the bedding throughout its full length. Bell or groove ends of rigid pipes and outside circumferential laps of flexible pipes shall be placed facing upgrade.

Paved or partially lined pipe shall be placed so that the longitudinal center line of the paved segment coincides with the flow line.

Elliptical and elliptically reinforced concrete pipes shall be placed with the manufacturer's reference lines designating the top of the pipe within five degrees of a vertical plane through the longitudinal axis of the pipe.

701-3.4 JOINING PIPE. Joints shall be made with (1) cement mortar, (2) cement grout, (3) rubber gaskets, (4) plastic gaskets, (5) coupling bands.

Mortar joints shall be made with an excess of mortar to form a continuous bead around the outside of the pipe and shall be finished smooth on the inside. Molds or runners shall be used for grouted joints to retain the poured grout. Rubber ring gaskets shall be installed to form a flexible watertight seal.

a. Concrete pipe. Concrete pipe may be either bell and spigot or tongue and groove. Pipe sections at joints shall be fully seated and the inner surfaces flush and even. Concrete pipe joints shall be sealed with rubber gaskets meeting ASTM C443 when leak resistant joints are required.

b. Metal pipe. Metal pipe shall be firmly joined by form-fitting bands conforming to the requirements of ASTM A760 for steel pipe and AASHTO M196 for aluminum pipe.

c. PVC, Polyethylene, or Polypropylene pipe. Joints for PVC, Polyethylene, or Polypropylene pipe shall conform to the requirements of ASTM D3212 when leak resistant joints are required. Joints for PVC and Polyethylene pipe shall conform to the requirements of AASHTO M304 when soil tight joints are required. Fittings for polyethylene pipe shall conform to the requirements of AASHTO

Exhibit 1

M252 or ASTM M294. Fittings for polypropylene pipe shall conform to ASTM F2881, ASTM F2736, or ASTM F2764.

d. Fiberglass pipe. Joints and fittings shall be as detailed on the plans and in accordance with the manufacturers recommendations**.** Joints shall meet the requirements of ASTM D4161 for flexible elastomeric seals.

701-3.5 EMBEDMENT AND OVERFILL. Pipes shall be inspected before any fill material is placed; any pipes found to be out of alignment, unduly settled, or damaged shall be removed and re-laid or replaced at the Contractor's expense.

701-3.5-1 EMBEDMENT MATERIAL REQUIREMENTS

a. Concrete Pipe. Embedment material and compaction requirements shall be in accordance with the applicable Type of Standard Installation (Types 1, 2, 3, or 4) per ASTM C1479. If a concrete cradle or CLSM embedment material is used, it shall conform to the plan details.

b. Plastic and fiberglass Pipe. Embedment material shall meet the requirements of ASTM D3282, A-1, A-2-4, A-2-5, or A-3. Embedment material shall be free of organic material, stones larger than 1.5 inches in the greatest dimension, or frozen lumps. Embedment material shall extend to 12 inches above the top of the pipe.

c. Metal Pipe. Embedment material shall be granular as specified in the contract document and specifications, and shall be free of organic material, rock fragments larger than 1.5 inches in the greatest dimension and frozen lumps. As a minimum, backfill materials shall meet the requirements of ASTM D3282, A-1, A-2, or A-3. Embedment material shall extend to 12 inches above the top of the pipe.

701-3.5-2 PLACEMENT OF EMBEDMENT MATERIAL

The embedment material shall be compacted in layers not exceeding 6 inches on each side of the pipe and shall be brought up one foot above the top of the pipe or to natural ground level, whichever is greater. Thoroughly compact the embedment material under the haunches of the pipe without displacing the pipe. Material shall be brought up evenly on each side of the pipe for the full length of the pipe.

When the top of the pipe is above the top of the trench, the embedment material shall be compacted in layers not exceeding 6 inches and shall be brought up evenly on each side of the pipe to one foot above the top of the pipe. All embedment material shall be compacted to a density required under Item P-152.

Concrete cradles and flowable fills, such as controlled low strength material (CLSM) or controlled density fill (CDF), may be used for embedment provided adequate flotation resistance can be achieved by restraints, weighing, or placement technique.

It shall be the Contractor's responsibility to protect installed pipes and culverts from damage due to construction equipment operations. The Contractor shall be responsible for installation of any extra strutting or backfill required to protect pipes from the construction equipment.

Exhibit 1

701-3.6 OVERFILL

Pipes shall be inspected before any overfill is in place. Any pipes found to be out of alignment, unduly settled, or damaged shall be removed and relaid or replaced at the Contractor's expense. Evaluation of any damage to RCP shall be evaluated based on AASHTO R73.

Overfill material shall be place and compacted in layers as required to achieve compaction to at least 95 percent standard proctor per ASTM D1557. The soil shall contain no debris, organic matter, frozen material, or stones with a diameter greater than one half the thickness of the compacted layers being placed.

701-3.7 INSPECTION REQUIREMENTS

An initial post installation inspection shall be performed by the RPR no sooner than 30 days after completion of installation and final backfill. Clean or flush all lines prior to inspection.

Use a camera with lighting suitable to allow a clear picture of the entire periphery of the pipe interior. Center the camera in the pipe both vertically and horizontally and be able to pan and tilt to a 90 degree angle with the axis of the pipe rotating 360 degrees. Use equipment to move the camera through the pipe that will not obstruct the camera's view or interfere with proper documentation of the pipe's condition. The video image shall be clear, focused, and relatively free from roll, static, or other image distortion qualities that would prevent the reviewer from evaluating the condition of the pipe.

For pipe sizes larger than 48 inches, a walk-through visual inspection shall be performed.

Incorporate specific inspection requirements for the various types of pipes beneath the general inspection requirements.

Reinforced concrete pipe shall be inspected, evaluated, and reported on in accordance with ASTM C1840, "Standard Practice for Inspection and Acceptance of Installed Reinforced Concrete Culvert, Storm Drain, and Storm Sewer Pipe." Any issues reported shall include still photo and video documentation. The zoom ratio shall be provided for all still or video images that document any issues of concern by the inspection firm.

METHOD OF MEASUREMENT

701-4.1 The length of pipe shall be measured in linear feet of pipe in place, completed, and accepted. It shall be measured along the centerline of the pipe from end or inside face of structure to the end or inside face of structure, whichever is applicable. Each class, type and size of pipe shall be measured separately. All fittings shall be included in the footage as typical pipe sections in the pipe being measured.

BASIS OF PAYMENT

701-5.0 These prices shall fully compensate the Contractor for furnishing all materials and for all preparation, excavation, and installation of these materials; and for all labor, equipment, tools, and incidentals necessary to complete the item.

701-5.1 Payment will be made at the contract unit price per linear foot for Reinforced Concrete Pipe (RCP).

Payment will be made under:

Item 701a	18-inch RCP, Class IV, Complete – per linear foot

Exhibit 1

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

American Association of State Highway and Transportation Officials (AASHTO)

AASHTO M167	Standard Specification for Corrugated Steel Structural Plate, Zinc-Coated, for Field-Bolted Pipe, Pipe-Arches, and Arches
AASHTO M190	Standard Specification for Bituminous-Coated Corrugated Metal Culvert Pipe and Pipe Arches
AASHTO M196	Standard Specification for Corrugated Aluminum Pipe for Sewers and Drains
AASHTO M219	Standard Specification for Corrugated Aluminum Alloy Structural Plate for Field-Bolted Pipe, Pipe-Arches, and Arches
AASHTO M243	Standard Specification for Field Applied Coating of Corrugated Metal Structural Plate for Pipe, Pipe-Arches, and Arches
AASHTO M252	Standard Specification for Corrugated Polyethylene Drainage Pipe
AASHTO M294	Standard Specification for Corrugated Polyethylene Pipe, 300- to 1500-mm (12- to 60-in.) Diameter
AASHTO M304	Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Wall Drain Pipe and Fittings Based on Controlled Inside Diameter
AASHTO MP20	Standard Specification for Steel Reinforced Polyethylene (PE) Ribbed Pipe, 300- to 900-mm (12- to 36-in.) Diameter

ASTM International (ASTM)

ASTM A760	Standard Specification for Corrugated Steel Pipe, Metallic Coated for Sewers and Drains
ASTM A761	Standard Specification for Corrugated Steel Structural Plate, Zinc Coated, for Field-Bolted Pipe, Pipe-Arches, and Arches
ASTM A762	Standard Specification for Corrugated Steel Pipe, Polymer Precoated for Sewers and Drains
ASTM A849	Standard Specification for Post-Applied Coatings, Pavings, and Linings for Corrugated Steel Sewer and Drainage Pipe
ASTM B745	Standard Specification for Corrugated Aluminum Pipe for Sewers and Drains
ASTM C14	Standard Specification for Nonreinforced Concrete Sewer, Storm Drain, and Culvert Pipe
ASTM C76	Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
ASTM C94	Standard Specification for Ready Mixed Concrete
ASTM C144	Standard Specification for Aggregate for Masonry Mortar
ASTM C150	Standard Specification for Portland Cement
ASTM C443	Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets

Exhibit 1

ASTM C506	Standard Specification for Reinforced Concrete Arch Culvert, Storm Drain, and Sewer Pipe
ASTM C507	Standard Specification for Reinforced Concrete Elliptical Culvert, Storm Drain and Sewer Pipe
ASTM C655	Standard Specification for Reinforced Concrete D-Load Culvert, Storm Drain and Sewer Pipe
ASTM C990	Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants
ASTM C1433	Standard Specification for Precast Reinforced Concrete Monolithic Box Sections for Culverts, Storm Drains, and Sewers
ASTM D1056	Standard Specification for Flexible Cellular Materials Sponge or Expanded Rubber
ASTM D3034	Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings
ASTM D3212	Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
ASTM D3262	Standard Specification for "Fiberglass" (Glass-Fiber Reinforced Thermosetting Resin) Sewer Pipe
ASTM D3282	Standard Practice for Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes
ASTM D4161	Standard Specification for "Fiberglass" (Glass-Fiber Reinforced Thermosetting Resin) Pipe Joints Using Flexible Elastomeric Seals
ASTM D6690	Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements
ASTM F477	Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe
ASTM F667	Standard Specification for 3 through 24 in. Corrugated Polyethylene Pipe and Fittings
ASTM F714	Standard Specification for Polyethylene (PE) Plastic Pipe (DR PR) Based on Outside Diameter
ASTM F794	Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe & Fittings Based on Controlled Inside Diameter
ASTM F894	Standard Specification for Polyethylene (PE) Large Diameter Profile Wall Sewer and Drain Pipe
ASTM F949	Standard Specification for Poly (Vinyl Chloride) (PVC) Corrugated Sewer Pipe with a Smooth Interior and Fittings
ASTM F2435	Standard Specification for Steel Reinforced Polyethylene (PE) Corrugated Pipe
ASTM F2562	Specification for Steel Reinforced Thermoplastic Ribbed Pipe and Fittings for Non-Pressure Drainage and Sewerage
ASTM F2736	Standard Specification for 6 to 30 in. (152 to 762 mm) Polypropylene (PP) Corrugated Single Wall Pipe and Double Wall Pipe

Exhibit 1

ASTM F2764	Standard Specification for 30 to 60 in. (750 to 1500 mm) Polypropylene (PP) Triple Wall Pipe and Fittings for Non-Pressure Sanitary Sewer Applications
ASTM F2881	Standard Specification for 12 to 60 in. (300 to 1500 mm) Polypropylene (PP) Dual Wall Pipe and Fittings for Non-Pressure Storm Sewer Applications

National Fire Protection Association (NFPA)

NFPA 415	Standard on Airport Terminal Buildings, Fueling Ramp Drainage, and Loading Walkways

END ITEM D-701

Exhibit 1

ITEM D-705 PIPE UNDERDRAINS FOR AIRPORTS

DESCRIPTION

705-1.1 This item shall consist of the construction of pipe drains in accordance with these specifications and in reasonably close conformity with the lines and grades shown on the plans.

MATERIALS

705-2.1 GENERAL. Materials shall meet the requirements shown on the plans and specified below.

705-2.2 PIPE. The pipe shall be of the type called for on the plans or in the proposal and shall be in accordance with the following appropriate requirements.

AASHTO M252	Standard Specification for Corrugated Polyethylene Drainage Pipe, Type S and SP only.
ASTM F758	Standard Specification for Smooth-Wall Poly (Vinyl Chloride) (PVC) Plastic Underdrain Systems for Highway, Airport, and Similar Drainage

705-2.3 JOINT MORTAR. Not Used.

705-2.4 ELASTOMERIC SEALS. Elastomeric seals shall conform to the requirements of ASTM F477.

705-2.5 POROUS BACKFILL. Porous backfill shall be free of clay, humus, or other objectionable matter, and shall conform to the gradation in Table 1 when tested in accordance with ASTM C136.

Table 1. Gradation of Porous Backfill

Sieve Designation (square openings)	Percentage by Weight Passing Sieves
	Porous Material No. 2
1-1/2 inch (37.5 mm)	**100**
1 inch (25.0 mm)	**90 - 100**
3/8 inch (9.5 mm)	**25 - 60**
No. 4 (4.75 mm)	**5 - 40**
No. 8 (2.36 mm)	**0 - 20**
No. 16 (1.18 mm)	*
No. 50 (300 μm)	*
No. 100 (150 μm)	*

705-2.6 GRANULAR MATERIAL. Granular material used for backfilling shall conform to the requirements of ASTM D2321 for Class IA, IB, or II materials.

705-2.7 FILTER FABRIC. The filter fabric shall conform to the requirements of AASHTO M288 Class 2 or equivalent.

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Table 2. Fabric Properties

Fabric Property	Test Method	Test Requirement
Grab Tensile Strength, lbs	ASTM D4632	125 min
Grab Tensile Elongation %	ASTM D4632	50 min
Burst Strength, psi	ASTM D3785	125 min
Trapezoid Tear Strength, lbs	ASTM D4533	55 min
Puncture Strength, lbs	ASTM D4833	40 min
Abrasion, lbs	ASTM D4886	15 max loss
Equivalent Opening Size	ASTM D4751	70-100
Permittivity sec^{-1}	ASTM D4491	0.80
Accelerated Weathering (UV Stability) (Strength Retained - %)	ASTM D4355 *(500 hrs exposure)	70

705-2.8 CONTROLLED LOW-STRENGTH MATERIAL (CLSM). Controlled low-strength material shall conform to the requirements of Item P-153. All joints shall have elastomeric seals.

CONSTRUCTION METHODS

705-3.1 EQUIPMENT. All equipment required for the construction of pipe underdrains shall be on the project, in good working condition, and approved by the RPR before construction is permitted to start.

705-3.2 EXCAVATION. The width of the pipe trench shall be sufficient to permit satisfactory jointing of the pipe and thorough tamping of the bedding material under and around the pipe, but shall not be less than the external diameter of the pipe plus 6 inches on each side of the pipe. The trench walls shall be approximately vertical.

Where rock, hardpan, or other unyielding material is encountered, it shall be removed below the foundation grade for a depth of at least 4 inches. The excavation below grade shall be backfilled with selected fine compressible material, such as silty clay or loam, and lightly compacted in layers not over 6 inches in uncompacted depth to form a uniform but yielding foundation.

Where a firm foundation is not encountered at the grade established, due to soft, spongy, or other unstable soil, the unstable soil shall be removed and replaced with approved granular material for the full trench width. The RPR shall determine the depth of removal necessary. The granular material shall be compacted to provide adequate support for the pipe.

Excavated material not required or acceptable for backfill shall be disposed of by the Contractor as directed by the RPR. The excavation shall not be carried below the required depth; if this occurs, the trench shall be backfilled at the Contractor's expense with material approved by the RPR and compacted to the density of the surrounding material.

The pipe bedding shall be constructed uniformly over the full length of the pipe barrel, as required on the plans. The maximum aggregate size shall be 1 inch when the bedding thickness is less than 6 inches, and 1-1/2 inch when the bedding thickness is greater than 6 inches. Bedding shall be loosely placed, uncompacted material under the middle third of the pipe prior to placement of the pipe.

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The Contractor shall do trench bracing, sheathing, or shoring necessary to perform and protect the excavation as required for safety and conformance to federal, state and local laws. Unless otherwise provided, the bracing, sheathing, or shoring shall be removed by the Contractor after the backfill has reached at least 12 inches (300 mm) over the top of the pipe. The sheathing or shoring shall be pulled as the granular backfill is placed and compacted to avoid any unfilled spaces between the trench wall and the backfill material. The cost of bracing, sheathing, or shoring, and the removal of same, shall be included in the unit price bid per foot (meter) for the pipe.

705-3.3 LAYING AND INSTALLING PIPE.

a. Concrete pipe. Not Used.

b. Metal pipe. Not Used.

c. PVC, fiberglass, or polyethylene pipe. PVC or polyethylene pipe shall be installed in accordance with the requirements of ASTM D2321. Perforations shall meet the requirements of AASHTO M252 or AASHTO M294 Class 2, unless otherwise indicated on the plans. The pipe shall be laid accurately to line and grade.

d. All types of pipe. The upgrade end of pipelines, not terminating in a structure, shall be plugged or capped as approved by the RPR.

Unless otherwise shown on the plans, a 4-inch bed of granular backfill material shall be spread in the bottom of the trench throughout the entire length under all perforated pipe underdrains.

Pipe outlets for the underdrains shall be constructed when required or shown on the plans. The pipe shall be laid with tight-fitting joints. Porous backfill is not required around or over pipe outlets for underdrains. All connections to other drainage pipes or structures shall be made as required and in a satisfactory manner. If connections are not made to other pipes or structures, the outlets shall be protected and constructed as shown on the plans.

e. Filter fabric. The filter fabric shall be installed in accordance with the manufacturer's recommendations, or in accordance with the AASHTO M288 Appendix, unless otherwise shown on the plans.

705-3.4 MORTAR. The mortar shall be of the desired consistency for caulking and filling the joints of the pipe and for making connections to other pipes or to structures. Mortar that is not used within 45 minutes after water has been added shall be discarded. Retempering of mortar shall not be permitted.

705-3.5 JOINTS IN CONCRETE PIPE. Not Used.

705-3.6 EMBEDMENT AND BACKFILL

a. Earth. All trenches and excavations shall be backfilled soon after the pipes are installed, unless additional protection of the pipe is directed. The embedment material shall be select material from excavation or borrow and shall be approved by the RPR. The select material shall be placed on each side of the pipe out to a distance of the nominal pipe diameter and one foot over the top of the pipe and shall be readily compacted. It shall not contain stones 3 inches or larger in size, frozen lumps, chunks of highly plastic clay, or any other material that is objectionable to the RPR. The material shall be moistened or dried, as required to aid compaction. Placement of the embedment material shall not cause displacement of the pipe. Thorough compaction under the haunches and along the sides to the top of the pipe shall be obtained.

Exhibit 1

The embedment material shall be placed in loose layers not exceeding 6 inches in depth under and around the pipe. Backfill material over the pipe shall be placed in lifts not exceeding 8 inches. Successive layers shall be added and thoroughly compacted by hand and pneumatic tampers, approved by the RPR, until the trench is completely filled and brought to the planned elevation. Embedment and backfilling shall be done to avoid damaging top or side of the pipe.

In embankments and other unpaved areas, the backfill shall be compacted per Item P-152 to the density required for embankments in unpaved areas. Under paved areas, the subgrade and any backfill shall be compacted per Item P-152 to the density required for embankments for paved areas.

b. Granular backfill. When granular backfill is required, placement in the trench and about the pipe shall be as shown on the plans. The granular backfill shall not contain an excessive amount of foreign matter, nor shall soil from the sides of the trench or from the soil excavated from the trench be allowed to filter into the granular backfill. When required by the RPR, a template shall be used to properly place and separate the two sizes of backfill. The backfill shall be placed in loose layers not exceeding 6 inches in depth. The granular backfill shall be compacted by hand and pneumatic tampers to the requirements as given for embankment. Backfilling shall be done to avoid damaging top or side pressure on the pipe. The granular backfill shall extend to the elevation of the trench or as shown on the plans.

When perforated pipe is specified, granular backfill material shall be placed along the full length of the pipe. The position of the granular material shall be as shown on the plans. If the original material excavated from the trench is pervious and suitable, it shall be used in lieu of porous backfill No. 1.

If porous backfill is placed in paved or adjacent to paved areas before grading or subgrade operations is completed, the backfill material shall be placed immediately after laying the pipe. The depth of the granular backfill shall be not less than 12 inches, measured from the top of the underdrain. During subsequent construction operations, a minimum depth of 12 inches of backfill shall be maintained over the underdrains. When the underdrains are to be completed, any unsuitable material shall be removed exposing the porous backfill. Porous backfill containing objectionable material shall be removed and replaced with suitable material. The cost of removing and replacing any unsuitable material shall be at the Contractor's expense.

If a granular subbase blanket course is used which extends several feet beyond the edge of paving to the outside edge of the underdrain trench, the granular backfill material over the underdrains shall be placed in the trench up to an elevation of 2 inches above the bottom surface of the granular subbase blanket course. Immediately prior to the placing of the granular subbase blanket course, the Contractor shall blade this excess trench backfill from the top of the trench onto the adjacent subgrade where it can be incorporated into the granular subbase blanket course. Any unsuitable material that remains over the underdrain trench shall be removed and replaced. The subbase material shall be placed to provide clean contact between the subbase material and the underdrain granular backfill material for the full width of the underdrain trench.

c. Controlled low-strength material (CLSM). Controlled low-strength material shall conform to the requirements of Item P-153.

705-3.7 FLEXIBLE PIPE RING DEFLECTION. The flexible pipe shall be inspected by the Contractor during and after installation to ensure that the internal diameter of the pipe barrel has not been reduced by

Exhibit 1

more than 5 percent. For guidance on properly sizing mandrels, refer to ASTM D3034 and ASTM F679 appendices.

705-3.8 CONNECTIONS. When the plans call for connections to existing or proposed pipe or structures, these connections shall be watertight and made to obtain a smooth uniform flow line throughout the drainage system.

705-3.9 CLEANING AND RESTORATION OF SITE. After the backfill is completed, the Contractor shall dispose of all surplus material, soil, and rubbish from the site. Surplus soil may be deposited in embankments, shoulders, or as directed by the RPR. Except for paved areas of the airport, the Contractor shall restore all disturbed areas to their original condition.

METHOD OF MEASUREMENT

705-4.1 The length of pipe shall be the number of linear feet of pipe underdrains in place, completed, and approved; measured along the centerline of the pipe from end or inside face of structure to the end or inside face of structure, whichever is applicable. The several classes, types, and sizes shall be measured separately. All fittings shall be included in the footage as typical pipe sections in the pipeline being measured.

705-4.2 Underdrain pipe cleanout shall be measured per each installed, completed and approved.

BASIS OF PAYMENT

705-5.1 Payment will be made at the contract unit price per linear foot for pipe underdrains of the type, class, and size designated.

705-5.2 UNDERDRAIN PIPE, 6-INCH, PERFORATED, COMPLETE. Perforated pipe underdrains, complete (including, excavation, bedding, porous backfill, pipe fittings, filter fabric and backfill) shall be made at the contract unit price per linear foot complete (including porous backfill and filter fabric.

705-5.3 UNDERDRAIN PIPE, 6-INCH NON-PERFORATED, COMPLETE. Non-perforated pipe underdrains, compete (including, excavation, bedding and backfill) shall be made at the contract unit price per linear foot complete.

705-5.4 UNDERDRAIN PIPE CLEANOUT. Underdrain pipe cleanout will be paid for at the contract unit price per each in place when completed. This price shall be full compensation for furnishing all materials and for all preparation, excavation, backfilling and placing of the materials including filter fabric, wyes, tees, pipes, fittings, castings, and encasement; furnishing and installation of such specials and connections to pipes and other structures as may be required to complete the item as shown on the plans; and for all labor equipment, tools and incidentals necessary to complete the cleanout.

These prices shall be full compensation for furnishing all materials and for all preparation, excavation, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item D-705a	Underdrain Pipe, 6-inch - per linear foot
Item D-705b	Underdrain Pipe Cleanout - per each

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REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM A760	Standard Specification for Corrugated Steel Pipe, Metallic Coated for Sewers and Drains
ASTM A762	Standard Specification for Corrugated Steel Pipe, Polymer Precoated for Sewers and Drains
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C144	Standard Specification for Aggregate for Masonry Mortar
ASTM C150	Standard Specification for Portland Cement
ASTM C444	Standard Specification for Perforated Concrete Pipe
ASTM C654	Standard Specification for Porous Concrete Pipe
ASTM D2321	Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications
ASTM D3262	Standard Specification for "Fiberglass" (Glass-Fiber Reinforced Thermosetting Resin) Sewer Pipe
ASTM D4161	Standard Specification for "Fiberglass" (Glass-Fiber Reinforced Thermosetting Resin) Pipe Joints Using Flexible Elastomeric Seals
ASTM F477	Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe
ASTM F758	Standard Specification for Smooth Wall Poly (Vinyl Chloride) (PVC) Plastic Underdrain Systems for Highway, Airport, and Similar Drainage
ASTM F794	Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe & Fittings Based on Controlled Inside Diameter
ASTM F949	Standard Specification for Poly (Vinyl Chloride) (PVC) Corrugated Sewer Pipe with a Smooth Interior and Fittings
ASTM F2562	Specification for Steel Reinforced Thermoplastic Ribbed Pipe and Fittings for Non-Pressure Drainage and Sewerage

American Association of State Highway and Transportation Officials (AASHTO)

AASHTO M190	Standard Specification for Bituminous - Coated Corrugated Metal Culvert Pipe and Pipe Arches
AASHTO M196	Standard Specification for Corrugated Aluminum Pipe for Sewers and Drains
AASHTO M252	Standard Specification for Corrugated Polyethylene Drainage Pipe
AASHTO M288	Standard Specification for Geotextile Specification for Highway Applications
AASHTO M294	Standard Specification for Corrugated Polyethylene Pipe, 300- to 1500- mm (12- to 60-in.) Diameter
AASHTO M304	Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Wall Drain Pipe and Fittings Based on Controlled Inside Diameter
AASHTO MP20	Standard Specification for Steel-Reinforced Polyethylene (PE) Ribbed Pipe, 300- to 900-mm (12- to 36-in.) diameter
AASHTO	Standard Specifications for Highway Bridges

****END OF ITEM D-705****

Exhibit 1

Item D-751 Manholes, Catch Basins, Inlets and Inspection Holes

DESCRIPTION

751-1.1 This item shall consist of construction of manholes, catch basins, inlets, and inspection holes, in accordance with these specifications, at the specified locations and conforming to the lines, grades, and dimensions shown on the plans or required by the RPR.

MATERIALS

751-2.1 BRICK. Not used.

751-2.2 MORTAR. Mortar shall consist of one part Portland cement and two parts sand. The cement shall conform to the requirements of ASTM C150, Type I. The sand shall conform to the requirements of ASTM C144.

751-2.3 CONCRETE. Plain and reinforced concrete used in structures, connections of pipes with structures, and the support of structures or frames shall conform to the requirements of Item P-610.

751-2.4 PRECAST CONCRETE PIPE MANHOLE RINGS. Precast concrete pipe manhole rings shall conform to the requirements of ASTM C478. Unless otherwise specified, the risers and offset cone sections shall have an inside diameter of not less than 36 inches (90 cm) nor more than 48 inches (120 cm). There shall be a gasket between individual sections and sections cemented together with mortar on the inside of the manhole. Gaskets shall conform to the requirements of ASTM C443.

751-2.5 CORRUGATED METAL. Corrugated metal shall conform to the requirements of American Association of State Highway and Transportation Officials (AASHTO) M36.

751-2.6 FRAMES, COVERS, AND GRATES. The castings shall conform to one of the following requirements:

- **a.** ASTM A48, Class 35B: Gray iron castings
- **b.** ASTM A47: Malleable iron castings
- **c.** ASTM A27: Steel castings
- **d.** ASTM A283, Grade D: Structural steel for grates and frames
- **e.** ASTM A536, Grade 65-45-12: Ductile iron castings
- **f.** ASTM A897: Austempered ductile iron castings

All castings or structural steel units shall conform to the dimensions shown on the plans and shall be designed to support the loadings, aircraft gear configuration and/or direct loading, specified.

Each frame and cover or grate unit shall be provided with fastening members to prevent it from being dislodged by traffic but which will allow easy removal for access to the structure.

All castings shall be thoroughly cleaned. After fabrication, structural steel units shall be galvanized to meet the requirements of ASTM A123.

751-2.7 STEPS. The steps or ladder bars shall be gray or malleable cast iron or galvanized steel. The steps shall be the size, length, and shape shown on the plans and those steps that are not galvanized shall be given a coat of asphalt paint, when directed.

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751-2.8 PRECAST INLET STRUCTURES. Manufactured in accordance with and conforming to ASTM C913.

CONSTRUCTION METHODS

751-3.1 UNCLASSIFED EXCAVATION.

a. The Contractor shall excavate for structures and footings to the lines and grades or elevations, shown on the plans, or as staked by the RPR. The excavation shall be of sufficient size to permit the placing of the full width and length of the structure or structure footings shown. The elevations of the bottoms of footings, as shown on the plans, shall be considered as approximately only; and the RPR may direct, in writing, changes in dimensions or elevations of footings necessary for a satisfactory foundation.

b. Boulders, logs, or any other objectionable material encountered in excavation shall be removed. All rock or other hard foundation material shall be cleaned of all loose material and cut to a firm surface either level, stepped, or serrated, as directed by the RPR. All seams or crevices shall be cleaned out and grouted. All loose and disintegrated rock and thin strata shall be removed. Where concrete will rest on a surface other than rock, the bottom of the excavation shall not be disturbed and excavation to final grade shall not be made until immediately before the concrete or reinforcing is placed.

c. The Contractor shall do all bracing, sheathing, or shoring necessary to implement and protect the excavation and the structure as required for safety or conformance to governing laws. The cost of bracing, sheathing, or shoring shall be included in the unit price bid for the structure.

d. All bracing, sheathing, or shoring involved in the construction of this item shall be removed by the Contractor after the completion of the structure. Removal shall not disturb or damage finished masonry. The cost of removal shall be included in the unit price bid for the structure.

e. After excavation is completed for each structure, the Contractor shall notify the RPR. No concrete or reinforcing steel shall be placed until the RPR has approved the depth of the excavation and the character of the foundation material.

751-3.2 BRICK STRUCTURES. Not used.

751-3.3 CONCRETE STRUCTURES. Concrete structures which are to be cast-in-place within the project boundaries shall be built on prepared foundations, conforming to the dimensions and shape indicated on the plans. The construction shall conform to the requirements specified in Item P-610. Any reinforcement required shall be placed as indicated on the plans and shall be approved by the RPR before the concrete is placed.

All invert channels shall be constructed and shaped accurately to be smooth, uniform, and cause minimum resistance to flowing water. The interior bottom shall be sloped to the outlet.

751-3.4 PRECAST CONCRETE STRUCTURES. Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or another RPR approved third party certification program.

Precast concrete structures shall conform to ASTM C478. Precast concrete structures shall be constructed on prepared or previously placed slab foundations conforming to the dimensions and locations shown on the plans. All precast concrete sections necessary to build a completed structure shall be furnished. The different

sections shall fit together readily. Joints between precast concrete risers and tops shall be full-bedded in cement mortar and shall: (1) be smoothed to a uniform surface on both interior and exterior of the structure or (2) utilize a rubber gasket per ASTM C443. The top of the upper precast concrete section shall be suitably formed and dimensioned to receive the metal frame and cover or grate, or other cap, as required. Provision shall be made for any connections for lateral pipe, including drops and leads that may be installed in the structure. The flow lines shall be smooth, uniform, and cause minimum resistance to flow. The metal or metal encapsulated steps that are embedded or built into the side walls shall be aligned and placed in accordance to ASTM C478. When a metal ladder replaces the steps, it shall be securely fastened into position.

751-3.5 CORRUGATED METAL STRUCTURES. Corrugated metal structures shall be prefabricated. All standard or special fittings shall be furnished to provide pipe connections or branches with the correct dimensions and of sufficient length to accommodate connecting bands. The fittings shall be welded in place to the metal structures. The top of the metal structure shall be designed so that either a concrete slab or metal collar may be attached to allow the fastening of a standard metal frame and grate or cover. Steps or ladders shall be furnished as shown on the plans. Corrugated metal structures shall be constructed on prepared foundations, conforming to the dimensions and locations as shown on the plans. When indicated, the structures shall be placed on a reinforced concrete base.

751-3.6 INLET AND OUTLET PIPES. Inlet and outlet pipes shall extend through the walls of the structures a sufficient distance beyond the outside surface to allow for connections. They shall be cut off flush with the wall on the inside surface of the structure, unless otherwise directed. For concrete or brick structures, mortar shall be placed around these pipes to form a tight, neat connection.

751-3.7 PLACEMENT AND TREATMENT OF CASTINGS, FRAMES, AND FITTINGS. All castings, frames, and fittings shall be placed in the positions indicated on the plans or as directed by the RPR, and shall be set true to line and elevation. If frames or fittings are to be set in concrete or cement mortar, all anchors or bolts shall be in place before the concrete or mortar is placed. The unit shall not be disturbed until the mortar or concrete has set.

When frames or fittings are placed on previously constructed masonry, the bearing surface of the masonry shall be brought true to line and grade and shall present an even bearing surface so the entire face or back of the unit will come in contact with the masonry. The unit shall be set in mortar beds and anchored to the masonry as indicated on the plans or as directed by the RPR. All units shall set firm and secure.

After the frames or fittings have been set in final position, the concrete or mortar shall be allowed to harden for seven (7) days before the grates or covers are placed and fastened down.

751-3.8 INSTALLATION OF STEPS. The steps shall be installed as indicated on the plans or as directed by the RPR. When the steps are to be set in concrete, they shall be placed and secured in position before the concrete is placed. When the steps are installed in brick masonry, they shall be placed as the masonry is being built. The steps shall not be disturbed or used until the concrete or mortar has hardened for at least seven (7) days. After seven (7) days, the steps shall be cleaned and painted, unless they have been galvanized.

When steps are required with precast concrete structures they shall meet the requirements of ASTM C478. The steps shall be cast into the side of the sections at the time the sections are manufactured or set in place after the structure is erected by drilling holes in the concrete and cementing the steps in place.

When steps are required with corrugated metal structures, they shall be welded into aligned position at a vertical spacing of 12 inches.

Instead of steps, prefabricated ladders may be installed. For brick or concrete structures, the ladder shall be held in place by grouting the supports in drilled holes. For metal structures, the ladder shall be secured by

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welding the top support to the structure and grouting the bottom support into drilled holes in the foundation or as directed by the RPR.

751-3.9 BACKFILLING.

a. After a structure has been completed, the area around it shall be backfilled with approved material, in horizontal layers not to exceed 8 inches in loose depth, and compacted to the density required in Item P-152. Each layer shall be deposited evenly around the structure to approximately the same elevation. The top of the fill shall meet the elevation shown on the plans or as directed by the RPR.

b. Backfill shall not be placed against any structure until approved by the RPR. For concrete structures, approval shall not be given until the concrete has been in place seven (7) days, or until tests establish that the concrete has attained sufficient strength to withstand any pressure created by the backfill and placing methods.

c. Backfill shall not be measured for direct payment. Performance of this work shall be considered an obligation of the Contractor covered under the contract unit price for the structure involved.

751-3.10 CLEANING AND RESTORATION OF SITE. After the backfill is completed, the Contractor shall dispose of all surplus material, dirt, and rubbish from the site. Surplus dirt may be deposited in embankments, shoulders, or as approved by the RPR. The Contractor shall restore all disturbed areas to their original condition. The Contractor shall remove all tools and equipment, leaving the entire site free, clear, and in good condition.

METHOD OF MEASUREMENT

751-4.1 Manholes, catch basins, inlets, and inspection holes shall be measured by the unit.

BASIS OF PAYMENT

751-5.1 The accepted quantities of manholes, catch basins, inlets, and inspection holes will be paid for at the contract unit price per each in place when completed. This price shall be full compensation for furnishing all materials and for all preparation, excavation, backfilling and placing of the materials; furnishing and installation of such specials and connections to pipes and other structures as may be required to complete the item as shown on the plans; and for all labor equipment, tools and incidentals necessary to complete the structure.

Payment will be made under:

Item D-751a	Storm Manhole – per each
Item D-751b	Storm Inlet – per each
Item D-751c	Connect to Existing Manhole/Inlet/Cleanout/Underdrain– per each
Item D-751d	Adjust Existing Inlet to Grade – per each

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Exhibit 1

ASTM International (ASTM)

ASTM A27	Standard Specification for Steel Castings, Carbon, for General Application
ASTM A47	Standard Specification for Ferritic Malleable Iron Castings
ASTM A48	Standard Specification for Gray Iron Castings
ASTM A123	Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A283	Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates
ASTM A536	Standard Specification for Ductile Iron Castings
ASTM A897	Standard Specification for Austempered Ductile Iron Castings
ASTM C32	Standard Specification for Sewer and Manhole Brick (Made from Clay or Shale)
ASTM C144	Standard Specification for Aggregate for Masonry Mortar
ASTM C150	Standard Specification for Portland Cement
ASTM C443	Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets.
ASTM C478	Standard Specification for Precast Reinforced Concrete Manhole Sections
ASTM C913	Standard Specification for Precast Concrete Water and Wastewater Structures.

American Association of State Highway and Transportation Officials (AASHTO)

AASHTO M36	Standard Specification for Corrugated Steel Pipe, Metallic-Coated, for Sewers and Drains

****END OF ITEM D-751****

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Item D-754 Concrete Gutters, Ditches, and Flumes

DESCRIPTION

754-1.1 This item shall consist of Portland cement concrete gutters, ditches, and flumes constructed in accordance with these specifications at the specified locations in accordance with the dimensions, lines, and grades as shown on the plans.

MATERIALS

754-2.1 CONCRETE. Plain and reinforced concrete shall meet the requirements of Item P-610.

754-2.2 JOINTS. Joint filler materials and premolded joint material shall conform to Item P-605.

CONSTRUCTION METHODS

754-3.1 PREPARING SUBGRADE. Excavation shall be made to the required width and depth, and the subgrade upon which the item is to be built shall be compacted to a firm uniform grade. All soft and unsuitable material shall be removed and replaced with suitable approved material. When required, a layer of approved granular material, compacted to the thickness indicated on the plans, shall be placed to form a subbase. The underlying course shall be checked and accepted by the RPR before placing and spreading operations are started.

754-3.2 PLACING. The forms and the mixing, placing, finishing, and curing of concrete shall conform to the requirements of Item P-610 and the following requirements.

The concrete shall be tamped until it is consolidated and mortar covers the top surface. The surface of the concrete shall be floated smooth and the edges rounded to the radii shown on the plans. Before the concrete is given the final finishing, the surface shall be tested with a 12-foot straightedge, and any irregularities of more than 1/4 inch in 12-foot shall be eliminated.

The concrete shall be placed with dummy-grooved joints not to exceed 8 feet apart.

Expansion joints of the type called for in the plans shall be constructed to replace dummy groove joints at a spacing of approximately 100 feet. When the gutter is placed next to concrete pavement, expansion joints in the gutter shall be located opposite expansion joints in the pavement. When a gutter abuts a pavement or other structure, an expansion joint shall be placed between the gutter and the other structure.

Forms shall not be removed within 24 hours after the concrete has been placed. Minor defects shall be repaired with mortar containing one (1) part cement and two (2) parts fine aggregate.

Depositing, compacting, and finishing the item shall be conducted to build a satisfactory structure. If any section of concrete is found to be porous, or is otherwise defective, it shall be removed and replaced by the Contractor without additional compensation.

754-3.3 BACKFILLING After the concrete has set sufficiently, the spaces adjacent to the structure shall be refilled to the required elevation with material specified on the plans and compacted by mechanical equipment

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to at least 90% of the maximum density as determined by ASTM D698. The in-place density shall be determined in accordance with ASTM D1556.

754-3.4 CLEANING AND RESTORATION OF SITE. After the backfill is completed, the Contractor shall dispose of all surplus material, dirt, and rubbish from the site. Surplus dirt may be deposited in embankments, shoulders, or as ordered by the RPR. The Contractor shall restore all disturbed areas to their original condition. The Contractor shall remove all tools and equipment, leaving the entire site free, clear and in good condition.

Performance of the work described in this section shall be considered as a subsidiary obligation of the Contractor, covered under the contract unit price for the structure.

METHOD OF MEASUREMENT

754-4.1 Concrete shall be measured by the linear foot. No deductions shall be made for the volume occupied by reinforcing steel, anchors, conduits, weep holes, or piling.

754-4.2 Reinforcing steel shall be incidental to the cost of concrete. No separate measurement shall be made.

BASIS OF PAYMENT

754-5.1 The accepted quantities of structural concrete will be paid for at the contract unit price per linear foot, complete in place. Concrete apron shall be measured in a straight line through the catch basin.

Payment will be made under:

Item D-754-5.1	Construct Concrete Valley Gutter and Apron – per linear foot

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM D698	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lb/ft^3 (600 kN-m/m^3))
ASTM D1556	Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method

****END OF ITEM D-754****

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ITEM T-901 SEEDING

DESCRIPTION

901-1.1 This item shall consist of soil preparation, seeding and fertilizing the areas shown on the plans or as directed by the RPR in accordance with these specifications.

MATERIALS

901-2.1 SEED. The species and application rates of grass, legume, and cover-crop seed furnished shall be those stipulated herein. Seed shall conform to the requirements of Federal Specification JJJ-S-181, Federal Specification, Seeds, Agricultural.

Seed shall be furnished separately or in mixtures in standard containers labeled in conformance with the Agricultural Marketing Service (AMS) Seed Act and applicable state seed laws with the seed name, lot number, net weight, percentages of purity and of germination and hard seed, and percentage of maximum weed seed content clearly marked for each kind of seed. The Contractor shall furnish the RPR duplicate signed copies of a statement by the vendor certifying that each lot of seed has been tested by a recognized laboratory for seed testing within six (6) months of date of delivery. This statement shall include: name and address of laboratory, date of test, lot number for each kind of seed, and the results of tests as to name, percentages of purity and of germination, and percentage of weed content for each kind of seed furnished, and, in case of a mixture, the proportions of each kind of seed. Wet, moldy, or otherwise damaged seed will be rejected.

Seeds shall be applied as follows:

Seed Properties and Rate of Application

Component	Rate of Application lb/acre
Vulpir Myuros (14%)	8
Blando Brome (34%)	20
Trifolium Hirtum (52%)	30
Mulch	2,000
M-Binder	200
Commercial Fertilizer	300

901-2.2 LIME. Not required

901-2.3 FERTILIZER. Fertilizer shall be standard commercial fertilizers supplied separately or in mixtures containing the percentages of total nitrogen, available phosphoric acid, and water-soluble potash. They shall be applied at the rate and to the depth specified, and shall meet the requirements of applicable state laws. They shall be furnished in standard containers with name, weight, and guaranteed analysis of contents clearly marked thereon. No cyanamide compounds or hydrated lime shall be permitted in mixed fertilizers.

The fertilizers may be supplied in one of the following forms:

a. A finely-ground fertilizer soluble in water, suitable for application by power sprayers; or

Fertilizers shall be 22-10-5 commercial fertilizer and shall be spread at the rate of 200-lb per acre.

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901-2.4 SOIL FOR REPAIRS. The soil for fill and topsoiling of areas to be repaired shall be at least of equal quality to that which exists in areas adjacent to the area to be repaired. The soil shall be relatively free from large stones, roots, stumps, or other materials that will interfere with subsequent sowing of seed, compacting, and establishing turf, and shall be approved by the RPR before being placed.

CONSTRUCTION METHODS

901-3.1 ADVANCE PREPARATION AND CLEANUP. After grading of areas has been completed and before applying fertilizer and ground limestone, areas to be seeded shall be raked or otherwise cleared of stones larger than 2 inches in any diameter, sticks, stumps, and other debris that might interfere with sowing of seed, growth of grasses, or subsequent maintenance of grass-covered areas. If any damage by erosion or other causes has occurred after the completion of grading and before beginning the application of fertilizer and ground limestone, the Contractor shall repair such damage include filling gullies, smoothing irregularities, and repairing other incidental damage.

An area to be seeded shall be considered a satisfactory seedbed without additional treatment if it has recently been thoroughly loosened and worked to a depth of not less than 5 inches as a result of grading operations and, if immediately prior to seeding, the top 3 inches of soil is loose, friable, reasonably free from large clods, rocks, large roots, or other undesirable matter, and if shaped to the required grade.
When the area to be seeded is sparsely sodded, weedy, barren and unworked, or packed and hard, any grass and weeds shall first be cut or otherwise satisfactorily disposed of, and the soil then scarified or otherwise loosened to a depth not less than 5 inches. Clods shall be broken and the top 3 inches of soil shall be worked into a satisfactory seedbed by discing, or by use of cultipackers, rollers, drags, harrows, or other appropriate means.

901-3.2 DRY APPLICATION METHOD. Not Used.

901-3.3 WET APPLICATION METHOD.

a. **General.** The Contractor may elect to apply seed and fertilizer (and lime, if required) by spraying them on the previously prepared seedbed in the form of an aqueous mixture and by using the methods and equipment described herein. The rates of application shall be as specified in the special provisions.

b. **Spraying equipment.** The spraying equipment shall have a container or water tank equipped with a liquid level gauge calibrated to read in increments not larger than 50 gallons over the entire range of the tank capacity, mounted so as to be visible to the nozzle operator. The container or tank shall also be equipped with a mechanical power-driven agitator capable of keeping all the solids in the mixture in complete suspension at all times until used.

The unit shall also be equipped with a pressure pump capable of delivering 100 gallons per minute at a pressure of 100 lb / sq inches. The pump shall be mounted in a line that will recirculate the mixture through the tank whenever it is not being sprayed from the nozzle. All pump passages and pipe lines shall be capable of providing clearance for 5/8 inch (16 mm) solids. The power unit for the pump and agitator shall have controls mounted so as to be accessible to the nozzle operator. There shall be an indicating pressure gauge connected and mounted immediately at the back of the nozzle.

The nozzle pipe shall be mounted on an elevated supporting stand in such a manner that it can be rotated through 360 degrees horizontally and inclined vertically from at least 20 degrees below to at least 60 degrees above the horizontal. There shall be a quick-acting, three-way control valve connecting the recirculating line to the nozzle pipe and mounted so that the nozzle operator can

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control and regulate the amount of flow of mixture delivered to the nozzle. At least three different types of nozzles shall be supplied so that mixtures may be properly sprayed over distance varying from 20 to 100 feet. One shall be a close-range ribbon nozzle, one a medium-range ribbon nozzle, and one a long-range jet nozzle. For case of removal and cleaning, all nozzles shall be connected to the nozzle pipe by means of quick-release couplings.

In order to reach areas inaccessible to the regular equipment, an extension hose at least 50 feet in length shall be provided to which the nozzles may be connected.

c. Mixtures. Lime, if required, shall be applied separately, in the quantity specified, prior to the fertilizing and seeding operations. Not more than 220 pounds of lime shall be added to and mixed with each 100 gallons of water. Seed and fertilizer shall be mixed together in the relative proportions specified, but not more than a total of 220 pounds of these combined solids shall be added to and mixed with each 100 gallons of water.

All water used shall be obtained from fresh water sources and shall be free from injurious chemicals and other toxic substances harmful to plant life. The Contractor shall identify to the RPR all sources of water at least two (2) weeks prior to use. The RPR may take samples of the water at the source or from the tank at any time and have a laboratory test the samples for chemical and saline content. The Contractor shall not use any water from any source that is disapproved by the RPR following such tests.

All mixtures shall be constantly agitated from the time they are mixed until they are finally applied to the seedbed. All such mixtures shall be used within two (2) hours from the time they were mixed or they shall be wasted and disposed of at approved locations.

d. Spraying. Lime, if required, shall be sprayed only upon previously prepared seedbeds. After the applied lime mixture has dried, the lime shall be worked into the top 3 inches, after which the seedbed shall again be properly graded and dressed to a smooth finish.

Mixtures of seed and fertilizer shall only be sprayed upon previously prepared seedbeds on which the lime, if required, shall already have been worked in. The mixtures shall be applied by means of a high-pressure spray that shall always be directed upward into the air so that the mixtures will fall to the ground like rain in a uniform spray. Nozzles or sprays shall never be directed toward the ground in such a manner as might produce erosion or runoff.

Particular care shall be exercised to ensure that the application is made uniformly and at the prescribed rate and to guard against misses and overlapped areas. Proper predetermined quantities of the mixture in accordance with specifications shall be used to cover specified sections of known area.

Checks on the rate and uniformity of application may be made by observing the degree of wetting of the ground or by distributing test sheets of paper or pans over the area at intervals and observing the quantity of material deposited thereon.

On surfaces that are to be mulched as indicated by the plans or designated by the RPR, seed and fertilizer applied by the spray method need not be raked into the soil or rolled. However, on surfaces on which mulch is not to be used, the raking and rolling operations will be required after the soil has dried.

901-3.4 MAINTENANCE OF SEEDED AREAS. The Contractor shall protect seeded areas against traffic or other use by warning signs or barricades, as approved by the RPR. Surfaces gullied or otherwise damaged

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following seeding shall be repaired by regrading and reseeding as directed. The Contractor shall mow, water as directed, and otherwise maintain seeded areas in a satisfactory condition until final inspection and acceptance of the work.

When either the dry or wet application method outlined above is used for work done out of season, it will be required that the Contractor establish a good stand of grass of uniform color and density to the satisfaction of the RPR. A grass stand shall be considered adequate when bare spots are one square foot or less, randomly dispersed, and do not exceed 3% of the area seeded.

METHOD OF MEASUREMENT

901-4.1 The quantity of seeding to be paid for shall be the number of acres measured on the ground surface, completed and accepted.

BASIS OF PAYMENT

901-5.1 Payment shall be made at the contract unit price per acre or fraction thereof, which price and payment shall be full compensation for furnishing and placing all material and for all labor, equipment, tools, and incidentals necessary to complete the work prescribed in this item.

Payment will be made under:

Item T-901a	Seeding – per acre

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

<u>ASTM International (ASTM)</u>

ASTM C602	Standard Specification for Agricultural Liming Materials

<u>Federal Specifications (FED SPEC)</u>

FED SPEC	JJJ-S-181, Federal Specification, Seeds, Agricultural

<u>Advisory Circulars (AC)</u>

AC 150/5200-33	Hazardous Wildlife Attractants on or Near Airports

<u>FAA/United States Department of Agriculture</u>

Wildlife Hazard Management at Airports, A Manual for Airport Personnel

****END OF ITEM T-901****

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ITEM T-905 TOPSOIL

DESCRIPTION

905-1.1 This item shall consist of preparing the ground surface for topsoil application, removing topsoil from designated stockpiles or areas to be stripped on the site or from approved sources off the site, and placing and spreading the topsoil on prepared areas in accordance with this specification at the locations shown on the plans or as directed by the RPR.

MATERIALS

905-2.1 TOPSOIL. Topsoil shall be the surface layer of soil with no admixture of refuse or any material toxic to plant growth, and it shall be reasonably free from subsoil and stumps, roots, brush, stones (2 inches (50 mm) or more in diameter), and clay lumps or similar objects. Brush and other vegetation that will not be incorporated with the soil during handling operations shall be cut and removed. Ordinary sod and herbaceous growth such as grass and weeds are not to be removed, but shall be thoroughly broken up and intermixed with the soil during handling operations. Heavy sod or other cover, which cannot be incorporated into the topsoil by discing or other means, shall be removed. The topsoil or soil mixture, unless otherwise specified or approved, shall have a pH range of approximately 5.5 pH to 7.6 pH, when tested in accordance with the methods of testing of the Association of Official Agricultural Chemists in effect on the date of invitation of bids. The organic content shall be not less than 3% nor more than 20% as determined by the wet-combustion method (chromic acid reduction). There shall be not less than 20% nor more than 80% of the material passing the 200 mesh (75 μm) sieve as determined by the wash test in accordance with ASTM C117.

Natural topsoil may be amended by the Contractor with approved materials and methods to meet the above specifications.

905-2.2 INSPECTION AND TESTS. Within 10 days following acceptance of the bid, the RPR shall be notified of the source of topsoil to be furnished by the Contractor. The topsoil shall be inspected to determine if the selected soil meets the requirements specified and to determine the depth to which stripping will be permitted. At this time, the Contractor may be required to take representative soil samples from several locations within the area under consideration and to the proposed stripping depths, for testing purposes as specified in paragraph 905-2.1.

CONSTRUCTION METHODS

905-3.1 GENERAL. Areas to be topsoiled shall be shown on the plans. If topsoil is available on the site, the location of the stockpiles or areas to be stripped of topsoil and the stripping depths shall be shown on the plans.

Suitable equipment necessary for proper preparation and treatment of the ground surface, stripping of topsoil, and for the handling and placing of all required materials shall be on hand, in good condition, and approved by the RPR before the various operations are started.

905-3.2 PREPARING THE GROUND SURFACE. Immediately prior to dumping and spreading the topsoil on any area, the surface shall be loosened by discs or spike-tooth harrows, or by other means approved by the RPR, to a minimum depth of 2 inches to facilitate bonding of the topsoil to the covered subgrade soil. The surface of the area to be topsoiled shall be cleared of all stones larger than 2 inches in any diameter and all litter or other material which may be detrimental to proper bonding, the rise of capillary moisture, or the proper growth of the desired planting. Limited areas, as shown on the plans, which are too compact to respond to these operations shall receive special scarification.

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Grades on the area to be topsoiled, which have been established by others as shown on the plans, shall be maintained in a true and even condition. Where grades have not been established, the areas shall be smooth-graded and the surface left at the prescribed grades in an even and compacted condition to prevent the formation of low places or pockets where water will stand.

905-3.3 OBTAINING TOPSOIL. Prior to the stripping of topsoil from designated areas, any vegetation, briars, stumps and large roots, rubbish or stones found on such areas, which may interfere with subsequent operations, shall be removed using methods approved by the RPR. Heavy sod or other cover, which cannot be incorporated into the topsoil by discing or other means shall be removed.

When suitable topsoil is available on the site, the Contractor shall remove this material from the designated areas and to the depth as directed by the RPR. The topsoil shall be spread on areas already tilled and smooth-graded, or stockpiled in areas approved by the RPR. Any topsoil stockpiled by the Contractor shall be rehandled and placed without additional compensation. Any topsoil that has been stockpiled on the site by others, and is required for topsoil purposes, shall be removed and placed by the Contractor. The sites of all stockpiles and areas adjacent thereto which have been disturbed by the Contractor shall be graded if required and put into a condition acceptable for seeding.

When suitable topsoil is secured off the airport site, the Contractor shall locate and obtain the supply, subject to the approval of the RPR. The Contractor shall notify the RPR sufficiently in advance of operations in order that necessary measurements and tests can be made. The Contractor shall remove the topsoil from approved areas and to the depth as directed. The topsoil shall be hauled to the site of the work and placed for spreading, or spread as required. Any topsoil hauled to the site of the work and stockpiled shall be rehandled and placed without additional compensation.

905-3.4 PLACING TOPSOIL. The topsoil shall be evenly spread on the prepared areas to a uniform depth of 2 inches after compaction, unless otherwise shown on the plans or stated in the special provisions. Spreading shall not be done when the ground or topsoil is frozen, excessively wet, or otherwise in a condition detrimental to the work. Spreading shall be carried on so that turfing operations can proceed with a minimum of soil preparation or tilling.

After spreading, any large, stiff clods and hard lumps shall be broken with a pulverizer or by other effective means, and all stones or rocks (2 inches (50 mm) or more in diameter), roots, litter, or any foreign matter shall be raked up and disposed of by the Contractor. after spreading is completed, the topsoil shall be satisfactorily compacted by rolling with a cultipacker or by other means approved by the RPR. The compacted topsoil surface shall conform to the required lines, grades, and cross-sections. Any topsoil or other dirt falling upon pavements as a result of hauling or handling of topsoil shall be promptly removed.

METHOD OF MEASUREMENT

905-4.1 Topsoil obtained on the site and/or amended shall not be measured separately but shall be considered incidental to Item P-152.

905-4.2 Topsoil obtained off the site shall be measured by the number of cubic yards of topsoil measured in its original position and stripped or excavated. Topsoil shall be measured by volume in cubic yards computed by the method of end areas.

BASIS OF PAYMENT

905-5.1 No separate payment will be made for topsoil obtained on the site. Topsoil, testing, and any amendments to the topsoil shall be considered incidental to Item P-152.

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905-5.2 Payment will be made at the contract unit price per cubic yard for topsoil obtained off the site. This price shall be full compensation for furnishing all materials and for all preparation, placing, and spreading of the materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item T-905a	Topsoil (Imported) - per cubic yard

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM C117	Materials Finer than 75 µm (No. 200) Sieve in Mineral Aggregates by Washing

Advisory Circulars (AC)

AC 150/5200-33	Hazardous Wildlife Attractants on or Near Airports

FAA/United States Department of Agriculture

Wildlife Hazard Management at Airports, A Manual for Airport Personnel

**** END OF ITEM T-905 ****

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ITEM L-108 UNDERGROUND POWER CABLE FOR AIRPORTS

DESCRIPTION

108-1.1 This item shall consist of furnishing and installing power cables that are direct buried and furnishing and/or installing power cables within conduit or duct banks per these specifications at the locations shown on the plans. It includes excavation and backfill of trench for direct-buried cables only. Also included are the installation of counterpoise wires, ground wires, ground rods and connections, cable splicing, cable marking, cable testing, and all incidentals necessary to place the cable in operating condition as a completed unit to the satisfaction of the RPR. This item shall not include the installation of duct banks or conduit, trenching and backfilling for duct banks or conduit, or furnishing or installation of cable for FAA owned/operated facilities.

EQUIPMENT AND MATERIALS

108-2.1 GENERAL.

a. Airport lighting equipment and materials covered by advisory circulars (AC) shall be approved under the Airport Lighting Equipment Certification Program per AC 150/5345-53, current version.

b. All other equipment and materials covered by other referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification, when requested by the RPR.

c. Manufacturer's certifications shall not relieve the Contractor of the responsibility to provide materials per these specifications. Materials supplied and/or installed that do not comply with these specifications shall be removed (when directed by the RPR) and replaced with materials that comply with these specifications at the Contractor's cost.

d. All materials and equipment used to construct this item shall be submitted to the RPR for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify products or models applicable to this project. Indicate all optional equipment and delete any non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment to which they apply on each submittal sheet. Markings shall be made bold and clear with arrows or circles (highlighting is not acceptable). The Contractor is solely responsible for delays in the project that may accrue directly or indirectly from late submissions or resubmissions of submittals.

e. The data submitted shall be sufficient, in the opinion of the RPR, to determine compliance with the plans and specifications. The Contractor's submittals shall be electronically submitted in pdf format, tabbed by specific section. The RPR reserves the right to reject any and all equipment, materials, or procedures that do not meet the system design and the standards and codes, specified in this document.

f. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for at least twelve (12) months from the date of final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner. The Contractor shall maintain a minimum insulation resistance in accordance with paragraph 108-3.10e with isolation transformers connected in new circuits and new segments of existing circuits through the end of the contract

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warranty period when tested in accordance with AC 150/5340-26, Maintenance Airport Visual Aid Facilities, paragraph 5.1.3.1, Insulation Resistance Test.

108-2.2 CABLE. Underground cable for airfield lighting facilities (runway and taxiway lights and signs) shall conform to the requirements of AC 150/5345-7, Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits latest edition. Conductors for use on 6.6 ampere primary airfield lighting series circuits shall be single conductor, seven strand, #8 American wire gauge (AWG), L-824 Type B, 5,000 volts, non-shielded, with cross-linked polyethylene insulation. Conductors for use on 20 ampere primary airfield lighting series circuits shall be single conductor, seven strand, #6 AWG, L-824 Type C, 5,000 volts, non-shielded, with cross-linked polyethylene insulation. L-824 conductors for use on the L-830 secondary of airfield lighting series circuits shall be sized in accordance with the manufacturer's recommendations. All other conductors shall comply with FAA and National Electric Code (NEC) requirements. Conductor sizes noted above shall not apply to leads furnished by manufacturers on airfield lighting transformers and fixtures.

Wire for electrical circuits up to 600 volts shall comply with Specification L-824 and/or Commercial Item Description A-A-59544A and shall be type THWN-2, 75°C for installation in conduit and RHW-2, 75°C for direct burial installations. Conductors for parallel (voltage) circuits shall be type and size and installed in accordance with NFPA-70, National Electrical Code.

Unless noted otherwise, all 600-volt and less non-airfield lighting conductor sizes are based on a 75°C, THWN-2, 600-volt insulation, copper conductors, not more than three single insulated conductors, in raceway, in free air. The conduit/duct sizes are based on the use of THWN-2, 600-volt insulated conductors. The Contractor shall make the necessary increase in conduit/duct sizes for other types of wire insulation. In no case shall the conduit/duct size be reduced. The minimum power circuit wire size shall be #12 AWG.

Conductor sizes may have been adjusted due to voltage drop or other engineering considerations. Equipment provided by the Contractor shall be capable of accepting the quantity and sizes of conductors shown in the Contract Documents. All conductors, pigtails, cable step-down adapters, cable step-up adapters, terminal blocks and splicing materials necessary to complete the cable termination/splice shall be considered incidental to the respective pay items provided.

Cable type, size, number of conductors, strand and service voltage shall be as specified in the Contract Document.

108-2.3 BARE COPPER WIRE (COUNTERPOISE, BARE COPPER WIRE GROUND AND GROUND RODS). Wire for counterpoise or ground installations for airfield lighting systems shall be No. 6 AWG bare solid copper wire for counterpoise and/or No. 6 AWG insulated stranded for grounding bond wire per ASTM B3 and ASTM B8, and shall be bare copper wire . For voltage powered circuits, the equipment grounding conductor shall comply with NEC Article 250.

Ground rods shall be copper-clad steel. The ground rods shall be of the length and diameter specified on the plans, but in no case be less than 10 feet (2.54 m) long and 3/4 inch (19 mm) in diameter.

108-2.4 CABLE CONNECTIONS. In-line connections or splices of underground primary cables shall be of the type called for on the plans, and shall be one of the types listed below. No separate payment will be made for cable connections.

a. **The cast splice.** A cast splice, employing a plastic mold and using epoxy resin equivalent to that manufactured by 3M™ Company, "Scotchcast" Kit No. 82-B, or an approved equivalent, used for potting the splice is acceptable.

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b. The field-attached plug-in splice. Field attached plug-in splices shall be installed as shown on the plans. The Contractor shall determine the outside diameter of the cable to be spliced and furnish appropriately sized connector kits and/or adapters. Tape or heat shrink tubing with integral sealant shall be in accordance with the manufacturer's requirements. Primary Connector Kits manufactured by Amerace, "Super Kit", Integro "Complete Kit", or approved equal is acceptable.

c. The factory-molded plug-in splice. Specification for L-823 Connectors, Factory-Molded to Individual Conductors, is acceptable.

d. The taped or heat-shrink splice. Taped splices employing field-applied rubber, or synthetic rubber tape covered with plastic tape is acceptable. The rubber tape should meet the requirements of ASTM D4388 and the plastic tape should comply with Military Specification MIL-I-24391 or Commercial Item Description A-A-55809. Heat shrinkable tubing shall be heavy-wall, self-sealing tubing rated for the voltage of the wire being spliced and suitable for direct-buried installations. The tubing shall be factory coated with a thermoplastic adhesive-sealant that will adhere to the insulation of the wire being spliced forming a moisture- and dirt-proof seal. Additionally, heat shrinkable tubing for multi-conductor cables, shielded cables, and armored cables shall be factory kits that are designed for the application. Heat shrinkable tubing and tubing kits shall be manufactured by Tyco Electronics/ Raychem Corporation, Energy Division, or approved equivalent.

In all the above cases, connections of cable conductors shall be made using crimp connectors using a crimping tool designed to make a complete crimp before the tool can be removed. All L-823/L-824 splices and terminations shall be made per the manufacturer's recommendations and listings.

All connections of counterpoise, grounding conductors and ground rods shall be made by the exothermic process or approved equivalent, except that a light base ground clamp connector shall be used for attachment to the light base. All exothermic connections shall be made per the manufacturer's recommendations and listings.

108-2.5 SPLICER QUALIFICATIONS. Every airfield lighting cable splicer shall be qualified in making airport cable splices and terminations on cables rated at or above 5,000 volts AC. The Contractor shall submit to the RPR proof of the qualifications of each proposed cable splicer for the airport cable type and voltage level to be worked on. Cable splicing/terminating personnel shall have a minimum of three (3) years continuous experience in terminating/splicing medium voltage cable.

108-2.6 CONCRETE. Concrete shall be proportioned, placed, and cured per Item P-610, Concrete for Miscellaneous Structures.

108-2.7 FLOWABLE BACKFILL. Flowable material used to backfill trenches for power cable trenches shall conform to the requirements of Item P-153, Controlled Low Strength Material.

108-2.8 CABLE IDENTIFICATION TAGS. Cable identification tags shall be made from a non-corrosive material with the circuit identification stamped or etched onto the tag. The tags shall be of the type as detailed on the plans.

108-2.9 TAPE. Electrical tapes shall be Scotch™ Electrical Tapes –Scotch™ 88 (1-1/2 inch (38 mm) wide) and Scotch™ 130C® linerless rubber splicing tape (2-inch (50 mm) wide), as manufactured by the Minnesota Mining and Manufacturing Company (3M™), or an approved equivalent.

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108-2.10 ELECTRICAL COATING. Electrical coating shall be Scotchkote™ as manufactured by 3M™, or an approved equivalent.

108-2.11 EXISTING CIRCUITS. Whenever the scope of work requires connection to an existing circuit, the existing circuit's insulation resistance shall be tested, in the presence of the RPR. The test shall be performed per this item and prior to any activity that will affect the respective circuit. The Contractor shall record the results on forms acceptable to the RPR. When the work affecting the circuit is complete, the circuit's insulation resistance shall be checked again, in the presence of the RPR. The Contractor shall record the results on forms acceptable to the RPR. The second reading shall be equal to or greater than the first reading or the Contractor shall make the necessary repairs to the existing circuit to bring the second reading above the first reading. All repair costs including a complete replacement of the L-823 connectors, L-830 transformers and L-824 cable, if necessary, shall be borne by the Contractor. All test results shall be submitted in the Operation and Maintenance (O&M) Manual.

108-2.12 DETECTABLE WARNING TAPE. Plastic, detectable, American Public Works Association (APWA) Red (electrical power lines, cables, conduit and lighting cable) with continuous legend tape shall be polyethylene film with a metalized foil core and shall be 3-6 inches (75-150 mm) wide. Detectable tape is incidental to the respective bid item. Detectable warning tape for communication cables shall be orange. Detectable warning tape color code shall comply with the APWA Uniform Color Code.

CONSTRUCTION METHODS

108-3.1 GENERAL. The Contractor shall install the specified cable at the approximate locations indicated on the plans. Unless otherwise shown on the plans, all cable required to cross under pavements expected to carry aircraft loads shall be installed in concrete encased duct banks. Cable shall be run without splices, from fixture to fixture.

Cable connections between lights will be permitted only at the light locations for connecting the underground cable to the primary leads of the individual isolation transformers. The Contractor shall be responsible for providing cable in continuous lengths for home runs or other long cable runs without connections unless otherwise authorized in writing by the RPR or shown on the plans.

In addition to connectors being installed at individual isolation transformers, L-823 cable connectors for maintenance and test points shall be installed at locations shown on the plans. Cable circuit identification markers shall be installed on both sides of the L-823 connectors installed and on both sides of slack loops where a future connector would be installed.

Provide not less than 3 feet (1 m) of cable slack on each side of all connections, isolation transformers, light units, and at points where cable is connected to field equipment. Where provisions must be made for testing or for future above grade connections, provide enough slack to allow the cable to be extended at least one foot (30 cm) vertically above the top of the access structure. This requirement also applies where primary cable passes through empty light bases, junction boxes, and access structures to allow for future connections, or as designated by the RPR.

Primary airfield lighting cables installed shall have cable circuit identification markers attached on both sides of each L-823 connector and on each airport lighting cable entering or leaving cable access points, such as manholes, hand holes, pull boxes, junction boxes, etc. Markers shall be of sufficient length for imprinting the cable circuit identification legend on one line, using letters not less than 1/4 inch (6 mm) in size. The cable circuit identification shall match the circuits noted on the construction plans.

108-3.2 INSTALLATION IN DUCT BANKS OR CONDUITS. This item includes the installation of the cable in duct banks or conduit per the following paragraphs. The maximum number and voltage ratings of

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cables installed in each single duct or conduit, and the current-carrying capacity of each cable shall be per the latest version of the National Electric Code, or the code of the local agency or authority having jurisdiction.

The Contractor shall make no connections or splices of any kind in cables installed in conduits or duct banks.

Unless otherwise designated in the plans, where ducts are in tiers, use the lowest ducts to receive the cable first, with spare ducts left in the upper levels. Check duct routes prior to construction to obtain assurance that the shortest routes are selected and that any potential interference is avoided.

Duct banks or conduits shall be installed as a separate item per Item L-110, Airport Underground Electrical Duct Banks and Conduit. The Contractor shall run a mandrel through duct banks or conduit prior to installation of cable to ensure that the duct bank or conduit is open, continuous and clear of debris. The mandrel size shall be compatible with the conduit size. The Contractor shall swab out all conduits/ducts and clean light bases, manholes, etc., interiors immediately prior to pulling cable. Once cleaned and swabbed, the light bases and all accessible points of entry to the duct/conduit system shall be kept closed except when installing cables. Cleaning of ducts, light bases, manholes, etc., is incidental to the pay item of the item being cleaned. All raceway systems left open, after initial cleaning, for any reason shall be re-cleaned at the Contractor's expense. The Contractor shall verify existing ducts proposed for use in this project as clear and open. The Contractor shall notify the RPR of any blockage in the existing ducts.

The cable shall be installed in a manner that prevents harmful stretching of the conductor, damage to the insulation, or damage to the outer protective covering. The ends of all cables shall be sealed with moisture-seal tape providing moisture-tight mechanical protection with minimum bulk, or alternately, heat shrinkable tubing before pulling into the conduit and it shall be left sealed until connections are made. Where more than one cable is to be installed in a conduit, all cable shall be pulled in the conduit at the same time. The pulling of a cable through duct banks or conduits may be accomplished by hand winch or power winch with the use of cable grips or pulling eyes. Maximum pulling tensions shall not exceed the cable manufacturer's recommendations. A non-hardening cable-pulling lubricant recommended for the type of cable being installed shall be used where required.

The Contractor shall submit the recommended pulling tension values to the RPR prior to any cable installation. If required by the RPR, pulling tension values for cable pulls shall be monitored by a dynamometer in the presence of the RPR. Cable pull tensions shall be recorded by the Contractor and reviewed by the RPR. Cables exceeding the maximum allowable pulling tension values shall be removed and replaced by the Contractor at the Contractor's expense.

The manufacturer's minimum bend radius or NEC requirements (whichever is more restrictive) shall apply. Cable installation, handling and storage shall be per manufacturer's recommendations. During cold weather, particular attention shall be paid to the manufacturer's minimum installation temperature. Cable shall not be installed when the temperature is at or below the manufacturer's minimum installation temperature. At the Contractor's option, the Contractor may submit a plan, for review by the RPR, for heated storage of the cable and maintenance of an acceptable cable temperature during installation when temperatures are below the manufacturer's minimum cable installation temperature.

Cable shall not be dragged across base can or manhole edges, pavement or earth. When cable must be coiled, lay cable out on a canvas tarp or use other appropriate means to prevent abrasion to the cable jacket.

108-3.3 INSTALLATION OF DIRECT-BURIED CABLE IN TRENCHES. Unless otherwise specified, the Contractor shall not use a cable plow for installing the cable. Cable shall be unreeled uniformly in place alongside or in the trench and shall be carefully placed along the bottom of the trench. The cable shall not be unreeled and pulled into the trench from one end. Slack cable sufficient to provide strain relief shall be placed in the trench in a series of S curves. Sharp bends or kinks in the cable shall not be permitted.

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Where cables must cross over each other, a minimum of 3 inches (75 mm) vertical displacement shall be provided with the topmost cable depth at or below the minimum required depth below finished grade.

a. Trenching. Where turf is well established and the sod can be removed, it shall be carefully stripped and properly stored. Trenches for cables may be excavated manually or with mechanical trenching equipment. Walls of trenches shall be essentially vertical so that a minimum of surface is disturbed. Graders shall not be used to excavate the trench with their blades. The bottom surface of trenches shall be essentially smooth and free from coarse aggregate. Unless otherwise specified, cable trenches shall be excavated to a minimum depth of 18 inches (0.5 m) below finished grade per NEC Table 300.5, except as follows:

- When off the airport or crossing under a roadway or driveway, the minimum depth shall be 36 inches (91 cm) unless otherwise specified.

- Minimum cable depth when crossing under a railroad track, shall be 42 inches (1 m) unless otherwise specified.

The Contractor shall excavate all cable trenches to a width not less than 6 inches (150 mm). Unless otherwise specified on the plans, all cables in the same location and running in the same general direction shall be installed in the same trench.

When rock is encountered, the rock shall be removed to a depth of at least 3 inches (75 mm) below the required cable depth and it shall be replaced with bedding material of earth or sand containing no mineral aggregate particles that would be retained on a 1/4-inch (6.3 mm) sieve. Flowable backfill material may alternatively be used.

Duct bank or conduit markers temporarily removed for trench excavations shall be replaced as required.

It is the Contractor's responsibility to locate existing utilities within the work area prior to excavation. Where existing active cables cross proposed installations, the Contractor shall ensure that these cables are adequately protected. Where crossings are unavoidable, no splices will be allowed in the existing cables, except as specified on the plans. Installation of new cable where such crossings must occur shall proceed as follows:

(1) Existing cables shall be located manually. Unearthed cables shall be inspected to assure absolutely no damage has occurred.

(2) Trenching, etc., in cable areas shall then proceed, with approval of the RPR, with care taken to minimize possible damage or disruption of existing cable, including careful backfilling in area of cable.

In the event that any previously identified cable is damaged during the course of construction, the Contractor shall be responsible for the complete repair or replacement.

b. Backfilling. After the cable has been installed, the trench shall be backfilled. The first layer of backfill in the trench shall encompass all cables ; be 3 inches (75 mm) deep, loose measurement; and shall be either earth or sand containing no mineral aggregate particles that would be retained on a 1/4-inch (6.3 mm) sieve. This layer shall not be compacted. The second layer shall be 5 inches (125 mm) deep, loose measurement, and shall contain no particles that would be retained on a one inch (25.0 mm) sieve. The remaining third and subsequent layers of backfill shall not exceed 8

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inches (20 cm) of loose measurement and be excavated or imported material and shall not contain stone or aggregate larger than 4 inches (100 mm) maximum diameter.

The second and subsequent layers shall be thoroughly tamped and compacted to at least the density of the adjacent material. If the cable is to be installed in locations or areas where other compaction requirements are specified (under pavements, embankments, etc.) the backfill compaction shall be backfill with controlled low strength material (CLSM) in accordance with P-153.

Trenches shall not contain pools of water during backfilling operations. The trench shall be completely backfilled and tamped level with the adjacent surface, except that when turf is to be established over the trench, the backfilling shall be stopped at an appropriate depth consistent with the type of turfing operation to be accommodated. A proper allowance for settlement shall also be provided. Any excess excavated material shall be removed and disposed of per the plans and specifications.

Underground electrical warning (caution) tape shall be installed in the trench above all direct-buried cable. Contractor shall submit a sample of the proposed warning tape for acceptance by the RPR. If not shown on the plans, the warning tape shall be located 6 inches (150 mm) above the direct-buried cable or the counterpoise wire if present. A 3-6 inch (75 - 150 mm) wide polyethylene film detectable tape, with a metalized foil core, shall be installed above all direct buried cable or counterpoise. The tape shall be of the color and have a continuous legend as indicated on the plans. The tape shall be installed 8 inches (200 mm) minimum below finished grade.

c. Restoration. Following restoration of all trenching near airport movement surfaces, the Contractor shall visually inspect the area for foreign object debris (FOD) and remove any that is found. Where soil and sod has been removed, it shall be replaced as soon as possible after the backfilling is completed. All areas disturbed by work shall be restored to its original condition. The restoration shall include the seeding as shown on the plans. The Contractor shall be held responsible for maintaining all disturbed surfaces and replacements until final acceptance. When trenching is through paved areas, restoration shall be equal to existing conditions. If the cable is to be installed in locations or areas where other compaction requirements are specified (under pavements, embankments, etc.) the backfill compaction shall be backfill with controlled low strength material (CLSM) in accordance with P-153. Restoration shall be considered incidental to the pay item of which it is a component part.

108-3.4 CABLE MARKERS FOR DIRECT-BURIED CABLE. The location of direct buried circuits shall be marked by a concrete slab marker, 2 feet (60 cm) square and 4-6 inch (10 - 15 cm) thick, extending approximately one inch (25 mm) above the surface. Each cable run from a line of lights and signs to the equipment vault shall be marked at approximately every 200 feet (61 m) along the cable run, with an additional marker at each change of direction of cable run. All other direct-buried cable shall be marked in the same manner. Cable markers shall be installed directly above the cable. The Contractor shall impress the word "CABLE" and directional arrows on each cable marking slab. The letters shall be approximately 4 inches (100 mm) high and 3 inches (75 mm) wide, with width of stroke 1/2 inch (12 mm) and 1/4 inch (6 mm) deep. Stencils shall be used for cable marker lettering; no hand lettering shall be permitted.

At the location of each underground cable connection/splice, except at lighting units, or isolation transformers, a concrete marker slab shall be installed to mark the location of the connection/splice. The Contractor shall impress the word "SPLICE" on each slab. The Contractor also shall impress additional circuit identification symbols on each slab as directed by the RPR. All cable markers and splice markers shall be painted international orange. Paint shall be specifically manufactured for uncured exterior concrete. After placement, all cable or splice markers shall be given one coat of high-visibility aviation orange paint as approved by the RPR. Furnishing and installation of cable markers is incidental to the respective cable pay item.

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108-3.5 SPLICING. Connections of the type shown on the plans shall be made by experienced personnel regularly engaged in this type of work and shall be made as follows:

a. **Cast splices.** These shall be made by using crimp connectors for jointing conductors. Molds shall be assembled, and the compound shall be mixed and poured per the manufacturer's instructions and to the satisfaction of the RPR.

b. **Field-attached plug-in splices.** These shall be assembled per the manufacturer's instructions. These splices shall be made by plugging directly into mating connectors. The joint where the connectors come together shall be finished by one of the following methods: (1) wrapped with at least one layer of rubber or synthetic rubber tape and one layer of plastic tape, one-half lapped, extending at least 1-1/2 inches (38 mm) on each side of the joint (2) Covered with heat shrinkable tubing with integral sealant extending at least 1-1/2 inches (38 mm) on each side of the joint or (3) On connector kits equipped with water seal flap; roll-over water seal flap to sealing position on mating connector.

c. **Factory-molded plug-in splices.** These shall be made by plugging directly into mating connectors. The joint where the connectors come together shall be finished by one of the following methods: (1) Wrapped with at least one layer of rubber or synthetic rubber tape and one layer of plastic tape, one-half lapped, extending at least 1-1/2 inches (38 mm) on each side of the joint. (2) Covered with heat shrinkable tubing with integral sealant extending at least 1-1/2 inches (38 mm) on each side of the joint. or (3) On connector kits so equipped with water seal flap; roll-over water seal flap to sealing position on mating connector.

d. **Taped or heat-shrink splices.** A taped splice shall be made in the following manner:

Bring the cables to their final position and cut so that the conductors will butt. Remove insulation and jacket allowing for bare conductor of proper length to fit compression sleeve connector with 1/4 inch (6 mm) of bare conductor on each side of the connector. Prior to splicing, the two ends of the cable insulation shall be penciled using a tool designed specifically for this purpose and for cable size and type. Do not use emery paper on splicing operation since it contains metallic particles. The copper conductors shall be thoroughly cleaned. Join the conductors by inserting them equidistant into the compression connection sleeve. Crimp conductors firmly in place with crimping tool that requires a complete crimp before tool can be removed. Test the crimped connection by pulling on the cable. Scrape the insulation to assure that the entire surface over which the tape will be applied (plus 3 inches (75 mm) on each end) is clean. After scraping, wipe the entire area with a clean lint-free cloth. Do not use solvents.

Apply high-voltage rubber tape one-half lapped over bare conductor. This tape should be tensioned as recommended by the manufacturer. Voids in the connector area may be eliminated by highly elongating the tape, stretching it just short of its breaking point. The manufacturer's recommendation for stretching tape during splicing shall be followed. Always attempt to exactly half-lap to produce a uniform buildup. Continue buildup to 1-1/2 times cable diameter over the body of the splice with ends tapered a distance of approximately one inch (25 mm) over the original jacket. Cover rubber tape with two layers of vinyl pressure-sensitive tape one-half lapped. Do not use glyptol or lacquer over vinyl tape as they react as solvents to the tape. No further cable covering or splice boxes are required.

Heat shrinkable tubing shall be installed following manufacturer's instructions. Direct flame heating shall not be permitted unless recommended by the manufacturer. Cable surfaces within the limits of the heat-shrink application shall be clean and free of contaminates prior to application.

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e. Assembly. Surfaces of equipment or conductors being terminated or connected shall be prepared in accordance with industry standard practice and manufacturer's recommendations. All surfaces to be connected shall be thoroughly cleaned to remove all dirt, grease, oxides, nonconductive films, or other foreign material. Paints and other nonconductive coatings shall be removed to expose base metal. Clean all surfaces at least 1/4 inch (6.4 mm) beyond all sides of the larger bonded area on all mating surfaces. Use a joint compound suitable for the materials used in the connection. Repair painted/coated surface to original condition after completing the connection.

108-3.6 BARE COUNTERPOISE WIRE INSTALLATION FOR LIGHTNING PROTECTION AND GROUNDING. If shown on the plans or included in the job specifications, bare solid #6 AWGcopper counterpoise wire shall be installed for lightning protection of the underground cables. The RPR shall select one of two methods of lightning protection for the airfield lighting circuit based upon sound engineering practice and lightning strike density.

a. Equipotential. Not used.

b. Isolation. Counterpoise size is as shown on the plans. The isolation method is an alternate method for use only with edge lights installed in turf and stabilized soils and raceways installed parallel to and adjacent to the edge of the pavement. NFPA 780 uses 15 feet to define "adjacent to".

The counterpoise conductor shall be installed halfway between the pavement edge and the light base, mounting stake, raceway, or cable being protected.

The counterpoise conductor shall be installed 8 inches (203 mm) minimum below grade. The counterpoise is not connected to the light base or mounting stake. An additional grounding electrode is required at each light base or mounting stake. The grounding electrode is bonded to the light base or mounting stake with a 6 AWG solid copper conductor.

See AC 150/5340-30, Design and Installation Details for Airport Visual Aids and NFPA 780, Standard for the Installation of Lightning Protection Systems, Chapter 11, for a detailed description of the Isolation Method of lightning protection.

c. Common Installation requirements. When a metallic light base is used, the grounding electrode shall be bonded to the metallic light base or mounting stake with a No. 6 AWG bare, annealed or soft drawn, solid copper conductor.

When a nonmetallic light base is used, the grounding electrode shall be bonded to the metallic light fixture or metallic base plate with a No. 6 AWG bare, annealed or soft drawn, solid copper conductor.

Grounding electrodes may be rods, ground dissipation plates, radials, or other electrodes listed in the NFPA 70 (NEC) or NFPA 780.

Where raceway is installed by the directional bore, jack and bore, or other drilling method, the counterpoise conductor shall be permitted to be installed concurrently with the directional bore, jack and bore, or other drilling method raceway, external to the raceway or sleeve.

The counterpoise wire shall also be exothermically welded to ground rods installed as shown on the plans but not more than 500 feet (150 m) apart around the entire circuit. The counterpoise system shall be continuous and terminate at the transformer vault or at the power source. It shall

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be securely attached to the vault or equipment external ground ring or other made electrode-grounding system. The connections shall be made as shown on the plans and in the specifications.

Where an existing airfield lighting system is being extended or modified, the new counterpoise conductors shall be interconnected to existing counterpoise conductors at each intersection of the new and existing airfield lighting counterpoise systems.

d. Parallel Voltage Systems. Provide grounding and bonding in accordance with NFPA 70, National Electrical Code.

108-3.7 COUNTERPOISE INSTALLATION ABOVE MULTIPLE CONDUITS AND DUCT BANKS. Counterpoise wires shall be installed above multiple conduits/duct banks for airfield lighting cables, with the intent being to provide a complete area of protection over the airfield lighting cables. When multiple conduits and/or duct banks for airfield cable are installed in the same trench, the number and location of counterpoise wires above the conduits shall be adequate to provide a complete area of protection measured 45 degrees each side of vertical.

Where duct banks pass under pavement to be constructed in the project, the counterpoise shall be placed above the duct bank. Reference details on the construction plans.

108-3.8 COUNTERPOISE INSTALLATION AT EXISTING DUCT BANKS. When airfield lighting cables are indicated on the plans to be routed through existing duct banks, the new counterpoise wiring shall be terminated at ground rods at each end of the existing duct bank where the cables being protected enter and exit the duct bank. The new counterpoise conductor shall be bonded to the existing counterpoise system.

108-3.9 EXOTHERMIC BONDING. Bonding of counterpoise wire shall be by the exothermic welding process or equivalent method accepted by the RPR. Only personnel experienced in and regularly engaged in this type of work shall make these connections.

Contractor shall demonstrate to the satisfaction of the RPR, the welding kits, materials and procedures to be used for welded connections prior to any installations in the field. The installations shall comply with the manufacturer's recommendations and the following:

a. All slag shall be removed from welds.

b. Using an exothermic weld to bond the counterpoise to a lug on a galvanized light base is not recommended unless the base has been specially modified. Consult the manufacturer's installation directions for proper methods of bonding copper wire to the light base. See AC 150/5340-30 for galvanized light base exception.

c. If called for in the plans, all buried copper and weld material at weld connections shall be thoroughly coated with 6 mm of 3MTM ScotchkoteTM, or approved equivalent, or coated with coal tar Bitumastic® material to prevent surface exposure to corrosive soil or moisture.

108-3.10 TESTING. The Contractor shall furnish all necessary equipment and appliances for testing the airport electrical systems and underground cable circuits before and after installation. The Contractor shall perform all tests in the presence of the RPR. The Contractor shall demonstrate the electrical characteristics to the satisfaction of the RPR. All costs for testing are incidental to the respective item being tested. For phased projects, the tests must be completed by phase. The Contractor must maintain the test results throughout the entire project as well as during the warranty period that meet the following:

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a. Earth resistance testing methods shall be submitted to the RPR for approval. Earth resistance testing results shall be recorded on an approved form and testing shall be performed in the presence of the RPR. All such testing shall be at the sole expense of the Contractor.

b. Should the counterpoise or ground grid conductors be damaged or suspected of being damaged by construction activities the Contractor shall test the conductors for continuity with a low resistance ohmmeter. The conductors shall be isolated such that no parallel path exists and tested for continuity. The RPR shall approve of the test method selected. All such testing shall be at the sole expense of the Contractor.

After installation, the Contractor shall test and demonstrate to the satisfaction of the RPR the following:

a. That all affected lighting power and control circuits (existing and new) are continuous and free from short circuits.

b. That all affected circuits (existing and new) are free from unspecified grounds.

c. That the insulation resistance to ground of all new non-grounded high voltage series circuits or cable segments is not less than 50 megohms. Verify continuity of all series airfield lighting circuits prior to energization.

d. That the insulation resistance to ground of all new non-grounded conductors of new multiple circuits or circuit segments is not less than 100 megohms.

e. That all affected circuits (existing and new) are properly connected per applicable wiring diagrams.

f. That all affected circuits (existing and new) are operable. Tests shall be conducted that include operating each control not less than 10 times and the continuous operation of each lighting and power circuit for not less than 1/2 hour.

g. That the impedance to ground of each ground rod does not exceed 25 ohms prior to establishing connections to other ground electrodes. The fall-of-potential ground impedance test shall be used, as described by American National Standards Institute/Institute of Electrical and Electronic Engineers (ANSI/IEEE) Standard 81, to verify this requirement. As an alternate, clamp-on style ground impedance test meters may be used to satisfy the impedance testing requirement. Test equipment and its calibration sheets shall be submitted for review and approval by the RPR prior to performing the testing.

Two copies of tabulated results of all cable tests performed shall be supplied by the Contractor to the RPR. Where connecting new cable to existing cable, insulation resistance tests shall be performed on the new cable prior to connection to the existing circuit.

There are no approved "repair" procedures for items that have failed testing other than complete replacement.

METHOD OF MEASUREMENT

108-4.1 The cost of all excavation, backfill, dewatering and restoration regardless of the type of material encountered shall be included in the unit price bid for the work.

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108-4.2 Cable or counterpoise wire installed in trench, duct bank or conduit shall be measured by the number of linear feet (meters) installed and grounding connectors, and trench marking tape ready for operation, and accepted as satisfactory. Separate measurement shall be made for each cable or counterpoise wire installed in trench, duct bank or conduit. The measurement for this item shall not include additional quantities required for slack. Cable and counterpoise slack is considered incidental to this item and is included in the Contractor's unit price. No separate measurement or payment will be made for cable or counterpoise slack.

108-4.3 No separate payment will be made for ground rods.

BASIS OF PAYMENT

108-5.1 Payment will be made at the contract unit price for trenching, cable and bare counterpoise wire installed in trench (direct-buried), or cable and equipment ground installed in duct bank or conduit, in place by the Contractor and accepted by the RPR. This price shall be full compensation for furnishing all materials and for all preparation and installation of these materials, and for all labor, equipment, tools, and incidentals, including ground rods and ground connectors and trench marking tape, necessary to complete this item.

Payment will be made under:

Item L-108a	Install #8 AWG, L-824C, 5000V, Wire – per linear foot
Item L-108b	Install #6 AWG, Bare Copper Counterpoise Including Ground Rods and Terminations – per linear foot

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Advisory Circulars (AC)

AC 150/5340-26	Maintenance of Airport Visual Aid Facilities
AC 150/5340-30	Design and Installation Details for Airport Visual Aids
AC 150/5345-7	Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits
AC 150/5345-26	Specification for L-823 Plug and Receptacle, Cable Connectors
AC 150/5345-53	Airport Lighting Equipment Certification Program

Commercial Item Description

A-A-59544A	Cable and Wire, Electrical (Power, Fixed Installation)
A-A-55809	Insulation Tape, Electrical, Pressure-Sensitive Adhesive, Plastic

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ASTM International (ASTM)

ASTM B3	Standard Specification for Soft or Annealed Copper Wire
ASTM B8	Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft
ASTM B33	Standard Specification for Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes
ASTM D4388	Standard Specification for Nonmetallic Semi-Conducting and Electrically Insulating Rubber Tapes

Mil Spec

MIL-PRF-23586F	Performance Specification: Sealing Compound (with Accelerator), Silicone Rubber, Electrical
MIL-I-24391	Insulation Tape, Electrical, Plastic, Pressure Sensitive

National Fire Protection Association (NFPA)

NFPA-70	National Electrical Code (NEC)
NFPA-780	Standard for the Installation of Lightning Protection Systems

American National Standards Institute (ANSI)/Institute of Electrical and Electronics Engineers (IEEE)

ANSI/IEEE STD 81	IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System

Federal Aviation Administration Standard

FAA STD-019E	Lightning and Surge Protection, Grounding Bonding and Shielding Requirements for Facilities and Electronic Equipment

****END OF ITEM L-108****

Exhibit 1

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ITEM L-110 AIRPORT UNDERGROUND ELECTRICAL DUCT BANKS AND CONDUITS

DESCRIPTION

110-1.1 This item shall consist of underground electrical conduits and duct banks (single or multiple conduits encased in concrete or buried in sand) installed per this specification at the locations and per the dimensions, designs, and details shown on the plans. This item shall include furnishing and installing of all underground electrical duct banks and individual and multiple underground conduits and removal of existing duct banks. It shall also include all turfing trenching, backfilling, removal, and restoration of any paved or turfed areas; concrete encasement, mandrelling, pulling lines, duct markers, plugging of conduits, and the testing of the installation as a completed system ready for installation of cables per the plans and specifications. This item shall also include furnishing and installing conduits and all incidentals for providing positive drainage of the system. Verification of existing ducts is incidental to the pay items provided in this specification.

EQUIPMENT AND MATERIALS

110-2.1 GENERAL.

a. All equipment and materials covered by referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification when requested by the RPR

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b. Manufacturer's certifications shall not relieve the Contractor of the responsibility to provide materials per these specifications and acceptable to the RPR. Materials supplied and/or installed that do not comply with these specifications shall be removed, when directed by the RPR and replaced with materials, that comply with these specifications, at the Contractor's cost.

c. All materials and equipment used to construct this item shall be submitted to the RPR for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify products or models applicable to this project. Indicate all optional equipment and delete non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment for which they apply on each submittal sheet. Markings shall be made bold and clear with arrows or circles (highlighting is not acceptable). The Contractor is solely responsible for delays in project that accrue directly or indirectly from late submissions or resubmissions of submittals.

d. The data submitted shall be sufficient, in the opinion of the RPR, to determine compliance with the plans and specifications. The Contractor's submittals shall be electronically submitted in pdf format, tabbed by specification section. The RPR reserves the right to reject any and all equipment, materials or procedures that do not meet the system design and the standards and codes specified in this document.

e. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

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110-2.2 STEEL CONDUIT. Rigid galvanized steel (RGS) conduit and fittings shall be hot dipped galvanized inside and out and conform to the requirements of Underwriters Laboratories Standards 6, 514B, and 1242. All RGS conduits or RGS elbows installed below grade, in concrete, permanently wet locations or other similar environments shall be painted with a 10-mil thick coat of asphaltum sealer or shall have a factory-bonded polyvinyl chloride (PVC) cover. Any exposed galvanizing or steel shall be coated with 10 mils of asphaltum sealer. When using PVC coated RGS conduit, care shall be exercised not to damage the factory PVC coating. Damaged PVC coating shall be repaired per the manufacturer's written instructions. In lieu of PVC coated RGS, corrosion wrap tape shall be permitted to be used where RGS is in contact with direct earth."

110-2.3 PLASTIC CONDUIT. Plastic conduit and fittings-shall conform to the following requirements:

- UL 514B covers W-C-1094-Conduit fittings all types, classes 1 thru 3 and 6 thru 10.
- UL 514C covers W-C-1094- all types, Class 5 junction box and cover in plastic (PVC).
- UL 651 covers W-C-1094-Rigid PVC Conduit, types I and II, Class 4.
- UL 651A covers W-C-1094-Rigid PVC Conduit and high-density polyethylene (HDPE) Conduit type III and Class 4.

Underwriters Laboratories Standards UL-651 and Article 352 of the current National Electrical Code shall be one of the following, as shown on the plans:

a. Type I–Schedule 40 and Schedule 80 PVC suitable for underground use either direct-buried or encased in concrete.

b. Type II–Schedule 40 PVC suitable for either above ground or underground use.

c. Type III – Schedule 80 PVC suitable for either above ground or underground use either direct-buried or encased in concrete.

d. Type III –HDPE pipe, minimum standard dimensional ratio (SDR) 11, suitable for placement with directional boring under pavement.

The type of solvent cement shall be as recommended by the conduit/fitting manufacturer.

110-2.4 SPLIT CONDUIT. Split conduit shall be pre-manufactured for the intended purpose and shall be made of steel or plastic.

110-2.5 CONDUIT SPACERS. Conduit spacers shall be prefabricated interlocking units manufactured for the intended purpose. They shall be of double wall construction made of high grade, high density polyethylene complete with interlocking cap and base pads. They shall be designed to accept No. 4 reinforcing bars installed vertically.

110-2.6 CONCRETE. Concrete shall be proportioned, placed, and cured per Item P-610, Concrete for Miscellaneous Structures.

110-2.7 PRECAST CONCRETE STRUCTURES. Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or another RPR approved third party certification program. Precast concrete structures shall conform to ASTM C478.

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110-2.8 FLOWABLE BACKFILL. Flowable material used to back fill conduit and duct bank trenches shall conform to the requirements of Item P-153, Controlled Low Strength Material.

110-2.9 DETECTABLE WARNING TAPE. Plastic, detectable, American Public Works Association (APWA) red (electrical power lines, cables, conduit and lighting cable), orange (telephone/fiber optic cabling) with continuous legend magnetic tape shall be polyethylene film with a metallized foil core and shall be 3-6 inches (75-150 mm) wide. Detectable tape is incidental to the respective bid item.

CONSTRUCTION METHODS

110-3.1 GENERAL. The Contractor shall install underground duct banks and conduits at the approximate locations indicated on the plans. The RPR shall indicate specific locations as the work progresses, if required to differ from the plans. Duct banks and conduits shall be of the size, material, and type indicated on the plans or specifications. Where no size is indicated on the plans or in the specifications, conduits shall be not less than 2 inches (50 mm) inside diameter or comply with the National Electrical Code based on cable to be installed, whichever is larger. All duct bank and conduit lines shall be laid so as to grade toward access points and duct or conduit ends for drainage. Unless shown otherwise on the plans, grades shall be at least 3 inches (75 mm) per 100 feet (30 m). On runs where it is not practicable to maintain the grade all one way, the duct bank and conduit lines shall be graded from the center in both directions toward access points or conduit ends, with a drain into the storm drainage system. Pockets or traps where moisture may accumulate shall be avoided. Under pavement, the top of the duct bank shall not be less than 18 inches (0.5 m) below the subgrade; in other locations, the top of the duct bank or underground conduit shall be not less than 18 inches (0.5 m) below finished grade.

The Contractor shall mandrel each individual conduit whether the conduit is direct-buried or part of a duct bank. An iron-shod mandrel, not more than 1/4 inch (6 mm) smaller than the bore of the conduit shall be pulled or pushed through each conduit. The mandrel shall have a leather or rubber gasket slightly larger than the conduit hole.

The Contractor shall swab out all conduits/ducts and clean base can, manhole, pull boxes, etc., interiors immediately prior to pulling cable. Once cleaned and swabbed the light bases, manholes, pull boxes, etc., and all accessible points of entry to the duct/conduit system shall be kept closed except when installing cables. Cleaning of ducts, base cans, manholes, etc., is incidental to the pay item of the item being cleaned. All raceway systems left open, after initial cleaning, for any reason shall be recleaned at the Contractor's expense. All accessible points shall be kept closed when not installing cable. The Contractor shall verify existing ducts proposed for use in this project as clear and open. The Contractor shall notify the RPR of any blockage in the existing ducts.

For pulling the permanent wiring, each individual conduit, whether the conduit is direct-buried or part of a duct bank, shall be provided with a 200-pound (90 kg) test polypropylene pull rope. The ends shall be secured and sufficient length shall be left in access points to prevent it from slipping back into the conduit. Where spare conduits are installed, as indicated on the plans, the open ends shall be plugged with removable tapered plugs, designed for this purpose.

All conduits shall be securely fastened in place during construction and shall be plugged to prevent contaminants from entering the conduits. Any conduit section having a defective joint shall not be installed. Ducts shall be supported and spaced apart using approved spacers at intervals not to exceed 5 feet (1.5 m).

Unless otherwise shown on the plans, concrete encased duct banks shall be used when crossing under pavements expected to carry aircraft loads, such as runways, taxiways, taxilanes, ramps and aprons. When under paved shoulders and other paved areas, conduit and duct banks shall be encased using flowable fill for protection.

All conduits within concrete encasement of the duct banks shall terminate with female ends for ease in current and future use. Install factory plugs in all unused ends. Do not cover the ends or plugs with concrete.
Where turf is well established and the sod can be removed, it shall be carefully stripped and properly stored.

Trenches for conduits and duct banks may be excavated manually or with mechanical trenching equipment unless in pavement, in which case they shall be excavated with mechanical trenching equipment. Walls of trenches shall be essentially vertical so that a minimum of shoulder surface is disturbed. Blades of graders shall not be used to excavate the trench.

When rock is encountered, the rock shall be removed to a depth of at least 3 inches (75 mm) below the required conduit or duct bank depth and it shall be replaced with bedding material of earth or sand containing no mineral aggregate particles that would be retained on a 1/4-inch (6.3 mm) sieve. Flowable backfill may alternatively be used

Underground electrical warning (Caution) tape shall be installed in the trench above all underground duct banks and conduits in unpaved areas. Contractor shall submit a sample of the proposed warning tape for approval by the RPR. If not shown on the plans, the warning tape shall be located 6 inches above the duct/conduit or the counterpoise wire if present.

Joints in plastic conduit shall be prepared per the manufacturer's recommendations for the particular type of conduit. Plastic conduit shall be prepared by application of a plastic cleaner and brushing a plastic solvent on the outside of the conduit ends and on the inside of the couplings. The conduit fitting shall then be slipped together with a quick one-quarter turn twist to set the joint tightly. Where more than one conduit is placed in a single trench, or in duct banks, joints in the conduit shall be staggered a minimum of 2 feet (60 cm).

Changes in direction of runs exceeding 10 degrees, either vertical or horizontal, shall be accomplished using manufactured sweep bends.

Whether or not specifically indicated on the drawings, where the soil encountered at established duct bank grade is an unsuitable material, as determined by the RPR, the unsuitable material shall be removed per Item P-152 and replaced with suitable material. Additional duct bank supports shall be installed, as approved by the RPR.

All excavation shall be unclassified and shall be considered incidental to Item L-110. Dewatering necessary for duct installation, and erosion per federal, state, and local requirements is incidental to Item L-110.

Unless otherwise specified, excavated materials that are deemed by the RPR to be unsuitable for use in backfill or embankments shall be removed and disposed of offsite.

Any excess excavation shall be filled with suitable material approved by the RPR and compacted per Item P-152.

It is the Contractor's responsibility to locate existing utilities within the work area prior to excavation. Where existing active cables) cross proposed installations, the Contractor shall ensure that these cables are adequately protected. Where crossings are unavoidable, no splices will be allowed in the existing cables, except as specified on the plans. Installation of new cable where such crossings must occur shall proceed as follows:

a. Existing cables shall be located manually. Unearthed cables shall be inspected to assure absolutely no damage has occurred

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b. Trenching, etc., in cable areas shall then proceed with approval of the RPR, with care taken to minimize possible damage or disruption of existing cable, including careful backfilling in area of cable.

In the event that any previously identified cable is damaged during the course of construction, the Contractor shall be responsible for the complete repair.

110-3.2 DUCT BANKS. Unless otherwise shown in the plans, duct banks shall be installed so that the top of the concrete envelope is not less than 18 inches (0.5 m) below the bottom of the base or stabilized base course layers where installed under runways, taxiways, aprons, or other paved areas, and not less than 18 inches (0.5 m) below finished grade where installed in unpaved areas.

Unless otherwise shown on the plans, duct banks under paved areas shall extend at least 3 feet (1 m) beyond the edges of the pavement or 3 feet (1 m) beyond any under drains that may be installed alongside the paved area. Trenches for duct banks shall be opened the complete length before concrete is placed so that if any obstructions are encountered, provisions can be made to avoid them. Unless otherwise shown on the plans, all duct banks shall be placed on a layer of concrete not less than 3 inches (75 mm) thick prior to its initial set. The Contractor shall space the conduits not less than 3 inches (75 mm) apart (measured from outside wall to outside wall). All such multiple conduits shall be placed using conduit spacers applicable to the type of conduit. As the conduit laying progresses, concrete shall be placed around and on top of the conduits not less than 3 inches (75 mm) thick unless otherwise shown on the plans. All conduits shall terminate with female ends for ease of access in current and future use. Install factory plugs in all unused ends. Do not cover the ends or plugs with concrete.

Conduits forming the duct bank shall be installed using conduit spacers. No. 4 reinforcing bars shall be driven vertically into the soil a minimum of 6 inches (150 mm) to anchor the assembly into the earth prior to placing the concrete encasement. For this purpose, the spacers shall be fastened down with locking collars attached to the vertical bars. Spacers shall be installed at 5-foot (1.5-m) intervals. Spacers shall be in the proper sizes and configurations to fit the conduits. Locking collars and spacers shall be submitted to the RPR for review prior to use.

When specified, the Contractor shall reinforce the bottom side and top of encasements with steel reinforcing mesh or fabric or other approved metal reinforcement. When directed, the Contractor shall supply additional supports where the ground is soft and boggy, where ducts cross under roadways, or where shown on the plans. Under such conditions, the complete duct structure shall be supported on reinforced concrete footings, piers, or piles located at approximately 5-foot (1.5-m) intervals.

All pavement surfaces that are to have ducts installed therein shall be neatly saw cut to form a vertical face. All excavation shall be included in the contract with price for the duct.

Install a plastic, detectable, color as noted, 3 to 6 inches (75 to 150 mm) wide tape, 8 inches (200 mm) minimum below grade above all underground conduit or duct lines not installed under pavement. Utilize the 3-inch (75-mm) wide tape only for single conduit runs. Utilize the 6-inch (150-mm) wide tape for multiple conduits and duct banks. For duct banks equal to or greater than 24 inches (600 mm) in width, utilize more than one tape for sufficient coverage and identification of the duct bank as required.

When existing cables are to be placed in split duct, encased in concrete, the cable shall be carefully located and exposed by hand tools. Prior to being placed in duct, the RPR shall be notified so that he may inspect the cable and determine that it is in good condition. Where required, split duct shall be installed as shown on the drawings or as required by the RPR.

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110-3.3 CONDUITS WITHOUT CONCRETE ENCASEMENT. Trenches for single-conduit lines shall be not less than 6 inches (150 mm) nor more than 12 inches (300 mm) wide. The trench for 2 or more conduits installed at the same level shall be proportionately wider. Trench bottoms for conduits without concrete encasement shall be made to conform accurately to grade so as to provide uniform support for the conduit along its entire length.

Unless otherwise shown on the plans, a layer of fine earth material, at least 4 inches (100 mm) thick (loose measurement) shall be placed in the bottom of the trench as bedding for the conduit. The bedding material shall consist of soft dirt, sand or other fine fill, and it shall contain no particles that would be retained on a 1/4-inch (6.3 mm) sieve. The bedding material shall be tamped until firm. Flowable backfill may alternatively be used.

Unless otherwise shown on plans, conduits shall be installed so that the tops of all conduits within the Airport's secured area where trespassing is prohibited are at least 18 inches (0.5 m) below the finished grade. Conduits outside the Airport's secured area shall be installed so that the tops of the conduits are at least 24 inches (60 cm) below the finished grade per National Electric Code (NEC), Table 300.5.

When two or more individual conduits intended to carry conductors of equivalent voltage insulation rating are installed in the same trench without concrete encasement, they shall be spaced not less than 3 inches (75 mm) apart (measured from outside wall to outside wall) in a horizontal direction and not less than 6 inches (150 mm) apart in a vertical direction. Where two or more individual conduits intended to carry conductors of differing voltage insulation rating are installed in the same trench without concrete encasement, they shall be placed not less than 3 inches (75 mm) apart (measured from outside wall to outside wall) in a horizontal direction and lot less than 6 inches (150 mm) apart in a vertical direction.

Trenches shall be opened the complete length between normal termination points before conduit is installed so that if any unforeseen obstructions are encountered, proper provisions can be made to avoid them.

Conduits shall be installed using conduit spacers. No. 4 reinforcing bars shall be driven vertically into the soil a minimum of 6 inches (150 mm) to anchor the assembly into the earth while backfilling. For this purpose, the spacers shall be fastened down with locking collars attached to the vertical bars. Spacers shall be installed at 5-foot (1.5-m) intervals. Spacers shall be in the proper sizes and configurations to fit the conduits. Locking collars and spacers shall be submitted to the RPR for review prior to use.

110-3.4 MARKERS. The location of each end and of each change of direction of conduits and duct banks shall be marked by a concrete slab marker 2 feet (60 cm) square and 4 - 6 inches (100 - 150 mm) thick extending approximately one inch (25 mm) above the surface. The markers shall also be located directly above the ends of all conduits or duct banks, except where they terminate in a junction/access structure or building. Each cable or duct run from a line of lights and signs to the equipment vault must be marked at approximately every 200 feet (61 m) along the cable or duct run, with an additional marker at each change of direction of cable or duct run.

The Contractor shall impress the word "DUCT" or "CONDUIT" on each marker slab. Impression of letters shall be done in a manner, approved by the RPR, for a neat, professional appearance. All letters and words must be neatly stenciled. After placement, all markers shall be given one coat of high-visibility orange paint, as approved by the RPR. The Contractor shall also impress on the slab the number and size of conduits beneath the marker along with all other necessary information as determined by the RPR. The letters shall be 4 inches (100 mm) high and 3 inches (75 mm) wide with width of stroke 1/2 inch (12 mm) and 1/4 inch (6 mm) deep or as large as the available space permits. Furnishing and installation of duct markers is incidental to the respective duct pay item.

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110-3.5 BACKFILLING FOR CONDUITS. For conduits, 8 inches (200 mm) of sand, soft earth, or other fine fill (loose measurement) shall be placed around the conduits ducts and carefully tamped around and over them with hand tampers. The remaining trench shall then be backfilled and compacted per Item P-152 except that material used for back fill shall be select material not larger than 4 inches (100 mm) in diameter.

Flowable backfill may alternatively be used.

Trenches shall not contain pools of water during back filling operations.

The trench shall be completely backfilled and tamped level with the adjacent surface; except that, where sod is to be placed over the trench, the backfilling shall be stopped at a depth equal to the thickness of the sod to be used, with proper allowance for settlement.

Any excess excavated material shall be removed and disposed of per instructions issued by the RPR.

110-3.6 BACKFILLING FOR DUCT BANKS. After the concrete has cured, the remaining trench shall be backfilled and compacted per Item P-152 "Excavation and Embankment" except that the material used for backfill shall be select material not larger than 4 inches (100 mm) in diameter. In addition to the requirements of Item P-152, where duct banks are installed under pavement, one moisture/density test per lift shall be made for each 250 linear feet (76 m) of duct bank or one work period's construction, whichever is less.

Flowable backfill may alternatively be used.

Trenches shall not contain pools of water during backfilling operations.

The trench shall be completely backfilled and tamped level with the adjacent surface; except that, where sod is to be placed over the trench, the backfilling shall be stopped at a depth equal to the thickness of the sod to be used, with proper allowance for settlement.

Any excess excavated material shall be removed and disposed of per instructions issued by the RPR.

110-3.7 RESTORATION. Where sod has been removed, it shall be replaced as soon as possible after the backfilling is completed. All areas disturbed by the work shall be restored to its original condition. The restoration shall include seeding shown on the plans. The Contractor shall be held responsible for maintaining all disturbed surfaces and replacements until final acceptance. All restoration shall be considered incidental to the respective L-110 pay item. Following restoration of all trenching near airport movement surfaces, the Contractor shall thoroughly visually inspect the area for foreign object debris (FOD), and remove any such FOD that is found. This FOD inspection and removal shall be considered incidental to the pay item of which it is a component part.

110-3.8 OWNERSHIP OF REMOVED CABLE. The Contractor shall remove all abandoned/unused conductors contained in conduits in which new conductors will be installed. No abandoned conductors shall be left in place at the completion of the job. All removed wire shall become the property of the Contractor and the Contractor shall be held responsible for removing the wire off airport property. The removal of existing conductors shall be considered incidental to the respective duct pay item and no separate payment will be made.

METHOD OF MEASUREMENT

110-4.1 Underground conduits and duct banks shall be measured by the linear feet (meter) for L-110a/b/c and by the lump sum for L-110d of conduits and duct banks installed, including encasement, locator tape, trenching and backfill with designated material, and restoration, and for drain lines, the termination at the drainage

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structure, all measured in place, completed, and accepted. Separate measurement shall be made for the various types and sizes.

BASIS OF PAYMENT

110-5.1 Payment will be made at the contract unit price per linear foot for each type and size of conduit and duct bank completed and accepted, including trench and backfill with the designated material, and, for drain lines, the termination at the drainage structure. This price shall be full compensation for removal and disposal of existing duct banks and conduits as shown on the plans, furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete this item per the provisions and intent of the plans and specifications.

Payment will be made under:

Item	L-110a	Install 1-2" SCH. 40 PVC Conduit, Direct Earth Buried (DEB) - per linear foot
Item	L-110b	Install 1-2" SCH. 40 PVC Conduit, Concrete Encased (CE) - per linear foot
Item	L-110c	Install 5-2" SCH. 40 PVC Conduit, Concrete Encased (CE) - per linear foot
Item	L-110d	Concrete Encase Existing FAA Line Under Proposed Pavement - per linear foot

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Advisory Circular (AC)

AC 150/5340-30	Design and Installation Details for Airport Visual Aids
AC 150/5345-53	Airport Lighting Equipment Certification Program

ASTM International (ASTM)

ASTM A615	Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement

National Fire Protection Association (NFPA)

NFPA-70	National Electrical Code (NEC)

Underwriters Laboratories (UL)

UL Standard 6	Electrical Rigid Metal Conduit - Steel
UL Standard 514B	Conduit, Tubing, and Cable Fittings
UL Standard 514C	Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers
UL Standard 1242	Electrical Intermediate Metal Conduit Steel
UL Standard 651	Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings
UL Standard 651A	Type EB and A Rigid PVC Conduit and HDPE Conduit

****END OF ITEM L-110****

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ITEM L-115 ELECTRICAL MANHOLES AND JUNCTION STRUCTURES

DESCRIPTION

115-1.1 This item shall consist of electrical manholes and junction structures (hand holes, pull boxes, junction cans, etc.) installed per this specification, at the indicated locations and conforming to the lines, grades and dimensions shown on the plans or as required by the RPR. This item shall include the installation of each electrical manhole and/or junction structures with all associated excavation, backfilling, sheeting and bracing, concrete, reinforcing steel, ladders, appurtenances, testing, dewatering and restoration of surfaces to the satisfaction of the RPR including removal of existing manholes and junction structures as shown on the plans.

EQUIPMENT AND MATERIALS

115-2.1 GENERAL.

a. All equipment and materials covered by referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification when so requested by the RPR.

b. Manufacturer's certifications shall not relieve the Contractor of the responsibility to provide materials per these specifications. Materials supplied and/or installed that do not comply with these specifications shall be removed (when directed by the RPR) and replaced with materials that comply with these specifications at the Contractor's cost.

c. All materials and equipment used to construct this item shall be submitted to the RPR for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify products or models applicable to this project. Indicate all optional equipment and delete any non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment to which they apply on each submittal sheet. Markings shall be made bold and clear with arrows or circles (highlighting is not acceptable). The Contractor is solely responsible for delays in the project that may accrue directly or indirectly from late submissions or resubmissions of submittals.

d. The data submitted shall be sufficient, in the opinion of the RPR, to determine compliance with the plans and specifications. The Contractor's submittals shall be electronically submitted in pdf format, tabbed by specification section. The RPR reserves the right to reject any and all equipment, materials or procedures that do not meet the system design and the standards and codes, specified in this document.

e. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from the date of final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

115-2.2 CONCRETE STRUCTURES. Concrete shall be proportioned, placed, and cured per Item P-610, Concrete for Miscellaneous Structures. Cast-in-place concrete structures shall be as shown on the plans.

115-2.3 PRECAST CONCRETE STRUCTURES. Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or another engineer approved third party certification program. Provide precast concrete structures where shown on the plans.

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Precast concrete structures shall be an approved standard design of the manufacturer. Precast units shall have mortar or bitumastic sealer placed between all joints to make them watertight. The structure shall be designed to withstand 100,000 lb aircraft loads, unless otherwise shown on the plans. Openings or knockouts shall be provided in the structure as detailed on the plans.

Threaded inserts and pulling eyes shall be cast in as shown on the plans.

If the Contractor chooses to propose a different structural design, signed and sealed shop drawings, design calculations, and other information requested by the RPR shall be submitted by the Contractor to allow for a full evaluation by the RPR. The RPR shall review per the process defined in the General Provisions.

115-2.4 JUNCTION BOXES. Junction boxes shall be L-867 Class 1 (non-load bearing) or L-868 Class 1 (load bearing) airport light bases that are encased in concrete. The light bases shall have a L-894 blank cover, gasket, and stainless steel hardware. All bolts, studs, nuts, lock washers, and other similar fasteners used for the light fixture assemblies must be fabricated from 316L (equivalent to EN 1.4404), 18-8, 410, or 416 stainless steel. If 18-8, 410, or 416 stainless steel is utilized it shall be passivated and be free from any discoloration. Covers shall be 3/8-inch (9-mm) thickness for L-867 and 3/4-inch (19-mm) thickness for L-868. All junction boxes shall be provided with both internal and external ground lugs.

115-2.5 MORTAR. The mortar shall be composed of one part of cement and two parts of mortar sand, by volume. The cement shall be per the requirements in ASTM C150, Type I. The sand shall be per the requirements in ASTM C144. Hydrated lime may be added to the mixture of sand and cement in an amount not to exceed 15% of the weight of cement used. The hydrated lime shall meet the requirements of ASTM C206. Water shall be potable, reasonably clean and free of oil, salt, acid, alkali, sugar, vegetable, or other substances injurious to the finished product.

115-2.6 CONCRETE. All concrete used in structures shall conform to the requirements of Item P-610, Concrete for Miscellaneous Structures.

115-2.7 FRAMES AND COVERS. The frames shall conform to one of the following requirements:

a.	ASTM A48	Gray iron castings
b.	ASTM A47	Malleable iron castings
c.	ASTM A27	Steel castings
d.	ASTM A283, Grade D	Structural steel for grates and frames
e.	ASTM A536	Ductile iron castings
f.	ASTM A897	Austempered ductile iron castings

All castings specified shall withstand a maximum tire pressure of 250 psi and maximum load of 100,000 lbs.

All castings or structural steel units shall conform to the dimensions shown on the plans and shall be designed to support the loadings specified.

Each frame and cover unit shall be provided with fastening members to prevent it from being dislodged by traffic, but which will allow easy removal for access to the structure.

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All castings shall be thoroughly cleaned. After fabrication, structural steel units shall be galvanized to meet the requirements of ASTM A123.

Each cover shall have the word "ELECTRIC" or other approved designation cast on it. Each frame and cover shall be as shown on the plans or approved equivalent. No cable notches are required.

Each manhole shall be provided with a "DANGER -- PERMIT-REQUIRED CONFINED SPACE, DO NOT ENTER" safety warning sign as detailed in the Contract Documents and in accordance with OSHA 1910.146 (c)(2).

115-2.8 LADDERS. Ladders, if specified, shall be galvanized steel or as shown on the plans.

115-2.9 REINFORCING STEEL. All reinforcing steel shall be deformed bars of new billet steel meeting the requirements of ASTM A615, Grade 60.

115-2.10 BEDDING/SPECIAL BACKFILL. Bedding or special backfill shall be as shown on the plans.

115-2.11 FLOWABLE BACKFILL. Flowable material used to backfill shall conform to the requirements of Item P-153, Controlled Low Strength Material.

115-2.12 CABLE TRAYS. Cable trays shall be of galvanized steel**]**. Cable trays shall be located as shown on the plans.

115-2.13 PLASTIC CONDUIT. Plastic conduit shall comply with Item L-110, Airport Underground Electrical Duct Banks and Conduits.

115-2.14 CONDUIT TERMINATORS. Conduit terminators shall be pre-manufactured for the specific purpose and sized as required or as shown on the plans.

115-2.15 PULLING-IN IRONS. Pulling-in irons shall be manufactured with 7/8-inch (22 mm) diameter hot-dipped galvanized steel or stress-relieved carbon steel roping designed for concrete applications (7 strand, 1/2-inch (12 mm) diameter with an ultimate strength of 270,000 psi (1862 MPa)). Where stress-relieved carbon steel roping is used, a rustproof sleeve shall be installed at the hooking point and all exposed surfaces shall be encapsulated with a polyester coating to prevent corrosion.

115-2.16 GROUND RODS. Ground rods shall be one piece, copper clad steel**.** The ground rods shall be of the length and diameter specified on the plans, but in no case shall they be less than 8 feet (2.4 m) long nor less than 5/8 inch (16 mm) in diameter.

CONSTRUCTION METHODS

115-3.1 UNCLASSIFIED EXCAVATION. It is the Contractor's responsibility to locate existing utilities within the work area prior to excavation. Damage to utility lines, through lack of care in excavating, shall be repaired or replaced to the satisfaction of the RPR without additional expense to the Owner.

The Contractor shall perform excavation for structures and structure footings to the lines and grades or elevations shown on the plans or as staked by the RPR. The excavation shall be of sufficient size to permit the placing of the full width and length of the structure or structure footings shown. All excavation shall be unclassified and shall be considered incidental to Item L-115. Dewatering necessary for structure installation and erosion per federal, state, and local requirements is incidental to Item L-115.

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Boulders, logs and all other objectionable material encountered in excavation shall be removed. All rock and other hard foundation material shall be cleaned of all loose material and cut to a firm surface either level, stepped or serrated, as directed by the RPR. All seams, crevices, disintegrated rock and thin strata shall be removed. When concrete is to rest on a surface other than rock, special care shall be taken not to disturb the bottom of the excavation. Excavation to final grade shall not be made until just before the concrete or reinforcing is to be placed.

The Contractor shall provide all bracing, sheeting and shoring necessary to implement and protect the excavation and the structure as required for safety or conformance to governing laws. The cost of bracing, sheeting and shoring shall be included in the unit price bid for the structure.

Unless otherwise provided, bracing, sheeting and shoring involved in the construction of this item shall be removed by the Contractor after the completion of the structure. Removal shall be effected in a manner that will not disturb or mar finished masonry. The cost of removal shall be included in the unit price bid for the structure.

After each excavation is completed, the Contractor shall notify the RPR. Structures shall be placed after the RPR has approved the depth of the excavation and the suitability of the foundation material.

Prior to installation the Contractor shall provide a minimum of 6 inches (150 mm) of sand or a material approved by the RPR as a suitable base to receive the structure. The base material shall be compacted and graded level and at proper elevation to receive the structure in proper relation to the conduit grade or ground cover requirements, as indicated on the plans.

115-3.2 CONCRETE STRUCTURES. Concrete structures shall be built on prepared foundations conforming to the dimensions and form indicated on the plans. The concrete and construction methods shall conform to the requirements specified in Item P-610. Any reinforcement required shall be placed as indicated on the plans and shall be approved by the RPR before the concrete is placed.

115-3.3 PRECAST UNIT INSTALLATIONS. Precast units shall be installed plumb and true. Joints shall be made watertight by use of sealant at each tongue-and-groove joint and at roof of manhole. Excess sealant shall be removed and severe surface projections on exterior of neck shall be removed.

115-3.4 PLACEMENT AND TREATMENT OF CASTINGS, FRAMES AND FITTINGS. All castings, frames and fittings shall be placed in the positions indicated on the Plans or as directed by the RPR and shall be set true to line and to correct elevation. If frames or fittings are to be set in concrete or cement mortar, all anchors or bolts shall be in place and position before the concrete or mortar is placed. The unit shall not be disturbed until the mortar or concrete has set.

Field connections shall be made with bolts, unless indicated otherwise. Welding will not be permitted unless shown otherwise on the approved shop drawings and written approval is granted by the casting manufacturer. Erection equipment shall be suitable and safe for the workman. Errors in shop fabrication or deformation resulting from handling and transportation that prevent the proper assembly and fitting of parts shall be reported immediately to the RPR and approval of the method of correction shall be obtained. Approved corrections shall be made at Contractor's expense.

Anchor bolts and anchors shall be properly located and built into connection work. Bolts and anchors shall be preset by the use of templates or such other methods as may be required to locate the anchors and anchor bolts accurately. Pulling-in irons shall be located opposite all conduit entrances into structures to provide a strong, convenient attachment for pulling-in blocks when installing cables. Pulling-in irons shall be set directly into the concrete walls of the structure.

115-3.5 INSTALLATION OF LADDERS. Ladders shall be installed such that they may be removed if necessary. Mounting brackets shall be supplied top and bottom and shall be cast in place during fabrication of the structure or drilled and grouted in place after erection of the structure.

115-3.6 REMOVAL OF SHEETING AND BRACING. In general, all sheeting and bracing used to support the sides of trenches or other open excavations shall be withdrawn as the trenches or other open excavations are being refilled. That portion of the sheeting extending below the top of a structure shall be withdrawn, unless otherwise directed, before more than 6 inches (150 mm) of material is placed above the top of the structure and before any bracing is removed. Voids left by the sheeting shall be carefully refilled with selected material and rammed tight with tools especially adapted for the purpose or otherwise as may be approved.

The RPR may direct the Contractor to delay the removal of sheeting and bracing if, in his judgment, the installed work has not attained the necessary strength to permit placing of backfill.

115-3.7 BACKFILLING. After a structure has been completed, the area around it shall be backfilled in horizontal layers not to exceed 6 inches (150 mm) in thickness measured after compaction to the density requirements in Item P-152. Each layer shall be deposited all around the structure to approximately the same elevation. The top of the fill shall meet the elevation shown on the plans or as directed by the RPR.

Backfill shall not be placed against any structure until approval is given by the RPR. In the case of concrete, such approval shall not be given until tests made by the laboratory under supervision of the RPR establish that the concrete has attained sufficient strength to provide a factor of safety against damage or strain in withstanding any pressure created by the backfill or the methods used in placing it.

Where required, the RPR may direct the Contractor to add, at his own expense, sufficient water during compaction to assure a complete consolidation of the backfill. The Contractor shall be responsible for all damage or injury done to conduits, duct banks, structures, property or persons due to improper placing or compacting of backfill.

115-3.8 CONNECTION OF DUCT BANKS. To relieve stress of joint between concrete-encased duct banks and structure walls, reinforcement rods shall be placed in the structure wall and shall be formed and tied into duct bank reinforcement at the time the duct bank is installed.

115-3.9 GROUNDING. A ground rod shall be installed in the floor of all concrete structures so that the top of rod extends 6 inches (150 mm) above the floor. The ground rod shall be installed within one foot (30 cm) of a corner of the concrete structure. Ground rods shall be installed prior to casting the bottom slab. Where the soil condition does not permit driving the ground rod into the earth without damage to the ground rod, the Contractor shall drill a 4-inch (100 mm) diameter hole into the earth to receive the ground rod. The hole around the ground rod shall be filled throughout its length, below slab, with Portland cement grout. Ground rods shall be installed in precast bottom slab of structures by drilling a hole through bottom slab and installing the ground rod. Bottom slab penetration shall be sealed watertight with Portland cement grout around the ground rod.

A grounding bus of 4/0 bare stranded copper shall be exothermically bonded to the ground rod and loop the concrete structure walls. The ground bus shall be a minimum of one foot (30 cm) above the floor of the structure and separate from other cables. No. 2 American wire gauge (AWG) bare copper pigtails shall bond the grounding bus to all cable trays and other metal hardware within the concrete structure. Connections to the grounding bus shall be exothermic. If an exothermic weld is not possible, connections to the grounding bus shall be made by using connectors approved for direct burial in soil or concrete per UL 467. Hardware connections may be mechanical, using a lug designed for that purpose.

Exhibit 1

115-3.10 CLEANUP AND REPAIR. After erection of all galvanized items, damaged areas shall be repaired by applying a liquid cold-galvanizing compound per MIL-P-21035. Surfaces shall be prepared and compound applied per the manufacturer's recommendations.

Prior to acceptance, the entire structure shall be cleaned of all dirt and debris.

115-3.11 RESTORATION. After the backfill is completed, the Contractor shall dispose of all surplus material, dirt and rubbish from the site. The Contractor shall restore all disturbed areas equivalent to or better than their original condition. All sodding, grading and restoration shall be considered incidental to the respective Item L-115 pay item.

The Contractor shall grade around structures as required to provide positive drainage away from the structure.

Areas with special surface treatment, such as roads, sidewalks, or other paved areas shall have backfill compacted to match surrounding areas, and surfaces shall be repaired using materials comparable to original materials.

Following restoration of all trenching near airport movement surfaces, the Contractor shall thoroughly visually inspect the area for foreign object debris (FOD), and remove any such FOD that is found. This FOD inspection and removal shall be considered incidental to the pay item of which it is a component part.

After all work is completed, the Contractor shall remove all tools and other equipment, leaving the entire site free, clear and in good condition.

115-3.12 INSPECTION. Prior to final approval, the electrical structures shall be thoroughly inspected for conformance with the plans and this specification. Any indication of defects in materials or workmanship shall be further investigated and corrected. The earth resistance to ground of each ground rod shall not exceed 25 ohms. Each ground rod shall be tested using the fall-of-potential ground impedance test per American National Standards Institute / Institute of Electrical and Electronic Engineers (ANSI/IEEE) Standard 81. This test shall be performed prior to establishing connections to other ground electrodes.

115-3.13 MANHOLE ELEVATION ADJUSTMENTS. The Contractor shall adjust the tops of existing manholes in areas designated in the Contract Documents to the new elevations shown. The Contractor shall be responsible for determining the exact height adjustment required to raise or lower the top of each manhole to the new elevations. The existing top elevation of each manhole to be adjusted shall be determined in the field and subtracted/added from the proposed top elevation.

The Contractor shall remove/extend the existing top section or ring and cover on the manhole structure or manhole access. The Contractor shall install precast concrete sections or grade rings of the required dimensions to adjust the manhole top to the new proposed elevation or shall cut the existing manhole walls to shorten the existing structure, as required by final grades. The Contractor shall reinstall the manhole top section or ring and cover on top and check the new top elevation.

The Contractor shall construct a concrete slab around the top of adjusted structures located in graded areas that are not to be paved. The concrete slab shall conform to the dimensions shown on the plans.

115-3.14 DUCT EXTENSION TO EXISTING DUCTS. Where existing concrete encased ducts are to be extended, the duct extension shall be concrete encased plastic conduit. The fittings to connect the ducts together shall be standard manufactured connectors designed and approved for the purpose. The duct extensions shall be installed according to the concrete encased duct detail and as shown on the plans.

Exhibit 1

METHOD OF MEASUREMENT

115-4.1 Electrical manholes and junction structures shall be measured by each unit completed in place and accepted. The following items shall be included in the price of each unit: All required excavation and dewatering:; sheeting and bracing; all required backfilling with on-site materials; restoration of all surfaces and finished grading and turfing; all required connections; temporary cables and connections; and ground rod testing

115-4.2 Manhole elevation adjustments shall be measured by the completed unit installed, in place, completed, and accepted. Separate measurement shall not be made for the various types and sizes.

BASIS OF PAYMENT

115-5.1 The accepted quantity of electrical manholes and junction structures will be paid for at the Contract unit price per each, complete and in place. This price shall be full compensation for furnishing all materials and for all preparation, excavation, backfilling and placing of the materials, furnishing and installation of appurtenances and connections to duct banks and other structures as may be required to complete the item as shown on the plans and for all labor, equipment, tools and incidentals necessary to complete the structure.

115-5.2 Payment shall be made at the contract unit price for manhole elevation adjustments. This price shall be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary, including but not limited to, spacers, concrete, rebar, dewatering, excavating, backfill, topsoil, sodding and pavement restoration, where required, to complete this item as shown in the plans and to the satisfaction of the RPR.

Payment will be made under:

Item L-115a	Install Electrical Pullbox, 4'x4', Aircraft Rated – per each
Item L-115b	Install L-867B Junction Box, Complete – per each

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

American National Standards Institute / Insulated Cable Engineers Association (ANSI/ICEA)

ANSI/IEEE STD 81	IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System

Advisory Circular (AC)

AC 150/5345-7	Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits
AC 150/5345-26	Specification for L-823 Plug and Receptacle, Cable Connectors
AC 150/5345-42	Specification for Airport Light Bases, Transformer Housings, Junction Boxes, and Accessories

Exhibit 1

AC 150/5340-30	Design and Installation Details for Airport Visual Aids
AC 150/5345-53	Airport Lighting Equipment Certification Program

Commercial Item Description (CID)

A-A 59544	Cable and Wire, Electrical (Power, Fixed Installation)

ASTM International (ASTM)

ASTM A27	Standard Specification for Steel Castings, Carbon, for General Application
ASTM A47	Standard Specification for Ferritic Malleable Iron Castings
ASTM A48	Standard Specification for Gray Iron Castings
ASTM A123	Standard Specification for Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products
ASTM A283	Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates
ASTM A536	Standard Specification for Ductile Iron Castings
ASTM A615	Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM A897	Standard Specification for Austempered Ductile Iron Castings
ASTM C144	Standard Specification for Aggregate for Masonry Mortar
ASTM C150	Standard Specification for Portland Cement
ASTM C206	Standard Specification for Finishing Hydrated Lime

FAA Engineering Brief (EB)

EB #83	In Pavement Light Fixture Bolts

Mil Spec

MIL-P-21035	Paint High Zinc Dust Content, Galvanizing Repair

National Fire Protection Association (NFPA)

NFPA-70	National Electrical Code (NEC)

****END OF ITEM L-115****

Exhibit 1

ITEM L-125 INSTALLATION OF AIRPORT LIGHTING SYSTEMS

DESCRIPTION

125-1.1 This item shall consist of airport lighting systems furnished and installed in accordance with this specification, the referenced specifications, and the applicable advisory circulars (ACs). The systems shall be installed at the locations and in accordance with the dimensions, design, and details shown in the plans. This item shall include the furnishing of all equipment, materials, services, and incidentals necessary to place the systems in operation as completed units to the satisfaction of the RPR.

EQUIPMENT AND MATERIALS

125-2.1 GENERAL.

a. Airport lighting equipment and materials covered by Federal Aviation Administration (FAA) specifications shall be certified under the Airport Lighting Equipment Certification Program in accordance with AC 150/5345-53, current version. FAA certified airfield lighting shall be compatible with each other to perform in compliance with FAA criteria and the intended operation. If the Contractor provides equipment that does not performs as intended because of incompatibility with the system, the Contractor assumes all costs to correct the system for to operate properly.

b. Manufacturer's certifications shall not relieve the Contractor of their responsibility to provide materials in accordance with these specifications and acceptable to the RPR. Materials supplied and/or installed that do not comply with these specifications shall be removed, when directed by the RPR and replaced with materials, which do comply with these specifications, at the sole cost of the Contractor.

c. All materials and equipment used shall be submitted to the RPR for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Clearly mark each copy to identify pertinent products or models applicable to this project. Indicate all optional equipment and delete non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment for which they apply on each submittal sheet. Markings shall be clearly made with arrows or circles (highlighting is not acceptable). The Contractor shall be responsible for delays in the project accruing directly or indirectly from late submissions or resubmissions of submittals.

d. The data submitted shall be sufficient, in the opinion of the RPR, to determine compliance with the plans and specifications. The Contractor's submittals shall be submitted in electronic PDF format, tabbed by specification section. The RPR reserves the right to reject any or all equipment, materials or procedures, which, in the RPR's opinion, does not meet the system design and the standards and codes, specified herein.

e. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

Exhibit 1

All LED light fixtures, with the exception of obstruction lighting (AC 150/5345-43) must be warranted by the manufacturer for a minimum of 4 years after date of installation inclusive of all electronics." Obstruction lighting warranty is set by the individual manufacturer.

125-2.2 CONDUIT/DUCT. Conduit shall conform to Specification Item L-110 Airport Underground Electrical Duct Banks and Conduits.

125-2.3 CABLE AND COUNTERPOISE. Cable and Counterpoise shall conform to Item L-108 Underground Power Cable for Airports.

125-2.4 TAPE. Rubber and plastic electrical tapes shall be Scotch Electrical Tape Numbers 23 and 88 respectively, as manufactured by 3M Company or an approved equal.

125-2.5 CABLE CONNECTIONS. Cable Connections shall conform to Item L-108 Installation of Underground Cable for Airports.

125-2.6 RETROREFLECTIVE MARKERS. Not required.

125-2.7 RUNWAY AND TAXIWAY LIGHTS. Runway and taxiway lights shall conform to the requirements of AC 150/5345-46. Lamps shall be of size and type indicated, or as required by fixture manufacturer for each lighting fixture required under this contract. Filters shall be of colors conforming to the specification for the light concerned or to the standard referenced.

Lights

Type	Class	Mode	Style	Option	Base	Filter	Transformer	Notes
L-861T	2	1	NA	4	L-867	Blue	L-830 Size Per Manufacturer	LED
L-852T	2	1	3	NA	L-868	Blue	L-830 Size Per Manufacturer	LED

125-2.8 RUNWAY AND TAXIWAY SIGNS. Runway and Taxiway Guidance Signs should conform to the requirements of AC 150/5345-44.

Signs

Type	Size	Style	Class	Mode	Notes
L-858L/R/Y	1	2/3	2	2	LED

125-2.9 RUNWAY END IDENTIFIER LIGHT (REIL). Not required

125-2.10 PRECISION APPROACH PATH INDICATOR (PAPI). Not required

125-2.11 CIRCUIT SELECTOR CABINET. Not required.

125-2.12 LIGHT BASE AND TRANSFORMER HOUSINGS. Light Base and Transformer Housings should conform to the requirements of AC 150/5345-42. Light bases shall be Type L-867, Class 1A or 1B, Size B shall be provided as indicated or as required to accommodate the fixture or device installed thereon. Base plates, cover plates, and adapter plates shall be provided to accommodate various sizes of fixtures.

Exhibit 1

125-2.13 ISOLATION TRANSFORMERS. Isolation Transformers shall be Type L-830, size as required for each installation. Transformer shall conform to AC 150/5345-47.

INSTALLATION

125-3.1 INSTALLATION. The Contractor shall furnish, install, connect and test all equipment, accessories, conduit, cables, wires, buses, grounds and support items necessary to ensure a complete and operable airport lighting system as specified here and shown in the plans.

The equipment installation and mounting shall comply with the requirements of the National Electrical Code and state and local code agencies having jurisdiction.

The Contractor shall install the specified equipment in accordance with the applicable advisory circulars and the details shown on the plans.

125-3.2 TESTING. All lights shall be fully tested by continuous operation for not less than 24 hours as a completed system prior to acceptance. The test shall include operating the constant current regulator in each step not less than 10 times at the beginning and end of the 24-hour test. The fixtures shall illuminate properly during each portion of the test.

125-3.3 SHIPPING AND STORAGE. Equipment shall be shipped in suitable packing material to prevent damage during shipping. Store and maintain equipment and materials in areas protected from weather and physical damage. Any equipment and materials, in the opinion of the RPR, damaged during construction or storage shall be replaced by the Contractor at no additional cost to the owner. Painted or galvanized surfaces that are damaged shall be repaired in accordance with the manufacturer's recommendations.

125-3.4 ELEVATED AND IN-PAVEMENT LIGHTS. Water, debris, and other foreign substances shall be removed prior to installing fixture base and light.

A jig or holding device shall be used when installing each light fixture to ensure positioning to the proper elevation, alignment, level control, and azimuth control. Light fixtures shall be oriented with the light beams parallel to the runway or taxiway centerline and facing in the required direction. The outermost edge of fixture shall be level with the surrounding pavement. Surplus sealant or flexible embedding material shall be removed. The holding device shall remain in place until sealant has reached its initial set.

METHOD OF MEASUREMENT

125-4.1 Runway and taxiway lights will be measured by the number of each type installed as completed units in place, ready for operation, and accepted by the RPR. Runway End Identifier Lights shall be measured by each system installed as a completed unit in place, ready for operation, and accepted by the RPR.

BASIS OF PAYMENT

125-5.1 Payment will be made at the Contract unit price for each complete runway or taxiway light, guidance sign, reflective marker, runway end identification light, precision approach path indicator, or abbreviated precision approach path indicator installed by the Contractor and accepted by the RPR. This payment will be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools and incidentals necessary to complete this item.

Exhibit 1

Payment will be made under:

Item	L-125a	Install LED L-861T Taxiway Edge Light, Complete – per each
Item	L-125b	Install In-Pavement LED L-852T Taxiway Edge Light, Complete – per each
Item	L-125c	Install LED L-858 Guidance Sign, Size 1, 2 Module, Complete – per each
Item	L-125d	Reinstall LED L-858 Guidance Sign, Size 1, 3 Module, Complete – per each

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Advisory Circulars (AC)

AC 150/5340-18	Standards for Airport Sign Systems
AC 150/5340-26	Maintenance of Airport Visual Aid Facilities
AC 150/5340-30	Design and Installation Details for Airport Visual Aids
AC 150/5345-5	Circuit Selector Switch
AC 150/5345-7	Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits
AC 150/5345-26	Specification for L-823 Plug and Receptacle, Cable Connectors
AC 150/5345-28	Precision Approach Path Indicator (PAPI) Systems
AC 150/5345-39	Specification for L-853, Runway and Taxiway Retroreflective Markers
AC 150/5345-42	Specification for Airport Light Bases, Transformer Housings, Junction Boxes, and
AC 150/5345-44	Specification for Runway and Taxiway Signs
AC 150/5345-46	Specification for Runway and Taxiway Light Fixtures
AC 150/5345-47	Specification for Series to Series Isolation Transformers for Airport Lighting Systems
AC 150/5345-51	Specification for Discharge-Type Flashing Light Equipment
AC 150/5345-53	Airport Lighting Equipment Certification Program

Engineering Brief (EB)

EB No. 67	Light Sources Other than Incandescent and Xenon for Airport and Obstruction Lighting Fixtures

****END OF ITEM L-125****

Exhibit 1

DIVISION 8

COUNTY OF VENTURA STANDARD SPECIFICATIONS

COUNTY of VENTURA

Department of Airports

STANDARD SPECIFICATIONS

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COUNTY OF VENTURA
PUBLIC WORKS AGENCY
STANDARD SPECIFICATIONS
PART 1 - GENERAL PROVISIONS

SECTION 0 - SSPWC ADOPTION AND MODIFICATIONS

0-1 STANDARD SPECIFICATIONS

Except as hereinafter provided or as modified by the Special Provisions, the provisions of Parts 2 through 5 of the 2015 edition of the Standard Specifications for Public Works Construction (referred to as SSPWC), published by BNi Building News, Los Angeles, are part of these Standard Specifications.

0-2 DELETIONS

The following portions of SSPWC are hereby deleted: Part 1 and Sections 200-1.6.2, and 301-1.4.

0-3 NUMBERING OF SECTIONS

The numbering in these modifications is compatible with the numbering in SSPWC. References to whole sections of SSPWC and these modifications are preceded by the word "Section", references to parts of sections show numbers only, such as "211-5", except at the beginning of a sentence, the word "Section" precedes the number. Standard Special Provisions, if included, are numbered as Sections 901 through 999. The Special Provisions are numbered starting with Section 1000 or higher.

Cross-references contained in SSPWC to sections deleted by 0-2 hereof shall be references to the sections of like number contained herein.

0-4 ADDITIONS

The sections that follow, either, replace sections of like number in SSPWC which were deleted in 0-2 above, modify sections of SSPWC, or add material not in SSPWC.

SECTION 1 - TERMS, DEFINITIONS, ABBREVIATIONS, UNITS OF MEASURE AND SYMBOLS

1-1 GENERAL Unless otherwise stated, the words directed, required, permitted, ordered, instructed, designated, considered necessary, prescribed, approved, acceptable, satisfactory, or words of like meaning, refer to actions, expressions, and prerogatives of the Engineer.

1-2 TERMS AND DEFINITIONS

Acceptance--The formal written acceptance by the Agency of the Work which has been completed in all respects in accordance with the Plans and Specifications and any Modifications thereof.

Addendum--Written or graphic instrument issued prior to the opening of Bids which clarifies, corrects or changes the bidding or Contract Documents. The term "Addendum" shall include bulletins and all other types of written notices issued to potential bidders prior to opening of Bids.

Agency--The legal entity for which the Work is being performed. Agreement--See Contract.

Base--A layer of specified material of planned thickness placed immediately below the pavement or surfacing.

Bid--The offer or proposal of the Bidder submitted on the prescribed form setting forth the prices for the Work.

Bidder--Any individual, firm, partnership, corporation, or combination thereof, submitting a Bid for the Work, acting directly or through a duly authorized representative.

Board--The officer or body constituting the awarding authority of the Agency.

Bond--Bid, performance and payment bond or other instrument of security.

Cash Contract--A contract financed by means other than special assessments.

Certificate of Compliance—A written document signed and submitted by a supplier or manufacturer that certifies that the material or assembled material supplied to the Work site conforms to the requirements of the Contract Documents.

Change Order--A written order to the Contractor signed by the Agency directing an addition, deletion or revision in the Work, or an adjustment in the Contract Price or the Contract time issued after the effective date of the Contract. A Change Order may or may not also be signed by the Contractor.

Code--The terms Government Code, Labor Code, etc. refer to codes of the State of California.

Consultant--A professional engineer, architect, landscape architect or other professional who designed the project or performed other services for the Agency on the project.

Contract--The written agreement between the Agency and the Contractor covering the Work.

Contract Documents--The Contract, Addenda, notice inviting bids, instruction to bidders; Bid (including documentation accompanying the Bid and any post-bid documentation submitted prior to the Notice of Award) when attached as an exhibit to the Contract, the Bonds, permits from jurisdictional regulatory agencies, Special Provisions, Plans, Standard Plans, Standard Specifications, Reference Specifications, Change Orders and Supplemental Agreements.

Contractor--The individual, partnership, corporation, joint venture, or other legal entity having a Contract with the Agency to perform the Work. In the case of work being done under permit issued by the Agency, the Permittee shall be construed to be the Contractor. The term "prime contractor" shall mean Contractor.

Contract Price--The total amount of money for which the Contract is awarded.

Contract Unit Price--The amount shown in the Bid for a single unit of an item of work.

County Sealer--The Sealer of Weights and Measures of the county in which the Contract is let.

Days--Days shall mean consecutive calendar days unless otherwise specified.

Daily Extra Work Reports--Reports on Agency furnished forms as required by 3-3.

Disputed Work--Work in which Agency and Contractor are in disagreement.

Due Notice--A written notification, given in due time, of a proposed action where such notification is required by the Contract to be given a specified interval of time (usually 48 hours or two Working Days) prior to the commencement of the contemplated action. Notification may be from Engineer to Contractor or from Contractor to Engineer.

Electrolier--Street light assembly complete, including foundation, standard, luminaire arm, luminaire, etc.

1-2 DEFINITIONS (Continued)

Engineer-- The Director of Public Works Agency acting either directly or through properly authorized agents, such agents acting within the scope of the particular duties delegated to them.

Field Directive--A written communication from the Engineer to the Contractor that does not make any Modification to the Contract Documents. It is used only to answer Contractor's questions and to provide decisions as specified in the Contract Documents.

Geotextile--Synthetic fiber used in civil engineering applications, serving the primary function of separation and filtration.

House Connection Sewer--A sewer, within a public street or right of way, proposed to connect any parcel, lot, or part of a lot with a main line sewer.

House Sewer--A sewer, wholly within private property, proposed to connect any building to a house connection sewer.

Luminaire--The lamp housing including the optical and socket assemblies (and ballast if so specified).

Major Bid Item--A single Contract item constituting 10% or more of the original Contract Price.

Mast Arm- The structural member or bracket, which, when mounted on a Standard, supports the luminaire.

Modification--Includes Change Orders and Supplemental Agreements. A Modification may only be issued after the effective date of the Contract.

Notice of Award--The written notice by the Agency to the successful Bidder stating that upon compliance by it with the required conditions, the Agency will execute the Contract.

Notice to Proceed--A written notice given by the Agency to the Contractor fixing the date on which the Contract time will start.

Owner--Same meaning as Agency.

Person--Any individual, firm, association, partnership, corporation, trust, joint venture, or other legal entity.

Plans--The drawings, profiles, cross sections, Standard Plans, working drawings, shop drawings, and supplemental drawings, or reproductions thereof, approved by the Engineer, which show the location, character, dimensions, or details of the Work.

Private Contract--Work subject to Agency inspection, control, and approval, involving private funds, not administered by the Agency.

Prompt--The briefest interval of time required for a considered reply, including time required for approval by a governing body.

Proposal--See Bid.

Reference Specifications--Those bulletins, standards, rules, methods of analysis or testing, codes, and specifications of other agencies, engineering societies, or industrial associations referred to in the Contract Documents. These refer to the latest edition, including amendments in effect and published at the time of advertising the project or issuing the permit, unless specifically referred to by edition, volume, or date.

Roadway--The portion of a street reserved for vehicular use.

Service Connection-All or any portion of the conduit cable or duct including meter, between a utility distribution line and an individual consumer

Service Lateral Connection-The interface of the House Connection Sewer with the host pipe. Sewer--Any conduit intended for the reception and transfer of sewage and fluid industrial waste.

Shop Drawings—Drawings showing details of manufactured or assembled products proposed to be incorporated in the Work.

Special Provisions--Any provisions which supplement or modify the Standard Specifications.

Specifications--Standard Specifications, Reference Specifications, Standard Special Provisions, Special Provisions, and specifications in Change Orders or Supplemental Agreements between the Contractor and the Board.

Standard—The shaft or pole used to support street lighting luminaire, traffic signal heads, mast arms, etc.

Standard Plans--Details of standard structures, devices, or instructions referred to on the Plans or in the Specifications by title or number.

Standard Special Provisions-- Special Provisions prepared in standardized form numbered in the series 401 through 499.

1-2 DEFINITIONS (Continued)

Standard Specifications--Parts 1 through 6 of this document. See Section 0. References to whole sections will be preceded by the word "Section", references to parts of sections will show numbers only, such as "3-2", except at the beginning of a sentence, the word "Section" precedes the number.

State--The State of California.

State Standard Plans--Standard Plans prepared by State of California, Business and Transportation Agency, Department of Transportation.

Stipulated Unit Price--Unit prices established by Agency in the Contract Documents.

Storm Drain--Any conduit and appurtenances intended for the reception and transfer of storm water.

Street--Any road, highway, parkway, freeway, alley, walk or way.

Subbase--A layer of specified material of planned thickness between a base and the subgrade.

Subcontractor--An individual, firm or corporation having a direct contract with the Contractor or with any other Subcontractor for the performance of a part of the Work.

Subgrade--For roadways, that portion of the roadbed on which pavement, surfacing, base, subbase, or a layer of other material is placed. For structures, the soil prepared to support a structure.

Supervision--Supervision, where used to indicate supervision by the Engineer, shall mean the performance of obligations, and the exercise of rights, specifically imposed upon and granted to the Agency in becoming a party to the Contract. Except as specifically stated herein, supervision by the Agency shall not mean active and direct superintendence of details of the Work.

Supplemental Agreement--A written amendment of the Contract Documents signed by both parties.

Surety--See 2-4.

Utility--Tracks, overhead or underground wires, pipelines, conduits, ducts, or structures, sewers or storm drains owned, operated or maintained in or across a public right of way or private easement.

Work--That which is proposed to be constructed or done under the Contract or permit, including the furnishing of all labor, materials, equipment, and services.

Working Day--See 6-7.2 and 6.7.2.1.

Working Drawings—Drawings showing details not shown on the Plans which are required to designed by the Contractor

1-3 ABBREVIATIONS

1-3.1 General. The abbreviations herein, together with others in general use, are applicable to these Standard Specifications and to all other Contract Documents.

All abbreviations and symbols used on Plans for structural steel construction shall conform to those given by the "Manual of Steel Construction" published by the American Institute of Steel Construction, Inc.

1-3.2 Common Usage

Abbreviation	Word or Words	Abbreviation	Word or Words
Aban	Abandon	l	Liters
Aband	Abandoned	Lab	Laboratory
ABS	Acrylonitrile-butadiene-styrene	Lat	Lateral
AC	Asphalt Concrete	LD	Local depression
ACP	Asbestos cement pipe	LED	Light Emitting Diode
ADA	Americans with Disabilities Act of 1990 (Public Law 101- 336, 104 Sat. 1990,42 USC 12101-12213 (as amended))	LH	Lamp hole
Alt	Alternate	LL	Live load
AmerStd	American Standard	LOL	Layout line
APC	Air Placed Concrete	Long	Longitudinal
ARAM	Asphalt Rubber Aggregate Membrane	LP	Lamp post
ARHM	Asphalt Rubber Hot Mix	LPS	Low pressure sodium (Light)
AWG	American Wire Gage (non-ferrous wire)	LS	Lump sum
B/W	Back of wall	LTS	Lime treated soil
BC	Beginning of curve	m	Meters
BCR	Beginning of curb return	Maint	Maintenance
Bdry	Boundary	Max	Maximum
BF	Bottom of footing	MC	Medium curing
BM	Bench mark	MCR	Middle of curb return
BMPs	Best Management Practices	Meas	Measure
BVC	Beginning of vertical curve	MH	Manhole, maintenance hole
C&G	Curb & Gutter	Mil Spec	Military specification
C&G	Curb and gutter	Min	Minimum
CAB	Crushed aggregate base	Misc	Miscellaneous

Exhibit 1

Abbreviation	Word or Words
CALOSHA	California Occupational Safety and Health Administration
CALTRANS	California Department of Transportation
CAP	Corrugated aluminum pipe
CB	Catch Basin
Cb	Curb
CBP	Catch Basin Connection Pipe
CBR	California Bearing Ratio
C-C	Center to center
CCFRPM	Centrifugally Cast Fiberglass Reinforced Plastic Mortar
CCR	California Code of Regulations
CCTV	Closed Circuit TV
CF	Cubic foot
CF	Curb face
CFR	Code of Federal Regulations
CFS	Cubic feet per second
CHDPE	Corrugated High Density Polyethylene
CIP	Cast iron pipe
CIPP	Cast-in-place pipe
CIPPC	Cast-in-place Concrete Pipe
CL	Clearance, center line
CLF	Chain link fence
CLSM	Controlled Low Strength Material
CMB	Crushed miscellaneous base
CMC	Cement mortar-coated
CML	Cement mortar-lined
cms	Cubic meters per second
CO	Cleanout (Sewer)
Col	Column
Conc	Concrete
Conn	Connection
Const	Construct, Construction
Coord	Coordinate
CQS	Cationic Quick-Setting
CRM	Crumb Rubber Modifier
CRS	Cationic Rapid-Setting
CSEP	Confined Space Entry Plan
CSP	Corrugated steel pipe
CSPA	Corrugated steel pipe arch
CSS	Cationic Slow-Setting
CT	California Test
CTB	Cement treated base
CV	Check valve
CY	Cubic yard
D	Depth, Load of pipe
db	Decibels
Dbl	Double
DF	Douglas Fir
Dia	Diameter
DIP	Ductile iron pipe
DL	Dead load
DT	Drain tile
Dwg	Drawing
Dwy Appr	Driveway approach
Dwy	Driveway
Ea	Each
EC	End of curve
ECR	End of curb return
EF	Each face
EG	Edge of gutter
EGL	Energy grade line
El	Elevation
ELC	Electrolier lighting conduit
ELT	Extra long ton of slurry
Eng	Engineer, Engineering
EP	Edge of pavement

Abbreviation	Word or Words
Mon	Monument
MSDS	Material Safety Data Sheet
Mult	Multiple
MUTCD	Manual on Uniform Traffic Control Devices
MVL	Mercury vapor light
N/A	No applicable
NRCP	Nonreinforced concrete pipe
Obs	Obsolete
oc	On center
OD	Outside diameter
OE	Outer edge
Opp	Opposite
Orig	Original
PAV	Pressure Aging Vessel
PB	Pull box
PC	Point of curvature
PCC	Point of compound curvature
PCC	Portland cement concrete
PCVC	Point of compound vertical curve
PE	Polyethylene
PG	Performance Graded
PI	Point of intersection
PL	Property line
PLI	Pounds per linear inch
PMB	Processed miscellaneous base
POC	Point on curve
POT	Point on tangent
PP	Power pole
PRC	Point of reverse curve
PRCB	Precast Reinforced Concrete Box
PRVC	Point of reverse vertical curve
PSI	Pounds per square inch
PT	Point of tangency
PVC	Polyvinyl chloride
Pvmt	Pavement
Pvt R/W	Private right of way
Q	Rate of flow in cms (CFS)
Quad	Quadrangle, Quadrant
R	Radius or Resistance value
R&O	Rock and Oil
R/W	Right of way
RA	Reclaimed Asphalt or Recycling agent
RAC	Recycled asphalt concrete
RAP	Reclaimed asphalt pavement
RBAC	Rubberized asphalt concrete
RC	Reinforced concrete or Rapid Curing
RCB	Reinforced concrete box
RCE	Registered civil engineer
RCP	Reinforced concrete pipe
RCV	Remote control valve
Ref	Reference
Reinf	Reinforced or reinforcement
Res	Reservoir
RGE	Registered geotechnical engineer
RPPCC	Reclaimed Plastic Portland Cement Concrete
RR	Railroad
RSE	Registered structural engineer
RTE	Registered traffic engineer
RTFO	Rolling Thin Film Oven
RW	Reclaimed Water
S	Slope
S/W	Sidewalk
SC	Slow curing
SCCP	Steel cylinder concrete pipe
SCNs	Supplementary Cementitious Materials

Exhibit 1

Abbreviation	Word or Words
Esmt	Easement
ETB	Emulsion treated base

Abbreviation	Word or Words
SD	Storm drain
SDR	Standard dimension ratio

Abbreviation	Word or Words
EVC	End of vertical curve
Exc	Excavation
Exist or Ex	Existing
Exp Jt	Expansion joint
F & C	Frame and cover
F & I	Furnish and install
F/W	Face of wall
Fab	Fabricate
FAS	Flashing arrow sign
FD	Floor drain
Fdn	Foundation
Fed Spec	Federal Specification
FG	Finished grade
FL	Flow line
FS	Finished surface
ft - lb	foot – pound
Ftg	footing
FW	Face of wall
Ga	Gauge
Galv	Galvanized
GG	Gap graded
GIP	Galvanized iron pipe
GL	Ground line or grade line
GM	Gas meter
GP	Guy pole
Gr	Grade
Grtg	Grating
GSP	Galvanized steel pipe
H	High or height
HB	Hose bib
HC	House connection
HDPE	High density Polyethylene
HDWL	Headwall
HGL	Hydraulic grade line
Hor, Horiz	Horizontal
Hp	Horsepower
HPG	High pressure gas
HPS	High pressure sodium (Light)
HRWRA	High Range Water Reducing Admixture
Hyd, Hydr	Hydraulic
ID	Inside diameter
Incl	Include, Including
Insp	Inspection
Inv	Invert
IP	Iron pipe
J	Joules
JC	Junction chamber
Jct	Junction
JS	Junction structure
Jt	Joint
kg	Kilograms
kPa	KiloPascals
L	Length

Abbreviation	Word or Words
SE	Sand Equivalent
Sec	Section
SF	Square foot
SG	Specific gravity
SI	International System of Units (Metric)
SLC	Service Lateral Connection
Spec	Specifications
SR	Standard ratio
SS	Sanitary sewer
SSB	Select sub-base
SSP	Structural steel plate pipe
SSPA	Structural steel plate pipe arch
St Hwy	State highway
Sta	Station
Std	Standard
Str Gr	Straight grade
Str	Straight
Struc	Structural/Structure
SW	Sidewalk
SWD	Sidewalk drain
SWPPP	Storm Water Pollution Prevention Plan
SY	Square Yard
T/W	Top of wall
Tan	Tangent
TC	Top of curb
TCP	Traffic control plan
Tel	Telephone
TF	Top of footing
Topo	Topography
Tr	Tract
Trans	Transition
TRMAC	Tire rubber modified asphalt concrete
TS	Traffic signal or transition structure
TSC	Traffic signal conduit
TSS	Traffic signal standard
TTC	Temporary traffic control
TW	Top of wall
Typ	Typical
U.S.	United States
U.S.C.	United States Code
USA	Underground Service Alert
Var	Varies, Variable
VB	Valve box
VC	Vertical curve
VCP	Vitrified clay pipe
Vert	Vertical
Vol	Volume
VTCSH	Vehicle Traffic Controls Signal Heads
W	Width or Wider
WATCH	Work Area Traffic Control Handbook
WI	Wrought iron
WM	Water meter
WPJ	Weakened plane joint
WTAT	Wet Track Abrasion Test
X Conn	Cross connection
x (as in 2x4)	by
X-Sec	Cross section

Oxnard Airport
Ventura County, California

1-3.3 Institutions.

Abbreviation	Word or Words
AAN	American Association of Nurserymen
AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
AGC	Associated General Contractors of America
AISC	American Institute of Steel Construction
ANSI	American National Standards Institute
API	American Petroleum Institute
APWA	American Public Works Association
AREA	American Railway Engineering Association
ASHRAE	American Society of Heating, Refrigeration and Air-Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWPA	American Wood Preserver's Association
AWS	American Welding Society
AWWA	American Water Works Association
CBSC	California Building Standards Commission
CRSI	Concrete Reinforcing Steel Institute
EIA	Electronic Industries Association
EPA	Environmental Protection Agency
ETL	Electrical Testing Laboratories
FCC	Federal Communications Commission
IAPMO	International Association of Plumbing and Mechanical Officials
ICC	International Code Council
IEEE	Institute of Electrical and Electronics Engineers
IMSA	International Municipal Signal Association
ITE	Institute of Traffic Engineers
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NOAA	National Oceanic and Atmospheric Administration (Department of Commerce)
RUS	Rural Utility Service
UL	Underwriters' Laboratories, Inc.
USGS	United State Geological Survey
WFCA	Western Fire Chiefs Association

1-3.4 Building Codes. The Ventura County Building Code (VCBC) and Ventura County Fire Code (VCFC) are applicable to the Work. VCBC and VCFC adopt by reference a number of uniform and national codes. Where such codes are referenced directly in the Specifications, such references shall be to the VCBC or VCFC which adopt and modify certain provisions in the referenced codes.

Abbreviation	Code	Publisher
CBC	California Building Code	CBSC
DBC	Uniform Code for Abatement of Dangerous Building	ICC
UBC	Uniform Building Code	ICC
UFC	Uniform Fire Code	ICC and WFCA
UHC	Uniform Housing Code	ICC
UMC	Uniform Mechanical Code	IAPMO
UPC	Uniform Plumbing Code	IAPMO
NEC	National Electrical Code	NFPA

1-3.5 Reference Documents.

Abbreviation	Document
HDM	Highway Design Manual, State of California, Department of Transportation, Latest Edition
MUTCD	Manual on Uniform Traffic Control Devices
SSP	Standard Plans, State of California, Department of Transportation, latest edition
SPPWC	Standard Plans for Public Works Construction, Latest edition, published by BNi Building News, Los Angeles,
SSPWC	Standard Specifications for Public Works Construction, (See Section 0-1)
SSS	Standard Specifications, State of California, Department of Transportation, latest edition
VCSS	Ventura County Standard Specifications (Division 1, Sections 0 through 10, of which this section is a part)

1-4 UNITS OF MEASURE

1-4.1 General. The International System of Units, also referred to as SI or the metric system, is the principal measurement system in these Specifications and shall be used for construction, unless otherwise stated in the Contract Documents. U. S. Standard Measure, also called U. S. Customary System, are included in parenthesis. SI units and U. S. Standard Measure in parenthesis may or may not be exactly equivalent. If U. S. Standard Measures are specified for use in the Contract Documents, then all values used for construction shall be U. S. Standard Measures shown in parentheses. However, certain material Specifications and test requirements contained herein use SI units specifically and conversions to U. S. Measures have not been included in these circumstances. When U. S. Standard Measures are not included in parentheses, the SI units shall control.

Reference is also made to ASTM E 380 for definitions of various units of the SI system and a more extensive set of conversion factors.

1-4.1.1 Units for Work. Where U. S. Standard Measure units are shown on the Plans or are specified, U. S. Standard Measure shall be used for the Work.

1-4.2 Units of Measure, Equivalents and Abbreviations

One U.S. Customary Unit	(abbreviation)	Is Equal To	#	SI Unit
mil (=0.001 in)		25.4	micrometers	(µm)
inch	(in)	25.4	millimeter	(mm)
inch	(in)	2.54	centimeter	(cm)
foot	(ft)	0.3048	meter	(m)
yard	(yd)	0.9144	meter	(m)
mile		1.6093	kilometer	(km)
square foot	(ft^2)	0.0929	square meter	(m^2)
square yard	(yd^2)	0.8361	square meter	(m^2)
cubic foot	(ft^3)	0.0283	cubic meter	(m^3)
cubic yard	(yd^3)	0.7646	cubic meter	(m^3)
acre (=43,560 ft^2)		0.4047	hectare (1ha=10,000m^2)	(ha)
gallon	(gal)	3.7854	Liter	(L)
fluid ounce	(fl. oz.)	29.5735	milliliter	(mL)
pound mass (avoirdupois)	(lbs)	0.4536	kilogram	(kg)
ounce mass	(oz)	0.02835	kilogram	(kg)
ounce mass	(oz)	28.35	grams	(g)
Ton (=2000 lb avoirdupois)		0.9072	Tonne (1 Tonne = 1000 kg)	
Poise		0.10	Pascal-second	(Pa-s)
centistoke	(cs)	1.00	square millimeter/sec.	(mm^2/s)
pound force	(lbf)	4.4482	Newton	(N)
pound per square inch	(psi)	6.8948	Kilopascal	(kPa)
pound force per foot	(lbf/ft)	14.594	Newton per meter	(N/M)
foot-pound force	(ft-lbf)	1.3558	Joules	(J)
foot-pound force per second	([ft-lbf]/s)	1.3558	Watt	(W)
part per million	(ppm)	1.00	milligram/liter	(mg/L)
Degree Fahrenheit	(°F)	0.5555	Degree Celsius	(°C)

Temperature: Celsius to Fahrenheit	Temperature: Fahrenheit to Celsius
Temperature °F = (1.8 x °C) + 32	Temperature °C = (°F - 32) / 1.8

SI Units Used in Both Systems		
Ampere (A)	second (s)	Candela (cd)
Volt (V)	decibel (db)	Lumen (lm)

Common Metric Prefixes					
kilo (k)	10^3	milli (m)	10^{-3}	nano (n)	10^{-9}
centi (c)	10^{-2}	micro (µ)	10^{-6}	pico (p)	10^{-12}

1-5 SYMBOLS

°	Degree	PL	Property line	%	Percent
'	Feet or minutes	SL	Survey line or station line	#	Number
"	Inches or seconds	CL	Center line	/	per or of (between words)
Δ	Delta, the central angle or angle between tangents			∠	Angle

Exhibit 1

SECTION 2 - SCOPE AND CONTROL OF WORK 2-1

2-1 AWARD AND EXECUTION OF CONTRACT

2-1.1 Award of Contract. The right is reserved to waive minor irregularities in the proposals and to reject any or all proposals. The award of the Contract, if it be awarded, will be to the lowest responsive, responsible Bidder, determined as provided on the Proposal Form, whose Proposal complies with all the requirements prescribed. Such award, if made, will be made within the number of Days stated in the Proposal form. If the lowest responsible Bidder refuses or fails to execute the Contract, the Agency may, within 45 additional Days, consider the next lowest Bidder to be the lowest responsive, responsible Bidder. The periods of time specified above within which the award of Contract may be made shall be subject to extension for such further period as may be agreed upon in writing by the Bidder concerned. If the Bidder's bid guarantee was in the form of a bid bond, the Bidder shall also submit a statement from the Surety that the bond has been extended for the same period.

Proposals not accompanied by a properly executed Noncollusion Affidavit required by Public Contract Code Section 7106 will be considered nonresponsive and will not be considered for award.

All bids will be compared on the basis of the quantities, amounts and unit prices, or lump sums, as shown on the Bid Proposal.

Before award, the Bidder may be required to furnish acceptable evidence of adequate capability, equipment and financial resources to adequately perform the Work. Bidders found not to be so qualified may have their bids rejected. If reasonable cause exists to believe collusion exists among Bidders, or that prices Bid are unbalanced between Bid items, any or all proposals may be rejected.

Award will not be made to a Bidder who is listed by the State Labor Commissioner as ineligible to bid, work on, or be awarded public works projects.

2-1.2 Notice of Award. Within one Day after award of Contract by the Board, the Bidder to whom Contract is awarded will be notified of award by email and telephone, or if no contact is made by telephone, then by mail. Within three business days after award of Contract, a Notice of Award will be sent, transmitting the Contract Documents to such Bidder for execution. If telephone contact is made, the Bidder may request that the Contract Documents be held in Agency's office to be picked up.

2-1.3 Execution of Contract Documents. On receipt of the Contract Documents, the Bidder shall promptly obtain the required insurance coverage, certificates of insurance, power-of-attorney and Contract bonds, execute the Contract, and transmit all required documents to the Agency.

2-1.4 Failure to Execute Documents. Should the Bidder fail to furnish Agency all required documents, properly executed, prior to the starting day of the Contract time computed as provided in 6-7.4 and stated in the Notice of Award, Agency may thereafter declare the Bidder to be in default and its Proposal guarantee forfeited.

2-1.5 Return of Proposal Guarantees. Within 10 Days after the award of the Contract, Agency will return the Proposal guarantees, other than Bidder's bonds, accompanying such of the proposals as are not to be further considered in making the award. The low and second Bidder's Proposal guarantee will be held until the Contract has been executed, after which all Proposal guarantees, except Bidders' bonds and any guarantees which have been forfeited, will be returned to the respective Bidders whose proposals they accompany.

2-2 ASSIGNMENT. No Contract or portion thereof may be assigned without consent of the Board except that the Contractor may assign money due or which will accrue to it under the Contract. If given written notice, such assignment will be recognized by the Board to the extent permitted by law, but any assignment of money shall be subject to all proper withholdings in favor of the Agency and to all deductions provided for in the Contract. All money withheld, whether assigned or not, shall be subject to being used by the Agency for completion of the Work, should the Contractor be in default.

2-3 SUBCONTRACTS.

2-3.1 General. Each Bidder shall comply with the Chapter of the Public Contract Code including Sections 4100 through 4113. The following excerpts or summaries of some of the requirements of that Chapter are included below for information.

The Bidder shall set forth in the Bid, as provided in 4104:

"(a) (1) The name, the location of the place of business, and the California contractor license number of each subcontractor who will perform work or labor or render service to the prime contractor in or about the construction of the work or improvement, or a subcontractor licensed by the State of California who, under subcontract to the prime contractor, specially fabricates and installs a portion of the work or improvement according to detailed drawings contained in the plans and specifications, in an amount in excess of one- half of 1 percent of the prime contractor's total bid or, in the case of bids or offers for the construction of streets or highways, including bridges, in excess of one-half of 1 percent of the prime contractor's total bid or ten thousand dollars ($10,000), whichever is greater.

(2) An inadvertent error in listing the California contractor license number provided pursuant to paragraph (1) shall not be grounds for filing a bid protest or grounds for considering the bid nonresponsive if the corrected contractor's license number is submitted to the public entity by the prime contractor within 24 hours after the bid opening and provided the corrected contractor's license number corresponds to the submitted name and location for that subcontractor."

If the Contractor fails to specify a Subcontractor, or specifies more than one Subcontractor for the same portion of the Work to be performed under the Contract (in excess of one-half of 1 percent of the Contractor's total bid), the Contractor shall be qualified to perform that portion itself, and shall perform that portion itself except as otherwise provided in the Code.

Except as provided in Section 4107, no prime contractor, whose Bid is accepted, shall substitute any person or Subcontractor in place of the Subcontractor listed in the original bid other than for causes and by procedures established in Section 4107.5 which provides procedures to correct a clerical error in the listing of a Subcontractor. Section 4110 provides that a Contractor violating any of the provisions of the Chapter violates the Contract and the Board may exercise the option either to cancel the Contract or assess the Contractor a penalty in an amount of not more than 10 percent of the subcontract involved, after a public hearing.

2-3.1.1 Use of Debarred Subcontractors Prohibited. The Contractor is prohibited from performing work using a Subcontractor who is listed by the State Labor Commissioner as ineligible to work on public works projects.

2-3.2 Additional Responsibilities. The Contractor shall give personal attention to the fulfillment of the Contract and shall keep the Work under its control.

Except where the required Contractor's License Class is "B", the Contractor shall perform, with its own organization, Contract work amounting to at least 50 percent of the Contract Price except that any designated "Specialty Items" may be performed by subcontract and the amount of any such "Specialty Items" so performed may be deducted from the Contract Price before computing the amount required to be performed by the Contractor with its own organization. "Specialty Items" will be identified by the Agency in the Bid or Proposal with an "[S]". Where an entire item is subcontracted, the value of work subcontracted will be based on the Contract Unit Price. This will be determined from information submitted by the Contractor, and subject to approval by the Engineer.

Before the work of any Subcontractor is started, the Contractor shall submit to the Engineer for approval a written statement showing the work to be subcontracted giving the name, contractor license number, registration with the Department of Industrial Relations, and business of each Subcontractor and description and value of each portion of work to be subcontracted.

2-3.3 Status of Subcontractors. Subcontractors shall be considered employees of the Contractor, and the Contractor shall be responsible for their work.

2-3.3.1 Subcontracts. The Contractor shall incorporate into all subcontracts, and the Subcontractor shall incorporate into all lower tier subcontracts, all of the Plans and Specifications which are part of the Contract between the Contractor and the Agency.

2-3.3.2 Contractor Responsible. The Contractor is responsible for properly performing and completing all Work required by the Contract whether or not it employs subcontractors for certain portions of the Work. It shall coordinate the sequence and timing of its efforts and that of its subcontractors to insure the proper and timely completion of the Work.

2-3.3.3 Specialty Contractors. Where a specialty Contractor's license is required by law or by the Specifications in order to perform certain portions of the Work, the Contractor may perform such portion with its own forces if it holds the proper license. Otherwise, it shall employ a properly licensed subcontractor to perform that portion of the Work. Such requirement to employ a subcontractor does not modify the other requirements of 2-3.

2-4 CONTRACT BONDS. Before execution of the Contract by the Agency, the Bidder shall file surety bonds with the Agency to be approved by the Board in the amounts and for the purposes noted below. Bonds issued by a Surety who is listed in the latest version of U.S. Department of Treasury Circular 570, who is authorized to issue bonds in California, and whose bonding limitation shown in said circular is sufficient to provide bonds in the amount required by the Contract shall be deemed to be approved unless specifically rejected by the Agency. Bonds from all other sureties shall be accompanied by all of the documents enumerated in Code of Civil Procedure 995.660(a). The Bidder shall pay all bond premiums, costs, and incidentals.

Each bond shall incorporate, by reference, the Contract and be signed by both the Bidder and Surety and the signature of the authorized agent of the Surety shall be notarized.

The Bidder shall provide two good and sufficient surety bonds. The "Payment Bond" (Material and Labor Bond) shall be for not less than 100 percent of the Contract Price, to satisfy claims of material suppliers and mechanics and laborers employed by it on the Work. The bond shall be maintained by the Contractor in full force and effect until the Work is accepted by the Agency, and until all claims for materials and labor are paid, and shall otherwise comply with the Civil Code.

The "Performance Bond" shall be for 100 percent of the Contract Price to guaranty faithful performance of all Work, within the time prescribed, in a manner satisfactory to the Agency, and that all materials and workmanship will be free from original or developed defects. The bond must remain in effect until the end of the warranty period set forth in 6.8-2.

Should any bond become insufficient, the Contractor shall renew the bond within 10 Days after receiving notice from the Agency.

Should any Surety at any time be unsatisfactory to the Board, notice will be given the Contractor to that effect. No further payments shall be deemed due or will be made under the Contract until a new Surety shall qualify and be accepted by the Board.

Changes in the Work, or extensions of time, made pursuant to the Contract, shall in no way release the Contractor or Surety from its obligations. Notice of such changes or extensions shall be waived by the Surety.

2-4.1 Bond Forms. Bonds shall be on forms furnished by Agency.

2-5 PLANS AND SPECIFICATIONS

2-5.1 General. The Contractor shall keep at the work site a copy of the Plans and Specifications, to which the Engineer shall have access at all times.
The Plans, Specifications, and other Contract Documents shall govern the Work. The Contract Documents are intended to be complementary and cooperative. Anything specified in the Specifications and not shown on the Plans, or shown on the Plans and not specified in the Specifications, shall be as though shown or specified in both.

The Plans shall be supplemented by such working drawings and shop drawings as are necessary to adequately control the Work.

The Contractor shall ascertain the existence of any conditions affecting the cost of the Work through reasonable examination of the work site prior to submitting the Bid..

Existing improvements visible at the work site, for which no specific disposition is made on the Plans, but which interfere with the completion of the Work, shall be removed and disposed of by the Contractor.

The Contractor shall, upon discovering any error or omission in the Plans or Specifications, immediately call it to the attention of the Engineer.

2-5.1.1 Specifications Captions. Captions accompanying specification parts, sections and paragraphs are for convenience of reference only and do not limit the content of such part, section or paragraph.

The division of the Plans into parts and the division of the Specifications into divisions and sections are for the ease of reference only and does not imply the division of work between trades or subcontractors.

2-5.2 Precedence of Contract Documents. If there is a conflict between any of the Contract Documents, the document highest in precedence shall control. The precedence shall be as follows:

1) Laws, Governing Regulations, Permits, and Current Prevailing Wage Rates.
2) Change Orders and Supplemental Agreements; most recent governing.
3) Executed Contract.
12) Federal Contract Provisions for AIP Program Projects
13) Notice Inviting Bids
14) Instructions to Bidders.

Exhibit 1

4) Bid Addenda.
5) Proposal Documents: Price Adjustments.
6) Proposal Documents: Bid Schedule.
7) Project Specific Requirements for Airport Construction: Technical Specifications.
8) Project Specific Requirements for Airport Construction: CSPP.
9) Project Specific Requirements for Airport Construction: All other documents not previously referenced in this list.
10) FAA Standard Specifications for Construction of Airports: Parts 3-13.
11) FAA Standard Specifications for Construction of Airports: Part 2
15) FAA Standard Specifications for Construction of Airports: Part 1.
16) Proposal Forms: All other documents not previously mentioned on this list.
17) OXR Drawings (Detail drawings taking precedence over planimetric drawings).
18) County of Ventura Standard Specifications.
19) All other documents not previously referenced in this list.
20) Reference documents.

For any conflicts between items of equal precedence or within an item, precedence shall be given to the test that appears first in the document.

2-5.3 Shop Drawings, Working Drawings, and Submittals.

2-5.3.1 General. Submittals shall be provided, at the Contractor's expense, as required in 2-5.3.2, 2-5.3.3 and 2-5.3.4, when required by the Plans or Special Provisions, or when requested by the Engineer.

Materials shall neither be furnished nor fabricated, nor shall any work for which submittals are required be performed, before the required submittals have been reviewed and accepted by the Engineer. Neither review nor acceptance of submittals by the Engineer shall relieve the Contractor from responsibility for errors, omissions, or deviations from the Contract Documents, unless such deviations were specifically called to the attention of the Engineer in the letter of transmittal. The Contractor shall be responsible for the correctness of the submittals.

The Contractor shall allow a minimum of 20 working days for review of submittals unless otherwise specified in the Special Provisions. Each submittal shall be accompanied by a letter of transmittal.

2-5.3.2 Working Drawings. Working drawings shall be of a size and scale to clearly show all necessary details. Six copies and one reproducible shall be submitted. If no revisions are required, 3 of the copies will be returned to the Contractor. If revisions are required, the Engineer will return one copy along with the reproducible for resubmission. Upon acceptance, the Engineer will return 2 of the copies to the Contractor and retain the remaining copies and the reproducible.

Working drawings are required in the following subsections:

TABLE 2-5.3.2 (A)

Item	Section Number	Title	Subject
1	7-8.5.2	Sanitary Sewers	Sewage Bypass and Pumping
2	7.8.6.3	Water Pollution Control	Storm Water Pollution Prevention Plan
3	7-8.6.6	Water Pollution Control	Dewatering Plan
4	7-10.2.2	Work Area Traffic Control	Traffic Control Plan
5	7-10.4..2.2	Safety	Trench Shoring
6	207-8.4	Joints	Vitrified Clay Pipe
7	207-10.2.1	General	Fabricated Steel Pipe
8	300-3.2	Cofferdams	Structure Excavation & Backfill
9	303-1.6.1	General	Falsework
10	303-1.7.1	General	Placing Reinforcement
11	303-3.1	General	Prestressed Concrete Construction
12	304-1.1.1	Shop Drawings	Structural Steel
13	304-1.1.2	Falsework Plans	Structural Steel
14	304-2.1	General	Metal Hand Railings
15	306-2.1	General	Jacking Operations
16	306-3.1	General	Tunneling Operations
17	306-3.4	Tunnel Supports	Tunneling Operations
18	306-6	Remodeling Existing Sewer Facilities	Polyethylene Liner Installation
19	306-8	Microtunneling	Microtunneling Operations

Working drawings listed above as Items 4, 5, 8, 9, 11, 12, 13, 15 and 18 shall be prepared by a Civil or Structural Engineer registered by the State of California.

2-5.3.3 Shop Drawings. Shop drawings are drawings showing details of manufactured or assembled products proposed to be incorporated into the Work. Shop drawings required shall be as specified in the Special Provisions.

2-5.3.4 Supporting Information. Supporting information is information required by the Specifications for the purposes of administration of the Contract, analysis for verification of conformance with the Specifications, the operation and maintenance of a manufactured product or system to be constructed as part of the Work, and other information as may be required by the Engineer. Six copies of the supporting information shall be submitted to the Engineer prior to the start of the Work unless otherwise specified in the Special Provisions or directed by the Engineer. Supporting information for systems shall be bound together and include all manufactured items for the system. If resubmittal is not required, three copies will be returned to the Contractor. Supporting information shall consist of the following and is required unless otherwise specified in the Special Provisions:

1) List of Subcontractors per 2-3.2.
2) List of Materials per 4-1.4.
3) Certificates of Compliance per 4-1.5.
4) Construction Schedule per 6-1.
5) Spill Prevention and Emergency Response Plan per 7-8.5.3
6) Confined Space Entry Program per 7-10.4.5.1
7) Lean concrete base mix designs per 200-4
8) Concrete mix designs per 201-1.1.
9) Asphalt concrete mix designs per 203-6.1.
10) Pipeline layout diagrams per 207-2.1
11) Equipment and materials list per 307-1
12) Controller cabinet wiring diagrams per 307-17.2.2
13) Data, including, but not limited to, catalog sheets, manufacturer's brochures, technical bulletins, specifications, diagrams, product samples, and other information necessary to describe a system, product or item. This information is required for irrigation systems, street lighting systems, and traffic signals, and may also be required for any product, manufactured item, or system.

2-5.4 Record Drawings. The Contractor shall prepare and maintain a set of prints in the Engineer's Field Office on which the locations and description of all plumbing, mechanical, and electrical facilities, which were not detailed fully on the Plans, are marked in colored pencil. Such prints shall also indicate any authorized changes from the original Plans. Such prints shall be furnished to the Engineer before final Acceptance of the Work.

2-6 WORK TO BE DONE. The Contractor shall perform all work necessary to complete the Contract in a satisfactory manner. Unless otherwise provided, it shall furnish all materials, equipment, tools, labor and incidentals necessary to complete the Work.

All work under the Contract shall be performed in accordance with the highest standards prevailing in the trades unless otherwise specified on the Plans or in the Special Provisions. Unless otherwise specified, it is the intent that the Contractor will construct a complete facility ready for use.

2-6.1 Manufacturer's Recommendations. Where the manufacturer of any materials or equipment provides written recommendations or instructions for its use or method of installation (including labels, tags, manuals, or trade literature), such recommendations or instructions shall be complied with except where the Contract Documents specifically require deviations.

2-6.2 Testing of Installed Components. Where the specifications provide that any component of the Work is to be tested, calibrated or adjusted during or after installation, such testing shall be performed by a qualified firm, approved by the Engineer. The firm performing the testing or calibration shall be employed by and paid for by the Contractor.

2-6.3 Training of Agency Personnel. Where the specifications provide for training of Agency personnel in the use or maintenance of any component of the Work, the Contractor shall arrange for and pay for competent personnel to perform the training. Contractor shall schedule the training with the Engineer.

SUBSURFACE DATA. All soil and test hole data, groundwater elevations, and soil analyses shown on the Plans or included in the Specifications apply only at the location of the test holes and to the depths shown. Soil test reports for test holes which have been drilled are available for inspection at the office of the Engineer. Additional subsurface exploration may be performed by Bidders or the Contractor at their own expense.

The indicated groundwater elevation is that existing at the date specified in the data. It is the Contractor's responsibility to determine and allow for the groundwater elevation on the date the Work is performed. A difference in groundwater elevation between what is shown in soil boring logs and what is actually encountered during construction will not be considered as a basis for Extra Work per 3-3.

Opinions, recommendations or conclusions contained in any soils report, soil boring logs, subsurface materials investigation, geological report or other similar studies, tests or reports, prepared for the Agency, are not a part of the Contract. Contractor shall be responsible for forming its own opinions and conclusions from the facts set forth in such reports.

2-7 RIGHTS-OF-WAY. Rights-of-way, easements or rights-of-entry for the Work will be provided by the Agency. Unless otherwise provided, the Contractor shall make arrangements, pay for, and assume all responsibility for acquiring, using, and disposing of additional work areas and facilities temporarily required. The Contractor shall indemnify and hold the Agency harmless from all claims for damages caused by such actions.

2-8 SURVEYING

2-9.1 Permanent Survey Markers. The Contractor shall notify the Engineer at least 7 Days before starting work to allow for the preservation of survey monuments, lot stakes (tagged), and bench marks. The Engineer, or the owner at its cost, shall file a Corner Record Form referencing survey monuments subject to disturbance in the Office of the County Surveyor prior to the start of construction and also prior to the completion of construction for the replacement of survey monuments. The Contractor shall not disturb survey monuments, lot stakes (tagged), or bench marks without the consent of the Engineer or the owner on Private Contracts. The Contractor shall bear the expense of replacing any that may be disturbed without permission. Replacement shall be done only under the direction of the Engineer by a Licensed Land Surveyor or a Registered Civil Engineer authorized to practice land surveying within the state.

When a change is made in the finished elevation of the pavement of any roadway in which a permanent survey monument is located, the Contractor shall adjust the monument cover to the new grade within 7 Days of finished paving unless otherwise specified.

2-9.2 Survey Service. The Engineer will set only the horizontal and vertical control survey points shown on the Plans. These will be set prior to the commencement of construction. The Contractor shall preserve these points as well as any other surveys established by the Engineer for use by the Contractor for the duration of their usefulness. If any survey points established by Engineer are lost or disturbed and need to be replaced, such replacement shall be by the Engineer at the expense of the Contractor. The Contractor shall employ engineers or surveyors to perform adequate surveys and staking necessary to construct the Work to the lines, elevations and grades shown on the Plans and for the Engineer's use in checking such work. Copies of the field notes or diagrams used in setting stakes shall be promptly furnished to the Engineer.

2-9.2.1 Open Areas. Where dimensions are not given on the Plans for parking lots, landscaped areas or graded areas, distances shall be scaled. Unless otherwise indicated, straight grades and smooth vertical curves shall be set between indicated elevations. Finished surfaces shall be sloped to drain in order to eliminate ponding of water.

2-9.2.2 Utilities. Section 5-5.1 requires the Contractor's cooperation during the relocation of utilities, which may require the setting of lines and grades when needed by utility owners performing relocations.

2-9.3 Contractor's Surveys. Surveying by private engineers and surveyors on the Work shall conform to the quality and practice required by the Engineer.

2-9.3.1 Errors in Surveys. The Contractor is responsible for the accuracy of all surveys except those performed by the Engineer. To assure that a survey point set by the Engineer has not been disturbed since it was set and that it was accurately set, all surveys by the Contractor shall be based on at least two survey points set by the Engineer or by other governmental surveys, in accordance with good survey practice. Should discrepancies be found between such points, the Engineer shall be notified and construction shall not proceed until the discrepancy has been resolved.

2-9.4 Line and Grade. All Work upon completion shall conform to the lines, elevations, and grades shown on the Plans.

2-9.5 Quantity Surveys. The Engineer will perform all quantity surveys for payment purposes, however, in performing such quantity surveys, it may make use of surveys performed by the Contractor.

2-9.6 Payment for Surveys. Payment for performing all of the surveying and staking as required by the Specifications and such additional surveying and staking as required by the Contractor will be made at the lump sum price set forth in the Proposal and shall be full compensation for furnishing all labor, equipment, instruments and materials necessary to perform the Work. If no bid item for surveying is included in the Proposal, the cost of surveying shall be included in the prices bid for other applicable items of work.

2-9 AUTHORITY OF BOARD AND ENGINEER. The Board has the final authority in all matters affecting the Work. Within the scope of the Contract, the Engineer has the authority to enforce compliance with the Plans and Specifications. The Contractor shall promptly comply with instructions from the Engineer or its authorized representative.

On all questions relating to quantities, the acceptability of material, equipment, or work, the execution, progress or sequence of work, and the interpretation of Specifications or drawings, the decision of the Engineer is final and binding, and shall be precedent to any payment under the Contract, unless otherwise ordered by the Board.

2-10.1 Decisions in Writing. Any and all decisions of the Engineer interpreting Specifications or drawings shall be in writing. Any purported "interpretation" which is not in writing shall not be binding upon the Agency and should not be relied upon by the Contractor.

2-10 INSPECTION

The Work is subject to inspection and approval of the Engineer. The Contractor shall notify the Engineer before noon of the working day before inspection is required. Work shall be done only in the presence of the Engineer, unless otherwise authorized. Any work done without proper inspection will be subject to rejection. The Engineer and any authorized representatives shall at all times have access to the Work during its construction at shops and yards as well as the Work site. The Contractor shall provide every reasonable facility for ascertaining that the materials and workmanship are in accordance with these specifications. Inspection of the Work shall not relieve the Contractor of the obligation to fulfill all conditions of the Contract.

2-11.1 Permit Inspections. The Contractor shall arrange for code compliance inspections by all agencies issuing permits for the Work. The Work shall not continue beyond mandatory inspection points without clearance from the controlling agency. Each agency involved shall be notified in accordance with the code they enforce or in accordance with their standard operating procedures. No extensions of time will be granted for delays occasioned by such inspections except where, through no fault of the Contractor, the inspection is delayed more than one Day beyond normal response time after proper notification has been given.

It shall be the Contractor's responsibility to see that any required inspection record card is signed off before proceeding with the next phase of the Work and completely signed off on completion of the Work.

2-11.2 Structural Observation. When the plans indicate that "Structural Observation" of specific work is required prior to Permit Inspection, Contractor shall notify Engineer, in writing, at least five working days prior to the date Contractor plans to have the work ready for structural observation. If the work is not ready for structural observation on the date indicated, Contractor shall reimburse Agency the cost of structural observer's visit to the Work site. If the work to be observed is substantially complete but is found to need correction before approval by the structural observer, Contractor shall give notice of a new date, as required above.

2-11 SPECIAL NOTICES. When specified in the Specifications or as directed by the Engineer, any notice required to be given in accordance with this subsection shall be in writing, dated, and signed by the Contractor or the Engineer. Such notices shall be served by any of the following methods:

a) Personal delivery with proof of delivery which may be made by declaration under penalty of perjury by any person over the age of 18 years. The proof of delivery shall show that delivery was performed in accordance with these provisions. Service shall be effective on the date of delivery. Notices given to the Contractor by personal delivery may be made to the Contractor's authorized representative at the Work site;or

b) Certified mail addressed to the mailing address of the recipient postage prepaid; return receipt requested. Service shall be effective on the date of the receipt of the mailing.

Simultaneously, the Agency may send the same notice by regular mail. If a notice that is sent by certified mail is returned unsigned, then delivery shall be effective pursuant to regular mail, provided the notice that was sent by regular mail is not returned.

2-12 AGENCY PERSONNEL AND AUTHORITY

2-13.1 General. The Board has complete authority for the project within the limits prescribed by law. Pursuant to resolutions duly adopted by the Board, the authority to perform certain functions has been delegated to the Director of Airports. Agency staff personnel and Consultants delegated thereto by the Director are authorized to perform functions limited as set forth in the following list of personnel and designated duties.

2-13.2 Chief Executive Officer (CEO). The Chief Executive Officer (CEO) of the County of Ventura has general authority to administer the Contract. The CEO has the following specific authority:

(a) To issue Contract Change Orders (CCO) and to settle claims subsequent to Acceptance as follows:

Original Contract Amount	Maximum Amount of any Change Order or Claim Settlement
$50,000 or less……..	$5,000
greater than $50,000 and not over $250,000……..	10% of the original Contract amount
greater than $250,000 and not over $3,950,000……..	$25,000 plus 5% of the original Contract cost in excess of $250,000.
greater than $3,950,000……...	$210,000

CCOs and claim settlements exceeding the amounts set forth above require Board approval.

(b) To suspend the Work for the benefit of the Agency.

(c) To issue extensions of Contract Time in accordance with the Contract Documents in excess of 10% of the Contract Time or 60 Working Days, whichever is greater.

2-13.3 Director of Airports(Director). The Director of Airports is the Engineer and has specific authority as a Deputy Executive Officer to Administer the Contract. The Director has the following authority:

(a) To issue Contract Change Orders (CCO) as follows:

Original Contract Amount	Maximum Amount of any Change Order
Less than $500,000…….....	$5,000
$500,000 to $1,000,000……	1% of Bid Price
Greater than $1,000,000……..	$10,000

(b) To issue extensions of Contract time in accordance with the Contract Documents up to 10% of the Contact Time or 60 Working Days, whichever is greater

(c) To make final adjustment of quantities where the total does not exceed the amounts listed in (a) above.

(d) To approve the substitution of subcontractors, where allowed by law, if the listed Subcontractor does not object when notified.

(e) To determine when the Work has been completed and acknowledge in writing the completion of the Work.

(f) To accept the Work when the Contractor has completed all obligations of the Contract, in accordance with the Plans, Specifications and other Contract Documents. The Engineer also has authority to make and record the Notice of Completion.

(g) To approve progress and final payments under the Contract, including the provisions for withholding funds.

(h) To determine whether performance on the Work is satisfactory. Satisfactory performance includes compliance with all contract requirements.

(i) In the absence of the Agency Director, a Deputy Director of Airports, may exercise the Engineer's authority. Such action will be indicated by "Acting" with the Department Director's signature.

2-13.4 Project manager. The Project manager responsible for the project is designated in the Notice to Proceed. This person may also be referred to as Project Engineer. The Project manager has the following authority:

(a) To interpret the Plans and Specifications.

(b) To make minor changes in the location or features of the Work where no change in cost is involved. Such changes in cost may not be the net of multiple changes.

(c) To approve substitutes for material and equipment specified by proprietary names when such material and equipment meet the Contract requirements.

(d) To approve shop drawings and submittals.

(e) To issue stop work orders when necessary to enforce the provisions of the Contract.

(f) To make determinations of each Working Day to be charged against the Contract time in accordance with 6-7.3.

(g) To take over a portion of the Work for Agency's use in accordance with 6-10.

(h) To receive all correspondence and other documents from the Contractor.

(i) To inspect the Work and perform Final Inspection subject to review by the Department Director and the Engineer.

2-13.5 Inspector. One or more inspectors will be assigned to the project by the Project manager. Substitutes may be used during absence of the assigned inspector. The Inspector has the following authority subject to review by the Project manager, Department Director and the Engineer:

(a) To view and inspect the Work, sample and test components (at the Work site and at offsite manufacturing locations), and to discuss the Work with the Contractor's field representative.

(b) To determine compliance with the Plans, Specifications and other Contract Documents and to issue warnings of noncompliance.

(c) To issue stop work notices in the following two instances only:

1) Where a safety hazard exists that has an immediate potential for serious injury or death.

2) Where the operation in progress, if continued for even a short period of time, could be adverse to the Agency's interests.

2-13.6 Other Agency Personnel and Consultants.

2-13.6.1 Materials Engineer. The Materials Engineer is designated in the Notice to Proceed. The Materials Engineer may assign one or more Materials Inspectors to the project.

Materials Inspectors have authority to sample and test material at the Work site and at offsite manufacturing or storage locations. They may furnish available written test results to the Contractor's field representative. At batch plants, they may issue warnings of noncompliance, but stop notices require the signature of the Materials Engineer or Project manager.

2-13.6.2 Surveyors & Technicians. Surveyors and technicians shall have free access to the site to perform their duties but have no authority related to Contract administration.

2-13.6.3 Other Persons. Other Agency personnel who are not involved in construction administration and the general public may be present at the site because it is their present place of work, as client/customers, as visitors, as future users of the facility, or as persons who will maintain the completed facility. Where the facility is to continue in use during construction, work access for Agency workers and client/customers shall be maintained as provided in the Special Provisions. Where the facility (or portion where construction is being performed) is not in use during construction, admittance to the Work site by Agency personnel not involved in construction administration and visitors may be allowed by the Contractor or by the inspector, subject to compliance with safety regulations. Such persons have no authority under the Contract and the Agency is not responsible for their comments, suggestions or directions.

2-13.6.4 Consultants. Consultants hired by the Agency shall have free access to the site to perform their duties but have no authority related to Contract administration, unless such duties are specifically identified in writing to the Contractor. When so identified, Consultant may perform the duties of certain Agency personnel described above.

SECTION 3 - CHANGES IN WORK

3-1 CHANGES REQUESTED BY THE CONTRACTOR

3-1.1 General. Changes in specified methods of construction may be made at the Contractor's request when approved in writing by the Engineer. Changes in the Plans and Specifications, requested in writing by the Contractor, which do not materially affect the Work and which are not detrimental to the Work or to the interests of the Agency, may be granted by the Board to facilitate the Work, when approved in writing by the Engineer. Nothing herein shall be construed as granting a right to the Contractor to demand acceptance of such changes.

3-1.2 Payment for Changes Requested by the Contractor. If such changes are granted, they shall be made at a reduction in cost or at no additional cost to the Agency. All costs to the Agency in reviewing the proposed change, or testing materials involved therein, shall be paid for by the Contractor, whether or not the change is approved.

3-2 CHANGES INITIATED BY THE AGENCY

3-2.1 General. The Agency may change the Plans, Specifications, character of the Work, or quantity of work, provided the total arithmetic dollar value of all such changes, both additive and deductive, does not exceed 25 percent of the Contract Price. Should it become necessary to exceed this limitation, the change shall be by written Supplemental Agreement between the Contractor and Agency, unless both parties agree to proceed with the change by Change Order.

Change orders shall be in writing and state the dollar value of the change or establish method of payment, any adjustment in Contract time, and, when negotiated prices are involved, shall provide for the Contractor's signature indicating its acceptance.

3-2.2 Payment for Changes Initiated by the Agency.

3-2.2.1 Contract Unit Prices. If a change is ordered in an item of work covered by a Contract unit price, and such change does not involve a substantial change in the character of the Work from that shown on the Plans or included in the Specifications, an adjustment in payment will be made based upon the increase or decrease in quantity and the Contract unit price. In the case of such an increase or decrease in a Major Bid Item, the use of this basis for the adjustment of payment will be limited to that portion of the change which, together with all previous changes to that item, is not in excess of 25% of the total cost of such item based on the original quantity and Contract unit price.

If a change is ordered in an item of work covered by a Contract unit price, and such change does involve a substantial change in the character of the Work from that shown on the Plans or included in the Specifications, an adjustment in payment will be made in accordance with 3-2.2.3.

Should any Contract item be deleted in its entirety, payment will be made only for actual costs incurred prior to notification of such deletion.

3-2.2.2 Stipulated Unit Prices. Stipulated unit prices are those established by the Agency in the Contract Documents, as distinguished from Contract unit prices submitted by the Contractor. Stipulated unit prices may be used for the adjustment of Contract changes.

3-2.2.3 Pricing. Adjustments in payments for changes other than those set forth in 3-2.2.1 and 3-2.2.2 will be determined by agreement between Contractor and Agency. If unable to reach agreement, the Agency may direct the Contractor to proceed on the basis of Extra Work in accordance with 3-3 or as set forth in 3-2.2.4.

3-2.2.4 Non-Agreed Prices. Agency may issue a change order directing the Contractor to proceed at a price set by the Agency or on the basis of Extra Work. If the Agency sets a price for the work covered by the change order, Contractor is entitled to payment for such work in accordance with 3-3 to the extent payment in accordance with 3-3 exceeds the price set by the Agency.

3-3 EXTRA WORK

3-3.1 General. New or unforeseen work will be classed as "Extra Work" when the Engineer determines that it is not covered by Contract Unit Prices or Stipulated Unit Prices.

3-3.2 Payment.

3-3.2.1 General. When the price for the Extra Work cannot be agreed upon, the Agency will pay for the Extra Work based on the accumulation of costs as provided herein.

3-3.2.2 Basis for Establishing Costs

(a) Labor. The cost of labor will be the current cost for wages prevailing for each craft or type of workers performing the Extra Work at the time the Extra Work is done, plus payment of health and welfare, pension, vacation, apprenticeship funds, and other direct costs included in the prevailing rates applicable to the project, as well as assessments or benefits required by lawful collective bargaining agreements. To the total of these labor costs, the labor surcharge set forth in the current CALTRANS Labor Surcharge and Equipment Rental Rates publication shall be applied.

The use of a labor classification which would increase the Extra Work cost will not be permitted unless the Contractor establishes the necessity for such additional costs.

Labor costs for equipment operators and helpers shall be reported only when such costs are not included in the invoice for the equipment rental. The labor cost for foremen shall be proportioned to all of their assigned work and only that applicable to Extra Work shall be paid. A foreman is defined as a lead working journeyman.

Nondirect labor costs including superintendence, payroll taxes, all types of insurance, and all other labor costs, not specifically provided for, shall be considered to be paid for as part of the markup of 3-3.2.3(a)(1).

(b) Materials. The cost of materials reported shall be at invoice or lowest current price at which such materials are locally available and delivered to the Work site in the quantities involved, plus sales tax, freight and delivery.

The Agency reserves the right to approve materials and sources of supply, or to supply materials to the Contractor if necessary for the progress of the Work. No markup shall be applied to any material provided by the Agency.

(c) Tool and Equipment Rental. No payment will be made for the use of tools which have a replacement value of $200 or less.

Regardless of ownership, the rates to be used for determining equipment rental costs shall not exceed the following:

(1) For equipment that is listed in the current CALTRANS Labor Surcharge and Equipment Rental Rates publication, the rates shown therein. The right of way delay and overtime/multiple shift factors contained therein shall be used as applicable.

(2) For equipment not listed in said CALTRANS publication, the listed rates prevailing locally at equipment rental agencies, or distributors, at the time the work is performed.

(3) For equipment rental that includes operators and helpers, the applicable cost from (1) or (2) above, plus the applicable labor costs as determined in accordance with (a) above.

The rental rates paid shall include the cost of fuel, oil, lubrication, supplies, small tools, necessary attachments, repairs and maintenance of any kind, depreciation, storage, insurance, and all incidentals.

Necessary loading and transportation costs for equipment used on the Extra Work shall be added to the other costs.

If equipment is used intermittently and, when not in use, could be returned to its rental source at less expense to the Agency than holding it at the work site, it shall be returned, unless the Contractor elects to keep it at the work site at no expense to the Agency.

All equipment shall be acceptable to the Engineer, in good working condition, and suitable for the purpose for which it is to be used. Manufacturer's ratings and manufacturer's approved modifications shall be used to classify equipment and it shall be powered by a unit of at least the minimum rating recommended by the manufacturer.

The reported rental rates for equipment already at the work site shall be for the duration of its use on the Extra Work, commencing at the time it is first put into actual operation on the Extra Work, plus the time required to move it from its previous site, and move it back to its previous site or to a closer site of next use.

3-3.2.2 Basis for Establishing Costs (Continued)

(d) Other Items. The Agency may authorize other items which may be required on the Extra Work. Such items include labor, service, material and equipment which are different in their nature from those required for the Work specified in the Contract and which are of a type not ordinarily available from the Contractor or any of its subcontractors.

Invoices covering all such items in detail shall be submitted with the request for payment.

(e) Invoices. Vendors' invoices for material, equipment rental, and other expenditures, shall be submitted with the request for payment. If the request for payment is not substantiated by invoices or other documentation, the Agency may establish the cost of the item involved at the lowest price which was current at the time of the report.

3-3.2.3 Markup

(a) Work by Contractor. The following percentage shall be added to the Contractor's costs and shall constitute the markup for all overhead and profits, and all other cost not specifically provided for:

(1) Labor…….....33%
(2) Materials…… 15%
(3) Equipment Rental…… 15%
(4) Other Items and Expenditures ...15%

To the sum of the cost and markups provided for in this section, 1 percent shall be added as compensation for bonding.

(b) Work by Subcontractor. When all or any part of the Extra Work is performed by a Subcontractor, the markup established in 3-3.2.3(a) shall be applied to the Subcontractor's actual cost of such work. A markup of 10% on the first $5,000 of the subcontracted portion of the Extra Work and a markup of 5% on work in excess of $5,000 of the subcontracted portion of the Extra Work may be added by the Contractor.

3-3.3 Daily Extra Work Reports by Contractor. When the price for the Extra Work cannot be agreed upon, the Contractor shall submit a Daily Extra Work Report to the Engineer on forms furnished by the Agency, together with applicable delivery tickets, listing all labor, materials, and equipment involved for that day, and for other services and expenditures when authorized. Failure to submit the Daily Extra Work Report, showing the labor and equipment hours and the quantity of materials used, by the close of the next Working Day may waive any rights for that day. Failure to submit fully completed Daily Extra Work Reports, with the required supporting documentation, within ten calendar days after the Engineer makes a written request for the such reports shall waive all rights for the work covered by the requested reports. An attempt shall be made to reconcile the Daily Extra Work Report daily, and it shall be signed by the Engineer and the Contractor. In the event of disagreement, pertinent notes shall be entered by each party to explain points which cannot be resolved immediately. Each party shall retain a signed copy of the Daily Extra Work Report. Daily Extra Work Reports by Subcontractors or others shall be submitted through the Contractor.

The Daily Extra Work Report shall:

1) Show names of workers, classifications, and hours worked.
2) Describe and list quantities of materials used.
3) Show type of equipment, size, identification number, and hours of operation, including loading and transportation, if applicable.
4) Describe other services and expenditures in such detail as the Agency may require.

In addition to the Daily Extra Work Reports, the Contractor shall furnish Certified Payroll Records for the labor included in the reports before payment will be made.

3-4 CHANGED CONDITIONS. The Contractor shall notify the Engineer in writing of the following work site conditions, hereinafter called changed conditions, promptly upon their discovery and before they are disturbed:

1) Subsurface or latent physical conditions differing materially from those represented in the Contract;
2) Unknown physical conditions of an unusual nature differing materially from those ordinarily encountered and generally recognized as inherent in Work of the character being performed; and
3) Material differing from that represented in the Contract which the Contractor believes may be hazardous waste, as defined in Section 25117 of the Health and Safety Code that is required to be removed to a Class I, Class II or Class III disposal site in accordance with provisions of existing law.

The Engineer will promptly investigate conditions which appear to be changed conditions. If the Engineer determines that the conditions are changed conditions and that they will materially increase or decrease the costs of any portion of the Work, a Change Order will be issued adjusting the compensation for such portion of the Work in accordance with 3-2.2. If the Engineer determines that conditions are changed conditions and that they will materially affect the performance time, the Contractor, upon submitting a written request, will be granted an extension of time subject to the provisions of 6-6.

If the Engineer determines that the conditions of which it has been notified by the Contractor do not justify an adjustment in compensation, the Contractor will be so notified in writing. This notice will also advise the Contractor of its obligation to notify the Engineer, in writing, if the Contractor disagrees.

Should the Contractor disagree with such determination, it may submit a written notice of potential claim to the Engineer before commencing the disputed work. In the event of such a disagreement, the Contractor shall not be excused on account of that disagreement from any scheduled completion date provided for by the Contract, but shall proceed with all Work to be performed under the Contract. However, the Contractor shall retain any and all rights provided either by Contract or by law which pertain to the resolution of disputes and protests between the contracting parties. The Contractor shall proceed as provided in 3-5.

The Contractor's failure to give notice of changed conditions promptly upon their discovery and before they are disturbed shall constitute a waiver of all claims in connection therewith.

3-5 DISPUTED WORK. If the Contractor and the Agency are unable to reach agreement on disputed work, the Agency may direct the Contractor to proceed with the Work. Payment shall be as later determined by mediation or arbitration, if the Agency and the Contractor agree thereto, or as fixed in a court of law.

Although not to be construed as proceeding under Extra Work provisions, the Contractor shall keep and furnish records of disputed work in accordance with 3-3.

SECTION 4 - CONTROL OF MATERIALS

4-1 MATERIALS AND WORKMANSHIP

4-1.1 General. All materials, parts, and equipment furnished by the Contractor in the Work shall be new, high grade, and free from defects. Quality of work shall be in accordance with the generally accepted standards. Material and work quality shall be subject to the Engineer's approval.

Materials and work quality not conforming to the requirements of the Specifications shall be considered defective and will be subject to rejection. Defective work or material, whether in place or not, shall be removed immediately from the site by the Contractor, at its expense, when so directed by the Engineer.

If the Contractor fails to replace any defective or damaged work or material after reasonable notice, the Engineer may cause such work or materials to be replaced. The replacement expense will be deducted from the amount to be paid to the Contractor.

Used or secondhand materials, parts, and equipment may be used only if permitted by the Specifications.

4-1.1.1 Materials Furnished by Agency. Materials furnished by the Agency will be available at locations designated in the Special Provisions or if not designated in the Special Provisions, they will be delivered to a single location of Agency's choice within the project area. They shall be hauled to the site of installation by the Contractor at its expense, including any necessary loading and unloading that may be involved. The cost of handling and placing materials furnished by the Agency shall be considered as included in the price paid for the Contract item involving such furnished materials.

The Contractor will be held responsible for all materials furnished to it, and it shall pay all demurrage and storage charges. Furnished materials, after delivery to Contractor, lost or damaged from any cause whatsoever shall be replaced by the Contractor. The Contractor will be liable to the Agency for the cost of replacing lost or damaged furnished material and such costs may be deducted from any monies due or to become due the Contractor.

4-1.2 Protection of Work and Materials. The Contractor shall provide and maintain storage facilities and employ such measures as will preserve the specified quality and fitness of materials to be used in the Work. Stored materials shall be reasonably accessible for inspection. The Contractor shall also adequately protect new and existing work and all items of equipment for the duration of the Contract.

The Contractor shall not, without the Agency's consent, assign, sell, mortgage, hypothecate, or remove equipment or materials which have been installed or delivered and which may be necessary for the completion of the Contract.

4-1.3 Inspection Requirements

4-1.3.1 General. Unless otherwise specified, inspection is required at the source for asphalt concrete pavement mixtures, structural concrete, metal fabrication, metal casting, welding, concrete pipe manufacture, protective coating application, and similar shop or plant operations. Steel pipe in sizes less than 450 mm (18 inches), vitrified clay and cast iron pipe in all sizes are acceptable upon certification as to compliance with the Specifications, subject to sampling and testing by the Agency. Standard items of equipment such as electric motors, conveyors, elevators, plumbing fixtures, etc., are subject to inspection at the Work site only. Special items of equipment such as designed electrical panel boards, large pumps, sewage plant equipment, etc., are subject to inspection at the source, normally only for performance testing. The Specifications may require inspection at the source for other items not typical of those listed in this section.

4-1.3.2 Inspection of Materials Not Locally Produced. When the Contractor intends to purchase materials, fabricated products, or equipment from sources located more than 80 km (50 miles) outside the geographical limits of the Agency, an inspector or accredited testing laboratory (approved by the Engineer), shall be engaged by the Contractor at its expense, to inspect the materials, equipment or process. This approval shall be obtained before producing any material or equipment. The inspector or representative of the testing laboratory shall evaluate the materials for conformance with the Plans and Specifications. The Contractor shall forward reports required by the Engineer. No materials or equipment shall be shipped nor shall any processing, fabrication or treatment of such materials be done without proper inspection by the approved agent. Approval by said agent shall not relieve the Contractor of responsibility for complying with the Contract requirements.

4-1.3.3 Inspection by the Agency. The Agency will provide all inspection and testing laboratory services within 80 km (50 miles) of the geographical limits of the Agency.

4-1.3.4 Certificates of Compliance. The Engineer may require certificates of compliance with the Specifications for materials or manufactured items produced outside of the Work site. Such certificates will not relieve the Contractor from the requirements of providing material and manufactured items complying with the Specifications even though they have been incorporated into the Work.

4-1.4 Tests of Materials. Before incorporation in the Work, the Contractor shall submit samples of materials, as the Engineer may require, at no cost to the Agency. The Contractor, at its own expense, shall deliver the materials for testing to the place and at the time designated by the Engineer. Unless otherwise provided, all initial testing and a reasonable amount of retesting shall be performed under the direction of the Engineer, and at no expense to the Contractor. If the Contractor is to provide and pay for testing, the Specifications will so state.

The Contractor shall notify the Engineer in writing, at least 15 Days in advance, of its intention to use materials for which tests are specified, to allow sufficient time to perform the tests. The notice shall name the proposed supplier and source of material.

If the notice of intent to use is sent before the materials are available for testing or inspection, or is sent so far in advance that the materials on hand at the time will not last but will be replaced by a new lot prior to use on the Work, it will be the Contractor's responsibility to re-notify the Engineer when samples which are representative may be obtained.

4-1.5 Certification. The Engineer may waive materials testing requirements of the Specifications and accept the manufacturer's written certification that the materials to be supplied meet those requirements. Materials test data may be required as part of the certification.

4-1.6 Trade Names or Equals. The Contractor may supply any of the materials specified or offer an equivalent. The Engineer shall determine whether the material offered is equivalent to that specified. Adequate time shall be allowed for the Engineer to make this determination.

Whenever any particular material, process, or equipment is indicated by patent, proprietary or brand name, or by name of manufacturer, such wording is used for the purpose of facilitating its description and shall be deemed to be followed by the words **or equal**. A listing of materials is not intended to be comprehensive, or in order of preference. The Contractor may offer any material, process, or equipment considered to be equivalent to that indicated. The substantiation of offers shall be submitted as provided in the Contract Documents.

The Contractor shall, at its expense, furnish data concerning items offered by it as equivalent to those specified. The Contractor shall have the material tested as required by the Engineer to determine that the quality, strength, physical, chemical, or other characteristics, including durability, finish, efficiency, dimensions, service, and suitability are such that the item will fulfill its intended function.

Test methods shall be subject to the approval of the Engineer. Test results shall be reported promptly to the Engineer, who will evaluate the results and determine if the substitute item is equivalent. The Engineer's findings shall be final. Installation and use of a substitute item shall not be made until approved by the Engineer.

If a substitute offered by the Contractor is not found to be equal to the specified material, the Contractor shall furnish and install the specified material.

The specified Contract completion time shall not be affected by any circumstance developing from the provisions of this section.

4-1.6.1 Compatibility with Design. Where the size, configuration, weight, fastening locations, fastening strength, utility rough-in locations, and utility capacities of equipment or devices offered by the Contractor as equivalents do not conform to those provided for in the Contract Documents or those which are necessary for equipment or devices indicated by brand names, the Contractor shall bear all costs of redesign and changes in construction necessary to adapt the offered equipment or device to the Work.

Equipment or devices will not be considered "equal" where the life cycle cost of operation, utilities and maintenance of the offered alternate is greater than those listed by brand names. Life cycle costs shall mean utility charges (demand and usage charges), maintenance, operating personnel and replacement (equipment, installation and down time expenses) all reduced to an average annual rate using the current interest rate earned on funds invested by the County Treasurer.

4-1.6.2 Trade Names Listed. Where the Agency has listed products by brand or trade name on the Plans or in the Specifications, or both, this shall not be construed as meaning every product may be used without furnishing shop drawings, without redesign of the facility or without a change in utility rough-in requirements.

Where use of products listed on the Plans or in the Specifications, or both, or where use of a substitute proposed as an "equal" product requires shop drawings, redesign of the facility, or revisions in the size and location of rough-in utility connections, or in connecting work, the Contractor shall provide any necessary shop drawings, or shall cause the preparation of any necessary redesign or revisions to the Plans at its own expense and shall bear the full cost of any necessary additional construction or reconstruction work. No work described in shop drawings, a redesign, or a revision to the Plans shall be undertaken until such shop drawings, redesign, or revisions have been approved by the Engineer. Any proposed redesign or revision to the Plans shall be accompanied by complete computations and details prepared by an appropriate licensed design professional.

4-1.7 Weighing Equipment. All scales used for proportioning materials shall be inspected for accuracy and certified within the past 12 months by the State of California Bureau of Weights and Measures, by the County Director or Sealer of Weights and Measures, or by a scale mechanic registered with or licensed by the County.

The accuracy of the work of a scale service agency, except as stated herein, shall meet the standards of the California Business and Professions Code and the California Code of Regulations pertaining to weighing devices. A certificate of compliance shall be presented, prior to operation, to the Engineer for approval and shall be renewed whenever required by the Engineer at no cost to the Agency.

All scales shall be arranged so they may be read easily from the operator's platform or area. They shall indicate the true net weight without the application of any factor. The figures of the scales shall be clearly legible. Scales shall be accurate to within 1 percent when tested with the plant shut down. Weighing equipment shall be so insulated against vibration or moving of other operating equipment in the plant area that the error in weighing with the entire plant running will not exceed 2 percent for any setting nor 1.5 percent for any batch.

4-1.8 Calibration of Testing Equipment. Testing equipment, such as, but not limited to, pressure gages, metering devices, hydraulic systems, force (load) measuring instruments, and strain-measuring devices shall be calibrated by a testing agency acceptable to the Engineer at intervals not to exceed 12 months and following repairs, modification, or relocation of the equipment. Calibration certificates shall be provided when requested by the Engineer.

SECTION 5 - UTILITIES

5-1 LOCATION. The Permittee (in the case of Private Contracts) and the Agency (in the case of Cash or Assessment Act Contracts), will search known substructure records and furnish the Contractor with copies of documents which describe the location of utility substructures, or will indicate on the Plans for the project those substructures (except for service connections) which may affect the Work. Information regarding removal, relocation, abandonment, or installation of new utilities will be furnished to prospective bidders.

Where underground main distribution conduits such as water, gas, sewer, electric power, telephone, or cable television are shown on the Plans, the Contractor shall assume that every property parcel will be served by a service connection for each type of utility.

As provided in Section 4216 of the California Government Code, at least 2 working days prior to commencing any excavation, the Contractor shall contact the regional notification center (Underground Service Alert of Southern California) and obtain an inquiry identification number.

The California Department of Transportation is not required by Section 4216 to become a member of the regional notification center. The Contractor shall contact it for location of its subsurface installations.

The Contractor shall determine the location and depth of all utilities, including service connections, which have been marked by the respective owners and which may affect or be affected by its operations. If no pay item is provided in the Contract for this work, full compensation for such work shall be considered as included in the prices bid for other items of work.

5-2 PROTECTION. The Contractor shall not interrupt the service function or disturb the support of any utility without authority from the owner or order from the Agency. All valves, switches, vaults, and meters shall be maintained readily accessible for emergency shutoff.

Where protection is required to ensure support of utilities located as shown on the Plans or in accordance with 5-1, the Contractor shall, unless otherwise provided, furnish and place the necessary protection at its expense.

Upon learning of the existence and location of any utility omitted from or shown incorrectly on the Plans, the Contractor shall immediately notify the Engineer in writing. When authorized by the Engineer, support or protection of the utility will be paid for as provided in 3-2.2.3 or 3-3.

The Contractor shall immediately notify the Engineer and the utility owner if any utility is disturbed or damaged. The Contractor shall bear the costs of repair or replacement of any utility damaged if located as noted in 5-1.

When placing concrete around or contiguous to any non-metallic utility installation, the Contractor shall at its expense:

1. Furnish and install a 50 mm (2 inch) cushion of expansion joint material or other similar resilient material; or
2. Provide a sleeve or other opening which will result in a 50 mm (2 inch) minimum-clear annular space between the concrete and the utility; or
3. Provide other acceptable means to prevent embedment in or bonding to the concrete.

Where concrete is used for backfill or for structures which would result in embedment, or partial embedment, of a metallic utility installation; or where the coating, bedding or other cathodic protection system is exposed or damaged by the Contractor's operations, the Contractor shall notify the Engineer and arrange to secure the advice of the affected utility owner regarding the procedures required to maintain or restore the integrity of the system.

5-3 REMOVAL. Unless otherwise specified, the Contractor shall remove all interfering portions of utilities shown on the Plans or indicated in the Bid documents as "abandoned" or "to be abandoned in place". Before starting removal operations, the Contractor shall ascertain from the Agency whether the abandonment is complete, and the costs involved in the removal and disposal shall be included in the Bid for the items of work necessitating such removals.

5-4 RELOCATION. When feasible, the owners responsible for utilities within the area affected by the Work will complete their necessary installations, relocations, repairs, or replacements before commencement of work by the Contractor. When the Plans or Specifications indicate that a utility installation is to be relocated, altered, or constructed by others, the Agency will conduct all negotiations with the owners and work will be done at no cost to the Contractor, except as provided in 301-1.6. Utilities which are relocated in order to avoid interference shall be protected in their position and the cost of such protection shall be included in the Bid for the items of work necessitating such relocation.

After award of the Contract, portions of utilities which are found to interfere with the Work will be relocated, altered or reconstructed by the owners, or the Engineer may order changes in the Work to avoid interference. Such changes will be paid for in accordance with 3-2.

When the Plans or Specifications provide for the Contractor to alter, relocate, or reconstruct a utility, all costs for such work shall be included in the Bid for the items of work necessitating such work. Temporary or permanent relocation or alteration of utilities requested by the Contractor for its convenience shall be its responsibility and it shall make all arrangements and bear all costs.

The utility owner will relocate service connections as necessary within the limits of the Work or within temporary construction or slope easements. When directed by the Engineer, the Contractor shall arrange for the relocation of service connections as necessary between the meter and property line, or between a meter and the limits of temporary construction or slope easements. The relocation of such service connections will be paid for in accordance with provisions of 3-3. Payment will include the restoration of all existing improvements which may be affected thereby. The Contractor may agree with the owner of any utility to disconnect and reconnect interfering service connections. The Agency will not be involved in any such agreement.

5-5 DELAYS. The Contractor shall notify the Engineer of its construction schedule insofar as it affects the protection, removal, or relocation of utilities. Said notification shall be included as a part of the construction schedule required in 6-1. The Contractor shall notify the Engineer in writing of any subsequent changes in the construction schedule which will affect the time available for protection, removal, or relocation of utilities.

The Contractor will not be entitled to damages or additional payment for delays attributable to utility relocations or alterations if correctly located, noted, and completed in accordance with 5-1.

The Contractor may be given an extension of time for unforeseen delays attributable to unreasonably protracted interference by utilities in performing work correctly shown on the Plans.

The Agency will assume responsibility for the timely removal, relocation, or protection of existing main or trunkline utility facilities within the area affected by the Work if such utilities are not identified in the Contract Documents. The Contractor will not be assessed liquidated damages for any delay caused by failure of Agency to provide for the timely removal, relocation, or protection of such existing facilities.

If the Contractor sustains loss due to delays attributable to interferences, relocations, or alterations not covered by 5-1, which could not have been avoided by the judicious handling of forces, equipment, or plant, there shall be paid to the Contractor such amount as the Engineer may find to be fair and reasonable compensation for such part of the Contractor's actual loss as was unavoidable and the Contractor may be granted an extension of time.

5-5.1 Cooperation During Utility Relocation. When utilities are to be relocated during construction, the Contractor shall cooperate and coordinate with the respective utility owners so they may relocate their facilities to clear the Work. Delays in relocation of utilities which result from failure to cooperate and coordinate will not be a cause for an extension of time or Non-Working Days.

5-6 COOPERATION. When necessary, the Contractor shall so conduct its operations as to permit access to the Work site and provide time for utility work to be accomplished during the progress of the Work.

SECTION 6 - PROSECUTION, PROGRESS AND ACCEPTANCE OF WORK

6-1 CONSTRUCTION SCHEDULE AND COMMENCEMENT OF WORK. The requirements of this section concerning submission of construction schedules shall not apply to projects where the time allowed to complete the Work is less than 25 Working Days or the total Contract Price bid is less than $75,000 unless required by the special provisions.

The Contractor shall submit a construction schedule concurrently with the submittal of signed Contract, Contract bonds, and certificate of insurance. The Notice to Proceed will be delayed until the schedule is received. See 6-7.4, Starting of Contract Time.

When required by the Special Provisions, a revised schedule shall be submitted monthly prior to each progress payment closure date. Processing of the progress payment will be delayed until such revised schedule complying with this section is received.

The construction schedule shall be in the form of a Construction Element vs. Time Chart as shown in Appendix B-1and a Work Complete vs. Time Chart as shown in Appendix B-2.

The B-1 Chart shall be in sufficient detail to show the chronological relationship of all activities of the project including, but not limited to, estimated starting and completion dates of various activities, submittal of shop drawings to the Engineer for approval, procurement of materials, and scheduling of equipment. The B-1 Chart shall recognize the requirements of 5-5. The B-1 Chart shall reflect obtaining all materials and completing all Work under the Contract within the specified time and in accordance with these Specifications. If the Contractor intends to complete the Work prior to the time for completion, the intended date of completion shall be set forth in the B-1 Chart and the Contractor shall execute a Contract Change Order that changes the number of Working Days allowed for completion to conform with such intended completion date. The Change Order shall not change the Contract Price.

The Contractor may submit a computer generated schedule in lieu of the form in Appendix B-1 and B-2, provided all of the elements shown on that form or specified herein are included.

An updated construction schedule shall be submitted prior to the next progress payment closure date whenever the actual percent Work complete versus percent time elapsed curve falls below and to the right of the dotted line shown on Appendix B-2.

If the Contractor desires to make a major change in its method of operations after commencing construction, or if its schedule fails to reflect the actual progress, it shall submit to the Agency a revised construction schedule in advance of beginning revised operations.

Revised and updated schedules shall show actual completion to the date of the revision in the lower segmented bar for each item.

The construction schedule shall be prepared as follows (see examples in Appendices C-1 and C-2):

1. On theB-1 Chart:
   a. Enter the project name and Specification No. as shown on the notice inviting bids and the Contractors name.
   b. List the items of Work either individually or combined where items are part of the same element of the Work.
   c. Assign a value for each horizontal space plotting interval in Working Days as follows: 1 working day for total Contract time of less than 100 working days, 2 for 100 to 200 working days and 5 for longer projects. Enter the value used in the space provided in the lower part of the form.
   d. At the end of performance time and draw a vertical line and label it "End Performance Time". Enter numbers at 10 times the plotting interval at the top of intermediate vertical lines.
   e. Shade in a bar in the upper segmented section for each work item to indicate the period during which Work will be performed. Move-in time and delivery time for materials shall be shown if significant to the schedule.

6-1 CONSTRUCTION SCHEDULE AND COMMENCEMENT OF WORK. (Continued)

2. On the B-2 Chart:
   - a. Enter the project name and Specification No. as shown on the notice inviting bids.
   - b. At time intervals of 10 or 20 working days:
     - (1) Compute the cumulative dollar value of Work which is expected to be completed for each item of Work, including the value of the completed portion of lump-sum items.
     - (2) Divide the values computed in "b(1)" by the Total Contract Price to determine the percentage of the entire Contract planned for completion at the end of each time interval.
     - (3) Divide the days of performance time at the end of each time interval by the total Contract performance time to obtain the percentage of elapsed performance time.
   - c. Plot each percentage of completion value figure computed in "b(2)" against the corresponding percentage of completion time computed in "b(3)" using scales on the bottom and left side of chart.
   - d. Connect points plotted in "c" with a line which will show the planned progress for the entire job.

If the proposed percent Work complete versus percent time elapsed line falls below and to the right of the dotted line drawn on the B-2 Chart, the Contractor shall provide sufficient information and backup to show that the Work can be completed on time.

6-1.1 Beginning of Work. The issuance of Notice to Proceed by Agency shall constitute the Contractor's authority to enter upon the site of the Work and to begin operations provided it has also notified Engineer at least 24 hours in advance. Entry upon the site without authority will be treated as trespassing.

6-1.2 Starting Work. The Contractor may start work at any time after the Notice to Proceed is issued but work shall begin within 15 Days after the starting date for the Contract, or at such other time as may be indicated in the Special Provisions. The actual date on which the Contractor starts work will not affect the required time for completion as provided for in 6-7 and 6-7.1.

6-1.3 Work Sequence. If required by the Special Provisions, the Contractor shall start construction operations on that part of the Work designated by the Engineer.

6-1.4 Resources Required. The Work shall be conducted in such a manner and with sufficient materials, equipment, and labor to insure its completion in accordance with the Plans and Specifications within the time set forth in the Contract.

62 2 PROSECUTION OF WORK. To minimize public inconvenience and possible hazard and to restore streets and other Work areas to their original condition and former state of usefulness as soon as practicable, the Contractor shall diligently prosecute the Work to completion. If, in the Engineer's opinion, the Contractor fails to prosecute the Work to the extent that the above purposes are not being accomplished, the Contractor shall, upon orders from the Engineer, immediately take the steps necessary to fully accomplish said purposes. All costs of prosecuting the Work as described herein shall be absorbed in the Contractor's bid. Should the Contractor fail to take the necessary steps to fully accomplish said purposes, after orders of the Engineer to do so, the Engineer may suspend the Work in whole or in part, until the Contractor takes said steps.

As soon as possible under the provisions of these Specifications, the Contractor shall backfill all excavations and restore to usefulness all improvements existing prior to the start of the Work.

If Work is suspended through no fault of the Agency, all expenses and losses incurred by the Contractor during such suspensions shall be borne by the Contractor. If the Contractor fails to properly provide for public safety, traffic, and protection of the Work during periods of suspension, the Agency may elect to do so, and deduct the cost thereof from monies due the Contractor. Such action will not relieve the Contractor from liability.

63 SUSPENSION OF WORK

6-3.1 General. The Work may be suspended in whole or in part when determined by the Engineer that the suspension is necessary in the interest of the Agency. The Contractor shall comply immediately with any written order of the Engineer. Such suspension shall be without liability to the Contractor on the part of the Agency except as otherwise specified in 6-6.3.

6-3.2 Archaeological and Paleontological Discoveries. If discovery is made of items of archaeological or paleontological interest, the Contractor shall immediately cease excavation in the area of discovery and shall not continue until ordered by the Engineer. When resumed, excavation operations within the area of discovery shall be as directed by the Engineer.

Discoveries which may be encountered may include, but not be limited to, dwelling sites, stone implements or other artifacts, animal bones, human bones and fossils.

The Contractor shall be entitled to an extension of time and compensation in accordance with the provisions of 6-6.

6-3.3 Temporary Suspension of Work. Should suspension of Work be ordered by reason of the failure of the Contractor to carry out orders or to perform any provisions of the Contract; or by reason of weather conditions being unsuitable for performing any item or items of Work; the Contractor, at its expense, shall do all the work necessary to provide a safe, smooth, and unobstructed passageway through construction for use by public traffic during the period of such suspension. In the event that the Contractor fails to perform the work above specified, the Agency may perform such work and the cost thereof will be deducted from monies due or to become due the Contractor.

If the Engineer orders a suspension of all of the Work, or a portion of the Work which is the current controlling operation or operations, due to unsuitable weather or to such other conditions as are considered unfavorable to the suitable prosecution of the Work, the days on which the suspension is in effect shall not be considered Working Days.

If a portion of Work at the time of such suspension is not a current controlling operation or operations, but subsequently does become the current controlling operation or operations, the determination of Working Days will be made on the basis of the then current controlling operation or operations.

If a suspension of Work is ordered by the Engineer due to the failure on the part of the Contractor to carry out orders given or to perform any provision of the Contract, the Days on which the suspension order is in effect shall be considered Working Days if such days are Working Days as defined.

64 TERMINATION OF THE CONTRACT FOR DEFAULT..

6.4.1 General. If, prior to the acceptance of the Work, the Contractor:

a) becomes insolvent, assigns its assets for the benefit of its creditors, is unable to pay its debts as they become due, or is otherwise financially unable to complete the Work,
b) abandons the Work by failing to report to the Work site and diligently prosecute the Work to completion,
c) disregards written instructions from the Agency or materially violates provisions of the Contract Documents,
d) fails to prosecute the Work according to the schedule approved by the Engineer,
e) disregards laws or regulations of any public body having jurisdiction, or
f) commits continuous or repeated violations of regulatory or statutory safety requirements, then the Agency will consider the Contractor in default of the Contract.

Notices, and other written communications regarding default between the Contractor, the Agency, and the Surety shall be transmitted in accordance with 2-12.

6-4.2 Notice to Cure. The Agency will issue a written notice to cure the default to the Contractor and its Surety. The Contractor shall commence satisfactory corrective actions within 5 Working Days after receipt.

6-4.3 Notice of Termination for Default. If the Contractor fails to commence satisfactory corrective action within 5 Working Days after receipt of the notice to cure, or to diligently continue satisfactory and timely correction of the default thereafter, then the Agency will consider the Contractor in default of the Contract and:

a) will terminate the Contractor's right to perform under the Contract by issuing a written notice of termination for default to the Contractor and its Surety,
b) may use any materials, equipment, tools or other facilities furnished by the Contractor to secure and maintain the Work site, and
c) may furnish labor, equipment, and materials the Agency deems necessary to secure and maintain the Work site. The provisions of this subsection shall be in addition to all other legal rights and remedies available to the Agency.

6-4.4 Responsibilities of the Surety. Upon receipt of the written notice of termination for default, the Surety shall immediately assume all rights, obligations and liabilities of the Contractor under the Contract. If the Surety fails to protect and maintain the Work site, the Agency may do so, and may recover all costs incurred. The Surety shall notify the Agency that it is assuming all rights, obligations and liabilities of the Contractor under the Contract and all money that is due, or would become due, to the Contractor shall be payable to the Surety as the Work progresses, subject to the terms of the Contract.

Within 15 Working Days of receipt of the written notice of termination for default, the Surety shall submit to the Agency a written plan detailing the course of action it intends to take to remedy the default. The Agency will review the plan and notify the Surety if the plan is satisfactory. If the Surety fails to submit a satisfactory plan, or if the Surety fails to maintain progress according to the plan accepted by the Agency, the Agency may, upon 48 hours written notice, exclude the Surety from the premises, take possession of all material and equipment, and complete the Work in any way the Agency deems to be expedient. The cost of completing the Work by the Agency shall be charged against the Surety and may be deducted from any monies due, or which would become due, the Surety. If the amounts due under the Contract are insufficient for completion, the Surety shall pay to the Agency, within 30 days after the Agency submits an invoice, all costs in excess of the remaining Contract Price.

6-4.5 Payment. The Surety will be paid for completion of the Work in accordance with 9-3 less the value of damages caused to the Agency by acts of the Contractor.

65 TERMINATION OF CONTRACT. The Board may terminate the Contract at its own discretion or when conditions encountered during the Work make it impossible or impracticable to proceed, or when the Agency is prevented from proceeding with the Contract by act of God, by law, or by official action of a public authority.
The Agency will issue a written notice of termination for convenience in accordance with 2-12. Upon receipt, the Contractor shall immediately cease work, except work the Contractor is directed to complete by the Engineer or required to complete for public safety and convenience. The Contractor shall immediately notify Subcontractors and suppliers to immediately cease their work.
The Contractor will be paid without duplication for:

a) work completed in accordance with the Contract Documents prior to the effective date of termination for convenience;
b) reasonable costs incurred in settlement of terminated contracts with Subcontractors, suppliers and others; and
c) reasonable expenses directly attributable to termination.
The Contractor shall submit a final termination settlement proposal to the Agency no later than 90 days from the effective date of termination, unless extended, in writing, by the Agency upon written request by the Contractor.

If the Contractor fails to submit a proposal, the Agency may determine the amount, if any, due the Contractor as a result of the termination. The Agency will pay the Contractor the amount it determines to be reasonable. If the Contractor disagrees with the amount determined by the Agency as being reasonable, the Contractor shall provide notice to the Agency within 30 days of receipt of payment. Any amount due shall be as later determined by arbitration, if the Agency and the Contractor agree thereto, or as fixed in a court of law.

66 DELAYS AND EXTENSIONS OF TIME

6-6.1 General. If delays are caused by unforeseen events beyond the control of the Contractor, such delays will entitle the Contractor to an extension of time as provided herein, but the Contractor will not be entitled to damages or additional payment due to such delays, except as provided in 6-6.3. Such unforeseen events may include war, government regulations, labor disputes, strikes, fires, floods, adverse weather necessitating cessation of work, other similar action of the elements, inability to obtain materials, equipment or labor, required Extra Work, or other specific events as may be further described in the Specifications.

No extension of time will be granted for a delay caused by the Contractor's inability to obtain materials unless the Contractor furnishes to the Engineer documentary proof of the inability to obtain such materials in a timely manner in accordance with the sequence of the Contractor's operations and the approved construction schedule.

If delays beyond the Contractor's control are caused by events other than those mentioned above, but substantially equal in gravity to those enumerated, and an extension of time is deemed by the Engineer to be in the best interests of the Agency, an extension of time may be granted, but the Contractor will not be entitled to damages or additional payment due to such delays, except as provided in 6-6.3.

If delays beyond the Contractor's control are caused solely by action or inaction by the Agency, such delays will entitle the Contractor to an extension of time as provided in 6-6.2.

6-6.2 Extensions of Time. Extensions of time, when granted, will be based upon the effect of delays to the Work as a whole and will not be granted for noncontrolling delays to minor included portions of Work unless it can be shown that such delays did, in fact, delay the progress of the Work as a whole.

6-6.3 Payment for Delays to Contractor. The Contractor will be compensated for damages incurred due to delays for which the Agency is responsible if such delays are unreasonable in the circumstances involved and were not within the contemplation of the parties when the Contract was awarded to the Contractor and delay the Work as a whole. Such actual costs will be determined by the Engineer. The Agency will not be liable for, and in making this determination the Engineer will exclude, all damages which the Engineer determines the Contractor could have avoided by any reasonable means including, without limitation, the judicious handling of forces, equipment, or plant.

6-6.4 Written Notice and Report. If the Contractor desires payment for a delay as specified in 6-6.3 or an extension of time, it shall, within 30 Days after the beginning of the delay, file with the Agency a written request and report as to the cause and extent of the delay. The request for payment or extension must be made at least 15 Days before the specified completion date. Failure by the Contractor to file these items within the time specified will be considered grounds for refusal by the Agency to consider such request.

6-6.4.1 Documentation of Delays. When the Contractor requests an extension of time for delay due to an inability to obtain materials or equipment, the documentary proof required by 6-6.1 shall include the following:

1. Date Engineer was notified of delay.
2. Date the delay began.
3. Exact description of material or equipment causing delay.
4. Documentation showing when and from whom ordered.
5. Documentation of promise to deliver.
6. Documentation of actual delivery date.
7. Description of how late delivery caused delay (include construction schedule).
8. Documentation of measures taken to get prompt delivery.
9. Documentation of attempts to get delivery from other sources.
10. Description of steps taken in project scheduling to minimize effects of late delivery.
11. Description of steps taken to get project back on schedule after actual delivery.
12. Statement of actual time lost as a result of late delivery.

6-7 TIME OF COMPLETION

6-7.1 General. The Contractor shall complete the Work within the time set forth in the Contract. The Contractor shall complete each portion of the Work within such time as set forth in the Contract for such portion. Unless otherwise specified, the time of completion of the Contract shall be expressed in Working Day

6-7.2 Working Day. A Working Day is any day within the period between the start of the Contract time as defined in 6-1 and the date provided in the Contract for completion or upon field acceptance by the Engineer of all Work provided for in the Contract, whichever occurs first, other than:

1. Saturday,
2. Sunday,
3. any day designated as a holiday by the Agency,
4. any other day designated as a holiday in a Master Labor Agreement entered into by the Contractor or on behalf of the Contractor as an eligible member of a Contractor Association,
5. any day the Contractor is prevented from working at the beginning of the workday for cause as defined in 6-6.1,
6. any day the Contractor is prevented from working during the first 5 hours of the workday with at least 60 percent of the normal work force for cause as defined in 6-6.1.

6-7.2.1 Holidays. Solely for the purposes of paragraph (3) of 6-7.2, the following days are designated as holidays by the Agency.

MONTH	A AGENCY EMPLOYEE HOLIDAYS	B OTHER DESIGNATED HOLIDAYS
January	1st day; 3rd Monday	None
February	3rd Monday	12th day
March	None	31st day
March-April	None	1 Friday between March 21 & April 23 designated as Good Friday
May	Last Monday	None
June	None	None
July	4th day	None
August	None	None
September	1st Monday	9th day
October	None	2nd Monday
November	11th day; 4th Thursday	the Friday following the 4th Thursday
December	25th	23rd day, only if Thursday or Friday; 24th day; 31st day

If any day listed above falls on Saturday, the preceding Friday is the holiday. If any day listed above falls on Sunday, the succeeding Monday is the holiday.

No extra holiday shall result when such Friday or Monday is already designated as a holiday.
A copy of a Working Day calendar incorporating the above-listed holidays and used by the Agency for Contract time accounting purpose will be furnished to the Contractor upon request.

The term "holiday" as used in this section shall not be construed as being the same as "holiday" within the meaning of 7-2.2.

Exhibit 1

The Contractor may perform work on the holidays designated in Column A above provided it has obtained prior written approval of the Engineer at least two Days in advance of performing the work. The Contractor may perform work on the holidays designated in Column B above provided the Contractor notifies the Engineer two Days in advance of the holiday.

6-7.2.2 Landscape Maintenance Period. Where a landscape maintenance period is specified, the portion of the time in such period that follows the completion of all other Work required by the Contract shall not be Working Days for Contract time accounting.

6-7.3 Contract Time Accounting. The Engineer will make a daily determination of each Working Day to be charged against the Contract time. These determinations will be discussed and the Contractor will be furnished a periodic statement showing the allowable number of Working Days of Contract time, as adjusted, at the beginning of the reporting period. The statement will also indicate the number of Working Days charged during the reporting period and the number of Working Days of Contract time remaining. If the Contractor does not agree with the statement, the Contractor must file a written protest within 15 Days after receipt, setting forth the facts of the protest. Otherwise, the statement will be deemed to have been accepted.

6-7.4 Starting Date for Contract Time and Notice to Proceed. The starting date for Contract time accounting will be determined by adding the number of Days indicated on the Proposal form to the date the Contract is awarded, however the Agency may, at its option, delay the starting date by not more than 180 calendar Days if necessary to obtain grants, permits, rights-of-way, or approval of federal or State authorities, or when prevented from starting the project due to causes beyond its control. Notice to Proceed will be issued within 30 calendar Days after the Contract, bonds, certificates of insurance and other documents have been returned, properly completed by the Contractor, unless the starting date is delayed as herein provided. If the Agency delays the Contract starting date, Notice to Proceed will be issued at least 7 calendar Days prior to the new starting date. Any delay caused by failure of the Contractor to properly complete or timely return the Contract Documents shall not change the Contract starting date and shall not be a cause for extending the Contract time. The Notice of Award will indicate a probable Contract starting date. The Notice to Proceed will indicate the actual Contract starting date, computed as herein described.

68 COMPLETION, ACCEPTANCE AND WARRANTY.

6-8.1 Completion and Acceptance. Acknowledgment of completion of the Work will occur prior to Acceptance by the Agency. Acceptance will only occur after all Contract requirements have been fulfilled, such as training, submission of warranties, maintenance manuals, record drawings, Release on Contract and the like. Acceptance by the Agency will occur when the Engineer signs the Notice of Completion.
The Work will be inspected by the Engineer promptly upon receipt of the Contractor's written assertion that the Work has been completed. If, in the Engineer's judgment, the Work has been completed in accordance with the Plans and Specifications, the Engineer will acknowledge completion of the Work. Completion of the Work, as used above, shall include the Contractor showing evidence of having received an occupancy clearance from Building and Safety, or other permit issuing agency, when a building, plumbing electrical, grading, or other permit is required for the Work. The Engineer will, in acknowledging completion of the Work, set forth in writing the date when the Work was completed. This will be the date when the Contractor is relieved from responsibility to protect the Work. This will also be the date to which liquidated damages will be computed.

6-8.2 Warranty and Correction

6-8.2.1 Warranty The Contractor warrants to the Agency that materials and equipment furnished under the Contract will be new, unless otherwise specified in the Contract Documents, and of good quality, that the Work will be free from defects in materials and workmanship and that the Work will conform to the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective by the Agency. This warranty excludes damage or defect caused by abuse (other than by the Contractor or those under the control of the Contractor), modifications not executed by the Contractor, or improper or insufficient maintenance. This warranty excludes normal wear and tear. Nothing in this warranty is intended to limit any manufacturer's warranty which provides the Agency with greater warranty rights.

6-8.2.2 Correction Period For a period of one (1) year from the date of acceptance of the Work by the Agency, the Contractor shall repair or replace any defective workmanship or materials or Work not in conformance with the Contract Documents after notice to do so from the Engineer, and within the time specified in the notice. If the Contractor fails to make such repair or replacement within the time specified in the notice, the Agency may perform the repair or replacement and the Contractor and the Contractor's sureties shall be liable for the cost thereof. The one (1) year period referenced in this section 6-8.2.2 applies only to the Contractor's obligation to repair or replace defective workmanship or materials or Work not in conformance with the Contract Documents and is not intended to constitute a period of limitations for any other rights or remedies the Agency may have regarding the Contractor's other obligations under the Contract Documents.

6-8.3 No Waiver of Legal Rights. The Agency shall not be precluded or estopped by any measurement, estimate, or certificate made either before or after the completion and Acceptance of the Work and payment therefor from showing the true amount and character of the Work performed and materials furnished by the Contractor, nor from showing that any such measurement, estimate, or certificate is untrue or is incorrectly made, nor that the Work or materials do not in fact conform to the Contract.

The Agency shall not be precluded or estopped, notwithstanding any such measurement, estimate, or certificate and payment in accordance therewith, from recovering from the Contractor or its sureties, or both, such damages as it may sustain by reason of the Contractor's failure to comply with the terms of the Contract.

Neither the Acceptance by the Engineer or by its representative, nor any payment for or Acceptance of the whole or any part of the Work, nor any extension of time, nor any possession taken by the Engineer shall operate as a waiver of any portion of the Contract or of any power herein reserved, or of any right to damages.

A waiver of any breach of the Contract shall not be held to be a waiver of any other or subsequent breach.

6-8.4 Landscape Maintenance Period. Final Acceptance of the Contract shall follow the satisfactory completion of all Contract Work, including the landscape maintenance period if one is specified.

6-8.5 Non-complying Work. Neither the final certificate of payment nor any provision in the Contract Documents, nor partial or entire occupancy of the premises by the Agency, shall constitute an Acceptance of Work not done in accordance with the Contract Documents or relieve the Contractor of liability in respect to any express warranties or responsibility for faulty materials or workmanship.

6-8.6 Written Warranties. The Contractor shall obtain and deliver to the Engineer all written warranties required to be furnished by the Specifications. Each of such warranty shall be underwritten by the Contractor for the full period prescribed therein, and shall bear its endorsement to such effect.

6-9 LIQUIDATED DAMAGES. Failure of the Contractor to complete the Work within the time allowed will result in damages being sustained by the Agency. Such damages are, and will continue to be, impracticable and extremely difficult to determine. For each consecutive calendar day in excess of the time specified, as adjusted in accordance with 6-6, for completion of the Work the Contractor shall pay to the Agency, or have withheld from monies due it, the sum of $250, unless otherwise provided in the Contract Documents.

Execution of the Contract under these Specifications shall constitute agreement by the Agency and Contractor that $250 per day is the minimum value of the costs and actual damage caused by failure of the Contractor to complete the Work within the allotted time, that such sum is liquidated damages and shall not be construed as a penalty, and that such sum may be deducted from payments due the Contractor if such delay occurs.

6-10 USE OF IMPROVEMENT DURING CONSTRUCTION. The Agency reserves the right to take over and utilize all or part of any completed facility or appurtenance. The Contractor will be notified in writing in advance of such action. Such action by the Agency will relieve the Contractor of responsibility for injury or damage to said completed portions of the improvement resulting from use by public traffic or from the action of the elements or from any other cause, except injury or damage resulting from the Contractor's operations or negligence. The Contractor will not be required to reclean such portions of the improvement before field completion, except for cleanup made necessary by its operations. Nothing in this section shall be construed as relieving the Contractor from full responsibility for correcting defective work or materials.

In the event the Agency exercises its right to place into service and utilize all or part of any completed facility or appurtenance, the Agency shall assume the responsibility and liability for injury to persons or property arising out of or resulting from the utilization of the facility or appurtenance so placed into service, except for any willful or negligent act or omission by the Contractor, Subcontractor, their officers, employees or agents.

6-10.1 Use of Improvements - Exceptions. The provisions of 6-10 shall not apply to projects for the repair, modification, enlargement or improvement of existing facilities that are to remain in use during construction except where a portion of the project which is completely independent from the rest of the Work can be completed and put into use by the Agency.

On projects on public roads, after satisfactory completion of an isolated section of the Work involving roadway improvements or repairs, when all temporary signs and other temporary Contractor facilities have been removed, the section is not being used as a detour, the section is no longer under the Contractor's control, and the section is opened to public traffic through the end of the Contract period, that section of the Work shall be taken over by the Agency as provided in 6-10. The Contractor shall indicate to the Engineer in writing when the conditions of this paragraph have been complied with and shall specify the limits of the section involved. Any taking over of the Work by the Agency shall be effective only when formal written notification is issued by the Agency.

6-11 NOTICE OF POTENTIAL CLAIM FOR ADDITIONAL COMPENSATION. Procedures for notice of claims in specific situations and circumstances are provided in the following sections:

3-4 .....Changed Conditions
6-6.4 .....Delay and Extensions of Time
6-7.3 .....Contract Time Accounting

Compliance with this section is not prerequisite to assertion of a claim involving those sections or based on differences in measurements or errors of computation as to Contract quantities.

Compliance with the provisions of this section is required in all other situations and circumstances.

It is the intention of this section that differences arising between the parties under and by virtue of the Contract be brought to the attention of the Engineer at the earliest possible time in order that such matters may be settled, if possible, or other appropriate action taken to resolve such differences.

The Contractor shall give the Engineer written notice of a potential claim, setting forth: (1) the reasons for which the Contractor believes additional compensation will or may be due; (2) the nature of the costs involved; and (3) insofar as possible, the amount of the potential claim.

If the claim is based upon an act or failure to act by the Engineer, the said notice must be given to the Engineer prior to the date when the work giving rise to the potential claim is commenced; in all other cases the said notice must be given to the Engineer within 15 Days after the happening of the event, thing or occurrence giving rise to the potential claim.

The Contractor shall not be entitled to the payment of any additional compensation where the written notice of potential claim has not been given to the Engineer in the manner required by and within the time limitations of this section.

6-12 DISPUTES AND CLAIMS; PROCEDURE.

6-12.1 GENERAL. Any and all decisions made on appeal pursuant to this section shall be in writing. Any "decision" purportedly made pursuant to this section which is not in writing shall not be binding upon the Agency and should not be relied upon by the Contractor.

Filing or giving the notices required under 3-4, 6-6.4, 6-7.3 and 6-11 is prerequisite to recovery under a Contractor's claim for additional compensation; nothing in this section shall excuse the Contractor from its duty to file or give the required notices, or from performing other duties required by the Contract Documents.

6-12.2 ADMINISTRATIVE REVIEW. Prior to proceeding under 6-12.3 or filing a Complaint in Arbitration, the Contractor shall exhaust its administrative remedies by submitting its claim for review and decision by the following Agency staff in the following sequence:

Project Manager, responsible for the project
Department Director (Public Works Agency), responsible for the project.
Director of the Public Works Agency (the Engineer)

If the Contractor disputes the Project Manager's decision on its claim, the Contractor shall submit the claim to the Department Director. If the Contractor disputes the Department Director's decision on its claim, the Contractor shall submit the claim to the Engineer. Agency staff decisions shall state the portion of the claim that is undisputed if any.

The Project Manager may elect to forward a claim submitted by the Contractor directly to the Department Director. The Project Manager must give the Contractor notice of that election and the Contractor may supplement its claim within 7 Days of such notice (unless the parties agree in writing to a different time) and its claim will be deemed submitted on the earlier of the day it supplements its claim, the day it states in writing that it will not supplement its claim or the daytime to supplement expires. The Department Director may forward a claim timely submitted by the Contractor directly to the Engineer instead of making a decision on the claim, in which case no notice or opportunity to supplement the claim is required, and the claim shall be deemed timely submitted to the Engineer.

The Engineer's decision on the claim shall be the Agency's final decision.

Claims submitted to the Department Director and the Engineer shall be submitted in writing and shall include:

a. A copy of the disputed decision.
b. A statement as to why the Contractor believes the decision is in error.
c. All information, argument, documents and evidence (collectively, materials) that the Contractor wishes to have considered in the review. Where the request for review is made to the Engineer, in lieu of resubmitting materials which have already been submitted to the Department Director, the Contractor may include with the request a list of the materials the Contractor wants the Engineer to consider. Any additional materials and evidence not previously submitted to the Department Director shall be included with the request to the Engineer, if the Contractor wishes them to be considered. If relevant evidence is not available at the time the request is made to the Department Director or the Engineer, the Contractor shall identify such evidence and include a statement as to when such evidence will be submitted.

The Project Manager shall issue a decision on a claim within 10 Days of receipt; if the Project Manager does not do so, then the Project manager will be deemed to have decided to reject the claim in its entirety as of the conclusion of the 10th Day after receipt. The Contractor shall submit a claim to the Department Director for review and decision within 7 Days of receipt of the Project Manager's decision or of the time the Project Manager is deemed to have decided to reject the claim, whichever is applicable. The Department Director shall issue a decision on a claim within 10 Days of the timely submission of the claim; if the Department Director does not do so, then the Department Director will be deemed to have decided to reject the claim in its entirety as of the conclusion of the 10th Day after timely submission. The Contractor shall submit a claim to the Engineer for review and decision within 7 Days of receipt of the Department Director's decision or of the time the Department Director is deemed to have decided to reject the claim, whichever is applicable. If a claim is timely submitted to the Engineer and the Engineer fails to issue a decision on that claim within the time limits prescribed for issuing a written statement under Public Contract Code, section 9204, subdivision (d)(1), the Engineer shall be deemed to have decided to reject the claim in its entirety. At any time after the Project Manager receives a claim, the Agency and Contractor may agree in writing to different time limits than those set forth in this paragraph.

6-12.3 MEET AND CONFER; MEDIATION If the Contractor disputes the Agency's final decision, the Contractor may demand in writing an informal conference to meet and confer for settlement of the issues in dispute. Upon receipt of a demand in writing sent by registered mail or certified mail, return receipt requested, the Agency shall schedule a meet and confer conference within 30 Days for settlement of the dispute.

Within 10 business days following the conclusion of the meet and confer conference, if the claim or any portion of the claim remains in dispute, the Agency shall provide the Contractor a written statement identifying the portion of the claim that remains in dispute and the portion that is undisputed. Any payment due on an undisputed portion of the claim shall be processed and made within 60 Days after the Agency issues its written statement. Any disputed portion of the claim, as identified by the Contractor in writing, shall be submitted to nonbinding mediation, with the Agency and the Contractor sharing the associated costs equally. The Agency and Contractor shall agree to a mediator within 10 business days after the disputed portion of the claim has been identified in writing. If the Agency

and Contractor cannot agree upon a mediator, each party shall select a mediator and those mediators shall select a qualified neutral third party to mediate with regard to the disputed portion of the claim. Each party shall bear the fees and costs charged by its respective mediator in connection with the selection of the neutral mediator. If mediation is unsuccessful, the parts of the claim remaining in dispute shall be subject to applicable procedures outside this section.

For purposes of this section, mediation includes any nonbinding process, including, but not limited to, neutral evaluation or a dispute review board, in which an independent third party or board assists the parties in dispute resolution through negotiation or by issuance of an evaluation. Any mediation utilized shall conform to the timeframes in this section.

Failure by the Agency to meet the time requirements of this section shall result in the portion of the claim that remains in dispute being deemed rejected in its entirety.

The parties may agree to waive, in writing, mediation under this section.

6-12.4 ARBITRATION. Claims and disputes arising under or related to the performance of the Contract, for which mediation under 6-12.3 was waived or unsuccessful except for claims which have been released by execution of the "Release on Contract" as provided in 9-4, shall be resolved by arbitration unless the Agency and the Contractor agree in writing, after the claim or dispute has arisen, to waive arbitration and to have the claim or dispute litigated in a court of competent jurisdiction. Arbitration shall be pursuant to Article 7.1 (commencing with Section 10240) of Chapter 1 of Part 2 of the Public Contract Code and the regulations promulgated thereto, Chapter 4 (commencing with Section 1300) of Division 2 of Title 1 of the California Code of Regulations. The arbitration decision shall be decided under and in accordance with California law, supported by substantial evidence and, in writing, contain the basis for the decision, findings of fact, and conclusions of law.

Arbitration shall be initiated by a Complaint in Arbitration made in compliance with the requirements of said Chapter 4. A Complaint in Arbitration by the Contractor shall be filed not later than 90 calendar Days after receipt of the final written decision of the Agency on the claim or dispute or within 300 Days after Acceptance of the Work by the Agency if no written decision has been issued. For the purposes of this section, "Acceptance of the Work by the Agency" shall be defined as the date the Notice of Completion is filed.

Where an election is made by either party to use the Simplified Claims Procedure provided under Sections 1340-1346 of said Chapter 4, the parties may mutually agree to waive representation by counsel.

All contracts valued at more than $25,000 between the Contractor and its subcontractors and suppliers shall include a provision that the subcontractors and suppliers shall be bound to the Contractor to the same extent that the Contractor is bound to the Agency by all terms and provisions of the Contract, including this arbitration provision.

6-13 CONTRACTOR'S WORK HOURS

6-13.1 Working Hours Limitations. Except as otherwise specified, no work shall be performed by the Contractor at the Work site between the hours of 7:00 p.m. and 7:00 a.m. the following day, nor shall work be performed on Saturdays, Sundays or holidays listed in 6-7.2.1.

6-13.2 Regular Work Schedule. The Contractor shall furnish a work schedule with the Construction Schedule required by 6-1 and inform the Engineer at least two Days in advance of changing the schedule. The schedule shall include the times for starting and ending work on each day. Such starting and ending times shall not be more than 10 1/2 hours apart.

6-13.3 Exceptions. The limitations on working hours and days shall not apply to emergency work made necessary by unusual conditions where such work is necessary to protect the Work, to protect the property of others, to protect life, or to ensure the orderly flow of traffic.

The limitations of this section shall not apply where work at times other than allowed by 6-13.1 and 6-13.2 is necessary in order to make utility connections or is required by other provisions contained in these Specifications in order to perform the work in the manner specified. In these cases, the Contractor shall obtain prior written approval of the Engineer at least two Days in advance of performing the work.

SECTION 7 - RESPONSIBILITIES OF THE CONTRACTOR

7-1 THE CONTRACTOR'S EQUIPMENT AND FACILITIES.

7-1.1 General. The Contractor shall furnish and maintain in good condition all equipment and facilities as required for the proper execution and inspection of the Work.
The Contractor shall provide and maintain enclosed toilets for the use of employees engaged in the Work. These accommodations shall be maintained in a neat and sanitary condition, and regularly pumped out.

7-1.2 Temporary Utility Services. The Contractor shall, at its own expense, make all arrangements necessary for the provision of temporary utility services necessary for its own use during performance of the Work.
The Contractor shall not draw water from any fire hydrant (except to extinguish a fire), without obtaining permission from the water utility owner.

7-1.3 Crushing and Screening Operations. Unless otherwise specified in the Special Provisions, the establishment and operation of portable screens and crushers will not be allowed on or adjacent to the Work site.

7-2 LABOR

7-2.1 General. The Contractor, its agents, and employees shall be bound by and comply with applicable provisions of the Labor Code and Federal, State, and local laws related to labor.
Any worker found by the Engineer to be incompetent, intemperate, troublesome, disorderly, or otherwise objectionable, or who fails to perform the Work properly and acceptably, shall be immediately removed from the Work site by the Contractor and shall not be reemployed in the performance on the Work.

7-2.1.1 Special Qualifications. Where the Engineer determines certain portions of the Work require experience, training, certification or other special qualifications that may not be possessed by the average journeyperson, such portions of the Work will be specifically identified in the Special Provisions and the special qualifications identified. When work requiring special qualifications is being performed, a person with such qualifications must be in immediate charge of the work. The person may be a lead journeyperson, foreperson or trade superintendent. The general superintendent or a foreperson who is not specifically assigned to the area where the identified work is being performed will not be considered to be in immediate charge of the work.
Written certification of the required qualifications shall be furnished to the Engineer at least one week prior to the time work is commenced on the work requiring such qualifications. Such certification is subject to review and acceptance by the Engineer. If, during performance of work requiring special qualifications, the qualified person becomes temporarily or permanently unavailable to the Contractor, work shall not proceed until a qualified replacement has been accepted by the Engineer. The Engineer will promptly consider the certification of the replacement.
If identified work is performed without a person having the special qualifications in charge, the Engineer may, at its sole discretion, order such work removed and replaced at the Contractor's expense.
If, after certification is accepted, the Engineer finds that the certification was inaccurate, or work on the project indicates a lack of the knowledge and experience to supervise the work, the Engineer may order the work stopped until an acceptable replacement has been certified, accepted and is in charge.

7-2.2 Prevailing Wages. Pursuant to Section 1773.2 of the Labor Code, the current prevailing rate of per diem wages at the time of the Bid as determined by the Director of the Department of Industrial Relations (DIR) are on file at the office of the Engineer. The Contractor shall post a copy of these rates at the Work site. Pursuant to Section 1774 of the Labor Code, the Contractor and any Subcontractors shall pay not less than the specified prevailing rates of wages to workers employed on the Contract. If the Contract is Federally-funded, the Contractor and any Subcontractors shall not pay less than the higher of these rates or the rates determined by the United States Department of Labor. Pursuant to Section 1775 of the Labor Code, the Contractor and any Subcontractors, shall, as a penalty to the Agency, forfeit the prescribed amounts per calendar day, or portion thereof, for each worker paid less than the prevailing wage rates. The project is subject to the compliance monitoring and enforcement by the California Department of Industrial Relations (DIR). The contractor is responsible for posting job site notices as prescribed by regulation pursuant to Labor Code section 1771.4, subdivision (a)(2). The Contractor and each Subcontractor, if any, must be registered with the DIR pursuant to Labor Code section 1725.5 and section 1771.1. The Contractor and each Subcontractor, if any, must submit certified payrolls to the Labor Commissioner pursuant to Labor Code 1771.4.

7-2.2.1 Apprentices. Apprentices shall be employed on the Work in accordance with Labor Code Section 1777.5. The Contractor is responsible for compliance with Labor Code Section 1777.5 for all apprenticeable occupations whether employed directly or through subcontractors.

7-2.2.2 Contractors' Duties Concerning Labor Code Compliance. As required by Labor Code 1775(b)(1), Labor Code Sections 1771, 1775, 1776, 1777.5, 1813 and 1815 are required to be included in the contract between the Contractor and subcontractors. The Contractor agrees to comply with these sections and all remaining provisions of the Labor Code.

7-2.3 Payroll Records. Pursuant to Section 1776 of the Labor Code the Contractor and each Subcontractor, if any, shall keep, make available, and submit to the Engineer within ten (10) days of receipt of a written request,

certified payroll records. Pursuant to Labor Code section 1776, subsection (h), the Contractor and each Subcontractor, if any, shall, as a penalty to the Agency, forfeit the prescribed amount for each calendar day, or portion thereof, for each worker, the Contractor and each Subcontractor, if any, fails to comply with that subsection until strict compliance is effectuated. The Contractor and each Subcontractor, if any, waives any right to any notice or hearing on the forfeiture of such penalties pursuant to Labor Code sections 1726 or 1771.6. The contractor shall include the in its subcontracts as required to make this paragraph effective as to each Subcontractor. Upon written request, the Contractor shall withhold penalties forfeited by a Subcontractor pursuant to Labor Code section 1776,l subsection (h), and this paragraph from payment due to such Subcontractor and remit such penalties withheld to the Agency.

7-2.4 Hours of Labor. Pursuant to Section 1810 of the Labor Code, 8 hours of labor shall constitute a legal day's work. Pursuant to Section 1813 of the Labor Code, the Contractor and any Subcontractors, shall, as a penalty to the Agency, forfeit the prescribed amount per calendar day for each worker required or permitted to work more than 8 hours in any 1 calendar day and 40 hours in any 1 calendar week without being compensated in accordance with Section 1815.

Pursuant to Section 1810 of the Labor Code, 8 hours of labor shall constitute a legal day's work. Pursuant to Section 1813 of the Labor Code, the Contractor and each Subcontractor, if any, shall, as a penalty to the Agency, forfeit the prescribed amount per calendar day for each worker required or permitted to work more than 8 hours in any 1 calendar day and 40 hours in any 1 calendar week without being compensated in accordance with Section 1815. Contractor and each Subcontractor, if any, waives any right to any notice or hearing on the forfeiture of such penalties pursuant to Labor Code sections 1726 and 1771.6. Contractor shall include terms in its subcontracts as required to make this paragraph effective as to each Subcontractor. Upon written request, Contractor shall withhold penalties forfeited by a Subcontractor pursuant to Labor Code section 1813 and this paragraph from payments due to such Subcontractor and remit such penalties withheld to the Agency.

7-3 INDEPENDENCE OF CONTRACTOR, INDEMNIFICATION AND POLLUTION

7-3.1 Independence of Contractor. It is understood and agreed that Contractor is at all times an independent contractor and that no relationship of employer-employee exists between the parties hereto.
Contractor will not be entitled to any benefits payable to employees of County, including but not limited to overtime, retirement benefits, workers' compensation benefits, injury leave or other leave benefits. County is not required to make any tax or benefit deductions from the compensation payable to Contractor under the provisions of this Agreement. As an independent contractor, Contractor hereby holds County harmless from any and all claims that may be made against County based upon any contention by any third party that an employer-employee relationship exists by reason of the Agreement.

If, in the performance of this Agreement, any third persons are employed by Contractor, such persons will be entirely and exclusively under the direction, supervision and control of Contractor. All terms of employment, including hours, wages, working conditions, discipline, hiring and discharging or any other terms of employment or requirements of law, will be determined by Contractor. County will have no right or authority over such persons or the terms of such employment, except as provided in this Agreement.

7-3.2 Indemnification and Hold Harmless Clause. All activities arising out of or relating to the performance of the Work covered by this Contract shall be at the risk of Contractor. To the fullest extent permitted by law, Contractor shall defend (at Agency's request), indemnify and hold harmless Agency, and the County of Ventura if the County of Ventura is not the entity defined as Agency under this Contract, including all of their boards, agencies, departments, officers, employees, agents and volunteers (collectively, "Indemnitee"), against any and all claims, suits, actions, legal or administrative proceedings, judgments, debts, demands, damages, including injury or death to any person or persons, and damage to any property including loss of use resulting therefrom, incidental and consequential damages, liabilities, interest, costs, attorneys' fees and expenses of whatsoever kind of nature, whether arising before, during or after commencement or completion of this Contract, whether against Contractor and Indemnitee or which are in any manner, directly, indirectly, in whole or in part, arising from any act, omission, fault or negligence, whether active or passive, of Contractor, a Subcontractor or anyone directly or indirectly employed by them or anyone for whose acts they may be liable in connection with or incident to the Contract, even though the same may have resulted from the joint, concurring or contributory negligence, or from the passive negligence, of Indemnitee or any other person or persons, unless the same be caused by the sole negligence of Indemnitee, or except to the extent caused by the active negligence or willful misconduct of Indemnitee.

The Agency will notify the Contractor of the receipt of any third-party claims.

7-3.3 Contamination and Pollution. Contractor, solely at its own cost and expense, will provide clean-up of any premises, property or natural resources contaminated or polluted due to Contractor activities. Any fines, penalties, punitive or exemplary damages assigned due to contaminating or polluting activities of the Contractor will be borne entirely by the Contractor.

7-3 INSURANCE REQUIREMENTS

Contractor, at its sole cost and expense, shall obtain and maintain in full force during the term of this Contract the following types of insurance:

7-4.1 Workers' Compensation Insurance.

7-4.1.1 Coverage. Workers' Compensation coverage, in full compliance with Labor Code 3700, for all employees of Contractor and Employer's Liability in the minimum amount of $1,000,000. The Agency, the County of Ventura, its officers, employees or Consultants, will not be responsible for any claims in law or equity occasioned by failure of Contractor to comply with this paragraph.

7-4.1.2 Certification. Before execution of the Contract by Agency, Contractor shall file with the Engineer the following signed certification:
"I am aware of the provisions of Section 3700 of the Labor Code which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the Work of this Contract."

7-4.2 Commercial General Liability Insurance

7-4.2.1 Minimum Limits and Scope; Insurance Classes. "Occurrence" coverage in the minimum amount of:

Coverage Class	Coverage
L-A	$ 1,000,000 combined single limit (CSL) bodily injury and property damage each occurence and $1,000,000 aggregate
L-B	$ 1,000,000 CSL bodily injury and property damage each occurrence and $2,000,000 aggregate
L-C	$ 5,000,000 CSL bodily injury and property damage each occurrence and $5,000,000 aggregate
L-D	$ 10,000,000 CSL bodily injury and property damage each occurrence and $10,000,000

If no coverage class is specified in "Proposal", coverage class L-B shall apply.
If Contractor maintains higher limits than the minimums shown above, the Agency requires and shall be entitled to coverage for the higher limits maintained by the Contractor. Any available insurance proceeds in excess of the specified minimum limits of insurance and coverage shall be available to the Agency.
Coverages shall include premises/operations; products/completed operations; independent contractors; underground, explosion and collapse hazards; personal and advertising injury; broad form property damage; and broad form blanket contractual.

7-4.2.2 Coverage Exceptions. On projects where no explosives will be used and no demolition is involved, the coverage for explosion may be omitted. On projects where no excavation is involved, the coverage for underground hazard may be omitted. The omission of said coverages is at Agency's option, and shall not abrogate Contractor's responsibilities for indemnification as set forth in these Specifications.

7-4.2.3 Excess Liability Policies. All Excess Liability policies, if used, shall be on an "umbrella" or following form of the primary layer of coverage.

7-4.3 Commercial Automobile Liability Insurance

Coverage in the minimum amount of $1,000,000 CSL bodily injury and property damage, including automobile liability, any auto.

7-4.4 Property Insurance

Contractor shall arrange for its own "Course of Construction" insurance on the project to protect its interests, as Agency does not have this coverage.
Contractor is responsible for delivering to Agency Work completed in accordance with the Contract except as provided in 7-18 (Acts of God). Should the Work being constructed be damaged by fire or other causes during construction, it shall be replaced by Contractor in accordance with the requirements of the Plans and Specifications without additional expense to Agency.

7-4.5 Other Insurance Provisions.

7-4.5.1 Insurance Company Qualifications. All insurance required shall be issued by (a) an admitted company or admitted companies authorized to transact business in the State of California which have a BEST rating of B+ or higher and a Financial Size Category (FSC) of VII or larger or (b) a California approved Surplus Line carrier or carriers which have a BEST rating of A or higher and a Financial Size Category (FSC) of VII or larger.
Workers compensation insurance not meeting the above requirements but meeting all other requirements of the specifications, will be accepted.

7-4.5.2 Primary Coverage. All insurance required shall be primary coverage as respects Agency and any insurance or self-insurance maintained by Agency or the County of Ventura shall be in excess of Contractor's insurance coverage and shall not contribute to it.

7-4.5.3 Aggregate Limits Exceeded. Agency shall not be notified immediately if any aggregate insurance limit is exceeded. Contractor shall purchase additional coverage to meet requirements.

7-4.5.4 Liability in Excess of Limits. Insurance coverage in the minimum amounts set forth herein shall not be construed to relieve Contractor for liability in excess of such coverage, nor shall it preclude Agency or the County of Ventura from taking such other actions as is available to it under any other provisions of this Contract or otherwise in law.

7-4.5.5 Additional Insured Endorsements. The Agency, the County of Ventura (if not defined as Agency) and all special Districts governed by the County of Ventura Board of Supervisors, and their officials, employees, and volunteers shall be named as Additional Insured as respects Work done by or on behalf of Contractor under the Contract on all policies required (except workers' compensation). With respect to Contractor's commercial general Liability insurance, Additional Insured coverage shall include both ongoing and completed operations.

7-4.5.6 Waiver of Subrogation Rights. Contractor agrees to waive all rights of subrogation against the Agency, the County of Ventura, including its boards, and all special Districts governed by the Board of Supervisors, for losses arising directly or indirectly from the activities or Work performed by Contractor under the Contract (applies only to Workers' Compensation and Commercial General Liability).

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7-4.5.7 Cancellation Notice Required. In the case of policy cancellation, Agency shall be notified by the insurance company or companies as provided for in the policy. Contractor shall notify Agency of any and all policy cancellations within three working days of the cancellation.

7-4.5.8 Documentation Required. Prior to execution of the Contract by Agency, Contractor shall provide Agency with Certificates of Insurance for all required coverages (see Appendix A for example), all required endorsement(s) and a copy of its course of insurance policy.

It is the responsibility of Contractor to confirm that all terms and conditions of Section 7-4 Insurance Requirements are complied with by any and all subcontractors that Contractor may use in the completion of the Contract.

7-4 PERMITS. The Agency will obtain, at no cost to the Contractor, all encroachment and building permits necessary to perform Contract Work in streets, highways, railways or other rights of way, unless the necessity for such permit(s) is created by a method of operation chosen by the Contractor. The Contractor shall obtain and pay for all costs incurred for permits necessitated by its operations such as, but not limited to, those permits required for night Work, overload, blasting and demolition.

The Contractor shall pay all business taxes or license fees that are required for the Work.

7-5.1 Highway and Railroad Permits. The Engineer will obtain the basic State highway and railroad encroachment permits which will include checking of plans. However, the Contractor must also obtain permits from these agencies. Inspection fees charged by these agencies must be paid by the Contractor.

7-5.2 Grading Ordinance

7-5.2.1 General.

All excavation, filling and grading operations in Ventura County are governed by the Ventura County Grading Ordinance or City Ordinances, except within the project right of way shown on the Plans.

7-5.2.2 Permits Required. Work outside the project right of way which involves excavation or filling of soils is subject to all requirements of the applicable grading ordinance. The requirements may include, but are not limited to, submitting of a grading plan prepared by a Civil Engineer, obtaining a grading permit, paying the permit fee, posting a grading bond, hiring professionals for engineering and testing services, compacting fills, constructing drainage facilities and providing erosion protection.

7-5.2.3 Imported and Exported Material. To ensure that neither the Agency nor the Contractor is a party to aiding or abetting any property owner (who is ultimately responsible) to violate the applicable grading ordinance, no material shall be imported from or exported or wasted outside the project right of way until the Contractor has furnished the Engineer a copy of the grading permit covering such operation on land where material is to be deposited or excavated, unless exempt.

7-5.2.4 Exemptions from Permit. No grading permit is required of the Contractor for Work performed within the project right of way shown on the Plans or on borrow or disposal areas shown on the Plans or described in the Special Provisions and which are specifically designated as being exempt from such permit requirements.

7-5.3 Building Permit.

7-5.3.1 Agency Furnished Permits. Except as provided in **7-5.3.2**, Agency will submit the plans for the Work to Department of Building and Safety, and other building related permit issuing agencies, for plan check and make the corrections necessary for the issuance of building and related permits. Agency will Pay plan check and permit fees for the Work. The Contractor may be required to furnish information to the permit issuing agencies, as required for the issuance of permits, and sign the permit.

7-5.3.2 Contractor Furnished Permits. Components or systems, required by the Contract, may require the preparation of plans and calculations to obtain approvals or permits from state or local building, fire prevention, public health, safety, environmental protection and other agencies in addition to the basic permits arranged for by the Agency as provided in **7-5.3.1**. Contractor shall take all actions in a timely manner to obtain such approvals or permits so as not to delay completion of the Work beyond the time provided in **6-7**. Contractor shall include all costs and consider the time required to obtain approvals or permits in the Contract price bid.

7-5.4 Coastal Zone Permits

7-5.4.1 Agency Furnished Permits. Permits required for Work on the project within rights of way furnished by the Agency within the Coastal Zone will be obtained by the Agency.

7-5.4.2 Contractor Furnished Permits. Permits required for the Contractor's operations outside of rights of way furnished by the Agency must be obtained by the Contractor. Such permits are required for brush removal, grading, dredging, disposal of material and many other operations within the Coastal Zone.

7-5 THE CONTRACTOR'S REPRESENTATIVE. Before starting work, the Contractor shall designate in writing a representative who shall have complete authority to act for it. An alternative representative may be designated as well. The representative or alternate shall be present at the Work site whenever work is in progress or whenever actions of the elements necessitate its presence to take measures necessary to protect the Work, persons, or property. Any order or communication given to this representative shall be deemed delivered to the Contractor. A joint venture shall designate only one representative and alternate. In the absence of the Contractor or its representative, instructions or directions may be given by the Engineer to the superintendent or person in charge of the specific work to which the order applies. Such order shall be complied with promptly and referred to the Contractor or its representative.

In order to communicate with the Agency, the Contractor's representative, superintendent, or person in charge of specific work shall be able to speak, read, and write the English language.

7-6 COOPERATION AND COLLATERAL WORK. The Contractor shall be responsible for ascertaining the nature and extent of any simultaneous, collateral, and essential work by others. The Agency, its workers and contractors and others, shall have the right to operate within or adjacent to the Work site during the performance of such work.

The Agency, the Contractor, and each of such workers, contractors and others, shall coordinate their operations and cooperate to minimize interference.

The Contractor shall include in its Bid all costs involved as a result of coordinating its work with others. The Contractor will not be entitled to additional compensation from the Agency for damages resulting from such simultaneous, collateral, and essential work. If necessary to avoid or minimize such damage or delay, the Contractor shall redeploy its work force to other parts of the Work.

Should the Contractor be delayed by the Agency, and such delay could not have been reasonably foreseen or prevented by the Contractor, the Engineer will determine the extent of the delay, the effect on the Work, and any extension of time.

7-7 WORK SITE MAINTENANCE

7-8.1 General Throughout all phases of construction, including suspension of the Work, and until acceptance per 6-8, the Contractor shall keep the Work site clean and free from rubbish and debris. Rubbish and debris collected on the Work site shall only be stored in roll-off, enclosed containers prior to disposal. Stockpiles of such will not be allowed.

When required by the Special Provisions, the Contractor shall provide a self-loading motorized street sweeper equipped with a functional water spray system. The sweeper shall clean all paved areas within the Work site and all paved haul routes at least once each working day.

The Contractor shall ensure there is no spillage along haul routes. Any such spillage shall be removed immediately and the area cleaned.

Should the Contractor fail to keep the Work site free from rubbish and debris, the Engineer may suspend the Work per 6-3 until the condition is corrected.

7-8.2 Air Pollution Control. The Contractor shall not discharge smoke, dust, equipment exhaust, or any other air contaminants into the atmosphere in such quantity as will violate any Federal, State, or local regulations.

The Contractor shall also abate dust nuisance by cleaning, sweeping and spraying with water, or other means as necessary. The use of water shall conform to 7-8.6.

7-8.3 Noise Control. Noise generated from the Contractor's operations shall be controlled as specified in the Special Provisions.

7-8.4 Storage of Equipment and Materials.

7-8.4.1 General Materials and equipment shall be removed from the Work site as soon as they are no longer necessary. Before inspection by the Engineer for acceptance, the Work site shall be cleared of equipment, unused materials, and rubbish so as to present a satisfactory clean and neat appearance.

Excess excavated material shall be removed from the Work site immediately unless otherwise specified in the Special Provisions.

Forms and form lumber shall be removed from the Work site as soon as practicable after stripping.

7-8.4.2 Storage in Public Streets. Construction materials and equipment shall not be stored in streets, roads, or highways for more than 5 days after unloading unless otherwise specified in the Special Provisions or approved by the Engineer. All materials or equipment not installed or used in construction within 5 days after unloading shall be stored at a location approved by the Engineer.

Excavated material, except that which is to be used as backfill in the adjacent trench, shall not be stored in public streets unless otherwise specified in the Special Provisions or approved by the Engineer. Immediately after placing backfill, all excess material shall be removed from the Work site.

7-8.5 Sanitary Sewers.

7-8.5.1 General. The flow of sewage shall not be interrupted. Should the Contractor disrupt the operation of existing sanitary sewer facilities, or should disruption be necessary for performance of the Work, the Contractor shall bypass the sewage flow around the Work. Sewage shall be conveyed in closed conduits and disposed of in a sanitary sewer system. Sewage shall not be permitted to flow in trenches nor be covered by backfill.

Whenever sewage bypass and pumping is required by the Plans or Specifications, or the Contractor so elects to perform, the Contractor shall submit per 2-5.3 a working drawing conforming to 7-8.5.2 detailing its proposed plan of sewage bypass and pumping.

7-8.5.2 Sewage Bypass and Pumping Plan. The plan shall indicate the locations and capacities of all pumps, sumps, suction and discharge lines. Equipment and piping shall be sized to handle the peak flow of the section of sewer line to be bypassed and pumped. Equipment and piping shall conform to 7-10, the Plans, and the Special Provisions. Bypass piping, when crossing areas subject to traffic loads, shall be constructed in trenches with adequate cover and otherwise protected from damage due to traffic. Lay-flat hose or aluminum piping with an adequate casing and/or traffic plates may be allowed if so approved by the Engineer. Bypass pump suction and discharge lines that extend into manholes shall be rigid hose or hard pipe. Lay flat hose will not be allowed to extend into manholes. The Contractor shall provide a backup bypass pumping system in case of malfunction. The backup bypass system shall provide 100 percent standby capability, and be in place and ready for immediate use.
Each standby pump shall be a complete unit with its own suction and discharge piping. In addition to the backup system, the Contractor shall furnish and operate vacuum trucks when required by the Plans or Special Provisions.

7-8.5.3 Spill Prevention and Emergency Response Plan. The Contractor shall prepare and submit per 2-5.3 a spill prevention and emergency response plan. The plan shall address implementation of measures to prevent sewage spills, procedures for spill control and containment, notifications, emergency response, cleanup, and spill and damage reporting.

The plan shall account for all storm drain systems and water courses within the vicinity of the Work which could be affected by a sewage spill. Catch basins that could receive spilled sewage shall be identified Unless otherwise specified in the Special Provisions, these catch basins shall be sealed prior to operating the bypass and pumping system. The Contractor shall remove all material used to seal the catch basins when the bypass and pumping system operations are complete.

The Contractor shall be fully responsible for containing any sewage spillage, preventing any sewage from reaching a watercourse, recovery and legal disposal of any spilled sewage, any fines or penalties associated with the sewage spill imposed upon by the Agency and/or the Contractor by jurisdictional regulatory agencies, and any other expenses or liabilities related to the sewage spill.

7-8.6 Water and Pollution Control. The Contractor shall prevent, control, and abate discharges of pollutants from the construction site in order to protect the storm drain system, which includes pipes, channels, streams, waterways, and other bodies of water, by the construction, installation or performance of water pollution control measures as shown on the Stormwater Pollution Control Plan (SWPCP) or Stormwater Pollution Prevention Plan (SWPPP) depending on the land area affected by the construction activity. The Contractor shall ensure compliance with the current State NPDES General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activity (General Construction Permit), NPDES No. CAS000002 and current Ventura County NPDES Municipal Separate Storm Sewer System (MS4) Permit No. CAS004002.

7-8.6.1 Compliance with NPDES General Construction Permit 7-

8.6.1.1 Construction Sites

If the Work involves construction activity that results in soil disturbance of one acre or more of total land area, or results in soil disturbances of less than one acre but is a part of a work area larger than one acre, the Contractor shall comply with the requirements of the General Construction Permit NPDES No. CAS000002. Construction activity includes clearing, grading, excavation, stockpiling, and reconstruction of existing facilities involving removal and replacement. Construction activity does not include routine maintenance such as, maintenance of original line and grade, hydraulic capacity, or original purpose of the facility.

The Contractor shall comply with requirements of the General Construction Permit (NPDES No. CAS000002), obtained by the Agency, including a site-specific Storm Water Pollution Prevention Plan (SWPPP) for the Work to be developed by Qualified SWPPP Developer (QSD) and implemented by the Qualified SWPPP Practitioner (QSP). After July 1, 2010, the Agency will electronically file all required Permit Registration Documents (PRDs) through the State Water Board's Stormwater Multi-Application and Report Tracking System (SMARTS) website, as required prior to the commencement of construction activity. PRDs consist of the Notice of Intent (NOI), Risk Assessment, Post-Construction Calculations, a Site Map, the SWPPP, a signed certification statement by the Legally Responsible Party (LRP), and the first annual fee. For the Permit application, the Contractor shall submit to Project Manager the following:

- The completed site-specific Risk Assessment
- Post-construction calculations if applicable for the project, and
- Site-specific SWPPP developed in accordance with applicable Permits.

7-8.6.1.2 Linear Utility Projects; Contractor shall comply with the requirements of the General Construction Permit NPDES No. CAS000002 for Linear Underground/Overhead projects (LUPs) one acre or greater.

7-8.6.2 Compliance with NPDES MS4 Permit

7-8.6.2.1 Construction Sites Less Than One Acre The Contractor shall ensure implementation of an effective combination of erosion and sediment control Best Management Practices (BMPs) listed in **Table 6** of the Ventura County NPDES MS4 Permit. The Contractor shall develop and implement a Storm Water Pollution Control Plan (SWPCP).

7-8.6.2.2 Construction Sites One Acre but Less Than 5 Acres The Contractor shall ensure implementation of an effective combination of appropriate erosion and sediment control BMPs from **Table 7** (BMPs at Construction sites 1 acre or greater but less than 5 acres) of the Ventura County NPDES MS4 Permit in addition to the ones identified in **Table 6** (BMPs at Construction sites less than 1 acre) to prevent erosion and sediment loss, and the discharge of construction wastes. For all construction sites one acre or greater, the Contractor shall submit the SWPPP to the Agency for review and certification as the Local SWPPP.

7-8.6.2.3 Construction Sites 5 Acres and Greater The Contractor shall ensure implementation of an effective combination of the following BMPs in **Tables 8** (BMPs at Construction sites 5 acres or greater) in addition to the ones identified in **Table 6** (BMPs at Construction sites less than 1 acre) and **Table 7** (BMPs at Construction sites 1 acre or greater but less than 5 acres) at all construction sites 5 acres and greater to prevent erosion and sediment loss, and the discharge of construction wastes. For all construction sites one acre or greater, the Contractor shall submit the SWPPP to the Agency for review and certification as the Local SWPPP.

7-8.6.2.4 Enhanced Construction BMP Implementation

Construction sites located on hillsides, adjacent or directly discharging to CWA 303(d) listed waters for siltation or sediment, and directly adjacent to Environmentally Sensitive Areas are termed "high risk sites." Contractor shall implement enhanced practices that preclude impacts to water quality posed by the high risk sites.

Contractor shall ensure that high risk sites are inspected by the Qualified SWPPP Developer, Qualified SWPPP Practitioner, or Certified Professionals in Erosion and Sediment Control (CPESC) at the time of BMP installation, at least weekly during the wet season, and at least once each 24 hour period during a storm event that generates runoff from the site, to identify BMPs that need maintenance to operate effectively, that have failed or could fail to operate as intended.

During the wet season, the area of disturbance shall be limited to the area that can be controlled with an effective combination of erosion and sediment control BMPs. Enhanced sediment controls should be used in combination with erosion controls and should target portions of the site that cannot be effectively controlled by standard erosion controls described above. Effective sediment and erosion control BMPs proposed by the Contractor shall include the BMPs listed in Table 9 (Enhanced Construction BMP Implementation) of the NPDES MS4 Permit. The Contractor shall implement the BMPs listed in Table 9 unless shown unnecessary. Also, the Contractor shall retain records of the inspection and a determination and rationale of the BMPs selected to control runoff.

7-8.6.3 Plan.

7-8.6.3.1 The SWPCP, required for construction projects less than one acre, shall be prepared in accordance with the requirements of current Ventura County NPDES MS4 Permit No. CAS004002 and County Ordinance No. 4142.

7-8.6.3.2 The SWPPP, required for construction projects one acre or greater, shall be prepared in accordance with the requirements of the state's General Construction Permit NPDES Permit CAS000002, Ventura Countywide Stormwater Quality Management Program, NPDES MS4 Permit No. CAS004002, and County Ordinance No. 4142.

7-8.6.3.3 The SWPCP/SWPPP shall identify potential pollutant sources on the construction site that may affect the quality of discharges, whether non-stormwater or stormwater, from the site and design the use and placement of water pollution control measures, BMPs, to effectively prohibit the entry of pollutants from the site into the storm drain system during construction. At a minimum, and depending on the size of the project area, the SWPCP/SWPPP will include all appropriate minimum BMPs as required by the Ventura Countywide Stormwater Quality Management Program, NPDES MS4 Permit No. CAS004002 (Tables 6 through 9). The SWPCP/SWPPP must utilize the measures recommended in the California Stormwater Quality Association (CASQA) Stormwater BMPs Handbook for Construction (January 2003 version until July 1, 2010 and 2009 version after July 1, 2010). Starting July 1, 2010 SWPPP shall be prepared by QSD as defined in the NPDES Permit CAS000002. The Contractor shall complete, sign and submit the SWPCP/SWPPP for review and final approval by the Project Engineer, prior to issuance of the Notice to Proceed as provided in 6-7.4.

7-8.6.3.4 For all construction projects one acre and greater, the Contractor shall submit the SWPPP to the Agency for review and certification as Local SWPPP in accordance with NPDES MS4 Permit No. CAS004002 prior to the Notice to Proceed as provided in 6-7.4.

7-8.6.4 Measures. All water pollution control measures shall conform to the requirements of the submitted SWPCP/SWPPP. If circumstances during the course of construction require changes to the original SWPCP/SWPPP, a revised SWPCP/SWPPP shall be promptly submitted to the Project Manager in each instance. The SWPPP shall be amended or revised by QSD. A copy of the current SWPCP/SWPPP including revisions and amendments shall be kept at the site to ensure that field personnel has access to the current document at all times. If measures being taken are inadequate to control water pollution effectively, the Project Manager may direct the Contractor to revise the operations and no further work shall be performed until adequate water pollution control measures are implemented. Effective September 2, 2011, implementation of the SWPPP shall be overseen by the Contractor's QSP as defined in the General Construction Permit NPDES No. CAS000002. All work installed by the Contractor in connection with the SWPCP/SWPPP but not specified to become a permanent part of the Work shall be removed and the site restored in so far as practical to its original condition prior to completion of the Work.

7-8.6.4.1 Post-Construction Standards; Contractor shall ensure that applicable post-construction standards are implemented to meet applicable project requirements of the Ventura County NPDES MS4 Permit and General Construction Permit NPDES No. CAS000002 (effective September 2, 2012).

7-8.6.4.2 Active Treatment Systems; Contractor shall comply with requirements of the General Construction Permit NPDES No. CAS000002 for active treatment systems as applicable.

7-8.6.5 Monitoring and Reporting

7-8.6.5.1 Monitoring; In accordance with the General Construction Permit NPDES No. CAS000002, the Contractor shall develop and implement monitoring program for Risk Level 2 and 3 sites. In addition at Risk Level 3 sites, contractor shall perform receiving water monitoring to meet Permit requirements.

7-8.6.5.2 Reporting; the Contractor shall ensure that all submittals and reports are prepared and submitted to the RWQCB in accordance with the applicable Permits. At minimum the reports will include Annual Report (for applicable projects due September 1st), Rain Event Action Plan (due 48 hrs prior to the rain event for the applicable projects), Numeric Action Levels (NAL) Exceedance Report (as required), Numeric Effluent Limitations (NELs) Violation Report (within 24 hours after NEL exceedance is identified). Contractor shall submit required reports to the Project Manager for review and approval prior to submittal to the RWQCB.

7-8.6.6 Dewatering Activities. All dewatering activities shall be performed in accordance with applicable regulatory requirements issued by the Los Angeles Regional Water Quality Control Board, including specific requirements contained in the Waste Discharge Requirements (WDR) when issued for the Work.

7-8.6.7 Payment. The Contract lump sum price for water pollution control shall include full compensation for furnishing all labor, materials, tools, equipment, services and incidentals and for doing all work involved in water pollution control as specified herein. Payment for water pollution control will be made as the Work proceeds and is in compliance with the approved Water Pollution Control Plan, on the following basis.

Partial payment estimate (excluding mobilization & water pollution control payments) as a percentage of the original Contract price (excluding the mobilization & water pollution control Bid items).		Cumulative amount of water pollution control pay item earned is the lesser of the amounts as computed by these two columns.	
Equal to or greater than	Less than	Percentage of water pollution control pay item	Percentage of the original Contract total.
5	10	10	1
10	20	20	2
20	50	50	3
50	Completion of Work	75	5
Completion of Work		100	

Where no Bid item is provided for water pollution control, payment for water pollution control shall be considered to be included in the other Bid items.

7-8. Drainage Control. The Contractor shall maintain drainage within and through the Work areas. Earth dams will not be permitted in paved areas. Temporary dams of sandbags, asphaltic concrete or other acceptable material will be permitted when necessary to protect the Work, provided their use does not create a hazard or nuisance to the public. Such dams shall be removed from the site as soon as their use is no longer necessary.

7-8. Final Cleaning. At the completion of the Work, the Contractor shall remove all waste materials and rubbish from and about the project, as well as all tools, construction equipment, temporary facilities, machinery, and surplus materials.

At completion of construction and just prior to final inspection, the Contractor shall thoroughly clean the interior and exterior of the buildings, including hardware, floors, roofs, sills, ledges, glass, or other surfaces where debris, plaster, paint, spots, and dirt or dust may have collected. All glass shall be washed clean and polished. Remove all grease, stains, labels, fingerprints, and other foreign materials from interior and exterior surfaces. Repair, patch, and touch up marred surfaces to match adjacent finishes.

The Contractor shall use only experienced workmen or professional cleaners for final cleaning. It shall use only cleaning materials recommended by the manufacturer of the surface to be cleaned, and use cleaning materials only on surfaces recommended by the cleaning material manufacturer.

It shall broom-clean all paved surfaces and rake-clean other surfaces of grounds.

The Contractor shall replace air conditioning filters if units were operated during construction, and clean all ducts, blowers, and coils if air conditioning units were operated without filters during construction.

After cleaning, the Contractor shall maintain the building in a clean condition until it is accepted by the Agency.

7-9 PROTECTION AND RESTORATION OF EXISTING IMPROVEMENTS. The Contractor shall be responsible for the protection of public and private property adjacent to the Work and shall exercise due caution to avoid damage to such property.

The Contractor shall repair or replace all existing improvements within the right-of-way which are not designated for removal (e.g., curbs, sidewalks, driveways, fences, walls, signs, utility installations, pavement, structures, etc.) which are damaged or removed as a result of its operations. When a portion of a sprinkler system within the right-of-way must be removed, the remaining lines shall be capped. Repairs and replacements shall be at least equal to existing improvements and shall match them in finish and dimension.

Maintenance of street and traffic signal systems that are damaged, temporarily removed or relocated shall be done in conformance with 307-1.5.

Trees, lawns, and shrubbery that are not designated to be removed shall be protected from damage or injury. If damaged or removed because of the Contractor's operations, they shall be restored or replaced in as nearly the original condition and location as is reasonably possible. Lawns shall be reseeded and covered with suitable mulch. The Contractor shall give reasonable notice to occupants or owners of adjacent property to permit them to salvage or relocate plants, trees, fences, sprinklers and other improvements which are designated for removal and would be destroyed because of the Work.

All costs to the Contractor for protecting, removing, and restoring existing improvements shall be absorbed in its bid.

In existing buildings, all surfaces, equipment, furniture and other property shall be protected from loss or damage by or as result of the Contractor's operations. The Contractor shall replace damaged property or shall repair and restore it to its previous condition. Patching, painting, replacement of wall, ceiling and floor covering and similar Work shall be done in such a manner that the repaired Work will not be readily noticeable.

7-1 PUBLIC CONVENIENCE AND SAFETY

7-10.1 Access.

7-10.1.1 General. The Contractor's operations shall cause no unnecessary inconvenience to the public or businesses in the vicinity of the Work. The Contractor shall have no greater length or quantity of Work under construction than can be properly prosecuted with a minimum of inconvenience to the public and other contractors engaged in adjacent or related work.

The Contractor shall provide continuous and unobstructed access to the adjacent properties unless otherwise specified in the Special Provisions or approved by Engineer. Work requiring traffic lane closures shall only be performed between the hours specified in the Special Provisions or shown on the TCP. Traffic shall be permitted to pass through the Work site, unless otherwise specified in the Special Provisions or shown on the TCP.

7-10.1.1.1 Vehicular Access. Vehicular access to residential driveways shall be maintained to the property line except when necessary construction precludes such access. If backfill has been completed to the extent that safe access may be provided and the street is opened to local traffic, the Contractor shall immediately clear the street and driveways and provide and maintain access.

7-10.1.1.2 Pedestrian Access. Safe, adequate, and ADA compliant pedestrian access shall be maintained unless otherwise approved by the Engineer. 7-10.2 Work Area Traffic Control.

7-10.2 Traffic Control

7-10.2.1 General. Work area traffic control shall conform to the California MUTCD, WATCH, or as specified in the Special Provisions. The total length of the traffic control zone shall include a buffer space, advance signing, striping transitions in advance of the Work site, existing striping, signing, and raised medians.

7-10.2.2 Traffic Control Plan.

7-10.2.2.1 General. If so specified in the Special Provisions or on the permit, the Contractor shall submit a TCP in accordance with 2-5.3. The sheets of the TCP shall display the title, phase identification, name of the firm preparing the TCP, name and stamp of the Registered Traffic or Civil Engineer, approval block for each jurisdictional agency, north arrow, sheet number, and number of sheets comprising the TCP. General notes and symbol definitions shall be included when required. Adequate dimensioning shall be provided to allow for proper field installation. The TCP shall be drawn to a 1 inch = 40 feet scale on common size sheets, either 8-1/2 inches x 11 inches, 8-112 inches x 14 inches, 11 inches x 17 inches, or 2-foot x 3-foot plan sheets as dictated by the length of the Work.

The requirements in the Special Provisions shall govern the design of the proposed TCP.

7-10.2.2.2 Payment. Payment for preparation of the TCP shall be included in the appropriate lump sum Bid items. If no Bid items have been provided, payment shall be included in the various Bid items unless otherwise specified in the Special Provisions.

7-10.3 Haul Routes. Unless otherwise specified in the Special Provisions, the haul route(s) shall be determined by the Contractor.

7-10.4 Safety.

7-10.4.1 Work Site Safety.

7-10.4.1.1 General. The Contractor shall provide safety measures as necessary to protect the public and workers within, or in the vicinity of, the Work site. The Contractor shall ensure that its operations will not create safety hazards. The Contractor shall provide safety equipment, material, and assistance to Agency personnel so that they may properly inspect all phases of the Work. When asbestos is being removed, the requirements of the CCR Title 8, Div. 1, Chapter 4, Subchapter 4 and Subchapter 7 shall be implemented.

7-10.4.1.2 Work Site Safety Official. The Contractor shall designate in writing a "Project Safety Official" who shall be at the Work site at all times, and who shall be thoroughly familiar with the Contractor's Injury and Illness Prevention Program (IIPP) and Code of Safe Practices (CSP). The Project Safety Official shall be available at all times to abate any potential safety hazards and shall have the authority and responsibility to shut down an unsafe operation, if necessary.

7-10.4.2 Safety Orders.

7-10.4.2.1 General. The Contractor shall have at the Work site, copies or suitable extracts of Construction Safety Orders, Tunnel Safety Orders, and General Industry Safety Orders issued by the State Division of Industrial Safety. Prior to beginning any excavation 5 feet in depth or greater, the Contractor shall submit to the Engineer, the name of the "Competent Person" as defined in CCR, Title 8, Section 1504, in accordance with 2-5.3. The "Competent Person" shall be present at the Work site as required by Cal-OSHA.

7-10.4.2.2 Shoring Plan. Before excavating any trench 5 feet (105m) or more in depth, the Contractor shall submit in accordance with 2-5.3 a detailed working drawing (shoring plan) showing the design of the shoring, bracing, sloping, or other provisions used for the workers' protection. If the shoring plan varies from the shoring system standards, the shoring plan shall be prepared by a registered Structural or Civil Engineer. The shoring plan shall accommodate existing underground utilities. No excavation shall start until the Engineer has accepted the shoring plan and the Contractor has obtained a permit from the State Division of Industrial Safety. A copy of the permit shall be submitted to the Engineer in accordance with 2-5.3. If the Contractor fails to submit a shoring plan or fails to comply with an accepted shoring plan, the Contractor shall suspend work at the affected location(s) when directed to do so by the Engineer. Such a directive shall not be the basis of a claim for Extra Work and the Contractor shall not receive additional compensation or Contract time due to the suspension.

7-10.4.2.3 Payment. Payment for shoring shall be included in the Bid item provided therefor. Payment for compliance with the provisions of the safety orders and all other laws, ordinances, and regulations shall be included in the various Bid items.

7-10.4.3 Use of Explosives. Explosives may be used only when authorized in writing by the Engineer, or as otherwise specified in the Special Provisions.
Explosives shall be handled, used, and stored in accordance with all applicable regulations. Prior to blasting, the

Contactor shall comply with the following requirements:

a) The jurisdictional law enforcement agency shall be notified 24 hours in advance of blasting.

b) The jurisdictional fire department shall be notified 24 hours in advance of blasting.

c) Blasting activities and schedule milestones shall be included in the Contractor's construction schedule per 6-1.

For a Private Contract, specific permission shall be obtained from the Agency in writing, prior to any blasting operations in addition to the above requirements.

The Engineer's approval of the use of explosives shall not relieve the Contractor from liability for claims caused by blasting operations.

7-10.4.4 Hazardous Substances. An MSDS as described in CCR, Title 8, Section 5194, shall be maintained at the Work site for all hazardous material used by the Contractor. Material usage shall be accomplished with strict adherence to California Division of Industrial Safety requirements and all manufacturer warnings and application instructions listed on the MSDS and on the product container label. The Contractor shall notify the Engineer if a specified product cannot be used under safe conditions. 7-10.4.5 Confined Spaces. 7-10.4.5.1 Confined Space Entry Program (CSEP). The Contractor shall be responsible for implementing, administering and maintaining a CSEP in accordance with CCR, Title 8, Sections 5156, 5157 and 5158.

Prior to the start of the Work, the Contractor shall prepare and submit a CSEP in accordance with 2-5.3. The CSEP shall address all potential physical and environmental hazards and contain procedures for safe entry into confined spaces such as the following:

a) Training of personnel
b) Purging and cleaning the space of materials and residue
c) Potential isolation and control of energy and material inflow
d) Controlled access to the space
e) Atmospheric testing of the space
f) Ventilation of the space
g) Special hazards consideration
h) Personal protective equipment
i) Rescue plan provisions

The submittal shall include the names of the Contractor's personnel, including each Subcontractor's personnel, assigned to the Work that will have CSEP responsibilities, their CSEP training, and their specific assignment and responsibility in carrying out the CSEP.

7-10.4.5 Confined Spaces.

7-10.4.5.1 Confined Space Entry Program (CSEP). The Contractor shall be responsible for implementing, administering and maintaining a CSEP in accordance with CCR, Title 8, Sections 5156, 5157 and 5158.
Prior to the start of the Work, the Contractor shall prepare and submit a CSEP in accordance with 2-5.3. The CSEP shall address all potential physical and environmental hazards and contain procedures for safe entry into confined spaces such as the following:

a) Training of personnel.
b) Purging and cleaning the space of materials and residue.
c) Potential isolation and control of energy and material inflow.
d) Controlled access to the space.
e) Atmospheric testing of the space.
f) Ventilation of the space.
g) Special hazards consideration.
h) Personal protective equipment.
i) Rescue plan provisions.

The submittal shall include the names of the Contractor's personnel, including each Subcontractor's personnel, assigned to the Work that will have CSEP responsibilities, their CSEP training, and their specific assignment and responsibility in carrying out the CSEP.

7-10.4.5.2 Permit-Required Confined Spaces. Entry into permit-required confined spaces as defined in CCR, Title 8, Section 5157 may be required as a part of the Work. Manholes, tanks, vaults, pipelines, excavations, or other enclosed or partially enclosed spaces shall be considered permit-required confined spaces until the pre-entry procedures demonstrate otherwise. The Contractor shall implement a permit-required CSEP prior to performing any work in a permit-required confined space. A copy of the permit shall be available at all times for review by the Contractor and the Engineer at the Work site.

7-10.4.5.3 Payment. Payment for the CSEP shall be included in the Bid items for which the CSEP is required.

7-10.5 Security and Protective Devices.

7-10.5.1 General. Security and protective devices shall consist of fencing, steel plates, or other devices as specified in the Special Provisions to protect open excavations

7-10.5.2 Security Fencing. The Contractor shall completely fence open excavations. Security fencing shall conform to 304-3.5. Security fencing shall remain in place unless workers are present and construction operations are in progress during which time the Contractor shall provide equivalent security.

7-10.5.3 Steel Plate Covers. The Contractor shall provide steel plate covers as necessary to protect from accidental entry into openings, trenches, and excavations.

7-11 PATENT FEES OR ROYALTIES. The Contractor shall absorb in its Bid, the patent fees or royalties on any patented article or process which may be furnished or used in the Work. The Contractor shall indemnify and hold the Agency harmless from any legal action that may be brought for infringement of patents.

7-12 ADVERTISING. The names of contractors, subcontractors, architects, or engineers, with their addresses and the designation of their particular specialties, may be displayed on removable signs. The size and location of such signs shall be subject to the Engineer's approval.

Commercial advertising matter shall not be attached or painted on the surfaces of buildings, fences, canopies, or barricades.

7-13 LAWS TO BE OBSERVED. The Contractor shall keep fully informed of State and National laws and County and Municipal ordinances and regulations which in any manner affect those employed in the Work or the materials used in the Work or in any way affect the conduct of the Work. It shall at all times observe and comply with all such laws, ordinances and regulations.

7-13.1 Mined Materials. Mined material from California surface mines, used on the Work, shall be from a mine identified in the list published by the California Department of Conservation (referred to as 3098 List), as required by Public Contract Code 20676. This list is available on the Internet at www.conservation.ca.gov/OMR/ab_3098_list/index.htm.

7-14 ANTITRUST CLAIMS. Section 7103.5 of the Public Contract Code provides:
"In entering into a public works contract or a subcontract to supply goods, services, or materials pursuant to a public works contract, the contractor or subcontractor offers and agrees to assign to the awarding body all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Sec. 15) or under the Cartwright Act (Chapter 2 [commencing with Section 16700] of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, services, or materials pursuant to the public works contract or subcontract. This assignment shall be made and become effective at the time the awarding body tenders final payment to the contractor, without further acknowledgement by the parties."

7-15 RECYCLABLE CONSTRUCTION & DEMOLITION WASTES. Ventura County Ordinance Code Section, 4421 et seq, requires that if any recyclable solid wastes or marketable reusable materials will be generated on the site of the Work within the unincorporated areas of Ventura County, the Contractor shall prepare a Construction & Demolition Debris Waste Diversion Plan and submit it to the Ventura County Public Works Agency, Water & Sanitation Department - Integrated Waste Management Division (IWMD). The Contractor shall prepare and file Construction & Demolition Debris Waste Diversion Reporting Forms as required by the IWMD.

For projects within the unincorporated areas of Ventura County, the Contractor shall submit an IWMD Form B-Recycling Plan approved by IWMD prior to issuance of the Notice to Proceed as provided in 6-7.4.

For projects within the unincorporated areas of Ventura County, the Contractor shall submit an IWMD Form C-Reporting Form approved by IWMD prior to the Engineer preparing the final estimate as provided in 9-3.2.

If the site of the Work is within an incorporated city, the Contractor shall comply with all the recycling, solid waste diversion, and hauling requirements of that incorporated city.

7-16 BLANK

7-17 LOSS OR DAMAGE TO THE WORK. The Contractor is responsible for delivering to the Agency Work completed in accordance with the Contract except as provided in 7-18. Should the Work being constructed be damaged by fire or other causes before Acceptance by the Agency, it shall be replaced in accordance with the requirements of the Plans and Specifications without additional expense to the Agency. The Agency does not carry "Course of Construction" insurance on the Work. Contractor should arrange for its own insurance to protect its interests.

7-18 ACTS OF GOD As provided in Section 7105 of the California Public Contract Code, the Contractor shall not be responsible for the cost of repairing or restoring damaged portions of the Work determined to have been proximately caused by an act of God in excess of 5 percent of the contracted amount, provided that the Work damaged was built in accordance with accepted and applicable building standards and the Specifications and Drawings. The Contractor shall obtain insurance to indemnify the Agency for any damage to the Work caused by an act of God if the premium of said insurance coverage is called for as a separate bid item in the bidding schedule for the Work. For purposes of this section, the term "acts of God" shall include only the following occurrences or conditions and effects: earthquakes in excess of a magnitude of 3.5 on the Richter Scale, and tidal waves.

SECTION 8 - FACILITIES FOR AGENCY PERSONNEL

8-1 GENERAL. A field office shall be provided when required by the Plans or Special Provisions. The field office shall be at a suitable location approved by the Engineer.

A field office shall be a weather-tight building of suitable proportions with 16 m^2 (120 sq. ft.) of floor area, at least one door, and a window area of 2 m^2 (22 Sq. Ft.). A field office may be a building or a separate room in a building the Contractor may be required to provide or that it may desire to provide for its own use. In either case, the room shall have a separate exterior door. All doors shall be provided with hasps for padlocks.

The office shall be convenient to the Work. It shall be adequately heated, ventilated, electrically lighted, and provided with telephone service, all at the expense of the Contractor or plant owner. Offices are for the exclusive use of Agency personnel, unless otherwise provided herein.

Field offices at the worksite shall be removed upon completion of the Work.

All costs incurred in furnishing, maintaining, servicing, and removing a field office required at the Work site shall be included in the price bid for such item. If such item is required by the Plans or Specifications and no bid item is provided in the Proposal, the costs shall be absorbed in the other items for which bids are entered. Buildings and equipment furnished by the Contractor at the Work site under the provisions of this section are the property of the Contractor.

The first progress payment will not be approved until all facilities are in place and fully comply with the Specifications.

8-2 EQUIPMENT FOR FIELD OFFICES. Unless otherwise specified, a field office shall be equipped with:

Plan table, 0.75 m x 1.5 m (2 1/2 ft. x 5 ft.) or larger
Plan rack, capacity to hold two sets of project Plans plus all shop drawings
Desk and chair
Two lockers with hasps for padlocks

SECTION 9 - MEASUREMENT AND PAYMENT

9-1 MEASUREMENT OF QUANTITIES FOR UNIT PRICE WORK

9-1.1 General. Unless otherwise specified, quantities of work shall be determined from measurements or dimensions in horizontal planes. However, linear quantities of pipe, piling, fencing, and timber shall be considered as being the true length measured along longitudinal axis.

Unless otherwise provided in Specifications, volumetric quantities shall be the product of the mean area of vertical or horizontal sections and the intervening horizontal or vertical dimension. The planimeter shall be considered an instrument of precision adapted to measurement of all areas.

9-1.2 Methods of Measurement. Materials and items of Work which are to be paid for on the basis of measurement shall be measured in accordance with the methods stipulated in the particular sections involved.

9-1.3 Certified Weights. When payment is to be made on the basis of weight, the weighing shall be done on certified platform scales or, when approved by the Engineer, on a completely automated weighing and recording system. The Contractor shall furnish the Engineer with duplicate licensed weighmaster's certificates showing actual net weights. The Agency will accept the certificate as evidence of weights delivered.

9-1.4 Units of Measurement. Measurements shall be in accordance with 1-4.1 and 1-4.2. A metric ton or “tonne” is equal to 1000 kilograms and the unit of liquid measure is a Liter (in U.S. Standard Measures, a pound is an avoirdupois pound; a ton is 2000 pounds avoirdupois; and the unit of liquid measure is a gallon).

9-2 LUMP SUM BID ITEMS. Items for which quantities are indicated as "Lump Sum", "L.S." or "Job" shall be paid for at the price indicated in the Proposal. Such payment shall be full compensation for the items of Work and all Work appurtenant thereto.

When required by the Specifications or requested by the Engineer, the Contractor shall submit to the Engineer within 15 Days after award of Contract, a detailed schedule in triplicate, to be used only as a basis for determining progress payments on a lump sum contract or any designated lump sum bid item. This schedule should equal in total the lump sum bid and shall be in such form and sufficiently detailed as to satisfy the Engineer that it correctly represents a reasonable apportionment of the lump sum. If Mobilization or Water Pollution Control are included in the detailed schedule, those items will be paid for as provided in 9-3.4.2 and 7-8.6.4, receptively.

9-3 PAYMENT

9-3.1 General. The quantities listed in the Bid schedule will not govern final payment unless identified by Agency on the Proposal as [F]. The symbol "[F]" indicates that the quantities shown on the Proposal form are the final pay quantities. Payment to the Contractor (except those items identified as [F]) will be made only for the actual quantities of Contract items constructed in accordance with the Plans and Specifications. Upon completion of construction, if the actual quantities show either an increase or decrease from the quantities given in the Bid schedule, the Contract Unit Prices will prevail subject to the provisions of 3-2.2.1. Payment for those items identified as [F] will be based on the quantities shown on the Proposal unless changed as provided in 3-2.2.1.

The unit and lump sum prices to be paid shall be full compensation for the items of work and all appurtenant work, including furnishing all materials, labor, equipment, tools and incidentals.

Payment for items shown on the Plans or required by the Specifications, for which no pay item is provided, shall be considered included in the prices named for the other items shown on the Proposal.

Payment will not be made for materials wasted or disposed of in a manner not called for under the Contract. This includes rejected material not unloaded from vehicles, material rejected after it has been placed and material placed outside of the Plan lines. No compensation will be allowed for disposing of rejected or excess material.

Whenever any portion of the Work is performed by the Agency at the Contractor's request, the cost thereof shall be charged against the Contractor, and may be deducted from any amount due or becoming due from the Agency. Whenever immediate action is required to prevent injury, death, or property damage, and precautions which are the Contractor's responsibility have not been taken and are not reasonably expected to be taken, the Agency may, after reasonable attempt to notify the Contractor, cause such precautions to be taken and shall charge the cost thereof against the Contractor, or may deduct such cost from any amount due or becoming due from the Agency. Agency action or inaction under such circumstances shall not be construed as relieving the Contractor or its Surety from liability.

9-3.1 General. (Continued)

Payment shall not relieve the Contractor from its obligations under the Contract; nor shall such payment be construed to be Acceptance of any of the Work. Payment shall not be construed as the transfer of ownership of any equipment or materials to the Agency. Responsibility of ownership shall remain with the Contractor who shall be obligated to store, protect, repair, replace, rebuild, or otherwise restore any fully or partially completed work or structure for which payment has been made; or replace any materials or equipment required to be provided under the Contract which may be damaged, lost, stolen or otherwise degraded in any way prior to completion of the Work under the Contract, except as provided in 6-10.

Warranty periods shall not be affected by any payment but shall commence on the date equipment or material is placed into service at the written direction of the Engineer. In the event such items are not placed into service prior to partial or final completion of the Work, the warranty periods will commence on the date set forth as the date of field completion in the Engineer's acknowledgement of completion.

If, within the time fixed by law, a properly executed notice to stop payment is filed with the Agency, due to the Contractor's failure to pay for labor or materials used in the Work, all money due for such labor or materials will be withheld from payment to the Contractor in accordance with applicable laws.

At the expiration of 35 Days from the date of recording of the Notice of Completion, or as prescribed by law, the amount deducted from the final estimate and retained by the Agency will be paid to the Contractor except such amounts as are required by law to be withheld by properly executed and filed notices to stop payment, or as may be authorized by the Contract to be further retained.

9-3.2 Partial and Final Payment. The Engineer will, after award of Contract, establish a closure date for the purpose of making monthly progress payments. The Contractor may request in writing that such monthly closure date be changed. The Engineer may approve such request when it is compatible with the Agency's payment procedure.

Each month, the Engineer will make an approximate measurement of the Work performed to the closure date and, as a basis for making monthly payments, estimate its value based on the Contract Unit Prices or as provided for in 9-2. When the Work has been satisfactorily completed, the Engineer will determine the quantity of Work performed and prepare the final estimate.

Work not conforming to the Contract Documents shall not be measured for payment.

Conformance with the Contract Documents shall be, in addition to constructing the Work in accordance with the Contract Documents, the Contractor's compliance with those portions of the Contract Documents not directly related to the completed Work, including but not limited to: construction and maintenance of detours; diversion and control of water; protection and repair of existing facilities of the Agency and adjacent owners; site maintenance; coordination with utilities and other contractors on the site; proper survey procedures and records; obtaining required permits and inspections; complying with working hour limitations; providing a Contractor's representative while Work is being performed; complying with environmental requirements; maintaining access and safety for users of facilities that are to remain in service during construction; and obeying all laws affecting the Work.

Payment for Extra Work will be made only on approved Daily Extra Work Reports with supporting documentation as required in 3-3.

From each progress estimate, 5 percent will be deducted and retained by the Agency, and the remainder less the amount of all previous payment will be paid to the Contractor.

No progress payment made to the Contractor or its sureties will constitute a waiver of the liquidated damages under 6-9.

9-3.2 Partial and Final Payment. (Continued)

As provided for in Sections 22300 of the California Public Contract Code, the Contractor may substitute securities for any monies withheld by the Agency to ensure performance under the Contract. In substituting securities, the Contractor may either:

a. Deposit qualifying securities already owned by the Contractor with the Escrow prior to the Contract payment date, or

b. Direct the Agency to send retained funds to the Escrow to be invested by the Escrow in qualifying securities as directed by the Contractor.

9-3.2.1 Release of Withheld Contract Funds. Pursuant to Public Contract Code Section 22300, Contractor has the option to deposit securities with an Escrow Agent as a substitute for retention earnings required to be withheld by Agency pursuant to the construction Contract between the Agency and the Contractor. A form of Escrow Agreement for Security Deposits in Lieu of Retention has been adopted by the Agency as one of the Contract Documents; procedures for implementing the provisions of the Escrow Agreement are contained in Escrow Instructions which shall become effective upon exercise of the option by the Contractor.

The Contractor shall take the following steps if it desires to substitute securities:

a. Execute the Escrow Agreement for Security Deposits in Lieu of Retention.
b. Furnish to the Escrow Agent a power of attorney and other forms necessary to empower the Escrow Agent to convert the securities to cash.
c. Furnish to the Escrow Agent the securities described.
d. Pay the Escrow Agent's fees and costs.

When the Contractor deposits with the Escrow Agent securities in lieu of money required to be withheld from progress payments, a sum of money equivalent to the current cash value of the securities as determined by the Escrow Agent shall be released to the Contractor by, or upon the direction of, the Agency.

If the total of the money plus the current cash conversion value of securities on deposit should fall below the aggregate amount of the sums required to be withheld from progress payments pursuant to 9-3.1 and 9-3.2, an amount equal to the difference shall be withheld from the next regular progress payment in addition to the amount which would ordinarily be withheld pursuant to 9-3.1 and 9-3.2. If the next regular progress payment is less than the total of the amounts to be withheld therefrom, the Contractor shall immediately either deposit with the Agency cash in the amount of the difference or deposit with the Escrow Agent additional securities having a current cash conversion value equal to or greater than the difference.

The Contractor shall be the beneficial owner of any such securities on deposit with the Escrow Agency and shall be entitled to any interest earned thereon prior to conversion. The Agency may direct the Escrow Agency to convert securities with the Escrow Agency into cash, and to deliver the cash to the Agency, in any case where the Contractor is in default, including the following:

a. where the Agency would be entitled to use funds withheld pursuant to 9-3.1 and 9-3.2 to satisfy claims of workers, materials suppliers or subcontractors, or to complete or correct work which the Contractor has failed or refused to complete or correct, or

b. where the Contractor has failed to comply with the requirements of this section respecting the deposit of additional cash or securities to make up for a fall in the value of securities already on deposit with the Escrow Agency.

The Agency may hold and use cash resulting from such a conversion of securities in the same manner as it would be entitled to hold and use funds withheld pursuant to 9-3.1 and 9-3.2.

9-3.2.2 Timely Progress Payments. As required by Public Contract Code Section 20104.50, the Contractor is informed that should a progress payment not be made within 30 Days after receipt of an undisputed and properly submitted payment request from the Contractor, the Agency shall pay interest to the Contractor on the unpaid amount at the rate set forth in the Code of Civil Procedures, Section 685.010(a). Agency shall promptly review payment requests, and if not determined to be proper, document to the Contractor, within 7 Days, the reasons why the request is not proper.

Contractor should refer to the code sections cited for further information.

9-3.3 Delivered Materials. Payment for the cost of materials and equipment delivered to the Work site but not incorporated in the Work will be included in the progress estimate if, prior to the closure date for the monthly progress payment, the material or equipment is listed by the Contractor on the Agency's form together with date of delivery, vendor's or Subcontractor's name and cost; is accompanied by a copy of an invoice showing the cost thereof; has an aggregate cost in excess of $5,000 for each progress payment; is currently on the Work site at an approved location and in good condition; and is one of the following:

1. Precast concrete units weighing more than 100 kilograms (200 pounds) each.
2. Structural steel members weighing more than 100 kilograms (200 pounds) each.
3. Individual pieces of electrical equipment costing over $1,000 each.
4. Individual pieces of mechanical equipment costing over $1,000 each.
5. Reinforced concrete pipe of any size.
6. Storm drainage pipe 900 mm (36") in diameter and larger.
7. Water and sewer pipe 300 mm (12") in diameter and larger.
8. Finish hardware for doors.
9. Other individual items of equipment costing over $1,000 each
10. Materials where the aggregate value of a single type of material exceeds $1,000 and is either:
    a) Fabricated or cut to fit the Work before delivery, or
    b) Of a size or type not available from any manufacturer without a special production run.

On unit price Bid items, the amount paid for materials or equipment delivered but not incorporated in the Work shall not exceed 75% of the amount of the Bid item which includes such material or equipment.

On lump sum Bid items, the amount paid for materials and equipment delivered and not incorporated in the Work shall not exceed 75% of the item in the approved schedule submitted in accordance with 9-2 of which such materials or equipment is a part.

Should materials or equipment previously paid for be damaged, destroyed, stolen or removed from the Work site, the payment previously made therefor will be deducted from the next progress payment, unless such materials or equipment are replaced prior thereto.

On the closure date for progress payments, as provided in 9-3.2, the Contractor shall certify that all materials and equipment not incorporated into the Work, for which payment has previously been made or is being requested, is still at the Work site and in good condition. Failure to provide such certification will be cause for deducting previous payments for materials not incorporated in the Work from the amount due the Contractor in the progress payment.

Payment for materials or equipment, as provided herein, shall not constitute approval or acceptance thereof nor shall such payment modify or abridge any of the rights the Agency has under the Specifications or at law nor relieve the Surety of any of its obligations under the bonds.

9-3.4 Mobilization

9-3.4.1 Scope. Mobilization includes preliminary services, work and operations, including but not limited to, furnishing required bonds, obtaining necessary permits and work areas, providing a specified field office, the movement of labor, supplies, equipment and incidentals to the Work site, and for all other work, services and operations which must be performed or for which costs are incurred prior to performing work of the other Contract items.

9-3.4.2 Payment. The Contract lump sum price bid for mobilization shall include full compensation for furnishing all labor, materials, tools, equipment, services and incidentals and for doing all work involved in mobilization as specified herein. Payment for mobilization will be made as the Work proceeds on the following basis except that where a field office is required by the Specifications, no payment for mobilization will be made until the specified field office has been provided:

Partial payment estimate (excluding mobilization & water pollution control payments) as a percentage of the original Contract price (excluding the mobilization & water pollution control Bid items).		Cumulative amount of mobilization pay item earned is the lesser of the amounts as computed by these two columns.	
Equal to or greater than	Less than	Percentage of mobilization pay item	Percentage of the original Contract total.
5	10	50	5
10	20	75	7.5
20	50	95	9.5
50	Completion of Work	100	10
Completion of Work		100	

Where no Bid item is provided for mobilization, payment for mobilization shall be considered to be included in the other Bid items.

9-4 TERMINATION OF AGENCY LIABILITY. After completion of all work required by the contract, Agency will furnish Contractor a Release on Contract form stating the amount of total authorized payments for the project. Contractor shall execute and return said form within 21 days of receipt. Said form shall release and discharge the Agency from all claims of and liability to the Contractor for all manner of debts, demands, accounts, claims, and causes of action under or by virtue of said Contract except:

a. The claim against the Agency for the remainder, if any, of the amounts retained as provided in 9-3.2, and any amounts retained as required by Stop Notices or Labor Code provisions.

b. Any unsettled claims or disputes listed on the Release on Contract form which has been processed in compliance with the requirements for making claims under the Contract, including given timely notice pursuant to the applicable provisions of the Contract and following the procedure set forth in 6-12.

Acceptance of the Release on Contract by the Agency shall not be deemed a waiver or release of the Agency's right to contest either the substantive or procedural validity of any listed unsettled claims or disputes.

When executing the Release on Contract, the Contractor shall certify that each unsettled claim or dispute listed thereon has been processed in compliance with the requirements for making claims under the Contract, including giving timely notice pursuant to the applicable provisions of the Contract and following the procedures for resolution of disputes or claims set forth in 6-12 and that acceptance of the Release on Contract by the Agency shall not be deemed a waiver or release of the Agency's right to contest either the substantive or procedural validity of any listed unsettled claims or disputes.

If Contractor fails to execute and submit a Release on Contract within the 21-day time period set forth above, the Release on Contract shall be deemed to have been submitted with no unsettled claims or disputes listed on the Release on Contract. A payment of $1.00 will be made to the Contractor for such Release on Contract and waiver.

SECTION 10 - DIVERSION, CONTROL AND REMOVAL OF WATER

10-1 DESCRIPTION. This section covers the diversion, control and removal of all water entering into the construction area or otherwise affecting construction activities.

10-2 REQUIREMENTS. All permanent construction shall be performed in a site free from water unless otherwise provided for in the Special Provisions. The Contractor shall construct, maintain, and operate all necessary cofferdams, pumps, channels, flumes, drains, well points and/or other temporary diversion, protective, and water removal works required for diversion, control and removal of all water, whether surface or groundwater, whatever its source, during construction.

Inundation of partially completed Work due to lack of control during non-working periods will not be permitted, and may be cause for requiring removal and replacement of Work already completed.

The Contractor shall be responsible for obtaining the use of any property in addition to that provided for in the Plans and Specifications, which may be required for the diversion, protective, and water removal works so as not to create a hazard to persons or property or to interfere with the water rights of others.

It shall be understood and agreed that the Contractor shall hold the Agency and the Engineer harmless from legal action taken by any third party with respect to construction and operations of the diversion and protective works.

10-3 DIVERSION AND CONTROL WORKS.

Prior to beginning of work involving diversion, control and removal of water, the Contractor shall submit a water control plan to the Engineer. In the event circumstances during the course of construction require changes to the original water control plan, a revised water control plan shall be promptly submitted to the Engineer in each instance. No responsibility shall accrue to the Engineer or the Agency as a result of the plan or as a result of knowledge of the plan.

Construction and operation of the diversion, control and removal works shall be in accordance with the water control plan submitted, except deviations therefrom may be specifically approved by the Engineer.

All works installed by the Contractor in connection with dewatering, control, and diversion of water but not specified to become a permanent part of the Work, shall be removed and the site restored, insofar as practical, to its original condition prior to completion of construction or when directed by the Engineer.

10-4 PAYMENT. No separate Bid item is included. Payment for this item of Work will be considered to be included in the payments made for other items of Contract Work to which water control is incidental.

PART 2 CONSTRUCTION MATERIALS

SECTION 200 - ROCK MATERIALS

200-1 ROCK PRODUCTS

200-1.6 Stone for Riprap

200-1.6.1A Alternate Stone for Riprap. As an alternate to the requirements of Subsection 200-1.6, the sample may be subject to the following tests:

TESTS	TEST METHOD NO.	REQUIREMENTS
Apparent Specific Gravity	ASTM C 127	2.40 Min.
Resistance to Abrasion	ASTM C 535, Grading 1	35% Max.
Soundness	Section 211-8	10% Max.
Wet and Dry Loss	Section 211-9	5% Max.
Solubility	Section 211-10	No Loss

All rock shall be angular or subangular in shape. Angular shall be defined as having sharp corners and straight planes on all faces, with no evidence of wear caused by wind, water or abrasion. Subangular shall be defined the same as angular except that evidence of wear by wind, water or abrasion may be allowed. Determination of angularity will be made by the Engineer.

200-1.6.2 Riprap Size

The individual classes of rock used for riprap shall conform to the following:

Rock Sizes	RIPRAP CLASSES					
	1-Tonne (1-Ton)	½-Tonne (½-Ton)	¼-Tonne (¼-Ton)	Light	Facing	Cobble
	PERCENTAGE LARGER THAN					
2-Tonne (2-Ton)	0-5					
1-Tonne (1-Ton)	50-100	0-5				
½-Tonne (½-Ton)		50-100	0-5			
¼-Tonne (¼-Ton)	90-100		50-100	0-5		
100-kg (200-lb)		90-100		50-100	0-5	
35-kg (75-lb)			90-100	90-100	50-100	0-5
10-kg (25-lb)					90-100	95-100
0.5-kg (1-lb)	100	100	100	100	100	100

The amount of material smaller than the smallest size listed in the table for any class of riprap shall not exceed the percentage limit listed in the table determined on a weight basis.

Compliance with the percentage limit shown in the table for all other sizes of the individual pieces of any class of riprap shall be determined by the ratio of the number of individual pieces larger than the specified size compared to the total number of individual pieces larger than the smallest size listed in the table for that class.

Flat or needle shapes will not be accepted unless the thickness of individual pieces is greater than 1/3 the length.

Before placing in final location, depositing, or stockpiling within the project limits, each individual load of riprap must meet the size requirements of the class specified.

SECTION 206 - MISCELLANEOUS METAL ITEMS

206-3 GRAY IRON AND DUCTILE IRON CASTINGS

206-3.3.2A Manhole Frame and Cover Sets

Unless otherwise specified, manhole frames and covers shall be in accordance with the following Standard Plans contained in the SPPWC:

Clear Opening Diameter mm (Inches)	SPPWC Plan No.	Catalog Numbers	
		Alhambra Foundry	Long Beach Iron Works
600 (24)	630-1	A-1495	X-162
675 (27)	631-1	A-1496	X-164
750 (30)	632-1	A-1497	X-163
900 (36)	633-1	A-1498	X-106A

206-5 METAL RAILINGS.

206-5.2 Flexible Metal Guard Rail Materials.

206-5.2A Flexible Metal Guard Rail Materials; Modification. The "Construction" grade Douglas Fir for "posts, including blocks" does not have to be "free of heart center".

SECTION 210 - PAINT AND PROTECTIVE COATINGS

210-6 STORM DRAIN HARDWARE. All storm drain hardware, including manhole frames and covers, grates, protection bars, steps, etc., shall be protected from corrosion.

Storm drain hardware made of cast iron shall be protected by painting with, or dipping in, a commercial grade asphalt paint. Storm drain hardware made of steel shall be galvanized.

211-6 SIEVE ANALYSIS. Sieve analysis shall be performed in accordance with ASTM C136.

211-7 Sand Equivalent Test. This test is intended to serve as a field test to indicate the presence or absence of plastic fine material. The test shall be run in accordance with Calif. test 217 or ASTM D2419. When testing material containing asphalt, this test method shall be modified by drying the sample at a temperature not exceeding 38°C (100°F).

211-8 R-VALUE. Resistance (R-value) shall be determined by California Test 301.

211-9 SPECIFIC GRAVITY AND ABSORPTION. Apparent specific gravity, bulk specific gravity and absorption shall be determined by California Test 206, 207, 208, 209, 224, 225, or 308, Method C where zinc stearate may be substituted for paraffin.

211-10 LOS ANGELES RATTLER TEST. Loss in Los Angeles Rattler shall be determined by California Test 211.

211-11 SOUNDNESS. For riprap, the soundness shall be determined in accordance with Calif. Test 214, excluding sections D, E, G.2.b, and H, and adding the following:

a. The test sample shall be prepared by breaking or sawing a representative sampling of riprap into particles passing the 75 mm (three inch) and retained on the 50 mm (two inch) sieve. If there are a variety of rock types or degrees of weathering within a rock type, each unique type or condition must meet the loss requirement.

b. The test sample size shall be 25,000 grams (55 lbs.) ± 1 percent.

c. All particles of test sample which break into three or more pieces during testing shall be discarded. The remaining sample shall be washed on a 4.75 mm (#4) sieve and all particles retained shall be oven dried.

d. The loss in weight shall be determined by subtracting from the original weight of the test sample the final weight of all particles retained on the 4.75 mm (#4) sieve. Divide the loss in weight by the original weight and multiply by 100 to determine the percent loss.

e. Report the following:

(1) The percent loss.

(2) The number of pieces affected, classified as to number disintegrating, splitting, crumbling, cracking, flaking, etc.

211-12 WET AND DRY LOSS. Wet and dry loss shall be determined as follows:

A sample of rock shall be crushed, screened, oven dried, and 1,000 g (2.2 lbs.) to 1,500 g (3.3 lbs.) of the 19 mm (3/4 inch) to 9.5 mm (3/8 inch) fraction shall be taken for the test.

The crushed and graded sample shall be submerged in tap water for 8 hours at room temperature, after which the sample shall be drained and oven dried at 78°C (140°F). When dry, the sample shall be cooled to room temperature. This completes one cycle.

After 10 cycles, the percent loss shall be computed as follows:

$$\% \text{ Loss} = \frac{100 \times \text{Weight of Material Passing 4.75 mm (No. 4) Sieve}}{\text{Total Weight of Sample}}$$

211-13 SOLUBILITY. Approximately 0.5 kg (one pound), air dried samples shall be immersed in local tap water and in Pacific Ocean water (or a 3.5% sodium chloride solution) for 8 hours each at 78°C (140°F). After immersion, the samples shall be washed with tap water, air dried and reweighed.

211-14 Permeability Test. Permeability tests for granular soils shall be performed in accordance with ASTM D2434, using samples compacted to the specified field density.

PART 3 CONSTRUCTION METHODS

SECTION 301 - TREATED SOILS, SUBGRADE PREPARATION AND PLACEMENT OF BASE MATERIALS

301-1 SUBGRADE PREPARATION

301-1.3 Relative Compaction

301-1.3.1 Firm, Hard and Unyielding. The term "firm, hard and unyielding" as used in 301-1.3 shall mean that when the heaviest construction and hauling equipment used on the Work drives over the subgrade, no permanent deformation shall occur either before or during pavement construction.

301-1.4 Subgrade Tolerances. Subgrade for pavement, sidewalk, curb and gutter, driveways, or other roadway structures shall not vary more than 15 mm (0.05 feet) from the specified grade and cross section. Subgrade for subbase or base material shall not vary more than 15 mm (0.05 feet) from the specified grade and cross section.

Variations within the above specified tolerances shall be compensating so that the average grade and cross section specified are met.

301-2 UNTREATED BASE

301-2.3 Compacting

301-2.3.1 Tolerances. The tolerance requirement in 301-2.3 is modified from 6 mm (0.02 foot) to 15 mm (0.05 foot).

SECTION 302 - ROADWAYSURFACING

302-5 ASPHALT CONCRETE PAVEMENT

302-5.1 General

302-5.1.1 Asphalt Concrete Berms. Asphalt concrete berms shall be constructed of Class III- D-PG70-10 asphalt concrete by mechanical means to conform to the details and location as shown on the Plans.

A tack coat, as provided in 302-5.4, shall be applied to the existing or new pavement preceding the placement of the asphalt concrete berms.

302-5.4 Tack Coat

302-5.4.1 Fog Seal. When specified, a fog seal consisting of material meeting the requirements of 203-3 shall be applied to the surfaces of all completed asphalt concrete at the rate of 0.36 liter per square meter (0.08 gallon per square yard) of the combined emulsion or such lesser rate ordered by the Engineer. Surface to be sealed shall be free from dust, dirt, and other foreign material. Surface shall be sealed within 7 Days after paving.

302-5.9 Measurement and Payment

302-5.9.1 Measurement and Payment for Asphalt Berm. Asphalt concrete berms will be paid for at the Contract Unit Price per linear meter (feet) of berm in place. No separate measurement or payment will be made for asphalt, aggregate, or tack coat.

302-5.9.2 Measurement and Payment for Fog Seal, Tack Coat, and Prime Coat. Measurement and payment for the specified material shall be by the tonne (ton) in place. Emulsions shall be measured after the specified dilution has been made.

SECTION 303 - CONCRETE AND MASONRY CONSTRUCTION

303-5 CONCRETE CURBS, WALKS, GUTTERS, CROSS GUTTERS, ALLEY INTERSECTIONS, ACCESS RAMPS AND DRIVEWAYS

303-5.1 Requirements

303-5.1.4 Concrete Substitution. Class 280-C-14 (470-C-2000) may be used in lieu of Class 310-C-17 (520-C-2500) and Class 280-D-14 (470-D-2000) in lieu of Class 310-D-17 (520-D-2500) as specified in 201-1.1.2 for street surface improvements, excluding concrete pavement, when no class is specified on the Plans or in the Special Provisions.

SECTION 306 - UNDERGROUND CONDUIT CONSTRUCTION 306-1 OPEN TRENCH OPERATIONS

306-1.2 Installation of Pipe

306-1.2.1 Bedding

306-1.2.1.1 Bedding Material. When native material is allowed for backfill in the bedding zone, no rocks larger than 40 mm (1½") in maximum dimensions shall be included. Material containing ashes, cinders, and types of refuse or other deleterious material shall not be used as bedding.

306-1.2.1.2 Sewer Pipe Bedding. Bedding for sewer pipe from 100 mm (4") below the pipe to the spring line (horizontal diameter) of the pipe shall be free draining, granular material with a maximum size of 15 mm (1/2 inch), unless another bedding method is shown on the Plans.

Densification of the bedding material may be by the application of water or by mechanical means. Unless otherwise specified, all bedding material shall be densified to a relative density of 90%. Acceptability of densification in the bedding zone will be determined by visual inspection and probing to determine that no voids exist in the backfill material. In this paragraph, the word "voids" does not include intergranular voids in the soil structure.

306-1.2.1.3 Flexible Pipe Bedding. Bedding for flexible drainage and sewer pipe shall be granular material having a sand equivalent of at least 50. The bedding material shall be placed and compacted from 150 mm (six inches) below the pipe to the top of the bedding as defined in 306-1.2.1. A 1 m (three foot) long section of low permeability material (50% passing 75 μm (200) sieve) shall be installed and mechanically compacted in lieu of the above specified bedding material at intervals of 60 m (200 feet) or as otherwise indicated on the Plans.

306-9 DISINFECTION. All water mains and appurtenances shall be disinfected before being placed in service in accordance with AWWA C651 except as specified herein:

a. The water mains shall be chlorinated so that a chlorine residual of not less than 20 ppm remains in the water after standing in the pipe for 24 hours.

b. The Agency will perform sampling and testing of bacteriologic samples. Disinfection shall be repeated until two or more consecutive samples are negative for coliform organisms.

The pressure in the line being chlorinated shall be maintained at least 35 kPa (5 psi) lower than that existing in any Agency line to which it is connected.

306-10 WATERWORKS APPURTENANCES

306-10.1 Valves. Valves shall be located as shown on the drawings.

Each valve shall be operated prior to its installation to assure proper functioning. Valves shall be installed plumb and in alignment with the water main. Valves shall be anchored by metal ties to a concrete base. Line valves may be moved to the closest joint upon approval of the Engineer.

306-10.2 Valve Boxes. Each underground valve shall be provided with a valve box. The valve boxes shall be installed plumb and centered over the operating nut of the valve. Valve boxes shall be installed with concrete collars.

Where valve boxes are to be placed in asphaltic type pavement, they shall not be set to grade until after paving has been completed.

Where valve boxes are to be placed in concrete pavement, they shall be set to grade prior to paving operations.

306-10.3 Thrust Devices. A reaction or thrust device shall be provided on all dead ends, tees, elbows, and bends with more than 5 degrees deflection on pressure pipelines.

Thrust devices shall be cast-in-place concrete, poured against undisturbed or compacted earth. Thrust devices shall be sized and constructed in accordance with the Plans.

Thrust devices and anchor blocks shall be constructed of Class 280-C-14 (420-C-2000) concrete. Thrust devices and anchor blocks shall be cured at least 7 Days where Type IP or II cement is used or at least 48 hours where Type III cement is used.

Metal tie-rods or clamps shall be of adequate strength to prevent movement of pipe. All metal shall be coated in accordance with AWWA C110.

306-10.4 Fire Hydrants. Fire Hydrants shall be installed as shown on the Plans.

All hydrants shall stand plumb and shall have their nozzles parallel with or at right angles to the curb, with the pumper nozzle facing the curb, except that hydrants having only two hose nozzles 90 degrees apart shall be set with each nozzle facing the curb at an angle of 45 degrees.

In uncurbed public road rights of way, fire hydrants shall be located as far as possible from the traveled way while providing a 1 m (3-foot) wide clear space between the fire hydrant and the right of way line. In curbed public road rights of way, fire hydrants shall be installed so that there is 300 mm (12 inches) clear between the face of curb and the fire hydrant.

306-10.5 Fire Hydrant Barricades. Fire hydrant barricades shall consist of 100 mm (4-inch) standard steel pipe, schedule 40, filled with concrete, and having a total length of 2 m (72 inches). They shall be embedded in concrete blocks 300 mm (12 inches) in diameter and 1000 mm (40 inches) deep below ground surface with the barricade pipe embedded to 100 mm (4 inches) above the bottom of the concrete so 1 m (36 inches) extends above ground surface. The steel pipe above ground shall be painted chrome yellow in accordance with AWWA C503.

Barricades shall be installed between the fire hydrant and vehicle traffic paths at locations indicated on the Plans or where required by the water purveyor or Fire Department. Barricades shall not be installed within public road rights of way.

Fire hydrant barricades shall not obstruct the hydrant outlets.

310-5 Painting Various Surfaces

310-5.6 Painting Traffic Striping, Pavement Markings, and Curb Markings.

310-5.6.8A Application of Paint - Two Coats All painted traffic striping and markings shall be applied in two coats. The price named in any Bid item for painting traffic striping and markings shall include all costs for both applications, including any delays entailed for the required drying time between applications. If bleeding, curling or discoloration occurs following application of the second coat, unsatisfactory areas shall be given an additional coat, or coats, of paint. No additional payment will be made for work necessary to correct bleeding, curling or discoloration.

PART 4

SECTION 400 - ALTERNATE ROCK PRODUCTS, ASPHALT CONCRETE, PORTLAND CEMENT CONCRETE AND UNTREATED BASE MATERIAL

400-1 Rock Products

400-1.1 Requirements

400-1.1.1 General

Alternate rock material, Type S, as specified in Section 400 may be used on the Work.

400-3 Portland Cement Concrete

Suppliers of portland cement concrete shall file mix designs as required by 400-1.1.2

400-4 Asphalt Concrete

Suppliers of asphaltic cement concrete shall file mix designs as required by 400-1.1.2

ACORD®

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER	CONTACT NAME:	
	PHONE (A/C, No, Ext): / FAX (A/C, No):	
	E-MAIL ADDRESS:	
	INSURER(S) AFFORDING COVERAGE	NAIC #
INSURED	INSURER A :	
	INSURER B :	
	INSURER C :	
	INSURER D :	
	INSURER E :	
	INSURER F :	

COVERAGES **CERTIFICATE NUMBER:** **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSR	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
	GENERAL LIABILITY						EACH OCCURRENCE	$ See VCSS 7-4.2
	X COMMERCIAL GENERAL LIABILITY						DAMAGE TO RENTED PREMISES (Ea occurrence)	$
	CLAIMS-MADE X OCCUR						MED EXP (Any one person)	$
							PERSONAL & ADV INJURY	$
							GENERAL AGGREGATE	$ See VCSS 7-4.2
	GEN'L AGGREGATE LIMIT APPLIES PER:						PRODUCTS - COMP/OP AGG	$
	X POLICY PRO-JECT LOC							$
	AUTOMOBILE LIABILITY						COMBINED SINGLE LIMIT (Ea accident)	$ 1,000,000
	X ANY AUTO						BODILY INJURY (Per person)	$
	ALL OWNED AUTOS / SCHEDULED AUTOS						BODILY INJURY (Per accident)	$ 1,000,000
	HIRED AUTOS / NON-OWNED AUTOS						PROPERTY DAMAGE (Per accident)	$ 1,000,000
								$
	UMBRELLA LIAB X OCCUR						EACH OCCURRENCE	$
	EXCESS LIAB CLAIMS-MADE						AGGREGATE	$
	DED RETENTION $							$
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY Y / N						WC STATU-TORY LIMITS / OTH-ER	
	ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICE/MEMBER EXCLUDED? N / A (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below						E.L. EACH ACCIDENT	$
							E.L. DISEASE - EA EMPLOYEE	$
							E.L. DISEASE - POLICY LIMIT	$

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)

(Agency) - (Project Name) (Project Specification number)

The Agency and the County of Ventura, including its boards, all special Districts governed by the Board of Supervisors, agencies, departments, officers, consultants, employees, agents and volunteers, is named as Additional Insured as respects work done by Contractor under the terms of the contract on General Liability and Auto Liability Policies. Waiver of Subrogation is applicable to the Agency and the County of Ventura, its boards, districts, agencies, departments, officers, employees, agents and volunteers for Work Comp and General Liability. Endorsements required for referenced contract will be issued by the Insurance Company.

CERTIFICATE HOLDER	CANCELLATION
County of Ventura Public Works Agency L-1670 800 S. Victoria Avenue Ventura, CA 93009-1670	**SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.** AUTHORIZED REPRESENTATIVE

ACORD 25 (2010/05) **The ACORD name and logo are registered marks of ACORD**

Project: Contractor: Specification No:

WORKING DAYS OF CONSTRUCTION CONTRACT TIME

Item No.	Work or Material	BEGINNING OF CONTRACT TIME																					

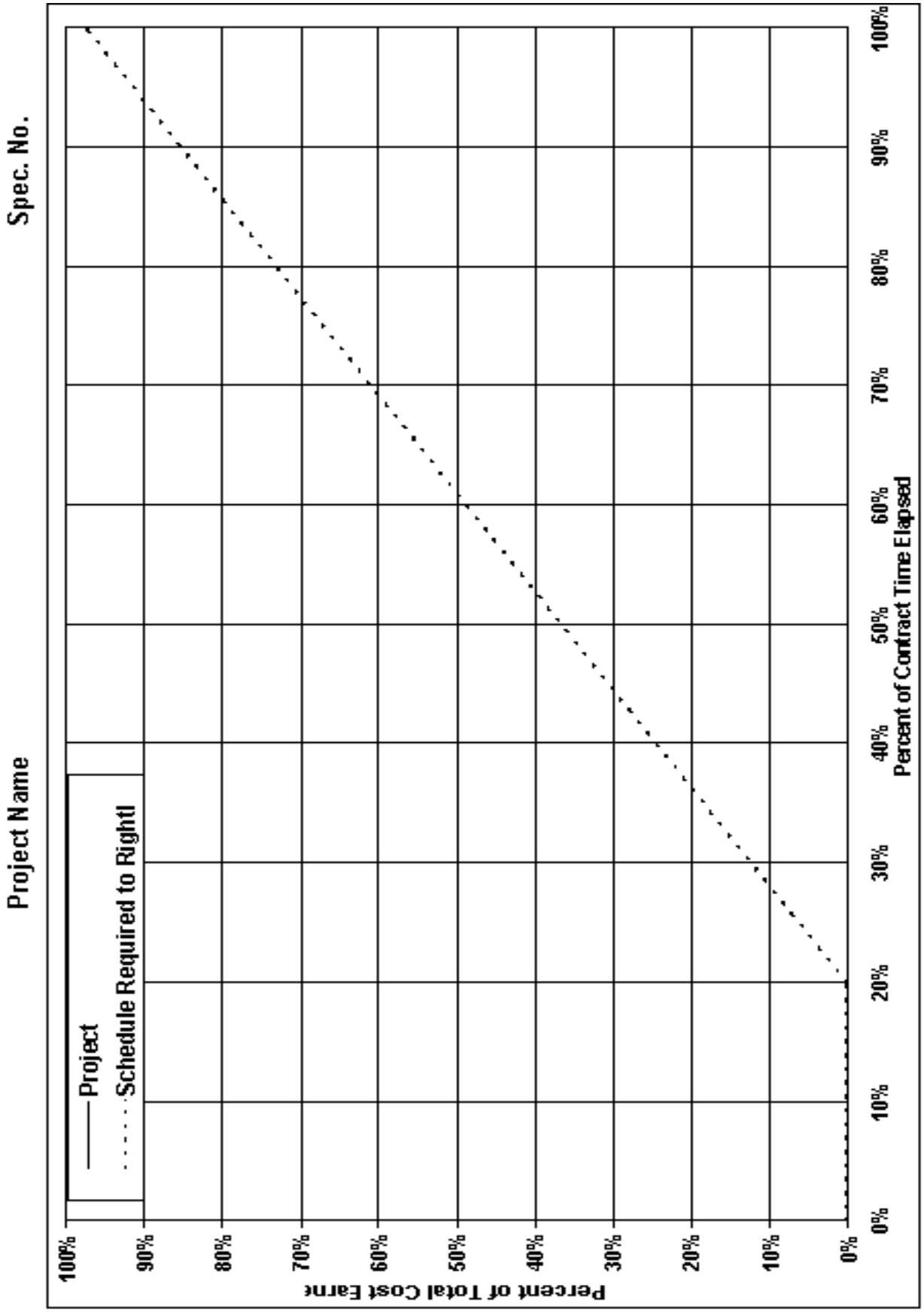
EACH HORIZONITAL INTERVAL EQUALS ____ WORKING DAYS OF CONTRACT TIME

Submitted _____ Contractor

By _____ Date

Title _____

Exhibit 1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Spec. No.
Project
Schedule Required to Right!
Percent of Total Cost Earne
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90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Percent of Contract Time Elapsed

Exhibit 1

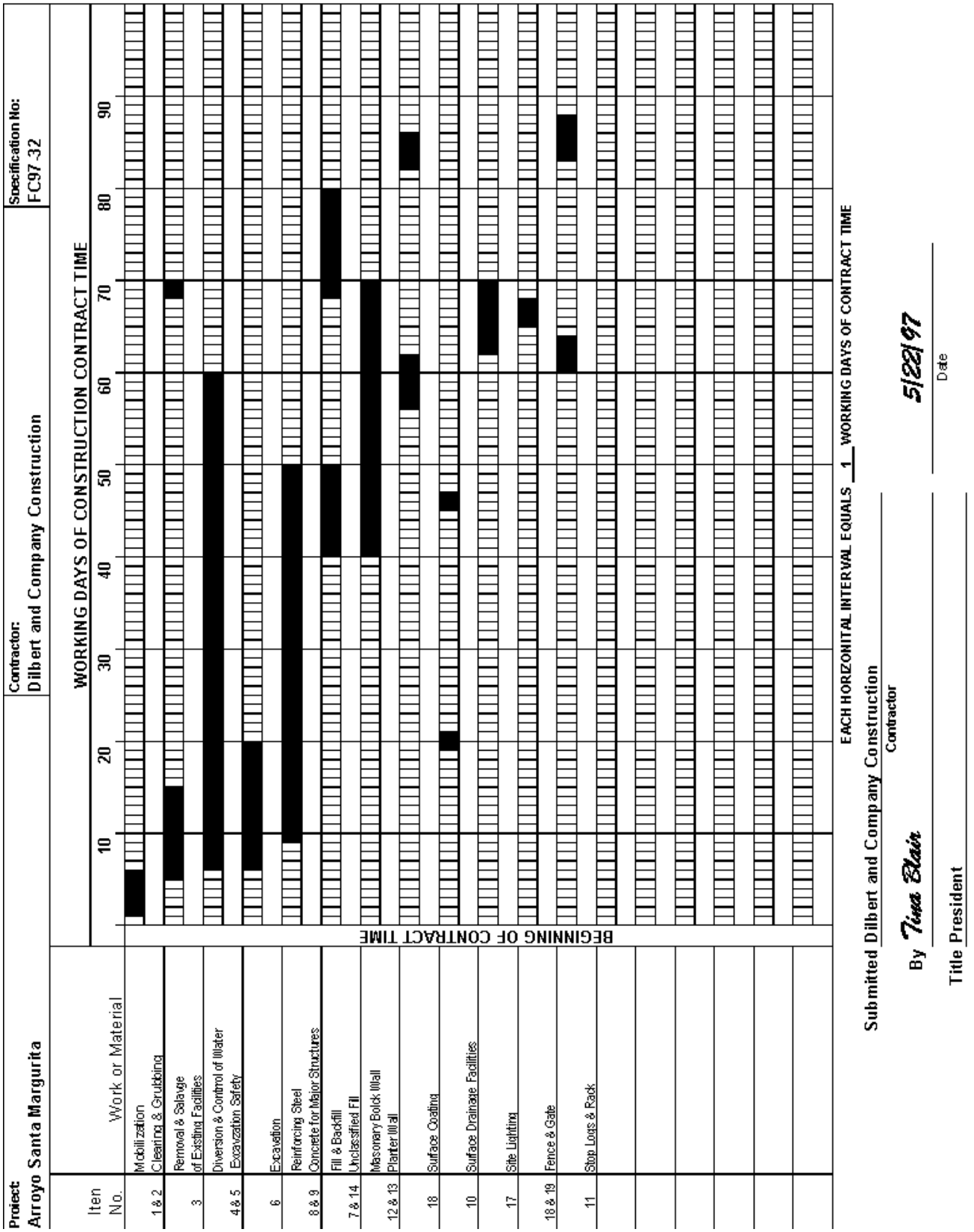
Project:
Arroyo Santa Margurita
Contractor:
Dilbert and Company Construction
Specification No:
FC97-32
Item No.
Work or Material
Mobilization
Clearing & Grubbing
Removal & Salvage of Existing Facilities
Diversion & Control of Water
Excavation Safety
Excavation
Reinforcing Steel
Concrete for Major Structures
Fill & Backfill
Unclassified Fill
Masonary Block Wall
Planter Wall
Surface Coating
Surface Drainage Facilities
Site Lighting
Fence & Gate
Stop Logs & Rack
1 & 2
3
4 & 5
6
8 & 9
7 & 14
12 & 13
18
10
17
18 & 19
11
BEGINNING OF CONTRACT TIME
WORKING DAYS OF CONSTRUCTION CONTRACT TIME
10
20
30
40
50
60
70
80
90
EACH HORIZONITAL INTERVAL EQUALS 1 WORKING DAYS OF CONTRACT TIME
Submitted Dilbert and Company Construction
Contractor
By Tina Blair
Title President
5/22/97
Date

Exhibit 1

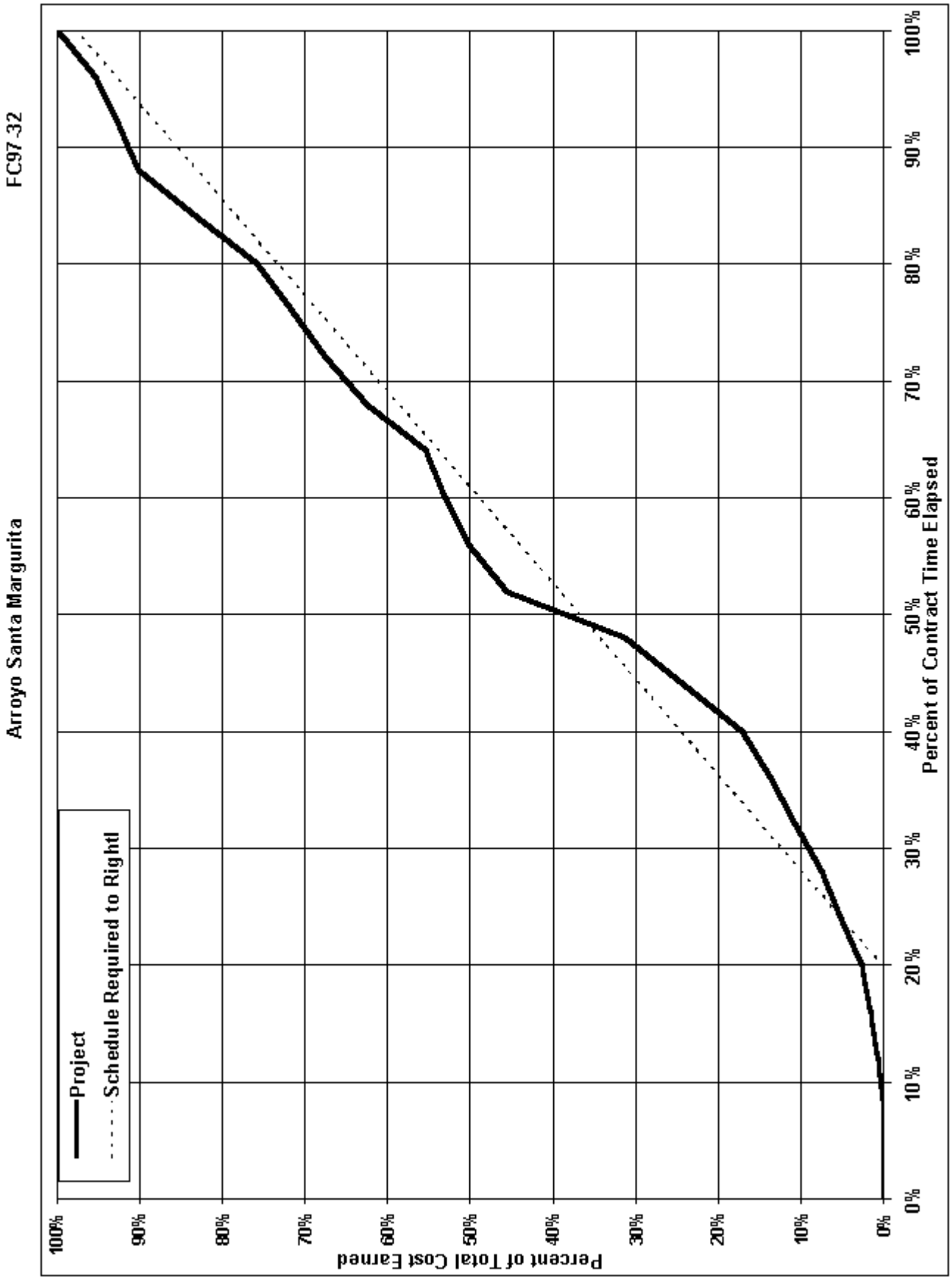
Arroyo Santa Margurita
FC97-32
Project
Schedule Required to Right!
Percent of Total Cost Earned
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
0 %
10 %
20 %
30 %
40 %
50 %
60 %
70 %
80 %
90 %
100 %
Percent of Contract Time Elapsed

Exhibit 1

ESCROW AGREEMENT FOR
SECURITY DEPOSITS IN LIEU OF RETENTION

This Escrow Agreement is made and entered into by and between
("Agency") whose address is _____ and
("Contractor") whose address is _____ and
("Escrow Agent") whose address is _____.

For the consideration hereinafter set forth, the Agency, Contractor and Escrow Agent agree as follows:

(1) Pursuant to Section 22300 of the Public Contract Code of the State of California, Contractor has the option to deposit securities with Escrow Agent as a substitute for retention earnings required to be withheld by Agency pursuant to the Construction Contract entered into between the Agency and Contractor for _____ in the amount of dated _____, (hereinafter referred to as the "Contract") which Contract is identified by Spec. No._____ and Auditor Controller's Contract No._____. Alternatively , on written request of the Contractor, the Agency shall make payments of the retention earnings directly to the Escrow Agent. When Contractor deposits the securities as a substitute for Contract earnings, the Escrow Agent shall notify the Agency within ten days of the deposit. The market value of the securities at the time of the substitution shall be at least equal to the cash amount then required to be withheld as retention under the terms of the Contract between the Agency and Contractor. Securities shall be held in the name of _____ , and shall designate the Contractor as the beneficial owner.

(2) The Agency shall make progress payments to the Contractor for those funds which otherwise would be withheld from progress payments pursuant to the Contract provisions, provided that the Escrow Agent holds securities in the form and amount specified above.

(3) When the Agency makes payments of retentions earned directly to Escrow Agent, the Escrow Agent shall hold them for the benefit of the Contractor until such time as the escrow created under this contract is terminated. The Contractor may direct the investment of the payments into securities. All terms and conditions of this agreement and the rights and responsibilities of the parties shall be equally applicable and binding when the Agency pays the Escrow Agent directly.

(4) Contractor shall be responsible for paying all fees for the expenses incurred by Escrow Agent in administering the escrow account. These expenses and payment terms shall be determined by the Agency, Contractor and Escrow Agent.

(5) The interest earned on the securities or the money market accounts held in escrow and all interest earned on that interest shall be for the sole account of Contractor and shall be subject to withdrawal by Contractor at any time and from time to time without notice to the Agency.

(6) Contractor shall have the right to withdraw all or any part of the principal in the Escrow Account only by written notice to Escrow Agent accompanied by written authorization from Agency to the Escrow Agent that Agency consents to the withdrawal of the amount sought to be withdrawn by Contractor.

(7) The Agency shall have a right to draw upon the securities in the event of default by the Contractor. Upon seven days' written notice to the Escrow Agent from the Agency of the default, the Escrow Agent shall immediately convert the securities to cash and shall distribute the cash as instructed by the Agency.

(8) Upon receipt of written notification from the Agency certifying that the Contract is final and complete, and that the Contractor has complied with all requirements and procedures applicable to the Contract, the Escrow Agent shall release to the Contractor all securities and interest on deposit less escrow fees and charges of the Escrow Account. The escrow shall be closed immediately upon disbursement of all moneys and securities on deposit and payments of fees and charges.

(9) Escrow Agent shall rely on the written notifications from the Agency and the Contractor pursuant to Sections (1) to (8), inclusive, of this Agreement and the Agency and Contractor shall hold Escrow Agent harmless from Escrow Agent's release and disbursement of the securities and interest as set forth above.

(10) The names of the persons who are authorized to give written notice or to receive written notice on behalf of the Agency and on behalf of Contractor in connection with the foregoing, and exemplars of their respective signatures are as follows:

On behalf of Agency:

_____, Director,
Public Works Agency

_____, Director
Central Services Department

_____, Director
Engineering Services Department

Address for all of the above:
Public Works Agency
800 South Victoria Avenue
Ventura, CA 93009

SAMPLE FORM

Form used for escrow will have names and signatures of persons authorized in accordance with paragraph 10.

On behalf of Contractor:

Title

Name

Signature

Street Address

City & State Zip Code

On behalf of Escrow Agent:

Title

Name

Signature

Street Address

City & State Zip Code

At the time the Escrow Account is opened, the Agency and Contractor shall deliver to the Escrow Agent a fully executed counterpart of this Agreement.

IN WITNESS WHEREOF, the parties have executed this Agreement by their proper officers on the date first set forth above.

Agency:
(Agency name)

Title

Name

Signature

Contractor:
(Contractor company name)

Title

Name

Signature

EXHIBIT "A"
ESCROW INSTRUCTIONS

The parties to this escrow are _____("Agency") and _____ ("Contractor") and _____("Escrow Agent"). Agency and Contractor have entered into a contract for the construction of _____which contract is identified by Spec. No. _____ and Auditor-Controller's Contract No. _____ and was entered into by and between Agency and Contractor ("Construction Contract"). Pursuant to Public Contract Code Section 22300, Contractor may substitute certain securities for an equivalent amount of money required to be withheld from progress payments by Agency to Contractor pursuant to the Construction Contract.

The Escrow Agent is hereby instructed as follows:

1. Contractor may deliver to Escrow Agent:

   (a) Securities of the types specified in Sections 22300 of the Public Contract Code and Section 16430 of the Government Code.

   (b) Such other documents as are necessary to enable Escrow Agent to convert such securities into cash.

2. Upon receipt of such securities and other documents, Escrow Agent shall notify Agency within ten days of the deposit, and shall examine them to determine whether they are in a form sufficient to effect conversion of the securities into cash. Escrow Agent shall thereupon send written notice of its determination to Agency.

3. Escrow Agent shall hold such securities as trustee for Agency. The right of Agency to such securities is superior to any other lien or claim of lien; provided, however, that Contractor shall be entitled to any interest earned by such securities prior to their conversion to cash pursuant to section 5 hereof, and further provided that such interest may be withdrawn by Contractor at any time and from time to time without notice to Agency.

   Securities may be substituted by Contractor, but any securities substituted for securities previously deposited shall not reduce the current cash value of securities held below that last reported to Agency by Escrow Agent.

4. Escrow Agent shall determine the current cash value of such securities held by it as of the close of business on the first business day following the _____ day of each month and, in addition, on any other days which the Agency may from time to time specify in a written notice to Escrow Agent. Current cash value shall be determined as follows:

   (a) For securities traded over-the-counter or on a stock exchange:

      (1) Determine either the current bid price for the securities as of the close of business or the face value of the securities, whichever is less.

      (2) Subtract the cost of sale (broker commission).

      (3) Subtract all unpaid escrow fees and costs associated therewith.

   (b) For certificates of deposit:

      (1) Determine the face amount.

      (2) Subtract the potential interest penalty for immediate conversion.

      (3) Subtract all unpaid escrow fees and costs associated therewith.

   (c) Determine the value of other securities by procedures calculated to determine net realizable value. Promptly upon making each such determination, Escrow Agent shall notify Agency of the securities held and current cash value of such securities.

5. At any time or times that Agency believes it has a right to do so under the provisions of the Construction Contract, Agency may, without the consent of Contractor, deliver to Escrow Agent a written demand that Escrow Agent convert to cash all or any part of such securities. Upon seven days' written notice from Agency of such demand, Escrow Agent shall convert to cash all or part of such securities as demanded and shall distribute the cash as instructed by the Agency.

6. When the Construction Contract has been satisfactorily completed on the part of Contractor and any stop notices filed against the Construction Contract have been released, Agency shall give written notice to Escrow Agent that such securities may be returned to Contractor. Upon receipt of such written notice and payment of all escrow fees and costs, the Escrow Agent shall deliver to Contractor all money, interest, securities and other documents remaining in escrow and the escrow shall terminate.

7. Contractor, and not Agency, shall be liable to Escrow Agent for all of Escrow Agent's fees and costs associated with this escrow.

8. The Director of the Ventura County Public Works Agency, a Department Director of said Agency, or other person authorized in writing by such Director or Department Director is authorized to give written notice and to make written demands on behalf of Agency pursuant to sections 4, 5 and 6 hereof.

9. All written notices and demands pursuant to the escrow agreement and these Instructions shall be addressed as follows:

(a) To Agency:

Director, Ventura County Public Works Agency
800 South Victoria Avenue
Ventura, California 93009

(b) To Contractor:

(c) To Escrow Agent:

DATED: _____

_____	_____	_____
_____	_____	_____
By _____	By_____	By_____
Title _____	Title _____	Title_____
AGENCY	CONTRACTOR	ESCROW AGENT Bank Charter: State [ ] Federal [ ] Escrow Agent's Address: _____ _____

Exhibit 1

APPENDIX E BLANK

Exhibit 1

RELEASE ON CONTRACT

CONTRACT NAME: _____

SPEC. NO. _____, PROJECT NO. _____

WHEREAS, by the terms of the contract dated ____ _, 20___ entered into by _____

_____and the undersigned CONTRACTOR,

_____

_____

_____

undersigned CONTRACTOR agreed to perform certain work for the compensation specified in said contract; and

WHEREAS, the CONTRACTOR represents that said work is fully completed and that final payment is due to the CONTRACTOR under terms of said contract,

NOW, THEREFORE, in consideration of the promises and the payment by [AGENCY NAME] to the CONTRACTOR of the amount due under the contract, to wit, the sum of $_____ and the additional consideration of $1.00, receipt of which is hereby acknowledged by the CONTRACTOR, the CONTRACTOR hereby releases and forever discharges _____ of and from all manner of debts, dues, demands, sum or sums of money, accounts, claims and causes of action, in law and in equity, under or by virtue of said contract except the claim against the Agency for the remainder, if any, of the amounts retained as provided in 9-3.2, any amounts retained as required by Stop Notices or Labor Code Provisions, and any unsettled claims or disputes as follows: (If none, leave blank)

Description of Claim or Dispute	Amount	Date of Claim	Date of Notice of Potential Claim

The CONTRACTOR certifies that each unsettled claim or dispute listed hereon has been processed in compliance with the requirements for making claims under the contract, including giving notice pursuant to the applicable provisions of the contract, and following the procedures for resolution of disputes or claims set forth in subsection 6-12 of the contract. Acceptance of this Release on Contract by the [Agency Name] shall not be deemed as a waiver or release of its right to contest either the substantive or procedural validity of any listed unsettled claims or disputes.

IN WITNESS WHEREOF, the hand and seal of the CONTRACTOR have been hereunto set this ___ day of _____, 20___.

THIS FORM MUST BE ACCOMPANIED
by a proper acknowledgement form
(See Civil Code Section 1189)

Contractor

By

Title

Exhibit 1

SAMPLE PERFORMANCE AND PAYMENT BOND FORM

Bond No._____

SURETY BONDS

PERFORMANCE BOND

Whereas, the «Agency», hereinafter called "Agency", and «Contr», hereinafter called "principal", have entered into a contract dated «ContrDate» whereby principal agrees to complete certain designated work identified as project «ProjName» (Spec. No.«SpecNo»), and to perform other duties and obligations as described in said contract, which is incorporated herein by this reference and made a part hereof; and

Whereas, principal is required under the terms of said contract to furnish a bond to guarantee principal's faithful performance of the work and all terms and conditions of the contract;

Now, therefore, we the principal and the undersigned, as corporate surety, are held and firmly bound unto Agency in the penal sum of «CostText» ($«OrigCostFmtd») lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, successors, executors and administrators, jointly and severally, firmly by these presents.

The condition of this obligation is such that if the principal, its heirs, executors, administrators, successors or assigns, shall in all things stand to and abide by, and well and truly keep and perform the covenants, conditions, and provisions in the said contract and any alteration thereof made as therein provided, on principal's part, to be kept and performed at the time and in the manner therein specified, and in all respects according to their true intent and meaning, and shall indemnify and save harmless Agency, its officers, agents and employees, as therein stipulated, then this obligation shall become null and void; otherwise it shall be and remain in full force and effect.

The above obligation shall continue after Agency's acceptance of the work for the duration of the warranty period as specified in the contract during which time if principal fails to make full, complete, and satisfactory repair or replacement to the work and/or fails to protect Agency from loss or damage resulting from or caused by defective materials or faulty workmanship, the obligation of surety hereunder shall continue so long as any obligation of principal remains.

PAYMENT BOND

And, whereas, under the terms of said contract, principal is required before entering upon the performance of the work, to file a good and sufficient payment bond with the Agency to secure the claims to which reference is made in Title 3 (commencing with Section 9000) of Part 6 of Division 4 of the Civil Code of the State of California.

Now, therefore, said principal and the undersigned, as corporate surety, are held firmly bound unto the Agency and all contractors, subcontractors, laborers, material suppliers and other persons employed in the performance of the aforesaid contract and referred to in the aforesaid Civil Code in the like sum of «CostText» dollars ($«OrigCostFmtd») for materials furnished or labor thereon of any kind, or for amounts due under the Unemployment Insurance Act with respect to such work or labor, or for any amounts required to be deducted, withheld and paid over to the Franchise Tax Board from the wages of employees of the contractor and the contractor's subcontractors, that said surety will pay the same in an amount not exceeding the amount hereinabove set forth, and also in case suit is brought upon this bond, will pay, in addition to the face amount thereof, costs and reasonable expenses and fees including reasonable attorney's fees incurred in successfully enforcing such obligation, to be awarded and fixed by the court, and to be taxed as costs and to be included in the judgment therein rendered.

It is hereby expressly stipulated and agreed that this bond shall inure to the benefit of any and all persons, companies and corporations entitled to file claims under Title 3 (commencing with Section 9000) of Part 6 of Division 4 of the Civil Code, so as to give a right of action to them or their assigns in any suit brought upon this bond.

Should this condition of this bond be fully performed, then this obligation shall become null and void; otherwise, it shall be and remain in full force and effect.

GENERAL TERMS

The surety hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of said contract or the plans and specifications accompanying the same shall in any manner affect its obligations on these bonds, and it does hereby waive notice of any such change, extension, alteration or addition.

Nothing herein shall limit the Agency's rights or surety's obligations under the contract or applicable law, including, without limitation, California Code of Civil Procedure section 337.15.

In witness whereof, this instrument has been duly executed by the principal and surety above named

on ,_____, 20 .

«Contr»
Name of Principal

By_____

Title_____

_____
Name of Surety

By_____
Attorney-in-Fact

Address _____

City_____ State ___ Zip_____

Telephone No._____

INDICATE COMPLETE ADDRESS OF SURETY TO WHICH CORRESPONDENCE CONCERNING THIS BOND SHOULD BE DIRECTED.

SAMPLE BOND FORM

Agency will prepare the Bond in this format and transmit it to the Contractor along with the Contract and the Notice of Award letter.

Surety shall fill in the Bond No., date identification and signature of surety in places provided.

Contractor shall sign and indicate title in place provided.

A-467/9-Tmpl

Exhibit 1

DIVISION 9

FAA-C-1391e

FAA-C-1391e
May 2019
SUPERSEDING
FAA-C-1391d
September 2014

DEPARTMENT OF TRANSPORTATION

FEDERAL AVIATION ADMINISTRATION SPECIFICATION

INSTALLATION, TERMINATION, SPLICING, AND TRANSIENT/SURGE PROTECTION OF UNDERGROUND ELECTRICAL DISTRIBUTION SYSTEM POWER CABLES

This specification is approved for use by all Departments of the Federal Aviation Administration (FAA)

Exhibit 1

FOREWORD

1. This specification provides requirements for the installation of FAA-owned and maintained underground electrical line distribution (ELD) systems in support of FAA facilities.

2. ELD systems include power cable and associated components on the exterior, commercial power supply side of the circuit at the airfield or remote site through to the service entrance power panels of FAA facilities. These are medium-voltage (MV) and low-voltage (LV) underground power cables, and overhead lines. Low-voltage systems such as MALSRs and ODALs, and high-voltage systems such as ALSF-2s are also included.

3. This specification excludes facility service entrance (load side) wiring (except for ALSF, MALSR, and RWSL system cables); communication, control, and signal cables. For guidance pertaining to these types of cables, consult the appropriate office of primary responsibility for applicable standards.

4. For installation of communication, control, and signal cables, including fiber optic transmission systems (FOTS), refer to FAA-STD-061, *Airport Fiber Optic Transmission Systems*; FAA-E-2042, *Cable, Electrical Control, Exterior*; and FAA-E-2072, *Electrical Cable, Telephone Exterior*.

5. Power for airfield lighting cables has a separate set of standards and procedures. Refer to the appropriate FAA Advisory Circulars (AC) 150/5340-7 and -26, and associated governing standards.

6. This is an update to an existing specification. It assimilates recent utility industry knowledge concerning ELD systems, with the aim of providing safer, more reliable FAA underground MV and LV ELD systems.

7. Changes in this version of the document include (see change history, page iv):
   a. Revised from “d” version to “e” version,
   b. Miscellaneous updates collected from field comments,
   c. Addition of certain lighted navaids system cables.

8. This specification ensures that minimum FAA requirements are met based on current commercial practices relating to safety, reliability, and restorability of FAA electrical line distribution systems. Contractors are encouraged to provide innovative, best-value solutions wherever possible within the bounds of these requirements.

Comments, suggestions, or questions on this document should be addressed to: Federal Aviation Administration, AJW-22, Power Services Group, Power Cable Program, 800 Independence Ave., S.W., Washington, DC 20591, https://employees.faa.gov/org/linebusiness/ato/operations/technical_operations/atc_facilities/power_services/power_cable/

Exhibit 1

Approved by:

Peter Megna
Manager (A),
Power Services Group, AJW-22

5/22/19
Date

Russell Green,
Manager,
Power Systems Engineering Team,
AJW-221

5/22/19
Date

Michael Vellucci,
Power Cable Program Manager,
Power Systems Engineering Team,
AJW-221

4/21/19
Date

Exhibit 1

Change History

1. Originator Name and Address AJW-22, Power Services Group	2. [] Proposed	3. Code Identification	4. Document No. FAA-C-1391c
Washington, DC	[X] Approved	5. Code Identification	6. DCN No.
7. System Designation	8. Related ECR/NCP No. ATO0W-CABLE-1023	9. Contract No.	10. Contractual Activity N/A
11. Product Integration Plan		12. Effectivity	

This notice informs recipients that the standard identified by the number (and revision letter) shown in block 4 has been changed. The pages changed by this DCN (being those furnished herewith) carry the same date as the DCN. The page numbers and dates listed below in the summary of changed pages, combined with non-listed pages of the original issue of the revision shown in block 4, constitute the current version of this specification.

13. DCN No.	14. Pages changed	S*	A/D*	15. Date
	Summary - general: a. Deletion of requirements for non-electrical-line-distribution (non-ELD) systems, including communications and telecommunications cables (both copper and FOTS), control cables, and constant-current-regulated runway approach and edge lighting power cables. b. Emphasis on product changes in FAA ELD systems from the older 2.4 kV to 4.16 kV distribution circuits to the newer industry standard medium voltage systems, e.g., 3-phase/7200 V (phase to neutral). The Power Cable Program favors 15 kV rated cables and equipment to bring FAA ELD systems up to compatibility with the utility industry and to meet future FAA needs. c. Increased attention to the protection of sensitive internal constituent parts of MV cable systems during installation, by (1) the imposition of stringent tests meeting IEEE criteria, and (2) using proper cable pulling, splicing, and terminating techniques. d. Addition of power cable acceptance testing process for newly installed cables (text main body and Appendix C). Acceptance tests classified as destructive by the IEEE, such as the DC high potential (HIPOT) test, shall no longer be performed on in-service power cables. e. Treatment of the qualifications of MV "qualified persons" during installations.			1/24/2012
	Details – changes: a. Non ELD systems, deletions from FAA-C-1391b version: pp. 1-4, 7-15, 17-19. Sections/paragraphs affected: 2.1.2, 2.1.3, 3.1.2, 3.2.1, 3.2.2, 3.4, 3.4.1.1, 3.4.1.2, 3.4.2.2, Table I, 3.4.3, 3.4.3.1, 3.4.4, 3.4.5, 3.5.1, 3.5.2, 3.6, 4.2, 4.3, 4.5, 4.5.1, 4.5.2, 4.6, 4.6.1, 4.6.2, 4.6.3, App A.			1/24/2012
	Details – changes: b. Product changes, additions in FAA-C-1391c: cable 3.3.6.2; 15 kV surge protection 5.8.2; 15 kV splice kits 5.9.			1/24/2012
	Details – changes: c. Installation of cables, additions in FAA-C-1391c: splice procedures 5.9; cable pulling 5.5.12 and App B; cable end sealing 5.5.11; installer qualifications 3.3.3.2; 50/60 Hz offline partial discharge test 3.3.6.3, 3.3.6.4.			1/24/2012
	Details – changes: d. Acceptance testing procedures, additions in FAA-C-1391c: 3.3.6; Appendix C.			1/24/2012
	Details – changes: e. Qualified persons and contractors, change in FAA-C-1391c: 3.3.3 (all), 3.3.6.4, 5.9.			1/24/2012
	Updated document from "c" version to "d" version.			4/4/2014
	Miscellaneous updates collected from field comments.			4/4/2014
	Submittals updated, products updated (added power cable, transformers, switchgear, service disconnects, terminations/splices, overcurrent devices, underground duct systems, and ducts and fittings).			4/4/2014
	Manhole cover wheel loading and guard wire grounding upgraded.			8/15/2014
	Miscellaneous updates as a result of field comments.			5/1/2019
	Expanded the scope of ELD systems to include low-voltage systems cables such as for MALSR and ODALS, and high-voltage systems such as ALSF-2s. Added Section 6 to provide specific installation instructions for these systems. Added Appendix G.			5/1/2019
	Submittals section updated; submittals matrix added as an appendix.			5/1/2019
	Added duct joining processes, see also appendix for bonding adhesives data sheet.			5/1/2019
	Product section updated. Installation processes updated.			5/1/2019

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1. SCOPE

This specification defines the minimum requirements for the installation of FAA's low voltage (typically 600 V and below) and medium voltage electrical line distribution (ELD) power cables buried directly in the earth or installed in underground duct or conduit. The industry defines medium voltage as between 1,000 V and 34,500 V nominal voltage line to ground and low voltage as 1000 V and below.

The installation work includes surveying, trenching, and backfilling, installation of cables, conduits, concrete-encased ducts, manholes, hand holes, duct markers, joints and splicing, terminating, providing surge protection, and testing of cables for acceptability of the finished ELD. In addition, this specification defines the responsibilities of the contractor with respect to safety, quality assurance, and quality control during the installation and testing of ELD systems.

This specification covers installation and acceptance testing of FAA ELD systems only. For maintenance of these systems, refer to FAA Order 6950.22.

This specification applies to installation of medium and low voltage facility electrical supply power cables and associated equipment. These systems provide facility power from the power supplier's primary service to the service entrance power panels of FAA facilities, to include low-voltage systems cables that feed MALSRs and ODALs, and high-voltage systems supplying power to ALSF-2 equipment.

For detailed information on the installation of non-ELD cable systems such as control cables, fiber optics telecommunication (FOTS) cables, communication cables, etc., consult with the office of primary responsibility (OPR). Consult also the applicable airport circulars for guidance. For basic separation requirements of FAA utility power cable systems from non-electrical-power cable systems, consult the section of this specification entitled, "Separation of Cables" (5.5.10).

When physically integrating non-ELD cables with power cables, do not assume all of the provisions of FAA-C-1391 apply without first coordinating with the appropriate OPR and the FAA onsite project engineer responsible for integration of the various types.

For detailed installation requirements for low-voltage systems such as MALSRs and ODALs, and high-voltage systems such as ALSF-2, see Section 6 and Appendix G.

Non-ELD OPRs consist of:

a. Control Cables – Telecommunications Services Group, AJM-313,
b. Fiber Optics Transmission Systems (FOTS) – Air-Ground Data Communications Group, AJM-313,
c. Voice Communications – Air-Ground Data Communications Group, AJM-313,
d. Runway Status Lights (RWSL) – Lighting Systems Group, AJW-46,
e. Others (as applicable).

Exhibit 1

For outdoor electrical work, this document takes precedence over FAA-C-1217, *Electrical Work, Premises Wiring*. FAA-C-1217 is not to be used for outdoor ELD electrical requirements. However, for the portions of the ELD that emerge from the ground and pass into an enclosed space such as a service disconnect rack, FAA-C-1217 shall apply.

Exhibit 1

2. APPLICABLE DOCUMENTS

2.1 General

Due to the continuous updating of Government documents, the FAA Contracting Officer and/or the FAA Project Engineer must specify the document version and publication date current at the time of contract award or project design. The documents below form a part of this specification. Some of the FAA documents listed are out of date but are still applicable; reference the notations next to each reference provided. FAA tailoring organizations should consult with the offices of primary responsibility to obtain the most recent applicable documentation.

2.2 Order of precedence

Requirements of ELD installations are based on the National Electrical Code (NEC); FAA-STD-019, *Lightning and Surge Protection, Grounding, Bonding, and Shielding Requirements for Facilities and Electronic Equipment*; and the content outlined in this document.

In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

2.3 Government documents

The following citations are government documents that are used as references in this specification.

2.3.1 FAA orders, standards, specifications, and handbooks

The most recent versions of the following FAA orders, standards, specifications, and handbooks are incorporated by reference as a part of this document. Unless otherwise stated, requirements contained in these documents are as cited in the project solicitation or contract. (Copies of FAA orders, standards, specifications, handbooks, drawings, and other applicable FAA documents may be obtained from the Contracting Officer issuing the invitation-for-bids or request-for-proposals. Requests should fully identify the material desired; for example: specification, standard, amendment, identification numbers of drawings possessing standard FAA signature block, and dates. Requests should cite the invitation for bids, request for proposals, the contract involved, or other source of the requested material.)

2.3.1.1. ORDERS

3900.19	FAA Occupational Safety and Health Program
JO 3900.57A Change 1	EOSH Requirements in the Planning and Execution of Construction and Maintenance Activities at NAS Facilities.
JO 3900.64	Air Traffic Organization Electrical Safety Program

Exhibit 1

JO 6750.16	Siting Criteria for Instrument Landing Systems
JO 6950.27	Power System Analyses: Load Flow Calculations, Short Circuit Analysis, Protective Device Coordination Studies, and Arc Flash Risk Assessment

2.3.1.2 FAA STANDARDS

FAA-STD-XXX	Underground Electric Line Distribution (ELD) Systems [Future]
FAA-STD-019	Lightning and Surge Protection, Grounding, Bonding, and Shielding Requirements for Facilities and Electronic Equipment
FAA-STD-061	Airport Fiber Optic Transmission Systems (FOTS)

2.3.1.3 ADVISORY CIRCULARS AND SPECIFICATIONS

150/5300-13	Airport Design
150/5320	Surface Drainage Design
150/5370	FAA Standards for Specifying Construction of Airports
150/5345-7	Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits
150/5345-26	Specification for L-823 Plug and Receptacle, Cable Connectors
FAA-E-113	Poles, Wood, Treated
FAA-C-1217	Electrical Work, Premises Wiring
FAA-E-2793	Cable, Electrical Power, 2,000 to 35,000 Volts
FAA-E-2042	Cable, Electrical Control, Exterior
FAA-E-2072	Cable, Telephone Exterior
FAA-E-2171	Cable, Coaxial Armored, M17/6-RG-11
FAA-E-2271	Cable, Coaxial, 50-Ohn, Foam Dielectric, 1/2 and 7/8 Inch
FAA-E-2524	Cable, Radio Frequency, Foam Dielectric, 1/2 and 7/8 Inch, Corrugated Type
FAA-E-2619	Cable, Coaxial, RG-35/U, Armored

Exhibit 1

FAA-E-2761 Cable, Fiber Optic, Multimode and Single Mode, Multifiber

2.3.1.4 HANDBOOKS

FAA-HDBK-XXX Underground Electric Line Distribution (ELD) Systems [Future]

2.3.2 Other Government documents, drawings, and publications

The following Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

American Association of State Highway & Transportation Officials Specifications

AASHTO HB-17 Standard Specifications for Highway Bridges

AASHTO HS-20 Standard Specifications for Highway Bridges

Occupational Safety and Health Administration Codes

Part 1926 Safety and Health Regulations for Construction

29 CFR 1910 Occupational Safety and Health Standards (General Industry)

Military Specifications

MIL-C-38359 Cable, Power, Electrical, Airport Lighting, Cross-Linked, Polyethylene XLP

MIL-I-3825 Insulating Tape, Self-Fusing

DLA A-A-50563 Conduit Outlet Boxes, Bodies, and Entrance Caps, Electrical: Cast Metal

DLA A-A-59213 Splice Connectors

DLA A-A-59214 Junction Box: Extension, Junction Box; Cover, Junction Box (Steel, Coated with Corrosion-Resistant Finish)

DLA A-A-59544 Cable and Wire, Electrical (Power, Fixed Installation)

DLA A-A-59551 Wire, Electrical, Copper (Uninsulated)

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Navy A-A-59827	Topside Conduit (Flexible) and Conduit fittings, Electrical: Composite Based (Non-metallic)
UFC 3-350-03FA	Electrical Power Supply and Distribution
UFC 3-600-01	Fire Protection Engineering for Facilities
UFGS 26 12 19.20	Single-Phase Transformers
UFGS 26 12 19.10	Three-Phase Transformers
UFGS 33 70 02.00 10	Electrical Distribution System, Underground

Federal Specifications

W-C-375/3	Circuit Breakers, Molded Case; Branch Circuit and Service
W-S-865	Switch, Box (Enclosed), Surface Mounted
WW-C-566	Conduit, Metal, Flexible
WW-C-581	Class 1 Type A with Standard for Electrical Rigid Metal Conduit - Steel, UL 6

2.4 Non-Government publications

The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

American National Standards Institute (ANSI) Standards

ANSI 6	Standard for Rigid Metal Conduit. (Same as UL 6)
ANSI 467	Standard for Grounding and Bonding Equipment. (Same as UL 467)
ANSI 514	Fittings for Cable and Conduit. (Same as UL 514)
ANSI 651	Schedule 40 and 80 Rigid PVC Conduit. (Same as UL 651)
ANSI A14.3	Safety Code for Fixed Ladders
ANSI C2	National Electrical Safety Code (NESC). (Same as IEEE C2)
ANSI C62.11	IEEE Standard for Metal-Oxide Surge Arresters for AC Power Circuits (>1 kV). (Same as IEEE C62.11)

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ANSI C62.22	IEEE Guide for the Application of Metal Oxide Surge Arrester for Alternating Current Power Circuits. (Same as IEEE C62.22)
ANSI C62.22.1	Guide for the Connection of Surge Arresters to Protect Insulated, Shielded Electric Power Cable Systems (Same as IEEE 1299/C62.22.1)
ANSI C62.41	Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and Less) AC Power Circuits. (Same as IEEE C62.41)
ANSI C80	Rigid Steel Conduit – Zinc Coated. (Same as NEMA C80)
ANSI C119.1	Sealed Insulated Underground Connector System Rated 600 Volts. (Same as NEMA C119.1)
ANSI FB 1	Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies. (Same as NEMA FB1)
ANSI RN 1	Polyvinyl-Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Steel Conduit. (Same as NEMA RN 1)
ANSI S-97-682-2007	Standard for Utility Shielded Power Cables Rated 5 through 46 kV (Same as ICEA S-97-682-2007)
ANSI TC 6 & 8	PVC Plastic Utilities Duct for Underground Installation. (Same as NEMA TC 6 & 8)
ANSI Z535	Safety Alerting Standards. (Same as NEMA Z535)

American Society of Civil Engineers Standards

CI/ASCE 38-02	Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data.

American Society for Testing & Materials (ASTM) Standards

ASTM A48	Standard Specification for Gray Iron Castings.
ASTM B8	Standard Specification for Concentric-Lay-Stranded Copper Conductors
ASTM C267-97	Standard Test Methods for Chemical Resistance of Mortars, Grouts, Monolithic Surfacings and Polymer Concretes

Exhibit 1

ASTM C478	Standard specification for Precast Concrete Manhole Section (AASHTO No. M199)
ASTM C579-96	Standard Test Methods for Compressive Strength of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings and Polymer Concretes
ASTM C580-93	Standard Test Method for Flexural Strength and Modulus of Elasticity of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings and Polymer Concretes
ASTM C858	Standard Specification for Underground Precast Concrete Utility Structures
ASTM C990	Standard Specification for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants.
ASTM D422	Standard Test Method for Particle-Size Analysis of Soils
ASTM D698	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort
ASTM D1056	Standard Specification for Flexible Cellular Materials - Sponge or Expanded Rubber
ASTM D2444-93	Standard Test Method for Determination of the Impact Resistance of Thermoplastic Pipe and Fittings by Means of a Tup (Falling Weight)
ASTM F512	Standard Specification for Smooth-wall PVC Conduit and Fittings for Underground Installation
ASTM 1962	Standard Guide for Use of Maxi-Horizontal Directional Drilling for Placement of Polyethylene Pipe or Conduit under Obstacles
ASTM F2160	Standard Specification for Solid Wall High Density Polyethylene (HDPE) Conduit

Institute of Electrical and Electronics Engineers (IEEE) Standards

IEEE C2	National Electrical Safety Code (NESC)
IEEE-48	Test Procedures and Requirements for Alternating-Current Cable Terminations Used on Shielded Cables Having Laminated Insulation Rated 2.5 kV through 765 kV or Extruded Insulation Rated 2.5 kV through 500 kV

Exhibit 1

IEEE 80	IEEE Guide for Safety in AC Substation Grounding
IEEE-100	The Authoritative Dictionary of IEEE Standards Terms
IEEE-386	Standard for Separable Insulated Connector Systems for Power Distribution Systems above 600 V
IEEE-400.2	IEEE Guide for Field Testing of Shielded Power Cable Systems Using Very Low Frequency (VLF)
IEEE-400.3	Guide for Partial Discharge Testing of Shielded Power Cables in a Field Environment
IEEE-404	Standard for Power Cable Joints
IEEE-525	Cable Systems in Substations
IEEE-835	Power Cable Ampacity Tables
IEEE C62.11	IEEE Standard for Metal-Oxide Surge Arresters for AC Power Circuits (>1 kV).
IEEE C62.22	IEEE Guide for the Application of Metal Oxide Surge Arrester for Alternating Current Power Circuits
IEEE 1299/C62.22.1	Guide for the Connection of Surge Arresters to Protect Insulated, Shielded Electric Power Cable Systems
IEEE C62.41 (Formerly IEEE 587)	Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and Less) AC Power Circuits

Insulated Cable Engineers Association (IECA) Standards

ICEA S-94-964	Concentric Neutral Cables Rated 5-46 kV
ICEA S-97-682-2007	Standard for Utility Shielded Power Cables Rated 5 through 46 kV

International Electrotechnical Commission (IEC) Standards

IEC 60071-2	Insulation coordination Part 2: application guide.

National Electric Manufacturers Association (NEMA) Standards

Exhibit 1

RN 1	Polyvinyl-Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Steel Conduit
FB1	Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies
TC 2	Electrical Polyvinyl Chloride (PVC) Tubing (EPT) and Conduit (EPC-40 AND EPC-80)
TC 3	PVC Fittings for Use with Rigid PVC Conduit and Tubing
TC 6 & 8	PVC Plastic Utilities Duct for Underground Installation
TC 7	Smooth-Wall Coilable Electrical Polyethylene Conduit
TC 9	Fittings for PVC Plastic Utilities Duct for Underground Installation
TC 14	Filament-Wound Reinforced Thermosetting Resin Conduit and Fittings
NECA/NEMA 605	Recommended Practice for Installing Underground Nonmetallic Utility Duct

Underwriters' Laboratories (UL) Inc. Standards

UL 6	Standard for Rigid Metal Conduit
UL 467	Standard for Grounding and Bonding Equipment
UL 514	Fittings for Cable and Conduit
UL 651	Schedule 40 and 80 Rigid PVC Conduit

National Fire Protection Association (NFPA) Standards

NFPA-70	National Electric Code (NEC)
NFPA-70E	Electrical Safety in the Workplace
NFPA-780	Standard for the Installation of Lightning Protection Systems
NEC Hdbk	Article 110.16, Flash Protection

Exhibit 1

NEC Hdbk	Article 344.10, Rigid Metal Conduit: Type RMC
NEC Hdbk	Article 280, Surge Arrestors, Over 1 kV

Exhibit 1

3. GENERAL

3.1 Definitions

Unless otherwise specified, electrical and electronics terms used in this specification, and on the drawings, shall be as defined in IEEE 100, *The Authoritative Dictionary of IEEE Standards Terms*.

In the text of this specification, the term “conduit” refers to a single pipe through which cable passes. The term “duct” refers to one or more conduits connected through a manhole or hand hole system.

In the text of this specification, "medium voltage cable splices" and "medium voltage cable joints" are used interchangeably and have the same meaning.

For the purposes of this specification, “FAA electrical line distribution systems (ELD)” are defined as:

Electrical Line Distribution (System). An FAA owned and operated electrical power distribution system (underground or overhead) running from a power source to FAA facility load(s). Low-voltage systems such as MASLRs and ODALs, and high-voltage systems such as ALSF-2s are also included in ELD systems. An ELD may include some or all of the following: power cable; transformers; sectionalizing switchgear; switchpads; disconnect switches; manholes; hand-holes; utility poles; direct earth buried (DEB) cables; and underground duct banks. Runway edge lighting cables, fiber optic communication cables, and control and signal cables are not included as part of ELD.

The demarcation point between an FAA ELD system and FAA facility premises wiring on an airport can be ambiguous. When in doubt, consult AJW-22, Power Services Group, Power Cable Program.

3.2 Submittals

Submittals are required for quality control (see Appendix E), unless otherwise directed. Submittals marked A are required. For submittals marked B or C, the FAA task or contract specifier shall evaluate the contract for each kind, voltage, or type of submittal used on the project and make a determination as to whether the submittal is required. Examples given are not limited to those shown in parentheses:

“A” indicates that the submittal is required.

“B” indicates that the submittal is required, unless specifically deleted by the contract specifier.

“C” indicates that a submittal is not generally required because it is expensive and/or time consuming (i.e., a special case). If the submittal is required, the contract specifier shall check off

the required submittal on the submittals matrix (Appendix E) and in the contract documents (as a CLIN item).

a. Contractor-generated design data (ANSI C2 and FAA-STD-032, Para 3.1.13)
   1. Code analysis (e.g., load flow study, voltage drop calculations, short circuit analysis, clearance calculations, design arc flash study, etc) (ANSI C2) [A]
   2. Design assumptions and parameters (FAA-STD-032) [B]
   3. Test reports and findings (e.g., soil resistivity) [C]
   4. Design calculations (FAA-STD-032) [A]
   5. Contractor-generated design drawings or sketches. [A]
b. Cost estimates [A]
c. Medium voltage cable [A]
d. Medium voltage cable splices and joints* [A]
e. Medium voltage cable terminations* [A]
f. Conduits [A]
g. Duct construction materials (e.g., concrete, alternatives to concrete where approved, fills and layers, etc) [A]
h. Switch pads and sectionalizing switchgear [A]
i. Transfer switches (automatic and manual) [A]
j. Transformers [A]
k. Surge arresters [A]
l. Live end caps or protective caps [A]
m. Precast concrete structures [A]
n. Sealing Material [B]
o. Manhole frames and covers [A]
p. Hand hole frames and covers [A]
q. Cable supports (racks, arms and insulators) [A]
r. Protective devices and coordination study [A]
s. As-built arc flash hazard study. Required when an existing study is not available, or if modifications are being made to the existing ELD system. [A]
t. Power cable manufacturer's factory certification [A]
   Medium voltage cable factory certification as per FAA-E-2793, Section 4.2 (includes meeting ICEA S-94-649, Sections 4.3.2.1 and 9.13). [A]
u. Field acceptance checks and tests (see Appendix C), including demonstrating the adequate performance of the circuit breakers. [A]
v. Arc-proofing test for cable fireproofing tape [C]
w. Cable installation plan and procedure (use cable installation plan only when pulling cable between manholes; do not use for pulling from pole riser to manhole only):
   1. Site layout drawing with cable pulls numerically identified [C]
   2. The manufacturer, type, and quantity of lubricant used on pull [C]
   3. The cable manufacturer and type of cable [A]
   4. The dates of cable pulls, time of day, and ambient temperature [C]
   5. The length of cable pull, calculated maximum cable pulling tension, and calculated maximum sidewall pressure. For cable pulls, a single generic table of cable pulls may be submitted. [A]
   6. The actual cable pulling tensions encountered during pull [C]

Exhibit 1

7. Certificates (tensiometer/dynamometer calibration, VLF tester calibration, etc) [C]

x. Cable splicer/terminator qualifications* The PMO shall assist with the designation of "qualified."[A]
y. Cable installer qualifications* The PMO shall assist with the designation of "qualified." [A]
z. Project design drawings [A]

*Note: The contractor shall provide the product drawings showing details of the connecting methods to be used, and a statement of the experience of the contractor in making connections on underground systems with the proposed product. Cable splicing/terminating personnel shall have a minimum of three (3) years continuous experience in terminating/splicing medium voltage cable. Products shall meet the latest editions of applicable standards as follows:

APPLICATION STANDARD (USE LATEST ISSUED)	LEVEL OF ACCEPTANCE
IEEE-404 Standard for Power Cable Joints	Meet or Exceed
IEEE-48 Standard for Cable Terminations	Meet or Exceed
ANSI C119.1 Sealed Insulated Underground Connector System Rated 600 Volts	Meet or Exceed
IEEE – 386 Standard for Separable Insulated Connectors	Meet or Exceed

3.3 Quality assurance

All work shall comply with the National Electrical Code (NEC) and IEEE C2/National Electrical Safety Code (NESC) for components and installation. To the maximum extent practicable, furnish products that are listed and labeled by a nationally recognized testing laboratory (NRTL) for the application, installation condition, and the environment in which the products are installed. Use of nonlisted components will not be allowed unless (1) it is demonstrated that listed components are not available, and (2) the FAA preapproves such components before installation. Approval shall be at the discretion of the FAA.

3.3.1 Quality control

The quality of civil engineering work, such as trenching, ducting, and other operations, shall be inspected by the FAA and approved after each major construction step. The FAA Project Engineer shall identify which equipment and material shall require factory acceptance tests before cost estimating the project. The contractor shall inform the FAA of manufacturing/shipping schedules and shall offer representatives of the FAA the opportunity to witness acceptance tests. These tests shall be performed on a statistically meaningful number of samples, as specified by FAA engineers. After receipt of equipment shipment and prior to installation, the contractor shall subject equipment to a thorough visual inspection. An FAA representative shall be notified in advance and afforded the opportunity to be present and witness this step. Nameplates and markers shall be checked against the required specifications, and deviations brought to the FAA's attention. At the FAA's request, quality control checks, including acceptable electrical measurements (such as cable insulation resistance tests) shall be performed and reported. After the installation of cable systems is completed, acceptance/commissioning tests shall be performed.

Exhibit 1

All equipment and materials shall be subject to acceptance through the manufacturers' certification of compliance with applicable requirements when so requested. The requirements of this standard shall be considered as minimum requirements and shall not relieve the contractor of the responsibility to furnish and install higher grades of materials than specified when so required by the contract drawings and specifications. The installation shall conform to the most stringent requirements of the National Electrical Code (NEC), the local electrical codes, NFPA-70E, and applicable ANSI and IEEE standards, e.g., the National Electrical Safety Code (NESC), as well as other relevant guides and standards as listed in Section 2.

3.3.2 Qualifications of personnel

3.3.2.1 Designers

The design team shall have at least one engineer with significant experience in medium voltage design, review, and construction management. The engineer shall have worked with electrical power systems, and shall have designed electrical distribution systems whose reliability, maintainability, availability, and fault tolerance are of a similarly high level to those found in campus environments such as hospitals, life safety systems, and/or large computer and telecommunication facilities. The design engineer shall have the ultimate responsibility for the construction set (specifications, drawings, and cost estimates) and installation quality control. Drawings and engineering documents published by a non-FAA entity shall be signed as approved by FAA Engineering Services or a representative of the PSG ELD/Power Cable Program upon design acceptance. Designers shall have experience in arc flash analysis, short circuit coordination (SCCS), and general electrical engineering experience.

3.3.2.2 Installation Crew

Experienced personnel regularly engaged in underground electrical distribution system work shall perform the installation. Personnel exclusively or mainly trained in overhead line work, or low-voltage facility wiring work, are not sufficiently qualified to install FAA medium-voltage underground electrical distribution systems. Only qualified personnel may work on electric circuit parts or equipment being installed.

A qualified person is one who has skills and knowledge related to the construction and operation of the FAA's electrical equipment and installations, and has received safety training to recognize and avoid the hazards involved. Management personnel shall be responsible for authorizing the qualified personnel to perform a task. Besides completion of Occupational and Safety and Health Administration (OSHA)/FAA required electrical safety training for qualified personnel, those persons authorized to work on FAA ELD systems shall meet the requirements of a Qualified Person as mandated by OSHA and as discussed in NFPA 70E.

Along with training, personnel performing medium voltage work on FAA ELDs shall have: (1) the skills and techniques necessary to distinguish exposed live parts from other parts of electric equipment, including wire and cables, (2) the skills and techniques necessary to determine the nominal voltage of exposed energized electrical conductors or parts, (3) knowledge of the safe approach boundaries, work clearances, and voltages involved, (4) familiarity with construction and operation of equipment and the hazards involved, (5) familiarity with electrical safety related work practices and precautionary techniques, (6) familiarity with proper use of personal

protective equipment (PPE), arc flash, insulating and shielding materials, (7) familiarity with the proper use of insulated tools and test equipment, (8) ability to make good decisions in determining the degree and extent of the hazard and the PPE and job planning necessary to perform the task safely, (9) familiarity with safety precautions associated with confined spaces, (10) knowledge of skills and techniques regarding how to select and use a voltage detector and phase meter, (11) familiarity with mechanical aspects of ELD installation work such as trenching, boring, excavation around existing utilities and structures, manhole rigging, and pulling cable, and (12) CPR training and basic training for emergency dispatch if an electrocution or confined spaces injury occurs.

Cable termination and splicing shall be performed only by experienced and qualified medium/high voltage electricians experienced in underground distribution systems. The PMO shall assist in approving qualifications. Before cable splices/terminations are made, the FAA may request a sample splice and/or termination be made to demonstrate the electricians' qualifications.

Optional: To qualify the splicer, the sample splice and/or termination shall comply with the requirements of accessory manufacturers, and pass the requirements of IEEE standards 48, 386, and 404 with respect to partial discharge.

3.3.2.3 Inspectors and Testing Personnel

Inspectors of the FAA ELD distribution systems shall have knowledge and experience in quality control activities related to the inspection of cables laid in trenches such as are found at large campus environments such as hospitals, life safety systems, and/or large computer and telecommunication facilities; shall perform quality control activities during installation and preacceptance of medium and low-voltage switchgear, protective devices, power distribution transformers, surge arrestor equipment, and motor control centers; shall review functional tests of electrical equipment and conduct inspection and preacceptance of electrical drawings, termination drawings, and cable schedules; and shall interpret the various drawings used in the projects for executing and recording the work.

Test personnel shall be qualified persons meeting the requirements stipulated in Appendix C.

3.3.3 Receiving, storing, and protecting

The contractor shall receive, store, protect, and handle products according to National Electrical Contractors Association NECA 1, *Standard Practices for Good Workmanship in Electrical Construction*, and NECA/NEMA 605, *Recommended Practice for Installing Underground Nonmetallic Utility Duct.*

3.3.4 Sequencing and scheduling

The contractor shall:

1) Notify the FAA resident engineer to schedule inspection of each duct bank or duct bank segment before concrete is placed.

2) Provide the FAA resident engineer with reasonable notification before the anticipated date of acceptance testing of the newly installed replacement ELD system so that arrangements can be made.

3.3.5 Cable testing

3.3.5.1 Government-furnished cable

If government-furnished power cable is delivered to the contractor, the contractor shall test the cable on the reel and report electrical or physical cable defects within two weeks of cable receipt. If adequate cable lengths are unavailable for testing on the reel, a visual inspection shall be made and damage reported to the FAA. The required tests shall then be made immediately after unreeling. Defects discovered when installing the cable shall be reported to the FAA in accordance with the contract provisions.

3.3.5.2 Contractor-furnished power cable

Single and multi-conductor power cables furnished by the contractor shall conform to the FAA specifications given in the Products section of this specification.

Power cable shall meet the following minimum requirements:

a. Copper conductors.

d. Insulation shall be a premium quality, heat, moisture, ozone and corona resistant thermosetting ethylene propylene rubber or tree retardant cross-linked polyethylene, in accordance with ANSI/ICEA 94-649, Part 4, Classes I and II, Table 4-1. Insulation shall be consistent with type MV90 for dry and wet locations.

e. Insulation thickness and integrity. The insulation thickness shall be at the 133% level at the applicable voltage class and in accordance with the latest edition of ICEA S-94-649. The insulation shall be free from voids, contaminants, gels, and agglomerates in accordance with the latest edition of AEIC CS8 and ICEA S-94-649.

c. Neoprene, polyethylene, or vinyl jacket for normal areas, and polytetrafluoroethylene (PTFE) (Teflon®) jacket in areas exposed to fuel, oil, solvent or chemical leakage, excessive groundwater, or extremely acidic soil.

d. For power cables with rated voltages to 8 kV, cable insulation shall have a minimum continuous voltage withstanding capability of four times rated voltage. For rated voltages above 8 kV, insulation shall have a minimum continuous voltage withstanding capability of three times rated voltage. Cable voltage surge capabilities shall be 15 times rated voltage for voltages to 8 kV, nine times rated voltage for voltages above 8 kV through 15 kV, and seven times rated voltage for voltages above 15 kV through 25 kV. Whenever a cable is covered by applicable ICEA/NEMA specifications, the cable shall pass the test requirements for such cable. In addition, the installed cable shall satisfy after-installation acceptance tests as specified below, and in Appendix C.

Exhibit 1

3.3.5.3 Acceptance testing of new power cable

Following installation, the contractor shall perform cable testing in the presence of the FAA. The contractor shall furnish necessary test instruments except where otherwise indicated in the project plans. Only currently calibrated instruments shall be used for cable testing. A laboratory approved by the measurement instrument manufacturer, or an ISO/IEC 17025 or ANSI/NCSL Z540-1 accredited facility shall perform instrument calibration. When conducting FAA-authorized third-party testing, offline partial discharge testing shall constitute the final acceptance test after completion of the installation.

Testing shall be completed on contractor-installed cable before connection is made to existing cables. If warranted, the FAA will test existing cables and provide the results to the contractor through the resident engineer prior to the contractor splicing or connecting cables he has installed to existing cables.

Certain acceptance tests classified as "destructive" by the IEEE shall only be conducted on newly installed cables. Such tests shall only be conducted within the test constraints given in Appendix C. Destructive tests shall not be performed on in-service power cables.

3.3.5.4 Acceptance testing of new power cables above 2,000 volts

CAUTION
Zero-energy verification shall be accomplished before doing any work on de-energized medium-voltage equipment. In preparing for, and conducting, power cable tests, follow electrical safety procedures as outlined in FAA Order 6950.22.

New FAA underground, shielded, medium-voltage power cables rated 2,000 volts and above shall be subjected, after installation but before connection to terminal equipment, to the following acceptance tests:

a. Continuity test for cable conductor, shield, and armor, using an ohmmeter type instrument. See FAA Order 6950.22 for parameters and test equipment.

b. Limited-voltage DC insulation resistance test using a Megger™ type instrument. This test is formulated to apply and hold a DC voltage on the cable for a specified time, while measuring insulation resistance. See Appendix C for test description and processes.

c. One of the following tests:

a. Very low frequency (VLF, 0.1 Hz) AC high-potential withstand "pass/fail" test. The purpose of this type of test is not to ensure cable system future performance but simply to reassure the construction team that the line is not grounded/shorted before energization. The test shall be performed after cable system installation, including terminations and joints, but before the cable system is placed in normal service. See Appendix C for test description and procedures.

Exhibit 1

b. If third-party partial discharge acceptance testing is authorized, a diagnostic 50/60 Hz, off-line partial discharge test. This test can localize and determine the severity of any defects in the new installation. Due to its requirements for specialized test equipment, signal processing software, and diagnostic skills, the test must be conducted by a third-party testing firm. The testing firm shall be a qualified contractor preauthorized by the FAA. See Appendix C for test description and procedures.

3.3.5.5 Acceptance testing of new power cables 600 volts and below

CAUTION
Zero-energy verification shall be accomplished before doing any work on de-energized medium-voltage equipment. In preparing for, and conducting, power cable tests, follow electrical safety procedures as outlined in FAA Order 6950.22.

All low-voltage (≤ 600 V) power cables shall measure not less than 50 megohms resistance between conductors, and between conductors and ground (see FAA Order 6950.22, *Maintenance of Electrical Power Cables,* Chapter 3, *Standards and Tolerances,* Paragraph 301, Table (see column heading labeled "NEW CABLE"). Measurements shall be taken at not less than 500 volts DC and not more than 1,000 volts DC. This test does not constitute proof that the system is free from insulation defects but rather supplies evidence that the insulation was not damaged during the installation process.

3.3.5.6 Failure of power cable under test

If the contractor-furnished cable fails to meet test requirements after installation, the contractor shall repair or replace, at his expense, the sections of cable proven defective.

If the government-furnished cable fails to meet test requirements after installation due to contractor's faulty installation practices, the contractor shall repair or replace the defective sections of cable at contractor's expense.

The installation contractor shall be responsible for retest costs if components are found to be substandard during acceptance test(s) as a result of contractor faulty installation practices.

4. PRODUCTS

4.1 Product options and substitutions

Alternative products may be substituted for product types that do not apply to the project. Consult with the FAA project engineer.

4.2 Power cable

Single and multi-conductor power cables shall conform to the following specifications:

a. For branch circuits not exceeding 600 volts:
   i) Follow NEC Article 310.15 for ampacity ratings of conductors.
   ii) For conductors for branch circuits as defined in NEC Article 100, size conductors to prevent a voltage drop exceeding 3 percent at the farthest outlet of power, heating, and lighting loads, or a combination of such loads, and where the maximum total voltage drop on both feeders and branch circuits to the farthest outlet does not exceed 5 percent, provided that there is a reasonable efficiency of operation.
   iii) Follow NEC Article 215.2(A)(1), Note 2, for voltage drop on feeder conductors.

b. FAA-E-2793 for single and multi-conductor power cables used in exterior 2,000 to 35,000 volt applications. Reference Section 4.2 for product factory certified test result reporting requirement.

4.3 Transformers

4.3.1 Medium voltage transformers (>1,000 volts)

4.3.1.1 Transformer design

ELD transformers are normally installed outdoors with proper clearance from structures. Transformers shall be “enviro-friendly” biodegradable electrical insulating and cooling-liquid filled. Choose less-flammable transformer liquids unless there is a specific requirement to do otherwise.

If the local site stipulates less flammable transformer liquids, the following section shall apply, use NFPA 70 for liquids having a fire point not less than 300 degrees C tested per ASTM D92 and a dielectric strength not less than 33 kV tested per ASTM D 877. Provide identification of transformer as "non-PCB" and "manufacturer's name and type of fluid" on the nameplate. The fluid shall be a biodegradable electrical insulating and cooling liquid classified by UL and approved by FM Approvals® as "less flammable" fluids. The fluid shall meet the following properties:

- Pour point: ASTM D 97, less than -15 degree C,
- Aquatic biodegradation: EPA 712-C-98-075, 100%,
- Trout toxicity: OECD Test 203, zero mortality of EPA 600/4-90/027F, pass.

Silicon-filled and R-temp filled transformers shall not be used for less-flammable applications.

Transformers shall be pad mounted and of dead front design. Aluminum windings are acceptable. Due to associated safety hazards, transformers of the pole-mounted style shall not be used for ground-level FAA ELD applications.

Vaults shall be used for all transformer and switchgear applications wherever possible, eliminating the need for sweeps.

4.3.1.2 Transformer cabinets

Use heavy-duty stainless steel cabinets in most corrosive or rural windblown dust environments, unless otherwise specified. The manufacturer's standard construction material is acceptable only in noncoastal, noncorrosive environments not subject to windblown dust. For coastal/corrosive environments, ensure that front sill, hood, and tank base of single compartment transformers are corrosion resistant and constructed of stainless steel of not less than No. 13 U.S. gage, conforming to ASTM A167, Type 304 or 304L, unless otherwise indicated on the drawings.

In highly corrosive environments, the addition of totally stainless steel tanks and metering is required. This detail shall be outlined in the design drawings.

4.3.1.3 Warning signs and arc flash/shock hazard labels

For the enclosures of pad-mounted transformers having a nominal rating exceeding 600 volts, provide warning signs. After completion of arc flash hazard and shock analyses, label transformers with arc flash hazard and shock hazard warning information suitable to the particular installation. In any instance where it is anticipated that the transformer must be opened while energized, a warning label shall be provided.

4.3.1.4 Transformer losses

Transformers should meet the efficiency standards set forth in DOD's Unified Facility Guide Specification (UFGS) 26 12 19.20, *Single Phase Transformers,* Section 2.2.3.

4.3.2 Low-voltage transformers (≤600 volts)

In FAA ELD systems, dry-type distribution transformers are used for buck boost applications or for short point-to-point distances for small loads of 600 volts or less. When used indoors, refer to FAA Specification FAA-C-1217, *Electrical Work, Premises Wiring.*

Transformers shall be mounted to allow for adequate ventilation (suitable for the local ambient temperatures).

4.4 Switchgear

FAA ELD systems contain two types of switchgear: switch pads and sectionalizing switchgear. Both are fused devices used to de-energize equipment to allow work to be done and to clear

faults downstream. More importantly, they isolate faulted line segments from a distribution system. These units shall be dead front-type units.

- Low-profile switch pads are typically used for single-phase applications.
- Sectionalizing switchgear are typically used for three-phase applications.
- Pads or vaults shall be constructed of concrete or composite concrete material. Concrete is preferred, but the latter may be used if approved by the FAA Resident Engineer and included on the drawings.
- Risers and cabinets shall be of heavy duty construction and consist of materials based on geographic location. Applications in dry locations shall employ steel; in wet/corrosive/windblown dust locations, use stainless steel.
    - Use stainless steel risers and cabinets in most weather/climate/windblown dust exposed applications. The manufacturer's standard construction material or NEMA 3R are acceptable only in noncoastal, noncorrosive, nondusty environments. For coastal/corrosive/dusty environments, ensure that cabinets are corrosion resistant and constructed of stainless steel (4X), unless otherwise indicated on the drawings. Riser shall include any part of the equipment base or cabinet that is within 1.5 inches of the concrete pad.
    - Enclosures shall meet the requirements of ANSI C57.12.28.
- Vaults shall be used for all switchgear applications wherever possible, eliminating the need for sweeps.

4.5 Outdoor disconnecting means and exterior panel boards

4.5.1 Outdoor disconnecting means

A main disconnect switch (MDS) ensures that electrical service to a facility can be completely de-energized for service or maintenance (Figure 4.5.1-1). Use heavy duty MDSs.

- Enclosures--MDSs shall be outdoor rated or stainless steel, heavy duty. Enclosures shall be NEMA 3R for typical applications, NEMA 4X for corrosive/salt/windblown dust environments.
- Wiring Gutters--The minimum size of side wiring gutters shall be 4 in. for power feeders up to and including 100 amperes, 6 in. for power feeders over 100 amperes and up to 225 amperes, and 8 in. for power feeders over 225 amperes and up to 600 amperes.
- Pads--Pads shall be constructed of concrete or polymer concrete composite material. Concrete pads shall be no less than 6 in. thick. Concrete pads shall be brushed, chamfered, and graded for drainage.

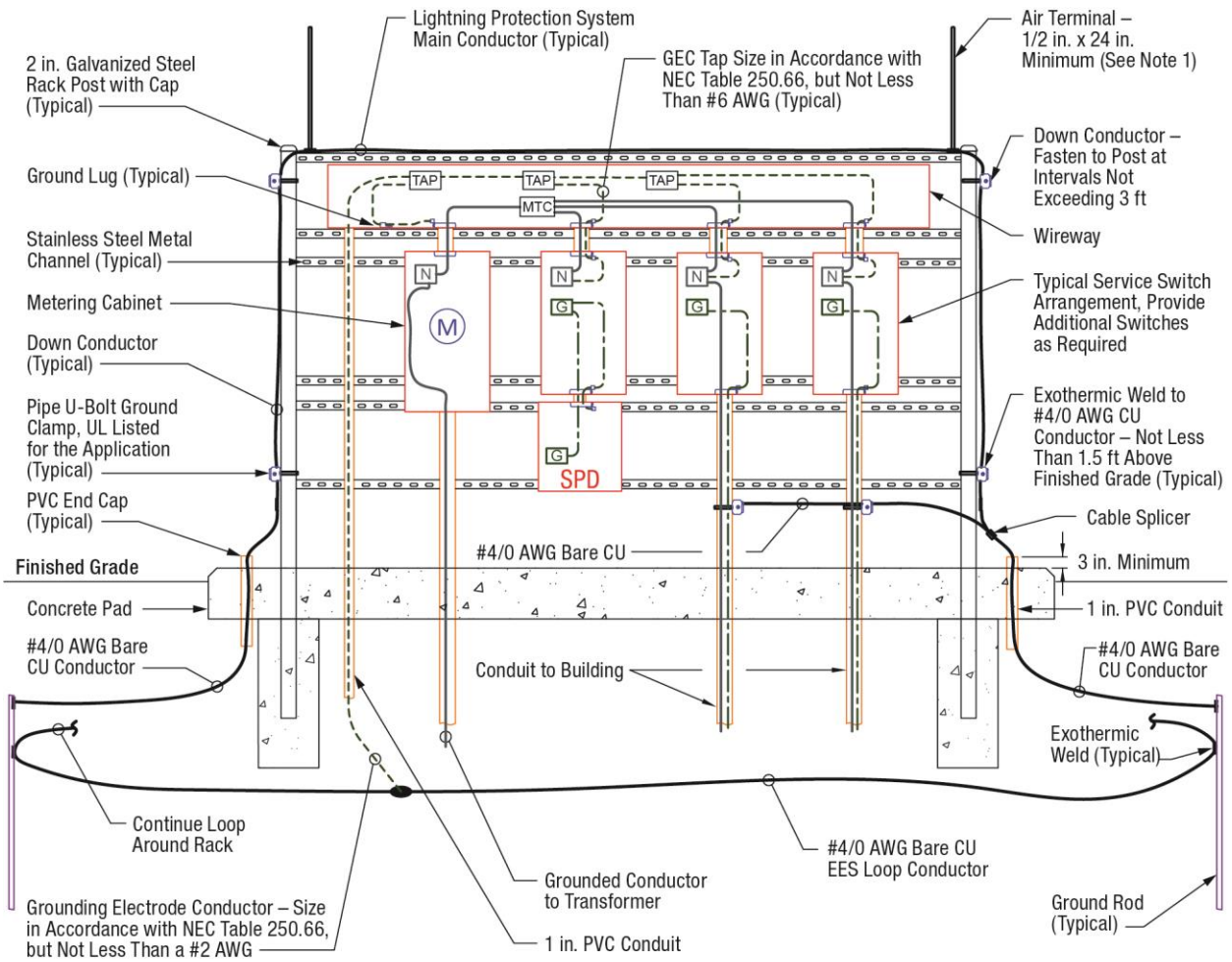

FIGURE 4.5.1-1. Typical ELD outdoor disconnecting means.

4.5.2 Exterior panel boards

Hinged-on-hinged panel boards are not required for exterior applications.

4.6 Terminations and splices

4.6.1 Terminations

All power cable terminations rated above 4,000 volts or with an outer shield shall be made with an authorized stress-relief device. Cable terminations shall be of a prefabricated design. Special care shall be exercised to provide the proper ratings and physical dimensions.

Exhibit 1

4.6.2 Splices

For medium voltage power cables (above 600 volts), use cold-shrink splice kits meeting ANSI/IEEE Std. 404 (for a 15 kV rating). For power cables below 600 volts, use heavy-wall self-sealing heat-shrinkable tubing meeting ANSI-C119.1-2006. Alternatively, use a poured epoxy splice, or any other splicing means approved by ANSI standards. The splice shall be approved by the lead FAA engineer or the FAA resident engineer.

4.7 Overcurrent protective devices

- For FAA ELD systems, the preferred protective devices are fuses. In transformers, fuses shall be immersion-type, current-limiting fuses, accessible from the exterior of the equipment.
- The specific type and size of protective device shall be selected based on a protective device coordination study and short circuit analysis, and as provided in the drawings.

4.8 Underground duct systems

The configuration of an underground duct system shall depend on the specific application. Conduit types used within FAA duct systems shall be of the size, material, and type indicated on the contract documents. Size of conduit shall always be indicated on the drawings. All conduit material shall be UL listed and installed in accordance with UL listings.

4.8.1 Concrete-encased rigid nonmetallic conduit

Rigid nonmetallic conduit consists of two types:

1) Concrete-encased Schedule 40 PVC conduit is preferred for ELD duct systems. Subject to FAA approval, to reduce costs or for special applications, direct-buried Schedule 80 PVC conduit may be used in lieu of concrete encasement.

2) High-density polyethylene (HDPE) with SDP rating of 11 is a rigid nonmetallic conduit commonly used for boring.

4.8.1.1 PVC conduit

PVC conduit shall meet the requirements of UL651 – *Schedule 40 and 80 Rigid PVC Conduit,* NEMA TC 2 – *Electrical Polyvinyl Chloride (PVC) Conduit.* Solvent-welded socket fittings shall meet the requirements of UL514C – *Non-Metallic Fittings for Conduit and Outlet Boxes,* and NEMA TC 3 – *PVC Fittings for Use with Rigid PVC Conduit and Tubing*.

4.8.1.2 HDPE conduit

HDPE conduit shall meet the requirements of ASTM F2160-10/ASTM 1962-11/NEMA TC7. Use standard dimension ratio (SDR) 11 HDPE conduit in all ELD installations. The SDR of a conduit is defined as the ratio of the average conduit diameter divided by the minimum wall thickness.

Exhibit 1

4.8.2 Plastic-coated steel conduit

4.8.2.1 PVC coated RGS

Where situations warrant, such as when runway and equipment shutdown impacts are a consideration, PVC coated RGS may be used in lieu of concrete encased PVC duct. This substitution must be annotated on the drawings. Direct-buried rigid galvanized steel shall be plastic coated. An acceptable alternative is RMC wrapped in half-lap fashion with pressure-sensitive 10-mil PVC-based corrosion protection tape.

PVC exterior coated, urethane interior coated, galvanized rigid steel conduit shall meet the requirements of NEMA RN 1 – *PVC Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit.*

4.8.2.2 Fittings and conduit bodies

Use 40 mil PVC exterior coated, urethane interior coated, zinc-plated, threaded, malleable iron meeting the requirements of UL514B – *Fittings for Conduit and Outlet Boxes,* and NEMA RN 1 – *PVC Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit*.

4.8.3 Direct buried rigid nonmetallic conduit

Direct-buried, non-concrete-encased conduit shall be Schedule 80 PVC or HDPE.

For PVC, solvent-welded socket fittings shall meet the requirements of UL514C – *Non-Metallic Fittings for Conduit and Outlet Boxes,* and NEMA TC 3 – *PVC Fittings for Use with Rigid PVC Conduit and Tubing*.

Where HDPE conduit is used in direct buried applications, the conduit shall meet the requirements of ASTM F2160-10/ASTM 1962-11/NEMA TC7. Use standard dimension ratio (SDR) 11 HDPE conduit. The SDR of a conduit is defined as the ratio of the average conduit diameter divided by the minimum wall thickness.

4.8.4 Rigid metal conduit (RMC)

Above-ground exterior conduit shall be rigid steel conduit.

Conduit used in exterior applications such as in a power distribution rack shall meet the RGS requirements of UL6 – *Rigid Metal Electrical Conduit*, and ANSI C80.1 – *Rigid Steel Conduit, Zinc Coated*.

RMC fittings and conduit bodies shall meet the requirements of UL514B and ANSI/NEMA FB1.

Fittings: Follow NEMA TC 9, NEMA TC 14, and ASTM F-512.

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4.9 Corrosion protection tape

Use pressure-sensitive, 10-mil-thick, PVC-based tape for corrosion protection of metal conduit and fittings.

4.10 Insulating bushings

Use NRTL-listed insulating bushings with 105º C rated insulation. Apply insulated protective caps to any unoccupied bushings. Dust caps shall not be used as substitutes for protective caps.

4.11 Grounding bushings

NRTL-listed, galvanized cast zinc fitting or malleable iron, 150º C rated insulated throat grounding bushings with lay-in type ground cable lugs.

4.12 Sweeps

All sweeps shall be PVC-coated or tape-wrapped rigid galvanized steel (RGS).

Do not provide sweeps into a manhole. Vaults shall be used for all transformer and switchgear applications wherever possible, eliminating the need for sweeps.

4.13 Duct spacers

Standard precast spacers (“chairs”) shall be used for duct support and alignment. Duct spacers shall provide a 3-inch separation between the conduit and the ground. There shall be a minimum of 3 inches of concrete on bottom, sides, and top of duct.

4.14 Duct plugs

In unused ducts, use soft, expansible gasket material compressed with non-metallic plates and bolts to produce a positive seal against water and gas.

4.15 Duct sealant

Do not use duct sealant within the duct bank system/conduits that interconnect the manholes. Only use duct sealant in and around conduits at the point they enter fixtures such as power equipment racks. Expanding foam sealants are not allowed.

Conduits entering a junction box or other electrical cabinets from underground shall be sealed with duct sealing compound at the point they enter the box or cabinet. Expanding foam sealants are not allowed for this purpose.

Conduit connections to the tops of exterior boxes, electrical cabinets, or switches shall be made with weatherproof hub fittings. For side and bottom entry points, use sealing locknuts.

4.16 Underground duct and cable warning tape

Furnish detectable underground warning tape for underground duct banks. Use aluminum-backed, 0.005 inch thick, underground warning tape with a red background color. Lettering shall be black and indicate the type service buried below:

"CAUTION BURIED ELECTRIC LINE BELOW"

Use tape width appropriate for the burial depth:

A. Three-inch wide tape for up to 18 inches depth.
B. Six-inch wide tape for up to 24 inches depth.

All direct buried cable shall be marked with extrusion-laminated underground marking tape. Tape shall be a minimum of six inches (6”) wide and shall run continuously in the cable trench six inches (6”) below the surface or as indicated on the project plans. Tape shall be bright red, and constructed of solid 100% pigmented plastic, and not an ink-coated plastic.

4.17 Pull wires and tape

For spare ducts, specify ¼ inch pull tape or nylon jet line having a minimum tensile strength of 210 pounds for non-metallic conduit. The FAA project engineer may specify a larger or more specialized pull tape (impregnated lubricant, distance marking, etc).

4.18 Precast electrical manholes and hand holes, accessories

4.18.1 Manholes and hand holes

Precast reinforced concrete electrical utility structures shall be of the size and shape as detailed on the drawings in conformance with ASTM C-858 – *Standard Specification for Underground Precast Concrete Utility Structures*. Electrical manholes are typically used for medium-voltage systems and are 4’ long, 4’ wide, and 4’ high, or as shown on the drawings. Electrical manhole sections shall conform to ASTM C-478. Electrical hand holes are typically used for low-voltage systems and are 3’ long, 2’ wide, and 30” high, or as shown on the drawings.

4.18.1.1 Manholes/hand hole structures, frames, and lids

4.18.1.1.1 Airports handling aircraft with maximum departure/takeoff weight of 30,000 lb and above--For airports with a design aircraft maximum departure weight of 30,000 lb and above,* manholes/hand holes, frames, and lids located within the airport runway/taxiway safety areas (RSA/TSA) shall be of the aircraft-rated type, designed and certified for 100,000 lb (45,000 kg) wheel loads with 250 psi (1.72 MPa) tire pressure. (Refer to FAA Advisory Circular

150/5320-6, Appendix 3, *Design of Structures for Heavy Airplanes*). Clearly indicate on the drawings underground utility structures that will be subject to aircraft loading. For planned future-expansion projects where manholes and hand holes are projected to fall within RSA and TSA boundaries, those structures shall be aircraft rated.

Outside the RSA/TSA, H-20 highway-rated manhole and hand hole components are permitted, provided an adequate proof load safety margin for the cover/cover frame is met. First, live loading shall meet basic H-20 loading requirements per A.A.S.H.T.O. HB-17, *Standard Specifications for Highway Bridges*. The live load shall be that loading which produces the maximum bending and shear moments in the structure. H-20 design wheel load is a minimum of 16,000 pounds, or 80 psi. For the safety margin, the cover/cover frame must meet AASHTO M306, which requires that it pass a proof load test of 40,000 lb applied on a 9x9-in. pad in the center of the cover/cover frame. H-20 rated utility structures that do not meet the above requirements shall not be used.

Manholes that consist of two sections shall be joined at the site to provide a watertight joint using a preformed flexible sealant as specified in ASTM C-990. A twelve inch (12 in.) diameter sump, four inches (4 in.) deep, shall be cast in the center of the manhole floor and supplied with a cast iron cover.

Manhole floor shall be cast integral with walls to form the bottom ring. Furnish a keyed joint between the bottom ring and top ring. Manhole roof shall be a one-piece concrete cap.

*Airports handling dual-wheel-landing-gear aircraft up to 60,000 lb maximum departure weight are permitted to use highway-rated manholes/hand holes and components in the RSA/TSA because the wheel load is distributed over four tires (60,000 ÷ 4 = 15,000 lb). Adequate safety margins must be met through proof loading. Refer to the H-20 loading requirements specified above.

4.18.1.1.2 Airports handling aircraft maximum departure/takeoff weight of 30,000 lb or below-- For airports with a design aircraft maximum departure weight of 30,000 lb or below (60,000 lb if dual-wheel landing gear), manholes/hand holes, frames, and lids located both within and outside the airport runway/taxiway safety areas (RSA/TSA) shall be of the highway-rated type, provided a safety margin for the manhole casting is added. Live loading shall be for H-20 loading with adequate safety margin as described in Section 4.18.1.1.1 above. Clearly indicate on the drawings underground structures that will be subject to aircraft loading.

For planned future-expansion projects where manholes and hand holes are projected to fall within RSA and TSA boundaries, and the expansion is expected to accommodate heavier aircraft with maximum departure/takeoff weight of 30,000 lb and above (60,000 lb if dual-wheel landing gear aircraft), those structures shall be aircraft rated. Concurrently, existing non-aircraft-rated manhole/hand hole structures throughout the airport's RSA/TSA areas shall be retrofitted with aircraft-rated structures and components.

Outside the RSA/TSA in non-vehicular traffic areas, other types of enclosure structures (e.g., polymer concrete, nonreinforced concrete, or other) may be used provided (1) they meet ANSI Tier 22 (design/ test = 22,500/33,750 lb) specifications, and (2) have been approved by the FAA resident engineer.

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Manholes that consist of two sections shall be joined at the site to provide a watertight joint using a preformed flexible sealant as specified in ASTM C-990. A twelve inch (12 in.) diameter sump, four inches (4 in.) deep, shall be cast in the center of the manhole floor and supplied with a cast iron cover.

Manhole floor shall be cast integral with walls to form the bottom ring. Furnish a keyed joint between the bottom ring and top ring. Manhole roof shall be a one-piece concrete cap.

Manhole markings--Identify electrical power manholes and hand holes by "FAA Power" markings cast in the steel cover, or so identified with a die stamped, nominal one sixteenth inch (1/16") minimum thickness copper plate, brazed or fastened to the cover with a minimum of two 10-32 brass machine screws.

4.18.2 Manholes accessories

Frame and lids--Use heavy duty cast iron manhole frame with solid lid, or other FAA approved manhole cover. Lid may be spring loaded. Alternatively, lid may consist of partitioned aircraft-rated lid segments, each segment capable of being lifted separately, facilitating easier and safer access.

Racks--Cable racks and cable support arms shall be furnished in the quantities and locations indicated by the drawings for each manhole. Racks shall be made of nonmetallic material (for example, PVC, plastic, or UL-rated glass-reinforced nylon). Saddle arms shall be as per the approved project drawings. Splices and cables shall be attached to cable racks.

4.19 Grounding cables

Depending on the application, ELD exterior grounding conductors shall be of the type and size required by applicable sections of FAA-STD-019.

4.20 Ground rods

Ground rods ("grounding electrodes") shall be three quarter inch (3/4") by ten foot (10') long copper or copper-clad steel.

4.21 Weather heads on risers, drip loops

Risers feeding FAA owned underground distribution systems shall have weather heads installed. Each weather head shall have drip loops that loop no less than 6" below the weather head.

4.22 Electrical equipment enclosures

Bases and cabinets of electrical equipment shall be of heavy-duty construction consisting of materials suitable to their geographic location.

Typical, dry, non-dusty environments--For typical dry conditions, mild steel (3R) bases and enclosures may be used. These provide protection against rain, sleet, and snow in outdoor applications.

Corrosive, wet, or windblown dust environments—For typical wet (or wet and salt-corrosive) conditions, and in rural areas subject to windblown dust, use stainless steel (4X) bases and enclosures.

For transformers installed in highly corrosive environments, the addition of totally stainless steel tanks and metering is required.

4.23 Equipment vaults and pads

Follow the drawings for specification and construction details of equipment foundation support structures. Specific applications are as follows:

4.23.1 Equipment vaults

For pad-mounted transformers and switchgear, use precast concrete vaults to facilitate ease of transition from duct bank system to transformer and switchgear termination points. Concrete shall meet or exceed a 28-day compressive strength of 4,000 psi.

4.23.2 Concrete pads for transformers and switchgear

Foundations of poured concrete pads for larger size transformers (>50 kVA) shall have a minimum thickness of 6 inches, unless otherwise specified on the drawings. Thicker pads than 6 in. may be considered in areas subject to frost heave. Concrete shall meet or exceed a 28-day compressive strength of 4,000 psi.

4.23.3 Concrete pads for power distribution racks

Foundations of poured concrete pads shall have a minimum thickness of 6 inches, unless otherwise specified on the drawings. Thicker pads than 6 in. may be considered in areas subject to frost heave. Concrete shall be chamfered, brushed, and graded for drainage. Concrete shall meet or exceed a 28-day compressive strength of 4,000 psi.

Prefabricated concrete pads with cutouts for conduit can be used where frost heave is prevalent. Install cables in conduit and leave a slack length of cable in case the pad is displaced upward by ground frost. Where pad cutouts are present, expansion couplers on protruding conduits should be considered in areas prone to frost heaving or ground settling.

4.23.4 Composite concrete equipment pads

Composite concrete equipment flat pads and box pads shall not warp, support flame, rust, or be UV degradable. Flat pads shall have a waffle bottom design to permit loose earth to fill bottom voids to level and stabilize the pad. Pads shall not be affected by asphalt, road salts, fertilizers, transformer oil, other common chemicals, weather, sunlight or other normal service conditions to which they may be exposed. Composite pads shall be capable, with equipment installed, of withstanding temperature variations of -40 degrees C (-40 degrees F) to +65 degrees C (149 degrees F) without cracking, splitting, or deforming. They shall not be designed and constructed so as to trap or hold water and shall be able to withstand repeated freeze-thaw cycles.

4.23.4.1 Lightweight polymer concrete equipment pads

If approved by the FAA Project Engineer, lightweight polymer concrete (LPC) flat pads and box pads that provide sufficient strength-to-weight ratios may be used. The pads shall have cutouts and preinstalled mounting hardware as required. No extra equipment is required to lift the pads into position. LPC pads shall meet or exceed a compressive strength of 11,000 psi per ASTM C579-96, a flexural strength of 1,800 psi per ASTM C580-93, and a modus of elasticity of 2,900,000 psi per ASTM C580-93. LPC pads/boxes shall also pass chemical resistance and impact resistance tests in accordance with ASTM C267-97 and D2444-93. LPC pads shall also meet NEC, ANSI/SCTE 77, and UL listing requirements.

4.23.4.2 Fiber reinforced concrete equipment pads

If approved by the FAA Project Engineer, fiber reinforced equipment pads may be used. Fiber reinforced pads shall be composed of cement mortar reinforced by alkali resistant glass fibers. The material shall incorporate a minimum of 4 percent by volume of alkali resistant glass fibers. The pads shall have cutouts and preinstalled mounting hardware as required. Fine aggregates shall conform to ASTM C33. Box pads shall have a minimum compression strength of 7500 psi after 28 days and flexural strength of 3200 psi. Box pad material shall meet or exceed the following results when tested under ASTM D695-08: peak load 1,187 lbf, peak stress 2,125 psi, and modulus 391 ksi. Pads shall meet or exceed a side wall deflection of .037” with 2,000 lb applied. Flat pads shall have a minimum compressive strength of 6,000 psi after 28 days.

4.24 Bollards

Bollards shall be used only where it is necessary to protect electrical equipment and enclosures from field vehicle damage or other mechanical damage. Bollard use and placement shall be as specified on the drawings or as determined by final location of equipment. Unless otherwise specified, use 4-in. diameter steel pipe filled with concrete. Bollards shall be placed 3 ft deep and extend 4 ft above ground level. Premanufactured plastic jackets shall cover each bollard.

5. EXECUTION

5.1 Scheduling of work

Scheduling of all work, including any airport runway impact, shall be part of the construction contract requirements. This specification shall serve as a reference specification to the construction contract.

Airport runways must remain in operation during certain periods. Contractors shall proceed in a manner that produces minimum disruption to the FAA and airport operations. During construction activity, contractors shall coordinate work through the FAA Resident Engineer, the airport authority, air traffic control tower, airport security, and other contractors as defined by the contract documents. Work performed within the RSA/TSA of an active runway may require runway/taxiway closing. Advance notice of proposed work near an active runway shall be required to be given by contractors to the FAA.

5.2 Existing FAA buried cable and ducts

5.2.1 FAA documentation

The contract documents define the drawing format used by the FAA to record the location of buried cable and ducts. The contractor shall use the FAA format during the course of work to ensure the accurate location of the new installations as described on the FAA drawings. Drawings and engineering documents published by a non-FAA entity shall be approved by the FAA project engineer.

5.2.2 FAA marking of known buried cables and ducts

All known FAA power, FOTS, control, and telecommunications cables leading to and from an operating facility shall be marked in the area of work by the FAA for the information of the contractor before starting work. The FAA will mark these cables once for the contractor. It shall be the contractor's responsibility to maintain these markings throughout the course of the project. Airport mowers may be expected to be in use by airport personnel throughout the duration of the work, keeping markers visible. FAA is responsible for marking FAA cables ONLY. The contractor shall be responsible for marking other cables and utilities in the work areas through a third party location service.

5.2.3 Other buried cables, ducts, piping and items

Locating utilities--The contractor shall be responsible for contacting the utilities prior to starting work and for confirming the location of existing utilities and other items that may be buried in the area of work. Along an area suspected of having utilities of any sort, the contractor shall hand dig or use other authorized low-impact digging system such as potholing. The airport authority shall be contacted to locate those items owned or known by the airport to exist.

Avoiding buried structures--The contractor shall take precautions to protect existing underground (buried) items including but not limited to fuel tanks; water lines; buried control, telecommunications, FOTS, and power cables; ducts; and structures. Buried items shall be protected from damage for the duration of work. The contractor shall immediately repair, with equal material by skilled workmen, those items damaged by the contractor or subcontractor.

Procedure for making repairs during installation--Prior authorization from the FAA shall be obtained for the materials, workers, time of day or night for making repairs, method of repairs, and permanent repairs the contractor proposes to make. In the event of inadvertent damage, the contractor shall immediately stop work and notify the FAA and utility when appropriate. Repair work shall be inspected and authorized by the FAA with the concurrence of the affected utility company, airport, or other owner(s) of the damaged item(s).

Replaced cables—Replaced cables shall trace the same routing path as previously employed. Should there be a need to divert from the previous route, careful planning shall be exercised, especially in areas where utilities, communications, control, and NAVAIDS systems such as Glide Slope and Localizer facilities are installed or planned to be installed in the future. Approval from the office of primary interest is required.

5.3 Safety during construction and testing

All necessary site work included in the overall scope of work, from delivery to site to final authorization, shall undergo a safety risk assessment. A detailed, site-specific, Safety Risk Assessment shall be submitted by the FAA Project Engineer for final authorization no fewer than 3 weeks prior to commencement of on-site work. During construction, installation, and testing, the contractor shall comply with the safety rules of FAA (FAA Order JO 3900.XX, FAA Advisory Circular AC 150/5370-2) and those dictated by OSHA (Part 1926), NEC, ANSI/IEEE, and ANSI C2 (the NESC). The contractor shall be responsible for the implementation of FAA-authorized items in the Safety Risk Assessment document.

5.4 Excavation and trenching

The following are general excavation and trenching requirements. Note paragraphs that follow for particular requirements for either (1) direct earth buried cables, or (2) underground duct cables.

5.4.1 Depth requirements

IEEE ANSI C2 (part of the National Electric Safety Code) specifies the minimum legal depth requirements for medium-voltage power cable during installation. Tailoring organizations shall evaluate site-specific requirements and follow the following standards in order of precedence: (1) IEEE ANSI C2, then (2) paragraphs below, then (3) local standards if applicable.

Conduits shall meet the following minimum standards:

a. Unless otherwise specified due to soil conditions or other circumstances, cables, conduits, and ducts shall be buried to the minimum depth to their top as specified by the following paragraphs b through g. In the event that achieving the minimum depth is not feasible, follow the direction of the FAA Resident Engineer.

b. Top of direct-earth buried (DEB) conduit or cables 600 volts and below shall be a minimum of twenty four inches (24") below finished grade, per ANSI C2 (see Table I), unless local conditions and regulations require deeper burial, in which case the contractor shall advise FAA about these conditions and regulations before proceeding with the construction.

TABLE I. Burial depths for DEB cable (source: ANSI C2)

Voltage (phase to phase)	Depth of burial	
	(mm)	(in.)
0 to 600	600	24
601 to 50,000	750	30

c. Top of direct-earth-buried conduit or cables over 600 volts shall be a minimum of thirty inches (30") below finished grade, per ANSI C2 (see Table I), unless local conditions and regulations require deeper burial, in which case the contractor shall advise FAA about these conditions and regulations before proceeding with the construction.

d. If finished grade has not been established before the cable trenches are excavated, it is the contractor's responsibility to determine what the final finished grade elevation will be and excavate the trench deep enough to meet the depth requirements at the end of the project.

e. Underground concrete-encased duct, and duct consisting of PVC Schedule 80, HDPE with SDP rating of 11, or RGS conduit, shall be installed so that the top of the conduit is buried at not less than twenty-four inches (24") below finished grade.

f. Additional requirements for all ducts: concrete-encased duct, rigid steel conduit, or PVC conduit shall be installed so that the top of the conduit is buried as follows:

1. When installed under runways, not less than thirty inches (30") below the bottom of paving, or as specified by the airport authority,

2. When installed under taxiways, not less than thirty inches (30") below the bottom of paving, or as specified by the airport authority,

3. When installed under other paved areas, in accordance with Table I or as required by the local jurisdiction.

4. For railroads and state-owned highways, at the minimum depth below grade as specified by those entities.

5. Where local conditions require unusually deep burial of ducts, contractor shall discuss the situation with the FAA project engineer and obtain preauthorization.

g. In northern climates where deep trenching is cost prohibitive as determined by the FAA, use a standard depth of not less than 24 inches (24") from top of duct, cable, or conduit to finished grade.

h. Cables shall not be direct buried under paved areas, runways, taxiways, roadways, railroad tracks, or ditches. Where cables cross under roads or other paving exceeding 5 feet in width, such cables shall be installed in rigid steel conduit, concrete-encased PVC, steel conduit, or high-density polyethylene (HDPE) conduit, as defined by the contract documents. Where cables cross under railroad tracks, such cables shall be installed in accordance with the requirements of the railroad authority. Cables under railroad grades may be installed in reinforced concrete-encased ducts, rigid galvanized steel sleeves, or HDPE conduit, subject to the requirements of the railroad authority. HDPE must be of sufficient crush strength to withstand expected static and dynamic loads over the expected lifetime of the cable without deformation. For directional boring under railroad and roadway grades, standard dimension ratio (SDR) 11 shall be used. The SDR of a conduit is defined as the ratio of the average conduit diameter divided by the minimum wall thickness. When installing direct buried cable, ducts shall extend at least 1 foot beyond each edge of paving and at least 5 feet beyond each side of railroad tracks.

i. Where direct burial cable transitions to duct-enclosed cable, direct-burial cables shall be centered in duct entrances, and a waterproof nonhardening mastic compound shall be used to facilitate such centering. Cables may be pulled into duct from a fixed reel where properly sized rollers are provided in the trench. Where cable is placed in duct (for example, under paved areas, roads, or railroads), ducts shall be made to slope in order to drain.

j. Where cuts are made in paving, the paving and subbase shall be restored to their original condition.

5.4.2 Survey requirements

5.4.2.1 Recording of data

The ELD project record shall consist of (a) information entered in computer-aided design and drafting (CADD) systems, (b) manual plotting onto the FAA drawing set, (c) Global Positioning System (GPS) data, (d) Geographic Information System (GIS) information or databases, and/or (e) other appropriate documentation as set forth in the contract documents.

Placement of markers--Drawings shall record positions of markers placed on top of direct earth buried (DEB) cable trenches. The markers shall be identified on the drawings by a small circle with a "P" in the center for power cable, "C" for control/fiber cable, "R" for coaxial cable, "S" for special purpose points, and "T" for telecommunications cable.

DEB cable--DEB cable trenches shall be identified on the drawings with text boxes pointing to the trench indicating what is in the trench. If there are several cables in the trench, each cable shall be called out. Power cables shall be identified both by the actual working voltage of the cable and the cable insulation rating. Anything unusual, peculiar, or unique about the cable runs shall also be called out in the drawings.

Duct banks--Duct banks shall be plotted on the drawings. Duct banks that are installed for future use shall have text boxes pointing to them indicating that they are future-use duct banks.

Manholes, hand holes, and splices--Manholes shall be identified on drawings by a small square with an "MH" in the center. Hand holes shall be identified by a small square with an "HH" in the center. Where manhole and hand hole numbers are provided on the contract drawings, they shall also be called out on the completed cable drawing. Splices made in manholes and hand holes shall be shown on the cable drawings.

Abandoned cables—If possible, the contractor shall indicate on the as-built drawings the locations of abandoned cables in places where they affect the excavation of new trenching, such as at points of intersection with other structures, including runways, taxiways, concrete pads, utility pathways, roads, etc.

5.4.2.2 Survey points

The contractor shall record the survey point of each manhole using GPS coordinates. At each major change of direction of the cable circuit, a manhole shall be installed and its location surveyed and recorded. Surveying and data gathering for this purpose shall be completed before a trench or structure is backfilled.

If for some reason the cable path deviates from a straight line between manholes, the deviation should be recorded as a survey point, using GPS coordinates, on the drawings for future reference. Where the cable terminates to a building, a transformer, an antenna, a light bar, an outside demarcation cabinet, power distribution rack, or other similar device, the survey shall include the GPS coordinates of the device or facility at the point where the cable terminates.

Special-purpose points--Special-purpose points may be used to indicate points such as splices or entrances to duct banks in records and on the drawings. Special-purpose points shall be accompanied by a text box to describe the function of the specific point.

5.5 Underground duct systems

Power distribution cables at FAA installations shall be installed in underground duct systems. Unless preauthorized per the drawing set and construction specifications, direct earth burial (DEB) of power distribution cables is prohibited. If preauthorized, any DEB construction shall meet the requirements in Section 5.6.

5.5.1 Preparation and excavation for underground ducts

In preparing to install underground ELD ducts, contractor shall meet the industry standards given in this section. Contractor shall also work with FAA to contact the owner for their requirements, coordinating underground ELD duct work to avoid interference with other airport projects and existing utilities. The contract specifier shall work with the Power Cable (ELD) Program Office to ensure coordination of work with other FAA programs that may have an interest in using the same duct system or trench.

The contractor shall excavate trenches for underground ducts as follows:

a. To the depth specified in paragraph 5.4.1.

b. Install underground duct bank systems according to the NEC, the NESC, NECA/NEMA 605 (*Recommended Practice for installing Underground Nonmetallic Utility Duct)*, ANSI/IEEE C2, and other requirements in this section.

c. Verify routing and termination locations of duct banks before excavation for rough-in.

d. Verify that field measurements are as shown on the drawings.

e. Position trench so concrete envelope of duct banks have minimum horizontal and vertical separations from parallel or perpendicular runs of other utility pipes or conduits (see Table II. Use Table II as a baseline, but always coordinate with local utilities for their requirements).

Note: Measurements are guides only; check with local authorities and the utility owners for their specific requirements.

f. Make trenches of sufficient width to receive work to be installed and provide specified concrete coverage on sides.

g. Conduit or castings required under roadways or railroads shall be installed by boring. Jacking of conduit is not allowed. Conduits bored under roads off airport property shall be a minimum of 30 inches (30”) below finished grade, or as required by the local jurisdiction.

h. Backfill excavations for duct banks and manholes in 6-inch layers using excavated soil. Remove roots, rocks and sharp objects. Furnish coarse sand as required for additional backfill material.

i. Moisture-condition backfill soil and compact to 95% of maximum density under paved areas and 90% of maximum density under unpaved areas.

j. Firmly tamp backfill.

k. Restore area.

TABLE II. Spacing of power cable ducts from other utilities.

UTILITY TYPE	PARALLEL LINES	PERPENDICULAR CROSSINGS
Water	36 inches horizontal separation	24 inches
Gravity Sewer	36 inches horizontal separation	24 inches
Force Main Sewer	36 inches horizontal separation	24 inches
Storm Drain	36 inches horizontal separation	24 inches
Natural Gas	60 inches horizontal separation	24 inches
Steam or Hot Water	60 inches horizontal separation	24 inches
Communications	24 inches horizontal separation of tamped soil or 3 inches of concrete. *No separation required for fiber optic cables.*	12 inches vertical separation of tamped soil or 3 inches of concrete
Electrical	12 inches horizontal separation of tamped soil or 3 inches of concrete	12 inches vertical separation of tamped soil or 3 inches of concrete

5.5.1.1 Connecting requirements for HDPE conduit running through and emerging from a bore

When placing HDPE conduit underground through a bore, use one continuous length of flexible HDPE conduit. In instances where a continuous run of conduit is not possible, individual sections shall be joined using heat-welded (fused) connections. After emerging from a bore, the HDPE will typically terminate in a manhole at both ends.

To join lengths of conduit together after emergence from a bore, follow these procedures:

a. If the emerging HDPE conduit is to be joined to PVC conduit, the HDPE conduit section shall be run into the bell end of the PVC conduit and cemented using a special bonding agent (Table III) (see Appendix F for a sample two-part bonding product). Adhesives typically used for connecting PVC segments are not of sufficient strength for HDPE-to-PVC transitions and shall not be used. Alternatively, the HDPE conduit may be connected to a PVC coupling on the end of a length of PVC conduit. The point of transition shall then either be (1) encased in concrete together with the remaining run of

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PVC, or (2) direct earth buried, depending on the type of burial method used for the rest of the run.

b. Connection details involving HDPE conduit shall be shown on the drawings.

TABLE III. Adhesive minimum pullout-force requirements for bonding HDPE to HDPE and HDPE to PVC conduit materials.

Conduit Diameter	Polyethylene Conduit to PVC Standard Coupling	
	Coupling length	Pullout Force
1 inch	2 ⅛ inch	760 lb
1 ½ inch	2 ⅜ inch	1,140 lb
2 inch	2 ½ inch	1,520 lb
4 inch	3 ¾ inch	4,560 lb

5.5.2 Backfilling

Backfilling material and procedures depend on the design used, whether concrete-encased duct or direct buried conduit. Consult FAA Advisory Circular AC 150/5370-10 for construction details.

Trenches shall be completely backfilled and tamped level with the adjacent surface. When necessary to obtain the desired compaction, backfill material shall be moistened or aerated. When sod is to be placed over a trench, backfill shall be stopped at a depth equal to the thickness of the sod to be used. Excess excavated material shall be removed in accordance with the contract documents. If approved, allow the trench to be backfilled with concrete, flush with the surface.

5.5.3 Restoration

Restoration shall be in accordance with local airport authority requirements, or as otherwise stated in the contract statement of work. Where it has been removed, soil shall be replaced as soon as possible after the backfilling is completed. All areas disturbed by the trenching, storing of dirt, cable laying, pad construction, and other work shall be restored to the original condition.

Restoration shall include the necessary grading, seeding, sodding, sprigging, or hydroseeding as required to restore the disturbed area to match the adjacent area. Where trenching cuts through paved areas, the surface shall be properly backfilled and resurfaced with paving similar to the original paving, or with concrete, as the drawings specify.

Resurfaced areas shall be level with original paving, free from cracks, and capable of withstanding full traffic loads without settling or cracking. The contractor shall be held responsible for maintaining all disturbed and restored surfaces until final acceptance by the FAA.

5.5.4 Duct installation

Cable duct banks shall be installed outside of the airport runway/taxiway safety areas (RSA/TSA), as well as ILS critical areas, to the greatest extent possible. Where trenching is required through an RSA or TSA area, place the manholes to the farthest extent possible outside the RSA and TSA while still maintaining standard spacing and directional change requirements as noted elsewhere in this specification. For locations of RSA/TSA/ILS areas, consult with the FAA Project Engineer and/or the local airport owning authority. (See also FAA Order JO 6750.16, *Siting Criteria for Instrument Landing Systems*, and FAA Advisory Circular 150/5300-13, *Airport Design*, particularly Chapter 6, *Navigation Aids [NAVAIDs] and On-Airport Air Traffic Control Facilities [ATC-F]*).

When there is an immediate change in direction of a duct system, a manhole or hand hole shall be installed. Any gradual change in direction (e.g., a gradual arc of the duct) shall require the approval of the resident engineer prior to installation.

Do not use duct sealant within the duct bank system/conduits that interconnect the manholes. Only use duct sealant in and around conduits at the point they enter fixtures such as power equipment racks. Expanding foam sealants are not allowed.

5.5.5 Manhole and hand hole installation

5.5.5.1 Manhole installation

Install manholes every 600 feet. Where there are long continuous, straight runs, manholes may be placed up to 1200 feet apart with preapproval of the project engineer. When there is a planned change in direction of the conduit between manholes of greater than 45 degrees (cumulatively within a run), an additional manhole shall be installed in place of the directional change (Figure 5.5.5.1-1).

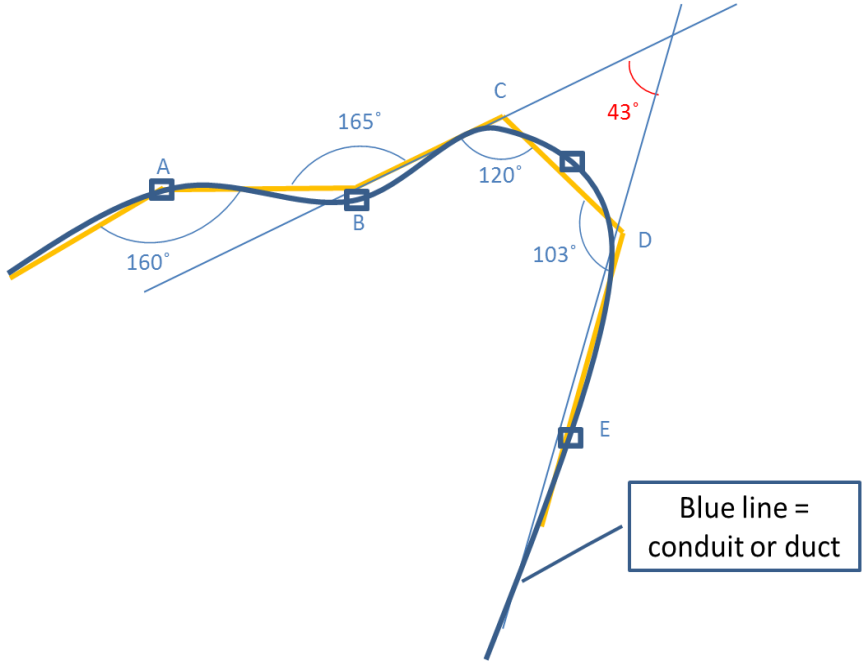
The top of the completed manhole shall be set above finish grade in unpaved areas to prevent water from ponding on the manhole. Place the top of the manhole 2 inches (2”) above grade, plus or minus 1 inch (1”). Grade the backfill material downward and away from the manhole. A one-eighth-inch (1/8”) per foot fall from the manhole top to finish grade, ten feet (10’) from each edge of the manhole is recommended.

The manhole lower half shall be set on a four-inch (4”) bed of crushed stone on undisturbed earth. Add a layer of geotextile fabric between the gravel and earth to enhance soil stability and prevent settling of the manhole. The contract drawings will define any additional requirements where soil bearing capacities are an issue or concern.

Backfill around the manhole in lifts commensurate with the soil and compact each backfill lift to the density of the surrounding earth.

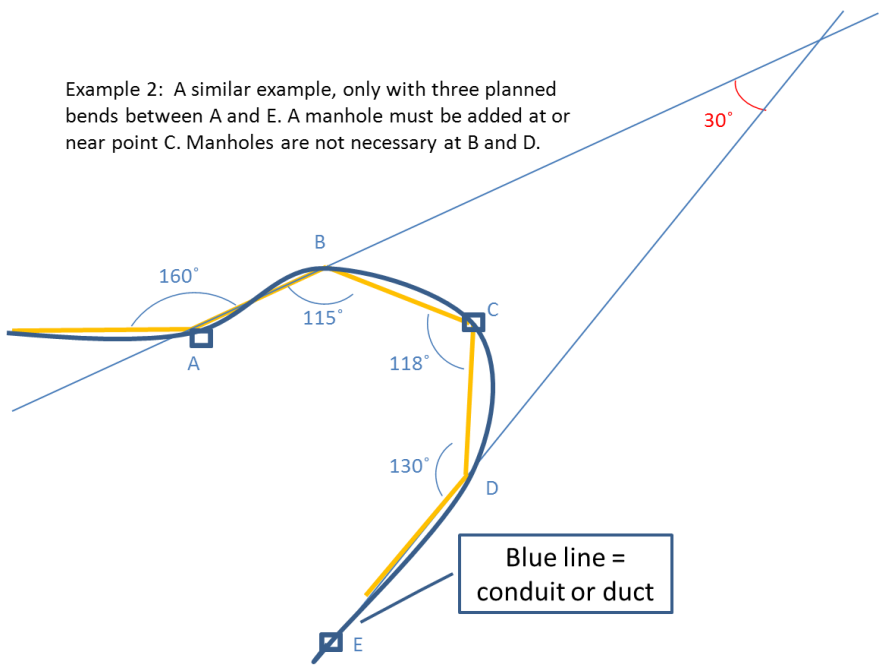
Exhibit 1

Example 1: Bends at points A and B are greater than 45 degrees and are proper. Bends at planned manholes C and D each individually are greater than 45 degrees and are nominally proper, but in combination, they form a virtual angle of less than 45 degrees. Therefore, a manhole is required between points C or D. Measured angles shall take into account entrance and exit angles of the duct if entering or leaving a manhole or hand hole.



(A)

Example 2: A similar example, only with three planned bends between A and E. A manhole must be added at or near point C. Manholes are not necessary at B and D.



(B)

FIGURE 5.5.5.1-1. Adding a manhole at points of tight radius of a duct or conduit.

Exhibit 1

5.5.5.2 Hand hole installation
The top of the hand hole shall be set above finish grade in unpaved areas to prevent water from ponding on the hand hole. A one eighth inch (1/8") per foot fall from the manhole top to finish grade, ten feet (10') from each edge of the hand hole is recommended.

The hand hole shall be set on a four-inch (4") bed of crushed stone on undisturbed earth. Add a layer of geotextile fabric between the gravel and earth to enhance soil stability and prevent settling of the manhole. The contract drawings will define any additional requirements where soil bearing capacities are an issue/concern.

Backfill around the hand hole in lifts commensurate with the soil and then compact each lift to the density of the surrounding earth.

5.5.5.3 Equipment manhole and hand hole conduit penetrations
Where a steel conduit penetrates a wall of a manhole or hand hole, a grounding bushing shall be installed. In medium-voltage manholes and hand holes, these grounding bushings shall be connected to each other and to the earth ground system with 6 AWG tinned bare copper conductors. In low-voltage hand holes, the grounding bushings shall be connected to the circuit equipment grounding conductor.

5.5.6 Mandrel requirements

The contractor shall mandrel each duct or conduit installed and each existing duct or conduit in which cable is installed or replaced. As each conduit run is completed, proceed according to the following steps:

a. For conduit sizes 3 inches (3") and larger, draw a flexible testing mandrel approximately 12 inches (12") long with a diameter less than the inside diameter of the conduit through the conduit. Next, draw a stiff bristle brush through until conduit is clear of particles of earth, sand, and gravel; then immediately install conduit plugs.

b. For conduit sizes less than 3 inches, draw a stiff bristle brush through until conduit is clear of particles of earth, sand, and gravel; then immediately install conduit plugs (see UFGS 33 71 02.00 20).

c. If the mandrel fails to pass through the duct being tested, either the duct is obstructed, misaligned, or the curve has too small a radius. If obstructed, use a high-pressure water jet to clear the conduit. Defective duct(s) shall be exposed and the defect corrected. After the duct(s) are repaired, repeat the mandrel test in that section of duct.

5.5.7 Spare ducts

Spare ducts shall only be used for power and nonmetallic fiber optic telecommunication systems (FOTS) cables. Jet line or pull tape shall be included in the duct.

5.5.8 Duct protection

All power cable ducts shall be securely fastened in place during construction and progress of the work, and shall be plugged daily at the end of work to prevent entrance of foreign material. A duct section having a defective joint shall not be installed.

All concrete-encased power cable ducts shall be raised at least 3 inches off the bottom of the trench using spacers ("chairs"). Bottom spacers may be secured to nominal one inch (1") boards to prevent sinking and overturning. This step shall be followed by a monolithic pour of concrete. Where two or more ducts are encased in concrete the contractor shall space them at not less than one and a half inches (1-1/2") (measured from outside wall to outside wall) using spacers applicable to the type of duct. As the concrete pour progresses, concrete not less than three inches (3") thick shall be placed around the sides and top of the duct bank. Interlock spacers shall be used every five feet (5') to ensure a uniform spacing between ducts.

Joints in adjacent ducts shall be staggered a minimum of twenty four inches (24") apart and shall be made completely waterproof prior to covering with concrete.

5.5.8.1 Concrete mix specification

Concrete for ELD structures such as pads and vaults shall have a minimum 28-day compressive strength of 4,000 psi. Concrete for concrete-encased ducts shall have a minimum 28-day compressive strength of 2,000 psi.

5.5.9 Ducts without concrete encasement

Trenches for single-duct power cable runs shall be no less than six inches (6") or more than twelve inches (12") wide, and the trench for two or more ducts installed at the same level shall be proportionally wider. Trench bottoms for ducts without concrete encasement shall be made to conform accurately to grade to provide uniform support for the duct along its entire length. A three inch (3") layer of bedding material shall be placed around the ducts. The bedding material shall contain no particles that would be retained on a half inch (1/2") sieve. The bedding material shall be tamped until firm. When two or more ducts are installed in the same trench without concrete encasement, they shall be spaced not less than two inches (2") apart (outside wall to outside wall) in a horizontal direction, or not less than six inches (6") apart (outside wall to outside wall) in a vertical direction.

Do not use duct sealant within the duct bank system/conduits that interconnect the manholes. Only use duct sealant in and around conduits at the point they enter fixtures such as power equipment racks. Expanding foam sealants are not allowed.

5.5.10 Separation of cables in duct

If installing communication, control, or signal cables in the vicinity of power cables, consult first with the FAA office of primary responsibility for guidance.

For the purposes of this document, "duct" is defined as a set of parallel-running conduits. Together, conduits make up a duct or ductbank system. Subject to the approval of the FAA project engineer, separation of cables installed in conduit or duct shall be as follows:

a. Power cables of the same circuit shall be installed in the same conduit.
b. Conductors of circuits rated 600 volts nominal or less, ac circuits, and dc circuits shall be permitted to occupy the same equipment wiring enclosure, cable, or raceway. Conductors shall have an insulation rating equal to at least the maximum circuit voltage applied to a conductor within the enclosure, cable, or raceway, NEC 300.3 (C)(1).
c. Conductors of circuits rated equal to or greater than 600 volts nominal shall not occupy the same equipment, wiring enclosure, cable, or raceway with conductors of circuits rated less than 600 volts nominal unless preauthorized by the FAA project engineer and as permitted in NEC 300.3 (C)(2).
d. Except in circumstances authorized by the FAA project engineer, power cables shall not be installed in the same duct systems with communication, control, and signal cables. Communication, control, and signal cables may be installed without separation from each other.
e. If joint-use applications with communication, control, or signal cables are authorized, power cable shall be installed in its own separate conduit. The conduit shall be separated a minimum of three inches (3"), outside wall to outside wall, from conduits that contain communications, control, and signal cables. The actual separation for each specific case shall be stipulated by the FAA project engineer.
f. Where cables of different types (i.e., power and control or signal) or different voltages are jointly installed as above, the individual cables or groups of cables shall be clearly and unambiguously identified by voltage and type.
g. Fiber optic, communications, and control cables shall have clearly identified and marked hand holes, pull boxes, and junction boxes that are completely separate from power cable manholes.

5.5.11 Installation of cables

To minimize splicing, the longest practicable lengths of cable shall be pulled into the ducts at one time. Unless otherwise specified, electrical power manholes and hand holes shall be as far apart as practicable based on the pulling specification of the cable installed. Typically, manholes and hand holes are installed 600 ft apart and at all points where directional change of the duct system is greater than 45 degrees. For long, straight, continuous runs, spacing may be increased, not to exceed 1,200 ft, provided cable manufacturer's specifications for pulling tension has been met, and subject to the project engineer's oversight. To meet grounding requirements of underground multigrounded neutral cable systems over 1,000 V, under no condition shall the distance between manholes or hand holes exceed 1,200 ft in accordance with ANSI C2 (NESC), Rule 96C, standard.

Splicing lengths of cables of different construction types together is not allowed. For example, do not connect shielded cable to concentric cable, or shielded cable to old unshielded cable. Exceptions to this rule will require written PSG approval before installation.

Where a power cable duct or conduit crosses a runway or taxiway, manholes and hand holes shall be placed just outside the RSA/TSA boundaries on opposite sides of the crossing. This will allow for adequate working space to avoid penetrating the safety areas during installation and maintenance activities.

The contractor shall verify that the duct is open, continuous, and clear of debris or blockage (use mandrel) before installing cable. Cable shall be installed in a manner to prevent harmful stretching of the conductor or damage to the outer protective covering or conductor insulation. Until connections are made, cable ends shall be sealed using adhesive-lined, heat-shrink end caps. Where more than one cable is to be installed in one duct, cable shall be pulled at the same time. In no case shall a splice be pulled into a duct or conduit.

When cable cutting is required, cable ends shall be effectively sealed against moisture immediately after cutting, using end caps as above. Bends of a radius less than eight (8) times the diameter for rubber-covered or plastic-covered cable, or twelve (12) times the diameter for metallic armored cable, shall not be made. Cable that has been kinked shall not be installed.

When unreeling, an observer shall be stationed at the reel to report cable irregularities. Unless specifically stated in the drawings, cables for installation in ducts or for direct burial shall comply with FAA-E-2793A. Specifically excluded are bare concentric neutral wire cable types. If communications or fiber optic cables are present in the same manholes and hand holes as medium voltage power cables, fire wrap the power cables.

5.5.12 Cable pulling

The below provisions on cable pulling shall be followed unless otherwise specified on the submittals matrix (Appendix E).

The contractor shall obtain from the manufacturer an installation manual or set of instructions that address such parameters as cable maximum allowable pulling tension and maximum allowable sidewall bearing pressure.

When requested by the project engineer, the contractor shall provide pulling calculations and a pulling plan, which shall be submitted along with the manufacturer’s instructions. Cable shall be installed strictly in accordance with the cable manufacturer's recommendations, ANSI/IEEE C2 standards, and the authorized installation plan.

In addition to any data or calculations required by the project engineer, the pulling plan shall include at a minimum:

a. The cable manufacturer and type of cable.

b. Maximum allowable pulling tension on each different type and size of conductor, and maximum allowable pulling tension on pulling device (see UFGS-33 71 02.00 20).

c. Cable sidewall bearing pressure.

Prior to pulling cable, pump the water out of the manholes and pull a mandrel/swab 1/4 inch smaller than the duct diameter through duct run to ensure adequate opening of duct run. Thoroughly swab conduits to remove foreign material before pulling cables.

Cables shall not be pulled from an outdoor (exterior) location when the outdoor (exterior) air temperature is below the cable manufacturer's minimum recommended pulling temperature.

Contractor shall furnish required installation tools to facilitate cable pulling without damage to the cable jacket. Such equipment is to include, but be not limited to, framework, sheaves, winches, cable reels and/or cable reel jacks, duct entrance funnels, pulling tension gauge, and similar devices.

The diameter of the sheaves shall be at least 10 times that of the diameter of the largest cable. Equipment shall be of substantial construction to allow steady progress once pulling has begun. Makeshift devices which may move or wear in a manner to pose a hazard to the cable shall not be used. Cable installation may be accomplished using a power winch or by hand.

Cable pulling lubricant shall be used to ease pulling tensions. The lubricant shall be compatible with the jacket material. The FAA project engineer will authorize the lubricant type used. Lubricant shall be water or silicone based so as not to injure the cable material used. Wax-based lubricants are not allowed. Lubricant shall not harden or become adhesive with age. Petroleum grease shall not be used.

Cable ends shall be sealed and firmly held in the pulling device during the pulling operation.

Use of a tensiometer or dynamometer is required for cable-pulling operations. Actual pulling tensions shall be continuously monitored. If actual pulling tension exceeds maximum pulling tension by 30% or more, the pulling operation shall be suspended and the project engineer consulted for investigation of a possible pulling obstruction or other anomaly. The cable pulling operation shall not exceed maximum allowable pulling tension. See Figure 5.5.12-1.

During pulling operations, several personnel shall be stationed at key points to ensure safety to cable and personnel: at duct entry, duct exit, cable feed, and at the pulling machinery.

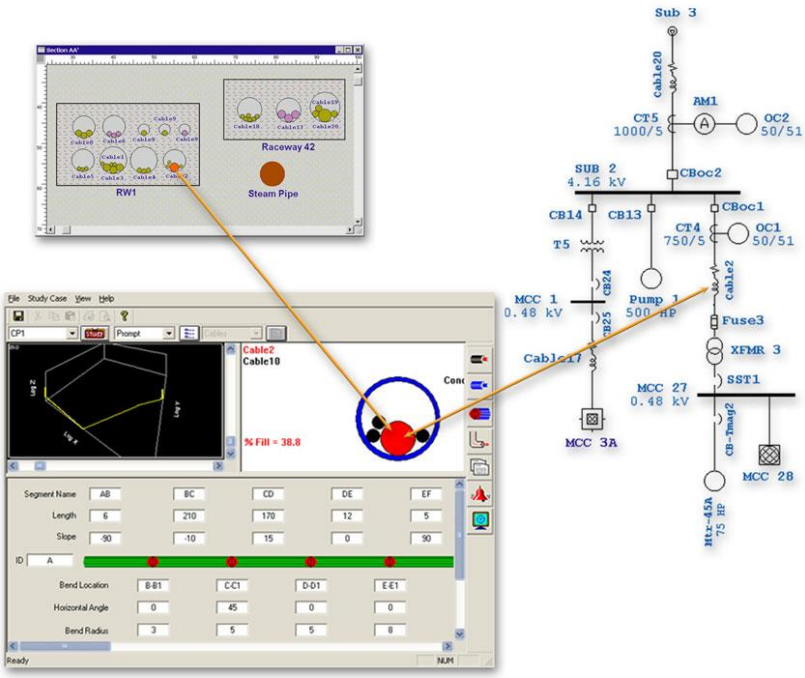


Diagram courtesy of ETAP Cable Systems Software

FIGURE 5.5.12-1. Industry software is readily available to assist with pulling calculations.

Avoid abrasion and other damage to cables during installation. The surface of a cable sheath or jacket shall not be damaged to a depth greater than one tenth (1/10th) the original thickness or be flattened out-of- round more than one tenth (1/10th) of the outside diameter.

Where cables are left in manhole or switchgear overnight or more than 8 hours prior to termination, the cable ends shall be sealed with paraffin or shrink wrap caps and supported in a manner which will prevent entrance of moisture into the cable. Cable shall be terminated and energized as soon as possible.

Table IV lists example maximum pulling tensions for commonly installed cables (see also Appendix B for a pocket guide on calculation methods).

The table is for illustration purposes only; it is the designer's and/or installer's responsibility to obtain the manufacturer’s data for the cable chosen for installation. The manufacturer’s data shall be used in conjunction with the pull-configuration(s) proposed, cable type and ampacity, size of conduit, distance, grade, degree of sweeps/bends, proper lubricant, etc, to calculate the maximum tension for each cable pull. The resulting value shall not exceed cable maximum tension and maximum sidewall pressure values.

Exhibit 1

TABLE IV. Maximum allowable non-armored power cable pull tensions using tensiometer/dynamometer and rope.

CABLE	TENSION (Pounds)	ROPE DIAMETER (INCHES) Cotton	Manila	Dacron	Nylon
2 - 1c #8 Solid	264	3/16			
3 - 1c #8 Solid	264	1/4	3/16		
4 - 1c #8 Solid	422		1/4		
2 - 1c #6 Stranded	420	1/4	3/16		
3 - 1c #6 Stranded	420	5/16	1/4		
4 - 1c #6 Stranded	672	3/8		3/16	
1 - 2c #8 Stranded	264	1/4			
1 - 3c #8 Stranded	396	1/4			
1 - 4c #8 Stranded	528		1/4		
1 - 2c #6 Stranded	420	1/4	3/16		
1 - 3c #6 Stranded	630	5/16			
1 - 4c #6 Stranded	840	3/8	5/16	3/16	
1 – 1c #4 Stranded, Conc Neut (CN)	334	For pull rope sizes, consult manufacturer (etc)			
2 – 1c #4 Stranded, CN	668				
3 – 1c #4 Stranded, CN	1,002				
4 – 1c #4 Stranded, CN	1,069				
3 – 1c #2 Stranded	1,593				
4 – 1c #2 Stranded	1,699				
3 – 1c #2 Stranded, CN	1,856				
4 – 1c #2 Stranded, CN	1,962				
3 – 1c #1/0 Stranded	2,534				
4 – 1c #1/0 Stranded	2,703				
3 – 1c #1/0 Stranded, 600 V	2,955				
4 – 1c #1/0 Stranded, 600 V	3,124				

Legend: No. of cables - No. of conductors (c)/ Gauge (AWG)
Note: The above figures are to be used as a guide only. Consult with the manufacturer for exact maximum pull tensions for a given cable type. Ensure conformance with the ANSI/IEEE C2 standards.

Exhibit 1

5.6 Direct earth buried cables

Direct earth buried (DEB) cables are to be avoided. However, if preauthorized per the FAA-approved drawing set and construction specifications, DEB cable construction shall meet the following requirements. Coordinate underground power cable installation work to avoid interference with other airport projects and with existing utilities.

General--The contractor shall excavate trenches for direct-earth burial cable as follows:

a. To the depth specified in paragraph 5.4.1b.

b. To a width of not less than four inches (4”) for single or six to eight inches (6-8”) for multiple runs of power cable.

c. To a width and depth that will provide horizontal or vertical separation of power cables from other power cables of different voltage ratings, or from power cable and a control or signal cable.

d. Where soil is known to be rocky, select backfill for cable protection. Backfill shall be firmly tamped in the separation area.

e. Restoration shall be in accordance with paragraph 5.5.3.

Unless otherwise specified, power cables in the same location and routed in the same general direction shall be installed in the same trench. Trenches for cables may be excavated manually or with powered trenching equipment. Cable plows shall not be used unless express permission is granted by the FAA project engineer. When rock is encountered, remove to a depth of at least 3 inches (3”) below the cable and fill the space with sand or clean earth free from particles larger than 1/4 inch. Bottoms of trenches shall be smooth and free of stones and sharp objects. Where materials in bottoms of trenches are other than sand, a 3-inch layer of sand shall be laid first and compacted to approximate densities of surrounding firm soil. Trenches shall be in straight lines between cable markers. Bends in trenches shall have a radius of not less than 36 inches (36”) consistent with the cable manufacturer's published minimum cable bending radius for the cable installed. Walls of trenches shall be essentially vertical so that a minimum of shoulder surface is disturbed.

Trenches shall be opened only for the time required to install, inspect and survey the cables in accordance with FAA Advisory Circular 150/5370. The trench shall be closed in the same working day or marked, barricaded and/or lighted according to current airport specifications and requirements.

Installation in trench--Direct earth burial cable shall be unreeled in place along the sides of or in trenches and carefully placed on sand or earth bottoms. Pulling cables into direct-burial trenches from a fixed reel position shall not be permitted, except as required to pull cables through conduits under paving or railroad tracks. Dragging cables over the ground shall not be permitted.

Separation of cables--Separation between direct earth burial cables shall be as follows:

a. Power cables may be laid together in the trench. In these instances, there shall be a minimum of 3 inches (3”) of separation between cables.

b. Non-power cables (fiber optic, communications, and control cables) shall be installed in a separate trench from power cables (exception: DEB power cable crossing a control cable at the perpendicular and with 12 inches [12”] vertical separation). A concrete marker indicating the presence of power cables shall be installed along the route of the trench.

c. Where cables of different types (power and control or signal) or of different voltages are installed together as stated in (a) and (b) above, the individual cables or groups of the same type cables shall be clearly and unambiguously identified by installing metal or approved plastic tags indicating the type (power, control or signal) and voltages for power cables. These tags should be installed in accordance with Section 5.12.

d. Backfill that serves to separate cables shall be firmly tamped.

Bends--Bends in cables shall have an inner radius not less than those specified in NFPA 70 for the type of cable, or manufacturer's recommendation.

Splicing--Where splices are required, provide splices designed and rated for direct burial. See splicing Section 5.9 for instructions. All splices shall have their neutrals/shield solidly grounded.

Slack loop--A slack loop shall be provided at each end termination point of a cable to facilitate any future repairs. Slack loops shall have no bends with an inner radius less than twelve times the outside diameter of the cable. Where cable is brought above ground, additional slack shall be as shown by the drawings or as directed by the FAA.

Backfilling--After underground medium-voltage DEB cable has been installed and inspected, the trench shall be backfilled. The first layer of backfill shall be 3 inches (3”) deep, loose measurement, and shall be either earth or natural sand containing no material aggregate particles that would be retained on a one quarter inch (1/4”) sieve. This layer shall not be compacted. The second layer shall be 9 inches (9”) deep, loose measurement, and shall contain no particles that would remain on a one inch (1”) sieve.

The remainder of the backfill shall be excavated or imported material (if necessary) and shall not contain stone aggregate larger than 4 inches (4”) maximum diameter. The second and subsequent layers shall be thoroughly tamped and compacted to the density of the adjacent undisturbed soil.

Thermal resistivity--Trench backfill shall have a soil thermal rho of 90°C-cm/W or less.

Screening/sieving-- Compacted trench backfills shall meet ASTM D422 and ASTM D698, shall be sufficiently compacted, and shall not have backfill lifts that are too thick. Failure to prepare backfill properly will result in degraded thermal capability of the cable system.

5.7 Cable installation in manholes

Cables shall be carefully formed on nonmetallic racks around the interior of manholes or hand holes, avoiding sharp bends or kinks. Ensure that enough cable is coiled in the manhole so that a number of splice repairs can be made without having to fully enter the manhole. Tie splices and cables to cable racks using one eighth inch (1/8") nylon line. Splices shall be a minimum of two feet (2') from the mouth of the duct opening into the manhole or hand hole. Where this is not possible, splices shall be located as advised in the manhole/hand hole specification or drawing. Splices in different cables shall be staggered.

5.8 Cable terminations, connections, surge protection, and fault protection

5.8.1 Cable terminations and connections

Installation of prefabricated cable terminations shall strictly conform to manufacturer's installation recommendations using proper specialized tools. Special care shall be exercised to use the proper ratings and physical dimensions.

5.8.2 Connections to a three-phase engine generator

When providing single-phase backup power to other facilities, connect the two new single-phase legs to the lowest loaded phases of the generator. The lowest loaded phases shall be determined by performing a load reading. This reading shall be confirmed by referring to the history of the technical performance record (TPR).

5.8.3 Surge protection

Apply surge protection in accordance with the following standards:

a. For FAA-owned low voltage power systems (600 volts and below) at or after the facility service entrance, surge protection devices (SPD) shall be applied in accordance with FAA-STD-019.

b. In ELD installations, a fused disconnect switch may be installed before the SPD and connected to the line side of the service.

c. Surge protection for the 1,000 V to 15 kV medium voltage range shall be implemented in accordance with ANSI/IEEE C62.11 and NEC Article 280.

The following guidelines apply to locating and installing surge protection devices (SPD) (see Appendix A for product operating parameters).

a. If an FAA-owned distribution transformer is fed from an overhead line by means of a medium voltage cable, surge arresters of the metal-oxide varistor (MOV) type shall be

installed at the pole top and at the transformer between each phase and ground. The pole type arrester shall be of the intermediate class, while the transformer surge arrester shall be of the distribution type. The continuous voltage rating of the arresters shall be determined in a protection and insulation coordination study. As a further protection against direct lightning, intermediate arresters shall be installed one span before and after the interconnection of transformer. Surge arrester leads connecting to cable conductor and grounded metal shield must be as short as possible to minimize the protective voltage level. This recommended surge protection scheme is illustrated in Figure 5.8.3-1.

b. If an FAA-owned distribution transformer is fed from a station transformer directly by means of a medium voltage underground cable, a distribution arrester shall be installed at both ends of the cable in accordance to the guidelines provided in paragraph (a) above.

c. Install surge arresters of the proper class on transformers.

d. Unless otherwise shown on the drawings, surge arresters are not required on medium-voltage switchgear.

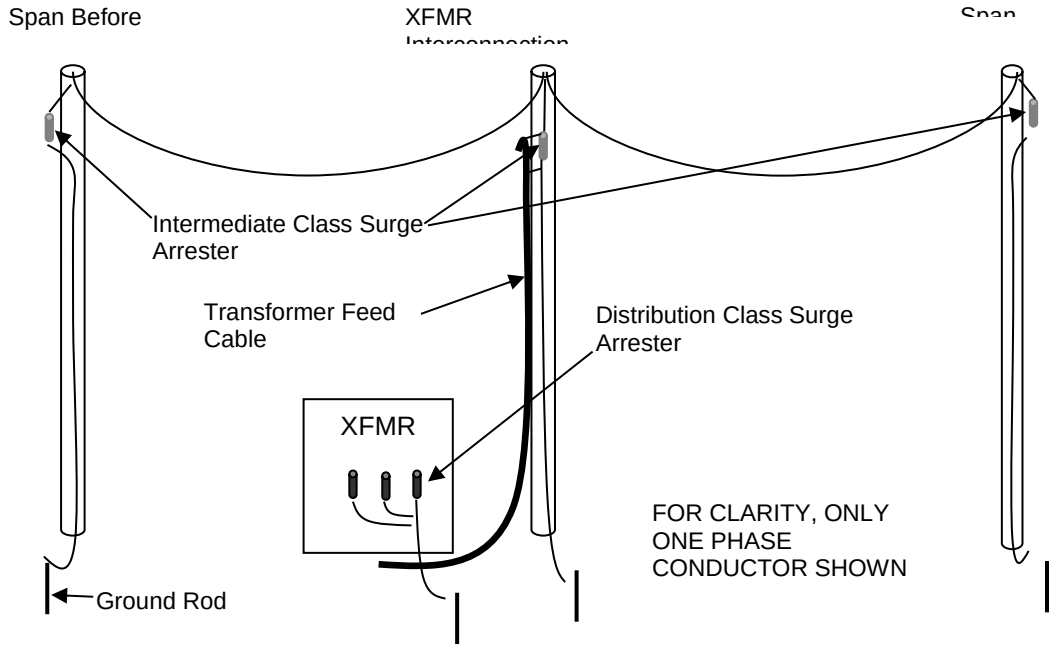


FIGURE 5.8.3-1. Schematic representation of recommended surge protection system.

Exhibit 1

5.8.4 Fault isolation

Use sectionalizing switchgear to protect the underground electrical line distribution circuit as a whole from electrical faults. This shall be accomplished by isolating faults to single National Airspace System (NAS) facilities versus multiple facilities ("daisy chained"). Where existing power cable layouts do not permit the isolation of individual facilities, add a sectionalizing switchgear.

Similarly, do not connect transformer primaries in a given electrical line distribution (ELD) service together in parallel such that a single power cable or transformer fault upstream will be allowed to de-energize downstream loads in the ELD circuit, thereby disabling multiple NAS facilities.

5.9 Splices

Avoid splices wherever possible; instead, use a mid-span grounding kit instead of a splice. Stagger splices on multiple cables in a trench. Keep cable ends to be spliced free from moisture by using tape or caps. When conducting FAA-authorized third-party testing, at the completion of the installation of each cable section (from termination to termination), subject the cable section to a 50/60 Hz partial discharge test in accordance with IEEE 400.3 at up to 2.5 times operating voltage level for a duration not to exceed 30 seconds, while the cable section is disconnected from the rest of the system. Any partial discharge within a splice shall comply with the requirements of IEEE 404. Splices are not to be drawn inside of any conduit or duct.

Buried and nonseparable T and Y joints shall not be used. These joints are inherently unreliable and cannot be properly commissioned with partial discharge diagnostics. Finding a fault becomes more difficult and harmful to existing cable assets. In addition, faults due to these types of unreliable joints can cause failures in multiple facilities due to a lack of sectionalizing.

Each cable splicer shall be qualified in making cable splices and in the use of specified cable splicing kits and specialized tools. The contractor shall obtain FAA authorization of the splice and cable splicer prior to making field splices. Cable splicing methods and materials shall be of a type recommended by the splicing materials manufacturer for the cable to be spliced. Splices shall be as follows:

a. FAA medium voltage power cables (above 600 volts). Use cold-shrink splice kits. The contractor shall make sure that the proper kit and tools are used for each application. The cold shrink product shall meet ANSI/IEEE Std. 404 (for a 15 kV rating).

b. FAA power cables 600 volts and below. Use heavy-wall self-sealing heat-shrinkable tubing meeting ANSI-C119.1-2006, poured epoxy splice, or any other splicing means approved by ANSI standards.

c. Cable armor and shields. Follow splice kit manufacturers' directions.

d. Evaluation of products. As a submittal to FAA, the contractor shall provide the product drawings showing details of the splicing methods used. In addition, products shall meet the latest editions of standards in Table V.

TABLE V. Cable splicing specification equivalents.

APPLICATION STANDARD	LEVEL OF ACCEPTANCE
IEEE-404 Standard for Power Cable Joints	Meet or Exceed
IEEE-48 Standard for Cable Terminations	Meet or Exceed
ANSI C119.1 Sealed Insulated Underground Connector System Rated 600 Volts	Meet or Exceed
IEEE – 386 Standard for Separable Insulated Connectors	Meet or Exceed

5.10 Power distribution racks, disconnect switches, junction boxes, and electrical cabinets

Power distribution racks - If vertical supports for power distribution racks supporting disconnect switches are separated by more than 6 feet, add a middle (third) vertical support. Where required by the FAA, use bollards to protect the installation from vehicle impacts.

Main disconnect switches – Ensure that installed MDSs meet heavy duty NEMA 3R for typical applications, heavy duty NEMA 4X stainless steel for coastal/corrosive/dusty environments. Construct pads of concrete, or use prefabricated composite pads.

Lightning protection of power distribution racks – At least one air terminal shall be installed on each power distribution rack, regardless of rack width or proximity to a zone of protection of other nearby facilities. Air terminal selection and grounding shall conform to FAA-STD-019.

Conduits entering a junction box or other electrical cabinets from underground shall be sealed with duct sealing compound at the point they enter the box or cabinet**.** Expanding foam sealants are not allowed for this purpose.

Conduit connections to the tops of exterior boxes, electrical cabinets, or switches shall be made with weatherproof hub fittings. For side and bottom entry points, use sealing locknuts.

5.11 Grounding of ELD systems

Local published standards may take precedence over the national standard. In the case of ambiguity or significant deviation, contact Power Services Group, Power Cable Program Office, to provide a technical evaluation. ELD system grounding shall comply with FAA-STD-019, NFPA 70, IEEE C2, and in accordance with the specific guidance provided herein.

1) Typical FAA medium-voltage ELD elements to be grounded include:

   a. Power Cables – ground the multigrounded neutral wires and shields,
   b. Guard wires,
   c. Manholes and hand holes,

d. Equipment and equipment enclosures,
e. Surge arresters,
f. Steel conduits and fittings based on application,
g. Direct earth buried power cables – multigrounded shields,
h. Abandoned power cables
   i. In duct and manhole systems, ground the conductor(s) and the multigrounded neutral wires and shields (if present) at both ends.
   ii. DEB cables shall be cut back 10 feet below grade and buried, with no requirement to ground the cable.
   iii. Document the section that was cut back as "abandoned" on as-built drawings.

2) Typical FAA low-voltage ELD elements to be grounded include:

a. Low-voltage cable segment between a facility transformer and the service entrance,
b. Service entrance disconnects, meter bases, and associated equipment,
c. Power distribution racks,
d. Abandoned low-voltage power cables in manholes/hand holes. These shall be grounded in the manhole, or removed. Document the section that was cut back as "abandoned" on as-built drawings.
e. Abandoned DEB low-voltage power cables shall be cut back 10 feet but do not require grounding. Document the section that was cut back as "abandoned" on as-built drawings.

5.11.1 Power cables, multigrounded neutral wires and shields

The FAA ELD systems follow the same practice as multigrounded (solidly grounded) medium voltage neutral systems in common use by the electric utility companies.

FAA power cables (both in conduit and DEB) shall be effectively grounded by ground connections of sufficiently low impedance levels. Cables shall also have sufficient current carrying capacity to limit the buildup of voltages to levels below those that may result in undue hazards to persons or connected equipment.

Multigrounded system—FAA medium voltage cables typically use metallic shields that require grounding (NEC requirement). The shields confine electric fields within the cable to obtain uniform radial distribution of the electric field, protect against induced voltages, and reduce the shock hazard risk to personnel. To effectively ground the shield, install multiple grounds to the cable neutral conductor to limit the voltage rise to 25 volts maximum (measured from neutral to earth ground) per IEEE Std 525. This shall be accomplished by connecting the neutral of the multigrounded system to electrodes at each transformer location and at a sufficient number of additional points totaling not less than four ground points in each mile of the entire line (every 1300 ft / 400 m [¼ mile], or less), not including grounds at individual services. This rule applies to underground jacketed shielded cable and to jacketed concentric neutral cable. (Ref NESC Section 9, Rule 096, *Ground Resistance Requirements – Multigrounded System)*. The same practice applies to different kinds of cables; for example, concentric wire, tape shield, etc.

Bonding across joints--Apply a shield bonding jumper wire across cable splices.

Service Laterals--For low-voltage service laterals, when two disconnects are separated by 200 feet or more, neutral-to-ground bonds are required at both locations in accordance with the national electrical safety code (NESC). When the distance is less than 200 feet, the disconnect closest to the transformer shall have the neutral to ground bonded. Typically, this is the first disconnecting means in accordance with the National Electrical Code (NEC). Consider ground impedance when installing systems with long runs to ensure that circuit breakers trip as expected under fault current situations. The installer shall demonstrate the adequate performance of the circuit breakers to the FAA.

5.11.2 Cable guard wires

Guard wires protect the power cable from lightning surges. The contractor shall install cable guard wires for all buried cables and conductors not routed in ferrous conduit, in accordance with FAA-STD-019e, Section 4.2.1.5.

> **Exception:** Guard wires are not required for penetration under runways, taxiways, or topographical features, including boring under buildings, creeks, rivers, lakes, shore approaches, roadways, congested areas, environmentally sensitive areas, landscaping, terrain, and obstacles, or for 15 kV concentric neutral power cables in concrete-encased duct systems and constructed in accordance with Sections 5.5.7 and 5.5.8 of this specification. This exception does not apply to concrete-encased PVC duct bank containing communication, data, or control cables, or to spare ducts that do not contain a corrugated inner duct reserved exclusively for fiber optic cables.

A 1/0 AWG bare copper stranded guard wire shall be used. The guard wire shall be embedded in the soil a minimum of 10 inches (25 cm) directly above, centered and parallel to the cable and/or duct to be protected.

When the width of the cable run or duct does not exceed 3 ft (90 cm), one guard wire centered over the cable run or duct shall be installed. When the cable run or duct is more than 3 feet (90 cm) in width, two guard wires shall be installed. The guard wires shall be spaced at least 12 inches (30 cm) apart and not be less than 12 inches (30 cm) or more than 18 inches (45 cm) inside the outermost wires or the edges of the duct.

The guard wire shall run continuously along the cable/duct run with no deviations from the run of the duct, and with no gaps. The guard wire shall be bonded to the earth electrode system (EES) at each end and to ground rods at approximately 90-foot intervals using exothermic welds. The spacing between ground rods shall vary by 10% to 20% to prevent resonance. Install the ground rods approximately 6 feet (2 m) on alternating sides of the trench and connect them via jumper wire to the continuously running guard wire as shown in Figure 5.11.2-1. The jumper wires shall be swept away from the guard wire in a repeatable pattern such that a lightning impulse will always be able to follow a curved path to ground within 180 ft. of any point along the run. Maintain a minimum 9-in. radius bend in the jumper sweeps.

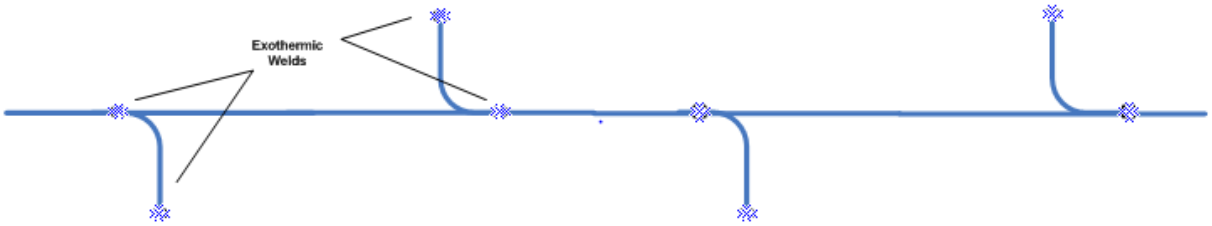


FIGURE 5.11.2-1. Grounding of cable guard wire. Note the alternating direction of the sweeps of the jumper wires. This pattern is required for the proper protection of the power cable.

For difficult excavations, such as rock formations or permafrost, the ground rods may be driven 3 feet on either side of the trench.

Where multiple conduits enter manholes, the following schemes illustrate guard wire grounding methods (all sharp corners to be rounded out) (Figure 5.11.2-2).

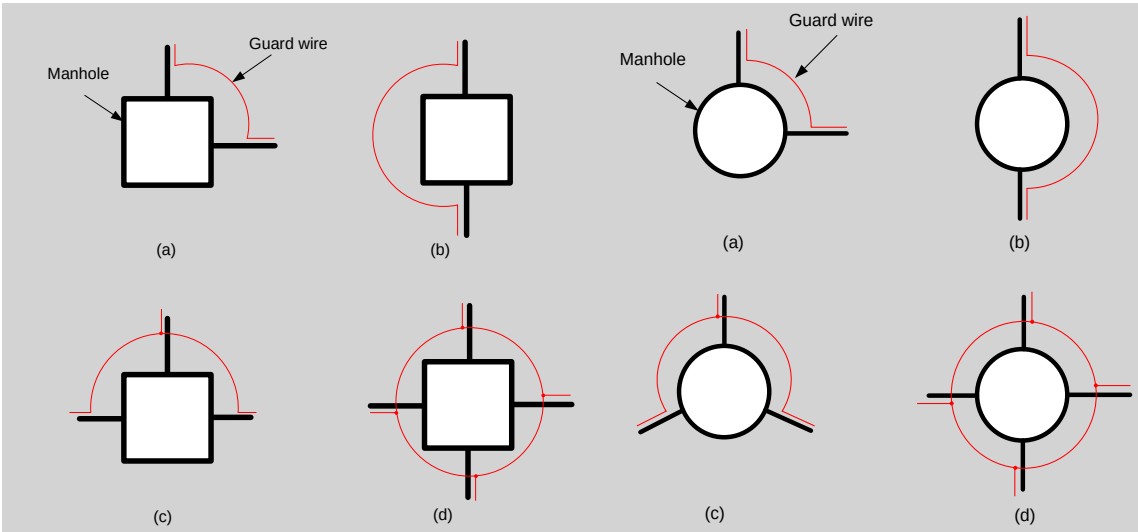


FIGURE 5.11.2-2. Guard wire grounding schemes.

5.11.3 Medium voltage manholes and hand holes

Power and control cables shall be installed in separate manholes and hand holes.

Until ready for acceptance testing, no installation work shall involve energized systems. Install power cables, ground wires, grounding loops, and manhole racks and furniture in such a way as to give maximum safe clearance space for personnel to enter the manhole when conducting subsequent operation and maintenance tasks. Conductors shall be placed well out of the way of human ingress/egress pathways through the manhole or vault. Bonding jumper wires shall be routed in such a manner that through-air clearance between adjacent conductors, and between conductors and any metallic or grounded surface, is maintained. During acceptance inspection,

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manhole installation configurations that are found to be untidy and/or lacking in clearance for later maintenance tasks shall be required to be redone at the contractor's expense.

If space is available, cable slack sufficient for one splice for each cable shall be left in each manhole. Elimination or shortening of slack lengths shall require authorization by the FAA.

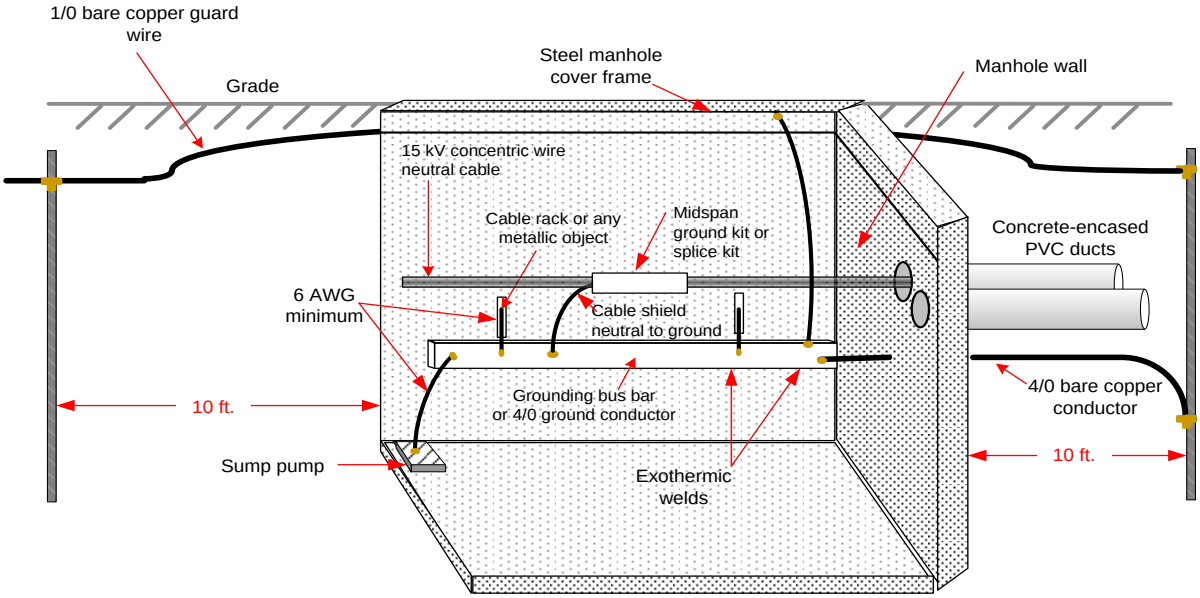
All new and existing cable in manholes shall be secured to nonmetallic racks on the manhole walls. Cables shall be secured to racks or mounted on a heavy duty nonmetallic multi-mount cable support arm.

Physical dimensions of manholes may be altered to fit requirements. The following procedure covers the minimum grounding requirements (Fig. 5.11.3-1 and 5.11.3-2):

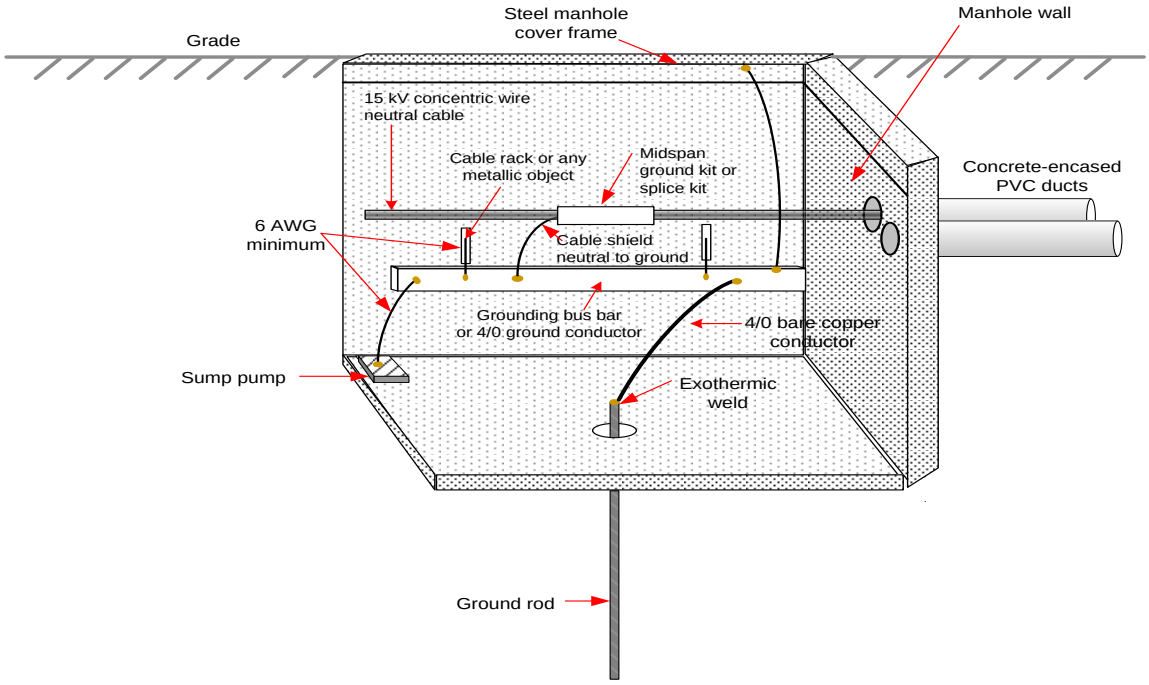
a. Where 15 kV cables enter a manhole, install a solid bare copper bus bar inside the manhole, or alternatively, run a 4/0 bare stranded copper grounding conductor, creating a grounding surface about 12 in. above the finished floor. Arrange bus bar or conductor so as to avoid interference with duct entrances into the manhole or with other cables. Make this conductor of sufficient length to facilitate repair and future installation operations. If the duct run contains a guard wire, connect the bus bar or 4/0 conductor to a ground rod outside of the manhole. Otherwise, connect the bus bar or 4/0 conductor to a ground rod inside the manhole.
b. Where installed, connect and exothermically weld the 1/0 AWG guard wires to the outside ground rods on each side of the manhole, ensuring 10 ft distance from the outside of the manhole to the ground rod.
c. If feasible, all connections, sweeps, or curves in the grounding system shall be smooth and shall be of at least 8 in. radius no matter what the orientation (vertical or horizontal).
d. Where new 15kV cables are installed and an existing grounding system is not present, bond the manhole cover frame, cable rack inserts, and other metal within the manhole with minimum #6 AWG bare copper conductors. Secure the #6 AWG conductors to the manhole walls as necessary to prevent interference with other cable routing. For the bus bar, use two-hole lugs to make the connections. If using a 4/0 ground conductor, wherever possible make connections using the exothermic process; otherwise use UL-listed grounding connectors.
e. Ground 15 kV concentric neutral cable in a manhole, but not more frequently than every 1,300 ft along the duct run (i.e., if manholes are spaced 600 ft apart, then the cable may be grounded in every other manhole). Two methods of grounding the neutral conductor or steel interlocked armor (if used) are permitted:
    a. Neutral mid-span grounding kit sized for the application. Remove the cable jacket to expose the concentric neutral conductors. Carefully follow the grounding kit manufacturer's instructions so as to cut only deep enough to remove the cable jacket to make this connection. The cable neutral grounding braid or the extended length #2 AWG concentric neutral shall be coupled together with a UL-listed grounding connector to a #2 AWG conductor, extended and exothermically welded to the #4/0 grounding conductor, or, if using a bus bar, mechanically terminated using two-hole lugs at the bus bar.
    b. Splices. Splices shall be of the cold shrink jacket seal type. All splices inside a manhole shall be solidly grounded, with jumper wires running across the joints to connect the cable shields. At the splice, when not using a mid-span grounding kit, ground the cable

neutral conductor to the bus bar. The cable neutral grounding braid or the extended length #2 AWG concentric neutral shall be coupled together with a UL-listed grounding connector to a #2 AWG conductor, extended and exothermically welded to the #4/0 grounding conductor, or, if using a bus bar, mechanically terminated using two-hole lugs at the bus bar.

f. Hand holes follow the same basic principles as above, with appropriate modifications.



(a)



(b)

FIGURE 5.11.3-1. Grounding and guard wire installation detail for (a) manhole having a guard wire, and (b) manhole lacking a guard wire.

Exhibit 1

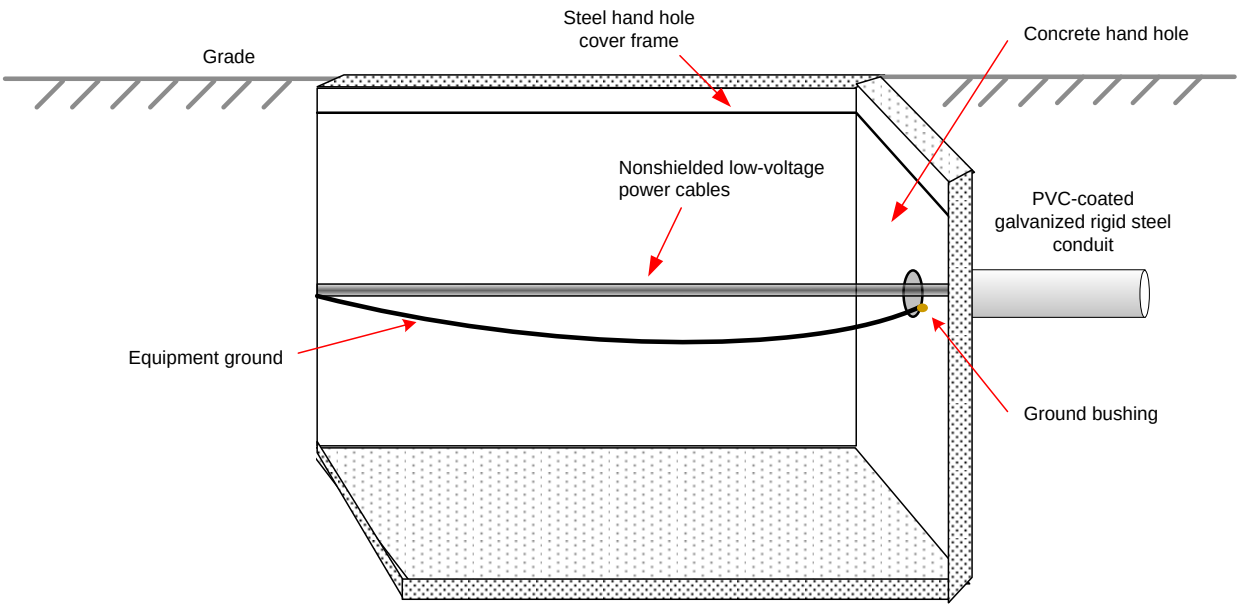


FIGURE 5.11.3-2. Hand hole grounding installation detail.

5.11.4 Equipment and equipment enclosures

Ground ELD equipment and equipment enclosures in accordance with NESC ANSI C2 Section 38, Rule 384 (for medium voltage equipment) and FAA-STD-019 (for low voltage equipment).

Pad-mounted transformers and other pad-mounted equipment—At a minimum, install a single ground rod. A 4/0 AWG ground conductor shall extend from the ground rod into the equipment compartment. Bond the transformer equipment frame and other non-current-carrying metal parts, such as cable shields, cable sheaths and armor, metallic conduit, and other non-current-carrying metal parts to the 4/0 AWG ground conductor above ground using mechanical connectors. Ground the secondary neutral.

Power distribution racks—Install a counterpoise at a distance of 2’ to 6’ from power distribution racks, and at a depth specified in the latest version of FAA-STD-019. Counterpoise shall consist of bare 4/0 AWG copper conductors and two driven ground rods around the rack. Ground the power distribution rack and equipment and other non-current-carrying metal parts to the counterpoise using exothermic welds. If power distribution rack is within 15 feet of a shelter having an existing FAA NAS earth electrode system (EES), a connection between both counterpoises shall be made.

Connect metallic conduits that terminate to the enclosure by grounding all bushings and the grounding conductor to the equipment ground bus.

Route cables within switchgear and enclosures in a manner which will allow room for bending and terminating of cables. Cable training bend radius shall be at least 12 times cable diameter.

5.11.5 Surge arresters

Follow detail drawings in the drawing set for surge arrester grounding. For ungrounded and single-grounded systems, modify the requirement in accordance with IEEE C2 and UFC 3-550-03FA.

Bond surge arresters and neutrals directly to the grounding electrode system. Keep lead lengths as short as possible with no kinks or sharp bends.

5.11.6 Conduit and fittings

Conduit joints and fittings shall be electrically continuous between joined parts. Ferrous conduit enclosing power conductors to FAA facilities shall be terminated using conductive fittings to their respective junction boxes, equipment cabinets, enclosures, or other grounded metal structures.

5.11.7 Low-voltage cable runs to facility service entrances

The ELD low-voltage (≤ 600 V) cable runs coming from a commercial utility power meter and feeding power to FAA facility service entrances are considered to be FAA owned and operated utility distribution systems and shall follow the grounding and safety requirements of IEEE C2/NESC. Wiring after the distribution service delivery point (usually at the terminals of the service equipment but always as close to the FAA facility as possible) is generally considered premises wiring and shall follow NEC/NFPA 70 Section 250, *Alternating Current Systems between 50 V and 1000 V.*

For the grounding requirements of service laterals, consult the grounding section of this specification.

In the FAA's ELD systems, there are gray areas in determining which electrical safety and grounding codes apply in a given situation or portion of the system (NESC or NEC); consult the office of primary interest to determine whether a segment is distribution or premises wiring.

5.11.8 ELD system grounding

5.11.8.1 Installation of power distribution rack earth electrode system (EES)

To meet site grounding requirements, install equipment counterpoise and EES according to the design drawings to ensure that the desired grounding values are achieved at all points of the ELD system.

Equipment distribution rack EES – Where not on or within 15 feet of an FAA NAS earth electrode system, install bare 4/0 AWG copper conductors in a loop not less than 12 inches (12") below finished top of soil grade. Connect the 4/0 AWG copper conductor to the ground rod with an exothermic weld.

Ground rods - Drive cone-pointed ground rods to full depth plus another 12 inches below grade. Ensure that the installation provides an earth ground of the appropriate value for the particular equipment being grounded. Neatly and firmly attach and exothermically weld two ground rods to the 4/0 AWG loop and keep the amount of exposed bare wire to a minimum.

5.11.8.2 Grounding and bonding connections
When feasible, where grounding connections are buried or otherwise normally inaccessible and/or uninspectable, use exothermic welds. Make exothermic welds strictly in accordance with the weld manufacturer's written recommendations. Welds that are "puffed up" or that show convex surfaces indicating improper cleaning are not acceptable. No mechanical connections shall be made below grade.

Mechanical connections above grade shall employ bolted solderless connectors, in compliance with UL 467.

5.11.8.3 Routing grounding and bonding conductors
Connect and bond transformer enclosures and equipment frames to the grounding counterpoise system. Size grounding and bonding conductors in accordance with the drawings. Bends less than 90 degrees are not permitted. Avoid routing ground conductors through concrete. When concrete penetration is necessary, cast nonmetallic conduit flush with the points of concrete entrance and exit so as to provide an opening for the ground conductor. Seal the opening with a sealing compound after installation.

5.11.8.4 Grounding cable across expansion joints
For grounding cables that cross expansion joints or similar separations in structures and pavements, use approved devices or methods of installation to provide the necessary slack in the cable across the joint to permit movement. Use stranded or other approved flexible copper cable across such separations.

5.11.8.5 Grounding of armored cable and metallic conduit
Apply the following requirement during initial cable installation. For medium voltage systems, bond cable armor and/or metallic conduit to the earth electrode grounding systems of the connected equipment at both ends with a 2 AWG conductor, including at splices in manholes and hand holes. An armored bonding jumper shall be installed across each splice. For low voltage systems, bond the cable armor to the ground bus of the service disconnecting means at the electrical service entry point. Bonds shall be electrically continuous between joined parts (see FAA-STD-019).

5.11.8.6 Grounding Riser poles
Directly connect equipment, neutrals, surge arresters, and items required to be grounded to the single continuous vertical ground rod conductor (No. 2 AWG minimum) on each riser pole. Ensure that ground rod conductors are stapled to wood poles at intervals not exceeding 2 feet.

5.12 Cable tagging, equipment markers and labels, and safety signs

5.12.1 Cable tags

Individual cables or groups of the same type of cable shall be clearly and unambiguously identified in accessible locations such as manholes, hand holes, junction boxes, and pull boxes by means of a minimum of two tags per cable, one near each duct entrance hole. Unless otherwise specified in the contract documents, cable tags shall be constructed of metal, or of rigid laminated plastic of at least 1/16" total thickness.

Plastic tags shall be exterior classified and consist of two plies: a plastic base and a 0.005" surface of impact acrylic plastic for front engraving. The tag shall be ultraviolet (UV) light stable. Engraving shall be black background and white letters. Tags shall be attached to the both terminated ends of the cable with two UV-rated nylon or stainless steel cable ties.

Cable terminations and potheads shall be tagged as to function, including facility which they serve, and any pertinent data (e.g., voltage, source, destination). Tags shall be marked with an abbreviation of the name of the facility or facilities served by the cable plus the letter "P" (Power). Where more than one identical cable is used to serve the same facility, cables may be bundled under one tag unless job plans state otherwise.

5.12.2 Equipment markers and labels

Design and select ELD equipment markers and labels for exterior use in accordance with this specification.

> **Exception:** When labeling wires and cables in ELD above-ground, enclosed applications (e.g., equipment racks), follow FAA-C-1217, *Electrical Work, Premises Wiring*.

5.12.2.1 Exterior equipment identification tags, labels, and plaques

Aluminum tags, or any other tags or labels approved by the project engineer, shall be labeled to identify ELD equipment. Attachment options include wires and ties, or screw mounts, nails, or bolts. Contrasting colors shall be considered when ordering tags and labels. Plaques may be made of laminated plastic.

5.12.2.2 Warning and safety signs and labels

To minimize accidents, manufacturers of electrical products use ANSI Z535, *Safety Alerting Standards,* to make their products and manuals safer. Contractors shall ensure that colors, safety signs and labels, safety symbols, barricade tapes, and information on product manuals, instructions, and collateral materials applying to FAA ELD equipment meet ANSI Z535.1 thru .6 standards.

5.12.2.3 Arc flash hazard labeling

In instances where an arc flash analysis has been completed and updated with any as-built changes, the results of the study shall be labeled on all corresponding equipment, as well as the

drawings. Follow NEC Article 110.16 for guidance on warning labels.

Electrical equipment shall be field marked to warn qualified persons of potential electric arc flash hazards. The marking shall be located so as to be clearly visible to qualified persons before installation of the equipment.

Following the completion of arc flash hazard and shock analyses, the electrical equipment evaluated shall be labeled to include the findings of the analyses. At a minimum, the label shall include the following information: flash hazard boundary; incident energy (calories/cm^2) at appropriate working distances; or personal protective equipment (PPE) level - including what fire-retardant clothing is required; shock hazard level (kV); limited approach boundary (feet/inches); restricted approach boundary (feet/inches); class of voltage-rated gloves for highest voltage present; equipment name; and date of survey.

5.13 Cable markers

5.13.1 Concrete markers for DEB cable

Concrete markers are required only for direct earth buried (DEB) cables. Install a concrete slab marker at each change of direction of DEB cable, over the ends of ducts or conduits which are installed under paved areas and roadways, and over each splice. Markers shall be two feet (2') square and six inches (6") thick. The markers shall be installed flat in the ground with the top approximately one inch (1") above the finished grade. Install slabs so that the side nearest the inscription on top includes an arrow indicating the side nearest the cable. Provide color, type, and depth of warning tape.

Concrete shall have a compressive strength of not less than 277 MPa (4,000 psi) and have a smooth, troweled finish on the exposed surface. After the concrete marker has set a minimum of 24 hours, the top surface shall be painted bright red with paint manufactured specifically for uncured exterior concrete. Markers shall not be installed in concrete or asphalt surfaces.

Each cable marker shall have the following information impressed upon its top surface:

a. The word "CABLE".

b. Name of facility served; for example, "ASR," "VORTAC," "ALS," etc.

c. The designation of the type of cables installed shall be shown on the marker. The type shall be marked with the following abbreviations: "P" for Power, "C" for Control, "T" for Telephone, and "R" for Coaxial (Radio Frequency).

d. An arrow to indicate the direction or change of direction of the cable run.

e. Any additional information as defined by the contract drawings.

f. The contractor shall obtain authorization from the FAA for the information to be impressed on the cable marker and for the method of impression. The letters shall

be four inches (4”) high, three inches (3”) wide and one half inch (1/2”) deep.

The location of the ends of ducts shall be marked with concrete markers 2 feet (2’) square and 6 inches (6”) thick. The duct markers are to be installed in the same manner as cable markers, except the following shall be impressed upon their top surface:

a. The word, "DUCT".

b. Name of facility served; for example, “ASR," “VORTAC,” “ALS,” etc.

c. An arrow to indicate the direction or the change in direction of the cable route.

d. The number of conduits and the type of conduits: for example, 4-P/2-C.

e. Any additional information as directed by the FAA project engineer.

DEB cables shall be marked every two hundred feet (200’) along a cable run, at each change of direction of the cable, and at each cable splice.

The markers used for DEB cables shall be impressed with a “P” for power cable.

Information: American Public Works Association (APWA) color codes for underground utilities are shown in Table VI.

TABLE VI. APWA color codes.

COLOR CODE	TYPE OF UNDERGROUND UTILITY
RED	Electric power lines, cables or conduits, and lighting cables
YELLOW	Gas, oil, steam, petroleum or other hazardous liquid or gaseous materials
ORANGE	Communications, cable TV, alarm or signal lines, cables, or conduits
BLUE	Potable water lines
GREEN	Sewers, storm sewer facilities and utilities, or their drains lines
PURPLE	Reclaimed water, irrigation, or slurry lines
WHITE	Proposed excavation
PINK	Temporary survey marking

5.14 Acceptance and inspection procedures

After the installation of power cable systems is completed, the FAA and/or its contractor shall perform acceptance/commissioning testing (refer to Appendix C). All safety procedures for energizing the systems following installation shall follow OSHA confined spaces regulations and NFPA 70E. Tests shall be conducted in the operational environment to confirm operational readiness of the ELD and to identify safety hazards involving any component of the ELD system that will support a system in the NAS.

If applicable, participants shall include the FAA project manager, project engineer(s), contract technical representatives, environmental, safety, real estate, power company contracts representative, airport authority representative, and airport staff.

Once acceptance tests are completed and the results accepted, the FAA shall take beneficial occupancy of the ELD system. This may occur in stages.

Exhibit 1

6. INSTALLATION OF SYSTEM CABLES

System cables consist of power cables that leave a facility to provide power to a light lane, such as an ALSF, MALSR, ODALs, etc. This specification does not cover associated system equipment such as light housing assemblies (LHA), electronics, etc. Consult with the applicable office of primary for installation of those systems. See Appendix G for details of FAA's various lighted navaids cable systems.

Install all system cables in Schedule 80 conduit and follow the burial depth requirements provided in this specification for ELD system cables.

6.1 MALSR/MALSF/MALS System Cables

6.1.1 Power Cables Running from a Shelter to the Distribution Panel

Install power cables from the MALS shelter to the distribution panel using Schedule 80 PVC conduit. Install cables from the distribution panel through Schedule 80 PVC conduit. These cables shall be installed through hand holes inline and beside each light bar station in the MALS system. If a MALS has a threshold, a separate PVC conduit system shall be installed directly from the distribution panel to the threshold disconnect switch. Follow the specification for ELD hand holes herein for providing and installing system cable hand holes.

6.1.2 Flasher Power Cables

From the MALSR/F shelter, the flasher power cables shall run through its own Schedule 80 conduit system and terminate in a hand hole at the first flasher. This cable shall continue through Schedule 80 conduit to all remaining flashers. A hand hole shall be installed at each flasher station.

6.1.3 Flasher Control Cables

From the MALSR/F shelter, the flasher control cable shall run through its own Schedule 80 conduit system and terminate in a hand hole at the first flasher. This cable shall continue through Schedule 80 conduit to all remaining flashers. It is permissible to run the flasher control cable through the same hand holes as the MALSR/F flasher power cables. These two systems operate at the same voltage and present no inherent danger from the power cable voltages.

6.2 ALSF System Cables

ALSF power cables for the steady burning lights shall run from the facility to each loop through its own Schedule 80 PVC conduit system. A hand hole shall be installed at the first termination

point of the loop, and another at the last termination point of the loop as it returns to the facility. In addition, a Schedule 80 PVC conduit system shall interconnect each light station in each loop.

6.2.1 Flasher Power Cables

From the ASLF facility, the flasher power cables shall run through its own Schedule 80 conduit system, pass through a hand hole at the first flasher station, and terminate in the first flasher junction box terminal block. From the terminal block, a cable to the next flasher station shall continue through Schedule 80 conduit via hand holes located at each flasher. This configuration shall continue to all flashers. A hand hole shall be installed at each flasher station to allow the cable to pass through and terminate in each junction box located at each flasher station.

6.2.2 Flasher Control Cables

From the ALSF facility, the flasher control cable shall run through its own Schedule 80 conduit system and terminate in a hand hole at the first flasher. This cable shall continue through Schedule 80 conduit to all remaining flashers. It is permissible to run the flasher control cable through the same hand holes as the ALSF flasher power cables. These two systems operate at the same voltage and present no inherent danger from the power cable voltages.

APPENDIX A—Surge Arrester Performance Data

1. SCOPE

This appendix provides surge arrester performance data for FAA medium-voltage (MV) electrical line distribution (ELD) systems. Surge arresters protect the following ELD system elements:

a. Overhead lines and distribution transformers (utility responsibility),
b. MV transformers and cable installations,
c. MV cables,
d. Internal switchgear and sectionalizing switchgear in MV networks,
e. Other ELD-related special-purpose applications as required.

2. APPLICABLE DOCUMENTS

2.1 Non-government publications

Institute of Electrical and Electronics Engineers (IEEE)

IEEE C62.11 (2005; And 1 2008)
Standard for Metal-Oxide Surge Arresters for Alternating Current Power Circuits (>1kV)

Guide Information for Electrical Equipment, The White Book 2011, and UL Product Categories Correlated to the 2008 and 2011 National Electrical Code®. Surge Arresters 1000 Volts and Higher (VZQK)

National Electrical Manufacturers Association (NEMA)

NEMA LA 1 (1992; R 1999) Standard for Surge Arresters

National Fire Protection Association (NFPA)

NFPA 70 (2008; TIA 08-1) National Electrical Code

NEC article 280: Introduces surge arresters, general requirements, installation requirements, and connection requirements.

Exhibit 1

3. REQUIREMENTS

3.1 Performance Requirements

3.1.1 General

The requirement is for high-quality metal-oxide surge arresters for use in FAA-owned distribution networks to ensure the protection of underground power cables, low-level distribution transformers, generators, sectionalizing switches, and other electrical equipment. Surge arresters limit dangerous voltage surges caused by lightning strikes or switching anomalies occurring in the ELD network. Arresters also increase the availability of power by reducing outages. Voltage surges can result in personnel injuries from electrical shock, insulation damage to equipment, and possibly fire. Surge arresters provide safe dissipation of these surges.

The standard root-mean-square (rms) maximum continuous operating voltage (MCOV) and rms duty-cycle voltage ratings for typical nominal voltage values and configurations used in FAA underground electrical distribution systems (except note 1) are shown in the table below. Light-duty surge arresters in common use in FAA ELD systems correspond to these configurations.

Nominal Voltage (KVrms)	MCOV (KVrms)	Duty-Cycle (KVrms)
4,160Y (3φ) 2,400 (1φ)	5.1 KV 2.55 kV	6 KV 3 kV
13,200Y(3φ) 7,620 (1φ)	15.3 KV 7.65 kV	18 KV 9 kV
4,160Δ (3φ)(see note 1)	5.1	6 kV
13,800	15.3 kV	18 kV

Note (1): The delta configuration is not a typical FAA ELD configuration. If you encounter this configuration or any configuration not shown above, call the Power Cable Program Office, AJW-22, for guidance.

3.1.2 Placement

Medium voltage surge arresters shall be provided on the line side of:

1. Pole-mounted transformers (utility responsibility in most cases),

2. Overhead to underground terminal poles (utility responsibility),

3. All “normally open” switchways of pad-mounted sectionalizing switches connected to and served from overhead lines,

4. Underground primary metering installations connected to and served from overhead lines (utility company responsibility),

5. On the line side of any location where a voltage/facility transition occurs, e.g., at a facility pad-mounted transformer.

Exhibit 1

3.1.3 IEEE Standard C62.11

The design, fabrication, testing, and performance requirement to which a medium voltage surge arrester shall comply is IEEE C62.11 (reference provided above). The definition provided in IEEE C62.11 for metal-oxide surge arresters for ac power circuits greater than 1 kV is:

> **Arrester, distribution, light duty class:** An arrester normally installed on and used to protect underground distribution systems where the major portion of the lightning stroke current is discharged by an arrester located at the overhead line/cable junction.

This class of surge arrester conforms to the minimum recommended level to provide protection against switching and other transient voltages in the underground ELD infrastructure. Light duty class arresters are constrained by the prescribed test requirements of standard IEEE C62.11 (see table below).

Surge arrester test requirements

Class	Rated voltage (kV)		Lightning impulse classifying current (kA)	Minimum High current Short duration withstand (kA)	Minimum Low current Long duration withstand (A, μs)
	Duty cycle	MCOV			
Distribution, light duty	3–36	2.55–29	5	40	75, 2000

3.1.4 Service conditions

An arrester installed in the FAA ELD system shall be capable of successful operations under the service conditions given in the paragraphs below.

3.1.4.1 Usual service conditions

Physical conditions

a) Ambient air temperature in the general vicinity of the arrester shall be between –40°C and +40°C except that: (1) Ambient air temperature in the general vicinity of dead front arresters shall be between –40 °C and +65 °C, and (2) Ambient liquid temperature in the general vicinity of liquid-immersed arresters shall be between –40°C and +95°C.
b) Maximum temperature of the arrester, due to external heat sources in the general vicinity of the arrester, shall not exceed 60°C, except that (1) Maximum temperature of the dead front arrester shall not exceed 85°C, and (2) Maximum temperature of the liquid-immersed arresters shall not exceed 120°C.
c) Altitude shall not exceed 1800 m (6,000 ft), except for liquid-immersed arresters.

System conditions

a) Nominal power system frequency of 48 Hz to 62 Hz.
b) System line-to-ground voltage within the ratings of the arrester under all system operating conditions.

3.1.4.2 Unusual service conditions. Exposure to any of the service conditions described in the sections below may require special consideration in the design or application of arresters.

Physical conditions

a) Ambient temperatures in the general vicinity of the arrester exceeding the values given in Section 3.1.4.1 above, Physical Conditions.
b) Maximum arrester temperatures exceeding the values given in Section 3.1.4.1 above, Physical Conditions.
c) Altitude exceeding 1800 m (6,000 ft). Arresters for service at higher altitudes shall be suitable for operation at either of the following altitude ranges:
   i) 1801–3600 m (6,001–12,000 ft).
   ii) 3601–5400 m (12,001–18,000 ft).
d) Exposure to any of the following:
   i) Damaging fumes or vapors
   ii) Excessive dirt, salt spray, or other current-conducting deposits.
   iii) Steam.
   iv) Explosive atmospheres, abnormal vibrations, or shocks
e) Limitation on clearances to nearby conducting objects, particularly at altitudes exceeding 1800 m (6,000 ft)
f) Unusual transportation or storage.

System conditions

a) Nominal power frequency other than 48 Hz to 62 Hz
b) System operating conditions whereby the ratings of the arrester may be temporarily exceeded. Some examples are as follows:
   i) Loss of neutral ground on normally grounded circuit
   ii) Generator overspeed
   iii) Resonance during faults upon loss of major generation
   iv) System instability
   v) Persistent single line-to-ground fault on ungrounded three-phase systems
c) Any other unusual conditions known to the user.

Exhibit 1

APPENDIX B—Cable Pulling Calculations

This appendix provides basic information on how to calculate maximum pull force during cable pull operations. It is provided for information purposes only. For detailed information and more elaborate tables, consult the cable manufacturer. Industry software is readily available to assist with these calculations.

1. To calculate cable pulling force for a cable consisting of several segments, and/or where a cable bends around a curve or a number of curves, calculations are done in incremental segments/steps using formulas and tables, with the segments/steps added together to arrive at the cumulative maximum pull tension. Add an additional 15% margin for safety. To illustrate the cumulative method, an example is given: the pull force calculated for a cable segment A is added to a "bend multiplier" AB, a pull force for straight cable segment B, a pull force for cable segment C, a bend multiplier CD, and a cable segment D, etc., plus 15%.

The basic formula for calculating maximum pulling tension in a single cable section is:

$$T = L \times w \times f \times W,$$

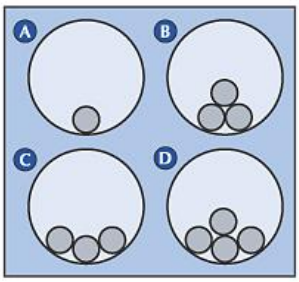
where
T is the total pulling tension (lb),
L is the length (ft) of cable being pulled,
w is the total weight (lb/ft) of the conductors,
f is the coefficient of friction (usually 0.5 for well-lubricated conditions),
W is the weight correction factor.

2. The process for calculating pull force for a segment of a cable run is as follows:

a. Enter the length of the cable segment in the formula above.
b. Enter the weight of the cable segment.
c. Enter the coefficient of friction.
d. Enter the weight correction factor W, derived as follows:
   i. Determine the geometric position of how the cables will lay in the conduit.
   ii. Calculate W using the table below.
e. Check for jamming hazard of the cables in the conduit.
f. Check sidewall bearing pressure (SWBP).
g. Check headroom.

3. The weight correction factor (W) calculation is based on the cable geometry in the duct:

Exhibit 1



A = Single; B = Triangular; C = Cradled; D = Diamond

To determine cable geometry, use the ratio of the conduit's inside diameter (D) to the cable's outside diameter (d) to find how the single conductors will sit in the conduit:

Triangular (Fig. B): This occurs when pulling three individual conductors from three separate reels, and their D/d ratio is less than 2.5. If pulling individual triplexed conductors from a single reel, the cables will also sit in this position.

Cradle (Fig. C): This position may occur when pulling three individual conductors from three separate reels, and their D/d ratio is between 2.5 and 3.0. This position is the least favorable because it yields the worst-case scenario of drag during the pull.

Diamond (Fig. D): This position occurs when pulling four individual conductors from four separate reels, and their D/d ratio is less than 3.0. If pulling quadruplexed individual conductors from a single reel, the multiconductor cable will also sit in this position.

No. of Conductors	**Position**	**Weight Factor Equation**
1	Single	$W = 1$
3	Triangular	$W = 1 / \{1-[d/(D-d)]^2\}^{1/2}$
3	Cradled	$W = 1 + \{(4/3) \times [d/(D-d)]^2\}$
4	Diamond	$W = 1 + \{2 \times [d/(D-d)]^2\}$
W = Weight correction factor D = Inside diameter of conduit d = Outside diameter of individual conductor		

For the most conservative calculation, use the cradle configuration.

4. Jamming ratio. When sizing the conduit system, installers must consider the possibility of cables jamming or wedging. This usually occurs when three or more individual conductors lie side by side in a single plane. As the conductors are pulled through a bend, the curvature of the bend tends to squeeze the conductors together. Use the following formula to determine the likelihood of jamming. Use the inside diameter of the conduit and the outside diameter of the individual conductor. Avoid jam ratios of 2.8 to 3.2 for Type MV extruded dielectric power cables:

$1.05 \times (D \div d)$

Exhibit 1

Where
D = the inside diameter of the conduit
d = the outside diameter of an individual conductor.
Constant factor 1.05 = correction for oval shape of bends in the sectional view.

- If the value is less than 2.5, the cable will jam,
- If the value is less than 3.0 but greater than 2.8, jamming is very possible,
- If the value is greater than 3.0, jamming will not occur.
- For medium-voltage extruded dielectric power cables, avoid values between 2.8 to 3.2.

5. Sidewall bearing pressure (SWBP). Sidewall bearing pressure (in pounds per foot) is the tension on the cable coming out of a bend (in pounds) divided by the inside radius of the bend (in feet). When pulling at a bend, the recommended maximum sidewall pressures for 15kV class and less is 500 lb/ft (or less, if recommended by the manufacturer).

No. of Conductors	**Position**	**SWBP Equation**
1	Single	SWBP = T ÷ R
3	Cradled	SWBP = [(3W – 2) x T] ÷ 3R
3	Triangular	SWBP = (W x T) ÷ 2R
4	Diamond	SWBP = (W – 1) x (T ÷ R)
W = weight correction factor; T = calculated tension; R = radius of bend (inside radius).		

6. Headroom. To ensure a safe and easy pull, provide clearance between the uppermost conductor and the top of the conduit. For straight pulls, a clearance as small as ¼ in. is considered safe. For more complex pulls, between ½ in. and 1 in. is required. Use the equations below to derive the clearance for a given conduit and cable sitting position. Note that allowance is made for variations in cable and conduit diameters, and the oval shape of the raceway sections at bends.

Configuration	**Clearance**
Single	$C = D' - d'$
Triangular	$C = \left[\sqrt{D' - 1.366\, d'} + \sqrt{(D' - d')}\right] \times \sqrt{[1 - (d' \div D' - d)^2]}$
Diamond	$C = \left[(D' - d') - 2d'^2\right] \div (D' - d')$
C = Clearance, D´ = 1.05 x nominal conduit inside diameter; d´ = 1.05 x nominal overall diameter of individual conductor.	

7. Limit pulling tension to 0.008 lb/cmil for copper conductors pulled by pulling eyes or pulling bolts (pulling tension applied directly to the conductor).

8. Limit pulling tension to 1,000 lb for jacketed cables pulled by cable grips.

Exhibit 1

9. Angle of bend. Every time there is a bend in the cable, a bend multiplier factor must be introduced:

Bend Angle	Multiplier
15	1.14
30	1.30
45	1.48
60	1.70
75	1.94
90	2.20
105	2.50
120	2.86

10. For steel, wire, rope, or tape used for cable pulling, a tensiometer or dynamometer graduated to indicate the tension on the cable being pulled can be used, or the contractor shall adapt a rope harness properly sized to limit pull tension to the value indicated. Any combination of a group of cables to be pulled into a duct shall not exceed the sum of individual allowable tension of each cable plus 15 percent.

APPENDIX C—Acceptance testing of newly installed FAA medium voltage underground power cables

This appendix specifies *acceptance testing* of newly installed FAA insulated underground medium voltage power cables rated 2 kV to 15 kV, shielded, non-shielded, and armored. It does not cover *installation testing* or *maintenance testing* as defined in IEEE 400.2. Nor does it cover testing of older, in-service cables. For comprehensive treatment of the maintenance testing of FAA power cables, refer to FAA Order 6950.22, *Maintenance of Electrical Power Cables*.

The testing guidance below applies to both direct burial cables and cables installed in nonmetallic and metal conduit. This appendix covers four types of tests used for validating acceptance of FAA medium voltage cables and accessories: (1) a continuity test, (2) an insulation resistance test; (3) an AC VLF field test; and (4) an offline 50/60 Hz partial discharge test. At a minimum, tests one through three (continuity, insulation resistance, and VLF withstand tests) shall be employed as acceptance tests of new FAA cable installations. Test four (offline PD test) is a state-of-the art test that provides the most thorough and exacting test data of all the choices. It can be substituted for the VLF withstand test if funding is available. The test must be conducted by a qualified third-party testing firm that is preapproved by the FAA, and requires extra lead time in planning the test activity (3 months).

Any newly installed cable that fails as a result of cable acceptance testing shall be replaced by the installation contractor at the installation contractor’s expense.

The paragraphs that follow detail each test’s theory of operation, parameters and tolerances, test schedules, and safety and test procedures. If any conflicts arise relating to power cable testing parameters, procedures, or safety as presented in this appendix, the guidance of FAA Order 6950.22 shall take precedence.

SAFETY REQUIREMENTS, GENERAL

The following are general safety requirements for all electrical power cable acceptance tests. Safety requirements particular to each test are provided in the tests’ respective sections that follow.

Before testing is performed, ensure that cables and associated terminations are isolated from electrical apparatus such as power transformers, potential transformers, surge arresters, capacitors, etc. Cables are allowed to be connected to switches and fused cutouts as long as the switch isolates the cable and terminations from electrical apparatus mentioned above. Maintain at least a 6-inch clearance between cable ends and any grounded surface. If modular "load break" elbow terminations are used on the cable, ensure that the load break elbows are inserted in the associated isolated parking bushings.

Ensure that all cables and terminations are disconnected and isolated from all sources of power. Using proper high-voltage test instruments, verify that the conductors are not energized and there is no back-feed from some unknown source.

Ensure that all cable shields, equipment grounding conductors, armor, and metallic conduits are properly grounded to the earth electrode system at both ends of the cable to be tested. If present, check to ensure that the cable shield, armor, and equipment grounding conductors are electrically continuous from one end of the cable to the other.

Refer to FAA Order 6950.22, Chapters 1 (Para. 105), 2 (Para. 220, 221, 222), and 5 (Para. 504), as well as applicable IEEE standards for more safety guidance.

1. INSULATION RESISTANCE TEST

1.1 Theory of Operation

After cable system installation and before the cable system is placed in normal service, a "limited voltage" DC insulation resistance test shall be performed and documented, including the testing of terminations and joints.

The insulation resistance test is classified by the IEEE as a diagnostic test. The purpose of the test is not to ensure the cable systems' future performance but simply to assure the construction team that the line is not grounded/shorted before energization. Insulation or dielectric resistance is the resistance to the flow of direct current through or over the surface of the insulating material. Cables are tested by measuring the resistance between conductors, and the resistance between each conductor and ground. For a new cable, or one that is believed to be in very good condition, all of these resistances should measure in megohms (for tolerances, see Section 1.2 of this appendix below).

Any insulation resistance values less than 50 megohms shall be investigated. Note that the insulation resistance values may be affected by temperature, cable geometry, cable length, and leakage along cable terminations.

The installation contractor shall be responsible for repair/replacement of any failed components and retest costs.

1.2 Parameters and Tolerance limits

For test parameters and tolerance limits, refer to FAA Order 6950.22, *Maintenance of Electrical Power Cables,* Chapter 3, *Standards and Tolerances,* Paragraph 301, Table (see column heading labeled "NEW CABLE").

1.3 Test Schedules

Test after installation and just before energizing the new system.

1.4 Safety and Test Procedure

1.4.1 Safety

Follow safety practices as set forth in Chapter 2 (Para. 221e[2][c]) and 5 (Para. 502, 503) of FAA Order 6950.22, *Maintenance of Electrical Power Cables.* Refer also to the paragraphs that follow, and IEEE standards, for additional safety and grounding procedures.

Before testing begins, ensure that all associated cable shields, armor, equipment grounding conductors, and metallic conduit are properly grounded at both ends to an approved earth grounding systems or electrode. Verify that the conductors are not energized.

Ensure that cable shields and/or armor are electrically continuous by performing a simple resistance measurement using a reliable and calibrated digital multimeter. Ensure that all insulated conductors in the cable assembly that are not to be tested, as well as adjacent cables, are properly grounded at both ends to prevent capacitive voltage build-up.

When testing, one or more cable ends will need to be remote from the testing site. Therefore, before testing is begun, cables ends under test must be cleared and guarded. Switches and fused cutouts and circuit breakers used for isolating the cable under test shall be identified, locked, and tagged out of service. If possible, remote ends of cable being tested should be enclosed in a locked enclosure, vault, room, or other location accessible to qualified personnel only. All testing shall be performed between earth/ground and each insulated conductor, and between each insulated conductor.

Insulation testing must comply with OSHA regulations, Standard for Electrical Safety in the Work Place (NFPA-70E), and the National Electrical Safety Code (ANSI C2). ***All medium/high voltage testing must be performed by TWO individuals.*** Before, during, and after testing, ensure that all applicable safety rules are followed, including the use of proper personal protection equipment (PPE), lockout/tagout of all associated electrical energy sources, testing cables for possible “backfeed” from unknown electrical sources, and discharge of residual capacitive charges on cables to be tested.

Use only the approved high-voltage power test instruments to check for AC and DC voltages on all cables. ***DO NOT use hand-held test instruments which are only rated (or used in electrical/electronic applications) at 1,000 volts or less.***

1.4.2 Test Procedure

Refer to FAA Order 6950.22, Chapter 5, Para. 503 for detailed test procedures. The test procedures cover new cables having either 100% or 133% cable insulation ratings. In instances where the new cable to be tested is joined to an older cable, consult with the FAA project engineer to adjust the testing parameters as needed.

CAUTION: After all tests are complete and before the cables and terminations are placed back into normal operation, ENSURE that all temporary safety grounding connections are removed from all insulated conductors that will be energized.

1.4.2.1 New 2,000 to 5,000 Volt Cables, Terminations, and Joints
Insulation resistance baseline measurements shall be taken and documented after cable system installation, including terminations and joints, but before the cable system is placed in normal service. Test with a 5,000 volt insulation resistance test set (AEMC Instruments Type 5070 or approved equal) applied incrementally up to the voltage rating of the cable for a duration of not to exceed 5 minutes. Do not exceed the rms line-to-ground voltage across the conductor and metallic shield. Record the resistance at each voltage level as well as the ambient temperatures and relative humidity. Perform insulation resistance testing from each insulated conductor to ground and between each insulated conductor (ref FAA Order 6950.22). Because of possible power capacity limitations of the test set, the maximum length of the cable to be tested shall be based on the manufacturer's testing data and the capability of the test equipment. Any insulation resistance values less than 50 megohms shall be investigated. Note that the insulation resistance values may be affected by temperature, cable geometry, cable length, and leakage along cable terminations. Terminations shall be thoroughly cleaned and, if required, a guard circuit shall be used at the termination. The installation contractor shall be responsible for repair/replacement of any failed components and retest costs.

1.4.2.2 New 15,000 Volt Cables, Terminations, and Joints
Insulation resistance baseline measurements shall be taken and documented after cable system installation, including terminations and joints, but before the cable system is placed in normal service. Test with a 5,000 volt insulation resistance test set (AEMC type 5070 or approved equal) applied incrementally up to 5,000 volts for a duration not to exceed 5 minutes. Record the resistance at each voltage level as well as the ambient temperatures and relative humidity. Perform insulation resistance testing from each insulated conductor to ground and between each insulated conductor (ref FAA Order 6950.22). Because of possible power capacity limitations of the test set, the maximum length of the cable to be tested shall be based on the manufacturer's testing data and the capability of the test equipment. Any insulation resistance values less than 50 megohms shall be investigated. Note that the insulation resistance values may be affected by temperature, cable geometry, cable length, and leakage along cable terminations. Terminations shall be thoroughly cleaned and, if required, a guard circuit shall be used at the termination. The installation contractor shall be responsible for repair/replacement of any failed components and retest costs.

2. AC VLF FIELD TEST

2.1 Theory of Operation

The AC Very Low Frequency (VLF) (0.1 Hz sinusoidal) field test is essentially a DC hipot test with a slow voltage oscillation to prevent the buildup of space charge in the cable insulation. The purpose of the test is not to ensure cable system future performance but simply to reassure the construction team that the line is not grounded/shorted before energization. The test is classified

by the IEEE as a destructive test because it is designed to bring a cable and/or accessory to failure where severe defects are present. Thus, the VLF withstand test is a pass/fail test and provides no localization or severity data other than the obvious outward sign of a defect upon failure. Only properly qualified persons may perform this test on FAA ELD systems.

VLF withstand testing is performed after insulation resistance testing. Even if prior insulation resistance testing has indicated that the cable is in good condition, the VLF test may provide a further indication of cable reliability.

Because VLF testing can cause a severe defect in a cable, joints, and/or terminations to fail, provisions should be made to have personnel on-site to find the defective/faulted cable or termination and make the required repairs. Retest the cable after the repairs. Repeat this procedure until cable and terminations pass the VLF test. The installation contractor shall be responsible for repair or replacement of any failed components and retest costs.

2.2 Parameters and Tolerance Limits

For test parameters and tolerance limits, refer to FAA Order 6950.22, *Maintenance of Electrical Power Cables,* Chapter 3, *Standards and Tolerances,* Paragraph 301, Table (see column heading labeled “NEW CABLE”). Also consult IEEE 400.2, *IEEE Guide for Field Testing of Shielded Power Cable Systems Using Very Low Frequency (VLF).*

2.3 Test Schedules

Test after installation and just before energizing the new system.

2.4 Safety and Test Procedure

2.4.1 Safety

Follow general safety practices as set forth in Chapters 1, 2, and 5 of FAA Order 6950.22, *Maintenance of Electrical Power Cables.* Refer also to IEEE 400.2 for safety and grounding procedures, and to the paragraphs below.

VLF testing must comply with OSHA regulations, Standard for Electrical Safety in the Work Place (NFPA-70E), and the National Electrical Safety Code (ANSI C2). ***All medium/high voltage testing must be performed by TWO individuals.*** Before, during, and after testing, ensure that all applicable safety rules are followed, including the use of proper personal protection equipment (PPE), lockout/tagout of all associated electrical energy sources, testing cables for possible "backfeed" from unknown electrical sources, and discharge of residual capacitive charges on cables to be tested.

Before testing is performed, ensure that all cables and associated terminations are disconnected and isolated from all sources of power, including electrical apparatus such as power

transformers, potential transformers, surge arresters, capacitors, etc. Cables are allowed to be connected to switches and fused cutouts as long as the switch isolates the cable and terminations from the electrical apparatus mentioned above. Maintain at least a 6-inch clearance between cable ends and any grounded surface. If modular load-break elbow terminations are used on the cable, ensure the load-break elbows are inserted in the associated isolated parking bushings. Verify that the conductors are not energized and there is no back-feed from some unknown source.

Properly ground all associated cable shields, armor, equipment grounding conductors, and metallic conduit at both ends to an approved earth grounding systems or electrode. Ensure that cable shields and/or armor are electrically continuous from one end of the cable to the other by performing a simple resistance measurement using a reliable and calibrated digital multimeter. Ensure that all insulated conductors in the cable assembly that are not to be tested, as well as adjacent cables, are properly grounded at both ends to prevent capacitive voltage build-up.

When testing, one or more cable ends will need to be remote from the testing site. Therefore, before testing is begun, cables ends under test must be cleared and guarded. Switches and fused cutouts and circuit breakers used for isolating the cable under test shall be identified, locked, and tagged out of service. If possible, remote ends of cable being tested should be enclosed in a locked enclosure, vault, room, or other location accessible to qualified personnel only.

All testing shall be performed between earth/ground and each insulated conductor, and between each insulated conductor. Use only the approved high-voltage power test instruments to check for AC and DC voltages on all cables. ***DO NOT use hand-held test instruments which are only rated (or used in electrical/electronic applications) at 1,000 volts or less!!!***

2.4.2 Test Procedure

If the new cable to be tested is joined to an older, in-service cable segment, consult with the FAA project engineer for guidance. The test voltage or other parameters may need to be adjusted for in-service cables because they are more sensitive to the high voltage levels attained during the test. Likewise, consult the FAA project engineer if two cable segments of different voltage ratings are being tested simultaneously, as the lower rated cable could be damaged by high voltage levels used to test the higher rated segment.

VLF testing is not required for cables with rated voltages less than 5,000 volts.

2.4.2.1 5,000 Volt Cables

For new 5,000 volt cables and terminations, the AC VLF field acceptance test shall be applied at not to exceed 14,000 volts (peak) for a duration of 15 minutes. This covers cables with both 100% and 133% cable insulation ratings. Record the pass or fail condition at the end of the test along with the ambient temperature and relative humidity. ***Because of possible power capacity limitations of the test set, the maximum length of the cable to be tested shall be based on the manufacturer's testing data and the capability of the test equipment.***

2.4.2.2 15,000 Volt Cables
For new 15,000 volt cables and terminations, the AC VLF field acceptance test shall be applied at 28,000 volts (peak) using a VLF test set (High Voltage Inc., type VLF-28CM or approved equal) for a duration of 15 minutes. This covers cables with both 100% and 133% cable insulation ratings. Record the pass or fail condition at the end of the test along with the ambient temperature and relative humidity. ***Because of possible power capacity limitations of the test set, the maximum length of the cable to be tested shall be based on the manufacturer's testing data and the capability of the test equipment.***

CAUTION: After all tests are complete and before the cables and terminations are placed back into normal operation, ENSURE that all temporary safety grounding connections are removed from all insulated conductors that will be energized.

3. OFFLINE 50/60 Hz PARTIAL DISCHARGE TEST

3.1 Theory of Operation

The offline 50/60 Hz partial discharge (PD) test can identify the location and severity of a defect within the new cable or its accessories, including a latent defect missed by hipot tests.
The test uses a 50/60 Hz high-voltage power source and sophisticated signal processing/analysis to detect minute partial discharges (PD) in cable insulation, pinpointing manufacturing weaknesses and workmanship errors. It is a reliable method for detecting defects inadvertently missed during factory tests, defects introduced during transportation and installation, and flaws introduced while handling and splicing the cables. These defects frequently do not appear in normal voltage withstand tests but can eventually cause undesirable service failures weeks, months, or years into the future.

The test is classified by the IEEE as a diagnostic test and not a destructive test (i.e., it is not designed to cause cable and accessories to fail). Due to its requirements for specialized test equipment, signal processing software, and diagnostic skills, the test must be conducted by a third-party testing firm. The testing firm must be a qualified contractor preauthorized by the FAA.

3.2 Parameters and Tolerance Limits

The test is conducted in accordance with IEEE 400.3 using a maximum test voltage of 2.0 to 2.5 times operating voltage level (Uo) for a duration not to exceed 30 seconds.

For test parameters and tolerance limits, refer to FAA Order 6950.22, Maintenance of Electrical Power Cables, Chapter 3, Standards and Tolerances, Paragraph 301, Table (see column heading labeled "NEW CABLE").

3.3 Test Schedules

Test after installation and just before energizing the new system. Allow adequate lead time for test planning with the third party testing firm: about 3 months before project completion for the initial notice, followed by 8 weeks' advance notice for setting up the information-gathering and detailed planning sessions.

3.4 Safety and Test Procedure

3.4.1 Safety

The third-party testing firm shall provide safety briefings at the beginning of each test session. See FAA Order 6950.22, Chapter 5, paragraph 504e(1) and applicable IEEE safety standards.

3.4.2 Test Procedure

For test procedure details, refer to FAA Order 6950.22, Maintenance of Electrical Power Cables, Chapter 5, Paragraph 504.

CAUTION: After all tests are complete and before the cables and terminations are placed back into normal operation, ENSURE that all temporary safety grounding connections are removed from all insulated conductors that will be energized.

APPENDIX D—Acronyms/glossary

AASHTO	American Association of State Highway and Transportation Officials
AC	Alternating Current Advisory Circular
AJW-22	FAA Power Services Group
ALS	Approach Lighting Systems
ANSI	American National Standards Institute
APWA	American Public Works Association
ASCE	American Society of Civil Engineers
ASR	Air Surveillance Radar
ASTM	American Society for Testing and Materials
AWG	American Wire Gauge. A standard for expressing wire diameter. As the AWG number gets smaller, the wire diameter gets larger.
C	Clearance (cable pulling)
°C	Degrees Centigrade
CADD	Computer-Aided Design and Drafting
cmil	Circular Mil(s). Area of a wire that is one-thousandth of an inch (.001 inch, one mil) in diameter.
CN	Concentric Neutral
CONUS	Continental United States
CT	Current Transformer
d	Cable Outside Diameter (cable pulling)
D	Conduit Inside Diameter (cable pulling)
D’	D x 1.05 (cable pulling)
DC	Direct Current
DEB	Direct Earth Buried
DLA	Defense Logistics Agency
DOD	Department of Defense
Duct Bank	A set of parallel conduits made of steel, PVC covered, steel, heavy-walled PVC, or thin-walled PVC in reinforced concrete. Duct banks terminate in utility access holes or vaults. If not enclosed in concrete, duct banks must be of thicker material than thin-walled PVC.
EES	Earth Electrode System
ELD	Electrical Line Distribution (System). An FAA owned and operated electrical power distribution system (underground or overhead) running from a power source to FAA facility load(s). Low-voltage systems such as MASLRs and ODALs, and high-voltage systems such as ALSF-2s are also classified as ELD systems. An ELD may include some or all of the following: power cable; transformers; sectionalizing switchgear; switchpads; disconnect switches; manholes; hand-holes; utility poles; direct earth buried (DEB) cables; and underground duct banks. Runway edge lighting cables, fiber optic communication cables, and control and signal cables are not included as part of ELD.

Exhibit 1

Electrical Trees
Tree-like growths consisting of non-solid or carbonized microchannels, which can occur at electric field enhancements such as protrusions, contaminants, voids, or water trees subjected to electrical stress for extended time periods. Partial discharges are responsible for electrical tree growth.

EPT	Electrical PVC Tubing
EPC	Electrical PVC Conduit
f	Coefficient of Friction (cable pulling)
FAA	Federal Aviation Administration
FOTS	Fiber Optic Telecommunications System(s)
ft	Feet
GIS	Geographic Information Systems
GPS	Global Positioning System

Grounding Conductor
A conductor used to connect equipment or the grounded circuit of a wiring system to the grounding electrode system.

Grounding Electrode
Copper rod, plate, or wire embedded in the ground for the specific purpose of dissipating electrical energy to the earth.

HAZMAT	Hazardous Materials
HDBK	FAA Handbook
HDPE	High-Density Polyethylene
HH	Hand Hole
HIPOT	High Potential (Test)
Hz	Hertz
ICEA	Insulated Cable Engineers Association
IEC	International Electrotechnical Commission
IECA	Insulated Cable Engineers Association
IEEE	Institute of Electrical and Electronics Engineers
in.	Inch(es)
ISO	International Standards Organization
JO	FAA Order
kg	Kilogram(s)
kV	Kilovolt(s)
L	Length of Cable (cable pulling)
lb	Pound(s)
LV	Low Voltage (Typically 600 V and Below for FAA ELD Systems)
m	Meter(s)
MCOV	Maximum Continuous Operating Voltage
MH	Manhole
mH	Millihenry(s)
MIL-STD	Military Standard
MIL-I	Military Specification
mil	Unit of Length, Equal to One Thousandth (10^{-3}) of an Inch (0.0254 millimeter)
mm	Millimeter
MOV	Metal Oxide Varistor

Exhibit 1

MV	Medium Voltage (600 V to 37.5 kV)
NAS	National Airspace System
NEC	National Electrical Code
NECA	National Electrical Contractors Association
NEMA	National Electrical Manufacturers Association
NESC	National Electrical Safety Code
NFPA	National Fire Protection Association
NRTL	Nationally Recognized Testing Laboratory
OPR	Office of Primary Responsibility
OSHA	Occupational Safety and Health Administration
Pa	Pascal(s)
pC	Picocoulomb(s)
PD	Partial Discharge
PMO	Program Management Office
PPE	Personal Protective Equipment
psi	Pounds per Square Inch
PSG	Power Services Group
PTFE	Polytetrafluoroethylene (Teflon™)
PVC	Polyvinyl Chloride
PWRFRQ	Power Frequency (Test)
Qualified Person (Electrical)	A person knowledgeable in the construction and operation of electric power generation, transmission, and/or distribution equipment, along with associated hazards. Also known as “qualified worker.”
R	Radius of Bend (cable pulling)
Rated Voltage (Cable)	Manufacturer’s specified maximum voltage at which the cable can operate.
rms	Root Mean Square
RMC	Rigid Metal Conduit
RSA	Runway Safety Area. Areas of a runway established to enhance safety in the event of an aircraft undershoot, overrun, or excursion from the side of the runway.
SDR	Standard Dimensional Ratio, defined as the ratio of the average conduit diameter divided by the minimum wall thickness.
SPD	Surge Protection Device
STD	FAA Standard
SWBP	Sidewall Bearing Pressure (cable pulling)
T	Total Pulling Tension (cable pulling)
TR-XLPE	Tree-retardant XLPE
TSA	Taxiway Service Area
U_o	Operating Voltage, Line to Ground
UFC	Unified Facilities Criteria
UFGS	Unified Facilities Guide Specification (DOD). The UFGS was founded by the Secretary of Defense and mandated by the Department of Defense for all Military Services to unify their specifications into one database.
UL	Underwriters’ Laboratory
UV	Ultraviolet

Exhibit 1

V	Volt(s)
VLF	Very Low Frequency
VORTAC	VOR/Tactical Air Navigation
w	Weight of Conductors (cable pulling)
W	Weight correction factor (cable pulling)
Xfmr	Transformer
XLPE	Cross-Linked Polyethylene

APPENDIX E—Submittals Matrix

Contractor-generated design data	
• Code analysis (e.g., voltage drops, clearance calculations, design arc flash study, etc) (ANSI C2)	A Required.
• Design assumptions and parameters (FAA-STD-032)	B ☐ Not required for this project (check block).
• Test reports and findings (e.g., soil resistivity, load bearing, frost analysis, etc)	C ☐ Required for this project (check block).
• Design calculations (FAA-STD-032)	A Required.
• Contractor-generated design drawings or sketches.	A Required.
Cost estimates	A Required.
Medium voltage cable	A Required.
Medium voltage cable splices and joints*	A Required.
Medium voltage cable terminations*	A Required.
Conduits	A Required.
Duct construction materials (e.g., concrete, alternatives to concrete where approved, fills and layers, etc)	A Required.
Switch pads and sectionalizing switchgear	A Required.
Transfer switches (automatic and manual)	A Required.
Transformers	A Required.
Surge arresters	A Required.
Live end caps or protective caps	A Required.
Precast concrete structures	A Required.
Sealing Material	B ☐ Not required for this project (check block).
Manhole frames and covers	A Required.
Hand hole frames and covers	A Required.
Cable supports (racks, arms and insulators)	A Required.
Protective devices and coordination study	A Required.
As-built arc flash hazard study. Required when an existing study is not available, or if modifications are being made to the existing ELD system.	A Required.

Exhibit 1

Electrical equipment factory test reports		
Medium voltage cable factory certified test result report as per FAA-E-2793, Section 4.2 (includes meeting ICEA S-94-649, Sections 4.3.2.1 and 9.13).	A	Required.
Transformers	A	Required.
Switchgear, including sectionalizing switchgear	A	Required.
Disconnects	A	Required.
Other components	B ☐	Not required for this project (check block).
Field acceptance checks and tests (see Appendix C)	A	Required.
Arc-proofing test for cable fireproofing tape	C ☐	Required for this project (check block).
Cable installation plan and procedure		
• Site layout drawing with cable pulls numerically identified	C ☐	Required for this project (check block).
• List of equipment used, with calibration certifications	C ☐	Required for this project (check block).
• The manufacturer, type, and quantity of lubricant used on pull	C ☐	Required for this project (check block).
• The cable manufacturer and type of cable	C ☐	Required for this project (check block).
• The dates of cable pulls, time of day, and ambient temperature	C ☐	Required for this project (check block).
• The length of cable pull and calculated cable pulling tension (calculated value, not maximum value). A single generic table of cable pulls may be submitted.	C ☐	Required for this project (check block).
• The calculated maximum cable pulling tension	A	Required.
• The calculated maximum cable sidewall pressure	A	Required.
Cable splicer/terminator qualifications* [A]	A	Required.
Cable installer qualifications* [A]	A	Required.
Project design drawings [A]	A	Required.

Exhibit 1

APPENDIX F—HDPE-to-HDPE and HDPE-to-PVC Conduit Adhesive - Sample Product

BonDuit®

Conduit Adhesive

American Polywater's

BONDS to Polyethylene, PVC, Fiberglass, Metals and more

BonDuit® Conduit Adhesive is a unique two-part adhesive system used to transition-splice conduits (innerducts) of different types. BonDuit® Adhesive in 5 minutes makes a strong, durable splice that is air/water tight. Requires no expensive equipment.

Estimated Load Capacity and Usage

Conduit Diameter	Polyethylene Conduit to PVC Standard Coupling	
	Coupling length	Pullout Force
1 inch	2 ⅝ inch	760 lbs_f
1 ½ inch	2 ⅝ inch	1,140 lbs_f
2 inch	2 ½ inch	1,520 lbs_f
4 inch	3 ¾ inch	4,560 lbs_f

Results are based on careful surface preparation and a 24-hour cure at 70° F. Under these cure conditions; the load will reach 50% capacity after one hour and fully cured in 24 hours. To create air-tight joints for air-assisted cable installation, a cure time of 2 hours at 70°F is recommended. BonDuit® Conduit Adhesive is not designed for high stress pulls, such as those in HDD installations.

Numbers of Applications

BonDuit® Conduit Adhesive kit contain the materials necessary to prepare plastic and metal surfaces for bonding. By following the instructions, a strong joint takes just minutes. Each cartridge contains enough material for numerous applications, depending on the size of each coupling or joint.

Conduit Size	Applications per Cartridge
1 inch	20-30
1 ½ inch	12-18
2 inch	10-15
4 inch	4-6

Exhibit 1

APPENDIX G—Installation of Low-Voltage MALSR Systems and High-Voltage ALSF Systems

G.1 ALSF Systems

G.1.1 SYSTEM: NEW BEDFORD PANORAMEX CORPORATION (NBP)

Reference: TI 6850.87 *DUAL MODE HIGH INTENSITY APPROACH LIGHTING SYSTEM (ALSF-2/SSALR) SYSTEM TYPE FA-10700*, Vol. III, paragraph 9.6.2.3, *Lighting Field Preparation*.

Figures 9-4, 9-5, and 9-6 of the above TI show a typical lighting field concrete pad, conduit, and cable routing; typical pullbox, ICC, and junction box concrete pad, conduit, and cable routing. Install equipment and conduits as specified by the approved FAA design drawings. Basic installation process is as follows:

a. Locate the installation site and dig trenches capable of accommodating wiring specified on the installation drawings. These trenches shall be deep enough to bury the wiring/conduit below the frost line. A trench will be required for the wiring/conduit that carries main power to the substation building. Specific features of the conduit installation will be determined by the requirements of the site. Follow the guidelines as provided in the site approved design/installation drawings.

b. Install wiring/conduit in the trenches. Backfill the trenches.

c. Install wiring/conduit for pullbox, ICC, and junction box as specified by the approved FAA design drawings.

Note: The details are in the approved design drawings, not the TI text or figures.

G.1.2 SYSTEM: AIRFLO INSTRUMENT COMPANY

Reference: TI 6850.69 *DUAL MODE HIGH INTENSITY APPROACH LIGHTING SYSTEM (ALSF-2/SSALR) TYPE FA-10048*, Section 9.5, *Installation Procedure*.

Install the ASLF-2/SSALR Lighting System in accordance with the approved FAA design drawings. Basic installation process is as follows:

a. Locate the installation site and dig trenches capable of accommodating wiring specified on the installation drawings. These trenches shall be deep enough to bury the wiring/conduit below the frost line. A trench will be required for the wiring/conduit that carries main power to the substation building. Specific features of the conduit installation will be determined by the requirements of the site. Follow the guidelines as provided in the site approved design/installation drawings.
b. Install wiring/conduit in the trenches. Backfill the trenches.

Exhibit 1

c. Install wiring/conduit for pullbox, ICC, and junction box as specified by the approved FAA design drawings.

G.1.3 SYSTEM: GODFREY ENGINEERING
Reference: TI 6850.56 *DUAL MODE HIGH INTENSITY APPROACH LIGHTING SYSTEM (ALSF-2/SSALR) TYPE FA-9993*, Section 9.5, *Installation Procedure*.

Install the ASLF-2/SSALR Lighting System in accordance with the approved FAA design drawings. Basic installation process is as follows:

a. Locate the installation site and dig trenches capable of accommodating wiring specified on the installation drawings. These trenches shall be deep enough to bury the wiring/conduit below the frost line. A trench will be required for the wiring/conduit that carries main power to the Substation Building. Specific features of the conduit installation will be determined by the requirements of the site. Follow the guidelines as provided in the site approved design/installation drawings.

b. Install wiring/conduit in the trenches. Backfill the trenches.

G.1.4 SYSTEM: ADB-ALNACO INC.
Reference: TI 6850.55 *ALSF-2 / SSALR SEQUENCED FLASHING LIGHT SYSTEM TYPE FA 9988* (Referenced from 6850.56, Section 9.2). See paragraph 9.5**,** *Installation of Equipment***).**

a. Refer to the project plans, specifications, and drawings for specific installation instructions.

b. Install wiring/conduit for pullbox, ICC, and junction box as specified by the approved FAA design drawings.

G.2 MALS/MALSF/MALSR Systems

G.2.1 SYSTEM: MULTI ELECTRIC MFG. INC.
(Reference applicable TI, Facility Standards D-6213 (1981), site installation as-built drawings, and specification FAA-C-2626.)

Reference: TI 6850.1A, *MEDIUM INTENSITY APPROACH LIGHTING SYSTEM TYPE FA-8091* (1948)

Reference: TI 6850.7, *MALSR MEDIUM INTENSITY APPROACH LIGHTING SYSTEM WITH SEQUENCED FLASHES TYPES FA-8767 and FA-8767-1* (1972)

G.2.2 SYSTEM: GTE SYLVANIA
(Reference applicable TI, Facility Standards D-6213 (1981), site installation as-built drawings, and specification FAA-C-2626.)
Reference: TI 6850.9, *MEDIUM INTENSITY APPROACH LIGHTING SYSTEM WITH RUNWAY ALIGNMENT INDICATOR LIGHTS (MALSR) TYPE FA-8982* (1973)

Exhibit 1

G.2 3 SYSTEM: MULTI ELECTRIC MFG. INC.
(Reference applicable TI, Facility Standards D-6213 (1981), site installation as-built drawings, and specification FAA-C-2626.)

Reference: TI 6850.12, *MALSR MEDIUM INTENSITY APPROACH LIGHTING SYSTEM WITH RUNWAY ALIGNMENT INDICATOR LIGHTS TYPE FA-9425* (1974)

G.2.4 SYSTEM: SEPCO DIVISION, Connecticut International Corp.
(Reference applicable TI, Facility Standards D-6213 (1981), site installation as-built drawings, and specification FAA-C-2626.)

Reference: TI 6850.38, *MALSR MEDIUM INTENSITY APPROACH LIGHTING SYSTEM WITH RUNWAY ALIGNMENT INDICATOR LIGHTS TYPE FA-9629* (1977)

G.2.5 SYSTEM: MULTI ELECTRIC MFG. INC.
(Reference applicable TI, Facility Standards D-6213 (1981), site installation as-built drawings, and specification FAA-C-2626.)

Reference: TI 6850.49, *MALS MEDIUM INTENSITY APPROACH LIGHTING SYSTEM TYPE FA-9877* (1979)

Reference: TI 6850.62, *MALSR/MALS MEDIUM INTENSITY APPROACH LIGHTING SYSTEM WITH RUNWAY ALIGNMENT INDICATOR LIGHTS TYPE FA-9994* (1980)

G.2.6 SYSTEM: GODFREY ENGINEERING
(Reference applicable TI, Facility Standards D-5240 (1986), site installation as-built drawings, and specification FAA-C-2626.)

Reference: TI 6850.70, *MEDIUM INTENSITY APPROACH LIGHTING SYSTEM WITH RUNWAY ALIGNMENT INDICATOR LIGHTS (MALSR) TYPE FA-10097* (1986)

Reference: TI 6850.82, *MEDIUM INTENSITY APPROACH LIGHTING SYSTEM WITH RUNWAY ALIGNMENT INDICATOR LIGHTS (MALSR) TYPE FA-10267* (1988)

G.2.7 SYSTEM: AVW ELECTRONIC SYSTEMS
(Reference applicable TI, Facility Standards D-6292 (1998 - updated), site installation as-built drawings, and specification FAA-C-2626.)

Reference: TI 6850.85, *MEDIUM INTENSITY APPROACH LIGHTING SYSTEM WITH RUNWAY ALIGNMENT INDICATOR LIGHTS (MALSR) AND REMOTE MONITORING SUBSYSTEM (RMS) TYPE FA-10290* (1992)

G.2.8 SYSTEM: DME CORPORATION
(Reference applicable TI, Facility Standards D-6292 (1998 - updated), site installation as-built drawings, and specification FAA-C-2626.)

Reference: TI 6850.89, *MEDIUM INTENSITY APPROACH LIGHTING SYSTEM WITH RUNWAY ALIGNMENT INDICATOR LIGHTS (MALSR) AND REMOTE MONITORING SUBSYSTEM TYPE FA-11500* (1994)

Reference: TI 6850.97, *MEDIUM INTENSITY APPROACH LIGHTING SYSTEM WITH RUNWAY ALIGNMENT INDICATOR LIGHTS (MALSR) TYPE FA-17900* (TYPE FA-11501 or FA-21000 POWER & CONTROL ASSEMBLY) (2009 - Updated)

Exhibit 1

DIVISION 10

GEOTECHNICAL REPORT

Earth Systems
4378 Old Santa Fe Road | San Luis Obispo, CA 93401 | Ph: 805.544.3276 | www.earthsystems.com

February 23, 2022

File No.: 302524-004

Michael Quinn
Jviation, a Woolpert Company
6920 Santa Teresa Boulevard, Suite 208
San Jose, CA 95119

PROJECT: COUNTY OF VENTURA, OXNARD AIRPORT
CONNECTOR TAXIWAY RECONSTRUCTION
OXNARD, CALIFORNIA

SUBJECT: Subgrade Treatment Recommendations

REF:

1) ESP (Earth Systems Pacific). January 21, 2020a. Geotechnical Engineering Report, Oxnard Airport, Runway and Taxiway Connector Rehabilitation/Reconstruction, Oxnard, California. Doc. No. 1901-103.SER.REV. File No. 302524-001
2) ESP (Earth Systems Pacific). July 10, 2020b. Geotechnical Engineering Report, Oxnard Airport, Taxiway F Improvements, Oxnard, California. Doc. No. 2007-040.SER. File No. 302524-002
3) ESP (Earth Systems Pacific). July 10, 2020c. Addendum to Geotechnical Engineering Reports – Sulfate Testing of Subgrade Soils for Evaluation of Lime Treatment Option, Oxnard Airport, Runway and Taxiway Connector Rehabilitation/Reconstruction, Oxnard, California. Doc. No. 2002-053.ADD. File No. 302524-001/2

Dear Mr. Quinn:

As requested, Earth Systems Pacific has prepared this letter to address the subgrade treatment of the connector taxiways based upon the current grading which includes finish surface elevation changes as well as horizontal control modifications. Two geotechnical engineering reports and an addendum to address sulfates in the soil were prepared by this firm for the original design (ESP 2020a, 2020b, and 2020c).

During construction of the runway in 2021, the subgrade material was treated with a combination of lime and cement rather than only cement due to variable subgrade conditions encountered based upon a similar grade change, as well as to increase efficiency for the contractor. As requested, Earth Systems has reviewed the planned taxiway layout, including horizontal layout, which will include areas that are currently paved taxiways as well as areas that will be expanded into currently unpaved areas, and vertical finish surface elevation changes ranging from -0.28 feet and +1.21 feet.

Based upon this review, the areas where grades will be elevated will have little to no cohesive material based upon the borings from the original reports. Further, we understand the combination treatment was very successful in the cohesive subgrade and non-cohesive subgrade areas. Therefore, a combination of treatments is again recommended. In the non-cohesive subgrade areas, the lime treatment should be reduced to 1 percent by dry weight to address the sulfate potential in the cohesive fraction of the subgrade. In the cohesive subgrade areas, the initial lime treatment should be 3 percent by dry weight. The initial mellowing period in the non-cohesive areas can be reduced to 2 days with a minimum of three mixing passes on the final day. The initial mellowing period in the cohesive areas can be reduced to 4 days based upon the results of the sulfate testing during the runway reconstruction with a minimum of two mixing passes at least two days after the initial mixing. The contractor should sample and have the soil tested to confirm a sulfate level below 3,000 ppm prior to the final treatment.

The final treatment in the non-cohesive areas should consist of a minimum of 2.5 percent cement by dry weight. The final treatment in the cohesive areas should consist of a minimum of 2.0 percent cement by dry weight. If compaction operations of the P-209 are not started within 72 hours of the final treatment, during the period from 48 to 72 hours after compaction, the surface should be microcracked by applying 3 single passes with a 12-ton vibratory steel drum roller at maximum amplitude travelling from 2 to 3 mph.

If there are any questions concerning this letter, please do not hesitate to contact the undersigned.

Sincerely,

Earth Systems Pacific

Sydney Johnson
Project Manager

Robert Down
Principal Engineer

REGISTERED PROFESSIONAL ENGINEER
ROBERT W. DOWN
No. 70206
CIVIL
STATE OF CALIFORNIA

Doc. No.: 2202-058.LTR/cr

GEOTECHNICAL ENGINEERING REPORT
OXNARD AIRPORT
RUNWAY 7-25 AND TAXIWAY
CONNECTOR IMPROVEMENTS
2889 WEST 5TH STREET
OXNARD, CALIFORNIA
MEAD & HUNT, INC. PROJECT NO. 3138400-181115.01

July 10, 2020

Prepared for

Mr. Jeff Leonard, PE
Associate Practice Leader
Aviation Services
Mead & Hunt, Inc.

Prepared by

Earth Systems Pacific
4378 Old Santa Fe Road
San Luis Obispo, CA 93401

Exhibit 1

Earth Systems
4378 Old Santa Fe Road | San Luis Obispo, CA 93401 | Ph: 805.544.3276 | www.earthsystems.com

July 10, 2020

FILE NO.: 302524-001

Mr. Jeff Leonard, PE
Associate Practice Leader, Aviation Services
Mead & Hunt, Inc.
1360 19th Hole Drive, Suite 200
Windsor, CA 95492-7717

PROJECT: OXNARD AIRPORT
RUNWAY 7-25 AND TAXIWAY CONNECTOR IMPROVEMENTS/RECONSTRUCTION
2889 WEST 5TH STREET
OXNARD, CALIFORNIA
MEAD & HUNT, INC. PROJECT NO. 3138400-181115.01

SUBJECT: Geotechnical Engineering Report - Final

CONTRACT REFERENCE: Service Work Order No. 1 by Mead & Hunt, Inc., Referencing Proposal to Provide a Geotechnical Engineering Investigation and Recommendations, Oxnard Airport, Runway and Taxiway Connector Rehabilitation / Reconstruction, Oxnard, California, by Earth Systems Pacific, Doc. No. 1804-100.PRP, dated April 26, 2018

Dear Mr. Leonard:

As per the referenced Service Work Order, this geotechnical engineering report has been prepared for use in the design of the Runway 7-25 and Taxiway Connector Improvements Project at Oxnard Airport in Oxnard, California. Boring logs and a boring location map, results of laboratory testing, and conclusions regarding CBR testing, earthwork shrinkage, and subsurface water and soil moisture contents are provided. This final report version incorporates responses to comments received from the client on a draft version issued on February 6, 2019.

We appreciate the opportunity to have provided geotechnical services for this project and look forward to working with you again in the future. If there are any questions concerning this report, please do not hesitate to contact the undersigned.

Sincerely,

Earth Systems Pacific

REGISTERED PROFESSIONAL ENGINEER FREDERICK J. POTTHAST No. GE 2369 Exp. 03/31/22 GEOTECHNICAL STATE OF CALIFORNIA

Fred J. Potthast, GE
Principal Engineer

Copy to: Mead & Hunt, Inc., Attn.: Edoardo Barber, and Jannet Loera

Doc. No.: 2007-039.SER/cr

Exhibit 1

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APPENDICES

1.0 INTRODUCTION

This geotechnical engineering report has been completed for the client's use in the development of a preliminary pavement design for Runway 7-25 and Taxiway Connectors A through E at Oxnard Airport in Oxnard, California. Previous investigations of the pavement on the Airport were provided by this firm (ESP 2015) and by Miller Geosciences, Inc. (Miller 2014). Based on those reports, the existing pavement sections are known to consist of varying thicknesses of asphalt concrete (AC) over varying thicknesses of aggregate base (AB). Runway 7-25 and Taxiways A through E are in regular use currently.

In general, this report contains logs of the subsurface conditions encountered in our exploratory borings, the results of laboratory tests, and conclusions regarding CBR testing, earthwork shrinkage, and subsurface water and soil moisture contents. We understand that this report, and the previous investigations, will be used by the client and the owner to determine if rehabilitation or reconstruction of the runway and taxiway connectors will be necessary.

2.0 SCOPE OF SERVICES

The scope of work for this geotechnical engineering report included a general site reconnaissance, subsurface exploration, laboratory testing of soil samples, engineering evaluation of the data collected, and the preparation of this report. The investigation and subsequent recommendations were based on information and base maps provided by the client.

The report and recommendations are intended to be in general accordance with AC 150/5320-6F (FAA 2016), the client's requested work scope, and common geotechnical engineering practice in this area under similar conditions at this time. The tests were performed in general conformance with the standards noted, as modified by common geotechnical engineering practice in this area under similar conditions at this time.

It is our intent that this report be used exclusively by the client to determine if rehabilitation or reconstruction of the runway and taxiway connectors will be necessary. The information may also be used to develop plans for future projects; however, no other specific projects are planned at this time. Application beyond these intents is strictly at the user's risk. As there may be geotechnical issues yet to be resolved, the geotechnical engineer should be retained to provide consultation as the project progresses, to assist in verifying that pertinent geotechnical issues have been addressed and to aid in conformance with the intent of this report. In the event this

report is used to develop project plans, it may also be advantageous to retain the geotechnical engineer to review the grading and drainage plans as they near completion to further aid in conformance of the plans with the intent of this report.

This report does not address issues in the domain of the contractor such as, but not limited to, site safety, excavatability, shoring, temporary slope angles, construction methods, etc. Analysis of site geology and of the soil for corrosive potential, radioisotopes, asbestos (either naturally occurring or in man-made products), lead or mold potential, hydrocarbons, or other chemical properties are beyond the scope of this investigation. Ancillary features beyond the pavement areas covered by this report are also not within our scope and are not addressed.

In the event that there are any changes in the nature of the work scope, or if any assumptions used in the preparation of this report prove to be incorrect, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and the conclusions of this report modified or verified in writing.

3.0 FIELD INVESTIGATION

On October 28 through November 1, 2018, a total of 40 borings were extended on the runways and taxiways within the project area, during night-shift closure periods. The borings were drilled to a maximum depth of 10.0 feet below the existing pavement surfaces with a Mobile Drill rig, Model B-53, equipped with 6-inch outside diameter hollow stem auger and an automatic hammer for sampling. The approximate locations of the borings are shown on the Exploration Location Maps – Figures 1A and 1B, in Appendix A.

The boring locations, which were provided to us by the client, were identified and marked in the field during a site visit with airport staff on October 10, 2018. During the field meeting, the general areas of all requested boring locations were determined by airport staff to be clear of underground utility lines, with only slight adjustments in a few locations made to increase setback distances. A table with the actual boring locations identified by latitude and longitude, as determined using a Verizon Android Smartphone, is also included in Appendix A.

As the borings were drilled, soil samples were obtained using a 3-inch outside diameter ring-lined barrel sampler (ASTM D 3550-17 with shoe similar to D 2937-17) at approximate subgrade elevation. Standard penetration tests (SPT) using a 2-inch outside diameter split-spoon sampler were also performed in the borings (ASTM D 1586-11) from 5 to 6.5 feet and from 8.5 to 10.0 feet in each boring. Bulk samples were secured from the auger cuttings.

The pavement sections at each boring location were noted by direct measurement of the material layers in the boring. The soils underlying the pavement sections were initially classified and logged in general accordance with the Unified Soils Classification System (ASTM D 2488-17). Final classifications of the soils in accordance with the Unified Soils Classification System (ASTM D 2487-17) were made following completion of laboratory testing. Copies of the boring logs and a boring log legend can also be found in Appendix A. In reviewing the boring logs and legend, the reader should recognize that the legend is intended as a guideline only, and there are a number of conditions that may influence the soil characteristics as observed during drilling. These include, but are not limited to, cementation, variations in soil moisture, presence of groundwater, and other factors. Consequently, the logger must exercise judgment in interpreting soil characteristics, possibly resulting in soils descriptions that vary somewhat from the legend. Following completion of drilling, the borings were backfilled with cement-treated auger spoils and gravel, and then patched at the surface with cold-mix AC (Instant Road Repair by International Roadway Research).

4.0 LABORATORY INVESTIGATION

In situ moisture content and unit dry weight (ASTM D 2937-17, as modified for ring liners) were determined for the ring samples. Fourteen bulk samples were tested for the following: maximum density and optimum moisture (ASTM D 1557-12, modified), particle size distribution (ASTM D 422-63/07; D 1140-17), plasticity index (ASTM D 4318-17), and CBR (ASTM D 1883-16, for a range of moisture contents, with ASTM D 1557-12 as the reference standard for maximum density). Two additional bulk samples were tested for the same series of parameters, except that CBR testing was completed with the soils lime treated at 3, 5 and 7 percent by dry weight of soil at optimum moisture content only. One additional sample was tested for plasticity index (ASTM D 4318-17), and three additional samples were tested for particle size distribution (ASTM D 422-63/07; D 1140-17). Please refer to Appendix B for the laboratory test results.

5.0 GENERAL SUBSURFACE PROFILE

Variations in the thicknesses of the existing pavement sections were observed throughout the borings drilled in the project area.

The AC thicknesses found in the borings on the runway varied from 3 inches in Borings 4, 21 and 28, to 6.5 inches in Boring 8. The majority of the thicknesses measured in the other borings on the runway varied from 4 to 5.5 inches. The miscellaneous aggregate base (mAB) supporting the

AC on the runway varied from 8 inches in Borings 8 and 10, to as much as 17 inches found in Boring 28. The mAB on the runway consisted of clayey sand with gravel, silty sand with gravel, and silty gravel with sand.

On the connector taxiways, the borings encountered more uniform AC thicknesses of 4 to 5.5 inches, with one section (Boring 40) at 6 inches. The mAB thicknesses ranged from 3.5 inches in Boring 32, to 12 inches in Borings 37 and 38. The mAB on the connector taxiways consisted of silty sand with gravel, and silty gravel with sand.

The pavement sections found in each of the borings are noted on Figures 2A and 2B - Existing Pavement Section Thicknesses, in Appendix C.

Below the pavement sections, thin (4 to 8 inches) layers of loose to medium dense poorly graded sand fill were found, generally on the west side of the project area, in Borings 1 through 8, 31 through 34, and 36. Below the poorly graded sand, and below the pavement sections in all other borings, the underlying soil was fill consisting of sandy lean clay, silty sand and lean clay to depths ranging from 2 to 5 feet below the existing pavement surfaces. Variable amounts of gravel were noted in the fill. The silty sand fill in Boring 33 contained traces of AC fragments; in Boring 40 the silty sand fill was mixed with sandy lean clay. In general, the silty sands were medium dense, and the clays were medium stiff to very stiff.

Alluvium was found below the fill in all of the borings, to the maximum depth explored of 10 feet below the existing pavement surfaces. The alluvium consisted of very soft to medium stiff sandy lean clay, silt, and lean clay; a layer of loose silty sand was also found in the alluvium in Boring 25.

The soils were described during drilling as being slightly moist to very moist. Subsurface water was not encountered in any of the borings, to the maximum depth explored of 10 feet below the existing pavement surface. However, caliche deposits, a residual mineral in the soil indicating the past presence of subsurface water, were found at various depths in 32 of the 40 borings drilled for this project.

Please refer to the logs in Appendix A for a more complete description of the subsurface conditions found in the borings.

Figures 3A and 3B – USCS Soil Types at Subgrade, in Appendix C, is a summary of the soil types found at or within 1.5 feet of subgrade (i.e., below the pavement sections) in the borings. The poorly graded sand layers found directly below the pavement sections in Borings 1 through 8, 31 through 34, and 36, are also indicated on Figures 3A and 3B.

6.0 CONCLUSIONS

Existing Pavement Sections and Miscellaneous Aggregate Base

The existing pavement sections found in the borings on the runway were variable, with the thicknesses of the AC ranging from 3 inches to 6.5 inches. The miscellaneous aggregate base (mAB) supporting the AC on the runway varied from 8 inches to 17 inches; the thicker sections of mAB appeared to be more on the eastern end of the runway. On the connector taxiways, the borings encountered AC thicknesses of 4 to 6 inches, with the underlying mAB ranging from 3.5 inches to 12 inches.

The 4 to 8-inch layers of poorly graded sand found below Borings 1 through 8, 31 through 34, and 36, appeared to be leveling courses, and it is unclear if they were considered to be part of the overall pavement section when constructed. The material itself appeared to be beach sand.

The mAB found below the AC in all borings was not uniform and varied from clayey sand with gravel to silty sand with gravel. Comparison of the results (Appendix B) of grain size distribution tests completed on the mAB with gradation specifications for FAA P-209 material and Caltrans Class 2 aggregate base indicate that none of the four samples tested appeared to meet the gradation requirements. Therefore, for the purposes of this report, the material was classified as “miscellaneous aggregate base (mAB).”

CBR Test Results

The laboratory test results indicate variability of the CBR values of the soils based on their USCS type and on their moisture contents. The CBR test results have been summarized on Figures 4A, 4B, 5A and 5B in Appendix C, and the following paragraphs are a discussion regarding use of the data on the maps. Determinations of the actual CBR values and elastic modulus (E) values to be used in either the design for reconstruction of pavement, or the evaluation for rehabilitation of existing pavement, are to be made by the project engineer.

Per AC 150/5320-6F (FAA 2016), Chapter 2.5.3, for flexible pavements, the elastic modulus E can be estimated from CBR test results using the following correlation: E (psi) = 1500 x CBR.

Reconstructed Pavement over Existing Soils

In general, the laboratory CBR test results indicate variations in the strengths of the soils tested based on their density and their moisture content. Variations in the CBR values were noted when moisture contents were above or below optimum moisture content for most of the samples. The summary of CBR values provided in the following paragraph is based on the assumption that the subgrade soils will be recompacted within a moisture conditioned range extending from 2 percent below optimum moisture content to 2 percent above optimum moisture content. If the subgrade soils are not maintained within this range, a reduction in the CBR value will occur. Assuming the CBR values provided in this report for pavement section reconstruction will be utilized for design, the project plans should fully indicate the relatively narrow moisture content range as a specification requirement, to allow the contractor to plan earthwork operations accordingly. Provisions should also be taken (e.g., proper surface drainage and flowlines away from edges of pavement, regular maintenance of the pavement surface to fill any cracks that develop, etc.) to ensure that the moisture contents of the subgrade soils remain within the design range for the design life of the pavement sections. As noted in the "Subsurface Water and Soil Moisture Contents" Section below, edge drains should be considered to help maintain soil moisture contents following construction.

For fully reconstructed conditions, where the existing pavement sections will be removed and the underlying soils can be moisture conditioned and recompacted, the CBR values of the subgrade soils can be increased in some areas from their *in situ* conditions. However, where the existing conditions are already very well compacted, a *decrease* in the effective CBR value at that location could occur with moisture conditioning and recompaction to a lesser value than the existing conditions. The most important soil condition achieved with complete reconstruction will be uniformity of subgrade moisture and density. Per FAA AC 150/5320-6F, the degree of relative compaction required at subgrade for any pavement areas where complete reconstruction will be undertaken (and therefore the CBR value that can be used in the reconstruction design) is based on the cohesive/non-cohesive classification of the subgrade soils. With the exception of the silty sands found at or near subgrade in Borings 5, 6, 24, 28, 33, 35, 39 and 40, the soils encountered at the site are considered cohesive (plasticity index of 3 or greater, per FAA AC 150/5320-6F, Chapter 3.9.3). Also per FAA AC 150/5320-6F, cohesive soils are required to be compacted at subgrade to a minimum of 95 percent of maximum dry density. Based on discussions with the client during development of the laboratory data, given the

scattered and inconsistent nature of the silty sands, it was decided to consider all of the subgrade soils on the site as being cohesive, with a compaction standard of 95 percent of maximum dry density.

Figures 4A and 4B in Appendix C are summaries of the CBR values expected at the boring locations, based on the results of our laboratory testing and assuming the soils are compacted to a minimum of 95 percent of maximum dry density within 2 percent of optimum moisture content. After discussing the design parameters and construction considerations with the client, and reviewing the laboratory CBR test results, it is our opinion that the following "approximate average" CBR values should be used in the design of reconstructed pavements for the project:

- Runway 7-25, from Borings 11/12 to Borings 21-22 (see Figures 4A and 4B in Appendix C) – CBR = 5
- All other portions of Runway 7-25 and all Taxiway connectors – CBR = 8

Reconstructed Pavement over Lime Treated Soil

To provide better subgrade CBR values and to reduce the design section where pavement will be fully reconstructed, lime treatment can be utilized. The existing pavement sections (asphalt concrete - AC and miscellaneous aggregate base - mAB) can also be pulverized/milled in place and mixed with the subgrade, to reduce or even eliminate off-haul and disposal from demolition, and to provide a stronger subgrade material than the native soils. Milled pavement section material should be thoroughly mixed with the native soils using disks or other suitable equipment, prior to shaping to provide the design crowned subgrade section. Final mixing of the materials after shaping will be completed during the lime treatment process by pugmills. Lime treatment of the native soils mixed with milled AC/mAB material will likely provide a superior subgrade material for support of new pavement, when compared to untreated native soils, or to lime treated native soils without milled AC/mAB.

Samples of the subgrade soils only (without milled AC/mAB) from Boring 5 and Boring 27 were tested for CBR value at optimum moisture content only, with lime treatment percentages of 3, 5 and 7 percent by dry weight of soil. Based on the laboratory test results, the approximate CBR values provided in Tables 1 and 2 were determined for the samples compacted to a minimum of 95 percent of maximum dry density. If utilized, the lime treated soil layer should be 12 to 16 inches thick. A thicker section may be appropriate for areas of the site where in situ soil moisture contents are well above optimum and construction equipment traffic may cause instability. The actual thickness of lime treated soil to be utilized should be determined by the engineer.

If the existing pavement sections are milled and stockpiled for later re-use as mAB, it is anticipated that some or all of the poorly graded sand layers found in Borings 1 through 8, 31 through 34 and 36 will be removed in the process. To maintain uniformity of the subgrade soils for lime treatment, any poorly graded and/or mAB layers remaining after the milling process should be removed from the lime treatment area and properly disposed off site or reused where acceptable on site. Alternately, if the quantity of poorly graded sand and/or mAB in the lime treatment zone is significant, the additive can be switched from lime to cement. The need to make this switch should be determined based on the conditions exposed at the time of construction.

Table 1 - CBR #3 – Boring 5 at 2.0 to 4.0 Feet – Dark Brown Silty Sand – Lime Treated

Lime Treatment	Max. Density, pcf	95% Max. Dens., pcf	Approximate CBR
3 %	119.0	113.0	52
5 %	116.6	110.8	72
7 %	114.9	109.2	62

Table 2 - CBR #6 – Boring 27 at 2.0 to 4.0 Feet – Dark Brown Sandy Lean Clay – Lime Treated

Lime Treatment	Max. Density, pcf	95% Max. Dens., pcf	Approximate CBR
3 %	115.6	109.8	37
5 %	113.3	107.6	52
7 %	114.0	108.3	62

<u>CBR Values for Existing Miscellaneous Aggregate Base (mAB)</u>

Samples of the miscellaneous aggregate base (mAB) from four of the borings were tested for CBR in the laboratory. As discussed with the client, considering its variability, it was decided that the mAB material was not consistent enough to be able to assume with any certainty that it would be capable of being compacted to 100 percent of maximum dry density with a reasonable amount of effort. The approximate CBR values in Table 3 were determined for the four samples of mAB material compacted to a minimum of 95 percent of maximum dry density within two percent of optimum moisture content. Per AC 150/5320-6F (FAA 2016), Chapter 2.5.6.3, a *maximum* elastic modulus (E) value of 50,000 psi (CBR = 33) is recommended for the mAB material.

Table 3 – CBR Vales of Existing Misc. Aggregate Base (mAB) below Existing AC

CBR No.	Soil Type (USCS)	Found in Borings	CBR
4	Brown Clayey Sand with Gravel (SC)	1 through 8	12
15	Brown Clayey Sand with Gravel (SC)	17 through 24	27
16	Brown Silty Gravel with Sand (GM)	25 through 30	50
17	Brown Silty Sand with Gravel (SM)	9 through 16, and 31 through 40	50

Rehabilitation of Existing Pavements

Figures 5A and 5B in Appendix C show the estimated CBR values of the subgrade soils at each boring location, based on their existing density and moisture contents, and on the results of the laboratory CBR tests. Note that in 26 of the 40 borings, the existing soil moisture contents and/or densities were beyond the range of the data from the laboratory CBR tests; those locations are marked on the map with an asterisk. Where the CBR information appeared to follow a trend line beyond the data range, a rough estimate of the CBR value was provided. Where the soil moisture contents and/or density values were well out of the data range or did not appear to follow a trend line, no CBR value was provided. After reviewing the design parameters and construction considerations with the client, reviewing the laboratory CBR test results, and considering the variability of the in situ moisture and site density test results, it is our opinion that a CBR value of only 1 or 2 should be used for the subgrade in its existing condition when evaluating the potential for rehabilitation of the existing pavement.

As noted in the "Subsurface Water and Soil Moisture Contents" Section below, edge drains should be considered to help maintain soil moisture contents following construction.

Swelling Soils

AC 150/5320-6F (FAA 2016) Chapter 3.10.1 describes the effects that swelling soils have on airport pavements, and recommends various treatments (removal and replacement, stabilization, modified compaction efforts and adequate drainage) to reduce the potential for damage to pavements due to swelling soils.

Chapter 3.10.2 (FAA 2016) indicates swelling soils "usually have liquid limits above 40 and plasticity indexes above 25." Only one soil type, the brown sandy fat clay (CH) found in Boring 39 from 2.0 to 5.0 feet, meets these criteria; the test results for this material were a liquid limit of 55 and a plasticity index of 40.

Chapter 3.10.3 (FAA 2016) indicates soils with a swell of greater than 3 percent when tested for CBR require treatment to reduce the potential for damage to pavements. The following samples exhibited a swell of greater than 3 percent when tested for CBR value:

- CBR #7 – Boring 23 from 3.5 to 5.0 feet. Expansion values ranged from 3.0 to 5.8 percent after soaking for the samples compacted at 3 percent below optimum moisture content only. Samples compacted at optimum and at 3 percent above optimum exhibited expansion values of 0.5 percent or less after soaking.
- CBR #14 – Boring 39 from 2.0 to 5.0 feet. Expansion values ranged from 3.3 to 5.3 percent after soaking for the samples compacted at 3 percent below optimum moisture content only. One sample compacted at optimum moisture content experienced 3.1 percent expansion after soaking; the other two samples compacted at optimum moisture content exhibited expansion values of 2.0 percent or less. All three samples compacted at 3 percent above optimum exhibited expansion values of 2.2 percent or less after soaking.

Chapter 3.10.1 (FAA 2016) states "Local experience and judgment should be applied in dealing with swelling soils to achieve the best results." It is our understanding that the pavement at Oxnard Airport does not exhibit pervasive evidence of damage due to swelling soils, i.e., significant edge cracking or random surface unevenness. In our opinion, the material found in Boring 23 (CBR #7) from 3.5 to 5.0 feet does not exhibit enough of the characteristics to be considered a swelling soil that should be accounted for in the design process. However, the fat clay soil found in Boring 39 from 2.0 to 5.0 feet *is* considered a swelling soil, and it should be considered in the design process. This material was only found in one boring, therefore its presence on the site is likely limited.

If the engineer elects to lime treat all of the native soils for a reconstruction process, per Table 3-1 "Recommended Treatment of Swelling Soils" (FAA 2016), the lime treatment will neutralize the swelling soils, and no additional action would be necessary. If reconstruction is planned *without* lime treatment, the most reasonable course of action, again per Table 3-1 "Recommended Treatment of Swelling Soils" (FAA 2016), would probably be to remove the fat clay soils to a depth of at least 36 inches below the pavement section and replace with non-swelling soil. If the

existing pavements are rehabilitated without reconstruction, the only option available to reduce the potential for damage would be to provide adequate surface and subsurface drainage, as described in the "Subsurface Water and Soil Moisture Contents" Section below, where the fat clay soils are present in the subgrade.

Earthwork Shrinkage

Soil volume loss, or "shrinkage", during earthwork can be attributed to three categories; soil loss due to stripping or demolition of existing improvements, subsidence of the underlying soils due to compaction, and shrinkage of fill soil as it is placed and compacted. These factors are partly due to the soil characteristics, but largely due to depths of cuts and fills, stripping techniques, type and weight of earthwork equipment, traffic pattern of earthwork equipment, and soil moisture at the time of grading.

In paved areas that are to be reconstructed, removal of distinct AC and AB layers can result in less loss than from removal of vegetation in unpaved areas, if any. The amount of soil loss that will occur is largely dependent upon how careful the contractor is in stripping and demolition/removal operations.

Subsidence of the site due to compaction of the soils below a fill area also occurs. Subsidence due to compaction is likely to be in the range of 0.1 to 0.2 feet. The main zone of subsidence is typically the upper two to three feet. Deeper subsidence is not expected as earthwork operations for pavement reconstruction are expected to be limited to the upper 1 to 2 feet in the project area.

To estimate shrinkage of the subgrade, *in situ* soil density data from ring samples taken in the borings at approximate subgrade elevation were analyzed. Appendix D contains a summary of the existing relative compaction at each depth where a ring sample was secured, as well as calculated shrinkage assuming final relative compaction values ranging from 95 to 100 percent.

As loss, subsidence, and shrinkage are only partly due to the soil characteristics, and are largely influenced by the earthwork equipment, earthwork methods, and soil moisture, these factors cannot be precisely estimated.

Subsurface Water and Soil Moisture Contents

Subsurface water was not encountered in any of the borings to the maximum depth drilled of 10 feet below the existing pavement surface. However, caliche deposits, a residual mineral in the

soil indicating the past presence of subsurface water, were found at various depths in 32 of the 40 borings drilled for this project. Caliche is an indicator that significant soil moisture contents have been present in the past. If soil moisture contents are well above optimum in pavement areas to be reconstructed, the soils could become unstable under equipment traffic. Unstable conditions hinder compaction efforts and are not acceptable to support fill or pavement section placement. All grading areas should be firm and unyielding following compaction operations and prior to placement of fill, aggregate base or pavement.

Depending on the time of year that construction operations take place, the most effective methods to deal with unstable conditions due to high soil moisture could be scarification and aeration, or the use of geotextile stabilization fabrics. Scarification and aeration may only be possible if the weather conditions are clear and if the project schedule permits.

If the project schedule will not allow drying of the soil naturally, stabilization fabric could be utilized. Additional excavation below subgrade may also be needed before the stabilization fabric is placed; the depth of overexcavation should be determined by the geotechnical engineer based on conditions exposed at the time of construction. After all excavations are complete, and prior to placement of the geotextiles, the exposed surfaces are typically back-dragged to a smooth condition to the degree practicable with light earthwork equipment. Geotextile stabilization fabric (Mirafi RS380i or similar material depending on the degree of instability) is typically placed in the excavated area and extended up the sidewalls of the excavation to within 2 inches of the bottom of the AC layer. Stabilization fabrics are rolled out along the long dimension of the reconstruction area (not perpendicular to it), and are stretched, overlapped and held in place according to the manufacturer's recommendations. Recycled subbase and/or imported aggregate base, per the overall pavement section design, is placed over the fabric in thin, moisture-conditioned lifts and compacted. Recycled subbase and/or aggregate base is placed by end-dumping on the fabric and spreading ahead of equipment; equipment traffic is typically not allowed to travel directly over the fabric. Initial lifts of subbase/base are spread and compacted by rubber-tired equipment; subsequent lifts are compacted using sheepsfoot and/or steel-drum equipment. Compaction equipment is usually operated in static mode only until base grade is reached, to reduce the potential for any free water in the underlying soils to be drawn through the fabric and into the subbase or aggregate base.

If it appears that stable conditions will not be created at base grade after the use of geotextiles, a layer of geogrid (Tensar TriAx TX-7 or similar material) can be placed according to the

manufacturer's recommendations as additional reinforcement at the approximate mid-depth of the subbase/aggregate base layer. Often sufficient material may not be in place over the geotextile stabilization fabric at mid-depth of the design subbase/aggregate base layer to fully mobilize its strength characteristics and to determine if geogrid will be needed, therefore it may be necessary to construct a full-scale test strip of the pavement section, with and without geogrid reinforcement. This test strip will give an indication as to whether or not geogrids will be required in any reconstruction areas.

Figures 6A and 6B – Subgrade Soil Moisture Content in Appendix C show the soil moisture contents at the time of our field exploration, and percentage above (or below) optimum moisture content. These data show that in the majority of the boring locations, soil moisture contents were above optimum moisture content, with some in excess of 10 percent above optimum. As noted in the "CBR Test Results" Section of this report, the CBR values decrease significantly with increasing soil moisture contents. To reduce the potential for accumulated moisture in the subgrade and the subsequent loss of soil strength (CBR value), positive surface drainage away from all paved areas must be provided. Edge drains adjacent to the pavement areas are also recommended. The drains could consist of conventional geotextile-wrapped and gravel-filled trenches with perforated collection pipes, or prefabricated panel-type drainage systems that are placed in narrow trenches. The 3- to 4-inch diameter perforated collection pipes in conventional trenches have the advantage of being able to be fitted with cleanouts for system maintenance; however, this could be outweighed by the relatively low cost of a thin panel drain system, as gravel drains require excavation of wider trenches, trench spoil disposal, and gravel placement. The actual type of system to be utilized, if any, should be determined by the engineer. The drains should be placed, wherever practicable, to dewater the upper 2 to 3 feet of soil below the pavement sections.

Soil Erodibility

The site soils are considered to be erodible. It is essential that all surface drainage be controlled and directed to appropriate discharge points, and that surface soils, particularly those disturbed during construction, are stabilized by vegetation or other means during and following construction.

7.0 OBSERVATION AND TESTING

1. It must be recognized that the recommendations contained in this report are based on a limited number of borings and rely on continuity of the subsurface conditions

Exhibit 1

encountered. Therefore, the geotechnical engineer should be retained to provide consultation during the design phase, to review plans as they near completion, to interpret this report during construction, and to provide construction monitoring in the form of testing and observation.

2. At a minimum, the following should be provided by the geotechnical engineer during construction:

   - Professional observation during grading
   - Oversight of special inspection during grading

3. Special inspection of grading should be provided as per the requirements of the FAA or Section 1705.6 and Table 1705.6 of the CBC; the soils special inspector should be under the direction of the geotechnical engineer. Subject to approval by the building official or other jurisdiction, special inspection requirements should be addressed by the geotechnical engineer during the preconstruction meeting (see below) prior to the start of grading operations.

   At a minimum, the following items should be inspected and/or tested by the special inspector:

   - Stripping and clearing of vegetation and existing pavement where planned for removal
   - Excavations to subgrade in any pavement reconstruction areas, and corrective operations (scarification/aeration or placement of geotextile stabilization fabric) in any unstable areas
   - Excavations to subgrade in any pavement reconstruction areas and scarification, moisture conditioning, and recompaction in stable areas
   - Fill, milled/pulverized AC (if any) and imported aggregate base quality, placement, moisture conditioning, and compaction
   - Utility trench backfill

4. A program of quality control should be developed prior to beginning grading. The contractor or project manager should determine any additional inspection items required by the architect/engineer or the governing jurisdiction.

5. Locations and frequency of compaction tests should be as per the recommendation of the geotechnical engineer at the time of construction. The recommended test location and frequency may be subject to modification by the geotechnical engineer, based upon soil and moisture conditions encountered, size and type of equipment used by the contractor, the general trend of the results of compaction tests, or other factors.

6. A preconstruction conference among the owner, the geotechnical engineer, the governing agency, the special inspector, the project inspector, the architect/engineer, and contractors is recommended to discuss planned construction procedures and quality control requirements.

7. The geotechnical engineer should be notified at least 48 hours prior to beginning construction operations. If Earth Systems Pacific is not retained to provide construction observation and testing services, it shall not be responsible for the interpretation of the information by others or any consequences arising therefrom.

8.0 CLOSURE

Our intent was to perform the investigation in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing in the locality of this project and under similar conditions. No representation, warranty, or guarantee is either expressed or implied. This report is intended for the exclusive use by the client as discussed in the “Scope of Services” section. Application beyond the stated intent is strictly at the user's risk.

This report is valid for conditions as they exist at this time for the type of project described herein. The conclusions and recommendations contained in this report could be rendered invalid, either in whole or in part, due to changes in building codes, FAA regulations, standards of geotechnical or construction practice, changes in physical conditions, or the broadening of knowledge.

If changes with respect to development type or location become necessary, if items not addressed in this report are incorporated into plans, or if any of the assumptions used in the preparation of this report are not correct, this firm shall be notified for modifications to this report. Any items not specifically addressed in this report should comply with the FAA, the CBC and/or the requirements of the governing jurisdiction.

The preliminary recommendations of this report are based upon the geotechnical conditions encountered at the site and may be augmented by additional requirements of the engineer, or

by additional recommendations provided by this firm based on conditions exposed at the time of construction.

Thank you for this opportunity to have been of service. If you have any questions, please feel free to contact this office at your convenience.

End of Text.

TECHNICAL REFERENCES

ESP. (Earth Systems Pacific). December 31, 2015. Geotechnical Engineering Report, Taxiway and Apron PCN Calculations, Oxnard Airport, Oxnard, California. Mead & Hunt, Inc., Project No. 3138400-150628.01

FAA. (U.S. Department of Transportation Federal Aviation Administration). November 10, 2016. Advisory Circular (AC) 150/5320-6F. Airport Pavement Design and Evaluation.

Miller. (Miller Geosciences, Inc.). August 28, 2014. Preliminary Geotechnical Explorations, Proposed Improvements, Oxnard Airport Runway, 2889 West 5th Street, Oxnard, California.

APPENDIX A

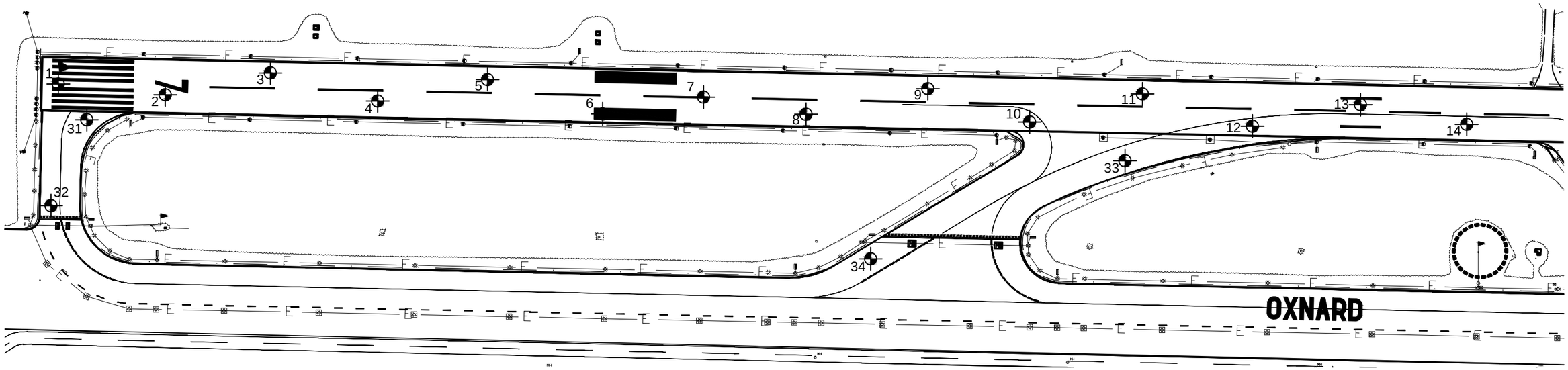
Figures 1a and 1b – Exploration Location Maps

Table 1 - Boring Locations by Latitude and Longitude

Boring Log Legend

Boring Logs

Exhibit 1



LEGEND

40 Boring Location (Approx.)

BASE MAP PROVIDED BY: MEAD AND HUNT, INC

N

NOT TO SCALE

Earth Systems Pacific
4378 Old Santa Fe Road, San Luis Obispo, CA 93401
www.earthsystems.com
(805) 544-3276 • Fax (805) 544-1786

FIGURE 1A - EXPLORATION LOCATION MAP

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements
2889 West 5th Street
Oxnard, California

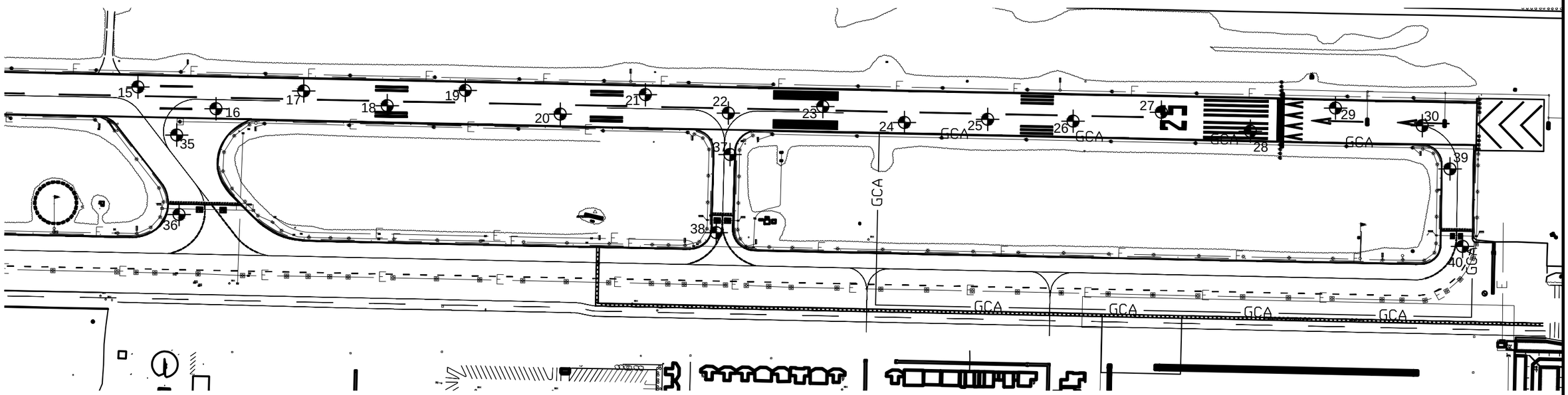
Exhibit 1

Date
February 2020

Project No.
302524-001

Sheet 1 of 2

OXNARDAIRPORT110518mgps



LEGEND

40 Boring Location (Approx.)

BASE MAP PROVIDED BY: MEAD AND HUNT, INC

N

NOT TO SCALE

Earth Systems Pacific
4378 Old Santa Fe Road, San Luis Obispo, CA 93401
www.earthsystems.com
(805) 544-3276 • Fax (805) 544-1786

FIGURE 1B - EXPLORATION LOCATION MAP
Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements
2889 West 5th Street
Oxnard, California

Exhibit 1

Date
February 2020

Project No.
302524-001

Sheet 2 of 2

OXNARDAIRPORT110518maps

BORING LOCATIONS BY LATITUDE AND LONGITUDE

Boring No.	Latitude	Longitude
1	34.20089	-119.21698
2	34.20090	-119.21639
3	34.20094	-119.21567
4	34.20078	-119.21501
5	34.20091	-119.21436
6	34.20079	-119.21373
7	34.20087	-119.21302
8	34.20077	-119.21245
9	34.20088	-119.21170
10	34.20071	-119.21107
11	34.20092	-119.21040
12	34.20075	-119.20971
13	34.20086	-119.20908
14	34.20677	-119.20847
15	34.20087	-119.20775
16	34.20081	-119.20710
17	34.20082	-119.20640
18	34.20079	-119.20576
19	34.20091	-119.20508
20	34.20077	-119.20449
21	34.20087	-119.20377
22	34.20075	-119.20392
23	34.20084	-119.20245
24	34.20074	-119.20182
25	34.20076	-119.20116
26	34.20076	-119.20049
27	34.20081	-119.19983
28	34.20072	-119.19908
29	34.20082	-119.19847
30	34.20075	-119.19784
31	34.20070	-119.21687
32	34.20026	-119.21700
33	34.20058	-119.21054
34	34.20005	-119.21200
35	34.20053	-119.20737
36	34.19999	-119.20740
37	34.20053	-119.20316
38	34.20002	-119.20325
39	34.20045	-119.19760
40	34.19996	-119.19747

Earth Systems Pacific

BORING LOG LEGEND

SAMPLE / SUBSURFACE WATER SYMBOLS	GRAPH. SYMBOL
CALIFORNIA MODIFIED	
STANDARD PENETRATION TEST (SPT)	
SHELBY TUBE	
BULK	
SUBSURFACE WATER DURING DRILLING	
SUBSURFACE WATER AFTER DRILLING	

UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487)

MAJOR DIVISIONS		GROUP SYMBOL	TYPICAL DESCRIPTIONS	GRAPH. SYMBOL
COARSE GRAINED SOILS	MORE THAN HALF OF MATERIAL IS LARGER THAN #200 SIEVE SIZE	GW	WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	
		GP	POORLY GRADED GRAVELS, OR GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	
		GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES, NON-PLASTIC FINES	
		GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES, PLASTIC FINES	
		SW	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES	
		SP	POORLY GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES	
		SM	SILTY SANDS, SAND-SILT MIXTURES, NON-PLASTIC FINES	
		SC	CLAYEY SANDS, SAND-CLAY MIXTURES, PLASTIC FINES	
FINE GRAINED SOILS	HALF OR MORE OF MATERIAL IS SMALLER THAN #200 SIEVE SIZE	ML	INORGANIC SILTS AND VERY FINE SANDS, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY	
		CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS	
		OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY	
		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS	
		CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS	
		OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS	
		PT	PEAT AND OTHER HIGHLY ORGANIC SOILS	

OBSERVED MOISTURE CONDITION

DRY	SLIGHTLY MOIST	MOIST	VERY MOIST	WET (SATURATED)

CONSISTENCY

COARSE GRAINED SOILS			FINE GRAINED SOILS		
BLOWS/FOOT		DESCRIPTIVE TERM	BLOWS/FOOT		DESCRIPTIVE TERM
SPT	CA SAMPLER		SPT	CA SAMPLER	
0-10	0-16	LOOSE	0-2	0-3	VERY SOFT
11-30	17-50	MEDIUM DENSE	3-4	4-7	SOFT
31-50	51-83	DENSE	5-8	8-13	MEDIUM STIFF
OVER 50	OVER 83	VERY DENSE	9-15	14-25	STIFF
			16-30	26-50	VERY STIFF
			OVER 30	OVER 50	HARD

GRAIN SIZES

U.S. STANDARD SERIES SIEVE				CLEAR SQUARE SIEVE OPENING		
# 200	# 40	# 10	# 4	3/4"	3"	12"

SILT & CLAY	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		

TYPICAL BEDROCK HARDNESS

MAJOR DIVISIONS	TYPICAL DESCRIPTIONS
EXTREMELY HARD	CORE, FRAGMENT, OR EXPOSURE CANNOT BE SCRATCHED WITH KNIFE OR SHARP PICK; CAN ONLY BE CHIPPED WITH REPEATED HEAVY HAMMER BLOWS
VERY HARD	CANNOT BE SCRATCHED WITH KNIFE OR SHARP PICK; CORE OR FRAGMENT BREAKS WITH REPEATED HEAVY HAMMER BLOWS
HARD	CAN BE SCRATCHED WITH KNIFE OR SHARP PICK WITH DIFFICULTY (HEAVY PRESSURE); HEAVY HAMMER BLOW REQUIRED TO BREAK SPECIMEN
MODERATELY HARD	CAN BE GROOVED 1/16 INCH DEEP BY KNIFE OR SHARP PICK WITH MODERATE OR HEAVY PRESSURE; CORE OR FRAGMENT BREAKS WITH LIGHT HAMMER BLOW OR HEAVY MANUAL PRESSURE
SOFT	CAN BE GROOVED OR GOUGED EASILY BY KNIFE OR SHARP PICK WITH LIGHT PRESSURE, CAN BE SCRATCHED WITH FINGERNAIL; BREAKS WITH LIGHT TO MODERATE MANUAL PRESSURE
VERY SOFT	CAN BE READILY INDENTED, GROOVED OR GOUGED WITH FINGERNAIL, OR CARVED WITH KNIFE; BREAKS WITH LIGHT MANUAL PRESSURE

TYPICAL BEDROCK WEATHERING

MAJOR DIVISIONS	TYPICAL DESCRIPTIONS
UNWEATHERED	NO DISCOLORATION, NOT OXIDIZED
SLIGHTLY WEATHERED	DISCOLORATION OR OXIDATION IS LIMITED TO SURFACE OF, OR SHORT DISTANCE FROM, FRACTURES: SOME FELDSPAR CRYSTALS ARE DULL
MODERATELY WEATHERED	DISCOLORATION OR OXIDATION EXTENDS FROM FRACTURES, USUALLY THROUGHOUT; Fe-Mg MINERALS ARE "RUSTY", FELDSPAR CRYSTALS ARE "CLOUDY"
HIGHLY WEATHERED	DISCOLORATION OR OXIDATION THROUGHOUT; FELDSPAR AND Fe-Mg MINERALS ARE ALTERED TO CLAY TO SOME EXTENT, OR CHEMICAL ALTERATION PRODUCES IN SITU DISAGGREGATION
DECOMPOSED	DISCOLORATION OR OXIDATION THROUGHOUT, BUT RESISTANT MINERALS SUCH AS QUARTZ MAY BE UNALTERED; FELDSPAR AND Fe-Mg MINERALS ARE COMPLETELY ALTERED TO CLAY

Exhibit 1

drafting/masters/Boring Log Legend 062719.dwg

Earth Systems Pacific

Boring No. 1

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem Auger

JOB NO.: 302524-001
DATE: 11/1/18

OXNARD AIRPORT RWY 7-25 AND TWY CONNECTOR IMPROVEMENTS
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			4" AC over 9" Brown CLAYEY SAND with GRAVEL (misc. AB)					
1	SP		+/- 4" POORLY GRADED SAND: brown, medium dense, moist (Fill)	0.5 - 1.0	○			
2	CL							6
3			SANDY LEAN CLAY: dark brown, stiff, moist	1.0 - 2.5	■	119.4	13.4	9 10
4				2.0 - 5.0	○			
5				5.0 - 6.5	●			3 2 2
6	CL		SANDY LEAN CLAY: brown, soft, moist (Alluvium)					
7								
8	ML		SILT: brown, very soft, moist, trace caliche					0
9				8.5 - 10.0	●			0 2
10			End of Boring @ 10.0'					
11			No subsurface water encountered					
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 2

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem Auger

JOB NO.: 302524-001
DATE: 11/1/18

OXNARD AIRPORT RWY 7-25 AND TWY CONNECTOR IMPROVEMENTS
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			4.5" AC over 10" Brown CLAYEY SAND with GRAVEL (misc. AB)					
1	SP		+/- 8" POORLY GRADED SAND: brown, loose, moist (Fill)	0.5 - 1.0	○			
2	CL		SANDY LEAN CLAY: dark brown, very stiff, moist	1.5-3.0	▬	121.1	13.8	6 13 16
3								
4				2.0 - 4.0	○			
5	CL		SANDY LEAN CLAY: brown, soft, moist (Alluvium)	5.0 - 6.5	●			3 2 2
6								
7								
8				8.5 - 10.0	●			0 1 2
9								
10			End of Boring @ 10.0' No subsurface water encountered					
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: ▬ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 3

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem Auger

JOB NO.: 302524-001
DATE: 11/1/18

OXNARD AIRPORT RWY 7-25 AND TWY CONNECTOR IMPROVEMENTS
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			3.5" AC over 12" Brown CLAYEY SAND with GRAVEL (misc. AB)					
1	SP		+/- 6" POORLY GRADED SAND: brown, loose, moist (Fill)	0.5 - 1.5	Grab			
2	CL		SANDY LEAN CLAY: dark brown, very stiff, moist	1.5 - 3.0	Ring	116.9	14.2	6 12 16
4	CL		SANDY LEAN CLAY: brown, soft, moist (Alluvium)	2.0 - 4.0	Grab			
5				5.0 - 6.5	SPT			2 1 2
7	ML		SILT: brown, very soft, moist					
8				8.5 - 10.0	SPT			1 1 1
10			End of Boring @ 10.0' No subsurface water encountered					

LEGEND: Ring Sample Grab Sample Shelby Tube Sample SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 4

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem Auger

JOB NO.: 302524-001
DATE: 11/1/18

OXNARD AIRPORT RWY 7-25 AND TWY CONNECTOR IMPROVEMENTS
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			3" AC over 14" Brown CLAYEY SAND with GRAVEL (misc. AB)					
1	SP		+/- 4" POORLY GRADED SAND: brown, loose, moist (Fill)					
2	CL		SANDY LEAN CLAY: dark brown, stiff, very moist	1.5 - 3.0	Ring	116.2	16.1	5 8 9
3								
4				2.0 - 5.0	Grab			
5	CL		SANDY LEAN CLAY: brown, soft, moist (Alluvium)	5.0 - 6.5	SPT			1 1 2
6								
7								
8				8.5 - 10.0	SPT			0 1 2
9								
10			End of Boring @ 10.0' No subsurface water encountered					
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: Ring Sample Grab Sample Shelby Tube Sample SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 5

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem Auger

JOB NO.: 302524-001
DATE: 11/1/18

OXNARD AIRPORT RWY 7-25 AND TWY CONNECTOR IMPROVEMENTS
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			4.5" AC over 12" Brown CLAYEY SAND with GRAVEL (misc. AB)					
1	SP		+/- 4" POORLY GRADED SAND: brown, loose, moist (Fill)	0.5 - 1.5	Grab			
2	SM		SILTY SAND: dark brown, medium dense, moist	1.5 - 3.0	Ring	118.3	14.5	4 12 12
3								
4	CL		SANDY LEAN CLAY: brown, very soft, moist, trace caliche deposits (Alluvium)	2.0 - 4.0	Grab			
5				5.0 - 6.5	SPT			1 1 1
6								
7								
8								0
9			very moist, trace clay	8.5 - 10.0	SPT			1 1
10			End of Boring @ 10.0' No subsurface water encountered					
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 6

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem Auger

JOB NO.: 302524-001
DATE: 11/1/18

OXNARD AIRPORT RWY 7-25 AND TWY CONNECTOR IMPROVEMENTS
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			4" AC over 12" Brown CLAYEY SAND with GRAVEL (misc. AB)					
1	SP		+/- 4" POORLY GRADED SAND: brown, loose, moist (Fill)	1.5 - 3.5	Grab			
2	SM		SILTY SAND: dark brown, medium dense, moist	1.5 - 3.0	Ring	121.5	13.3	7 9 10
4	CL		SANDY LEAN CLAY: brown to light brown, soft, moist, trace caliche deposits (Alluvium)	5.0 - 6.5	SPT			1 1 2
8			gray/brown mottled, very soft, trace clay	8.5 - 10.0	SPT			0 1 1
10			End of Boring @ 10.0' No subsurface water encountered					

LEGEND: Ring Sample; Grab Sample; Shelby Tube Sample; SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 7

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem Auger

JOB NO.: 302524-001
DATE: 11/1/18

OXNARD AIRPORT RWY 7-25 AND TWY CONNECTOR IMPROVEMENTS
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			6" AC over 12" Brown CLAYEY SAND with GRAVEL (misc. AB)					
1	SP		+/- 4" POORLY GRADED SAND: brown, loose, moist (Fill)	0.5 - 1.5	○			
2	CL		SANDY LEAN CLAY: dark brown, very stiff, moist	1.0 - 2.5	■	121.9	13.3	8 11 9
3				2.0 - 3.5	○			
4	CL		SANDY LEAN CLAY: brown, soft, moist, (Alluvium)					
5				5.0 - 6.5	●			0 1 2
6								
7								
8								0
9			very soft	8.5 - 10.0	●			0 1
10			End of Boring @ 10.0' No subsurface water encountered					
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 8

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem Auger

JOB NO.: 302524-001
DATE: 10/31/18

OXNARD AIRPORT RWY 7-25 AND TWY CONNECTOR IMPROVEMENTS
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			6.5" AC over 12" Brown CLAYEY SAND with GRAVEL (misc. AB)					
2	SP		+/- 4" POORLY GRADED SAND: brown, loose, moist (Fill)					13 15 9
	CL		SANDY LEAN CLAY: dark brown, stiff, slightly moist	1.0 - 2.5	Ring Sample	118.1	4.7	
3	CL		SANDY LEAN CLAY: brown, very soft, moist, trace caliche (Alluvium)	2.0 - 5.0	Grab Sample			
5				5.0 - 6.5	SPT			0 1 1
8				8.5 - 10.0	SPT			0 2 1
9			brown/gray mottled, soft, very moist, trace clay					
10			End of Boring @ 10.0' No subsurface water encountered					

LEGEND: Ring Sample; Grab Sample; Shelby Tube Sample; SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 9

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem Auger

JOB NO.: 302524-001
DATE: 10/31/18

OXNARD AIRPORT RWY 7-25 AND TWY CONNECTOR IMPROVEMENTS
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			4" AC over 11" Brown SILTY SAND with GRAVEL (misc. AB)	0.5 - 1.5	Grab			7 5 6
1	CL		SANDY LEAN CLAY: dark brown, medium stiff, very moist (Fill)	1.5 - 3.0	Ring	102.6	19.7	
				1.5 - 3.0	Grab			
2	CL		SANDY LEAN CLAY: brown, medium stiff, moist, caliche deposits (Alluvium)	3.0 - 5.0	Grab			
3								
4								0 1 1
5			very soft	5.0 - 6.5	SPT			
6			gray/brown mottled					
7								
8								0 0 2
9				8.5 - 10.0	SPT			
10			End of Boring @ 10.0' No subsurface water encountered					
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 10

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem Auger

JOB NO.: 302524-001
DATE: 10/31/18

OXNARD AIRPORT RWY 7-25 AND TWY CONNECTOR IMPROVEMENTS
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			10" AC over 8" Brown SILTY SAND with GRAVEL (misc. AB)	0.5 - 1.5	Grab			5
1				1.5 - 3.0	Ring	115.0	13.6	10
2	CL		SANDY LEAN CLAY: dark brown, stiff, moist (Fill)	1.5 - 2.5	Grab			11
3	CL		LEAN CLAY: brown, soft, moist (Alluvium)	2.5 - 4.0	Grab			
4								
5			caliche deposits	5.0 - 6.5	SPT			1 2 2
6								
7								
8								0
9			gray/brown mottled, very soft, very moist	8.5 - 10.0	SPT			1 1
10								
11			End of Boring @ 10.0' No subsurface water encountered					
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 11

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem Auger

JOB NO.: 302524-001
DATE: 10/31/18

OXNARD AIRPORT RWY 7-25 AND TWY CONNECTOR IMPROVEMENTS
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			4.5" AC over 12" Brown SILTY SAND with GRAVEL (misc. AB)					
1.5 - 3.0	CL		SANDY LEAN CLAY: dark brown, stiff, moist (Fill)	1.5 - 3.0	Ring	104.0	21.5	4 6 8
2.0 - 4.0				2.0 - 4.0	Grab			
4	CL		SANDY LEAN CLAY: brown/light brown mottled, very soft, moist, caliche deposits (Alluvium)					
5.0 - 6.5				5.0 - 6.5	SPT			0 0 1
8.5 - 10.0			very moist, trace clay	8.5 - 10.0	SPT			0 1 0
10			End of Boring @ 10.0' No subsurface water encountered					

LEGEND: Ring Sample Grab Sample Shelby Tube Sample SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 12

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem Auger

JOB NO.: 302524-001
DATE: 10/31/18

OXNARD AIRPORT RWY 7-25 AND TWY CONNECTOR IMPROVEMENTS
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			4" AC over 16" Brown SILTY SAND with GRAVEL (misc. AB)	0.5 - 1.5	Grab			3 7 9
1				1.5 - 3.0	Ring	95.5	24.8	
2	CL		SANDY LEAN CLAY: dark brown, stiff, moist, trace caliche (Fill)	2.0 - 4.0	Grab			
3								
4	CL		SANDY LEAN CLAY: brown/light brown mottled, soft, moist (Alluvium)					0 2 2
5				5.0 - 6.5	SPT			
6								
7								
8								1 1 1
9			brown/gray mottled, very soft, very moist	8.5 - 10.0	SPT			
10			End of Boring @ 10.0' No subsurface water encountered					
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 13

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem Auger

JOB NO.: 302524-001
DATE: 10/31/18

OXNARD AIRPORT RWY 7-25 AND TWY CONNECTOR IMPROVEMENTS
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			5" AC over 14" brown SILTY SAND with GRAVEL (misc. AB)					
1.5	CL		SANDY LEAN CLAY: dark brown, stiff, very moist (Fill)	1.5 - 3.0	Ring Sample	101.2	22.0	5 7 12
				2.0 - 4.0	Grab Sample			
4	CL		SANDY LEAN CLAY: brown/light brown mottled, soft, moist (Alluvium)	5.0 - 6.5	SPT			1 1 2
8			very soft	8.5 - 10.0	SPT			1 1 1
10			End of Boring @ 10.0' No subsurface water encountered					

LEGEND: Ring Sample Grab Sample Shelby Tube Sample SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 14

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem Auger

JOB NO.: 302524-001
DATE: 10/31/18

OXNARD AIRPORT RWY 7-25 AND TWY CONNECTOR IMPROVEMENTS
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			4.5" AC over 12" brown SILTY SAND with GRAVEL (misc. AB)	0.5 - 1.5	Grab			3
1	CL		SANDY LEAN CLAY: dark brown, stiff, very moist (Fill)	1.5 - 3.0	Ring	102.5	22.0	6 10
				2.0 - 5.0	Grab			
5	CL		SANDY LEAN CLAY: brown/light brown mottled, soft, moist, trace clay (Alluvium)	5.0 - 6.5	SPT			1 1 2
8			medium stiff	8.5 - 10.0	SPT			1 2 3
10			End of Boring @ 10.0' No subsurface water encountered					

LEGEND: Ring Sample; Grab Sample; Shelby Tube Sample; SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 15

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem Auger

JOB NO.: 302524-001
DATE: 10/30/18

OXNARD AIRPORT RWY 7-25 AND TWY CONNECTOR IMPROVEMENTS
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			4" AC over 15" brown SILTY SAND with GRAVEL (misc. AB)					
1								4
2	CL		SANDY LEAN CLAY: dark brown, stiff, very moist (Fill)	1.5 - 3.0	Ring Sample	100.1	23.4	7 11
				2.0 - 4.0	Grab Sample			
3			caliche deposits					
4								
5				5.0 - 6.5	SPT			1 1 1
6	CL		SANDY LEAN CLAY: brown/light brown mottled, very soft, moist (Alluvium)					
7								
8								1
9			soft	8.5 - 10.0	SPT			1 2
10			End of Boring @ 10.0'					
11			No subsurface water encountered					
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: Ring Sample Grab Sample Shelby Tube Sample SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 16

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem Auger

JOB NO.: 302524-001
DATE: 10/30/18

OXNARD AIRPORT RWY 7-25 AND TWY CONNECTOR IMPROVEMENTS
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			4" AC over 14" brown SILTY SAND with GRAVEL (misc. AB)					
1				1.5 - 3.0	Ring	109.3	19.0	4 7 9
2	CL		SANDY LEAN CLAY: dark brown, stiff, very moist (Fill)	2.0 - 4.0	Grab			
3								
4								
5	CL		SANDY LEAN CLAY: brown, medium stiff, moist, trace caliche deposits (Alluvium)	5.0 - 6.5	SPT			1 3 4
6								
7								
8				8.5 - 10.0	SPT			1 1 2
9			soft					
10			End of Boring @ 10.0' No subsurface water encountered					
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: Ring Sample Grab Sample Shelby Tube Sample SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 17

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem Auger

JOB NO.: 302524-001
DATE: 10/30/18

OXNARD AIRPORT RWY 7-25 AND TWY CONNECTOR IMPROVEMENTS
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			4.5" AC over 13" brown CLAYEY SAND with GRAVEL (misc. AB)	0.5 - 1.5	Grab			3 5 9
	CL		SANDY LEAN CLAY: dark brown, stiff, very moist (Fill)	1.5 - 3.0	Ring	104.8	20.8	
				3.0 - 5.0	Grab			
	CL		SANDY LEAN CLAY: dark brown, medium stiff, moist (Alluvium)					
5			brown, soft	5.0 - 6.5	SPT			1 1 2
8			gray/brown mottled, medium stiff	8.5 - 10.0	SPT			0 2 4
10			End of Boring @ 10.0' No subsurface water encountered					

LEGEND: Ring Sample Grab Sample Shelby Tube Sample SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 18

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem Auger

JOB NO.: 302524-001
DATE: 10/30/18

OXNARD AIRPORT RWY 7-25 AND TWY CONNECTOR IMPROVEMENTS
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			4" AC over 13" brown CLAYEY SAND with GRAVEL (misc. AB)					2 4 7
1.5 - 3.0	CL		SANDY LEAN CLAY: dark brown, medium stiff, very moist (Fill)	1.5 - 3.0	Ring Sample	103.2	20.1	
2.5 - 5.0	CL		SANDY LEAN CLAY: dark brown, medium stiff, moist (Alluvium)	2.5 - 5.0	Grab Sample			
5.0 - 6.5			soft, caliche deposits	5.0 - 6.5	SPT			1 1 2
8.5 - 10.0			gray/brown mottled, medium stiff	8.5 - 10.0	SPT			2 3 3
10			End of Boring @ 10.0' No subsurface water encountered					

LEGEND: Ring Sample Grab Sample Shelby Tube Sample SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 19

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem Auger

JOB NO.: 302524-001
DATE: 10/30/18

OXNARD AIRPORT RWY 7-25 AND TWY CONNECTOR IMPROVEMENTS
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			4" AC over 13" brown CLAYEY SAND with GRAVEL (misc. AB)	0.5 - 1.5	Grab			5
1				1.5 - 3.0	Ring	113.4	16.9	8 11
2	CL		SANDY LEAN CLAY: dark brown, stiff, very moist (Fill)	1.5 - 3.5	Grab			
3								
4	CL		SANDY LEAN CLAY: brown, soft, moist, caliche deposits (Alluvium)					1
5				5.0 - 6.5	SPT			1 3
6								
7								
8								0
9			light brown, very soft	8.5 - 10.0	SPT			1 1
10			End of Boring @ 10.0' No subsurface water encountered					
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: Ring Sample Grab Sample Shelby Tube Sample SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 20

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem Auger

JOB NO.: 302524-001
DATE: 10/30/18

OXNARD AIRPORT RWY 7-25 AND TWY CONNECTOR IMPROVEMENTS
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			4" AC over 13" brown CLAYEY SAND with GRAVEL (misc. AB)					
1	CL		SANDY LEAN CLAY: dark brown, stiff, very moist (Fill)	1.5 - 3.0	Ring	111.7	17.6	3 8 11
2	CL		SANDY LEAN CLAY: brown, soft, moist (Alluvium)	3.0 - 6.0	Grab			
3			caliche deposits	5.0 - 6.5	SPT			0 1 2
4			gray/brown mottled	8.5 - 10.0	SPT			1 2 3
5			End of Boring @ 10.0' No subsurface water encountered					
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: Ring Sample Grab Sample Shelby Tube Sample SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 21

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem Auger

JOB NO.: 302524-001
DATE: 10/30/18

OXNARD AIRPORT RWY 7-25 AND TWY CONNECTOR IMPROVEMENTS
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			3" AC over 13" brown CLAYEY SAND with GRAVEL (misc. AB)	0.5 - 1.5	Grab			4 9 15
1	CL		SANDY LEAN CLAY: dark brown, stiff, moist (Fill)	1.5 - 3.0	Ring	119.5	13.9	
2				1.5 - 3.0	Grab			
3	CL		SANDY LEAN CLAY: brown, very soft, moist, caliche deposits (Alluvium)					
4								0 1 1
5				5.0 - 6.5	SPT			
6								
7								
8								1 2 3
9			gray/brown mottled, medium stiff	8.5 - 10.0	SPT			
10			End of Boring @ 10.0'					
11			No subsurface water encountered					
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 22

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem Auger

JOB NO.: 302524-001
DATE: 10/29/18

OXNARD AIRPORT RWY 7-25 AND TWY CONNECTOR IMPROVEMENTS
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			4.5" AC over 16" brown CLAYEY SAND with GRAVEL (misc. AB)					
1	CL		SANDY LEAN CLAY: dark brown, stiff, very moist (Fill)	2.0 - 3.5	Ring Sample	114.0	17.6	4 7 10
2				2.0 - 4.0	Grab Sample			
3								
4	CL		brown					
5			SANDY LEAN CLAY: brown, soft, moist, caliche deposits (Alluvium)	5.0 - 6.5	SPT			1 1 2
6								
7								
8								
9			gray/brown mottled, medium stiff	8.5 - 10.0	SPT			1 2 3
10			End of Boring @ 10.0' No subsurface water encountered					
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: Ring Sample Grab Sample Shelby Tube Sample SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 23

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem Auger

JOB NO.: 302524-001
DATE: 10/29/18

OXNARD AIRPORT RWY 7-25 AND TWY CONNECTOR IMPROVEMENTS
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			6" AC over 13" brown CLAYEY SAND with GRAVEL (misc. AB)	0.5 - 1.5	Grab			9
1	CL		SANDY LEAN CLAY: dark brown, stiff, moist (Fill)	1.5 - 3.0	Ring	118.5	13.8	12 12
				1.5 - 3.5	Grab			
2				3.5 - 5.0	Grab			
3	CL		SANDY LEAN CLAY: brown, medium stiff, moist (Alluvium)					1
4			soft	5.0 - 6.5	SPT			1 2
5			light brown					
6								1
7			gray/brown mottled, medium stiff, caliche deposits	8.5 - 10.0	SPT			2 4
8								
9								
10			End of Boring @ 10.0' No subsurface water encountered					
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 24

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem Auger

JOB NO.: 302524-001
DATE: 10/29/18

OXNARD AIRPORT RWY 7-25 AND TWY CONNECTOR IMPROVEMENTS
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			5" AC over 12" brown CLAYEY SAND with GRAVEL (misc. AB)					
1				1.5 - 3.0	■	107.2	5.6	7 10 10
2	SM		SILTY SAND: yellow brown, medium dense, moist, trace gravel (Fill)	1.5 - 3.5	○			
3								
4	CL		SANDY LEAN CLAY: brown, soft, moist, caliche deposits (Alluvium)					
5				5.0 - 6.5	●			1 2 2
6								
7								
8				8.5 - 10.0	●			0 1 2
9								
10			End of Boring @ 10.0' No subsurface water encountered					
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 25

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem Auger

JOB NO.: 302524-001
DATE: 10/28/18

OXNARD AIRPORT RWY 7-25 AND TWY CONNECTOR IMPROVEMENTS
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			5" AC over 14" brown SILTY GRAVEL with SAND (misc. AB)	0.5 - 1.5	Grab			4 6 7
1	CL		SANDY LEAN CLAY: dark brown, medium stiff, very moist (Fill)	1.5 - 3.0	Ring	106.3	19.0	
2	CL		SANDY LEAN CLAY: brown, soft, moist, caliche deposits (Alluvium)	3.0 - 5.0	Grab			
3				5.0 - 6.5	SPT			0 2 2
4	SM		SILTY SAND: brown, loose, moist					
5	ML		SILT: brown, very soft, very moist, trace clay	8.5 - 10.0	SPT			0 0 1
6			End of Boring @ 10.0' No subsurface water encountered					
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 26

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem Auger

JOB NO.: 302524-001
DATE: 10/28/18

OXNARD AIRPORT RWY 7-25 AND TWY CONNECTOR IMPROVEMENTS
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			5" AC over 15" brown SILTY GRAVEL with SAND (misc. AB)	0.5 - 1.5	○			
2	CL		LEAN CLAY: gray brown, stiff, very moist (Fill)	2.0 - 3.5	▬	110.1	17.1	4 6 9
				2.0 - 4.0	○			
4				4.0 - 6.0	○			
5	CL		SANDY LEAN CLAY: brown, soft, moist (Alluvium)	5.0 - 6.5	●			1 2 2
8			very soft, caliche deposits	8.5 - 10.0	●			0 1 1
10			End of Boring @ 10.0' No subsurface water encountered					

LEGEND: ▬ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 27

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem Auger

JOB NO.: 302524-001
DATE: 10/28/18

OXNARD AIRPORT RWY 7-25 AND TWY CONNECTOR IMPROVEMENTS
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			5.5" AC over 16" brown SILTY GRAVEL with SAND (misc. AB)	0.5 - 1.5	○			
2	CL		SANDY LEAN CLAY: dark brown, stiff, very moist (Fill)	2.0 - 3.5	▬	97.4	20.8	5 7 7
				2.0 - 4.0	○			
5	CL		SANDY LEAN CLAY: brown, soft, moist, caliche deposits (Alluvium)	5.0 - 6.5	●			1 1 2
8			medium stiff	8.5 - 10.0	●			0 2 3
10			End of Boring @ 10.0' No subsurface water encountered					

LEGEND: ▬ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 28

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem Auger

JOB NO.: 302524-001
DATE: 10/28/18

OXNARD AIRPORT RWY 7-25 AND TWY CONNECTOR IMPROVEMENTS
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			3" AC over 17" brown SILTY GRAVEL with SAND (misc. AB)	0.5 - 1.5	Grab			
1								8
2	SM		SILTY SAND: brown, medium dense, slightly moist, trace gravel (Fill)	1.5 - 3.0	Ring	122.5	4.9	11
3				2.0 - 4.0	Grab			11
4	CL		SANDY LEAN CLAY: brown, medium stiff, moist, caliche deposits (Alluvium)					1
5				5.0 - 6.5	SPT			1
6			very soft					1
7								
8								0
9			very moist	8.5 - 10.0	SPT			0
10								1
11			End of Boring @ 10.0' No subsurface water encountered					
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: Ring Sample Grab Sample Shelby Tube Sample SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 29

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem Auger

JOB NO.: 302524-001
DATE: 10/28/18

OXNARD AIRPORT RWY 7-25 AND TWY CONNECTOR IMPROVEMENTS
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			5.5" AC over 14" brown SILTY GRAVEL with SAND (misc. AB)	0.5 - 1.5	Grab			
1								5 10 10
2	CL		SANDY LEAN CLAY: brown/gray mottled, stiff, moist (Fill)	1.5 - 3.0	Ring	112.5	15.3	
3				2.0 - 5.0	Grab			
4								1 1 1
5	CL		SANDY LEAN CLAY: brown, soft, moist, caliche deposits (Alluvium)	5.0 - 6.5	SPT			
6								
7								
8								0 2 3
9			medium stiff	8.5 - 10.0	SPT			
10			End of Boring @ 10.0' No subsurface water encountered					
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 30

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem Auger

JOB NO.: 302524-001
DATE: 10/28/18

OXNARD AIRPORT RWY 7-25 AND TWY CONNECTOR IMPROVEMENTS
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			4" AC over 14" brown SILTY GRAVEL with SAND (misc. AB)	0.5 - 1.5	Grab			
2	CL		SANDY LEAN CLAY: dark brown, stiff, moist (Fill)	1.5 - 3.0	Ring	112.2	14.7	6 7 9
3				2.0 - 5.0	Grab			
5	CL		SANDY LEAN CLAY: brown, soft, moist, caliche deposits (Alluvium)	5.0 - 6.5	SPT			0 1 2
8	ML		SILT: gray/brown mottled, medium stiff, moist, caliche deposits	8.5 - 10.0	SPT			2 3 5
10			End of Boring @ 10.0' No subsurface water encountered					

LEGEND: Ring Sample Grab Sample Shelby Tube Sample SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 31

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem Auger

JOB NO.: 302524-001
DATE: 11/1/18

OXNARD AIRPORT RWY 7-25 AND TWY CONNECTOR IMPROVEMENTS
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			4" AC over 4" SILTY SAND with GRAVEL (misc. AB)	1.0 - 2.5	Ring	110.6	17.2	5 6 11
1	SP							
2	CL		+/- 4" POORLY GRADED SAND: brown, loose, moist (Fill)	2.0 - 5.0	Grab			
3			SANDY LEAN CLAY: dark brown, stiff, very moist					
4								
5	CL		SANDY LEAN CLAY: brown, soft, moist, (Alluvium)	5.0 - 6.5	SPT			1 2 2
6								
7								
8								
9			medium stiff, caliche deposits	8.5 - 10.0	SPT			1 2 5
10			End of Boring @ 10.0' No subsurface water encountered					
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: Ring Sample Grab Sample Shelby Tube Sample SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 32

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem Auger

JOB NO.: 302524-001
DATE: 11/1/18

OXNARD AIRPORT RWY 7-25 AND TWY CONNECTOR IMPROVEMENTS
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			4" AC over 3.5" SILTY SAND with GRAVEL (misc. AB)	1.0 - 2.5	Ring	110.8	16.3	4 7 10
1	SP							
2	CL		+/- 4" POORLY GRADED SAND: brown, loose, moist (Fill)	2.0 - 5.0	Grab			
3			SANDY LEAN CLAY: dark brown, stiff, very moist (Fill)					
4								
5	CL		SANDY LEAN CLAY: brown, soft, moist (Alluvium)	5.0 - 6.5	SPT			1 1 2
6								
7								
8								
9			medium stiff	8.5 - 10.0	SPT			1 3 3
10			End of Boring @ 10.0' No subsurface water encountered					
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: Ring Sample Grab Sample Shelby Tube Sample SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 33

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem Auger

JOB NO.: 302524-001
DATE: 10/31/18

OXNARD AIRPORT RWY 7-25 AND TWY CONNECTOR IMPROVEMENTS
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			5" AC over 5.5" SILTY SAND with GRAVEL (misc. AB)	1.0 - 2.5	Ring	115.3	15.5	8 10 15
1	SP			1.5 - 3.5	Grab			
2	SM		+/- 4" POORLY GRADED SAND: brown, loose, moist (Fill)					
3			SILTY SAND: brown/dark brown mottled, medium dense, very moist, trace to some gravel, trace AC fragments (Fill)	3.5 - 5.0	Grab			
4	CL							
5			SANDY LEAN CLAY: brown, medium stiff, moist, caliche deposits (Alluvium)	5.0 - 6.5	SPT			3 3 3
6								
7			gray/brown mottled					
8								0 1 3
9			soft	8.5 - 10.0	SPT			
10			End of Boring @ 10.0' No subsurface water encountered					
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 34

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem Auger

JOB NO.: 302524-001
DATE: 10/31/18

OXNARD AIRPORT RWY 7-25 AND TWY CONNECTOR IMPROVEMENTS
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			4" AC over 5" SILTY SAND with GRAVEL (misc. AB)	1.0 - 2.5	Ring	118.4	13.7	9 11 11
1	SP			1.5 - 3.5	Grab			
2	CL		+/- 4" POORLY GRADED SAND: brown, loose, moist (Fill)					
3			SANDY LEAN CLAY: dark brown, stiff, moist (Fill)					
4	CL		SANDY LEAN CLAY: brown, medium stiff, moist, caliche deposits (Alluvium)					
5				5.0 - 6.5	SPT			2 3 3
6								
7								
8								0 1 1
9			gray/brown mottled, very soft	8.5 - 10.0	SPT			
10			End of Boring @ 10.0' No subsurface water encountered					
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 35

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem Auger

JOB NO.: 302524-001
DATE: 10/30/18

OXNARD AIRPORT RWY 7-25 AND TWY CONNECTOR IMPROVEMENTS
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			5" AC over 8" SILTY SAND with GRAVEL (misc. AB)	1.0 - 2.5	Ring	117.0	14.6	5 7 10
1	SM		SILTY SAND: orange brown, medium dense, very moist, some gravel (Fill)					
2								
3	CL		SANDY LEAN CLAY: dark brown, stiff, moist	3.0 - 5.0	Grab			
4	CL		SANDY LEAN CLAY: brown, medium stiff, moist (Alluvium)					
5			gray/brown mottled, caliche deposits	5.0 - 6.5	SPT			2 3 3
6								
7								
8			very soft, very moist	8.5 - 10.0	SPT			0 1 1
9								
10			End of Boring @ 10.0' No subsurface water encountered					
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: Ring Sample Grab Sample Shelby Tube Sample SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 36

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem Auger

JOB NO.: 302524-001
DATE: 10/30/18

OXNARD AIRPORT RWY 7-25 AND TWY CONNECTOR IMPROVEMENTS
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			5.5" AC over 8" SILTY SAND with GRAVEL (misc. AB)	0.5 - 1.5	○			8 8 7
1	SP			1.0 - 2.5	■	114.7	7.2	
2	CL		+/- 4" POORLY GRADED SAND: brown, loose, moist (Fill)	2.5 - 5.0	○			
3			SANDY LEAN CLAY: dark brown, stiff, slightly moist					
4								1 2 4
5	ML		SILT: gray/brown mottled, medium stiff, moist, caliche deposits (Alluvium)	5.0 - 6.5	●			
6								
7								
8								0 1 2
9			soft	8.5 - 10.0	●			
10			End of Boring @ 10.0' No subsurface water encountered					
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 37

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem Auger

JOB NO.: 302524-001
DATE: 10/29/18

OXNARD AIRPORT RWY 7-25 AND TWY CONNECTOR IMPROVEMENTS
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			5.5" AC over 12" SILTY SAND with GRAVEL (misc. AB)	0.5 - 1.5	Grab			5 8 12
	CL		SANDY LEAN CLAY: dark brown, stiff, very moist (Fill)	1.0 - 3.0	Ring	110.1	16.2	
				1.5 - 3.0	Grab			
	CL		SANDY LEAN CLAY: brown, very soft, moist, caliche deposits (Alluvium)	3.0 - 5.0	Grab			
5				5.0 - 6.5	SPT			1 1 1
8			gray/brown mottled, soft	8.5 - 10.0	SPT			1 1 2
10			End of Boring @ 10.0' No subsurface water encountered					

LEGEND: Ring Sample; Grab Sample; Shelby Tube Sample; SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 38

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem Auger

JOB NO.: 302524-001
DATE: 10/30/18

OXNARD AIRPORT RWY 7-25 AND TWY CONNECTOR IMPROVEMENTS
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			4.5" AC over 12" SILTY SAND with GRAVEL (misc. AB)					
1	CL		SANDY LEAN CLAY: brown/dark brown/yellow brown mottled, stiff, moist (Fill)	1.5 - 3.0	Ring Sample	110.9	14.7	6 12 13
2				2.0 - 4.0	Grab Sample			
3	CL		SANDY LEAN CLAY: brown, very soft, moist, caliche deposits (Alluvium)	5.0 - 6.5	SPT			0 1 1
4			soft	8.5 - 10.0	SPT			0 1 2
5			End of Boring @ 10.0' No subsurface water encountered					
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: Ring Sample Grab Sample Shelby Tube Sample SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 39

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem Auger

JOB NO.: 302524-001
DATE: 10/28/18

OXNARD AIRPORT RWY 7-25 AND TWY CONNECTOR IMPROVEMENTS
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			5" AC over 6" SILTY SAND with GRAVEL (misc. AB)					
1	SM		SILTY SAND: brown, loose, moist (Fill)	1.0 - 2.0	○			3 4 5
2	CH		SANDY FAT CLAY: dark brown, medium stiff, very moist (Alluvium)	1.0 - 2.5	■	108.4	19.1	
3				2.0 - 5.0	○			
4								
5	CL		SANDY LEAN CLAY: brown, soft, moist, caliche deposits	5.0 - 6.5	●			1 2 2
6								
7								
8			medium stiff	8.5 - 10.0	●			2 3 5
9								
10			End of Boring @ 10.0' No subsurface water encountered					
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 40

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem Auger

JOB NO.: 302524-001
DATE: 10/28/18

OXNARD AIRPORT RWY 7-25 AND TWY CONNECTOR IMPROVEMENTS
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			6" AC over 8" SILTY SAND with GRAVEL (misc. AB)					
1	SM		SILTY SAND: brown, loose, very moist, mixed with sandy lean clay (Fill)	1.5 - 3.5	○			5 8 8
2				1.5 - 3.0	▬	117.1	16.2	
3				3.5 - 6.5	○			
4	CL		SANDY LEAN CLAY: brown, medium stiff, moist, caliche deposits (Alluvium)					1 2 2
5			soft	5.0 - 6.5	●			
6								
7								
8				8.5 - 10.0	●			0 1 3
9								
10			End of Boring @ 10.0' No subsurface water encountered					
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: ▬ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

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APPENDIX B

Laboratory Test Results

Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

BULK DENSITY TEST RESULTS

ASTM D 2937-17 (modified for ring liners)

January 8, 2019

BORING NO.	DEPTH feet	MOISTURE CONTENT, %	WET DENSITY, pcf	DRY DENSITY, pcf
1	2.0 - 2.5	13.4	135.4	119.4
2	2.5 - 3.0	13.8	137.8	121.1
3	2.5 - 3.0	14.2	133.6	116.9
4	2.5 - 3.0	16.1	134.9	116.2
5	2.5 - 3.0	14.5	135.4	118.3
6	2.5 - 3.0	13.3	137.7	121.5
7	2.0 - 2.5	13.3	138.2	121.9
8	2.0 - 2.5	4.7	123.7	118.1
9	2.5 - 3.0	19.7	122.8	102.6
10	2.5 - 3.0	13.6	130.6	115.0
11	2.5 - 3.0	21.5	126.3	104.0
12	2.5 - 3.0	24.8	119.2	95.5
13	2.5 - 3.0	22.0	123.5	101.2
14	2.5 - 3.0	22.0	125.1	102.5
15	2.5 - 3.0	23.4	123.5	100.1
16	2.5 - 3.0	19.0	130.0	109.3
17	2.5 - 3.0	20.8	126.7	104.8
18	2.5 - 3.0	20.1	124.0	103.2
19	2.5 - 3.0	16.9	132.5	113.4
20	2.5 - 3.0	17.6	131.3	111.7
21	2.5 - 3.0	13.9	136.1	119.5
22	3.0 - 3.5	17.6	134.1	114.0
23	2.5 - 3.0	13.8	134.8	118.5
24	2.5 - 3.0	5.6	113.1	107.2
25	2.5 - 3.0	19.0	126.5	106.3
26	3.0 - 3.5	17.1	128.9	110.1
27	3.0 - 3.5	20.8	117.6	97.4
28	2.5 - 3.0	4.9	128.6	122.5
29	2.5 - 3.0	15.3	129.7	112.5
30	2.5 - 3.0	14.7	128.7	112.2
31	2.5 - 3.0	17.2	129.6	110.6
32	2.0 - 2.5	16.3	128.8	110.8
33	2.0 - 2.5	15.5	133.1	115.3
34	2.0 - 2.5	13.7	134.6	118.4

Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

BULK DENSITY TEST RESULTS

ASTM D 2937-17 (modified for ring liners)

January 8, 2019

BORING NO.	DEPTH feet	MOISTURE CONTENT, %	WET DENSITY, pcf	DRY DENSITY, pcf
35	2.0 - 2.5	14.6	134.1	117.0
36	2.0 - 2.5	7.2	123.0	114.7
37	2.5 - 3.0	16.2	127.9	110.1
38	2.5 - 3.0	14.7	127.2	110.9
39	2.0 - 2.5	19.1	129.1	108.4
40	2.5 - 3.0	16.2	136.0	117.1

Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

PLASTICITY INDEX

ASTM D 4318-17

January 8, 2019

Designation.:	CBR 1	CBR 2	CBR 4	CBR 5	CBR 7
Test No.:	1	2	3	4	5
Boring No.:	1	9	3	36	23
Sample Depth:	2.0 - 3.0'	3.0 - 5.0'	0.5 - 1.0'	2.0 - 5.0'	3.5 - 5.0'
Liquid Limit:	31	32	NL	33	36
Plastic Limit:	19	19	NP	18	18
Plasticity Index:	12	13	NP	15	18

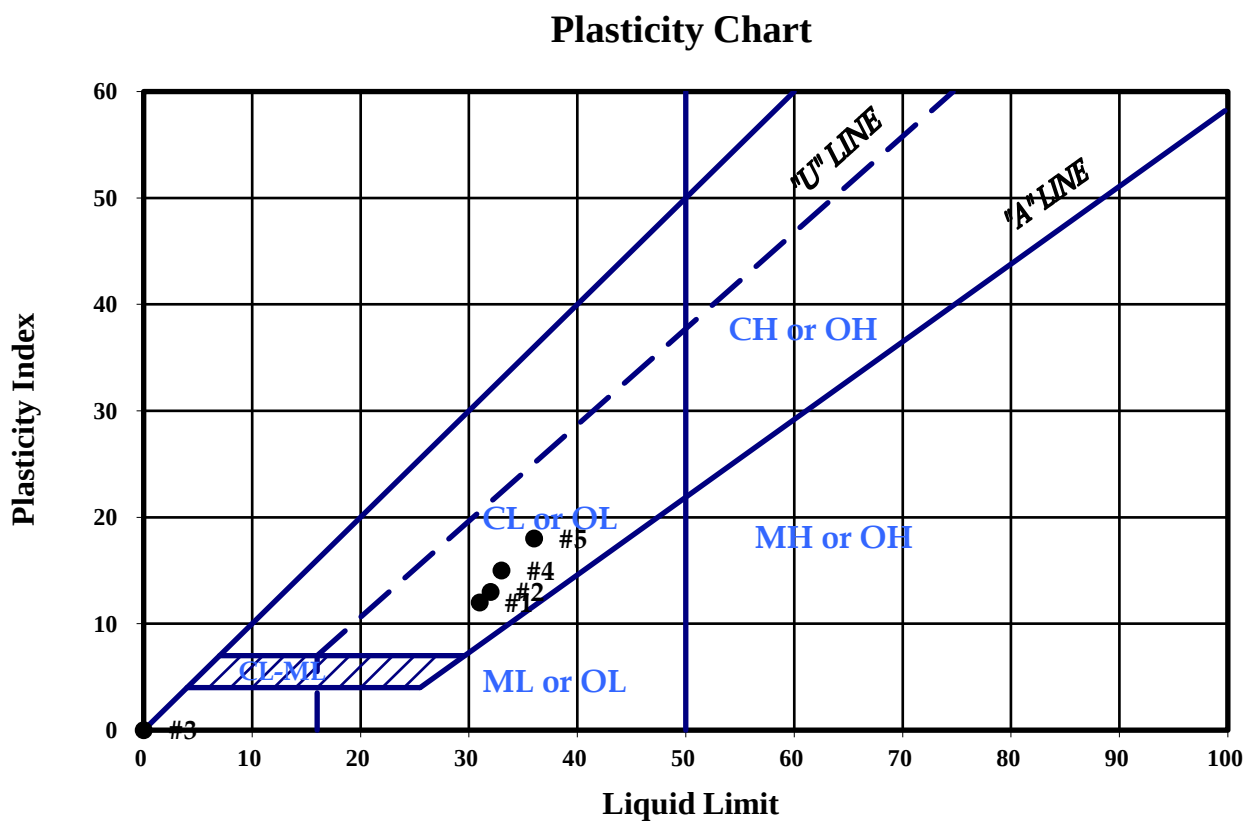


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

PLASTICITY INDEX

ASTM D 4318-17

January 8, 2019

Designation.:	CBR 8	CBR 9	CBR 11	CBR 12	CBR 13
Test No.:	1	2	3	4	5
Boring No.:	29	21	16	13	40
Sample Depth:	2.0 - 5.0'	1.5 - 3.0'	2.0 - 4.0'	2.0 - 5.0'	1.5 - 3.5'
Liquid Limit:	31	32	34	34	NL
Plastic Limit:	19	15	18	14	NP
Plasticity Index:	12	17	16	20	NP

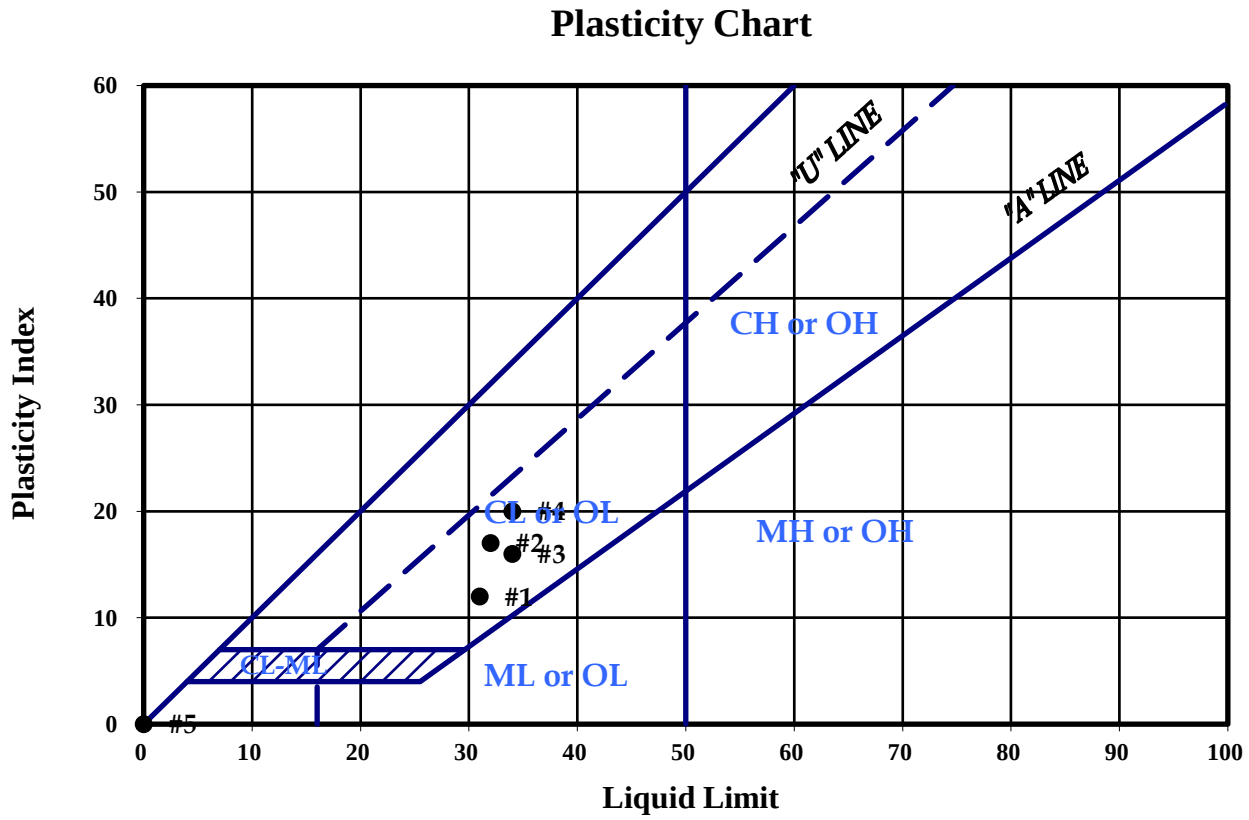


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

PLASTICITY INDEX

ASTM D 4318-17

January 8, 2019

Designation.:	CBR 14	CBR 15	CBR 16	CBR 17	
Test No.:	1	2	3	4	
Boring No.:	39	17	28	14	
Sample Depth:	2.0 - 5.0'	0.5 - 1.5'	0.5 - 1.5'	0.5 - 1.5'	
Liquid Limit:	55	33	NL	NL	
Plastic Limit:	15	17	NP	NP	
Plasticity Index:	40	16	NP	NP	

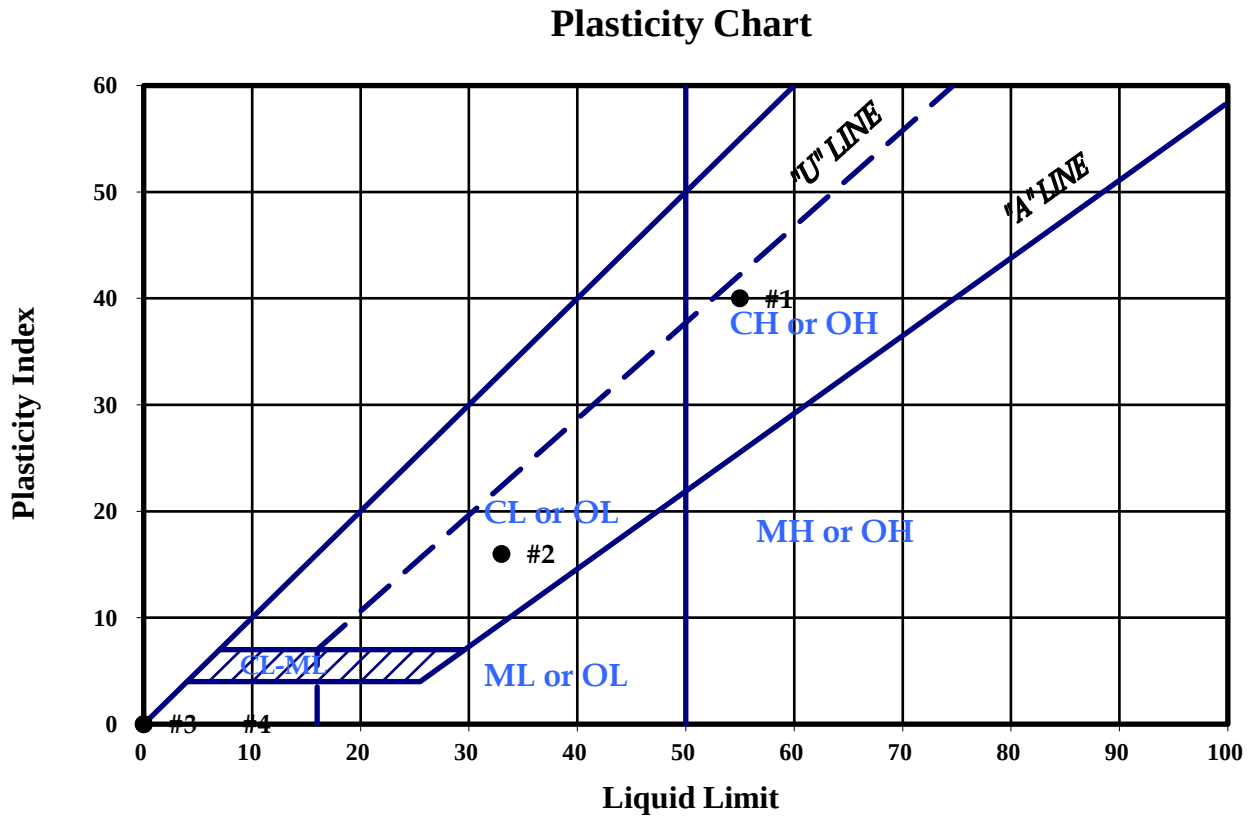


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

PLASTICITY INDEX

ASTM D 4318-17

January 8, 2019

Designation.:		CBR 3	CBR 6		
Test No.:	1	2	3		
Boring No.:	9	5	27		
Sample Depth:	0.5 - 1.5'	2.0 - 4.0'	0.5 - 1.5'		
Liquid Limit:	30	NL	40		
Plastic Limit:	16	NP	20		
Plasticity Index:	14	NP	20		

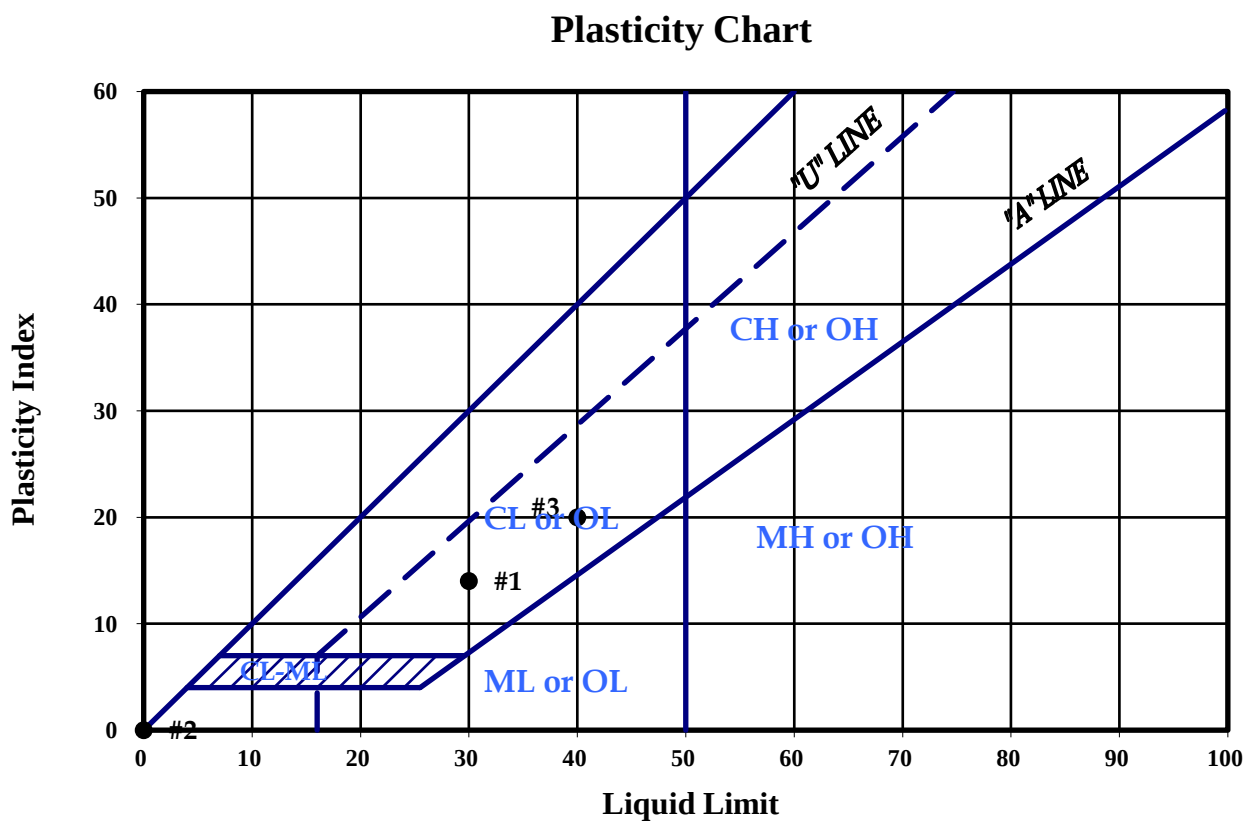


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

PARTICLE SIZE ANALYSIS

ASTM D 422-63/07

CBR #1; Boring #1 @ 2.0 - 5.0'

January 8, 2019

Sandy Lean Clay (CL)

Specific Gravity = 2.70 (assumed)

LL = 31; PL = 19; PI = 12

Gravel = 0%; Sand = 43%; Silt = 36%; Clay = 21%

Sieve size	% Retained	% Passing
1-1/2" (37.5-mm)	0	100
1" (25.0-mm)	0	100
3/4" (19.0-mm)	0	100
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	0	100
#8 (2.36-mm)	0	100
#16 (1.18-mm)	0	100
#30 (600-µm)	0	100
#50 (300-µm)	4	96
#100 (150-µm)	22	78
#200 (75-µm)	43	57
Hydrometer Analysis		
45-µm		39
32-µm		34
21-µm		29
12-µm		26
9-µm		24
5.2-µm		21
3.2-µm		18
Colloids		15

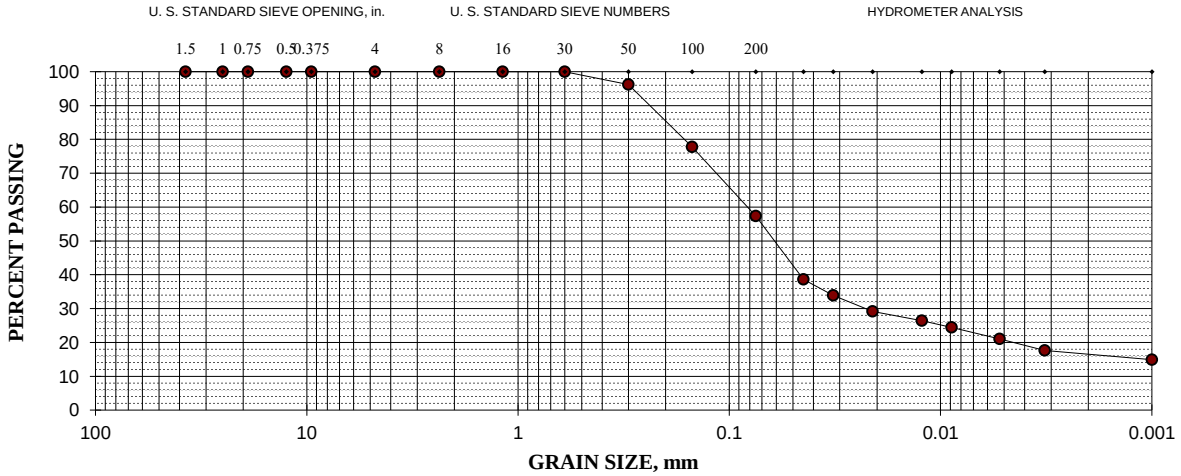


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

PARTICLE SIZE ANALYSIS

ASTM D 422-63/07

CBR #2; Boring #9 @ 3.0 - 5.0'

January 8, 2019

Sandy Lean Clay (CL)

Specific Gravity = 2.70 (assumed)

LL = 32; PL = 19; PI = 13

Gravel = 0%; Sand = 40%; Silt = 30%; Clay = 30%

Sieve size	% Retained	% Passing
1-1/2" (37.5-mm)	0	100
1" (25.0-mm)	0	100
3/4" (19.0-mm)	0	100
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	0	100
#8 (2.36-mm)	3	97
#16 (1.18-mm)	8	92
#30 (600-µm)	13	87
#50 (300-µm)	19	81
#100 (150-µm)	28	72
#200 (75-µm)	40	60

Hydrometer Analysis	
44-µm	49
32-µm	45
21-µm	40
12-µm	36
9-µm	34
5.1-µm	30
3.1-µm	26
Colloids	20

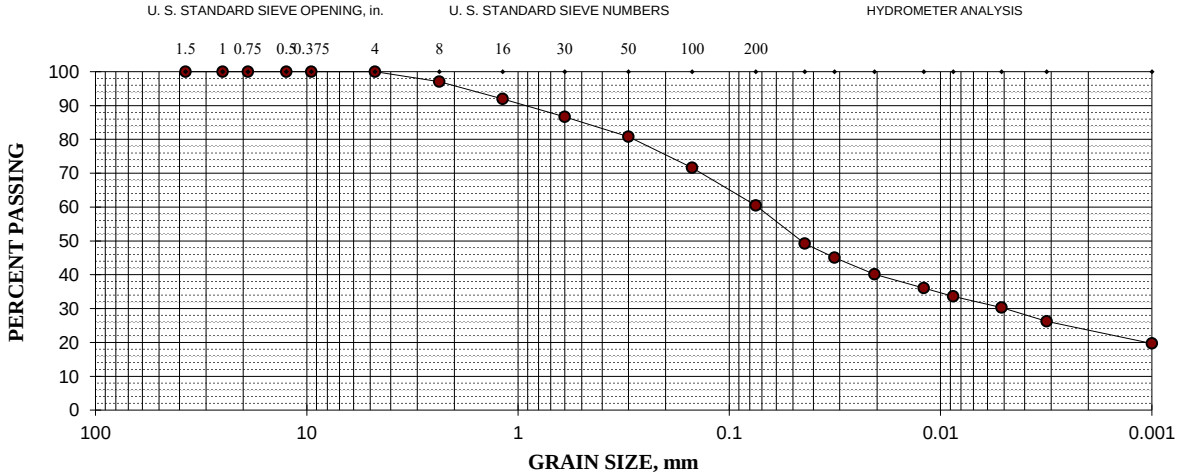


Exhibit 1

Oxnard Airport - Runway and Taxiway Rehabilitation / Reconstruction

302524-001

PARTICLE SIZE ANALYSIS

ASTM D 422-63/07

CBR #3; Boring #5 @ 2.0 - 4.0'

January 16, 2019

Silty Sand (SM)

Specific Gravity = 2.65 (assumed)

PI = NP

Gravel = 4%; Sand = 54%; Silt = 28%; Clay = 14%

Sieve size	% Retained	% Passing
1-1/2" (37.5-mm)	0	100
1" (25.0-mm)	0	100
3/4" (19.0-mm)	0	100
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	4	96
#8 (2.36-mm)	12	88
#16 (1.18-mm)	21	79
#30 (600-µm)	30	70
#50 (300-µm)	37	63
#100 (150-µm)	48	52
#200 (75-µm)	58	42
Hydrometer Analysis		
46-µm		30
32-µm		29
21-µm		24
13-µm		19
9-µm		16
5.2-µm		14
3.2-µm		12
Colloids		10

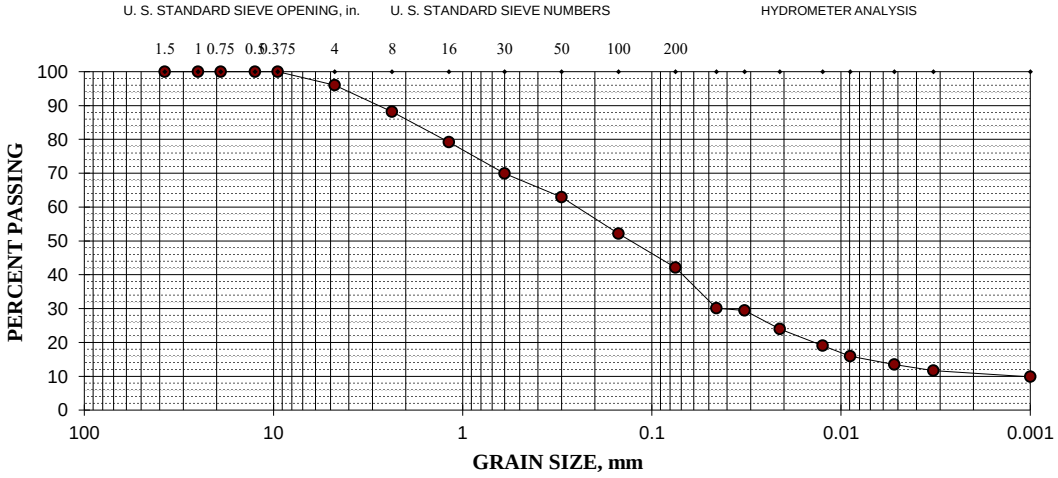


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

PARTICLE SIZE ANALYSIS

ASTM D 422-63/07

CBR #4; Boring #3 @ 0.5 - 1.0'

January 8, 2019

Clayey Sand with Gravel (SC)

Specific Gravity = 2.65 (assumed)

PI = NP

Gravel = 16%; Sand = 61%; Silt = 16%; Clay = 7%

Sieve size	% Retained	% Passing
1-1/2" (37.5-mm)	0	100
1" (25.0-mm)	0	100
3/4" (19.0-mm)	0	100
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	7	93
#4 (4.75-mm)	16	84
#8 (2.36-mm)	24	76
#16 (1.18-mm)	32	68
#30 (600-µm)	43	57
#50 (300-µm)	44	56
#100 (150-µm)	70	30
#200 (75-µm)	77	23
Hydrometer Analysis		
46-µm		15
33-µm		14
21-µm		12
13-µm		10
9-µm		8
5.3-µm		7
3.3-µm		5
Colloids		4

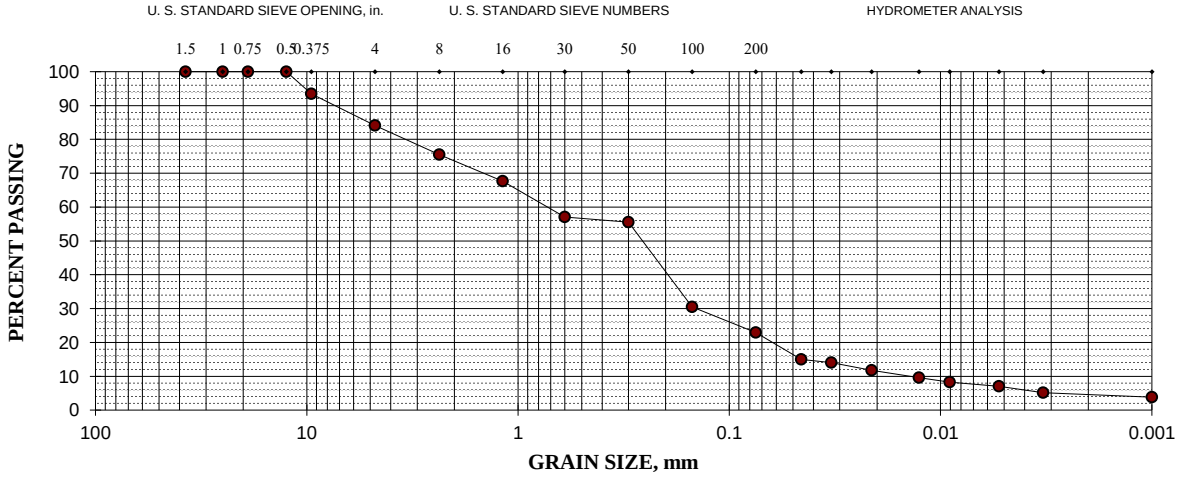


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

PARTICLE SIZE ANALYSIS

ASTM D 422-63/07

CBR #5; Boring #36 @ 2.5 - 5.0'

January 8, 2019

Sandy Lean Clay (CL)

Specific Gravity = 2.70 (assumed)

LL = 33; PL = 18; PI = 15

Gravel = 2%; Sand = 37%; Silt = 38%; Clay = 23%

Sieve size	% Retained	% Passing
1-1/2" (37.5-mm)	0	100
1" (25.0-mm)	0	100
3/4" (19.0-mm)	0	100
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	2	98
#8 (2.36-mm)	4	96
#16 (1.18-mm)	7	93
#30 (600-µm)	12	88
#50 (300-µm)	18	82
#100 (150-µm)	26	74
#200 (75-µm)	39	61
Hydrometer Analysis		
44-µm		46
32-µm		40
21-µm		34
12-µm		29
9-µm		27
5.0-µm		23
3.1-µm		20
Colloids		19

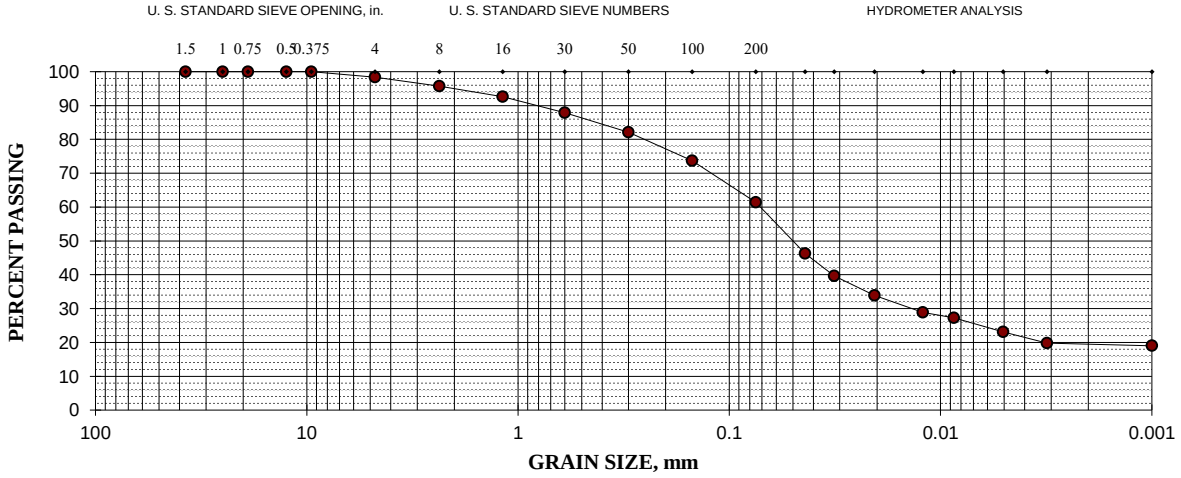


Exhibit 1

Oxnard Airport - Runway and Taxiway Rehabilitation / Reconstruction

302524-001

PARTICLE SIZE ANALYSIS

ASTM D 422-63/07

CBR #6 with 3% Lime added; Boring #27 @ 2.0 - 4.0'

January 8, 2019

Sandy Lean Clay (CL)

Specific Gravity = 2.70 (assumed)

LL = 40; PL = 20; PI = 20

Gravel = 1%; Sand = 34%; Silt = 38%; Clay = 27%

Sieve size	% Retained	% Passing
1-1/2" (37.5-mm)	0	100
1" (25.0-mm)	0	100
3/4" (19.0-mm)	0	100
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	1	99
#8 (2.36-mm)	1	99
#16 (1.18-mm)	3	97
#30 (600-µm)	4	96
#50 (300-µm)	8	92
#100 (150-µm)	23	77
#200 (75-µm)	35	65
Hydrometer Analysis		
42-µm		56
30-µm		51
20-µm		44
12-µm		35
9-µm		30
5.0-µm		27
3.1-µm		24
Colloids		19

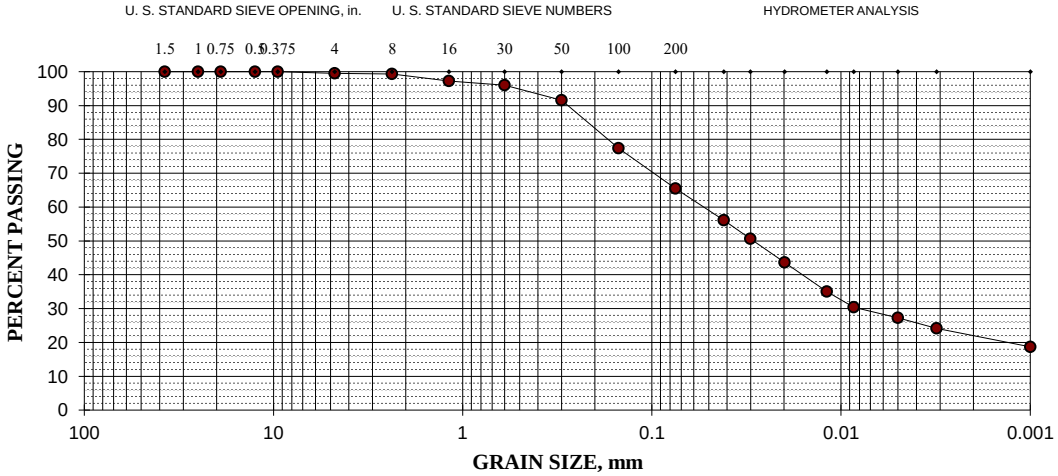


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

PARTICLE SIZE ANALYSIS

ASTM D 422-63/07

CBR #7; Boring #23 @ 3.5 - 5.0'

January 8, 2019

Sandy Lean Clay (CL)

Specific Gravity = 2.70 (assumed)

LL = 36; PL = 18; PI = 18

Gravel = 0%; Sand = 31%; Silt = 44%; Clay = 25%

Sieve size	% Retained	% Passing
1-1/2" (37.5-mm)	0	100
1" (25.0-mm)	0	100
3/4" (19.0-mm)	0	100
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	0	100
#8 (2.36-mm)	0	100
#16 (1.18-mm)	2	98
#30 (600-µm)	7	93
#50 (300-µm)	12	88
#100 (150-µm)	19	81
#200 (75-µm)	31	69
Hydrometer Analysis		
42-µm		52
31-µm		46
20-µm		37
12-µm		33
9-µm		29
5.0-µm		25
3.1-µm		20
Colloids		16

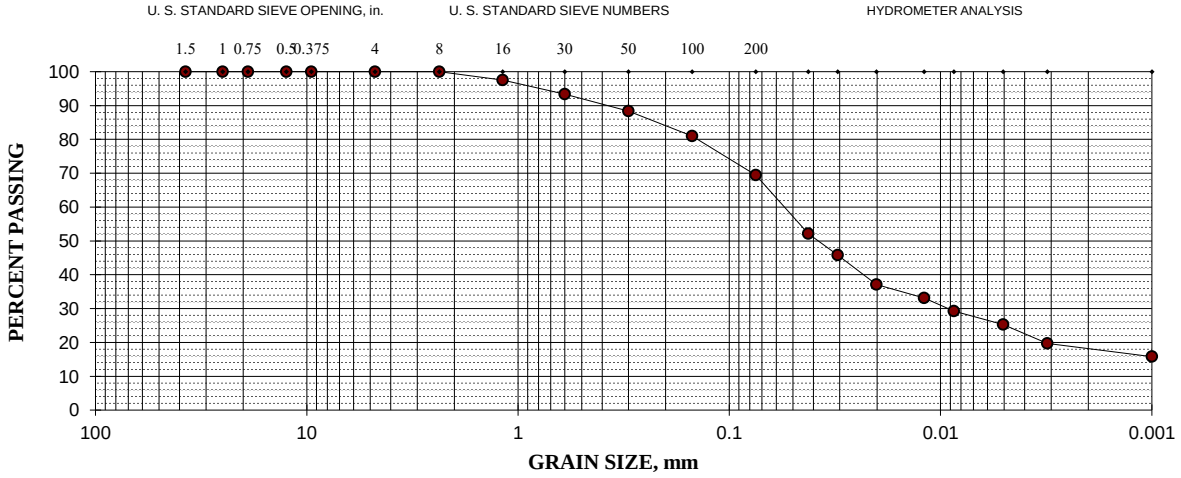


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

PARTICLE SIZE ANALYSIS

ASTM D 422-63/07

CBR #8; Boring #29 @ 2.0 - 5.0'

January 8, 2019

Sandy Lean Clay (CL)

Specific Gravity = 2.70 (assumed)

LL = 31; PL = 19; PI = 12

Gravel = 1%; Sand = 39%; Silt = 37%; Clay = 23%

Sieve size	% Retained	% Passing
1-1/2" (37.5-mm)	0	100
1" (25.0-mm)	0	100
3/4" (19.0-mm)	0	100
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	1	99
#8 (2.36-mm)	2	98
#16 (1.18-mm)	4	96
#30 (600-µm)	7	93
#50 (300-µm)	12	88
#100 (150-µm)	24	76
#200 (75-µm)	40	60
Hydrometer Analysis		
42-µm		46
31-µm		40
20-µm		34
12-µm		29
9-µm		25
5.0-µm		23
3.1-µm		18
Colloids		14

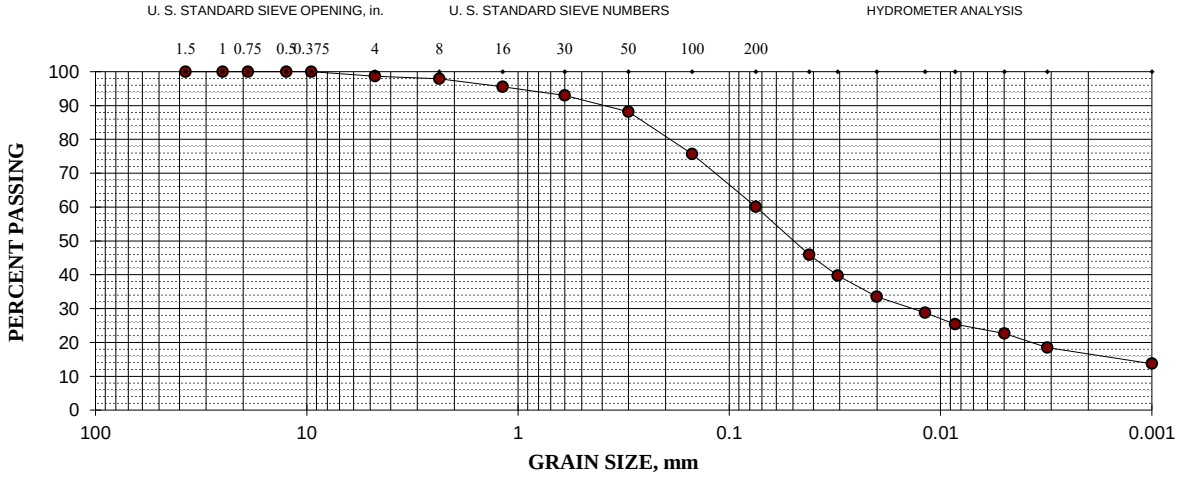


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

PARTICLE SIZE ANALYSIS

ASTM D 422-63/07

CBR #9; Boring #21 @ 1.5 - 3.0'

January 8, 2019

Sandy Lean Clay (CL)

Specific Gravity = 2.70 (assumed)

LL = 32; PL = 15; PI = 17

Gravel = 1%; Sand = 37%; Silt = 39%; Clay = 23%

Sieve size	% Retained	% Passing
1-1/2" (37.5-mm)	0	100
1" (25.0-mm)	0	100
3/4" (19.0-mm)	0	100
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	1	99
#4 (4.75-mm)	1	99
#8 (2.36-mm)	3	97
#16 (1.18-mm)	4	96
#30 (600-µm)	6	94
#50 (300-µm)	10	90
#100 (150-µm)	22	78
#200 (75-µm)	38	62
Hydrometer Analysis		
42-µm		46
31-µm		41
20-µm		36
12-µm		30
9-µm		26
5.0-µm		23
3.1-µm		19
Colloids		16

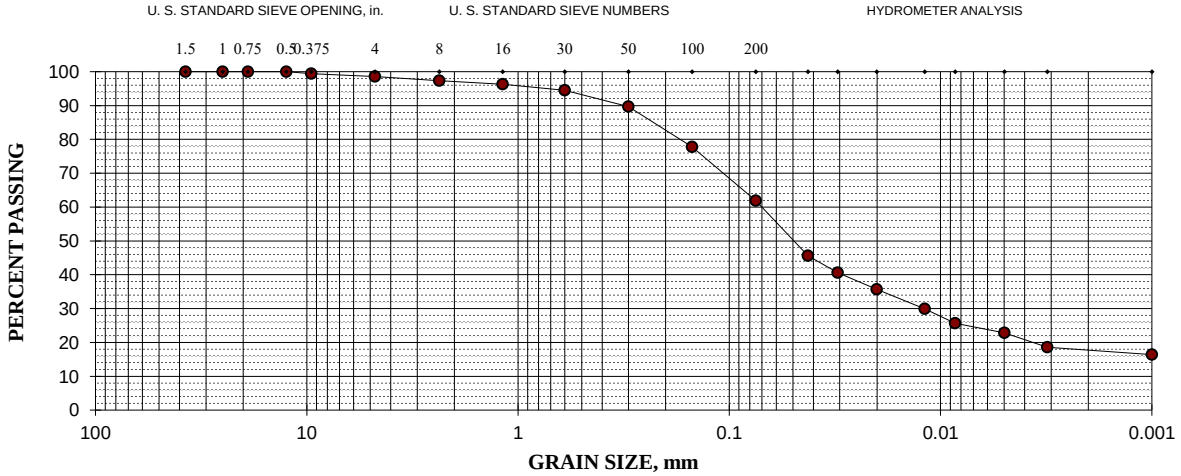


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

PARTICLE SIZE ANALYSIS

ASTM D 422-63/07

CBR #11; Boring #16 @ 2.0 - 4.0'

January 8, 2019

Sandy Lean Clay (CL)

Specific Gravity = 2.70 (assumed)

LL = 34; PL = 18; PI = 16

Gravel = 1%; Sand = 21%; Silt = 50%; Clay = 28%

Sieve size	% Retained	% Passing
1-1/2" (37.5-mm)	0	100
1" (25.0-mm)	0	100
3/4" (19.0-mm)	0	100
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	1	99
#8 (2.36-mm)	2	98
#16 (1.18-mm)	4	96
#30 (600-µm)	5	95
#50 (300-µm)	7	93
#100 (150-µm)	12	88
#200 (75-µm)	22	78
Hydrometer Analysis		
42-µm		51
31-µm		45
20-µm		40
12-µm		36
9-µm		31
5.1-µm		28
3.1-µm		24
Colloids		19

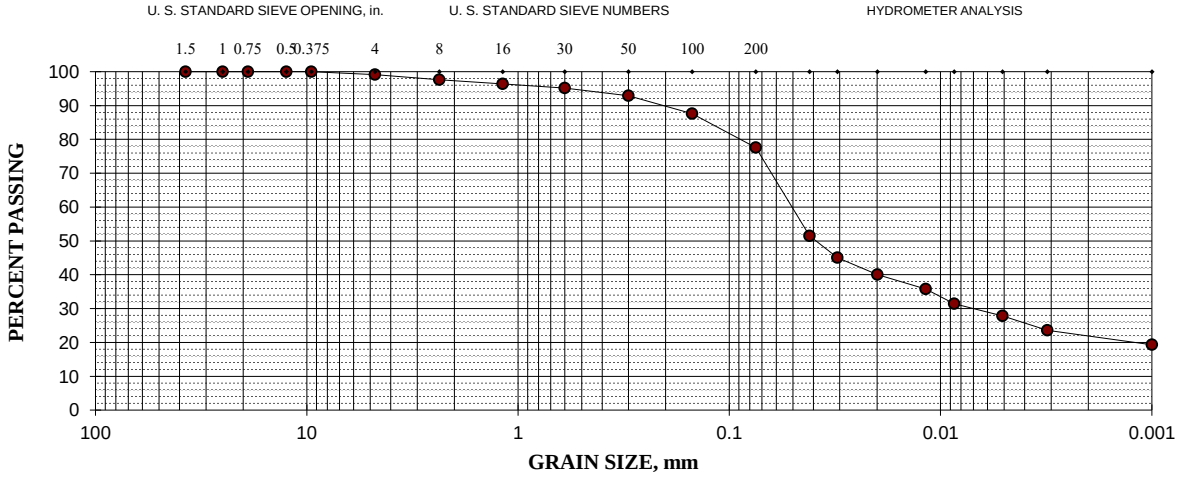


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

PARTICLE SIZE ANALYSIS

ASTM D 422-63/07

CBR #12; Boring #13 @ 2.0 - 4.0'

January 8, 2019

Sandy Lean Clay (CL)

Specific Gravity = 2.70 (assumed)

LL = 34; PL = 14; PI = 20

Gravel = 0%; Sand = 34%; Silt = 38%; Clay = 28%

Sieve size	% Retained	% Passing
1-1/2" (37.5-mm)	0	100
1" (25.0-mm)	0	100
3/4" (19.0-mm)	0	100
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	0	100
#8 (2.36-mm)	1	99
#16 (1.18-mm)	2	98
#30 (600-µm)	2	98
#50 (300-µm)	5	95
#100 (150-µm)	19	81
#200 (75-µm)	34	66

Hydrometer Analysis	
42-µm	54
30-µm	49
20-µm	41
12-µm	37
9-µm	33
5.1-µm	28
3.1-µm	24
Colloids	20

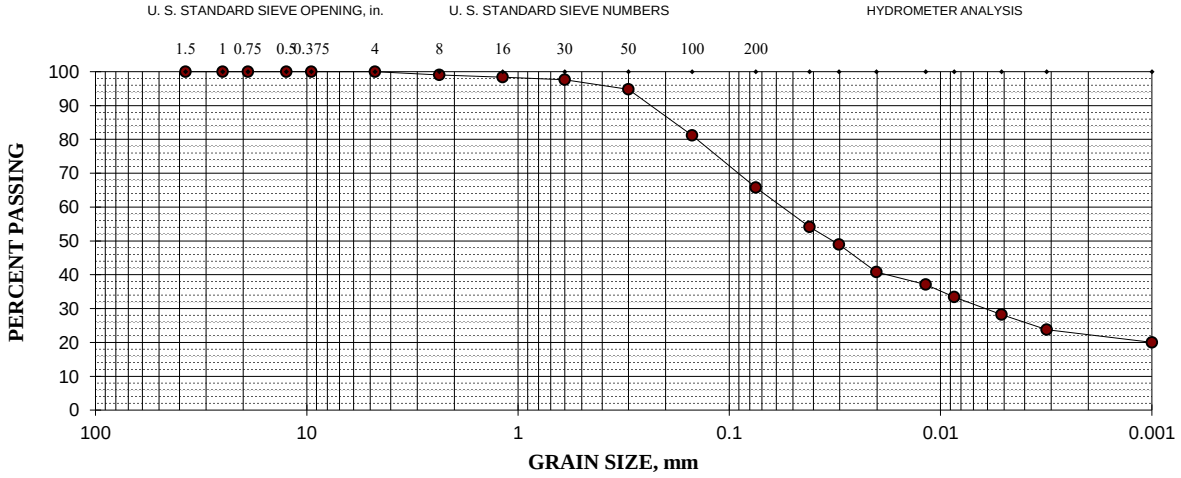


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

PARTICLE SIZE ANALYSIS

ASTM D 422-63/07

CBR #13; Boring #40 @ 1.5 - 3.5'

January 8, 2019

Silty Sand (SM)

Specific Gravity = 2.65 (assumed)

PI = NP

Gravel = 3%; Sand = 54%; Silt = 28%; Clay = 15%

Sieve size	% Retained	% Passing
1-1/2" (37.5-mm)	0	100
1" (25.0-mm)	0	100
3/4" (19.0-mm)	0	100
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	3	97
#8 (2.36-mm)	9	91
#16 (1.18-mm)	19	81
#30 (600-µm)	28	72
#50 (300-µm)	37	63
#100 (150-µm)	46	54
#200 (75-µm)	57	43

Hydrometer Analysis	
45-µm	32
33-µm	28
21-µm	24
13-µm	20
9-µm	18
5.2-µm	15
3.2-µm	13
Colloids	11

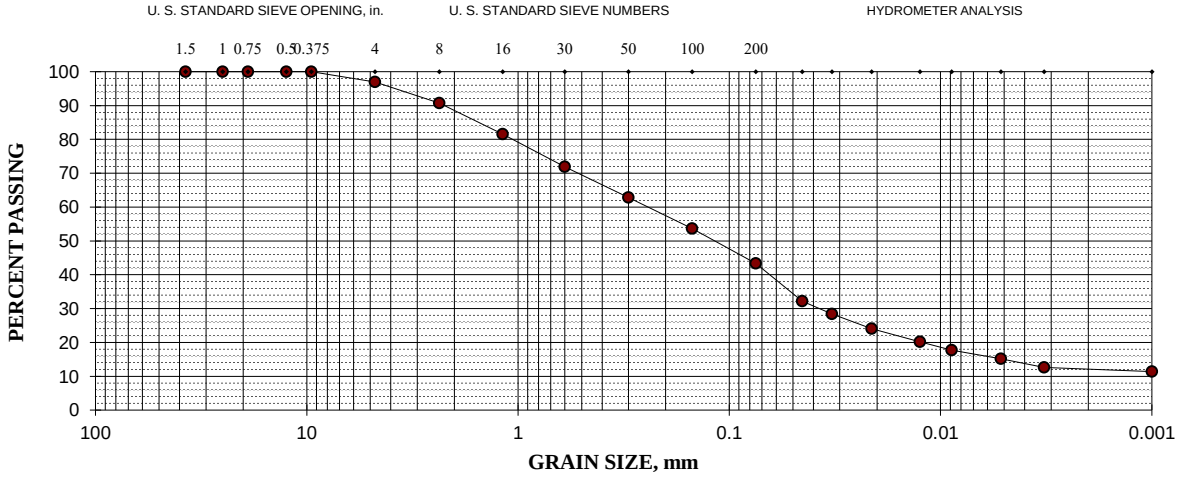


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

PARTICLE SIZE ANALYSIS

ASTM D 422-63/07

CBR #14; Boring #39 @ 2.0 - 5.0'

January 8, 2019

Sandy Fat Clay (CH)

Specific Gravity = 2.70 (assumed)

LL = 55; PL = 15; PI = 40

Gravel = 0%; Sand = 34%; Silt = 36%; Clay = 30%

Sieve size	% Retained	% Passing
1-1/2" (37.5-mm)	0	100
1" (25.0-mm)	0	100
3/4" (19.0-mm)	0	100
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	0	100
#8 (2.36-mm)	1	99
#16 (1.18-mm)	1	99
#30 (600-µm)	2	98
#50 (300-µm)	5	95
#100 (150-µm)	20	80
#200 (75-µm)	34	66

Hydrometer Analysis	
44-µm	56
32-µm	49
21-µm	44
12-µm	39
9-µm	35
5.2-µm	30
3.2-µm	25
Colloids	21

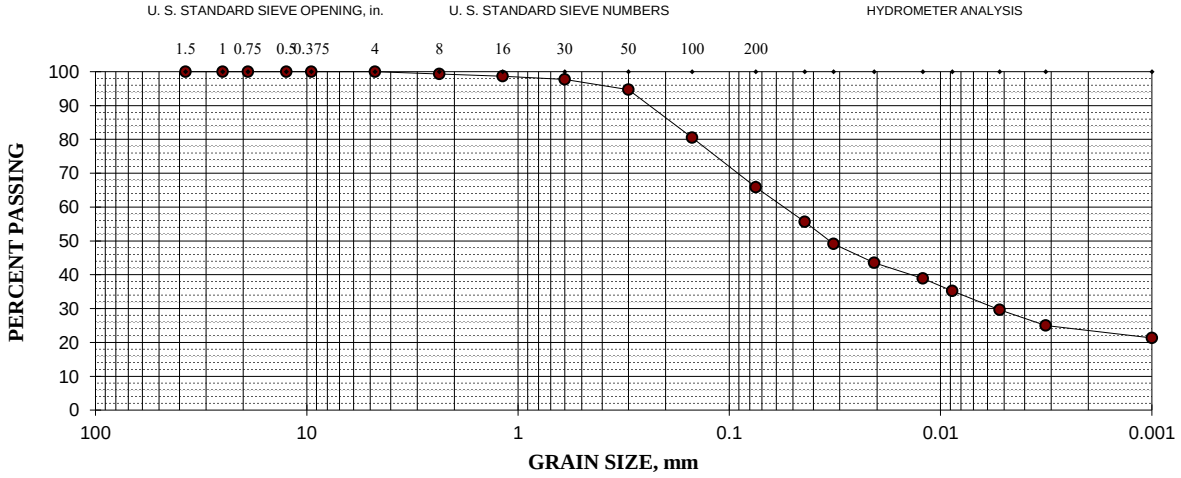


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

PARTICLE SIZE ANALYSIS

ASTM D 422-63/07

CBR #15; Boring #17 @ 0.5 - 1.5'

January 8, 2019

Clayey Sand with Gravel (SC)

Specific Gravity = 2.65 (assumed)

LL = 33; PL = 17; PI = 16

Gravel = 41%; Sand = 46%; Silt = 9%; Clay = 4%

Sieve size	% Retained	% Passing
1-1/2" (37.5-mm)	0	100
1" (25.0-mm)	4	96
3/4" (19.0-mm)	10	90
1/2" (12.5-mm)	20	80
3/8" (9.5-mm)	26	74
#4 (4.75-mm)	41	59
#8 (2.36-mm)	52	48
#16 (1.18-mm)	61	39
#30 (600-µm)	68	32
#50 (300-µm)	77	23
#100 (150-µm)	85	15
#200 (75-µm)	87	13
Hydrometer Analysis		
47-µm		10
34-µm		8
22-µm		7
13-µm		5
9-µm		5
5.3-µm		4
3.3-µm		3
Colloids		2

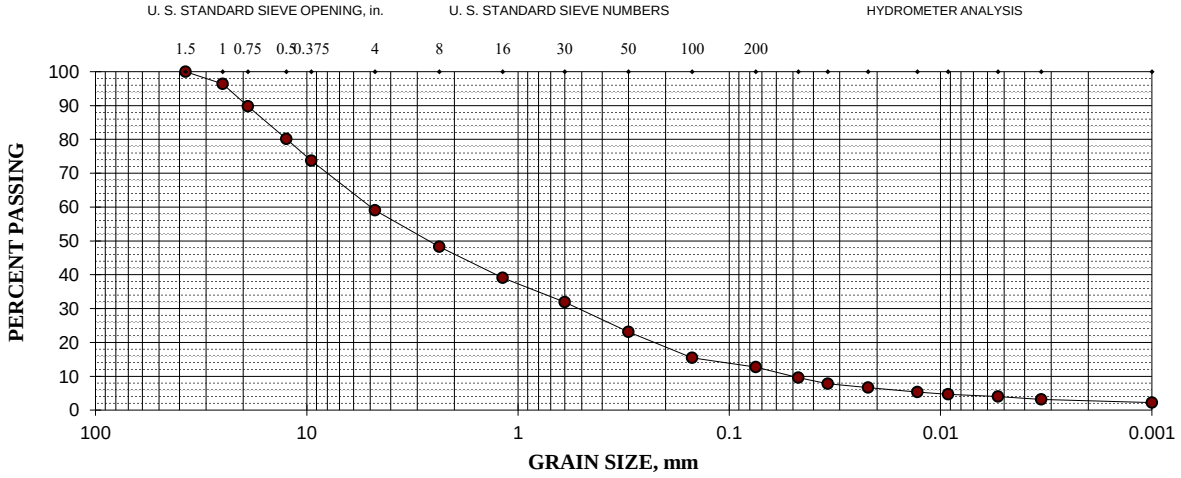


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

PARTICLE SIZE ANALYSIS

ASTM D 422-63/07

CBR #16; Boring #28 @ 0.5 - 1.5'

January 8, 2019

Silty Gravel with Sand (GM)

Specific Gravity = 2.65 (assumed)

PI = NP

Gravel = 46%; Sand = 41%; Silt = 10%; Clay = 3%

Sieve size	% Retained	% Passing
1-1/2" (37.5-mm)	0	100
1" (25.0-mm)	4	96
3/4" (19.0-mm)	10	90
1/2" (12.5-mm)	22	78
3/8" (9.5-mm)	29	71
#4 (4.75-mm)	46	54
#8 (2.36-mm)	57	43
#16 (1.18-mm)	62	38
#30 (600-µm)	69	31
#50 (300-µm)	76	24
#100 (150-µm)	82	18
#200 (75-µm)	87	13

Hydrometer Analysis	
47-µm	8
34-µm	7
22-µm	6
13-µm	5
9-µm	4
5.3-µm	3
3.3-µm	2
Colloids	2

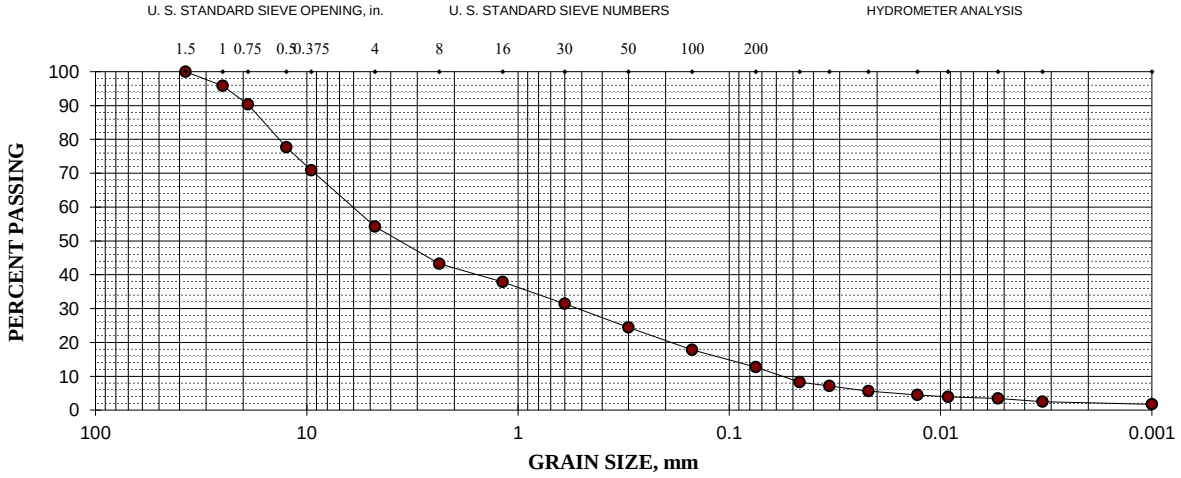


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

PARTICLE SIZE ANALYSIS

ASTM D 422-63/07

CBR #17; Boring #14 @ 0.5 - 1.5'

January 8, 2019

Silty Sand with Gravel (SM)

Specific Gravity = 2.65 (assumed)

PI = NP

Gravel = 35%; Sand = 52%; Silt = 9%; Clay = 4%

Sieve size	% Retained	% Passing
1-1/2" (37.5-mm)	0	100
1" (25.0-mm)	3	97
3/4" (19.0-mm)	7	93
1/2" (12.5-mm)	17	83
3/8" (9.5-mm)	22	78
#4 (4.75-mm)	35	65
#8 (2.36-mm)	43	57
#16 (1.18-mm)	51	49
#30 (600-µm)	60	40
#50 (300-µm)	70	30
#100 (150-µm)	80	20
#200 (75-µm)	87	13
Hydrometer Analysis		
48-µm		11
34-µm		9
22-µm		8
13-µm		6
9-µm		5
5.4-µm		4
3.4-µm		3
Colloids		2

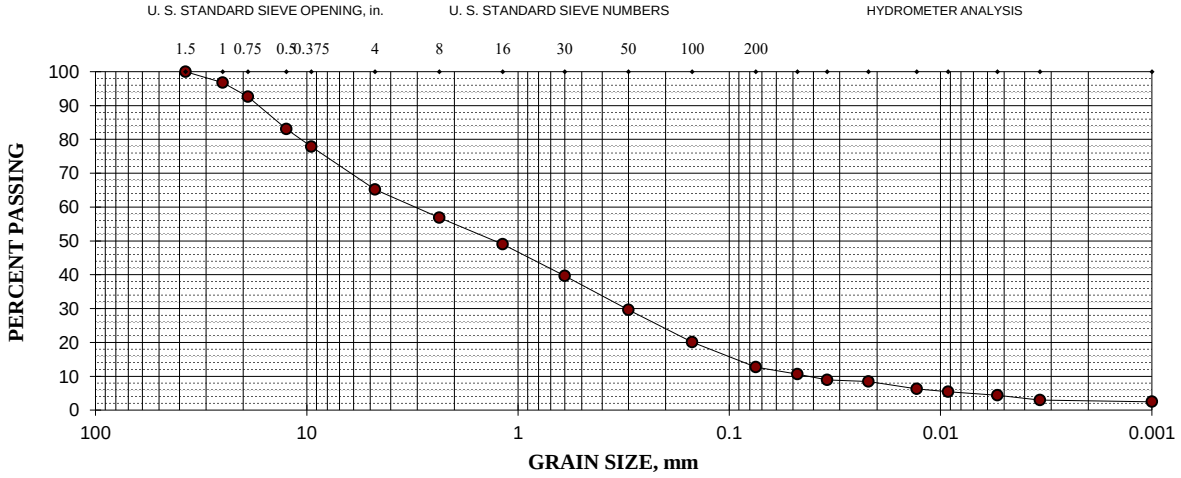


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

PARTICLE SIZE ANALYSIS

ASTM D 422-63/07

Boring #7 @ 2.0 - 3.5'

January 8, 2019

Sandy Lean Clay (CL)

Specific Gravity = 2.70 (assumed)

Gravel = 1%; Sand = 39%; Silt = 24%; Clay = 36%

Sieve size	% Retained	% Passing
1-1/2" (37.5-mm)	0	100
1" (25.0-mm)	0	100
3/4" (19.0-mm)	0	100
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	1	99
#8 (2.36-mm)	3	97
#16 (1.18-mm)	6	94
#30 (600-µm)	8	92
#50 (300-µm)	14	86
#100 (150-µm)	29	71
#200 (75-µm)	40	60
Hydrometer Analysis		
43-µm		52
31-µm		47
20-µm		46
12-µm		44
8-µm		39
4.9-µm		36
3.0-µm		32
Colloids		29

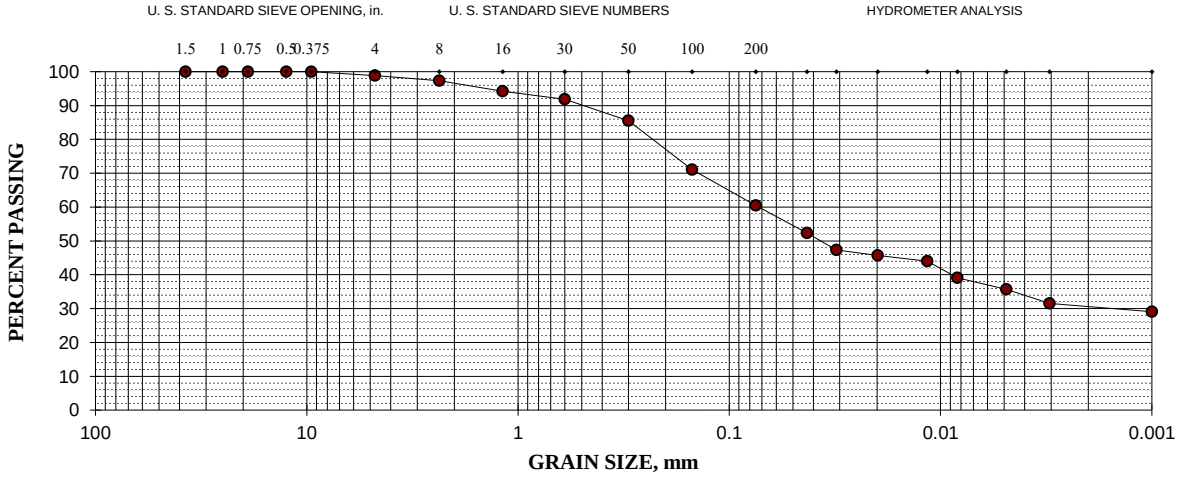


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

PARTICLE SIZE ANALYSIS

ASTM D 422-63/07

Boring #9 @ 1.5 - 3.0'

January 8, 2019

Sandy Lean Clay (CL)

Specific Gravity = 2.70 (assumed)

LL = 30; PL = 16; PI = 14

Gravel = 3%; Sand = 44%; Silt = 31%; Clay = 22%

Sieve size	% Retained	% Passing
1-1/2" (37.5-mm)	0	100
1" (25.0-mm)	0	100
3/4" (19.0-mm)	0	100
1/2" (12.5-mm)	2	98
3/8" (9.5-mm)	2	98
#4 (4.75-mm)	3	97
#8 (2.36-mm)	3	97
#16 (1.18-mm)	4	96
#30 (600-µm)	4	96
#50 (300-µm)	8	92
#100 (150-µm)	26	74
#200 (75-µm)	47	53

Hydrometer Analysis	
45-µm	44
33-µm	37
21-µm	32
12-µm	30
9-µm	26
5.1-µm	22
3.2-µm	19
Colloids	15

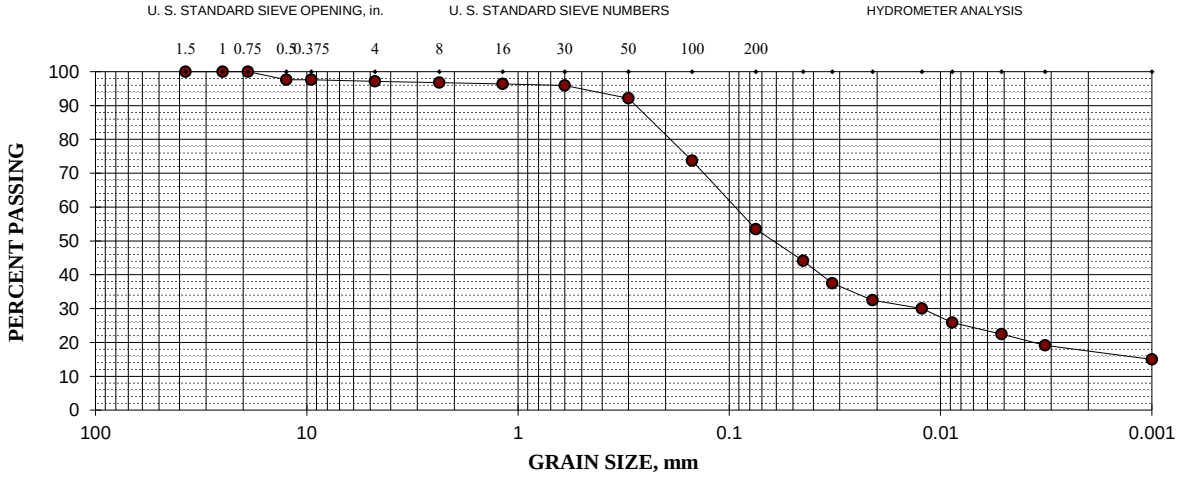


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

PARTICLE SIZE ANALYSIS

ASTM D 422-63/07

Boring #10 @ 1.5 - 2.5'

January 8, 2019

Sandy Lean Clay (CL)

Specific Gravity = 2.70 (assumed)

Gravel = 5%; Sand = 26%; Silt = 42%; Clay = 27%

Sieve size	% Retained	% Passing
1-1/2" (37.5-mm)	0	100
1" (25.0-mm)	0	100
3/4" (19.0-mm)	3	97
1/2" (12.5-mm)	3	97
3/8" (9.5-mm)	4	96
#4 (4.75-mm)	5	95
#8 (2.36-mm)	6	94
#16 (1.18-mm)	8	92
#30 (600-µm)	8	92
#50 (300-µm)	10	90
#100 (150-µm)	19	81
#200 (75-µm)	31	69
Hydrometer Analysis		
42-µm		46
30-µm		44
19-µm		41
12-µm		35
8-µm		30
4.9-µm		27
3.1-µm		22
Colloids		20

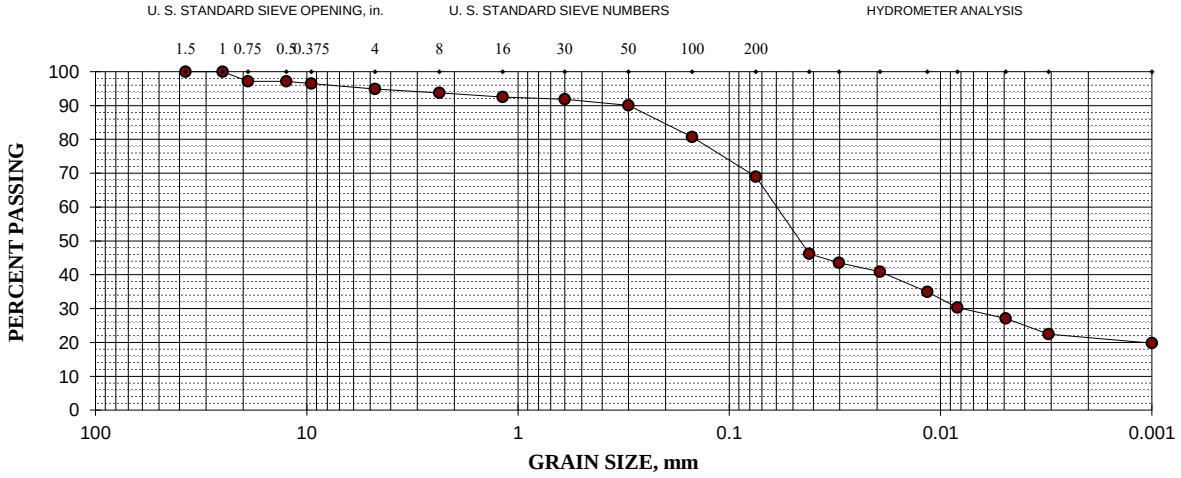


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

MOISTURE-DENSITY COMPACTION TEST

ASTM D 1557-12 (Modified)

PROCEDURE USED: A

PREPARATION METHOD: Moist

RAMMER TYPE: Mechanical

SPECIFIC GRAVITY: 2.70 (assumed)

January 8, 2019

CBR #1; Boring #1 @ 2.0 - 5.0'

Dark Brown Sandy Lean Clay (CL)

MAXIMUM DRY DENSITY: 123.5 pcf

OPTIMUM MOISTURE: 10.9%

SIEVE DATA:

Sieve Size	% Retained (Cumulative)
3/4"	0
3/8"	0
#4	0

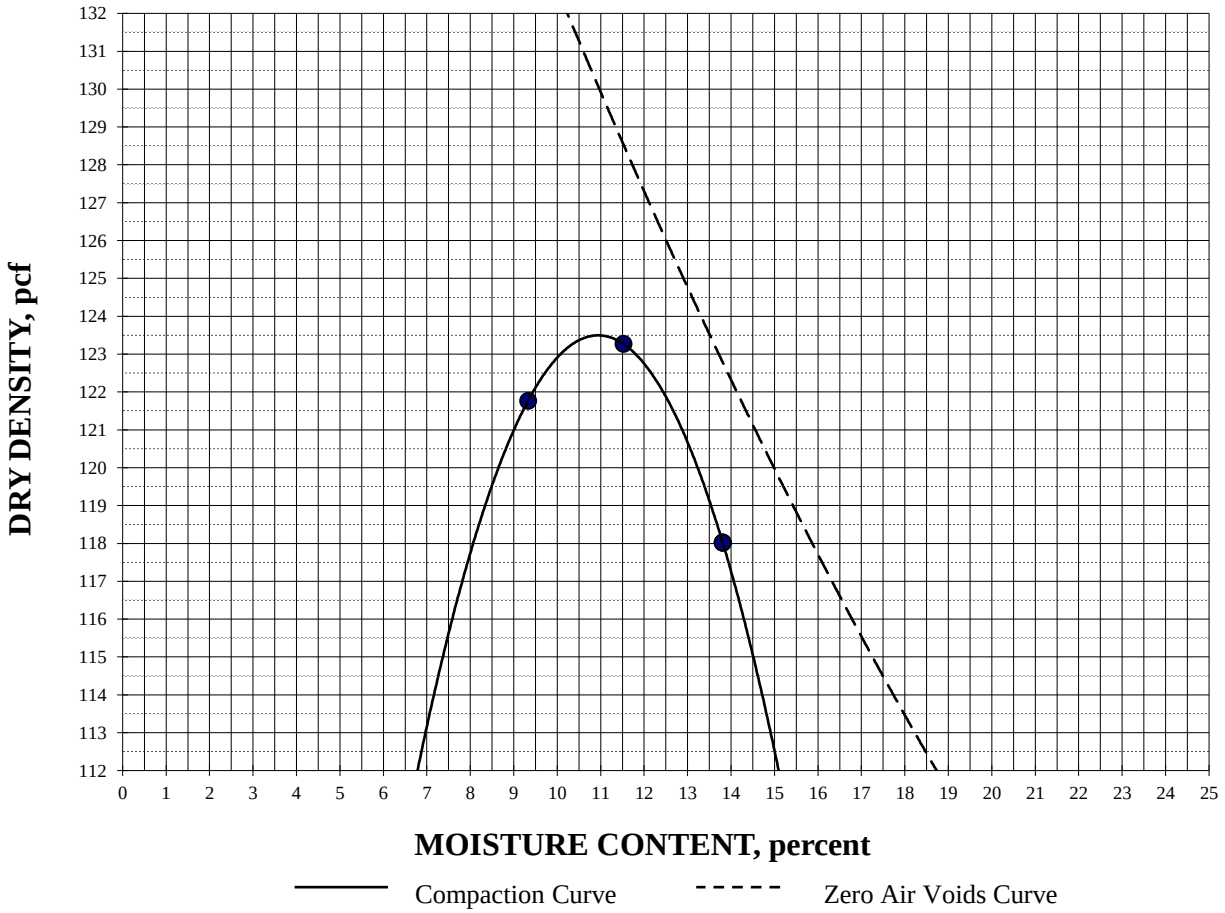


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

MOISTURE-DENSITY COMPACTION TEST

ASTM D 1557-12 (Modified)

PROCEDURE USED: A

PREPARATION METHOD: Moist

RAMMER TYPE: Mechanical

SPECIFIC GRAVITY: 2.70 (assumed)

January 8, 2019

CBR #2; Boring #9 @ 3.0 - 5.0'

Dark Brown Sandy Lean Clay (CL)

MAXIMUM DRY DENSITY: 120.2 pcf

OPTIMUM MOISTURE: 13.2%

SIEVE DATA:

Sieve Size	% Retained (Cumulative)
3/4"	0
3/8"	0
#4	0

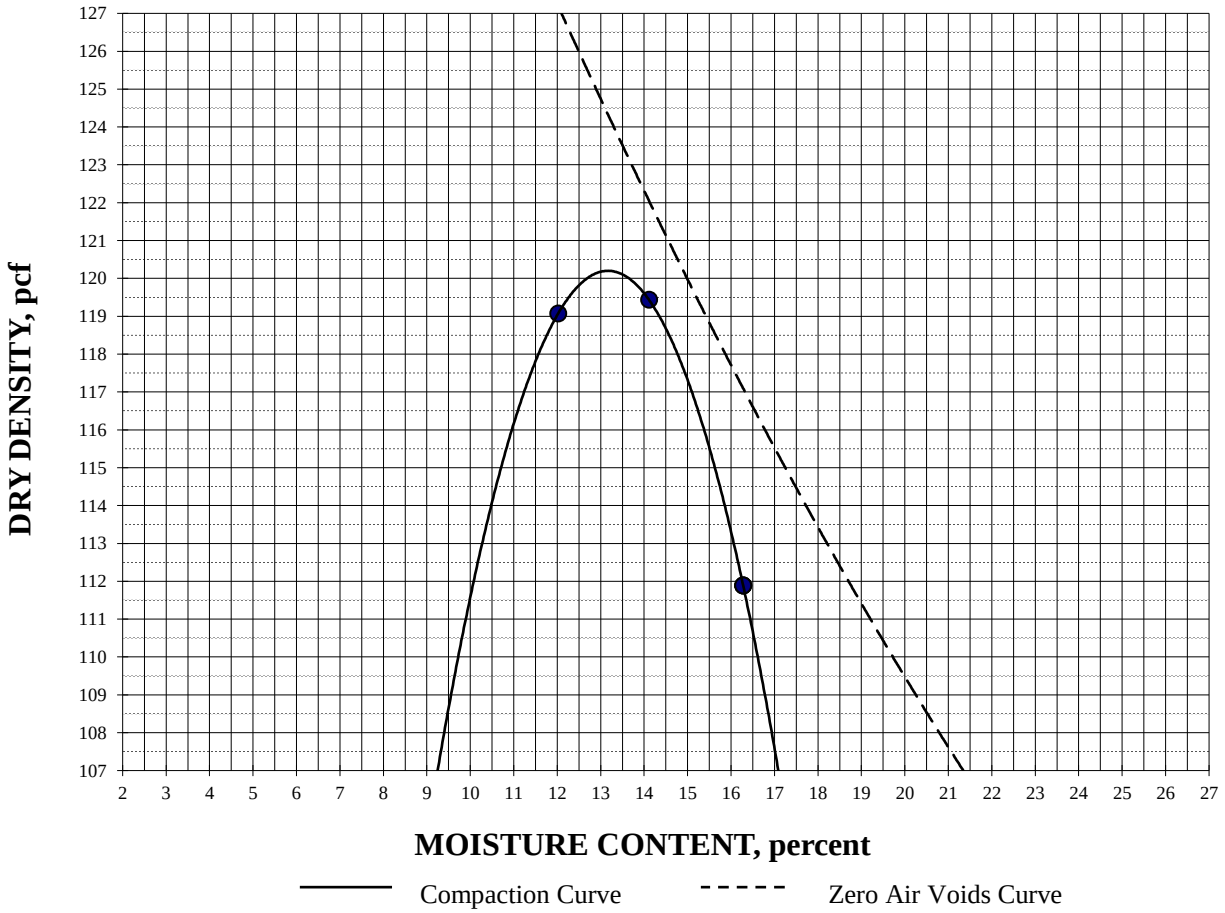


Exhibit 1

Oxnard Airport - Runway and Taxiway
Rehabilitation / Reconstruction

302524-001

MOISTURE-DENSITY COMPACTION TEST

ASTM D 1557-12 (Modified)

PROCEDURE USED: A

PREPARATION METHOD: Moist

RAMMER TYPE: Mechanical

SPECIFIC GRAVITY: 2.70 (assumed)

January 16, 2019

CBR #3 with 3% Lime added; Boring #5 @ 2.0 - 4.0'

Dark Brown Silty Sand (SM)

SIEVE DATA:

Sieve Size	% Retained
3/4"	0
3/8"	0
#4	0

MAXIMUM DRY DENSITY: 119.0 pcf

OPTIMUM MOISTURE: 12.0%

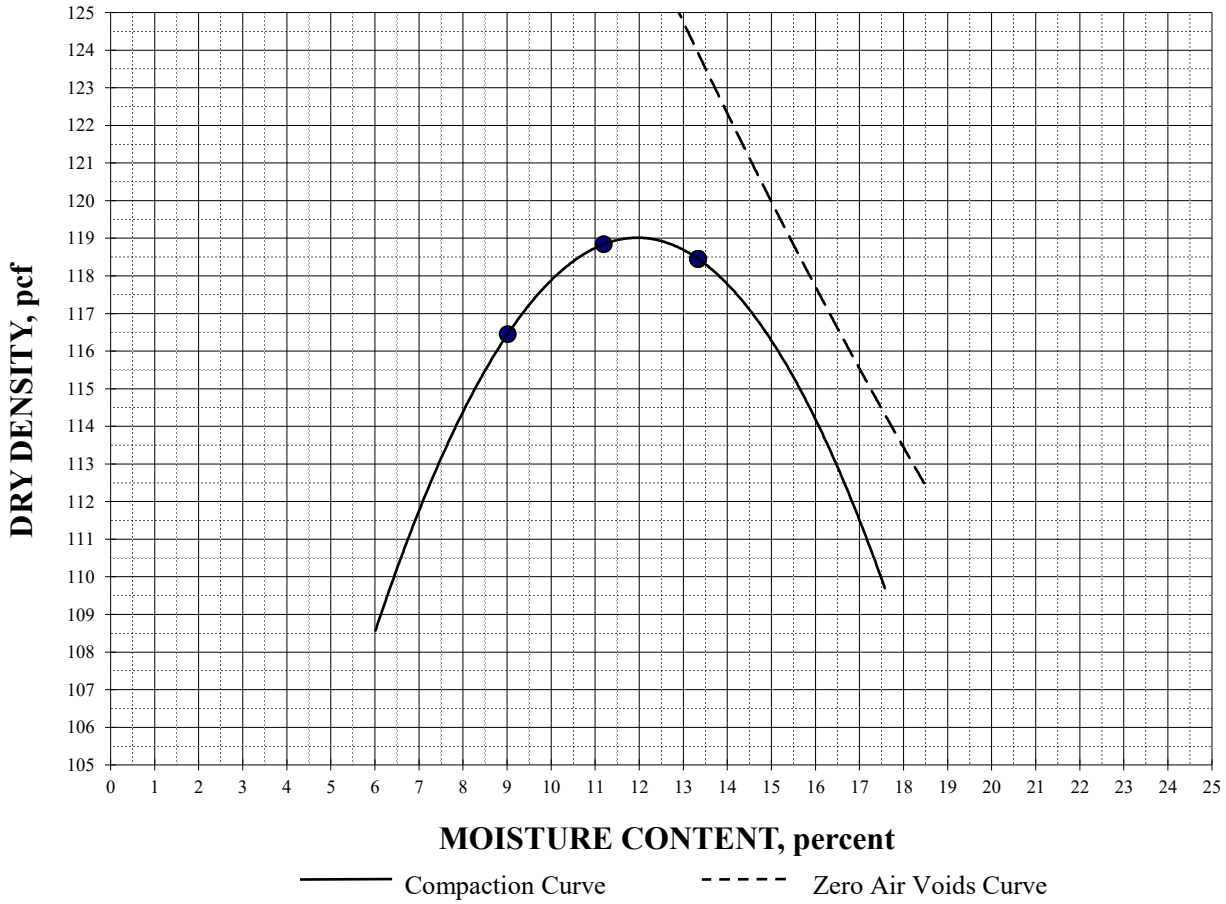


Exhibit 1

Oxnard Airport - Runway and Taxiway
Rehabilitation / Reconstruction

302524-001

MOISTURE-DENSITY COMPACTION TEST

ASTM D 1557-12 (Modified)

PROCEDURE USED: A

PREPARATION METHOD: Moist

RAMMER TYPE: Mechanical

SPECIFIC GRAVITY: 2.70 (assumed)

January 16, 2019

CBR #3 with 5% Lime added; Boring #5 @ 2.0 - 4.0'

Dark Brown Silty Sand (SM)

SIEVE DATA:

Sieve Size	% Retained
3/4"	0
3/8"	0
#4	0

MAXIMUM DRY DENSITY: 116.6 pcf

OPTIMUM MOISTURE: 12.2%

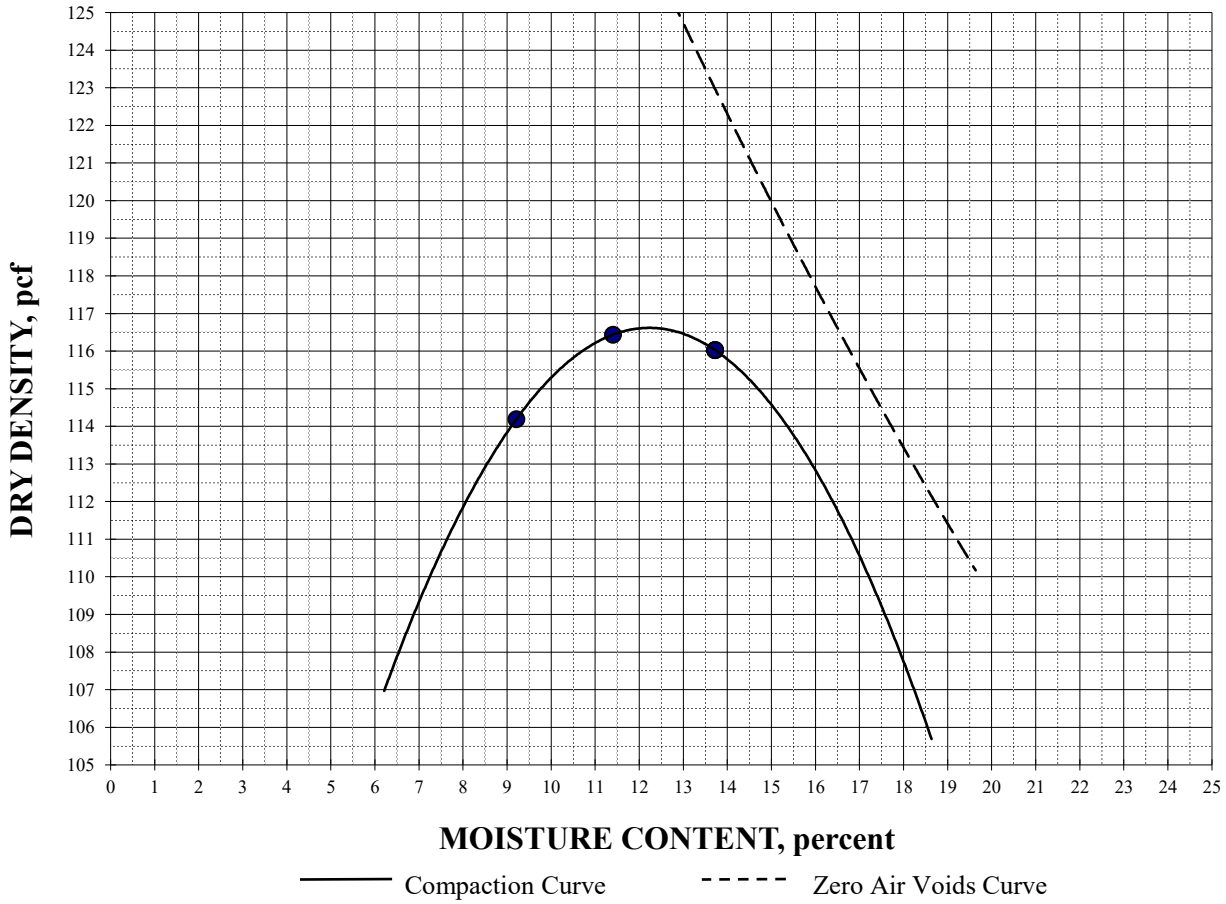


Exhibit 1

Oxnard Airport - Runway and Taxiway
Rehabilitation / Reconstruction

302524-001

MOISTURE-DENSITY COMPACTION TEST

ASTM D 1557-12 (Modified)

PROCEDURE USED: A

PREPARATION METHOD: Moist

RAMMER TYPE: Mechanical

SPECIFIC GRAVITY: 2.70 (assumed)

January 16, 2019

CBR #3 with 7% Lime added; Boring #5 @ 2.0 - 4.0'

Dark Brown Silty Sand (SM)

SIEVE DATA:

Sieve Size	% Retained
3/4"	0
3/8"	0
#4	0

MAXIMUM DRY DENSITY: 114.9 pcf

OPTIMUM MOISTURE: 12.3%

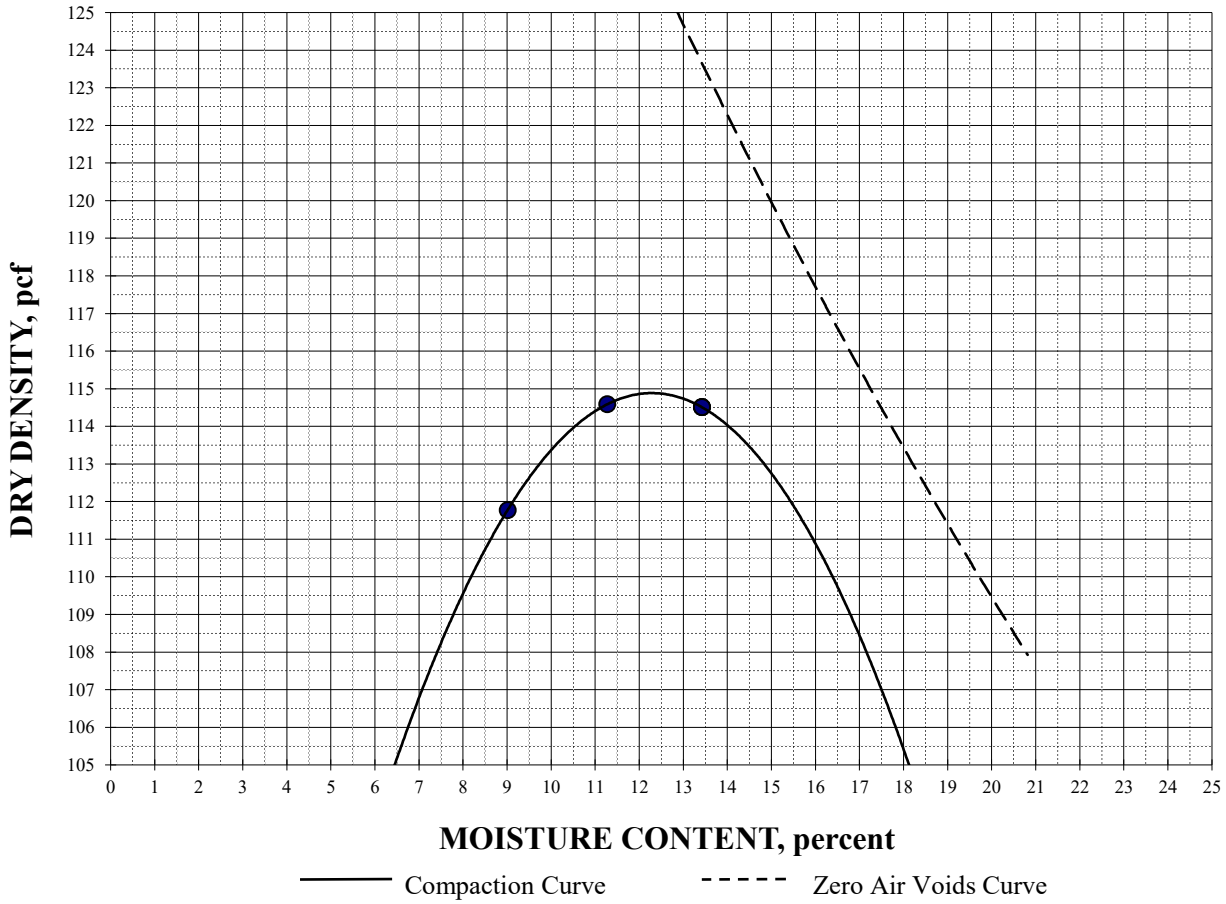


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

MOISTURE-DENSITY COMPACTION TEST

ASTM D 1557-12 (Modified)

PROCEDURE USED: C

PREPARATION METHOD: Moist

RAMMER TYPE: Mechanical

SPECIFIC GRAVITY: 2.65 (assumed)

January 8, 2019

CBR #4; Boring #3 @ 0.5 - 1.0'

Brown Clayey Sand with Gravel (SC)

SIEVE DATA:

Sieve Size	% Retained (Cumulative)
3/4"	0
3/8"	7
#4	16

MAXIMUM DRY DENSITY: 131.2 pcf

OPTIMUM MOISTURE: 6.9%

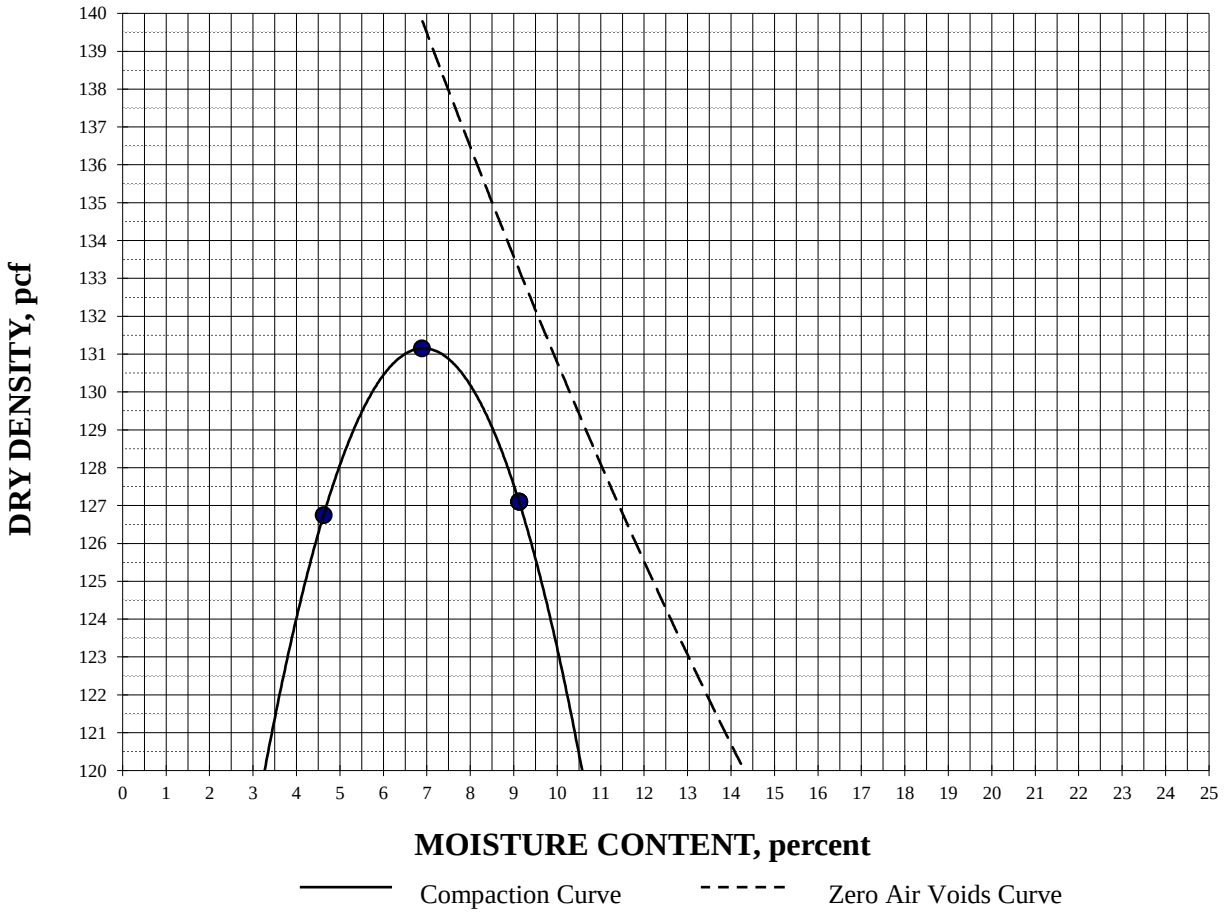


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

MOISTURE-DENSITY COMPACTION TEST

ASTM D 1557-12 (Modified)

PROCEDURE USED: A

PREPARATION METHOD: Moist

RAMMER TYPE: Mechanical

SPECIFIC GRAVITY: 2.70 (assumed)

January 8, 2019

CBR #5; Boring #36 @ 2.5 - 5.0'

Dark Brown Sandy Lean Clay (CL)

MAXIMUM DRY DENSITY: 121.5 pcf

OPTIMUM MOISTURE: 10.7%

SIEVE DATA:

Sieve Size	% Retained (Cumulative)
3/4"	0
3/8"	0
#4	2

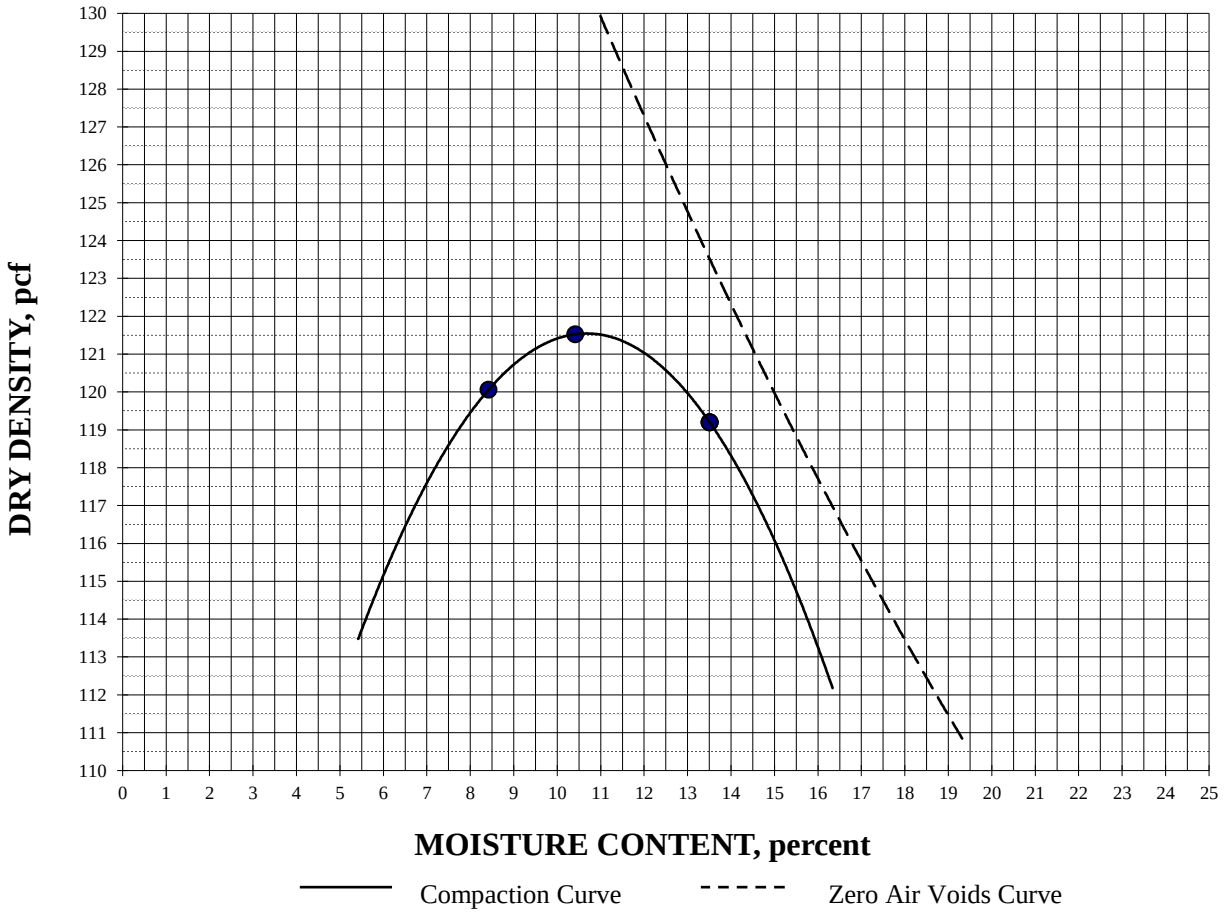


Exhibit 1

Oxnard Airport - Runway and Taxiway
Rehabilitation / Reconstruction

302524-001

MOISTURE-DENSITY COMPACTION TEST

ASTM D 1557-12 (Modified)

PROCEDURE USED: A

PREPARATION METHOD: Moist

RAMMER TYPE: Mechanical

SPECIFIC GRAVITY: 2.70 (assumed)

January 16, 2019

CBR #6 with 3% Lime added; Boring #27 @ 2.0 - 4.0'

Dark Brown Sandy Lean Clay (CL)

SIEVE DATA:

Sieve Size	% Retained
3/4"	0
3/8"	0
#4	1

MAXIMUM DRY DENSITY: 115.6 pcf

OPTIMUM MOISTURE: 14.1%

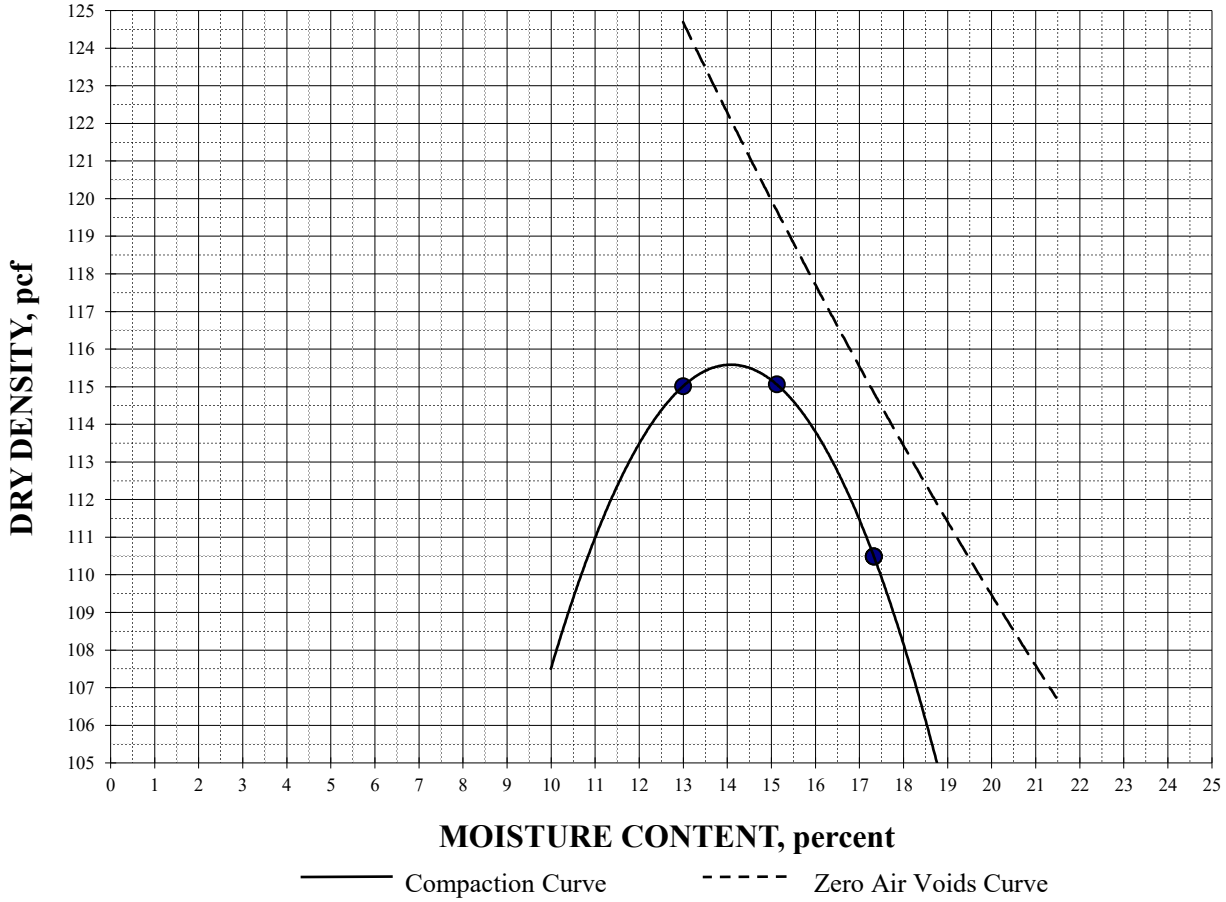


Exhibit 1

Oxnard Airport - Runway and Taxiway
Rehabilitation / Reconstruction

302524-001

MOISTURE-DENSITY COMPACTION TEST

ASTM D 1557-12 (Modified)

PROCEDURE USED: A

PREPARATION METHOD: Moist

RAMMER TYPE: Mechanical

SPECIFIC GRAVITY: 2.70 (assumed)

January 16, 2019

CBR #6 with 5% Lime added; Boring #27 @ 2.0 - 4.0'

Dark Brown Sandy Lean Clay (CL)

SIEVE DATA:

Sieve Size	% Retained
3/4"	0
3/8"	0
#4	1

MAXIMUM DRY DENSITY: 113.3 pcf

OPTIMUM MOISTURE: 15.2%

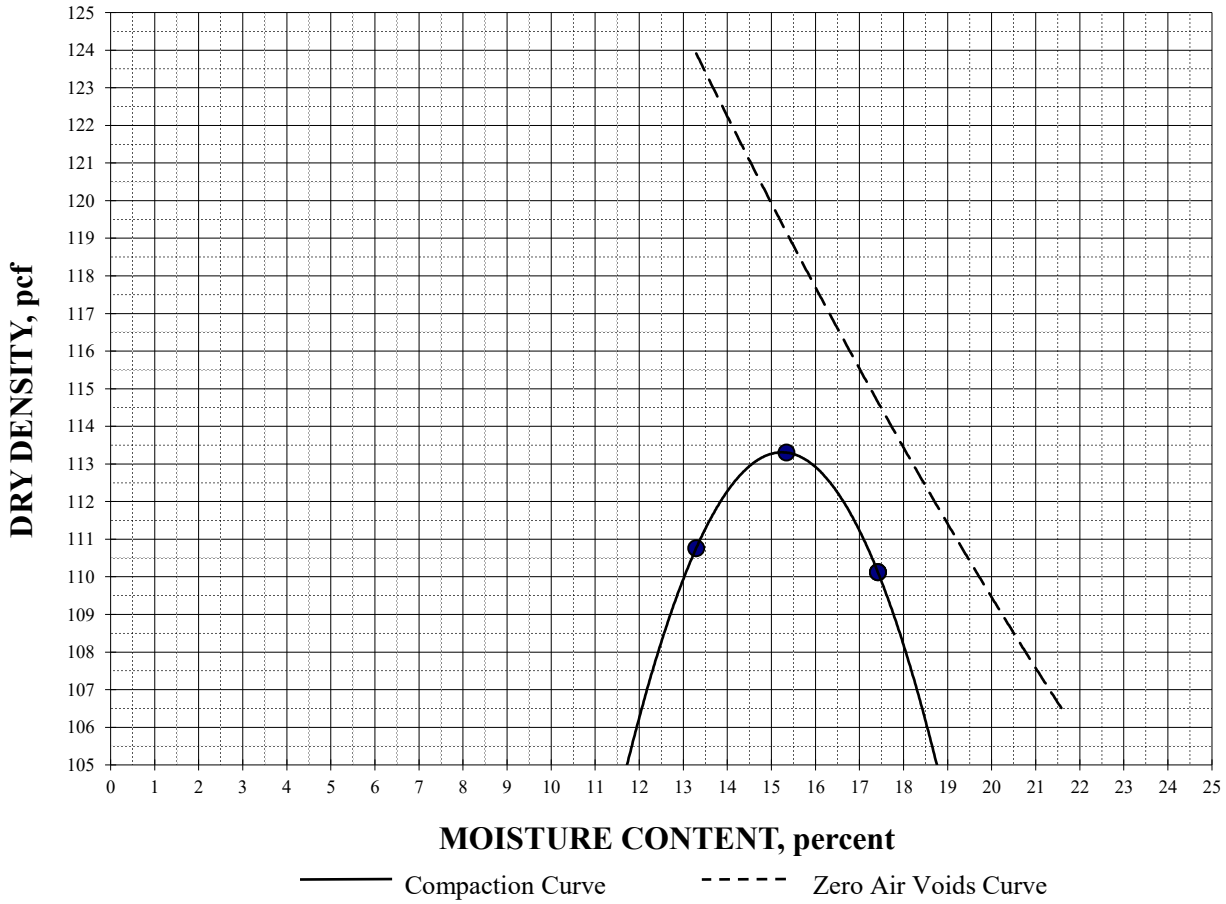


Exhibit 1

Oxnard Airport - Runway and Taxiway
Rehabilitation / Reconstruction

302524-001

MOISTURE-DENSITY COMPACTION TEST

ASTM D 1557-12 (Modified)

PROCEDURE USED: A

PREPARATION METHOD: Moist

RAMMER TYPE: Mechanical

SPECIFIC GRAVITY: 2.70 (assumed)

January 16, 2019

CBR #6 with 7% Lime added; Boring #27 @ 2.0 - 4.0'

Dark Brown Sandy Lean Clay (CL)

SIEVE DATA:

Sieve Size	% Retained
3/4"	0
3/8"	0
#4	1

MAXIMUM DRY DENSITY: 114.0 pcf

OPTIMUM MOISTURE: 15.6%

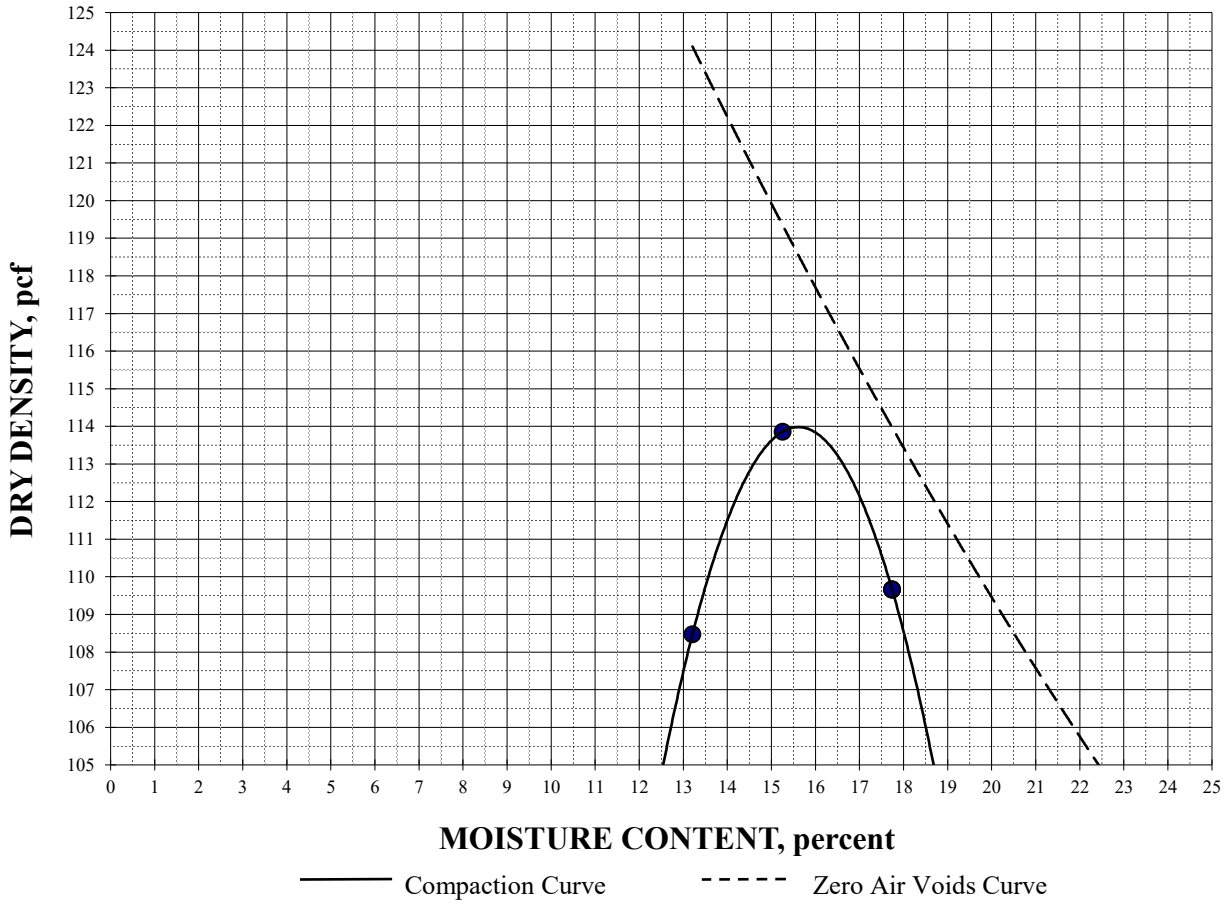


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

MOISTURE-DENSITY COMPACTION TEST

ASTM D 1557-12 (Modified)

PROCEDURE USED: A

PREPARATION METHOD: Moist

RAMMER TYPE: Mechanical

SPECIFIC GRAVITY: 2.70 (assumed)

January 8, 2019

CBR #7; Boring #23 @ 3.5 - 5.0'

Brown Sandy Lean Clay (CL)

MAXIMUM DRY DENSITY: 122.5 pcf

OPTIMUM MOISTURE: 10.0%

SIEVE DATA:

Sieve Size	% Retained (Cumulative)
3/4"	0
3/8"	0
#4	0

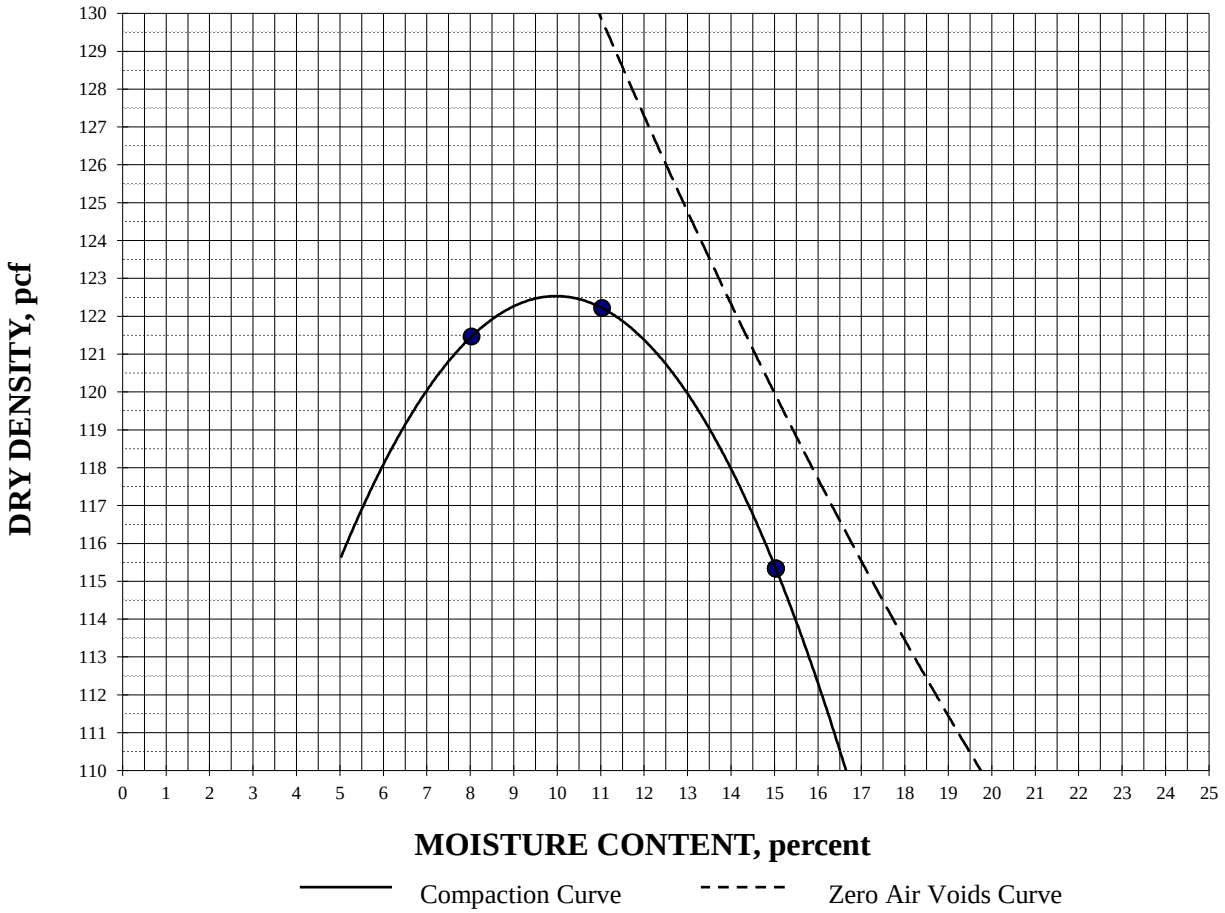


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

MOISTURE-DENSITY COMPACTION TEST

ASTM D 1557-12 (Modified)

PROCEDURE USED: A

PREPARATION METHOD: Moist

RAMMER TYPE: Mechanical

SPECIFIC GRAVITY: 2.65 (assumed)

January 8, 2019

CBR #8; Boring #29 @ 2.0 - 5.0'

Brown / Gray Mottled Sandy Lean Clay (CL)

SIEVE DATA:

Sieve Size	% Retained (Cumulative)
3/4"	0
3/8"	0
#4	1

MAXIMUM DRY DENSITY: 123.1 pcf

OPTIMUM MOISTURE: 11.9%

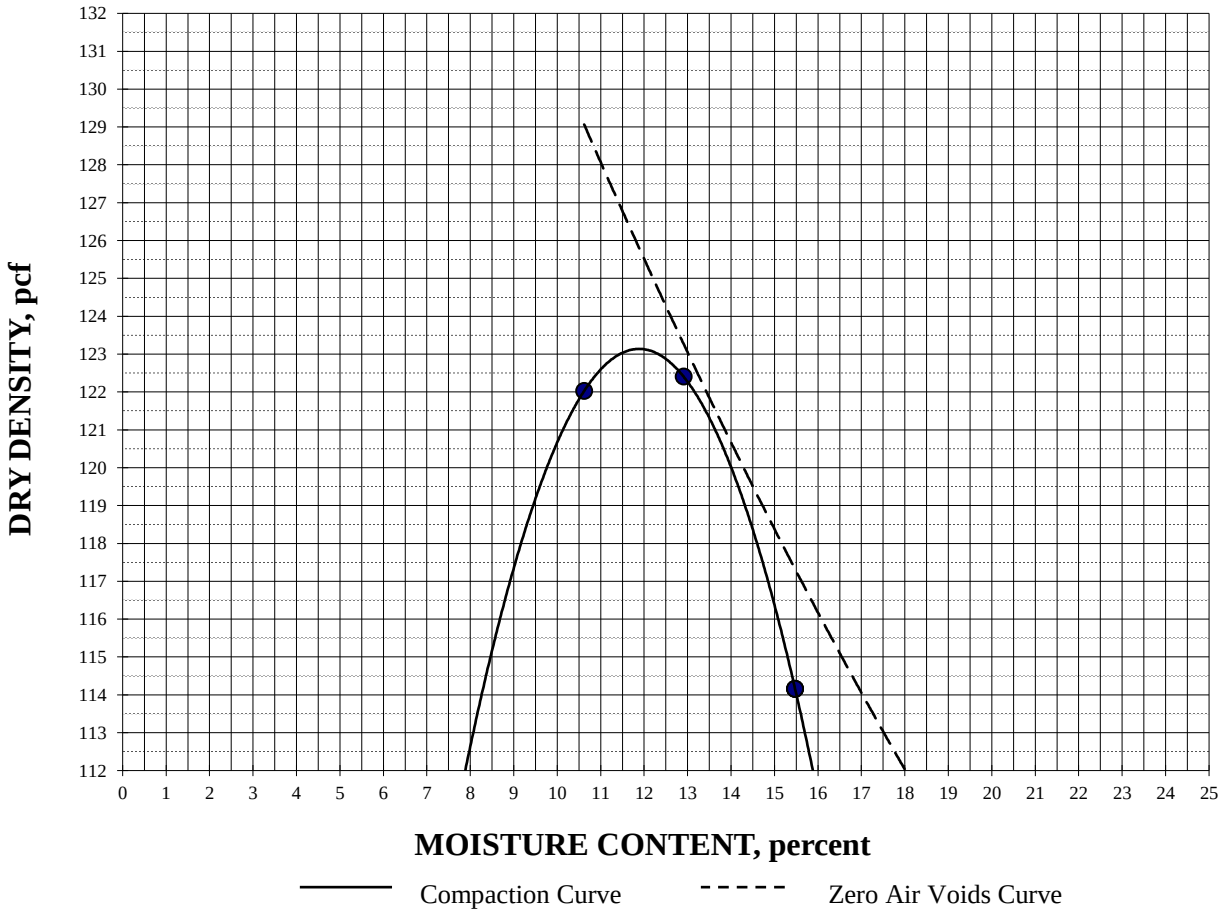


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

MOISTURE-DENSITY COMPACTION TEST

ASTM D 1557-12 (Modified)

PROCEDURE USED: A

PREPARATION METHOD: Moist

RAMMER TYPE: Mechanical

SPECIFIC GRAVITY: 2.70 (assumed)

January 8, 2019

CBR #9; Boring #21 @ 1.5 - 3.0'

Brown Sandy Lean Clay (CL)

MAXIMUM DRY DENSITY: 120.6 pcf

OPTIMUM MOISTURE: 13.4%

SIEVE DATA:

Sieve Size	% Retained (Cumulative)
3/4"	0
3/8"	1
#4	1

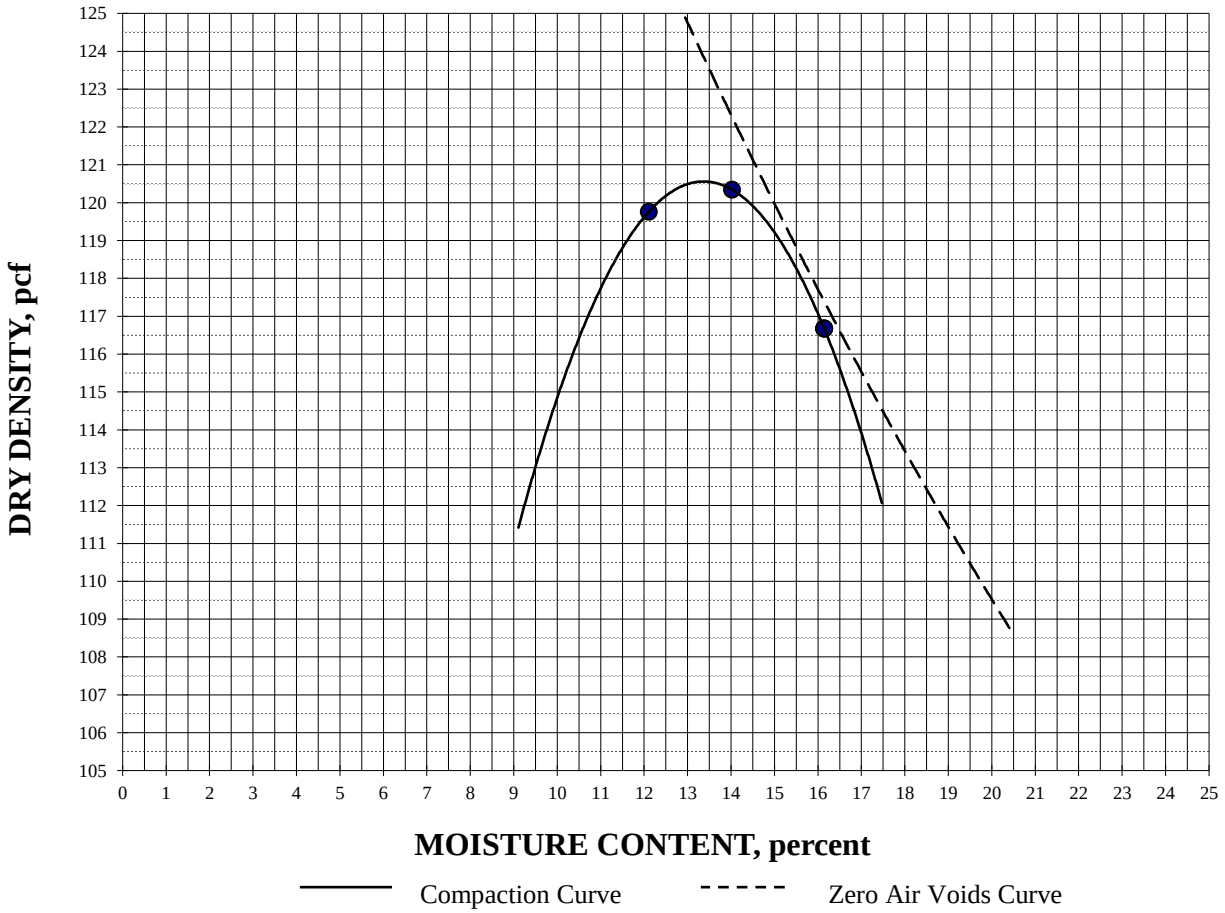


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

MOISTURE-DENSITY COMPACTION TEST

ASTM D 1557-12 (Modified)

PROCEDURE USED: A

PREPARATION METHOD: Moist

RAMMER TYPE: Mechanical

SPECIFIC GRAVITY: 2.70 (assumed)

January 8, 2019

CBR #11; Boring #16 @ 2.0 - 4.0'

Dark Brown Sandy Lean Clay (CL)

MAXIMUM DRY DENSITY: 114.7 pcf

OPTIMUM MOISTURE: 13.7%

SIEVE DATA:

Sieve Size	% Retained (Cumulative)
3/4"	0
3/8"	0
#4	1

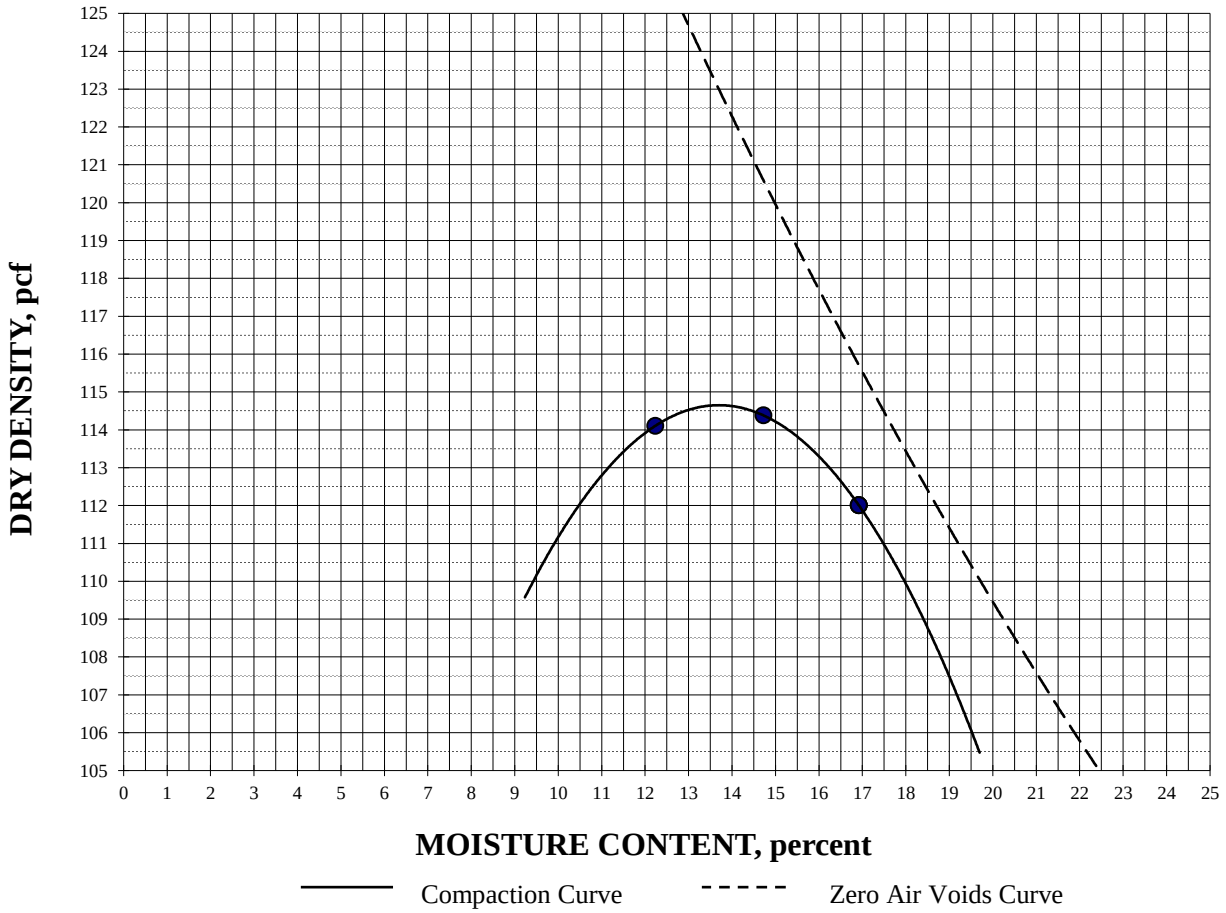


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

MOISTURE-DENSITY COMPACTION TEST

ASTM D 1557-12 (Modified)

PROCEDURE USED: A

PREPARATION METHOD: Moist

RAMMER TYPE: Mechanical

SPECIFIC GRAVITY: 2.70 (assumed)

January 8, 2019

CBR #12; Boring #13 @ 2.0 - 4.0'

Dark Brown Sandy Lean Clay (CL)

SIEVE DATA:

Sieve Size	% Retained (Cumulative)
3/4"	0
3/8"	0
#4	0

MAXIMUM DRY DENSITY: 112.2 pcf

OPTIMUM MOISTURE: 16.5%

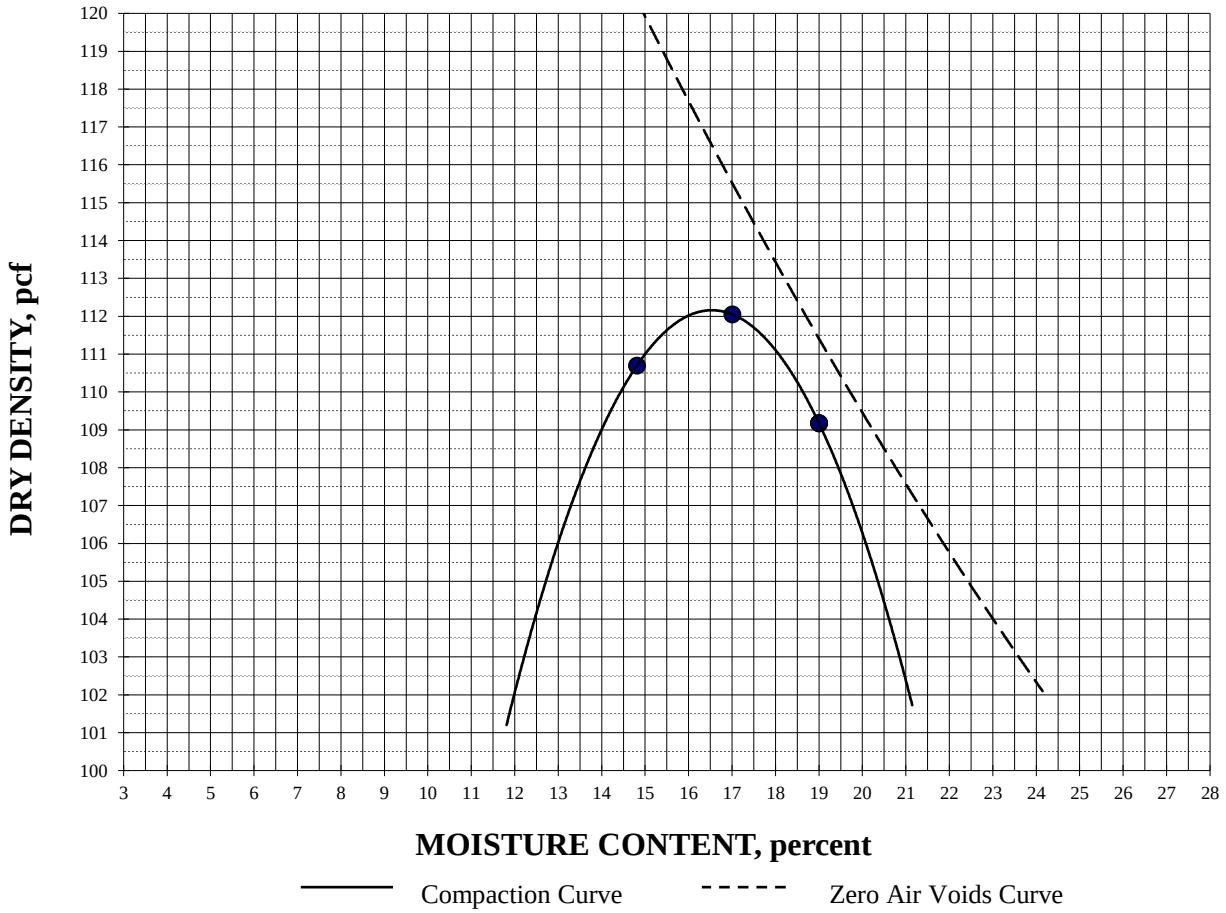


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

MOISTURE-DENSITY COMPACTION TEST

ASTM D 1557-12 (Modified)

PROCEDURE USED: A

PREPARATION METHOD: Moist

RAMMER TYPE: Mechanical

SPECIFIC GRAVITY: 2.65 (assumed)

January 8, 2019

CBR #13; Boring #40 @ 1.5 - 3.5'

Brown Silty Sand (SM)

MAXIMUM DRY DENSITY: 126.5 pcf

OPTIMUM MOISTURE: 9.2%

SIEVE DATA:

Sieve Size	% Retained (Cumulative)
3/4"	0
3/8"	0
#4	3

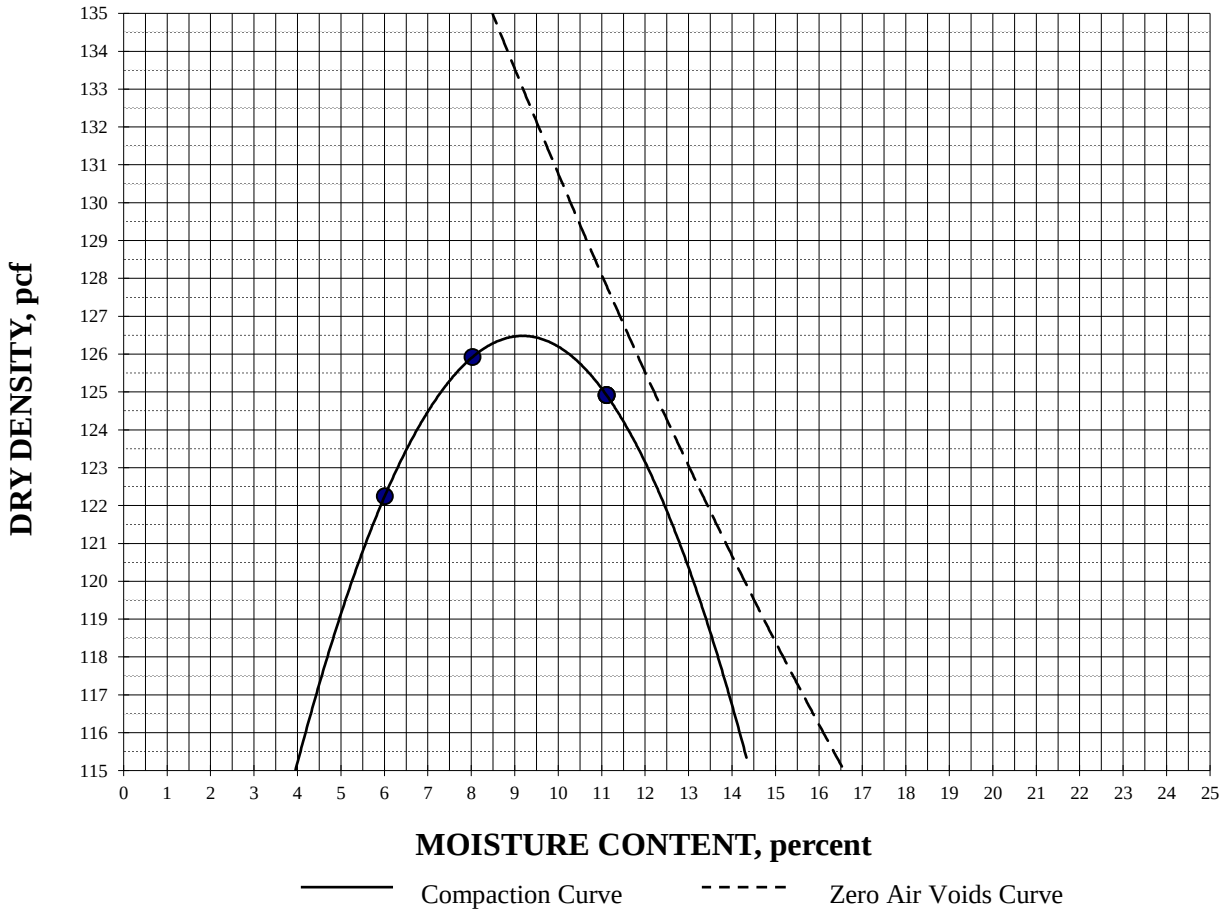


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

MOISTURE-DENSITY COMPACTION TEST

ASTM D 1557-12 (Modified)

PROCEDURE USED: A

PREPARATION METHOD: Moist

RAMMER TYPE: Mechanical

SPECIFIC GRAVITY: 2.70 (assumed)

January 8, 2019

CBR #14; Boring #39 @ 2.0 - 5.0'

Brown Sandy Fat Clay (CH)

MAXIMUM DRY DENSITY: 120.4 pcf

OPTIMUM MOISTURE: 9.6%

SIEVE DATA:

Sieve Size	% Retained (Cumulative)
3/4"	0
3/8"	0
#4	0

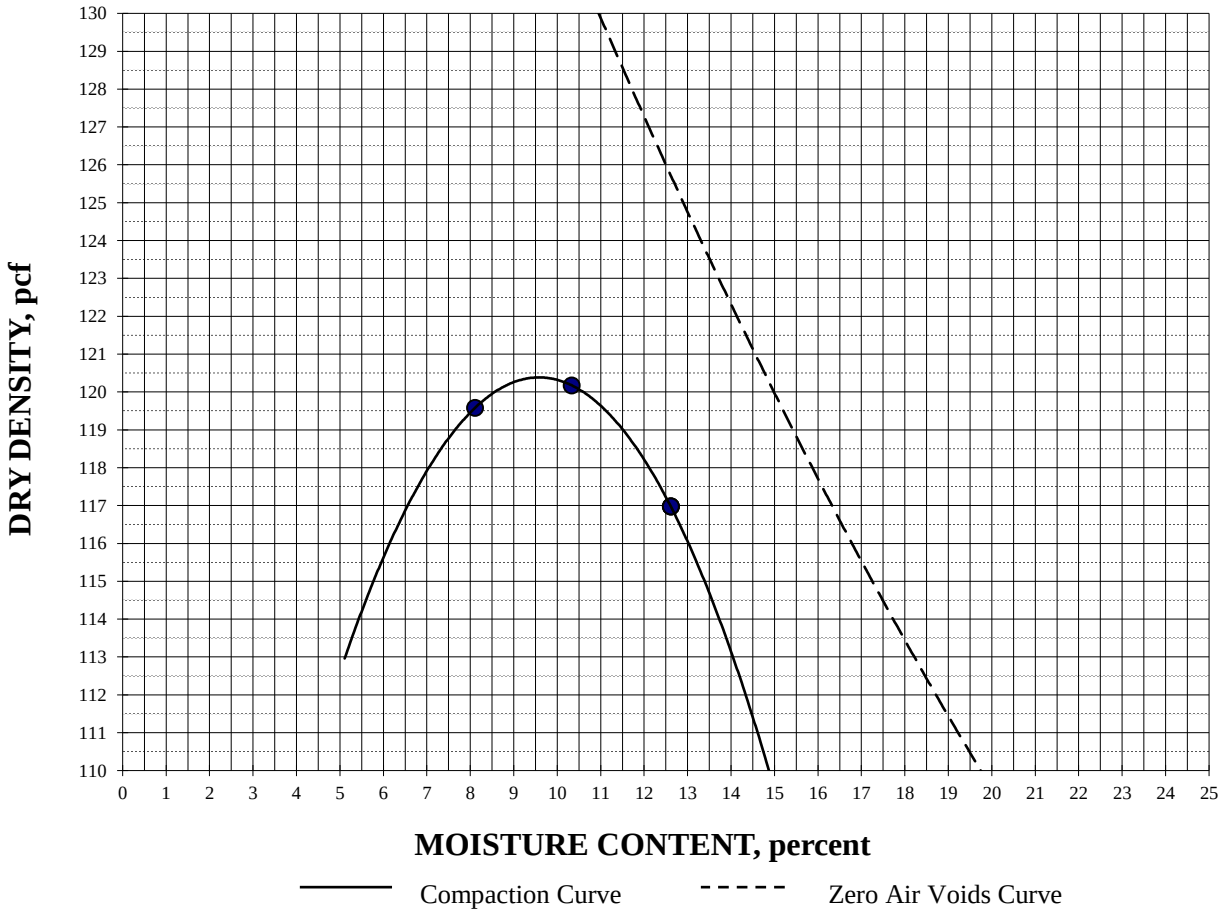


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

MOISTURE-DENSITY COMPACTION TEST

ASTM D 1557-12 (Modified)

PROCEDURE USED: C

PREPARATION METHOD: Moist

RAMMER TYPE: Mechanical

SPECIFIC GRAVITY: 2.65 (assumed)

January 8, 2019

CBR #15; Boring #17 @ 0.5 - 1.5'

Brown Clayey Sand with Gravel (SC)

SIEVE DATA:

Sieve Size	% Retained (Cumulative)
3/4"	10
3/8"	26
#4	41

MAXIMUM DRY DENSITY: 128.9 pcf

OPTIMUM MOISTURE: 8.0%

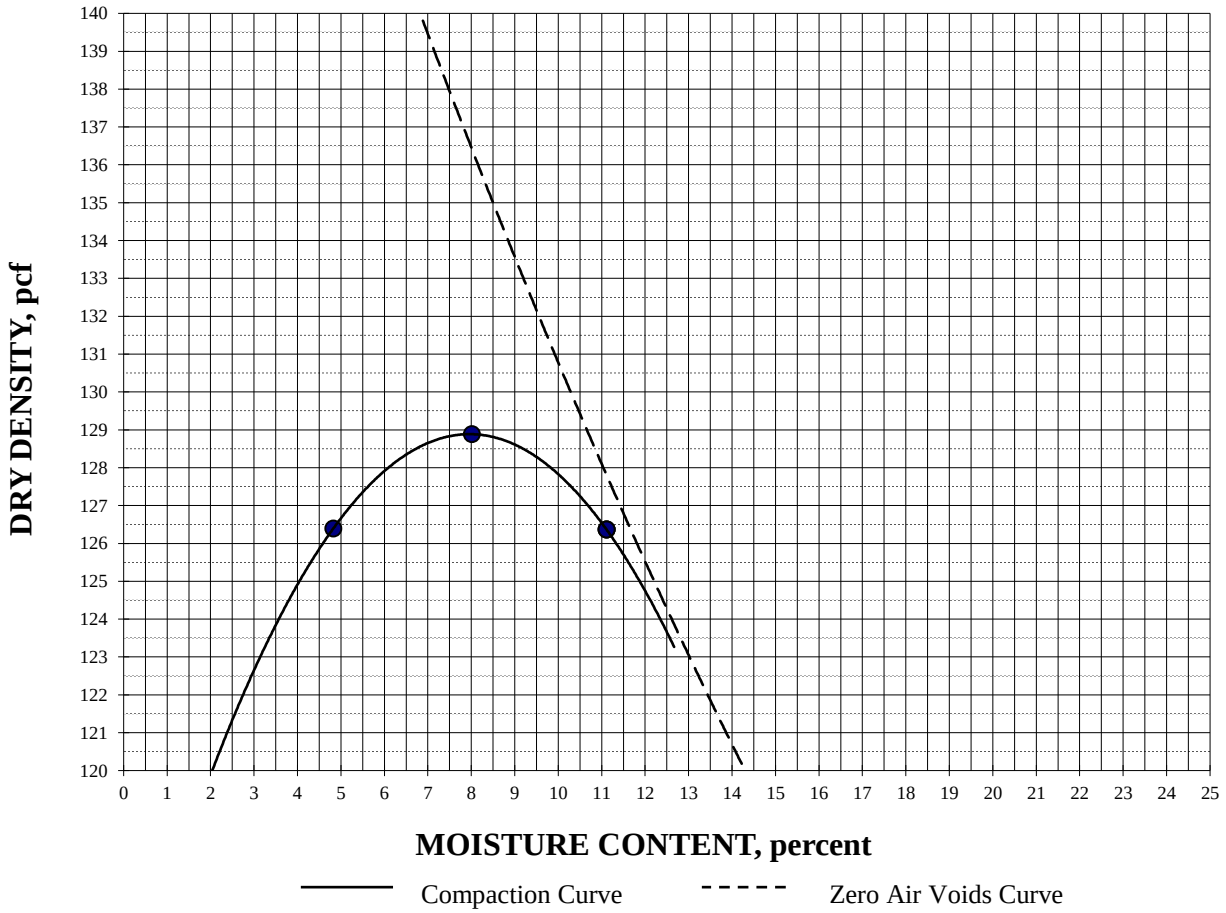


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

MOISTURE-DENSITY COMPACTION TEST

ASTM D 1557-12 (Modified)

PROCEDURE USED: C

PREPARATION METHOD: Moist

RAMMER TYPE: Mechanical

SPECIFIC GRAVITY: 2.65 (assumed)

January 8, 2019

CBR #16; Boring #28 @ 0.5 - 1.5'

Brown Silty Gravel with Sand (GM)

SIEVE DATA:

Sieve Size	% Retained (Cumulative)
3/4"	10
3/8"	29
#4	46

MAXIMUM DRY DENSITY: 130.2 pcf

OPTIMUM MOISTURE: 6.5%

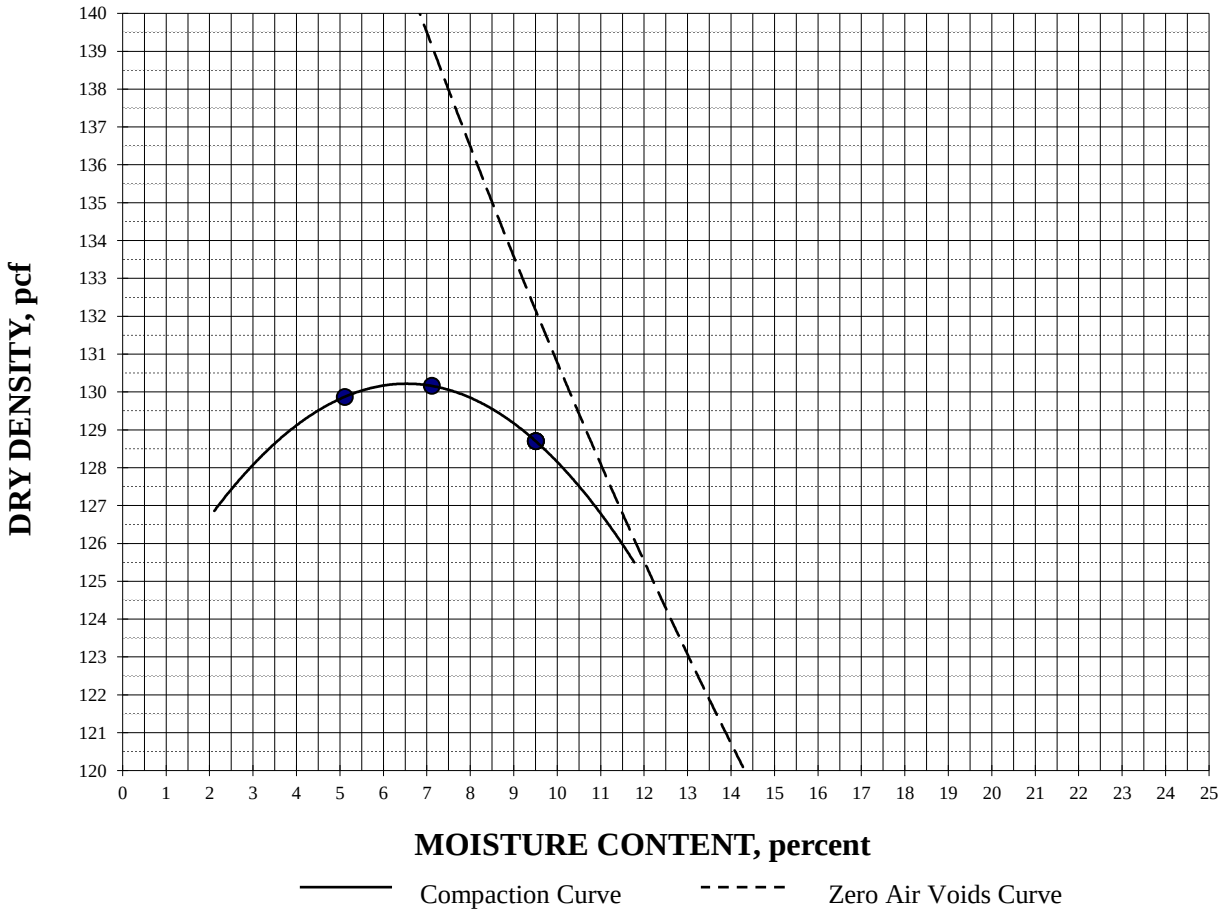


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

MOISTURE-DENSITY COMPACTION TEST

ASTM D 1557-12 (Modified)

PROCEDURE USED: C

PREPARATION METHOD: Moist

RAMMER TYPE: Mechanical

SPECIFIC GRAVITY: 2.65 (assumed)

January 8, 2019

CBR #17; Boring #14 @ 0.5 - 1.5'

Brown Silty Sand with Gravel (SM)

SIEVE DATA:

Sieve Size	% Retained (Cumulative)
3/4"	7
3/8"	22
#4	35

MAXIMUM DRY DENSITY: 132.4 pcf

OPTIMUM MOISTURE: 5.8%

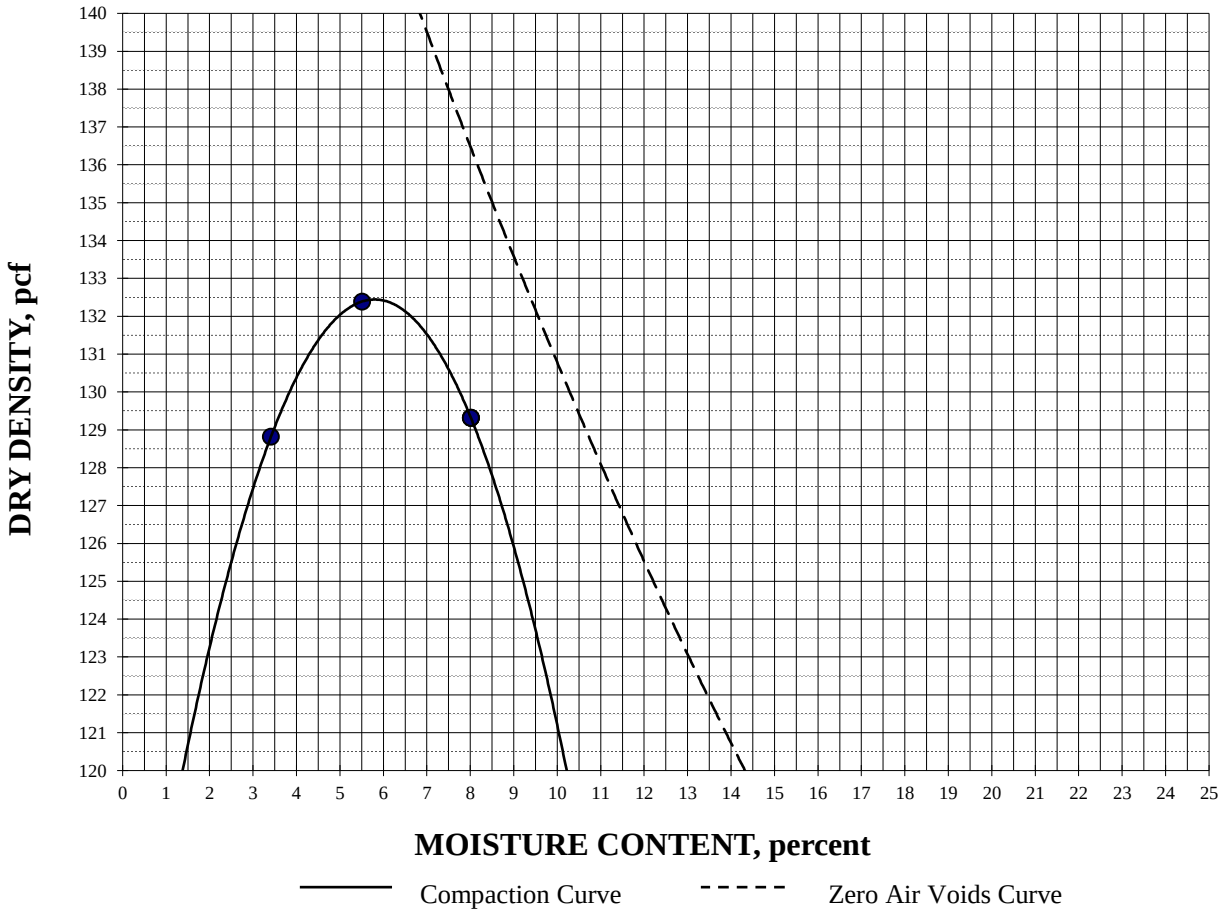


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #1; Boring #1 @ 2.0 - 5.0'
Dark Brown Sandy Lean Clay (CL)

January 8, 2019

10 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	106.8	112.2	112.6
Moisture content, %, before soak	7.9	10.9	13.9
Moisture content, %, after soak, avg.	15.3	16.8	18.8
Moisture content, %, after soak, top 1"	20.3	17.7	16.8
Expansion, %, 96 hour soak	1.9	0.1	0.2
Bearing Ratio, 0.100" penetration	2.9	8.7	3.4

25 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	109.9	118.6	116.5
Moisture content, %, before soak	7.9	10.9	13.9
Moisture content, %, after soak, avg.	13.7	14.4	16.5
Moisture content, %, after soak, top 1"	18.6	16.5	14.2
Expansion, %, 96 hour soak	1.6	0.2	0.1
Bearing Ratio, 0.100" penetration	6.9	23.8	7.1

56 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	117.7	124.3	118.0
Moisture content, %, before soak	7.9	10.9	13.9
Moisture content, %, after soak, avg.	14.3	12.4	14.1
Moisture content, %, after soak, top 1"	15.7	13.0	14.0
Expansion, %, 96 hour soak	1.0	0.0	0.0
Bearing Ratio, 0.100" penetration	21.3	32.3	4.7

Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #1; Boring #1 @ 2.0 - 5.0'

January 8, 2019

Dark Brown Sandy Lean Clay (CL)

DRY DENSITY vs. MOISTURE CONTENT

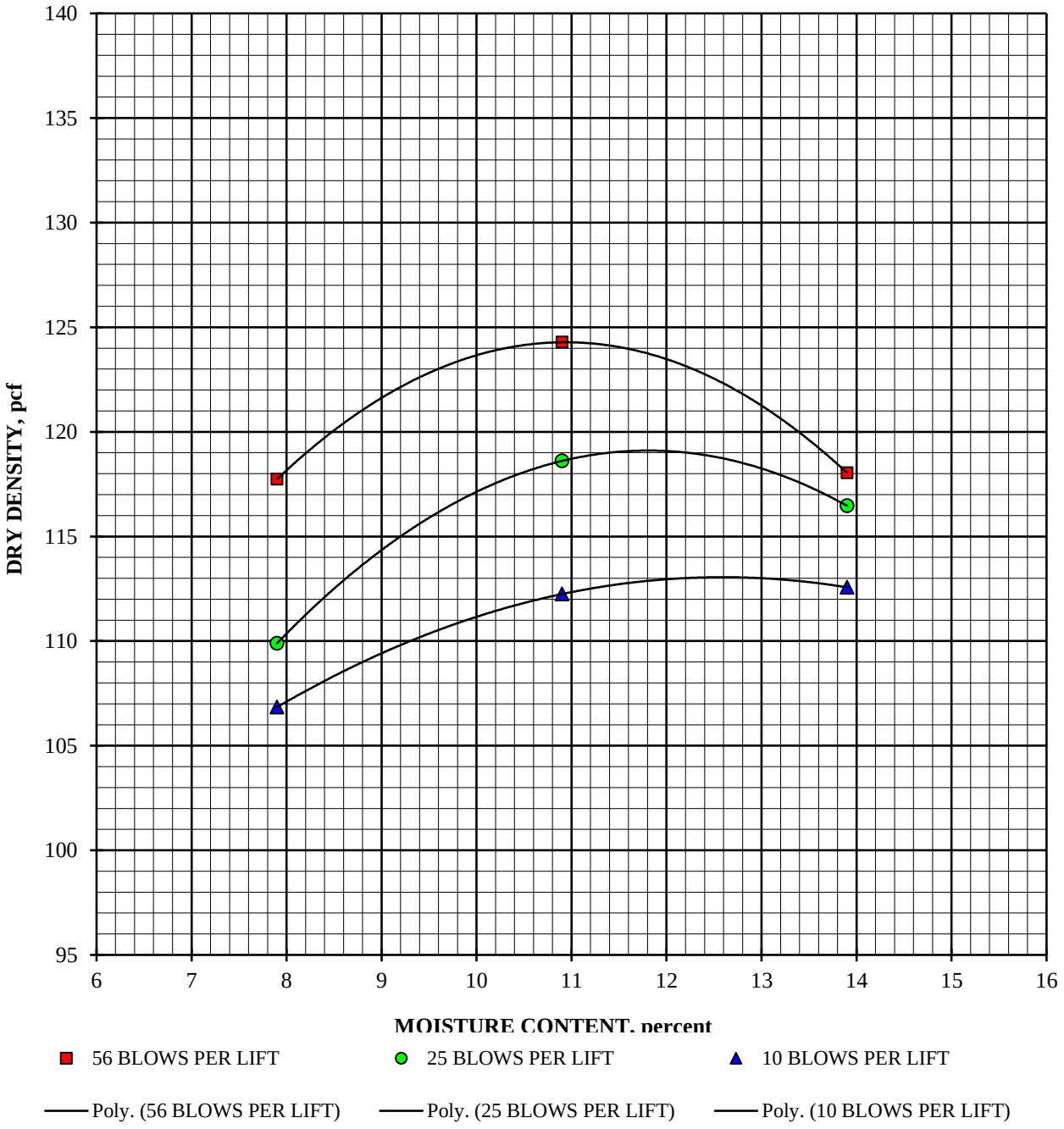


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #1; Boring #1 @ 2.0 - 5.0'

January 8, 2019

Dark Brown Sandy Lean Clay (CL)

CBR vs. MOISTURE CONTENT

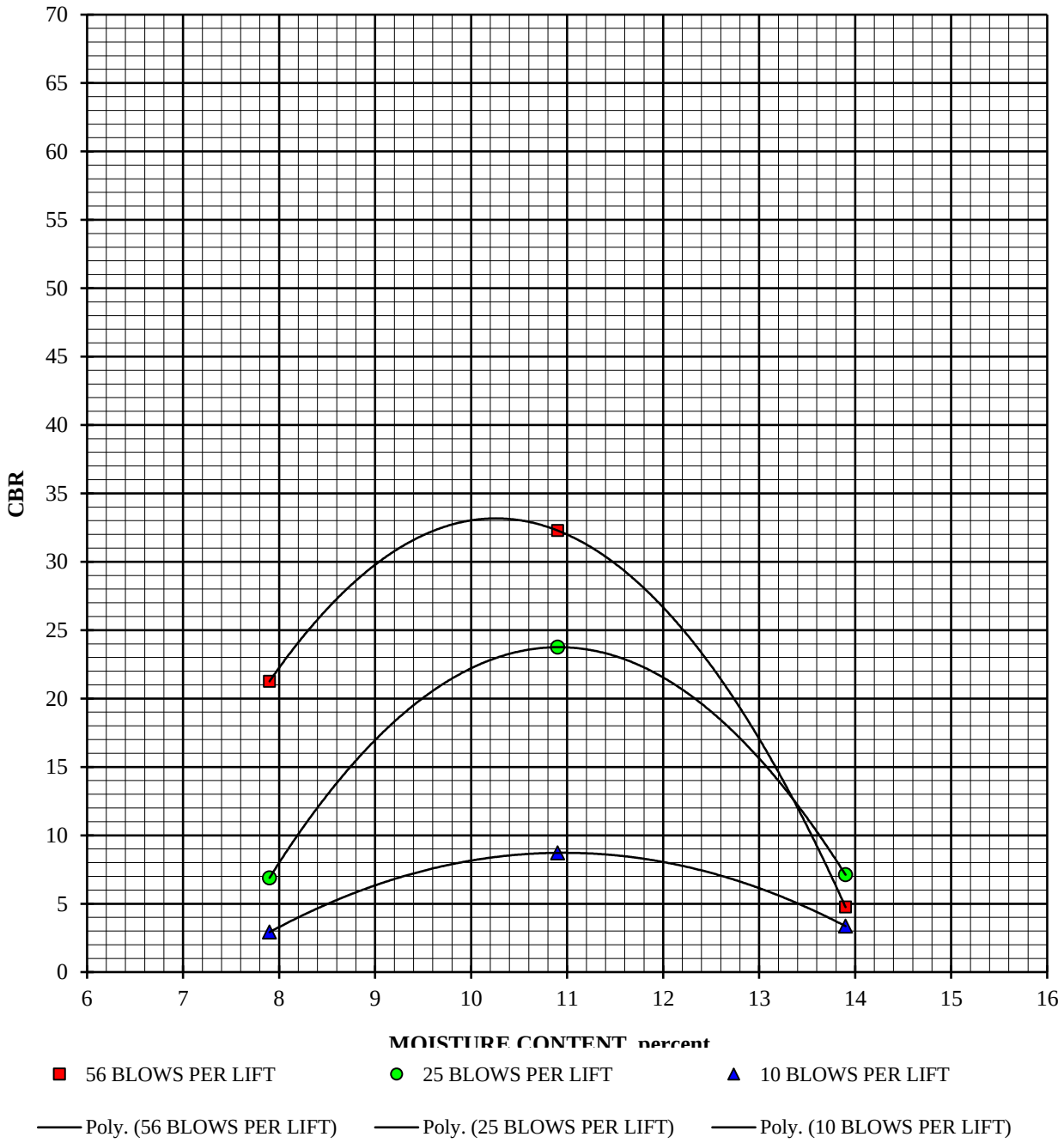


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #1; Boring #1 @ 2.0 - 5.0'

January 8, 2019

Dark Brown Sandy Lean Clay (CL)

DRY DENSITY vs. CBR

Arranged According to Moisture Content

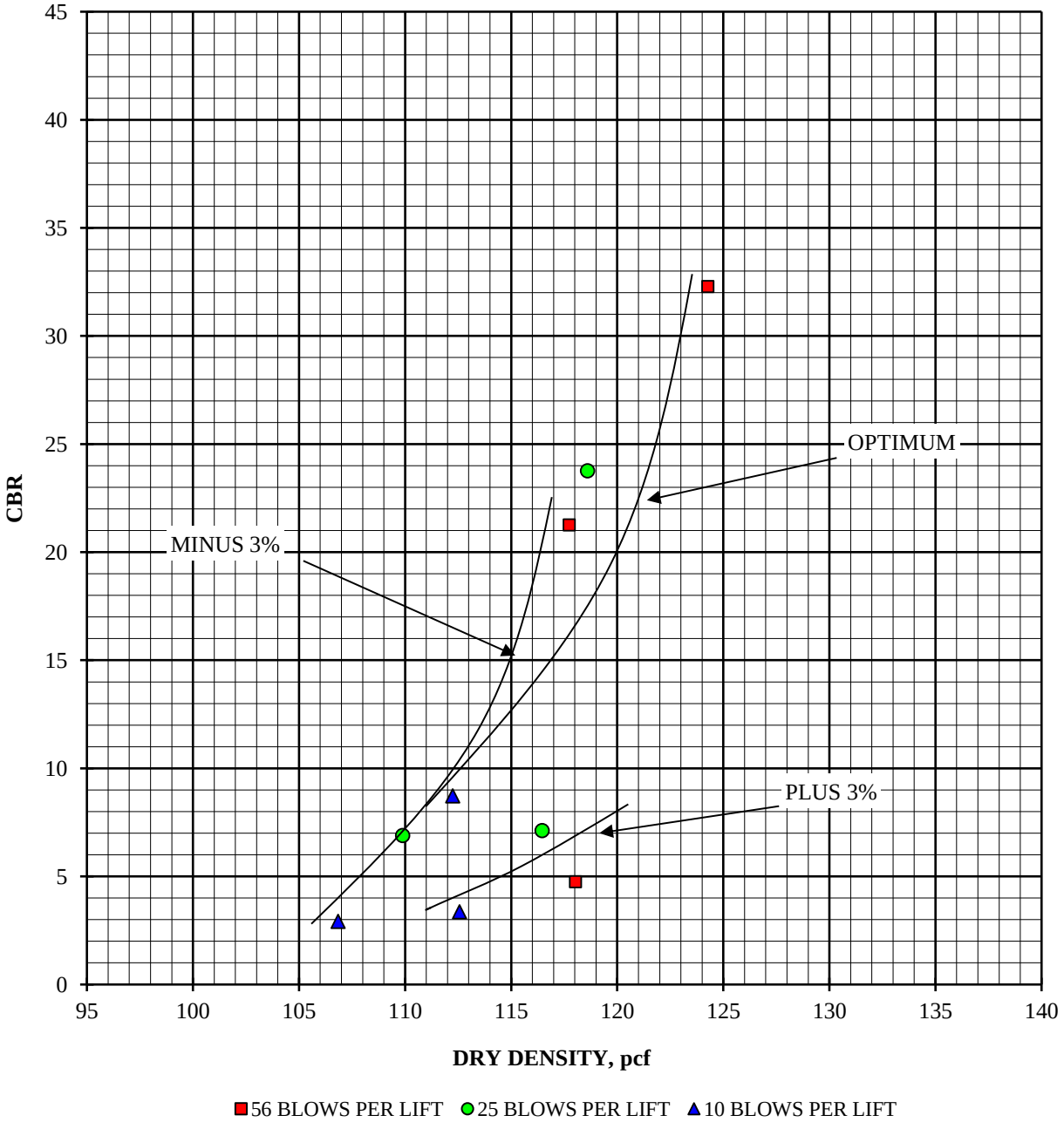


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR#2; Boring #9 @ 3.0 - 5.0'
Dark Brown Sandy Lean Clay (CL)

January 8, 2019

10 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	105.5	112.6	112.1
Moisture content, %, before soak	11.2	14.2	17.2
Moisture content, %, after soak, avg.	21.9	17.8	19.8
Moisture content, %, after soak, top 1"	21.7	20.4	17.8
Expansion, %, 96 hour soak	1.6	0.7	0.0
Bearing Ratio, 0.100" penetration	3.2	9.1	4.1

25 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	112.2	117.7	113.2
Moisture content, %, before soak	11.2	14.2	17.2
Moisture content, %, after soak, avg.	19.9	16.0	18.2
Moisture content, %, after soak, top 1"	20.3	16.8	17.3
Expansion, %, 96 hour soak	0.9	0.0	0.0
Bearing Ratio, 0.100" penetration	7.6	11.9	4.3

56 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	117.7	120.0	111.9
Moisture content, %, before soak	11.2	14.2	17.2
Moisture content, %, after soak, avg.	19.0	15.5	18.1
Moisture content, %, after soak, top 1"	17.4	14.7	16.4
Expansion, %, 96 hour soak	1.1	0.4	0.0
Bearing Ratio, 0.100" penetration	9.1	14.9	3.4

Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #2; Boring #9 @ 3.0 - 5.0'

January 8, 2019

Dark Brown Sandy Lean Clay (CL)

DRY DENSITY vs. MOISTURE CONTENT

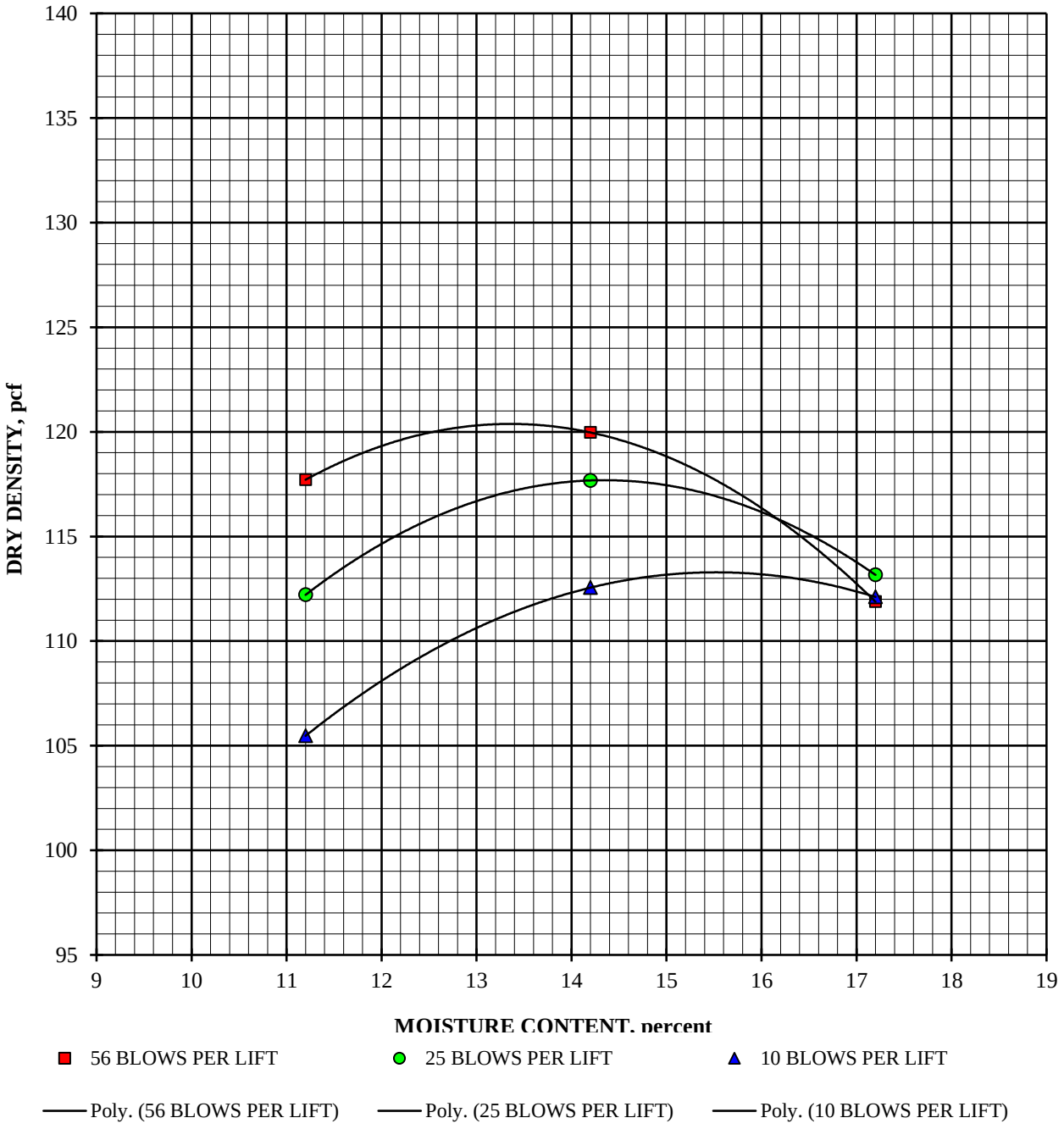


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #2; Boring #9 @ 3.0 - 5.0'

January 8, 2019

Dark Brown Sandy Lean Clay (CL)

CBR vs. MOISTURE CONTENT

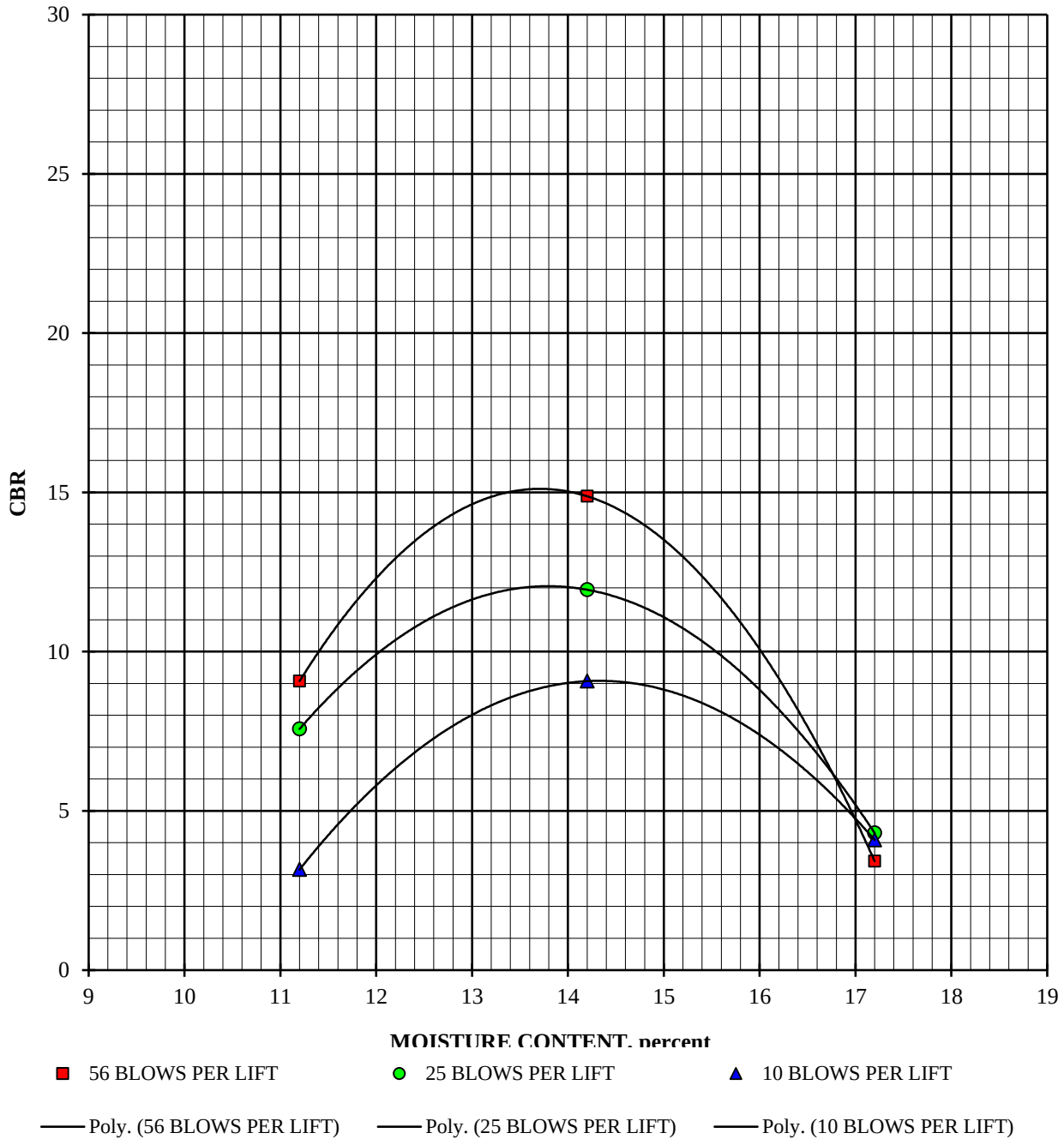


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #2; Boring #9 @ 3.0 - 5.0'

January 8, 2019

Dark Brown Sandy Lean Clay (CL)

DRY DENSITY vs. CBR

Arranged According to Moisture Content

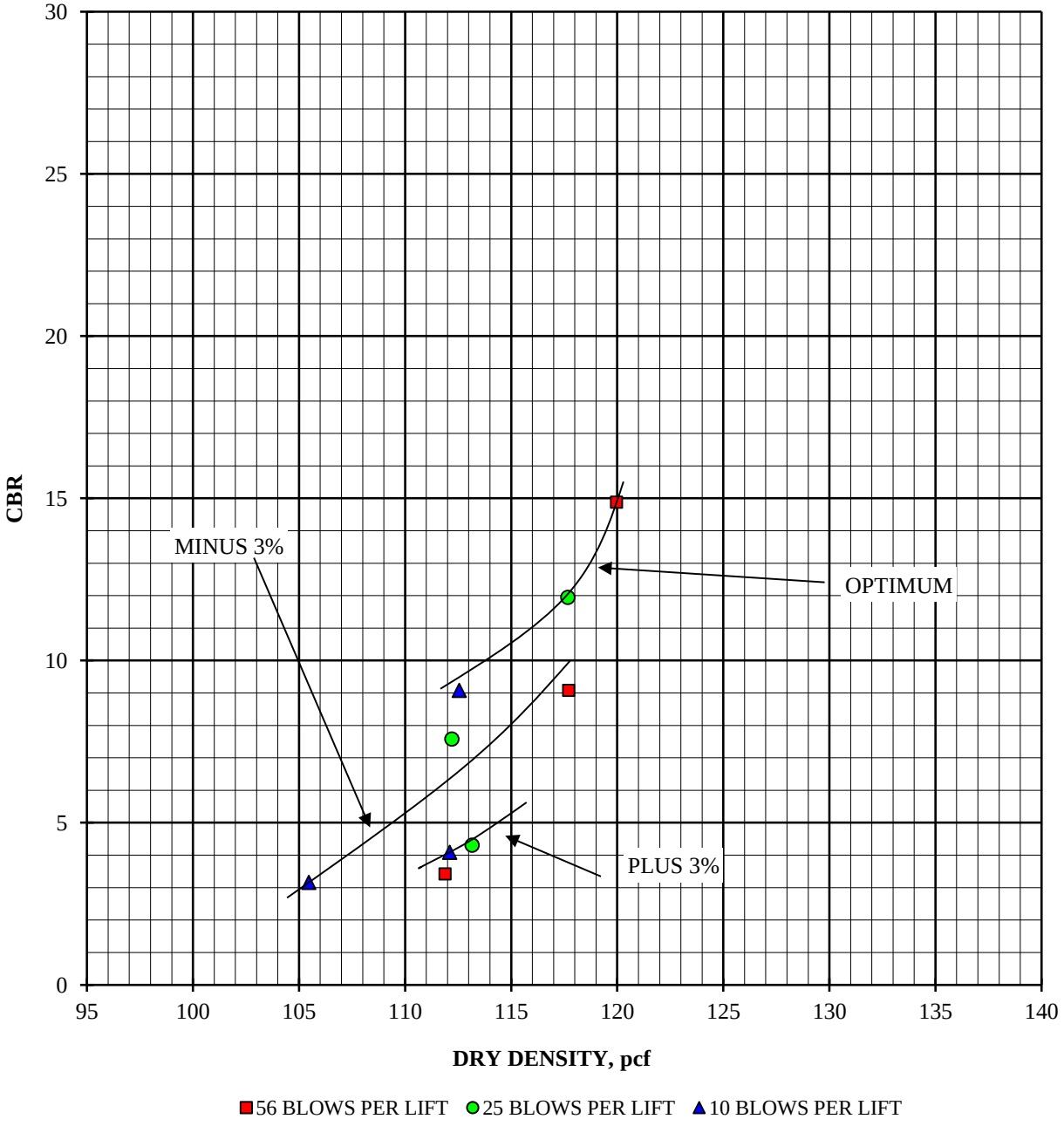


Exhibit 1

Oxnard Airport - Runway and Taxiway
Rehabilitation / Reconstruction

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-07 (At Optimum Moisture Content)

CBR #3 with 3% Lime added; Boring #5 @ 2.0 - 4.0'
Dark Brown Silty Sand (SM)

January 16, 2019

10 BLOWS PER LIFT

	Optimum Moisture
Dry density, pcf, before soak	103.2
Moisture content, %, before soak	12.0
Moisture content, %, after soak, avg.	20.3
Moisture content, %, after soak, top 1"	23.4
Expansion, %, 96 hour soak	0.0
Bearing Ratio, 0.100" penetration	17.4

25 BLOWS PER LIFT

	Optimum Moisture
Dry density, pcf, before soak	113.8
Moisture content, %, before soak	12.0
Moisture content, %, after soak, avg.	14.3
Moisture content, %, after soak, top 1"	19.5
Expansion, %, 96 hour soak	0.0
Bearing Ratio, 0.100" penetration	53.6

56 BLOWS PER LIFT

	Optimum Moisture
Dry density, pcf, before soak	118.3
Moisture content, %, before soak	12.0
Moisture content, %, after soak, avg.	13.2
Moisture content, %, after soak, top 1"	19.0
Expansion, %, 96 hour soak	0.2
Bearing Ratio, 0.100" penetration	78.1

Exhibit 1

Oxnard Airport - Runway and Taxiway
Rehabilitation / Reconstruction

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-07 (At Optimum Moisture Content)

CBR #3 with 3% Lime added; Boring #5 @ 2.0 - 4.0'

January 16, 2019

Dark Brown Silty Sand (SM)

DRY DENSITY vs. MOISTURE CONTENT

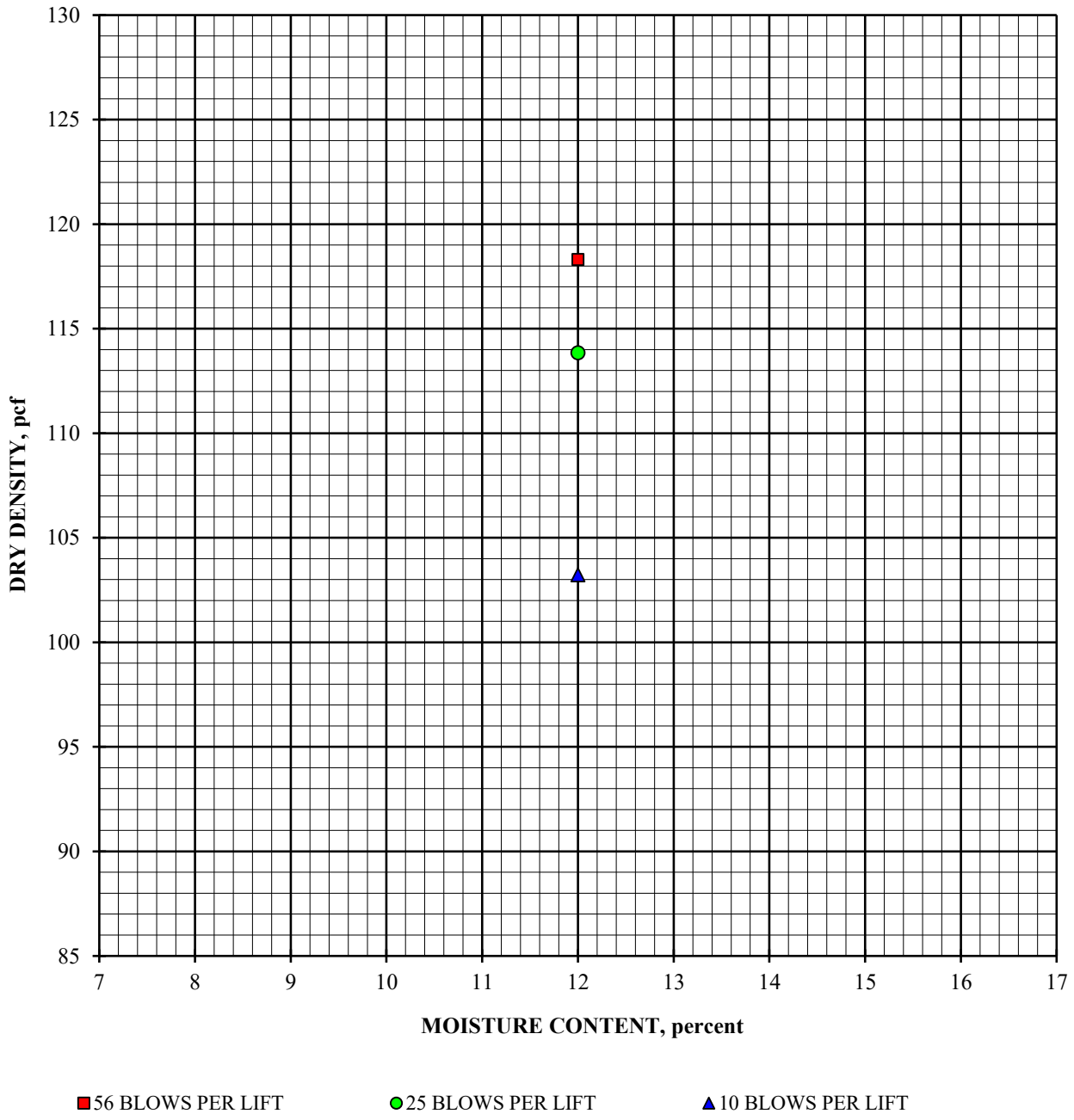


Exhibit 1

Oxnard Airport - Runway and Taxiway
Rehabilitation / Reconstruction

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-07 (At Optimum Moisture Content)

CBR #3 with 3% Lime added; Boring #5 @ 2.0 - 4.0'

January 16, 2019

Dark Brown Silty Sand (SM)

CBR vs. MOISTURE CONTENT

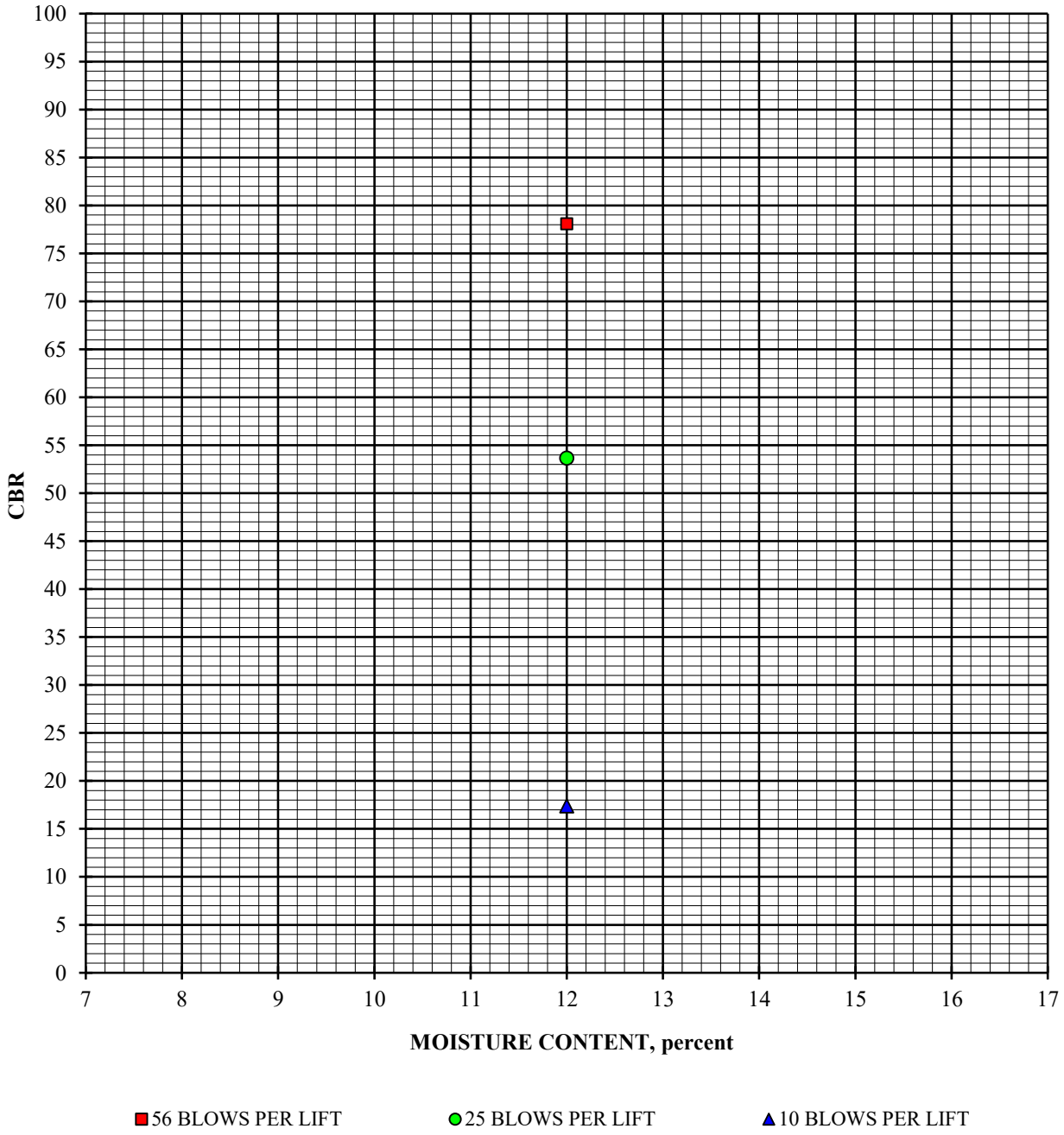


Exhibit 1

Oxnard Airport - Runway and Taxiway
Rehabilitation / Reconstruction

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-07 (At Optimum Moisture Content)

CBR #3 with 3% Lime added; Boring #5 @ 2.0 - 4.0'

January 16, 2019

Dark Brown Silty Sand (SM)

DRY DENSITY vs. CBR

AT Optimum Moisture Content

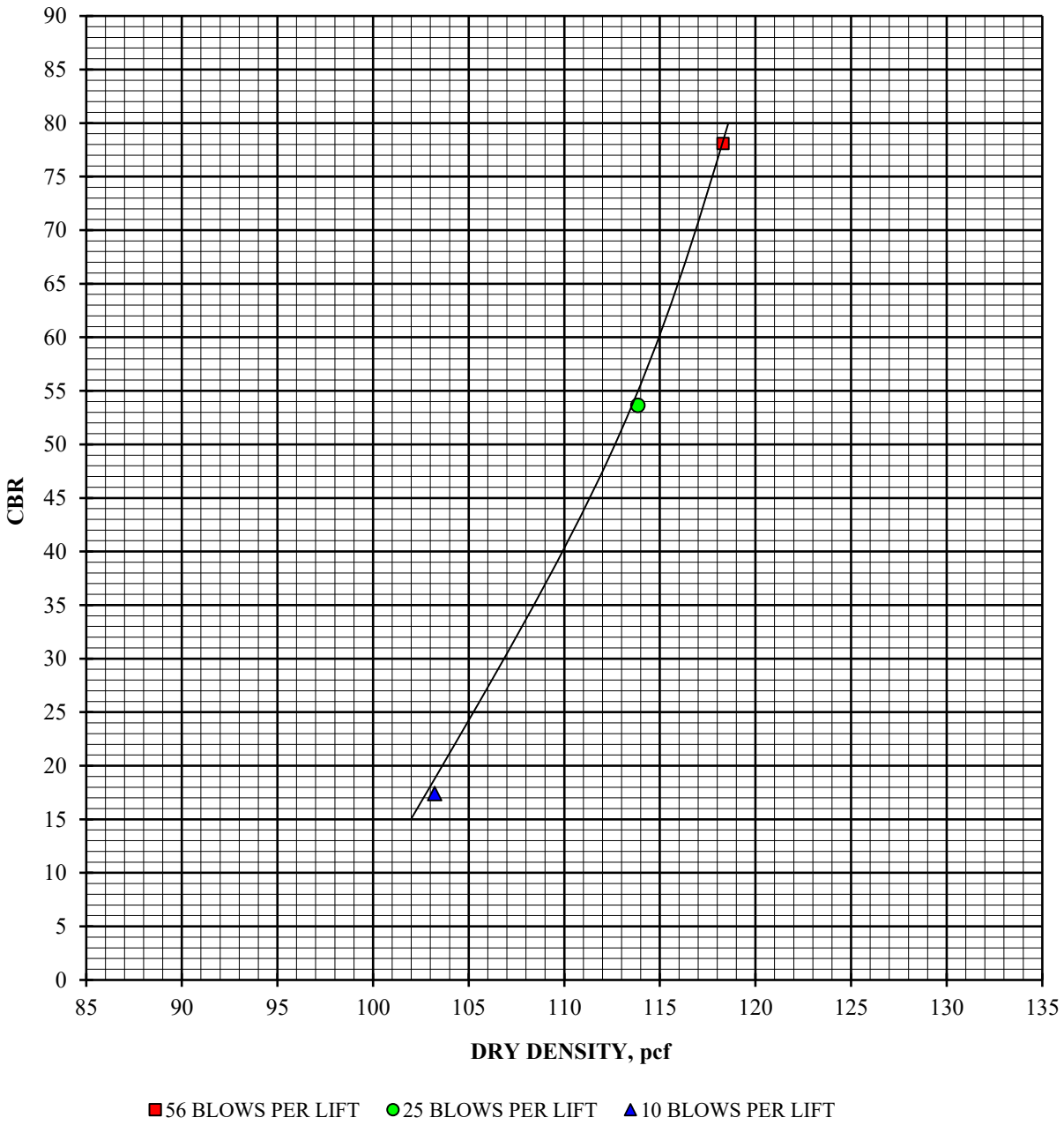


Exhibit 1

Oxnard Airport - Runway and Taxiway
Rehabilitation / Reconstruction

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-07 (At Optimum Moisture Content)

CBR #3 with 5% Lime added; Boring #5 @ 2.0 - 4.0'
Dark Brown Silty Sand (SM)

January 16, 2019

10 BLOWS PER LIFT

	Optimum Moisture
Dry density, pcf, before soak	99.0
Moisture content, %, before soak	12.2
Moisture content, %, after soak, avg.	24.1
Moisture content, %, after soak, top 1"	23.1
Expansion, %, 96 hour soak	0.0
Bearing Ratio, 0.100" penetration	16.3

25 BLOWS PER LIFT

	Optimum Moisture
Dry density, pcf, before soak	106.8
Moisture content, %, before soak	12.2
Moisture content, %, after soak, avg.	14.3
Moisture content, %, after soak, top 1"	19.9
Expansion, %, 96 hour soak	0.0
Bearing Ratio, 0.100" penetration	52.5

56 BLOWS PER LIFT

	Optimum Moisture
Dry density, pcf, before soak	115.2
Moisture content, %, before soak	12.2
Moisture content, %, after soak, avg.	13.5
Moisture content, %, after soak, top 1"	18.3
Expansion, %, 96 hour soak	0.1
Bearing Ratio, 0.100" penetration	90.9

Exhibit 1

Oxnard Airport - Runway and Taxiway
Rehabilitation / Reconstruction

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-07 (At Optimum Moisture Content)

CBR #3 with 5% Lime added; Boring #5 @ 2.0 - 4.0'

January 16, 2019

Dark Brown Silty Sand (SM)

CBR vs. MOISTURE CONTENT

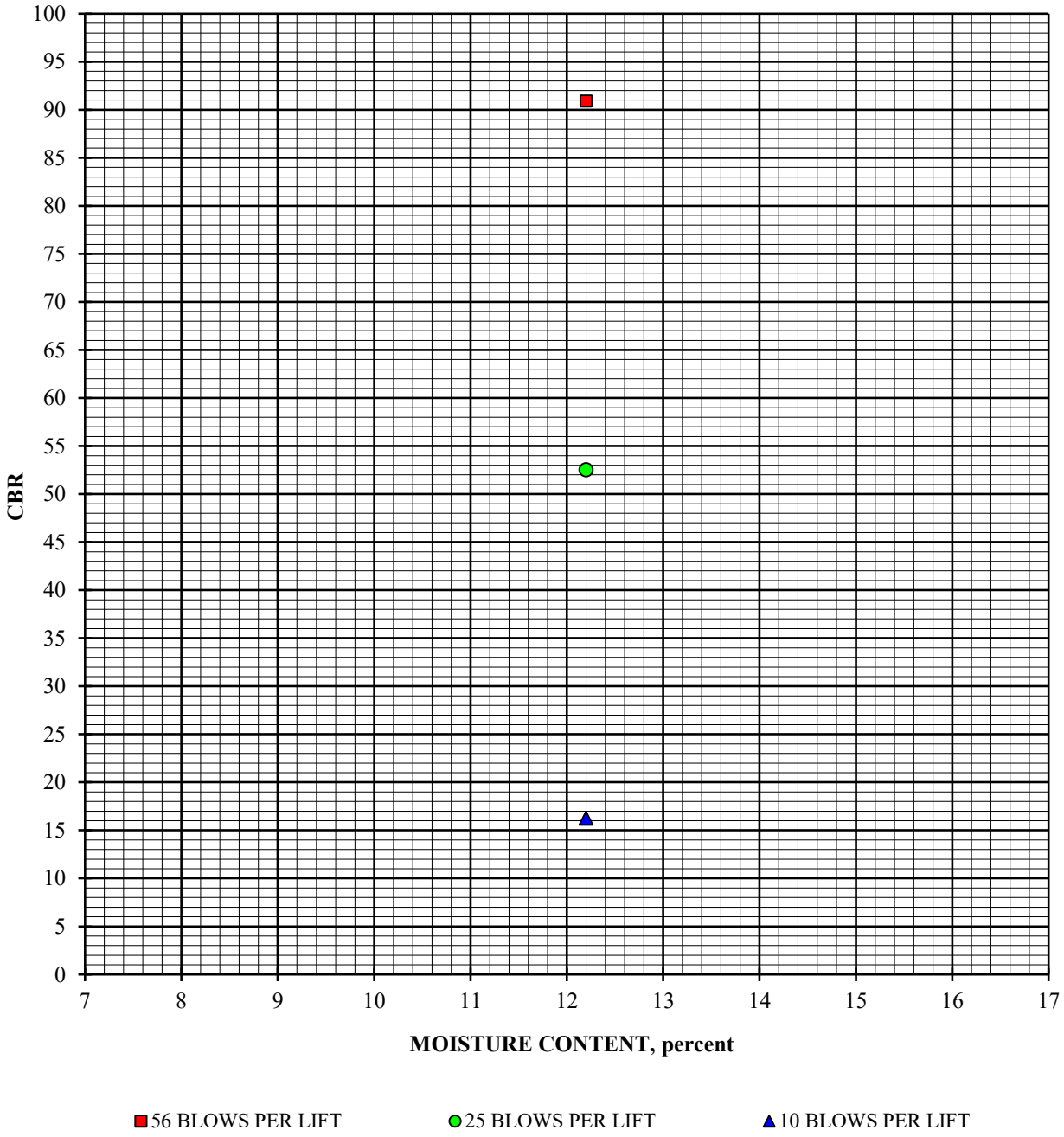


Exhibit 1

Oxnard Airport - Runway and Taxiway
Rehabilitation / Reconstruction

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-07 (At Optimum Moisture Content)

CBR #3 with 5% Lime added; Boring #5 @ 2.0 - 4.0'

January 16, 2019

Dark Brown Silty Sand (SM)

DRY DENSITY vs. MOISTURE CONTENT

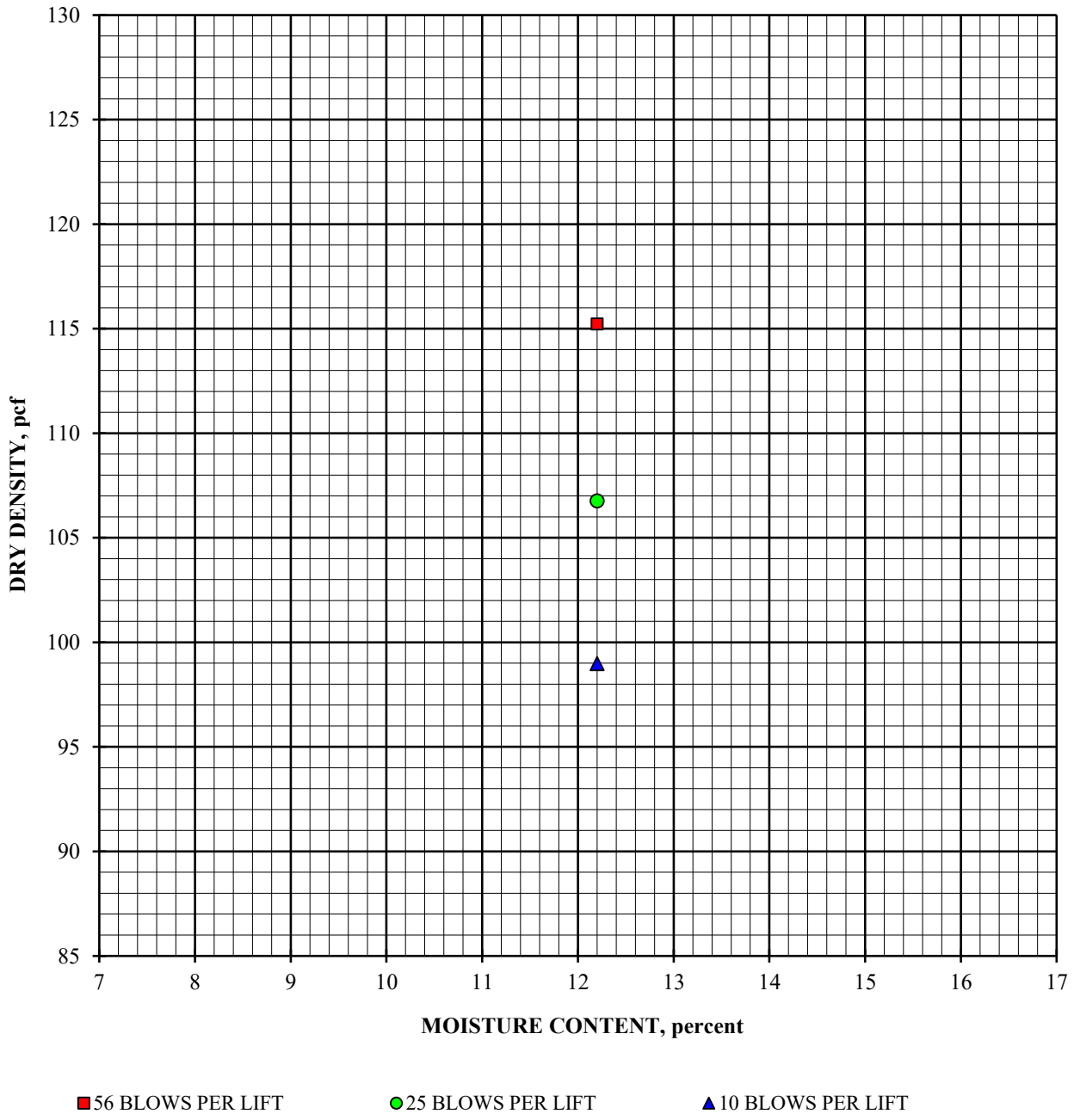


Exhibit 1

Oxnard Airport - Runway and Taxiway
Rehabilitation / Reconstruction

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-07 (At Optimum Moisture Content)

CBR #3 with 5% Lime added; Boring #5 @ 2.0 - 4.0'

January 16, 2019

Dark Brown Silty Sand (SM)

DRY DENSITY vs. CBR

AT Optimum Moisture Content

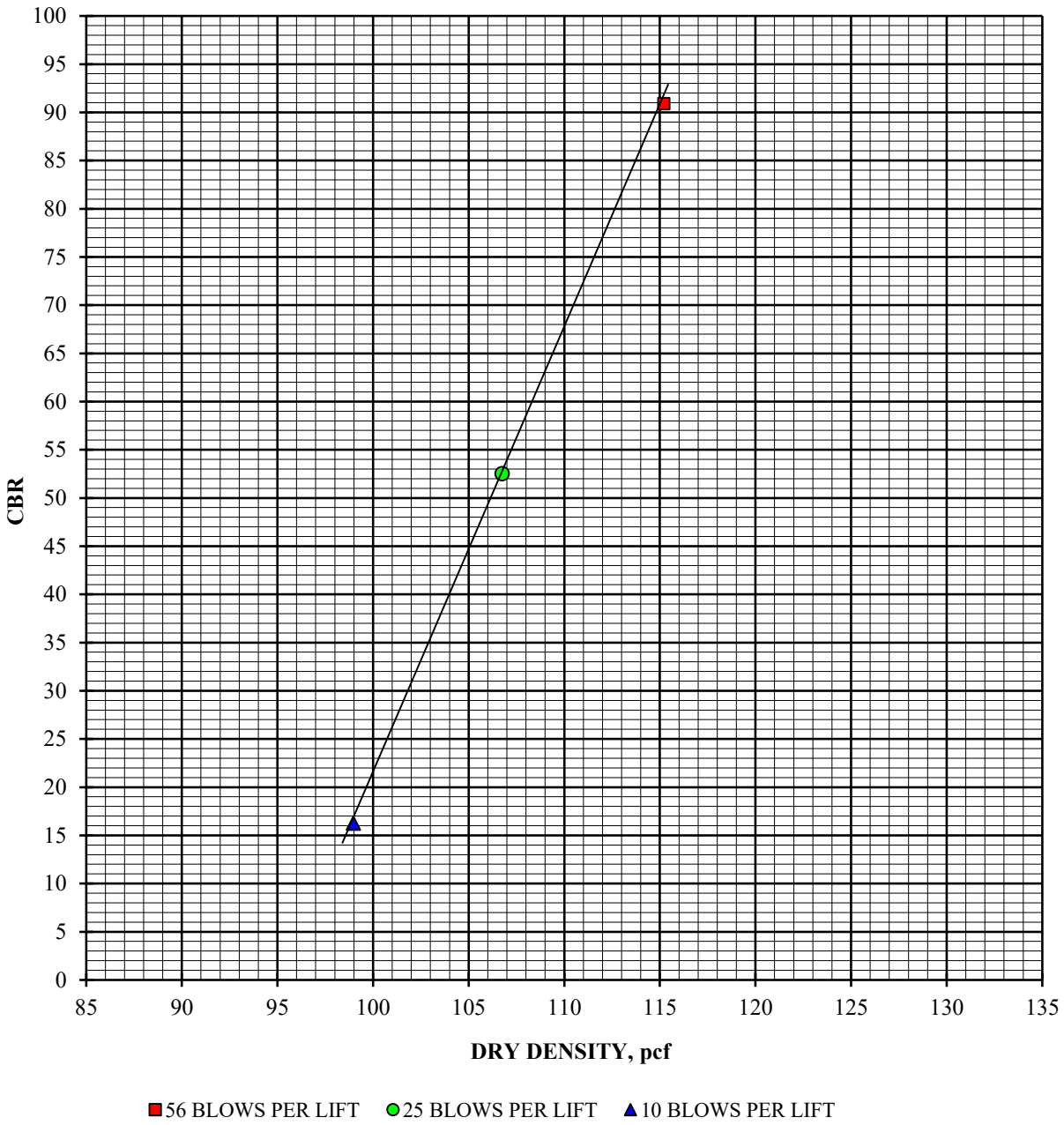


Exhibit 1

Oxnard Airport - Runway and Taxiway
Rehabilitation / Reconstruction

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-07 (At Optimum Moisture Content)

CBR #3 with 7% Lime added; Boring #5 @ 2.0 - 4.0'
Dark Brown Silty Sand (SM)

January 16, 2019

10 BLOWS PER LIFT

	Optimum Moisture
Dry density, pcf, before soak	97.2
Moisture content, %, before soak	12.3
Moisture content, %, after soak, avg.	25.3
Moisture content, %, after soak, top 1"	24.6
Expansion, %, 96 hour soak	0.1
Bearing Ratio, 0.100" penetration	18.5

25 BLOWS PER LIFT

	Optimum Moisture
Dry density, pcf, before soak	103.2
Moisture content, %, before soak	12.3
Moisture content, %, after soak, avg.	16.3
Moisture content, %, after soak, top 1"	22.4
Expansion, %, 96 hour soak	0.2
Bearing Ratio, 0.100" penetration	35.3

56 BLOWS PER LIFT

	Optimum Moisture
Dry density, pcf, before soak	111.9
Moisture content, %, before soak	12.3
Moisture content, %, after soak, avg.	13.6
Moisture content, %, after soak, top 1"	19.6
Expansion, %, 96 hour soak	0.5
Bearing Ratio, 0.100" penetration	77.6

Exhibit 1

Oxnard Airport - Runway and Taxiway
Rehabilitation / Reconstruction

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-07 (At Optimum Moisture Content)

CBR #3 with 7% Lime added; Boring #5 @ 2.0 - 4.0'

January 16, 2019

Dark Brown Silty Sand (SM)

CBR vs. MOISTURE CONTENT

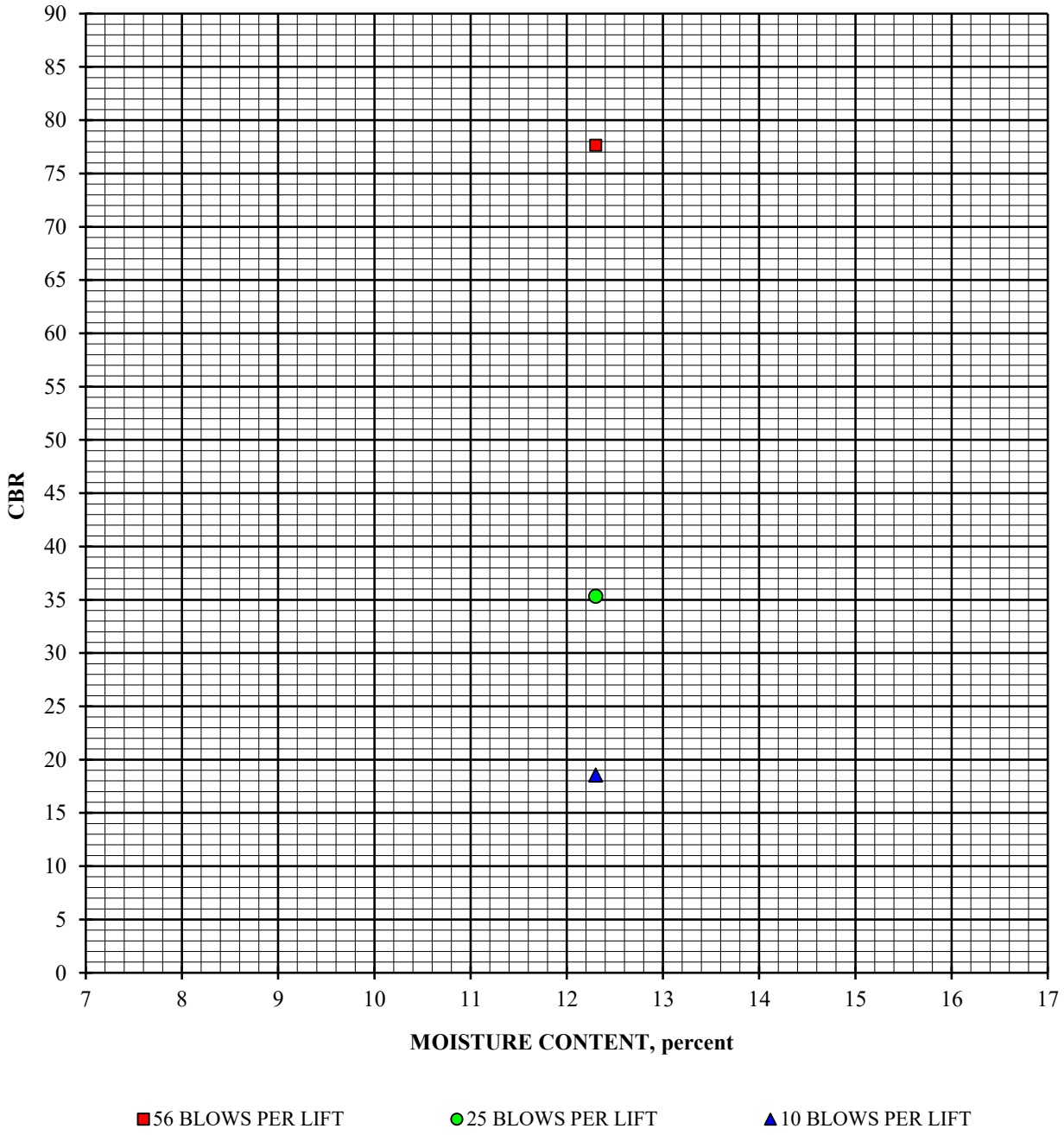


Exhibit 1

Oxnard Airport - Runway and Taxiway
Rehabilitation / Reconstruction

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-07 (At Optimum Moisture Content)

CBR #3 with 7% Lime added; Boring #5 @ 2.0 - 4.0'

January 16, 2019

Dark Brown Silty Sand (SM)

DRY DENSITY vs. MOISTURE CONTENT

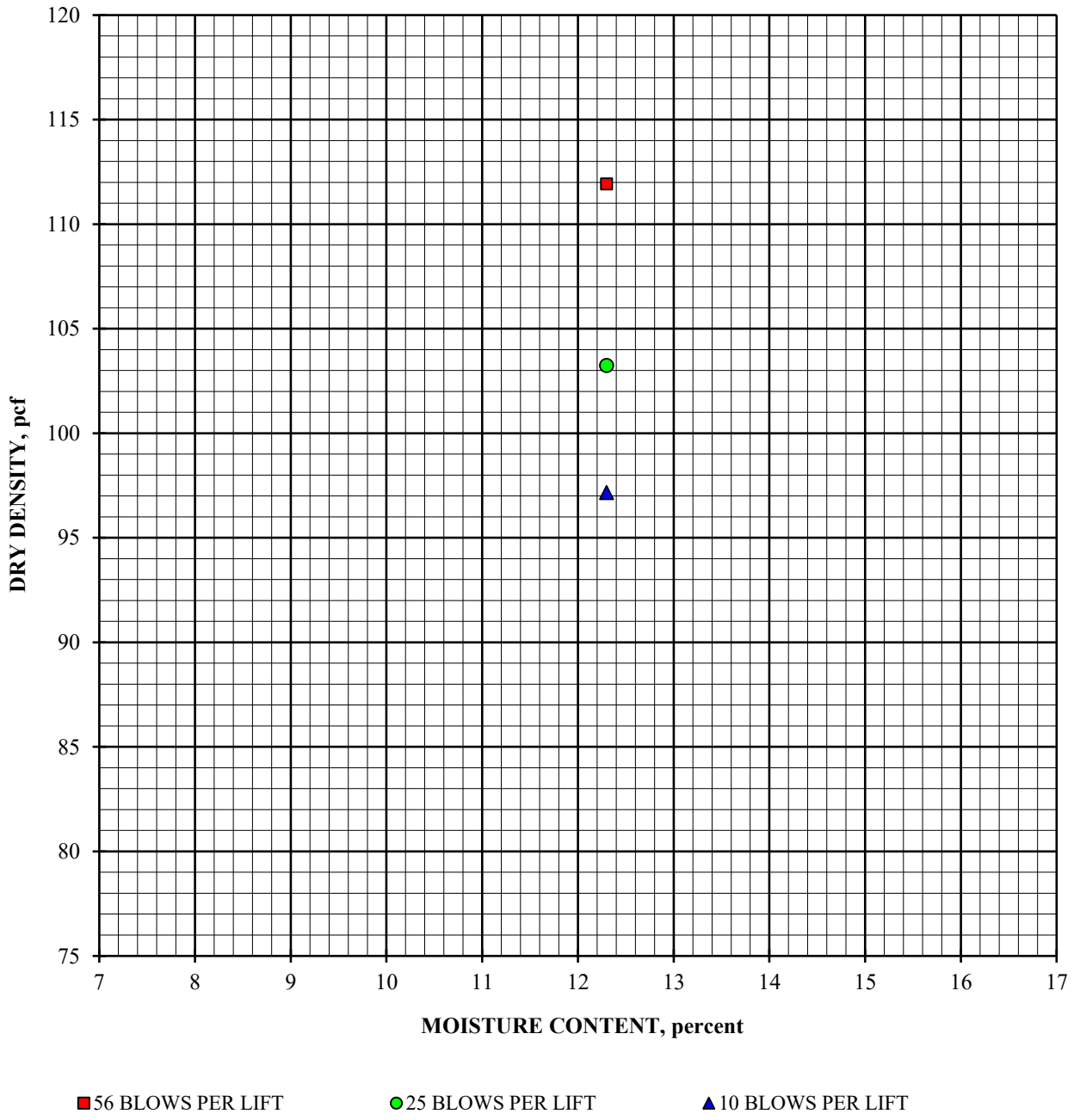


Exhibit 1

Oxnard Airport - Runway and Taxiway
Rehabilitation / Reconstruction

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-07 (At Optimum Moisture Content)

CBR #3 with 7% Lime added; Boring #5 @ 2.0 - 4.0'

January 16, 2019

Dark Brown Silty Sand (SM)

DRY DENSITY vs. CBR

AT Optimum Moisture Content

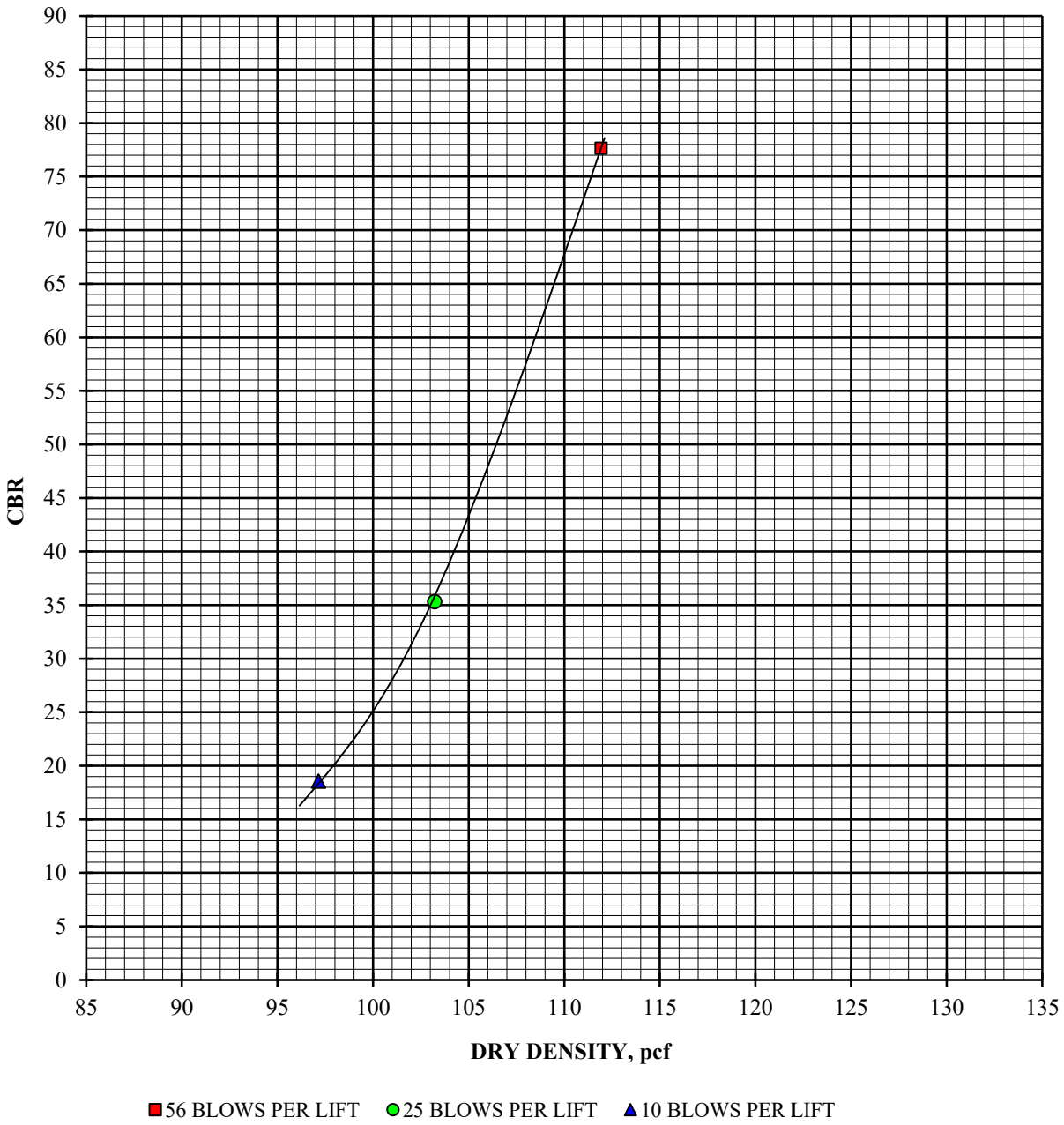


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #4; Boring #3 @ 0.5 - 1.0'
Brown Clayey Sand with Gravel (SC)

January 8, 2019

10 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	121.6	124.2	124.9
Moisture content, %, before soak	3.9	6.9	9.9
Moisture content, %, after soak, avg.	10.6	13.7	12.2
Moisture content, %, after soak, top 1"	11.8	9.4	10.0
Expansion, %, 96 hour soak	0.9	0.1	0.1
Bearing Ratio, 0.100" penetration	10.6	17.4	8.9

25 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	125.1	129.2	125.8
Moisture content, %, before soak	3.9	6.9	9.9
Moisture content, %, after soak, avg.	8.1	8.7	10.4
Moisture content, %, after soak, top 1"	9.1	7.5	9.9
Expansion, %, 96 hour soak	0.7	0.2	0.2
Bearing Ratio, 0.100" penetration	27.9	56.6	6.2

56 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	131.6	130.9	126.5
Moisture content, %, before soak	3.9	6.9	9.9
Moisture content, %, after soak, avg.	7.1	8.4	11.6
Moisture content, %, after soak, top 1"	8.1	7.3	10.1
Expansion, %, 96 hour soak	0.5	0.4	0.1
Bearing Ratio, 0.100" penetration	58.9	80.7	11.0

Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #4; Boring #3 @ 0.5 - 1.0'

January 8, 2019

Brown Clayey Sand with Gravel (SC)

CBR vs. MOISTURE CONTENT

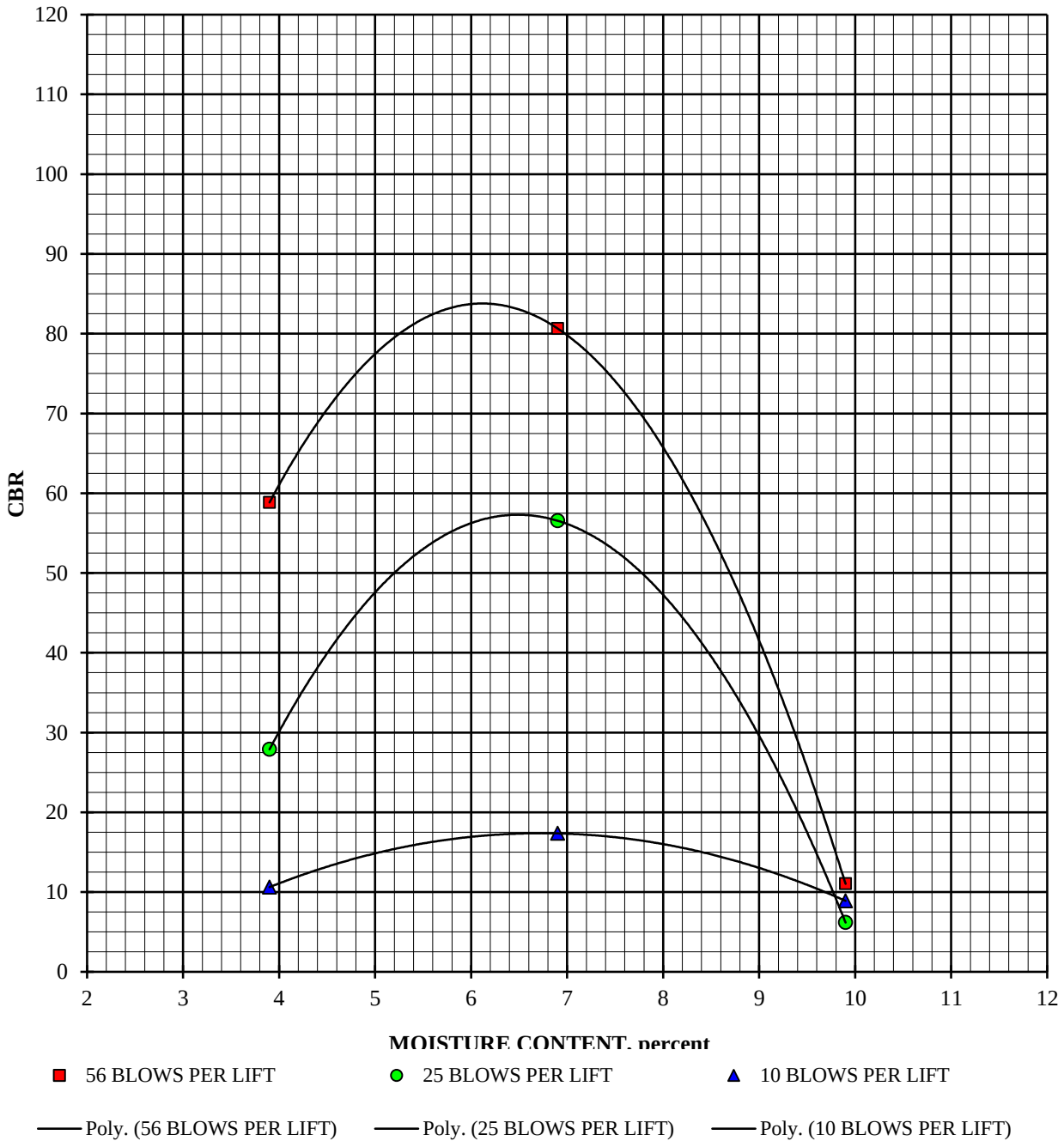


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #4; Boring #3 @ 0.5 - 1.0'

January 8, 2019

Brown Clayey Sand with Gravel (SC)

DRY DENSITY vs. MOISTURE CONTENT

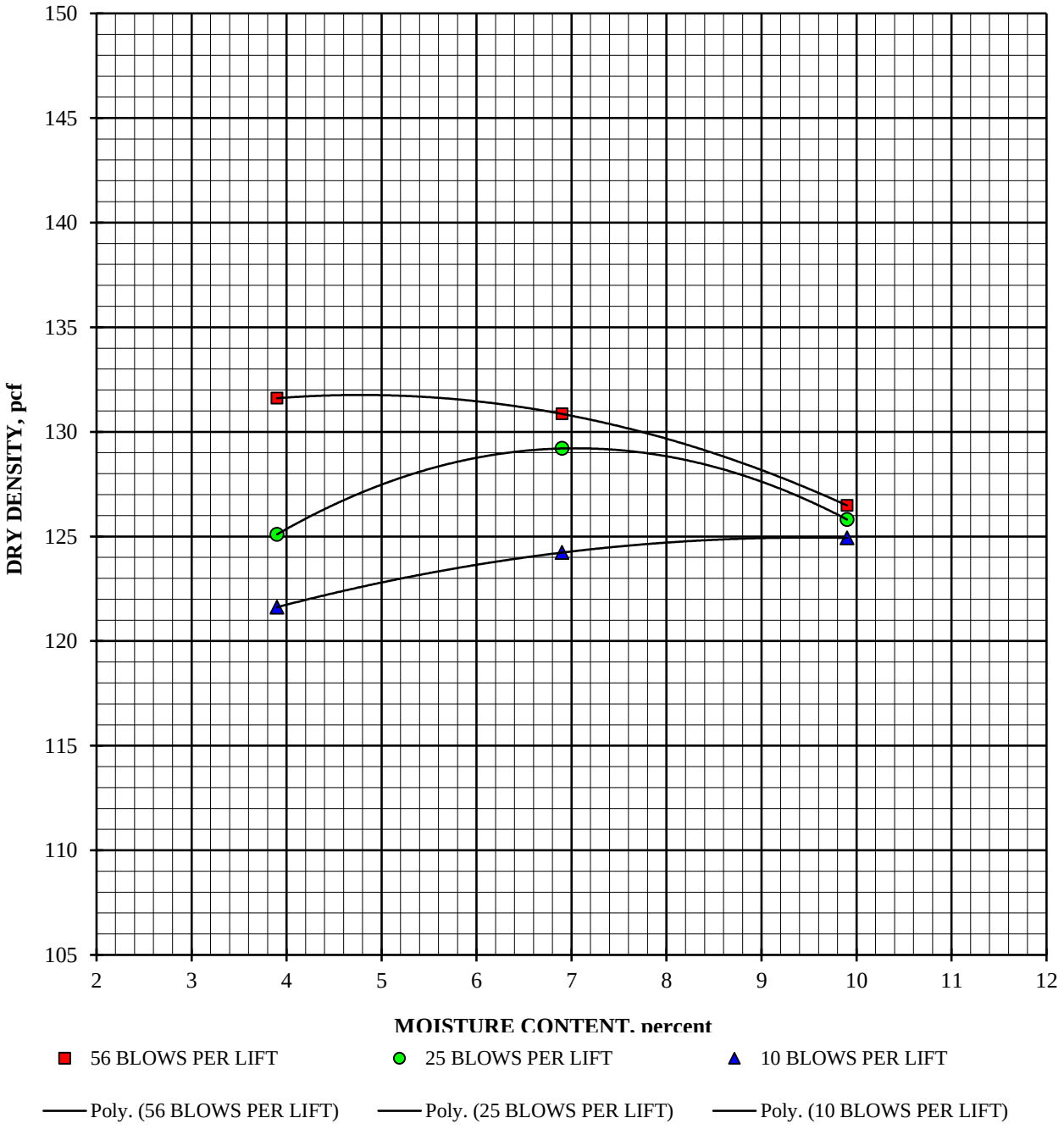


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #4; Boring #3 @ 0.5 - 1.0'

January 8, 2019

Brown Clayey Sand with Gravel (SC)

DRY DENSITY vs. CBR

Arranged According to Moisture Content

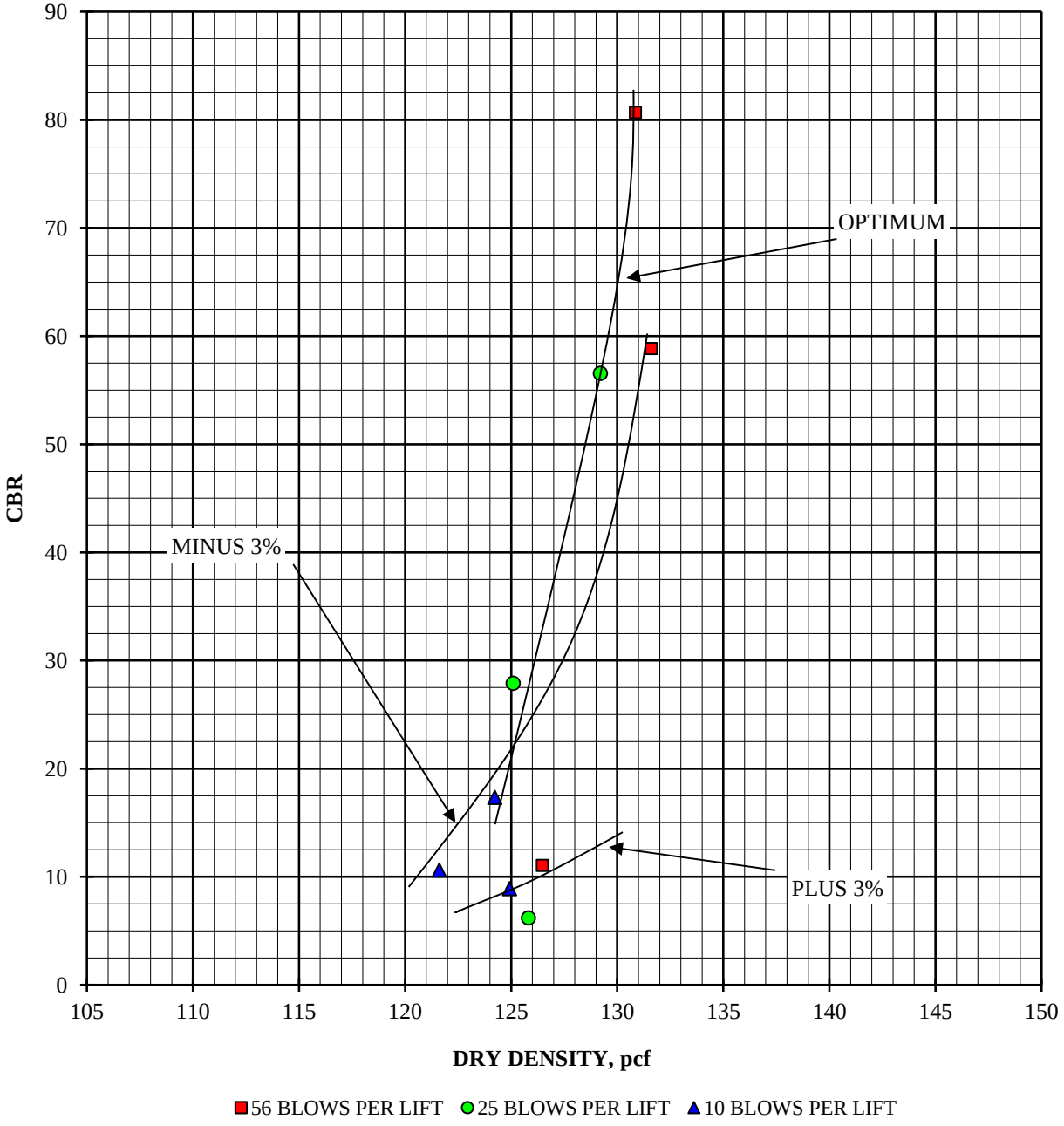


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #5; Boring #36 @ 2.5 - 5.0'
Dark Brown Sandy Lean Clay (CL)

January 8, 2019

10 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	105.0	107.6	105.1
Moisture content, %, before soak	7.7	10.7	13.7
Moisture content, %, after soak, avg.	21.4	14.8	26.8
Moisture content, %, after soak, top 1"	19.4	21.5	18.9
Expansion, %, 96 hour soak	1.9	0.3	0.1
Bearing Ratio, 0.100" penetration	2.3	2.6	2.2

25 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	111.8	115.1	115.9
Moisture content, %, before soak	7.7	10.7	13.7
Moisture content, %, after soak, avg.	18.1	16.4	16.7
Moisture content, %, after soak, top 1"	17.8	21.8	17.6
Expansion, %, 96 hour soak	2.0	0.6	0.1
Bearing Ratio, 0.100" penetration	3.8	14.4	7.4

56 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	121.2	121.4	118.4
Moisture content, %, before soak	7.7	10.7	13.7
Moisture content, %, after soak, avg.	13.5	11.6	14.1
Moisture content, %, after soak, top 1"	15.3	13.7	14.4
Expansion, %, 96 hour soak	2.7	0.2	0.1
Bearing Ratio, 0.100" penetration	10.6	24.2	6.2

Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #5; Boring #36 @ 2.5 - 5.0'

January 8, 2019

Dark Brown Sandy Lean Clay (CL)

DRY DENSITY vs. MOISTURE CONTENT

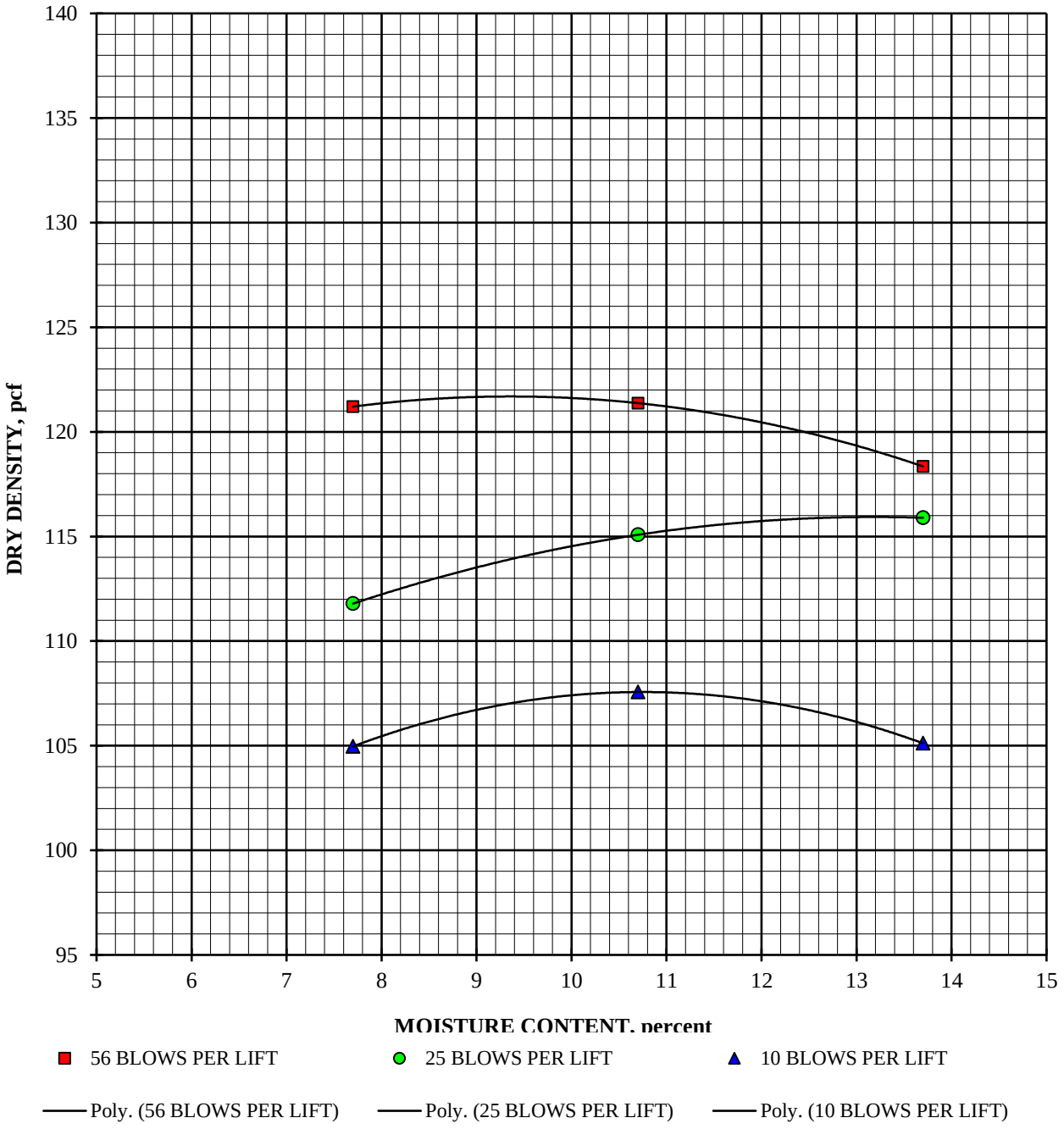


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #5; Boring #36 @ 2.5 - 5.0'

January 8, 2019

Dark Brown Sandy Lean Clay (CL)

CBR vs. MOISTURE CONTENT

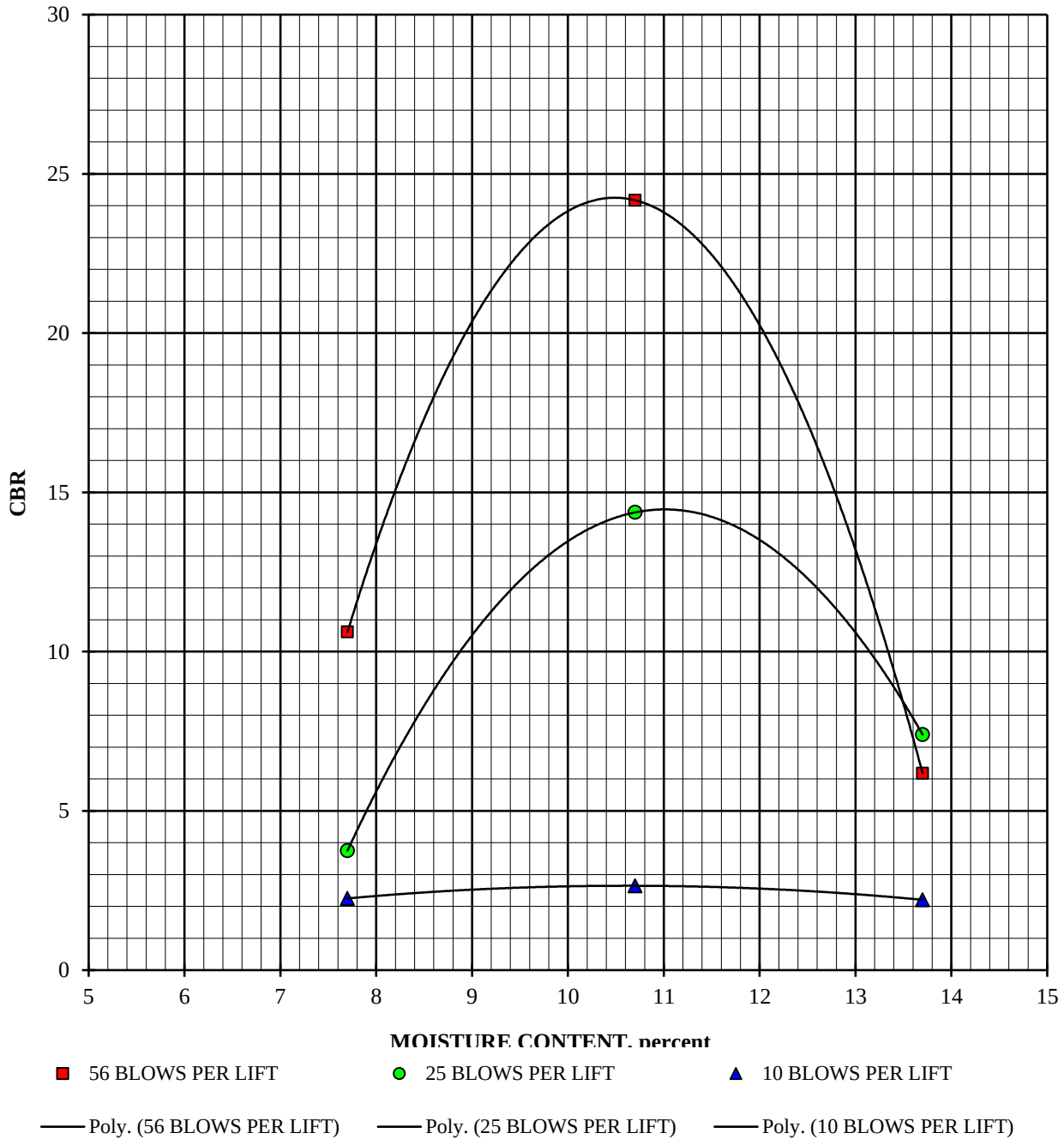


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #5; Boring #36 @ 2.5 - 5.0'

January 8, 2019

Dark Brown Sandy Lean Clay (CL)

DRY DENSITY vs. CBR

Arranged According to Moisture Content

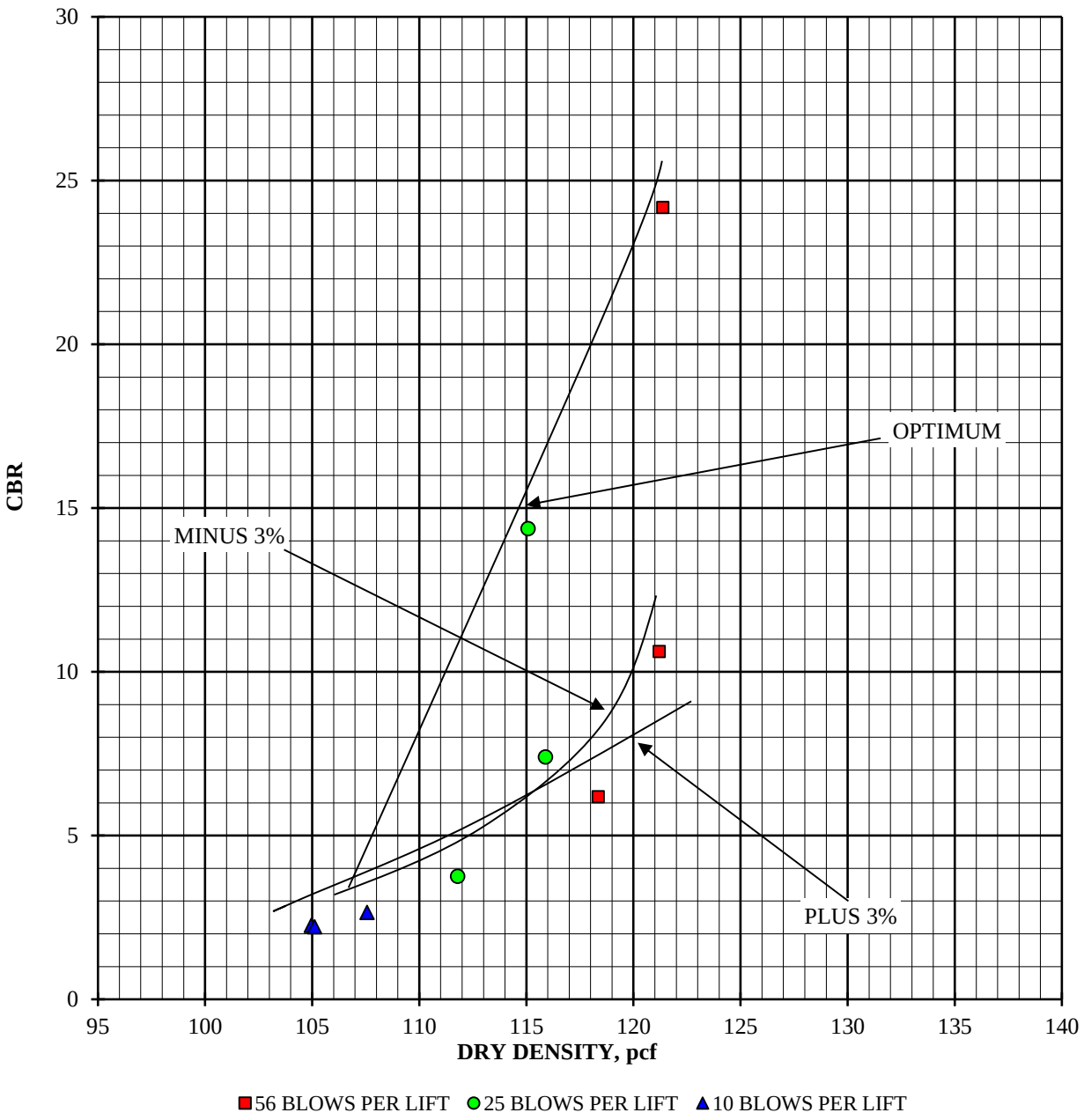


Exhibit 1

Oxnard Airport - Runway and Taxiway
Rehabilitation / Reconstruction

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-07 (At Optimum Moisture Content)

CBR #6 with 3% Lime added; Boring #27 @ 2.0 - 4.0'
Dark Brown Sandy Lean Clay (CL)

January 16, 2019

10 BLOWS PER LIFT

	Optimum Moisture
Dry density, pcf, before soak	106.0
Moisture content, %, before soak	14.1
Moisture content, %, after soak, avg.	19.0
Moisture content, %, after soak, top 1"	25.6
Expansion, %, 96 hour soak	0.1
Bearing Ratio, 0.100" penetration	27.4

25 BLOWS PER LIFT

	Optimum Moisture
Dry density, pcf, before soak	114.4
Moisture content, %, before soak	14.1
Moisture content, %, after soak, avg.	14.7
Moisture content, %, after soak, top 1"	19.2
Expansion, %, 96 hour soak	0.1
Bearing Ratio, 0.100" penetration	48.4

56 BLOWS PER LIFT

	Optimum Moisture
Dry density, pcf, before soak	116.4
Moisture content, %, before soak	14.1
Moisture content, %, after soak, avg.	15.0
Moisture content, %, after soak, top 1"	18.3
Expansion, %, 96 hour soak	0.1
Bearing Ratio, 0.100" penetration	53.4

Exhibit 1

Oxnard Airport - Runway and Taxiway
Rehabilitation / Reconstruction

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-07 (At Optimum Moisture Content)

CBR #6 with 3% Lime added; Boring #27 @ 2.0 - 4.0'

January 16, 2019

Dark Brown Sandy Lean Clay (CL)

DRY DENSITY vs. MOISTURE CONTENT

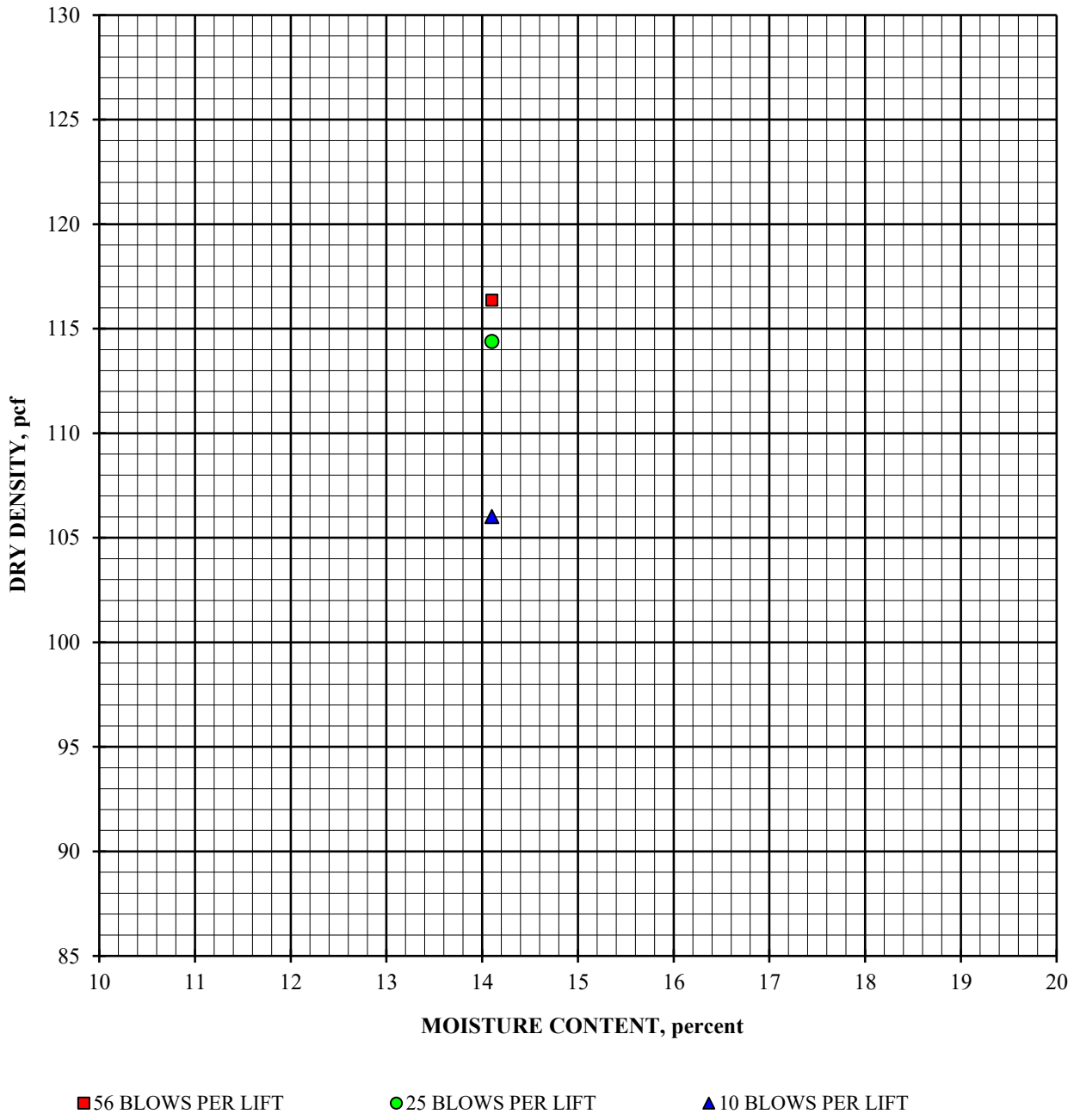


Exhibit 1

Oxnard Airport - Runway and Taxiway
Rehabilitation / Reconstruction

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-07 (At Optimum Moisture Content)

CBR #6 with 3% Lime added; Boring #27 @ 2.0 - 4.0'

January 16, 2019

Dark Brown Sandy Lean Clay (CL)

CBR vs. MOISTURE CONTENT

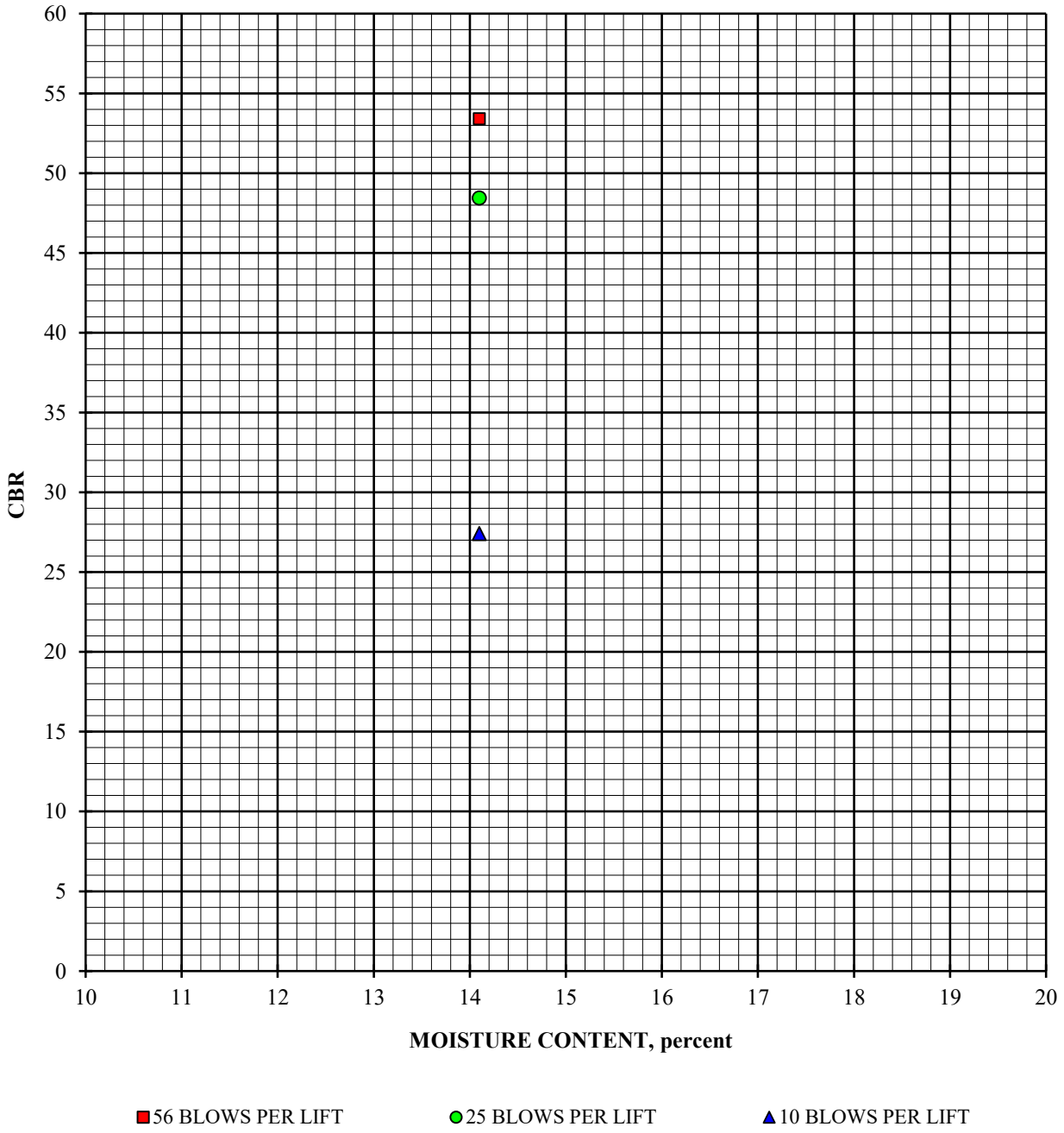


Exhibit 1

Oxnard Airport - Runway and Taxiway
Rehabilitation / Reconstruction

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-07 (At Optimum Moisture Content)

CBR #6 with 3% Lime added; Boring #27 @ 2.0 - 4.0'

January 16, 2019

Dark Brown Sandy Lean Clay (CL)

DRY DENSITY vs. CBR

AT Optimum Moisture Content

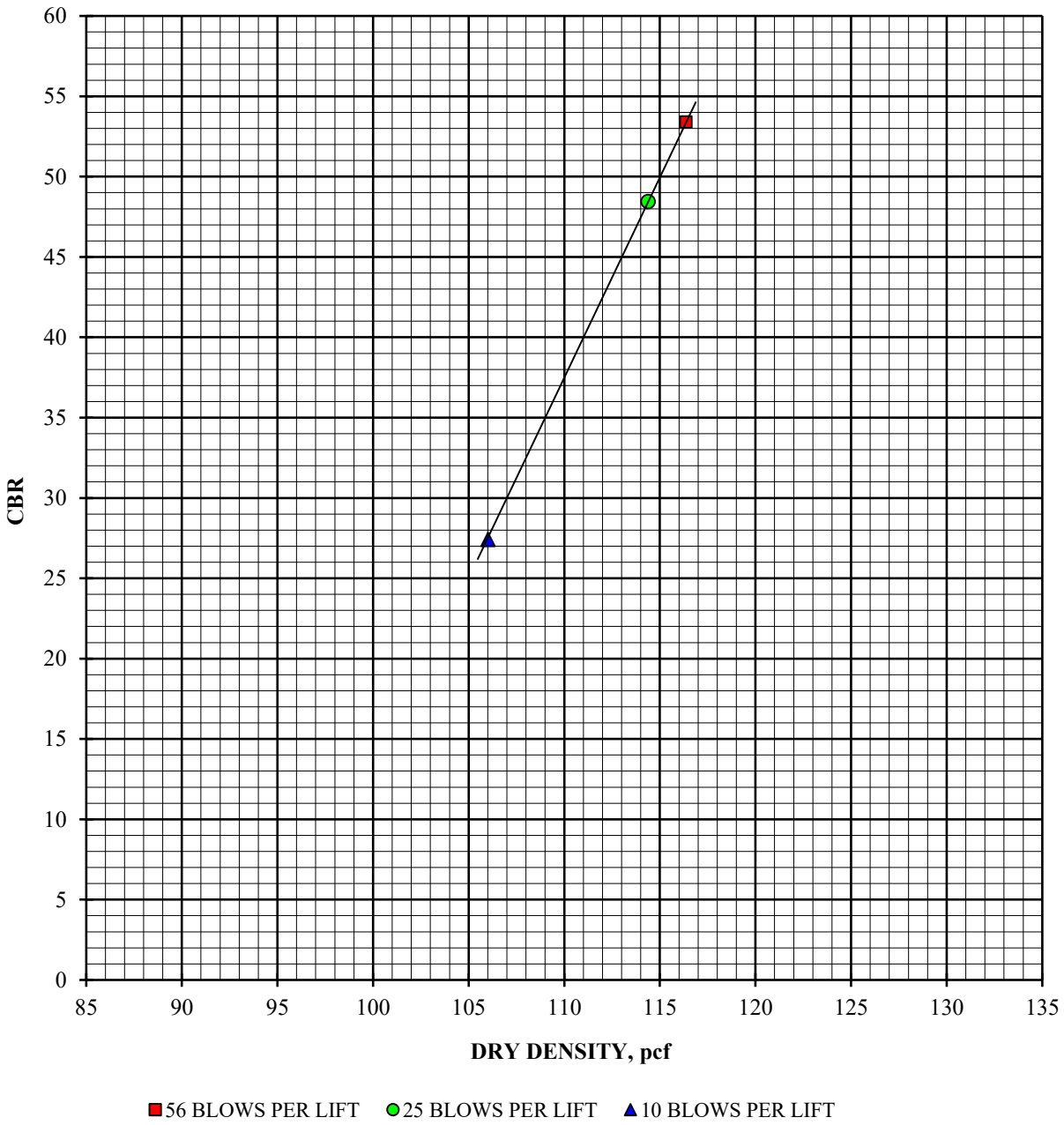


Exhibit 1

Oxnard Airport - Runway and Taxiway
Rehabilitation / Reconstruction

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-07 (At Optimum Moisture Content)

CBR #6 with 5% Lime added; Boring #27 @ 2.0 - 4.0'
Dark Brown Sandy Lean Clay (CL)

January 16, 2019

10 BLOWS PER LIFT

	Optimum Moisture
Dry density, pcf, before soak	98.9
Moisture content, %, before soak	15.2
Moisture content, %, after soak, avg.	22.6
Moisture content, %, after soak, top 1"	24.8
Expansion, %, 96 hour soak	0.1
Bearing Ratio, 0.100" penetration	22.2

25 BLOWS PER LIFT

	Optimum Moisture
Dry density, pcf, before soak	108.3
Moisture content, %, before soak	15.2
Moisture content, %, after soak, avg.	19.2
Moisture content, %, after soak, top 1"	21.4
Expansion, %, 96 hour soak	0.0
Bearing Ratio, 0.100" penetration	53.4

56 BLOWS PER LIFT

	Optimum Moisture
Dry density, pcf, before soak	114.1
Moisture content, %, before soak	15.2
Moisture content, %, after soak, avg.	17.7
Moisture content, %, after soak, top 1"	19.5
Expansion, %, 96 hour soak	0.1
Bearing Ratio, 0.100" penetration	72.9

Exhibit 1

Oxnard Airport - Runway and Taxiway
Rehabilitation / Reconstruction

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-07 (At Optimum Moisture Content)

CBR #6 with 5% Lime added; Boring #27 @ 2.0 - 4.0'

January 16, 2019

Dark Brown Sandy Lean Clay (CL)

DRY DENSITY vs. MOISTURE CONTENT

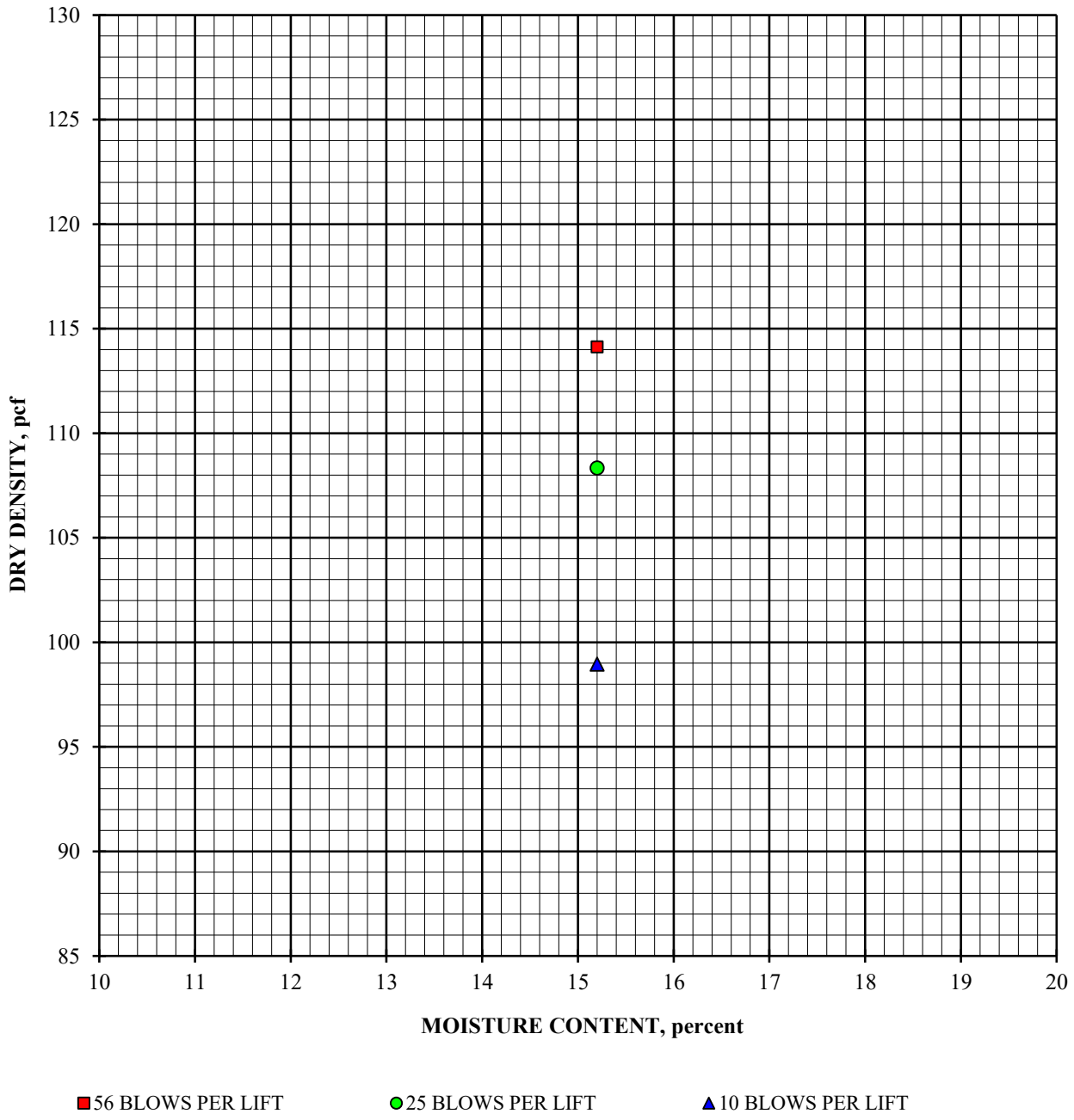


Exhibit 1

Oxnard Airport - Runway and Taxiway
Rehabilitation / Reconstruction

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-07 (At Optimum Moisture Content)

CBR #6 with 5% Lime added; Boring #27 @ 2.0 - 4.0'

January 16, 2019

Dark Brown Sandy Lean Clay (CL)

CBR vs. MOISTURE CONTENT

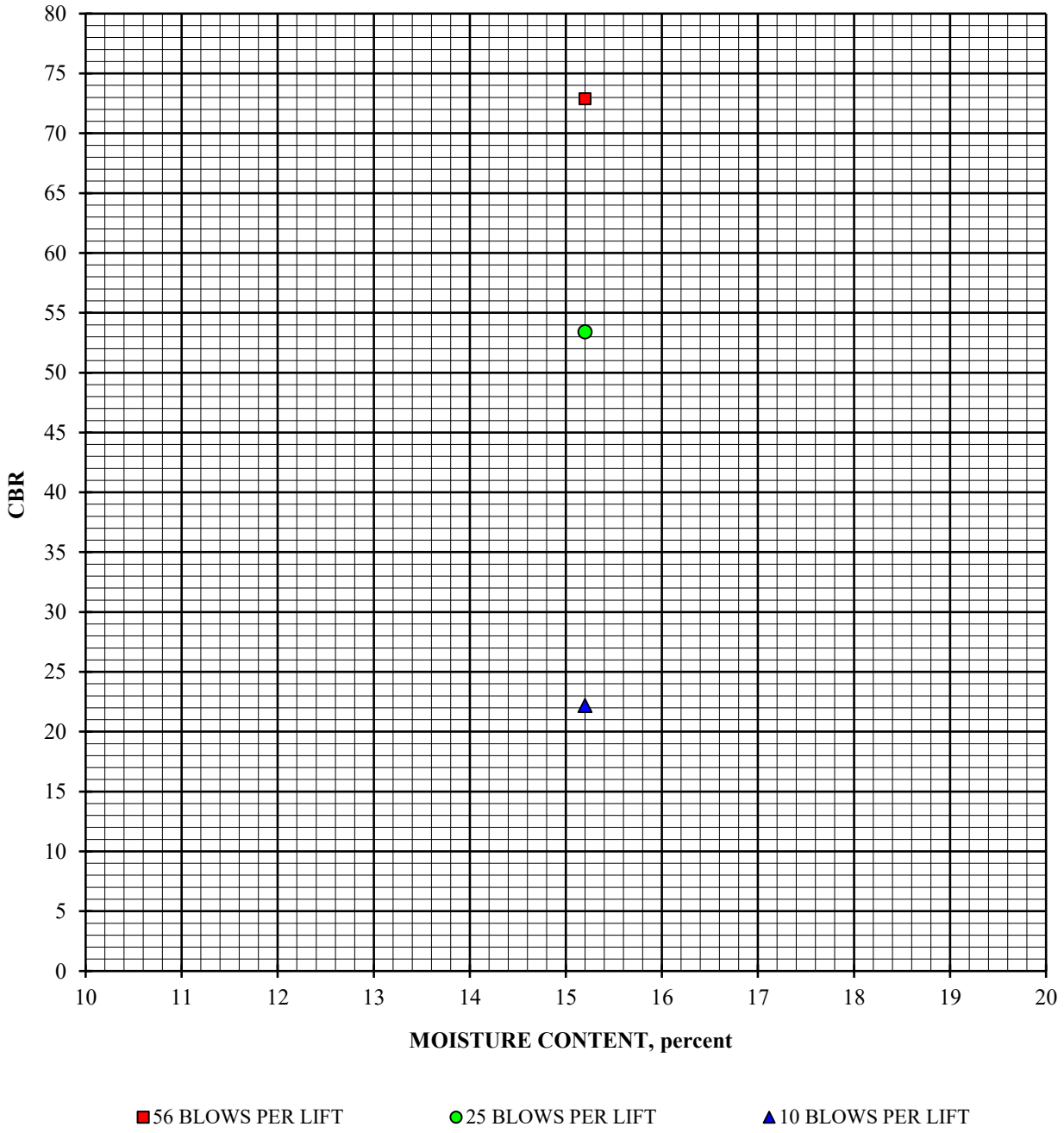


Exhibit 1

Oxnard Airport - Runway and Taxiway
Rehabilitation / Reconstruction

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-07 (At Optimum Moisture Content)

CBR #6 with 5% Lime added; Boring #27 @ 2.0 - 4.0'

January 16, 2019

Dark Brown Sandy Lean Clay (CL)

DRY DENSITY vs. CBR

AT Optimum Moisture Content

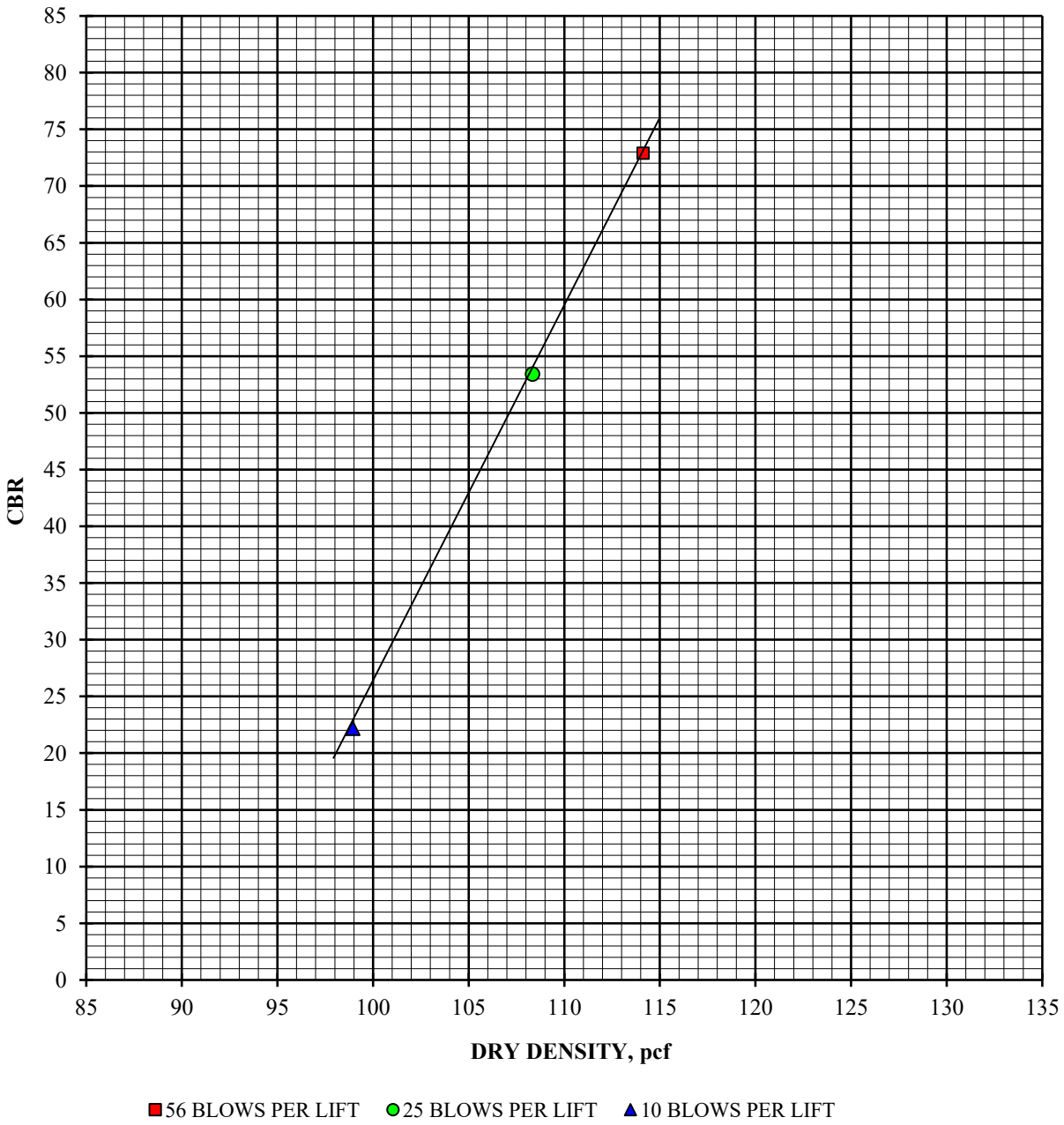


Exhibit 1

Oxnard Airport - Runway and Taxiway
Rehabilitation / Reconstruction

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-07 (At Optimum Moisture Content)

CBR #6 with 7% Lime added; Boring #27 @ 2.0 - 4.0'
Dark Brown Sandy Lean Clay (CL)

January 16, 2019

10 BLOWS PER LIFT

	Optimum Moisture
Dry density, pcf, before soak	97.7
Moisture content, %, before soak	15.6
Moisture content, %, after soak, avg.	24.4
Moisture content, %, after soak, top 1"	26.4
Expansion, %, 96 hour soak	0.2
Bearing Ratio, 0.100" penetration	27.1

25 BLOWS PER LIFT

	Optimum Moisture
Dry density, pcf, before soak	105.4
Moisture content, %, before soak	15.6
Moisture content, %, after soak, avg.	20.9
Moisture content, %, after soak, top 1"	24.4
Expansion, %, 96 hour soak	0.2
Bearing Ratio, 0.100" penetration	49.2

56 BLOWS PER LIFT

	Optimum Moisture
Dry density, pcf, before soak	114.0
Moisture content, %, before soak	15.6
Moisture content, %, after soak, avg.	18.0
Moisture content, %, after soak, top 1"	22.8
Expansion, %, 96 hour soak	0.1
Bearing Ratio, 0.100" penetration	85.8

Exhibit 1

Oxnard Airport - Runway and Taxiway
Rehabilitation / Reconstruction

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-07 (At Optimum Moisture Content)

CBR #6 with 7% Lime added; Boring #27 @ 2.0 - 4.0'

January 16, 2019

Dark Brown Sandy Lean Clay (CL)

DRY DENSITY vs. MOISTURE CONTENT

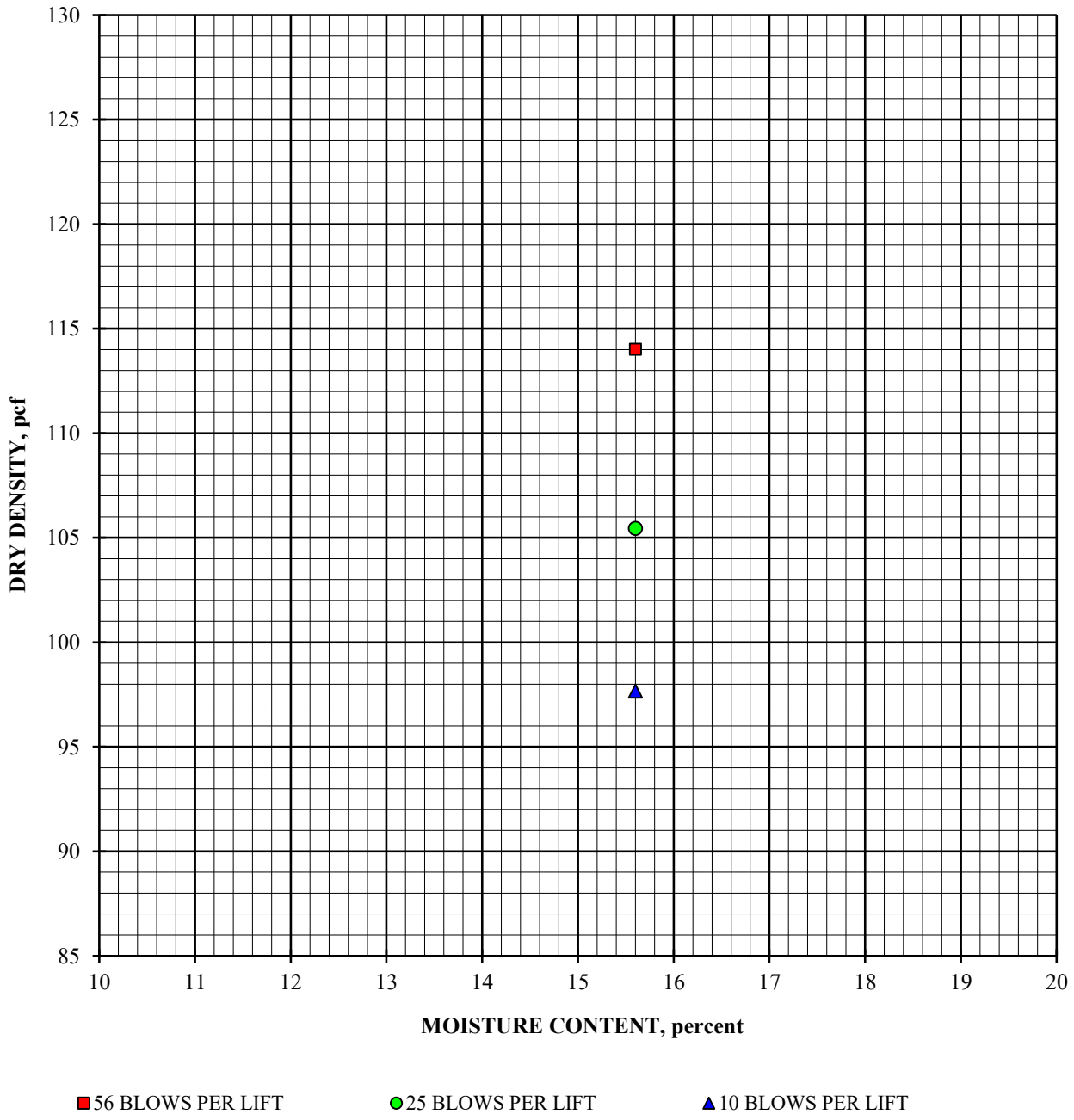


Exhibit 1

Oxnard Airport - Runway and Taxiway
Rehabilitation / Reconstruction

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-07 (At Optimum Moisture Content)

CBR #6 with 7% Lime added; Boring #27 @ 2.0 - 4.0'

January 16, 2019

Dark Brown Sandy Lean Clay (CL)

CBR vs. MOISTURE CONTENT

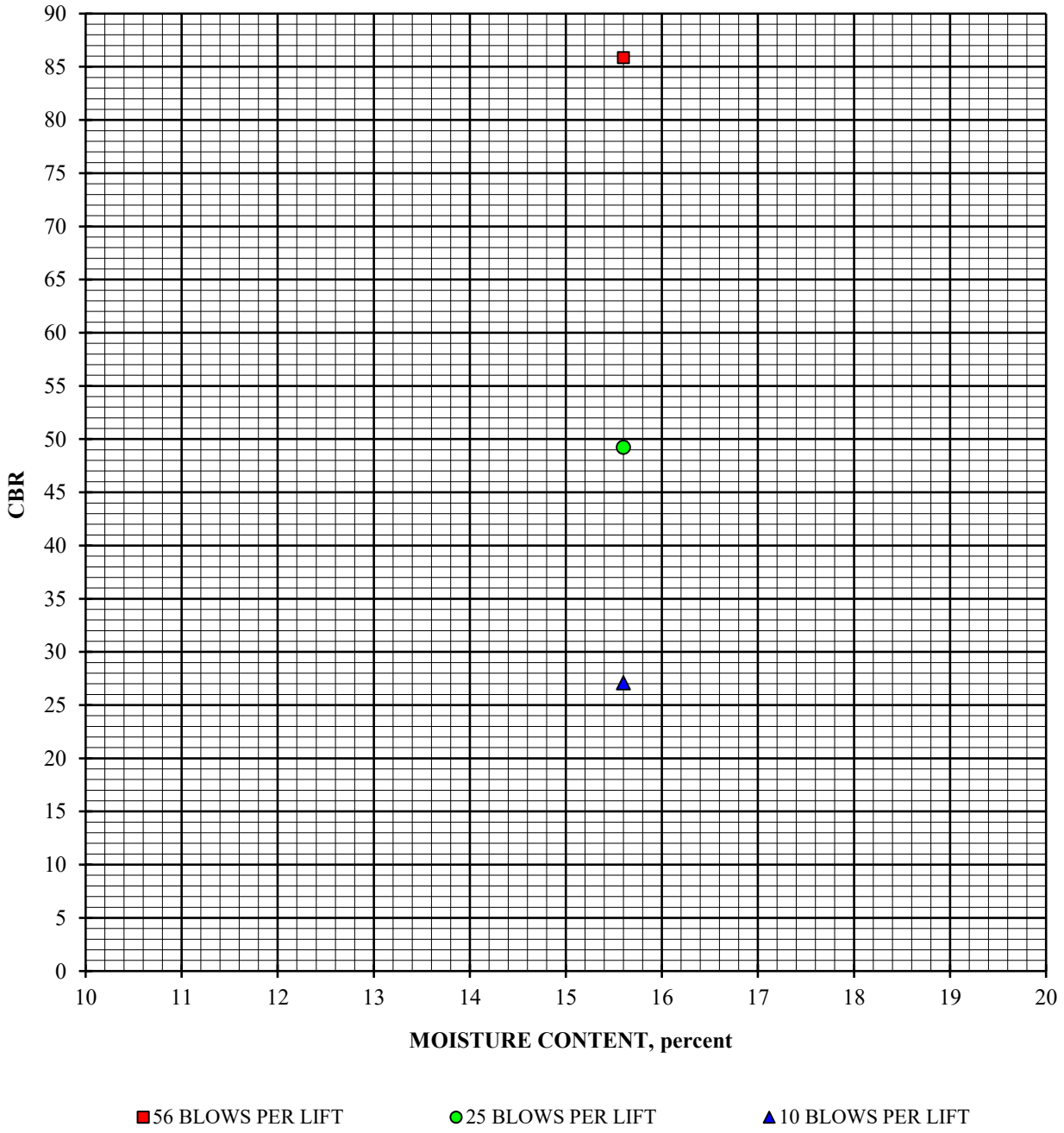


Exhibit 1

Oxnard Airport - Runway and Taxiway
Rehabilitation / Reconstruction

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-07 (At Optimum Moisture Content)

CBR #6 with 7% Lime added; Boring #27 @ 2.0 - 4.0'

January 16, 2019

Dark Brown Sandy Lean Clay (CL)

DRY DENSITY vs. CBR

AT Optimum Moisture Content

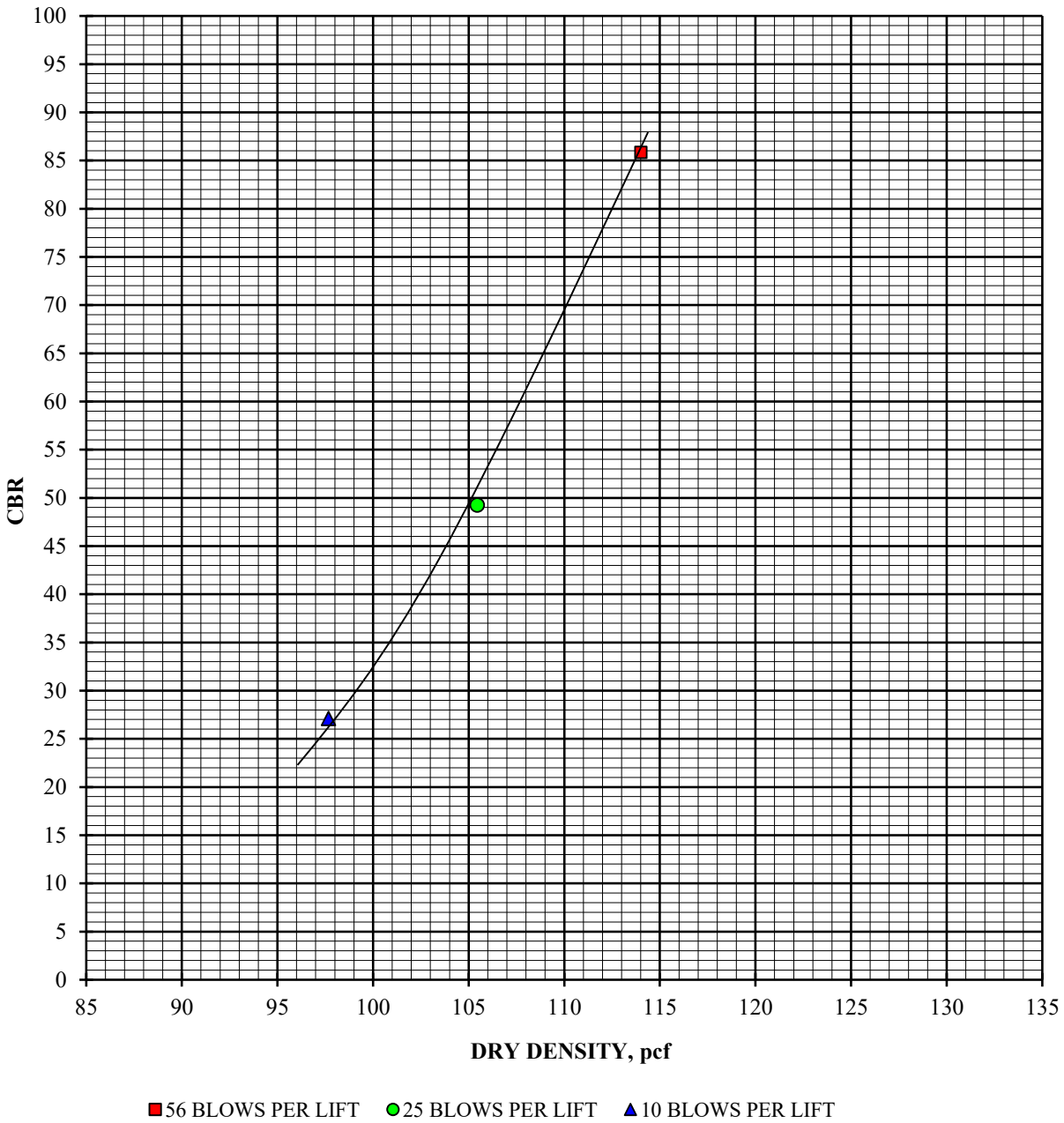


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #7; Boring #23 @ 3.5 - 5.0'
Brown Sandy Lean Clay (CL)

January 8, 2019

10 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	101.0	105.0	105.1
Moisture content, %, before soak	7.0	10.0	13.0
Moisture content, %, after soak, avg.	22.9	19.3	21.3
Moisture content, %, after soak, top 1"	26.2	23.5	25.3
Expansion, %, 96 hour soak	5.8	0.5	0.0
Bearing Ratio, 0.100" penetration	1.7	2.2	2.2

25 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	110.0	117.5	115.4
Moisture content, %, before soak	7.0	10.0	13.0
Moisture content, %, after soak, avg.	16.7	15.1	17.2
Moisture content, %, after soak, top 1"	23.7	20.3	20.5
Expansion, %, 96 hour soak	3.0	0.2	0.0
Bearing Ratio, 0.100" penetration	2.6	7.8	7.4

56 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	118.4	123.5	119.8
Moisture content, %, before soak	7.0	10.0	13.0
Moisture content, %, after soak, avg.	15.2	12.2	14.6
Moisture content, %, after soak, top 1"	18.6	14.8	15.7
Expansion, %, 96 hour soak	3.0	0.1	0.0
Bearing Ratio, 0.100" penetration	7.6	19.4	17.4

Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #7; Boring #23 @ 3.5 - 5.0'

January 8, 2019

Brown Sandy Lean Clay (CL)

DRY DENSITY vs. MOISTURE CONTENT

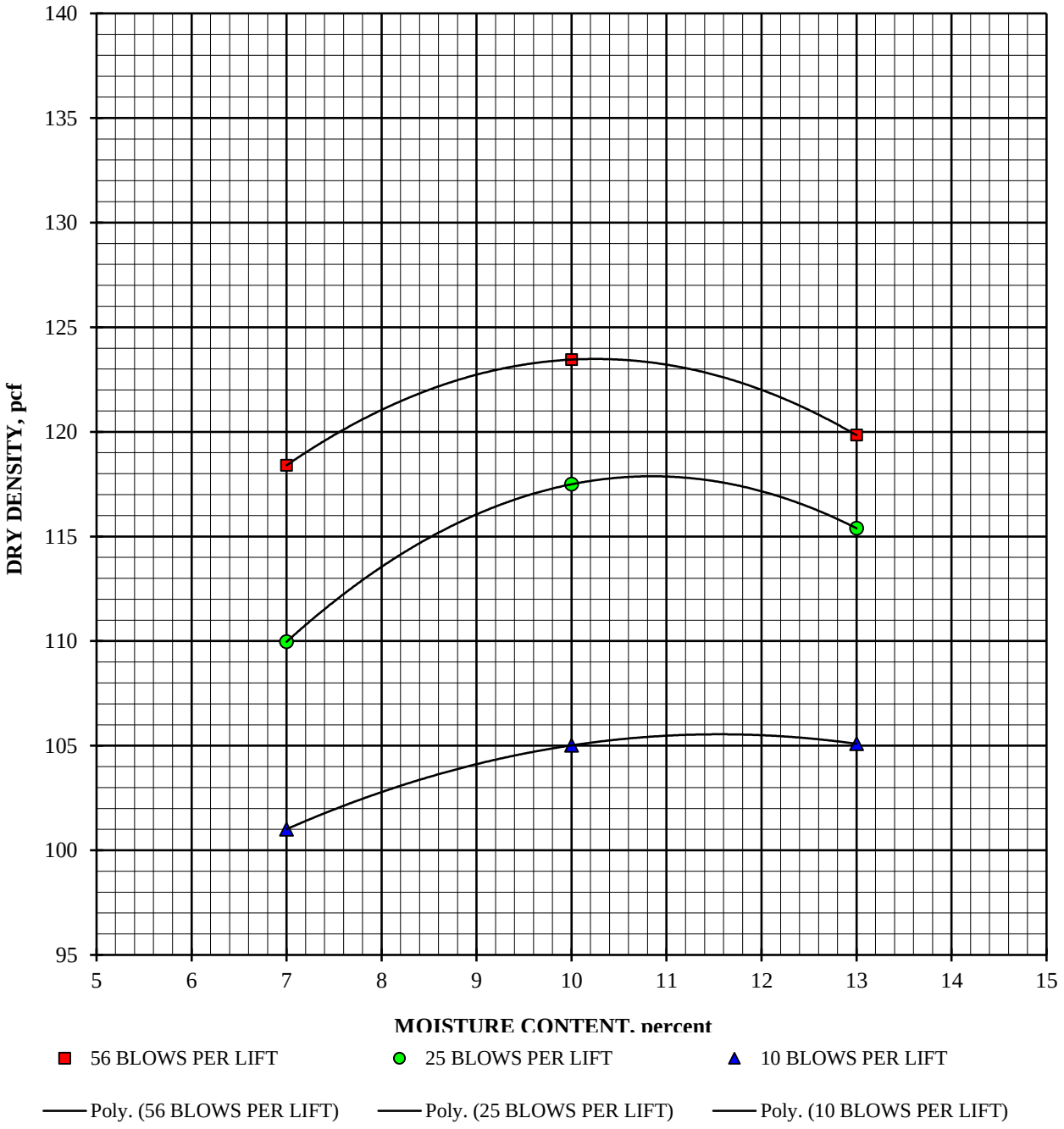


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #7; Boring #23 @ 3.5 - 5.0'

January 8, 2019

Brown Sandy Lean Clay (CL)

CBR vs. MOISTURE CONTENT

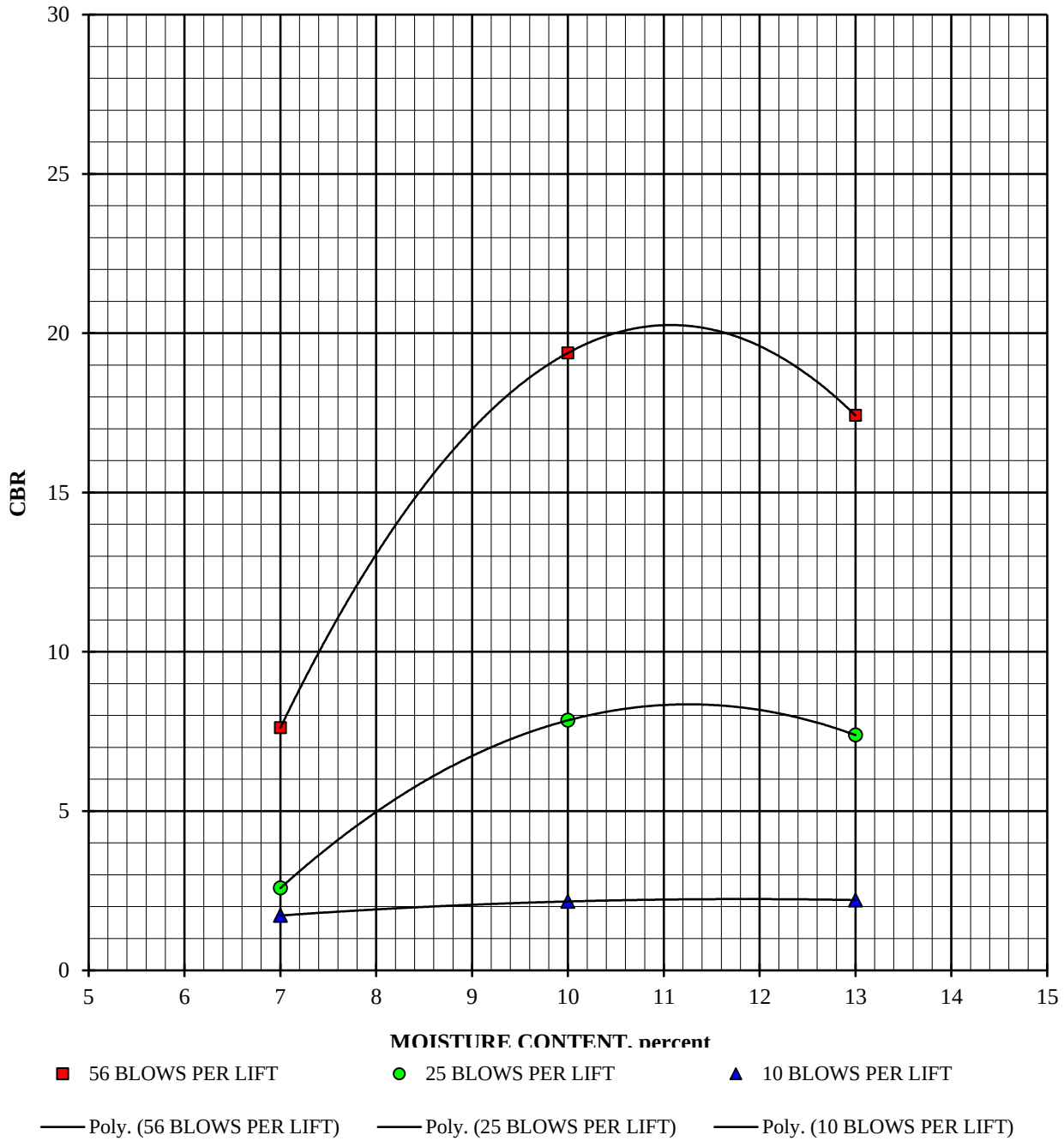


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #7; Boring #23 @ 3.5 - 5.0'

January 8, 2019

Brown Sandy Lean Clay (CL)

DRY DENSITY vs. CBR

Arranged According to Moisture Content

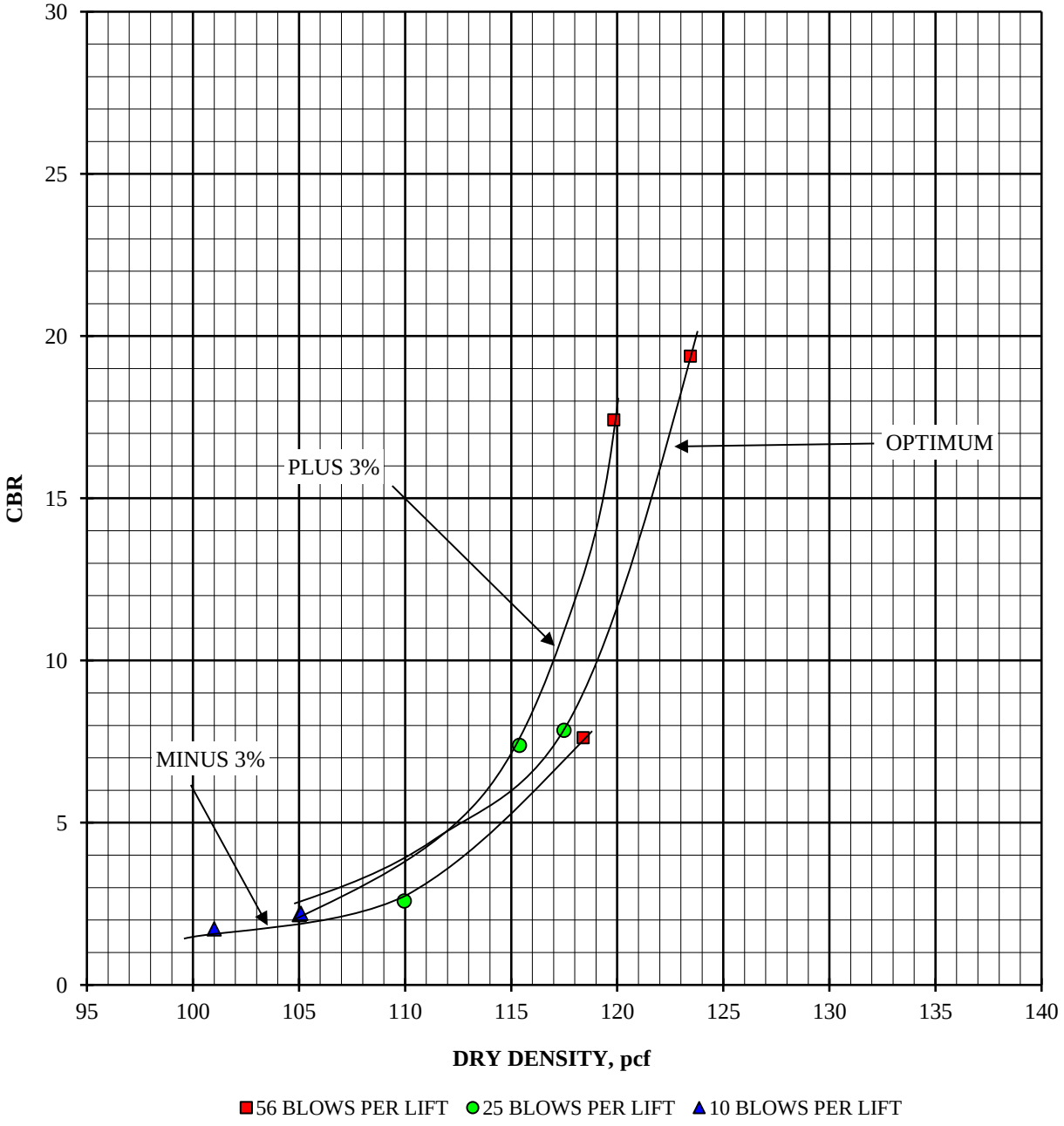


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #8; Boring #29 @ 2.0 - 5.0'
Brown / Gray Mottled Sandy Lean Clay (CL)

January 8, 2019

10 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	108.3	108.9	107.1
Moisture content, %, before soak	8.9	11.9	14.9
Moisture content, %, after soak, avg.	15.9	12.9	23.5
Moisture content, %, after soak, top 1"	20.4	18.3	17.7
Expansion, %, 96 hour soak	0.7	0.4	0.1
Bearing Ratio, 0.100" penetration	4.6	6.8	2.6

25 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	120.3	121.8	115.8
Moisture content, %, before soak	8.9	11.9	14.9
Moisture content, %, after soak, avg.	12.6	14.0	15.4
Moisture content, %, after soak, top 1"	16.8	15.6	16.5
Expansion, %, 96 hour soak	0.6	0.3	0.7
Bearing Ratio, 0.100" penetration	17.7	27.9	3.2

56 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	121.7	122.9	115.5
Moisture content, %, before soak	8.9	11.9	14.9
Moisture content, %, after soak, avg.	16.3	12.4	15.2
Moisture content, %, after soak, top 1"	13.8	15.1	16.8
Expansion, %, 96 hour soak	0.6	0.4	0.0
Bearing Ratio, 0.100" penetration	19.7	27.5	2.8

Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #8; Boring #29 @ 2.0 - 5.0'

January 8, 2019

Brown / Gray Mottled Sandy Lean Clay (CL)

DRY DENSITY vs. MOISTURE CONTENT

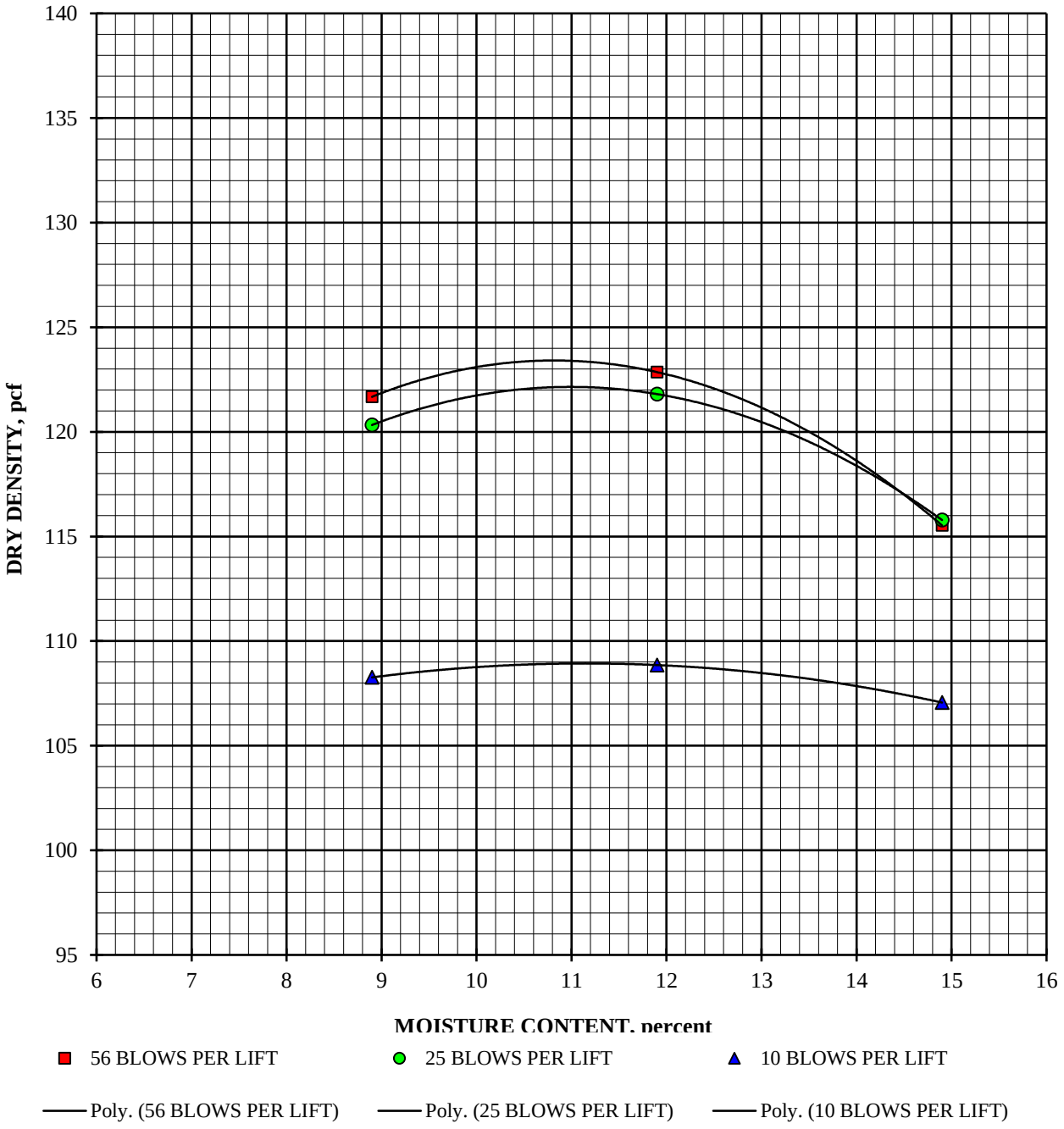


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #8; Boring #29 @ 2.0 - 5.0'

January 8, 2019

Brown / Gray Mottled Sandy Lean Clay (CL)

CBR vs. MOISTURE CONTENT

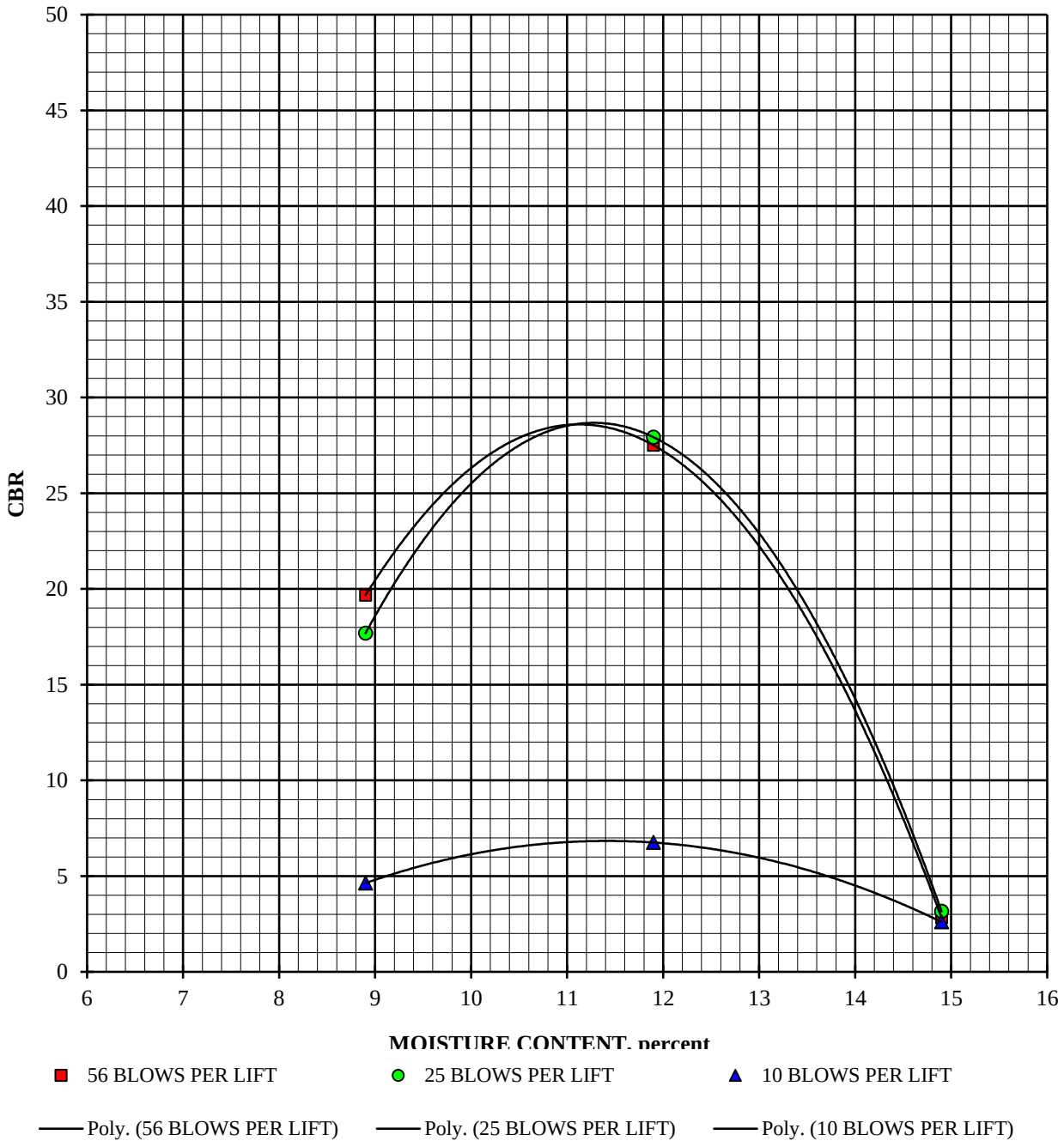


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #8; Boring #29 @ 2.0 - 5.0'

January 8, 2019

Brown / Gray Mottled Sandy Lean Clay (CL)

DRY DENSITY vs. CBR

Arranged According to Moisture Content

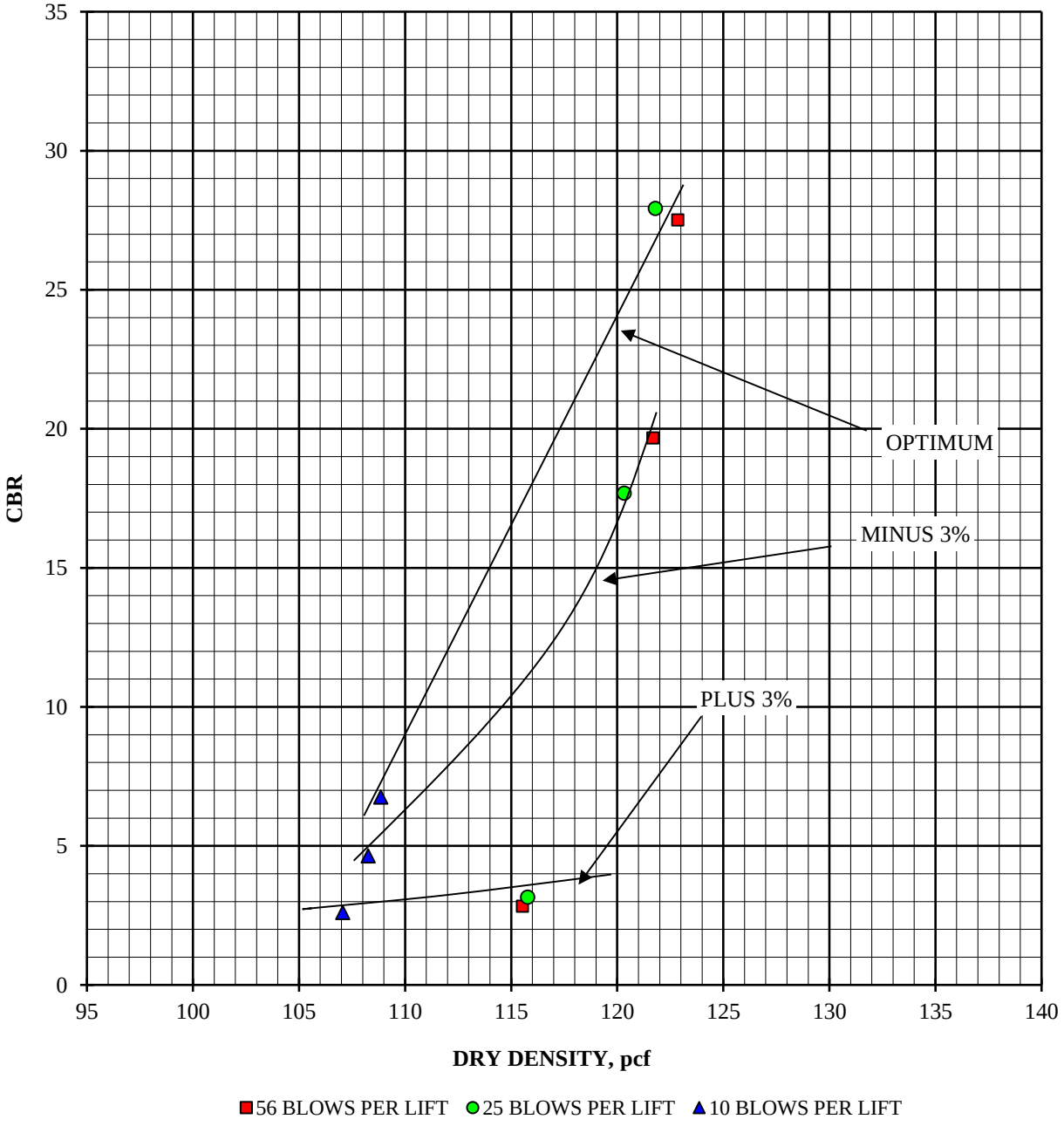


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #9; Boring #21 @ 1.5 - 3.0'
Brown Sandy Lean Clay (CL)

January 8, 2019

10 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	108.6	112.7	110.8
Moisture content, %, before soak	10.4	13.4	16.4
Moisture content, %, after soak, avg.	15.2	15.6	17.2
Moisture content, %, after soak, top 1"	19.1	22.8	19.8
Expansion, %, 96 hour soak	0.4	0.1	0.1
Bearing Ratio, 0.100" penetration	3.3	5.0	4.7

25 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	113.9	117.6	110.1
Moisture content, %, before soak	10.4	13.4	16.4
Moisture content, %, after soak, avg.	20.2	16.1	17.7
Moisture content, %, after soak, top 1"	17.3	18.8	19.1
Expansion, %, 96 hour soak	0.2	0.1	0.2
Bearing Ratio, 0.100" penetration	12.8	14.3	3.9

56 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	118.2	119.9	110.9
Moisture content, %, before soak	10.4	13.4	16.4
Moisture content, %, after soak, avg.	17.4	14.5	14.6
Moisture content, %, after soak, top 1"	16.2	15.8	18.9
Expansion, %, 96 hour soak	0.3	0.1	0.0
Bearing Ratio, 0.100" penetration	17.8	17.9	3.0

Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #9; Boring #21 @ 1.5 - 3.0'

January 8, 2019

Brown Sandy Lean Clay (CL)

DRY DENSITY vs. MOISTURE CONTENT

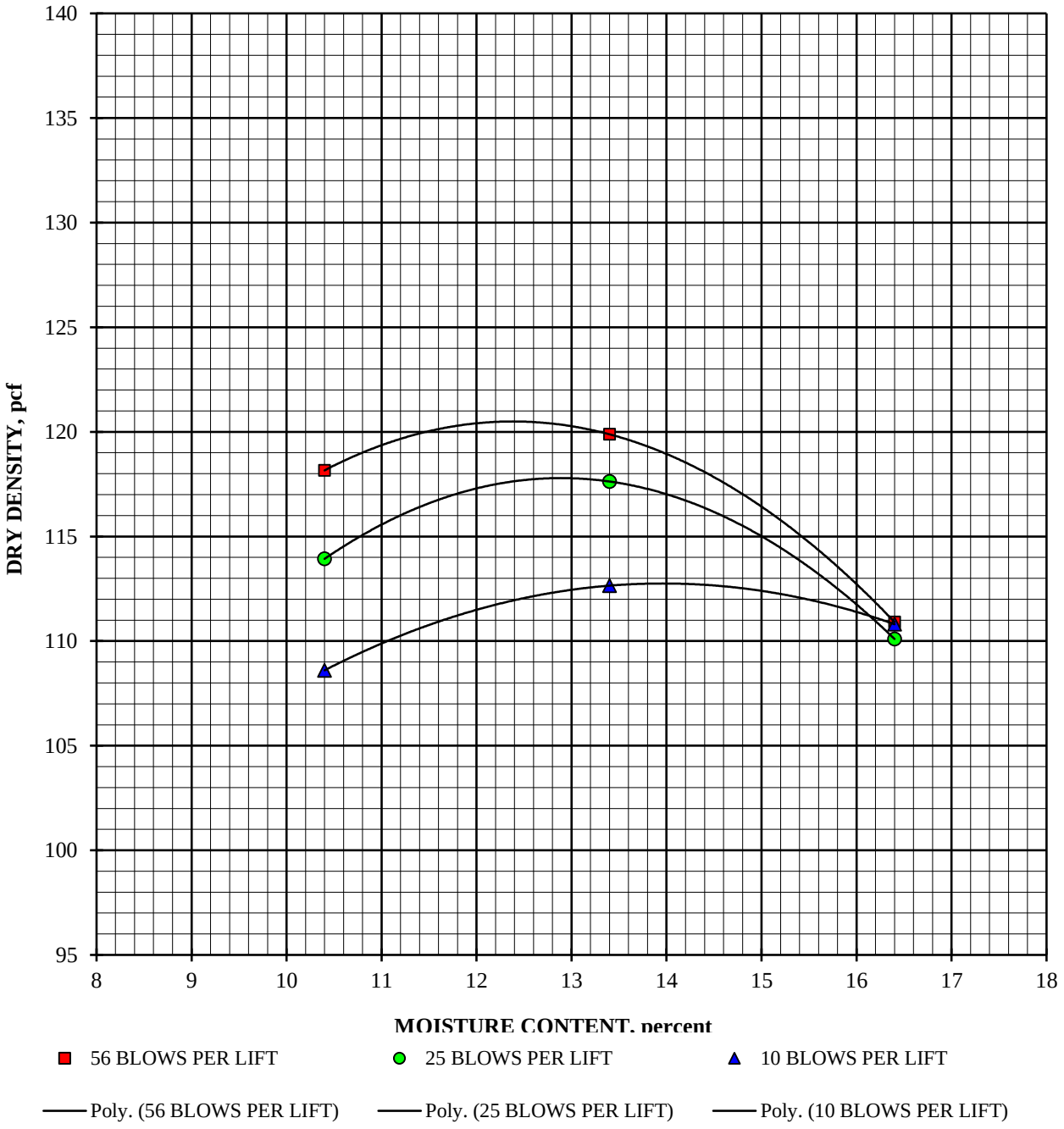


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #9; Boring #21 @ 1.5 - 3.0'

January 8, 2019

Brown Sandy Lean Clay (CL)

CBR vs. MOISTURE CONTENT

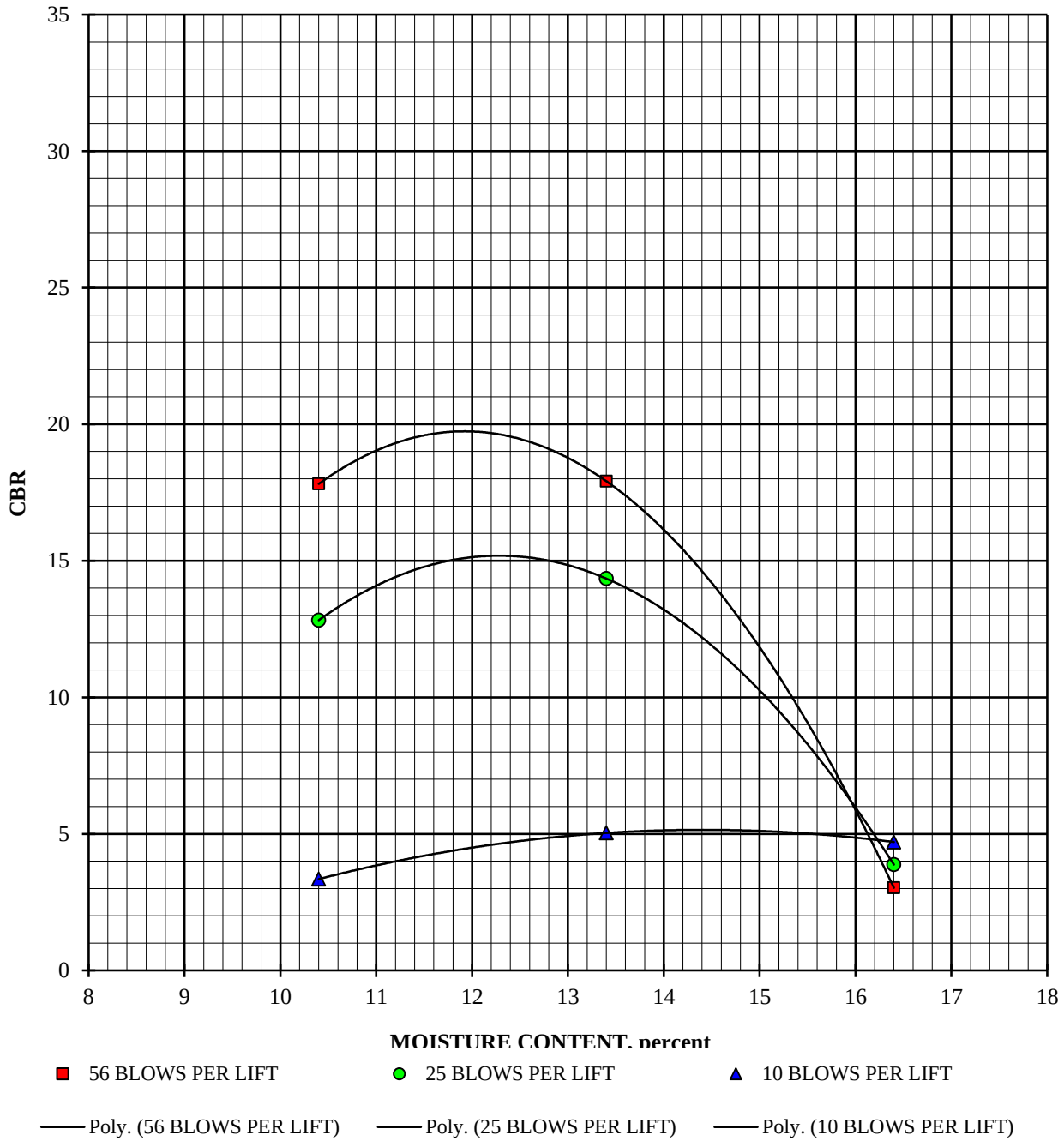


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #9; Boring #21 @ 1.5 - 3.0'

January 8, 2019

Brown Sandy Lean Clay (CL)

DRY DENSITY vs. CBR

Arranged According to Moisture Content

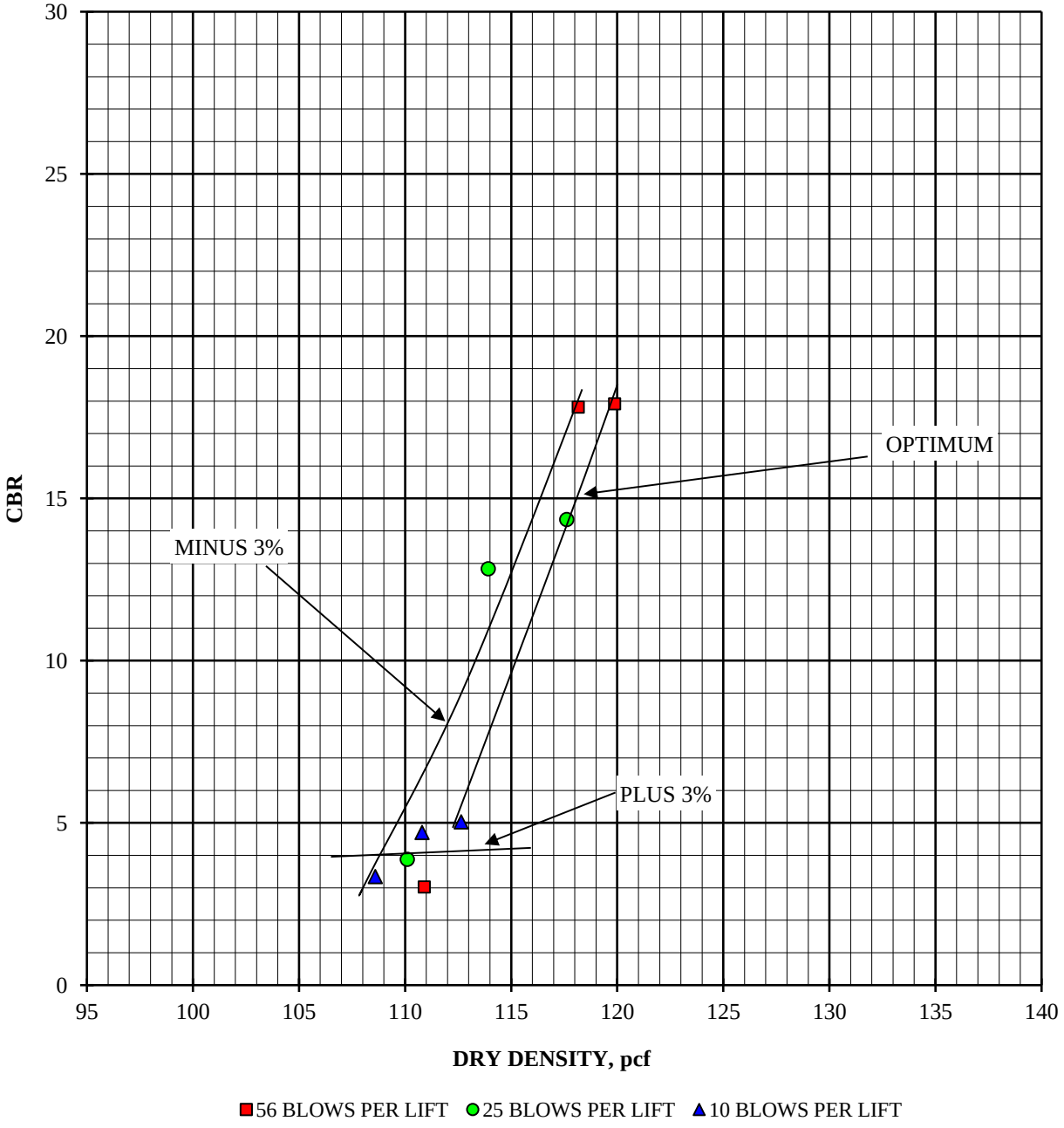


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #11; Boring #16 @ 2.0 - 4.0'
Dark Brown Sandy Lean Clay (CL)

January 8, 2019

10 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	107.9	109.0	107.4
Moisture content, %, before soak	10.7	13.7	16.7
Moisture content, %, after soak, avg.	18.6	17.4	20.1
Moisture content, %, after soak, top 1"	22.6	22.3	21.7
Expansion, %, 96 hour soak	0.4	0.2	0.0
Bearing Ratio, 0.100" penetration	3.6	5.9	3.0

25 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	112.3	114.4	110.2
Moisture content, %, before soak	10.7	13.7	16.7
Moisture content, %, after soak, avg.	20.3	16.2	19.2
Moisture content, %, after soak, top 1"	18.8	18.1	20.7
Expansion, %, 96 hour soak	0.3	0.2	0.0
Bearing Ratio, 0.100" penetration	8.7	10.0	3.2

56 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	113.0	114.6	111.1
Moisture content, %, before soak	10.7	13.7	16.7
Moisture content, %, after soak, avg.	22.1	16.5	18.3
Moisture content, %, after soak, top 1"	20.6	17.5	20.9
Expansion, %, 96 hour soak	0.4	0.2	0.0
Bearing Ratio, 0.100" penetration	10.9	12.1	2.9

Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #11; Boring #16 @ 2.0 - 4.0'

January 8, 2019

Dark Brown Sandy Lean Clay (CL)

DRY DENSITY vs. MOISTURE CONTENT

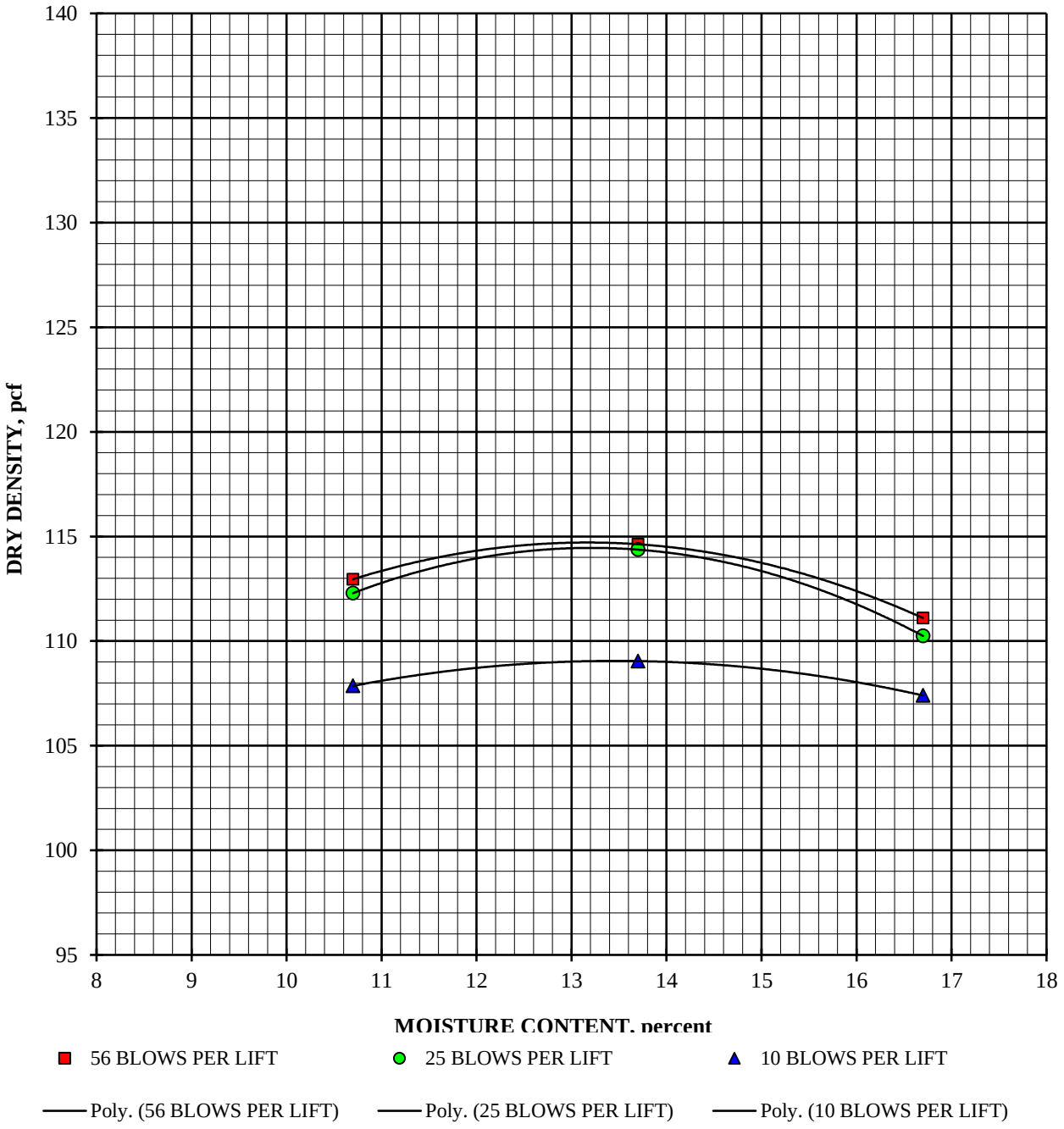


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #11; Boring #16 @ 2.0 - 4.0'

January 8, 2019

Dark Brown Sandy Lean Clay (CL)

CBR vs. MOISTURE CONTENT

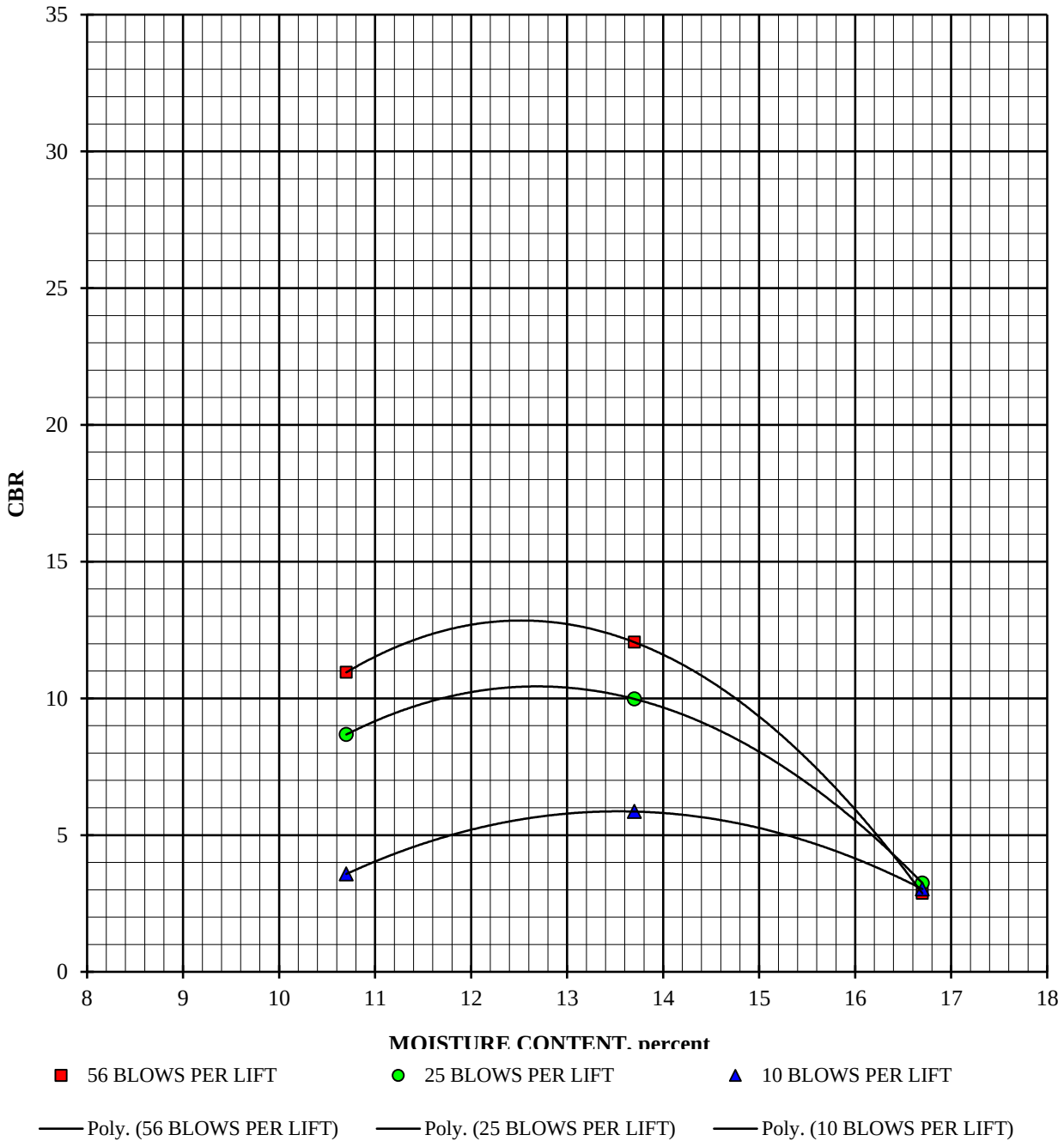


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #11; Boring #16 @ 2.0 - 4.0'

January 8, 2019

Dark Brown Sandy Lean Clay (CL)

DRY DENSITY vs. CBR

Arranged According to Moisture Content

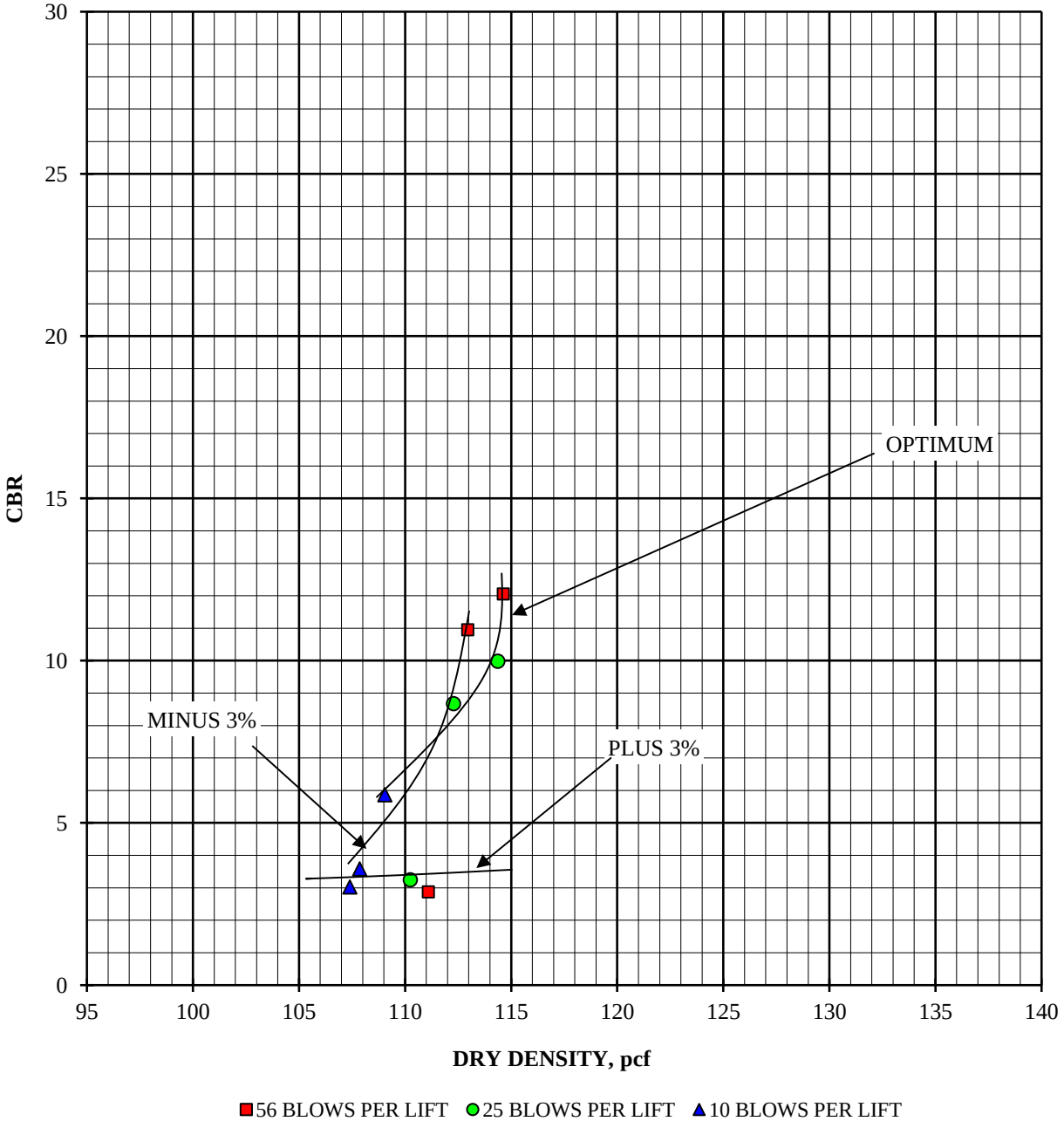


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #12; Boring #13 @ 2.0 - 4.0'
Dark Brown Sandy Lean Clay (CL)

January 8, 2019

10 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	100.6	103.3	103.8
Moisture content, %, before soak	13.5	16.5	19.5
Moisture content, %, after soak, avg.	24.8	22.0	20.5
Moisture content, %, after soak, top 1"	30.7	25.3	23.8
Expansion, %, 96 hour soak	0.5	0.1	0.0
Bearing Ratio, 0.100" penetration	2.5	5.9	4.6

25 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	111.4	111.7	106.0
Moisture content, %, before soak	13.5	16.5	19.5
Moisture content, %, after soak, avg.	15.8	18.3	19.7
Moisture content, %, after soak, top 1"	23.8	20.9	22.8
Expansion, %, 96 hour soak	0.2	0.1	0.0
Bearing Ratio, 0.100" penetration	10.5	15.2	4.6

56 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	112.2	112.6	105.8
Moisture content, %, before soak	13.5	16.5	19.5
Moisture content, %, after soak, avg.	21.0	19.2	19.8
Moisture content, %, after soak, top 1"	17.7	18.8	22.8
Expansion, %, 96 hour soak	0.5	0.0	0.0
Bearing Ratio, 0.100" penetration	13.6	15.8	4.3

Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #12; Boring #13 @ 2.0 - 4.0'

January 8, 2019

Dark Brown Sandy Lean Clay (CL)

DRY DENSITY vs. MOISTURE CONTENT

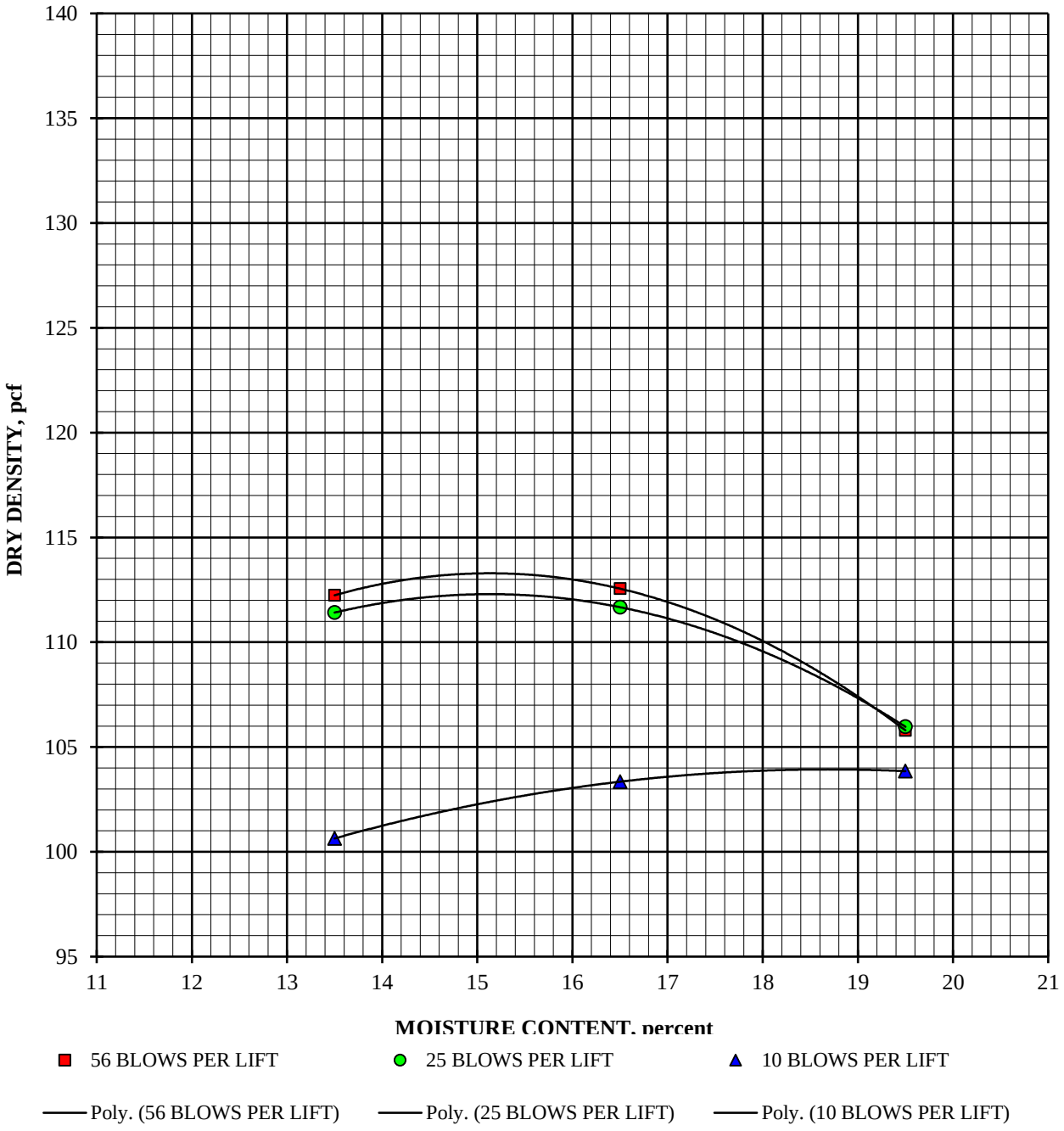


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #12; Boring #13 @ 2.0 - 4.0'

January 8, 2019

Dark Brown Sandy Lean Clay (CL)

CBR vs. MOISTURE CONTENT

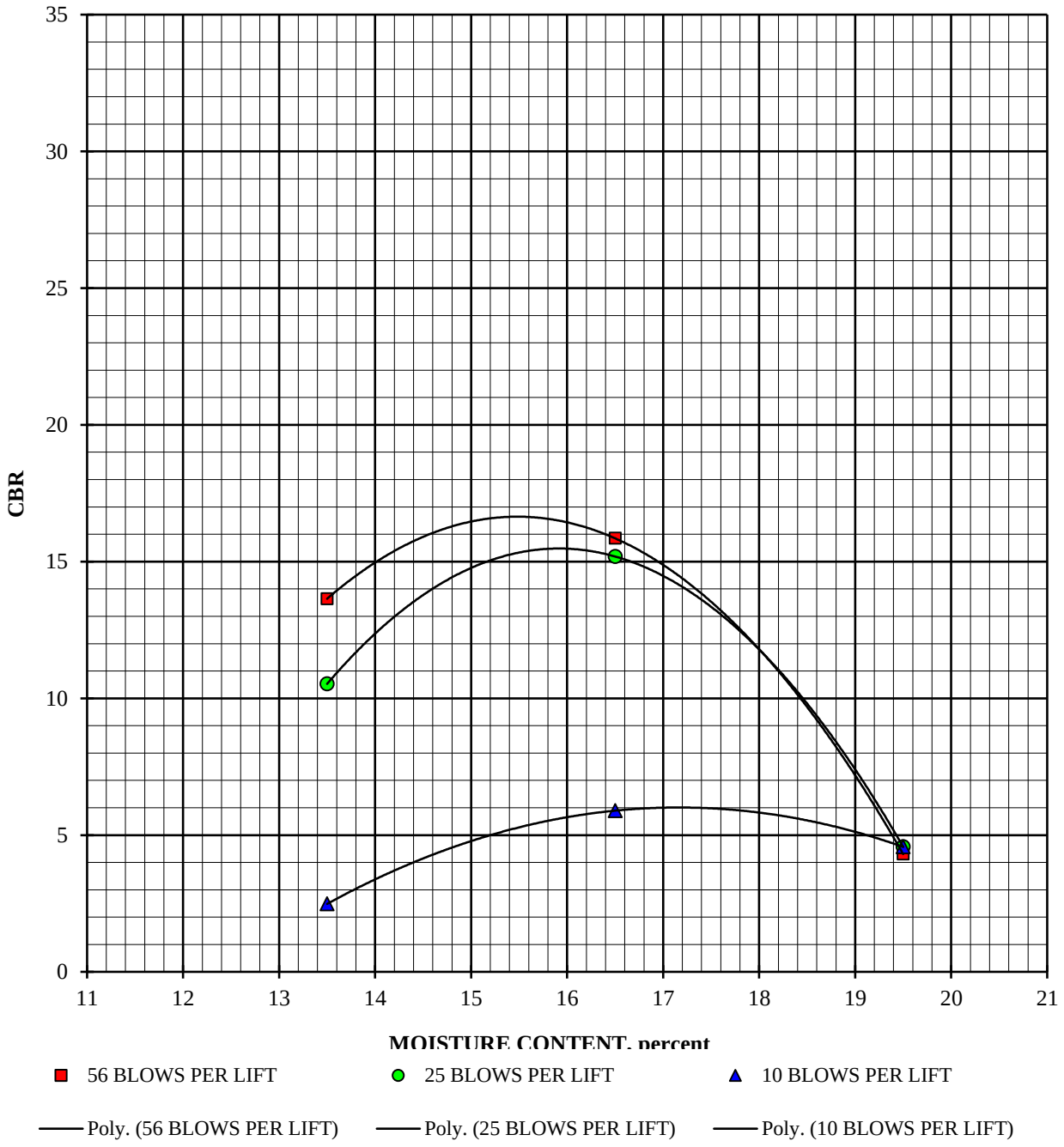


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #12; Boring #13 @ 2.0 - 4.0'

January 8, 2019

Dark Brown Sandy Lean Clay (CL)

DRY DENSITY vs. CBR

Arranged According to Moisture Content

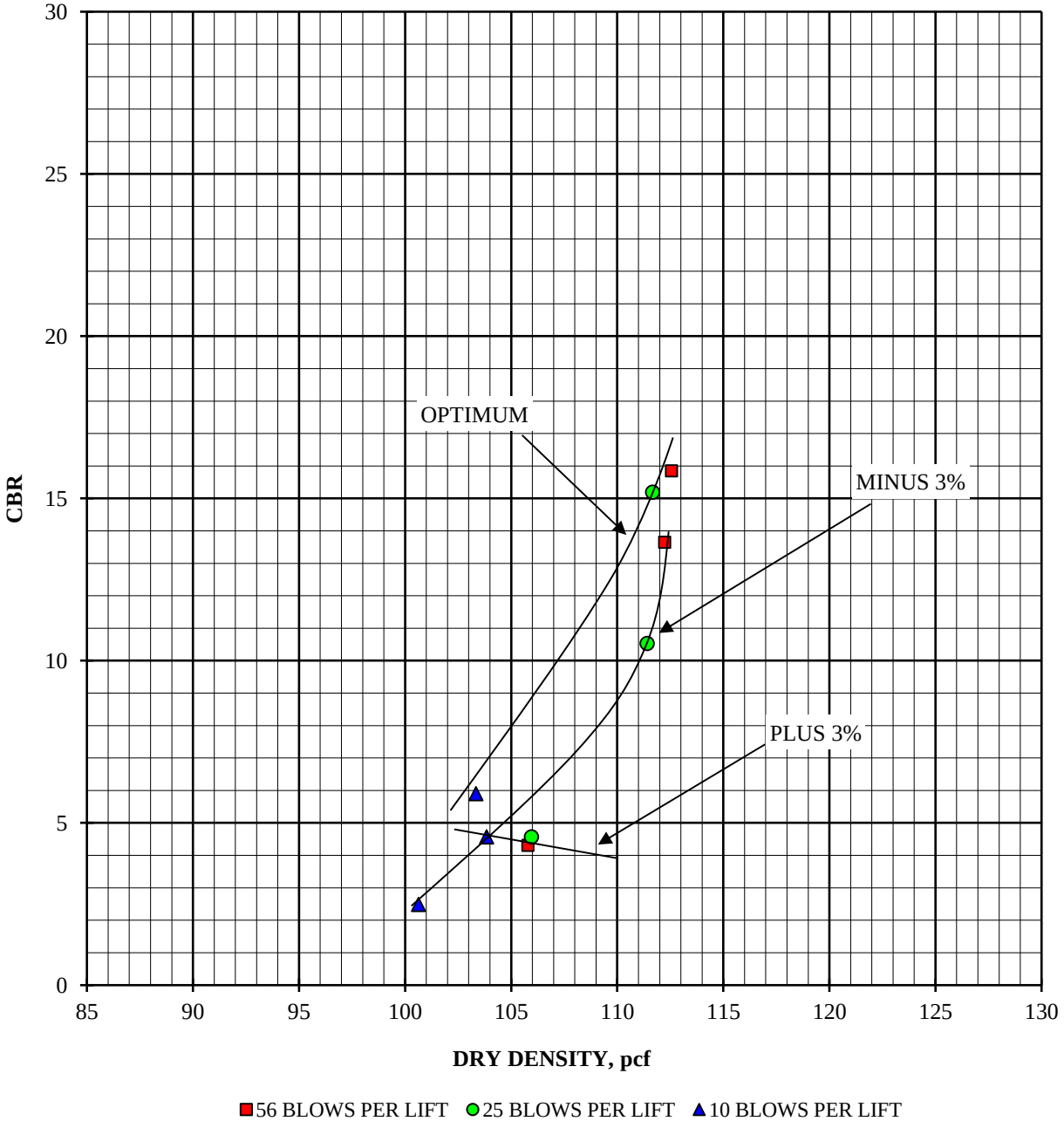


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #13; Boring #40 @ 1.5 - 3.5'
Brown Silty Sand (SM)

January 8, 2019

10 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	115.8	119.0	116.3
Moisture content, %, before soak	6.2	9.2	12.2
Moisture content, %, after soak, avg.	14.9	11.8	18.8
Moisture content, %, after soak, top 1"	19.3	15.9	14.0
Expansion, %, 96 hour soak	0.2	0.1	0.0
Bearing Ratio, 0.100" penetration	4.9	15.3	6.7

25 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	122.8	127.8	120.4
Moisture content, %, before soak	6.2	9.2	12.2
Moisture content, %, after soak, avg.	11.1	10.4	12.5
Moisture content, %, after soak, top 1"	15.1	11.4	13.0
Expansion, %, 96 hour soak	0.4	0.1	0.0
Bearing Ratio, 0.100" penetration	16.9	25.3	4.8

56 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	123.0	129.2	121.2
Moisture content, %, before soak	6.2	9.2	12.2
Moisture content, %, after soak, avg.	15.6	11.7	14.1
Moisture content, %, after soak, top 1"	13.3	10.4	12.4
Expansion, %, 96 hour soak	0.5	0.2	0.0
Bearing Ratio, 0.100" penetration	26.2	35.0	4.6

Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #13; Boring #40 @ 1.5 - 3.5'

January 8, 2019

Brown Silty Sand (SM)

CBR vs. MOISTURE CONTENT

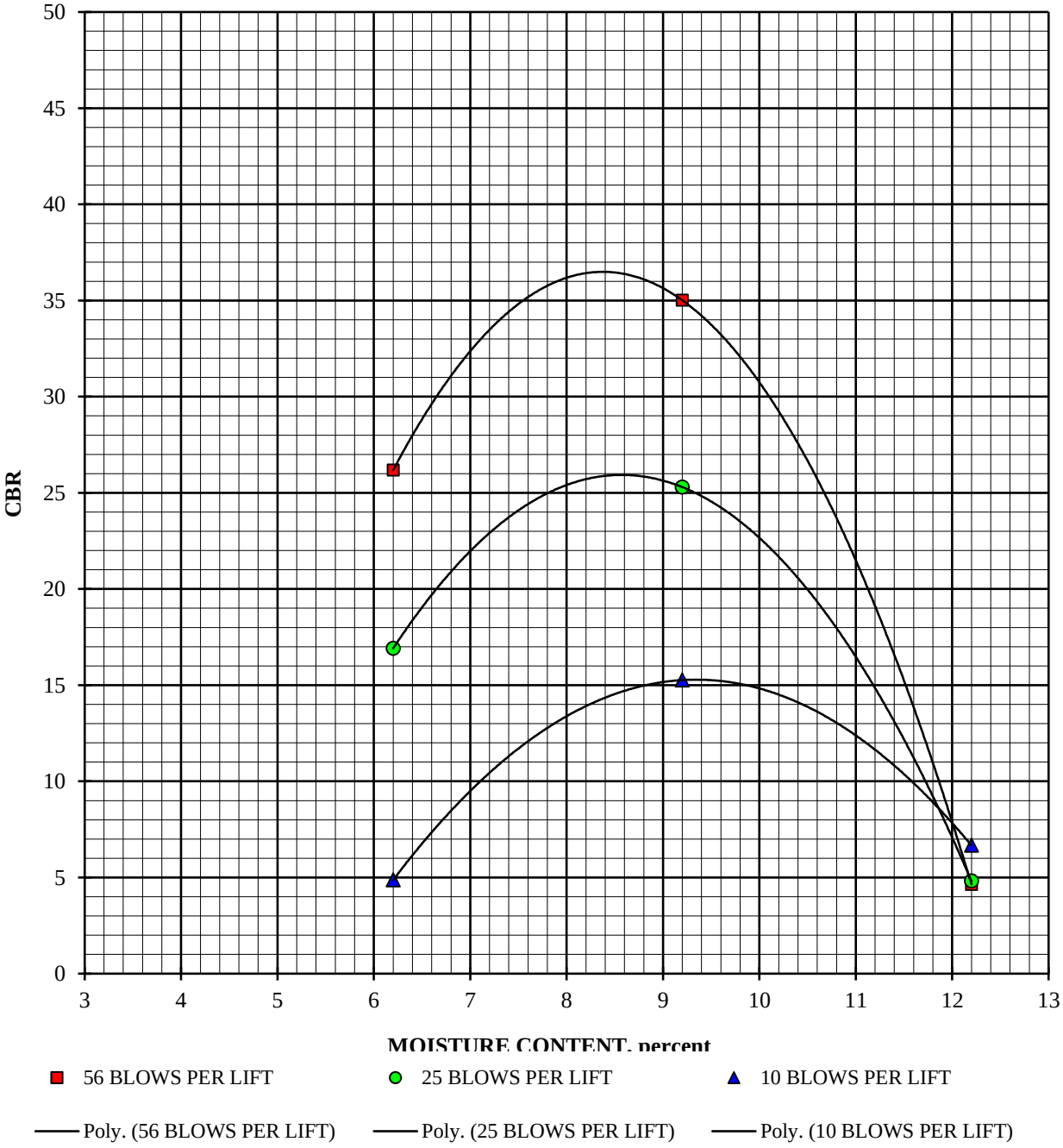


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #13; Boring #40 @ 1.5 - 3.5'

January 8, 2019

Brown Silty Sand (SM)

DRY DENSITY vs. MOISTURE CONTENT

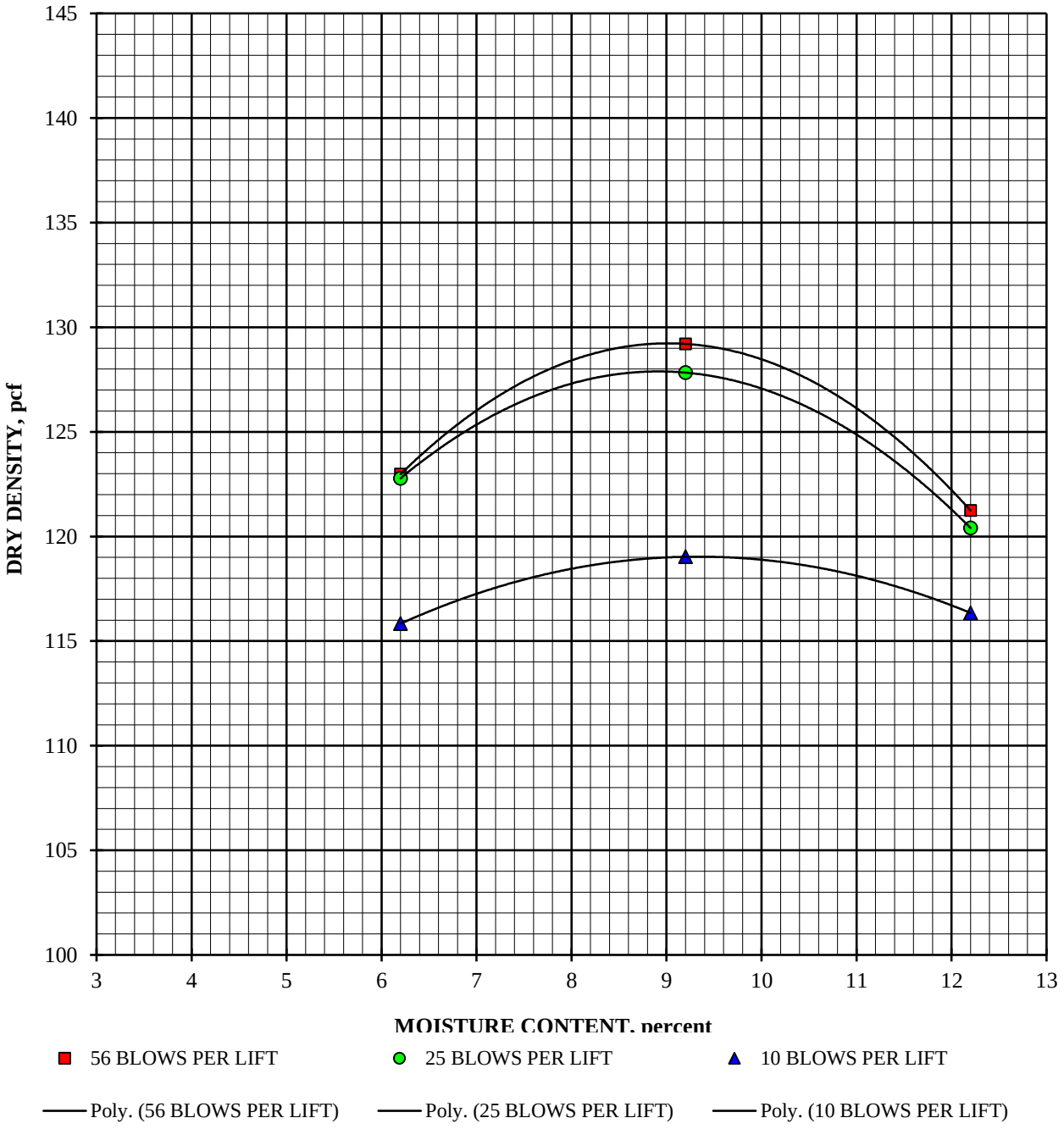


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #13; Boring #40 @ 1.5 - 3.5'

January 8, 2019

Brown Silty Sand (SM)

DRY DENSITY vs. CBR

Arranged According to Moisture Content

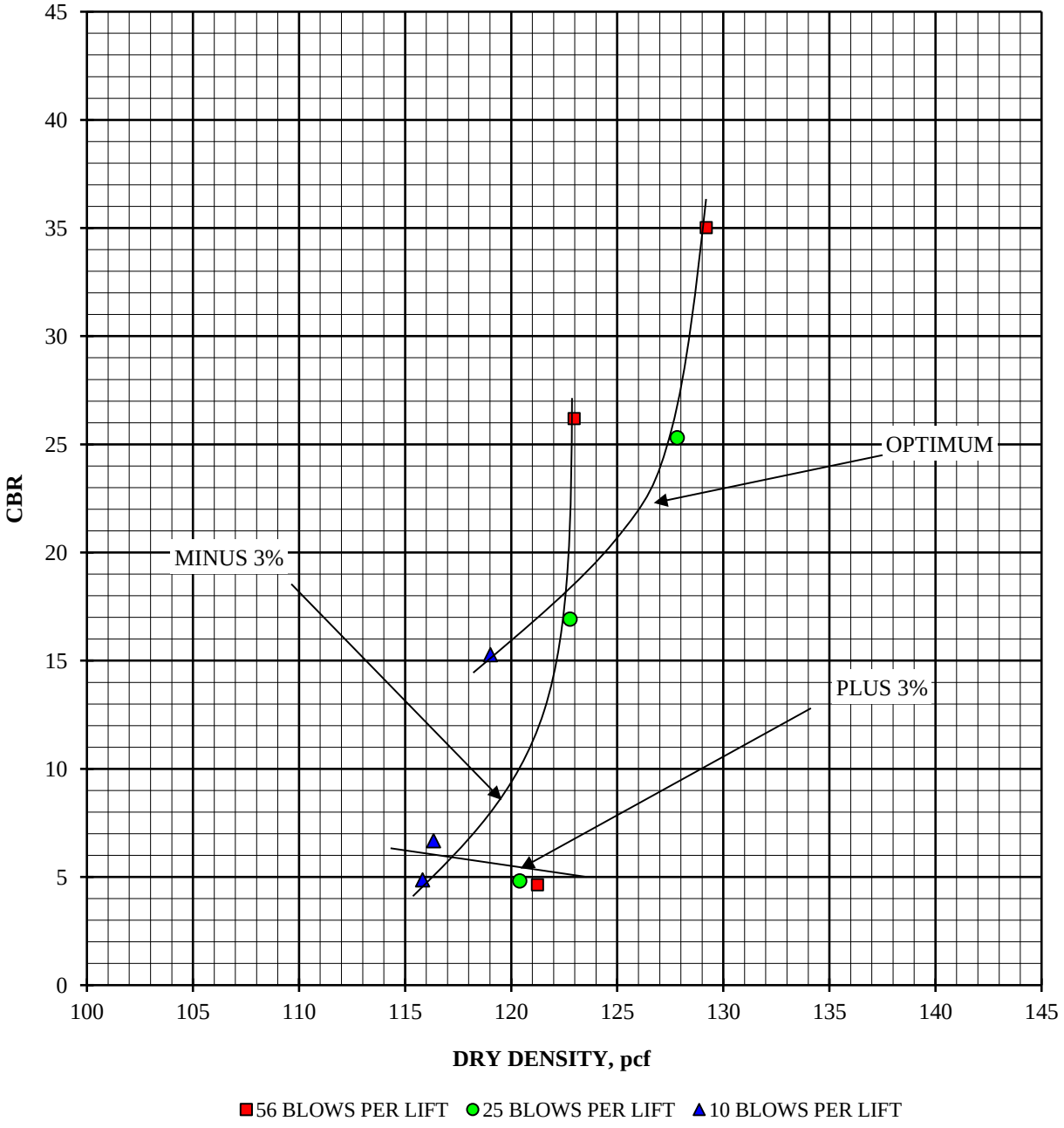


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #14; Boring #39 @ 2.0 - 5.0'
Brown Sandy Fat Clay (CH)

January 8, 2019

10 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	105.6	110.2	106.0
Moisture content, %, before soak	6.6	9.6	12.6
Moisture content, %, after soak, avg.	20.5	17.4	24.2
Moisture content, %, after soak, top 1"	22.2	21.4	17.8
Expansion, %, 96 hour soak	5.3	3.1	2.2
Bearing Ratio, 0.100" penetration	2.0	3.2	2.2

25 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	115.3	117.5	116.0
Moisture content, %, before soak	6.6	9.6	12.6
Moisture content, %, after soak, avg.	16.8	15.3	13.9
Moisture content, %, after soak, top 1"	21.9	17.9	17.2
Expansion, %, 96 hour soak	3.3	2.0	0.0
Bearing Ratio, 0.100" penetration	3.8	5.5	4.6

56 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	118.2	123.8	117.2
Moisture content, %, before soak	6.6	9.6	12.6
Moisture content, %, after soak, avg.	20.0	13.1	13.2
Moisture content, %, after soak, top 1"	19.5	18.0	17.7
Expansion, %, 96 hour soak	4.1	1.6	0.0
Bearing Ratio, 0.100" penetration	6.7	14.7	3.4

Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #14; Boring #39 @ 2.0 - 5.0'

January 8, 2019

Brown Sandy Fat Clay (CH)

DRY DENSITY vs. MOISTURE CONTENT

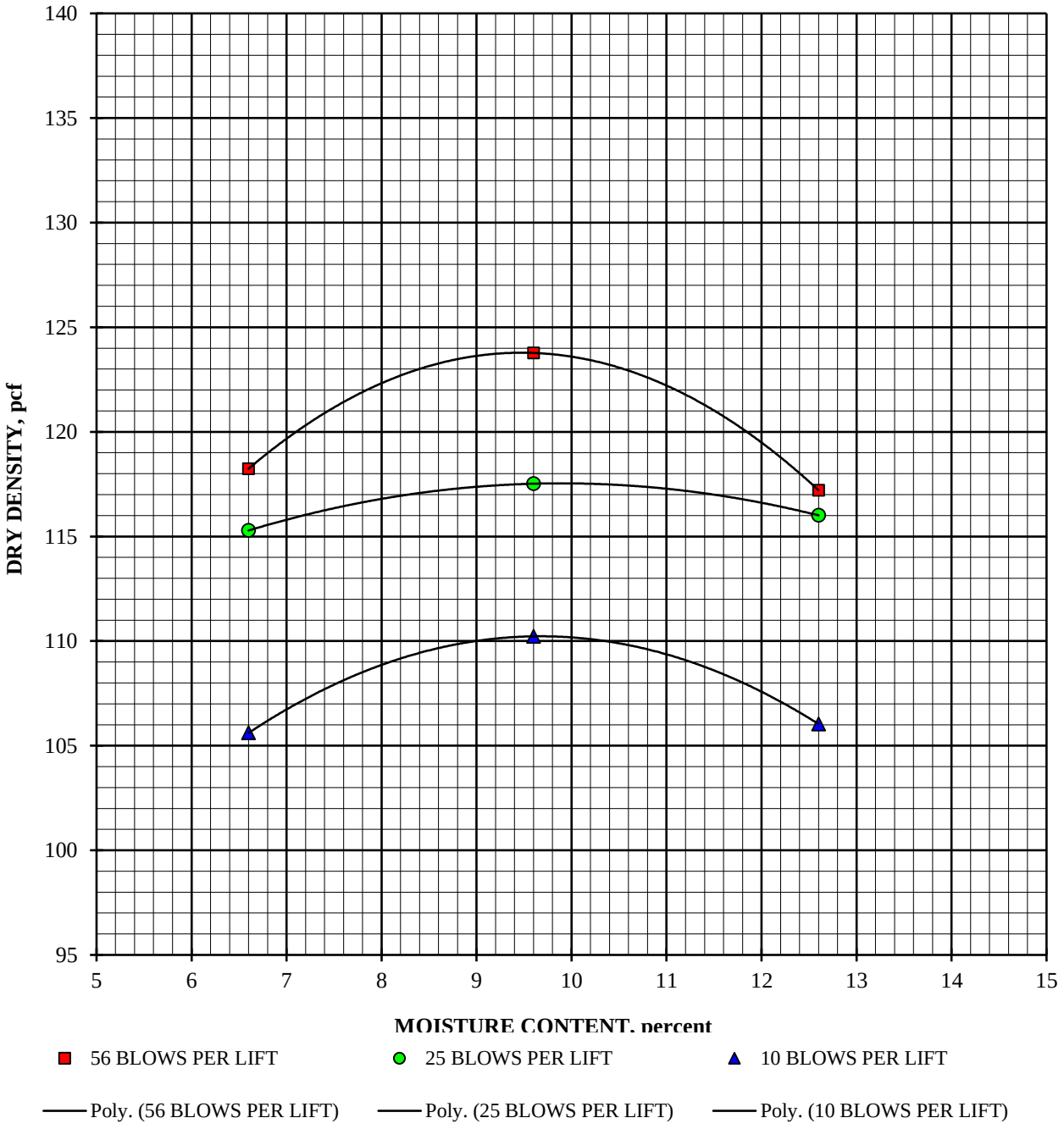


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #14; Boring #39 @ 2.0 - 5.0'

January 8, 2019

Brown Sandy Fat Clay (CH)

CBR vs. MOISTURE CONTENT

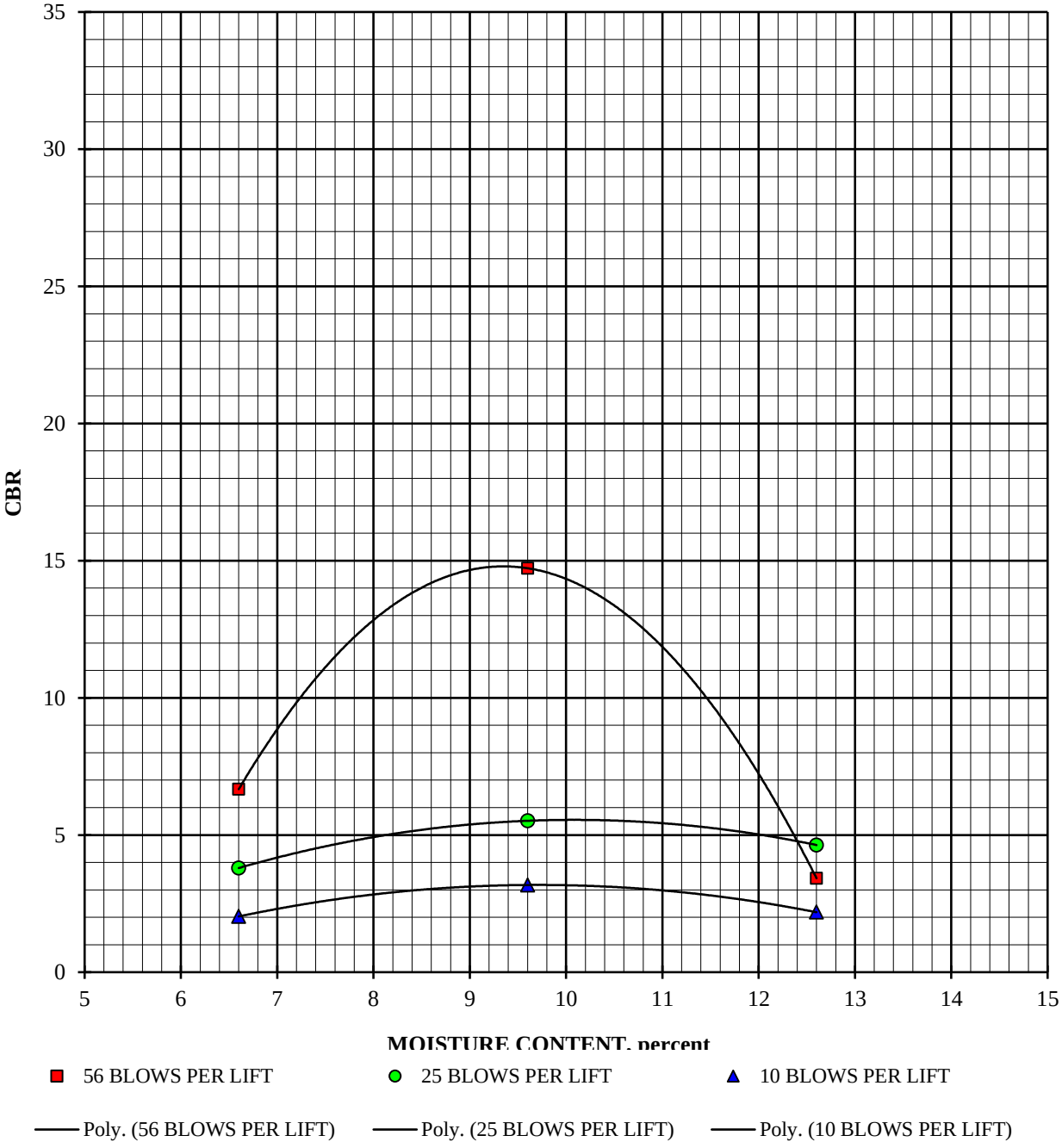


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #14; Boring #39 @ 2.0 - 5.0'

January 8, 2019

Brown Sandy Fat Clay (CH)

DRY DENSITY vs. CBR

Arranged According to Moisture Content

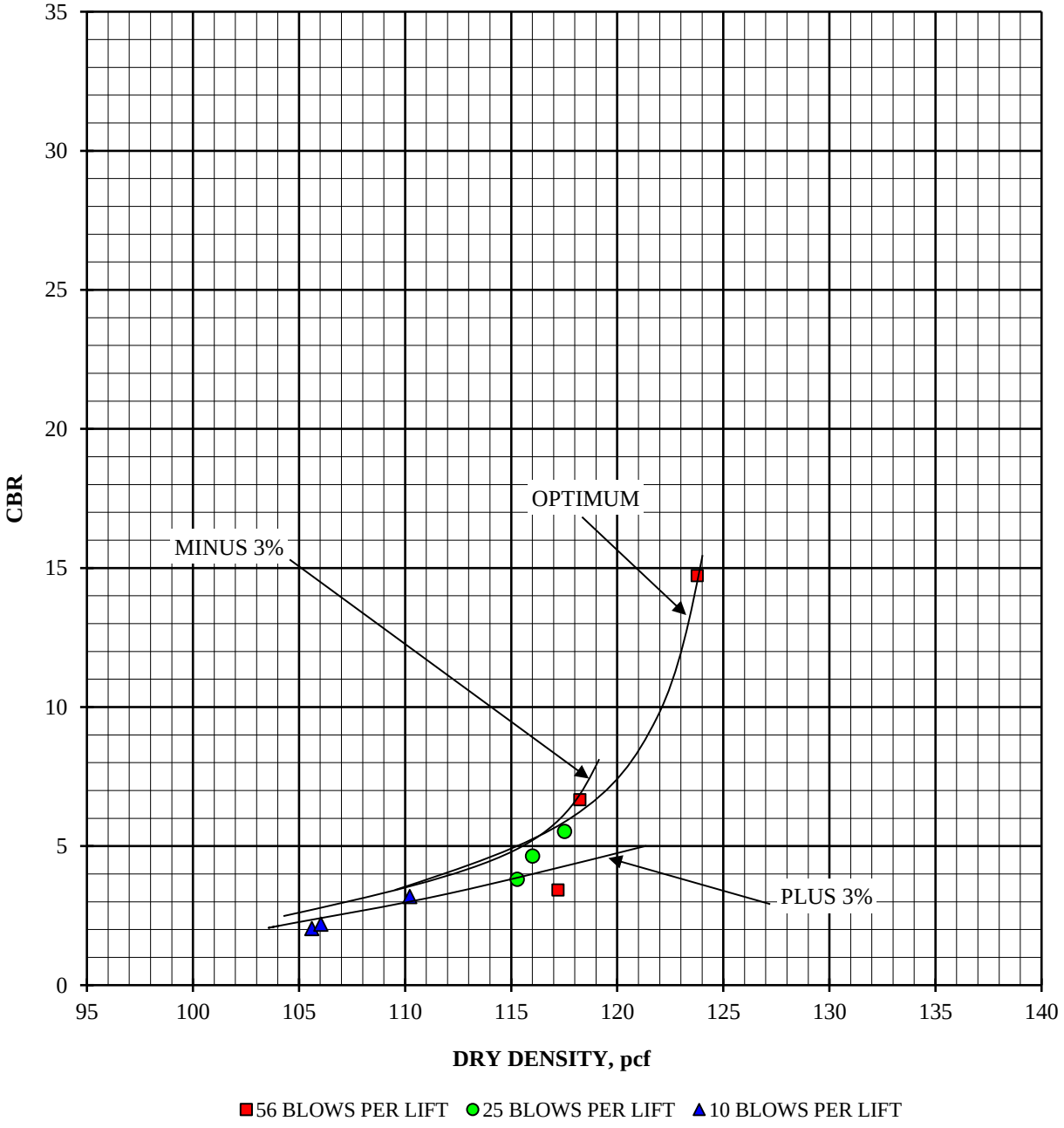


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #15; Boring #17 @ 0.5 - 1.5'
Brown Clayey Sand with Gravel (SC)

January 8, 2019

10 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	118.7	119.3	119.1
Moisture content, %, before soak	5.0	8.0	11.0
Moisture content, %, after soak, avg.	13.0	12.4	17.2
Moisture content, %, after soak, top 1"	16.7	13.8	13.6
Expansion, %, 96 hour soak	0.0	0.0	0.0
Bearing Ratio, 0.100" penetration	14.2	21.9	13.3

25 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	119.8	122.4	120.6
Moisture content, %, before soak	5.0	8.0	11.0
Moisture content, %, after soak, avg.	14.8	13.7	17.8
Moisture content, %, after soak, top 1"	14.2	13.1	12.8
Expansion, %, 96 hour soak	0.2	0.1	0.2
Bearing Ratio, 0.100" penetration	15.8	61.2	24.7

56 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	125.3	129.2	128.1
Moisture content, %, before soak	5.0	8.0	11.0
Moisture content, %, after soak, avg.	5.6	9.3	19.9
Moisture content, %, after soak, top 1"	16.3	14.4	13.6
Expansion, %, 96 hour soak	0.2	0.1	0.0
Bearing Ratio, 0.100" penetration	20.8	81.7	61.2

Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #15; Boring #17 @ 0.5 - 1.5'

January 8, 2019

Brown Clayey Sand with Gravel (SC)

CBR vs. MOISTURE CONTENT

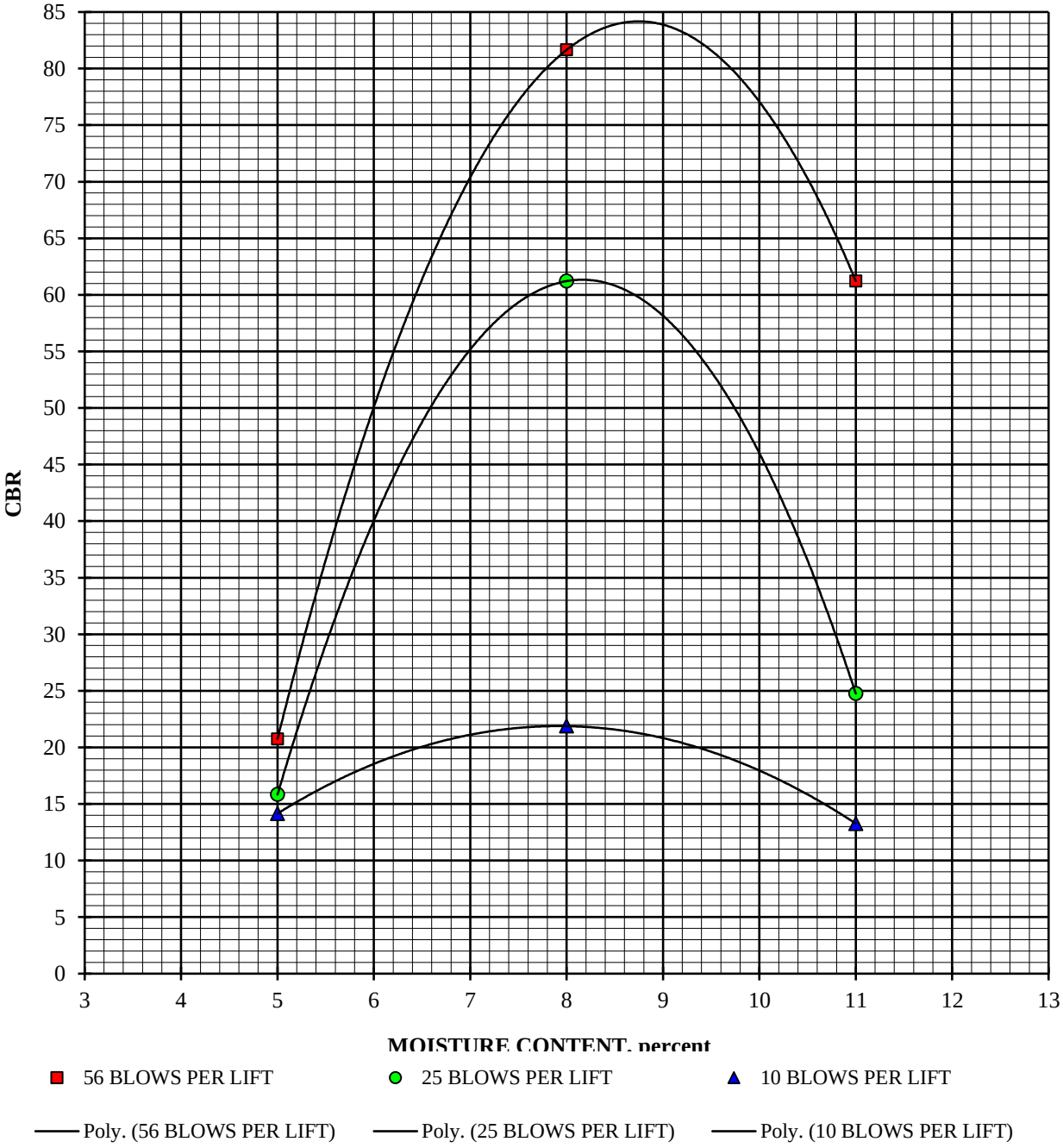


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #15; Boring #17 @ 0.5 - 1.5'

January 8, 2019

Brown Clayey Sand with Gravel (SC)

DRY DENSITY vs. MOISTURE CONTENT

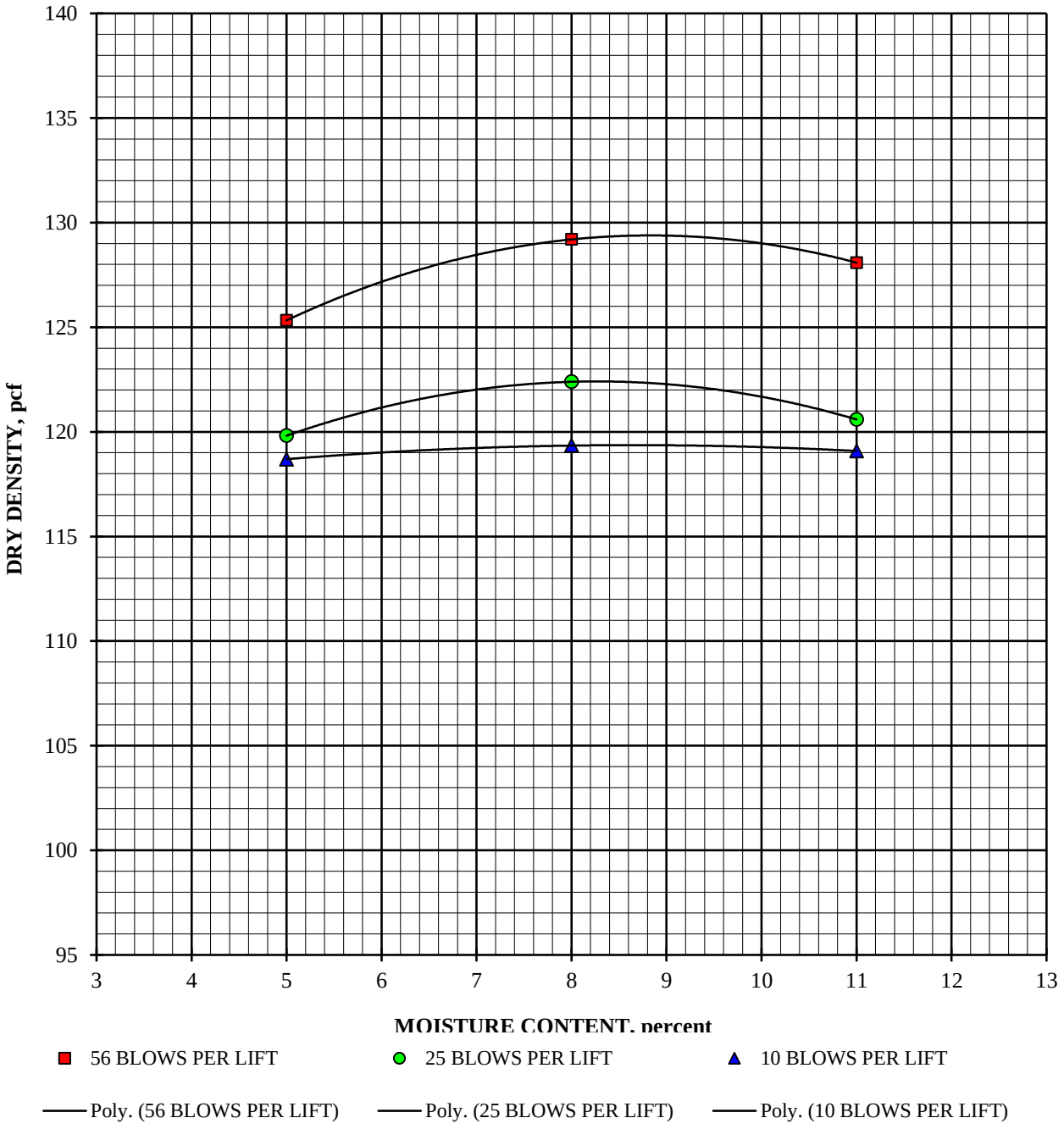


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #15; Boring #17 @ 0.5 - 1.5'

January 8, 2019

Brown Clayey Sand with Gravel (SC)

DRY DENSITY vs. CBR

Arranged According to Moisture Content

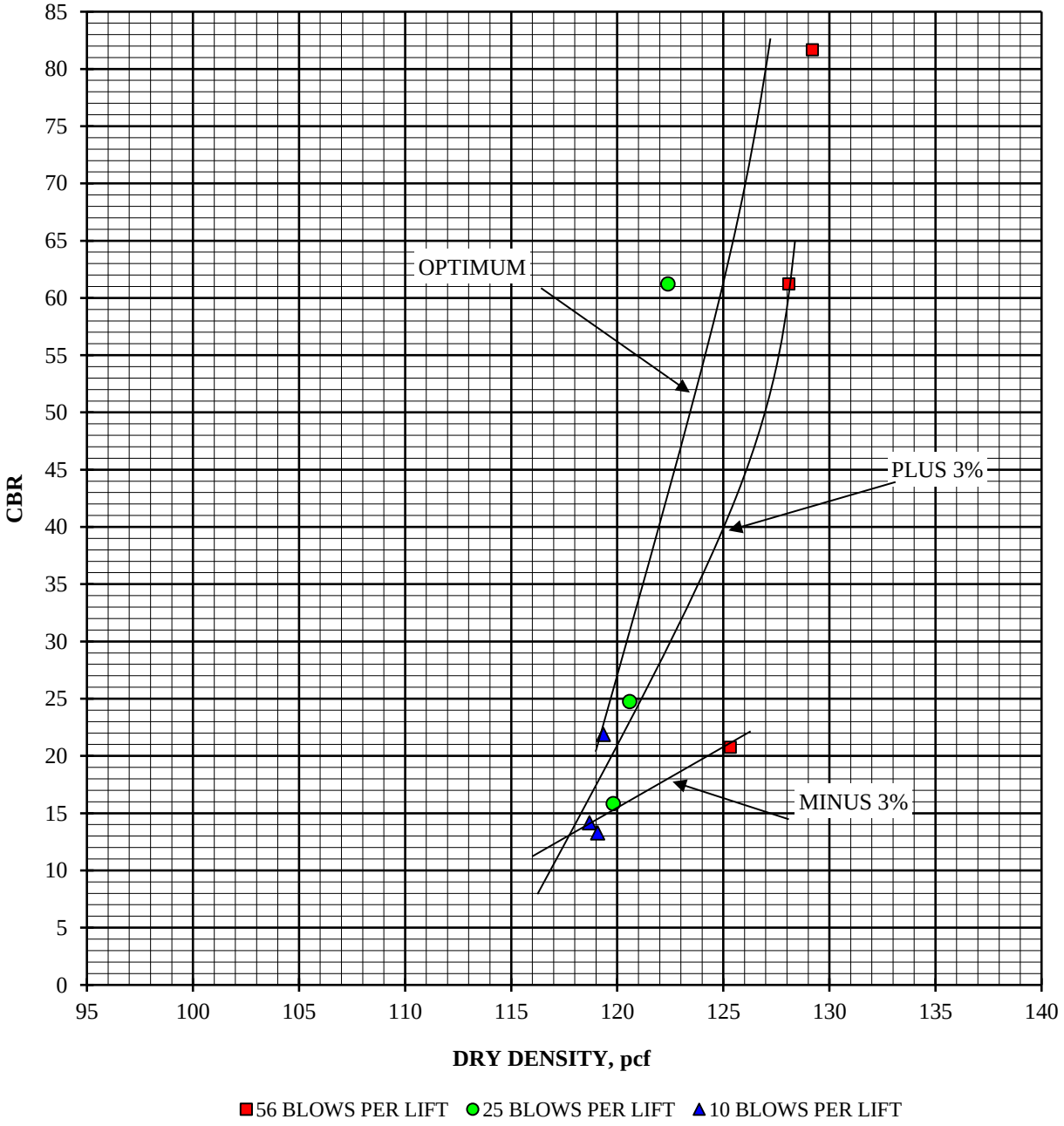


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #16; Boring #28 @ 0.5 - 1.5'
Brown Silty Gravel with Sand (GM)

January 8, 2019

10 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	118.8	121.8	112.9
Moisture content, %, before soak	3.5	6.5	9.5
Moisture content, %, after soak, avg.	8.2	8.9	20.8
Moisture content, %, after soak, top 1"	9.6	9.3	9.0
Expansion, %, 96 hour soak	0.0	0.0	0.0
Bearing Ratio, 0.100" penetration	6.9	24.9	14.9

25 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	119.0	124.4	113.7
Moisture content, %, before soak	3.5	6.5	9.5
Moisture content, %, after soak, avg.	8.7	8.1	11.4
Moisture content, %, after soak, top 1"	9.8	8.0	8.7
Expansion, %, 96 hour soak	0.0	0.0	0.0
Bearing Ratio, 0.100" penetration	17.7	48.5	23.0

56 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	128.6	130.6	115.3
Moisture content, %, before soak	3.5	6.5	9.5
Moisture content, %, after soak, avg.	6.4	7.7	9.8
Moisture content, %, after soak, top 1"	9.0	7.1	9.2
Expansion, %, 96 hour soak	0.0	0.0	0.0
Bearing Ratio, 0.100" penetration	41.2	85.5	26.2

Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #16; Boring #28 @ 0.5 - 1.5'

January 8, 2019

Brown Silty Gravel with Sand (GM)

CBR vs. MOISTURE CONTENT

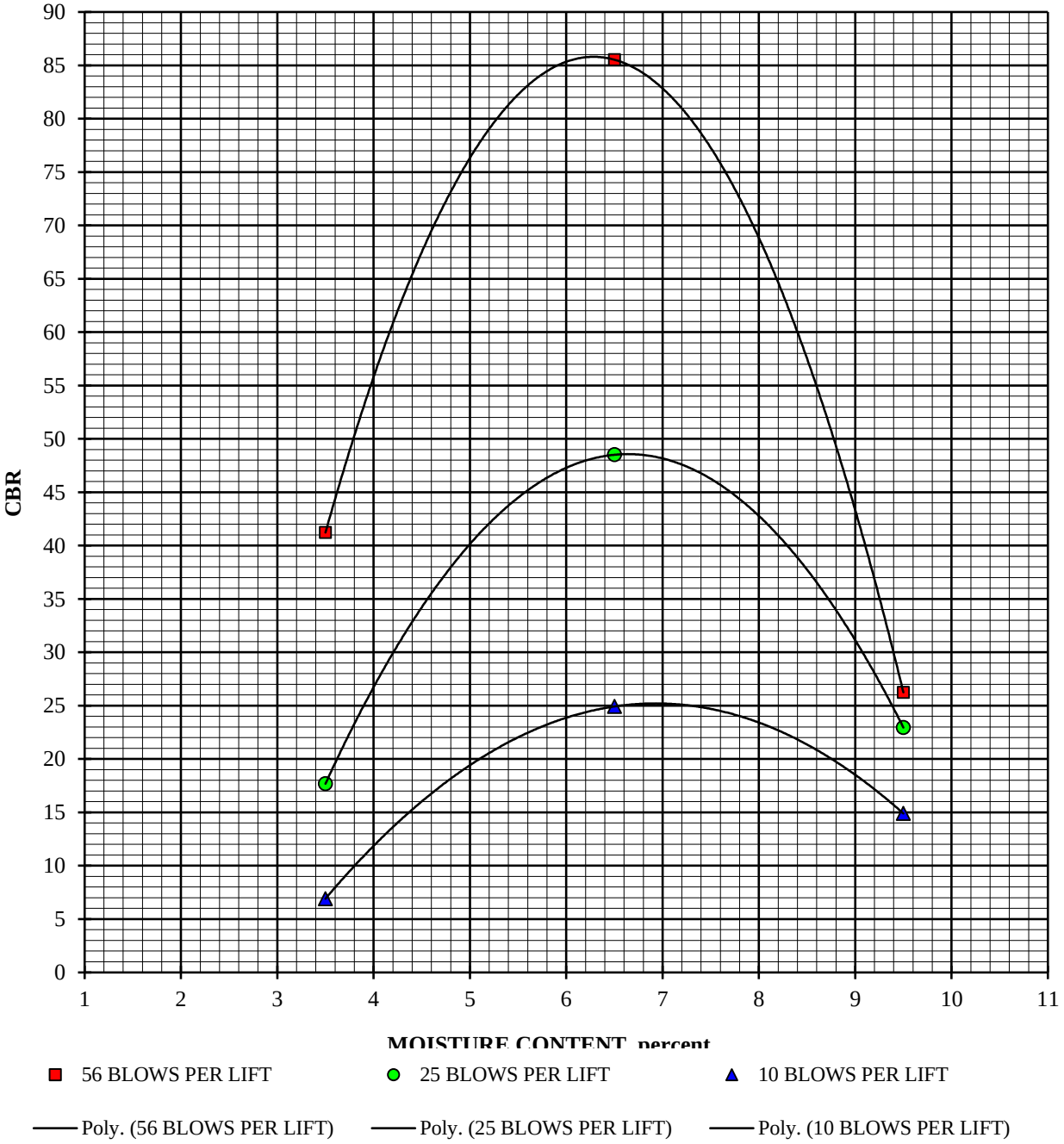


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #16; Boring #28 @ 0.5 - 1.5'

January 8, 2019

Brown Silty Gravel with Sand (GM)

DRY DENSITY vs. MOISTURE CONTENT

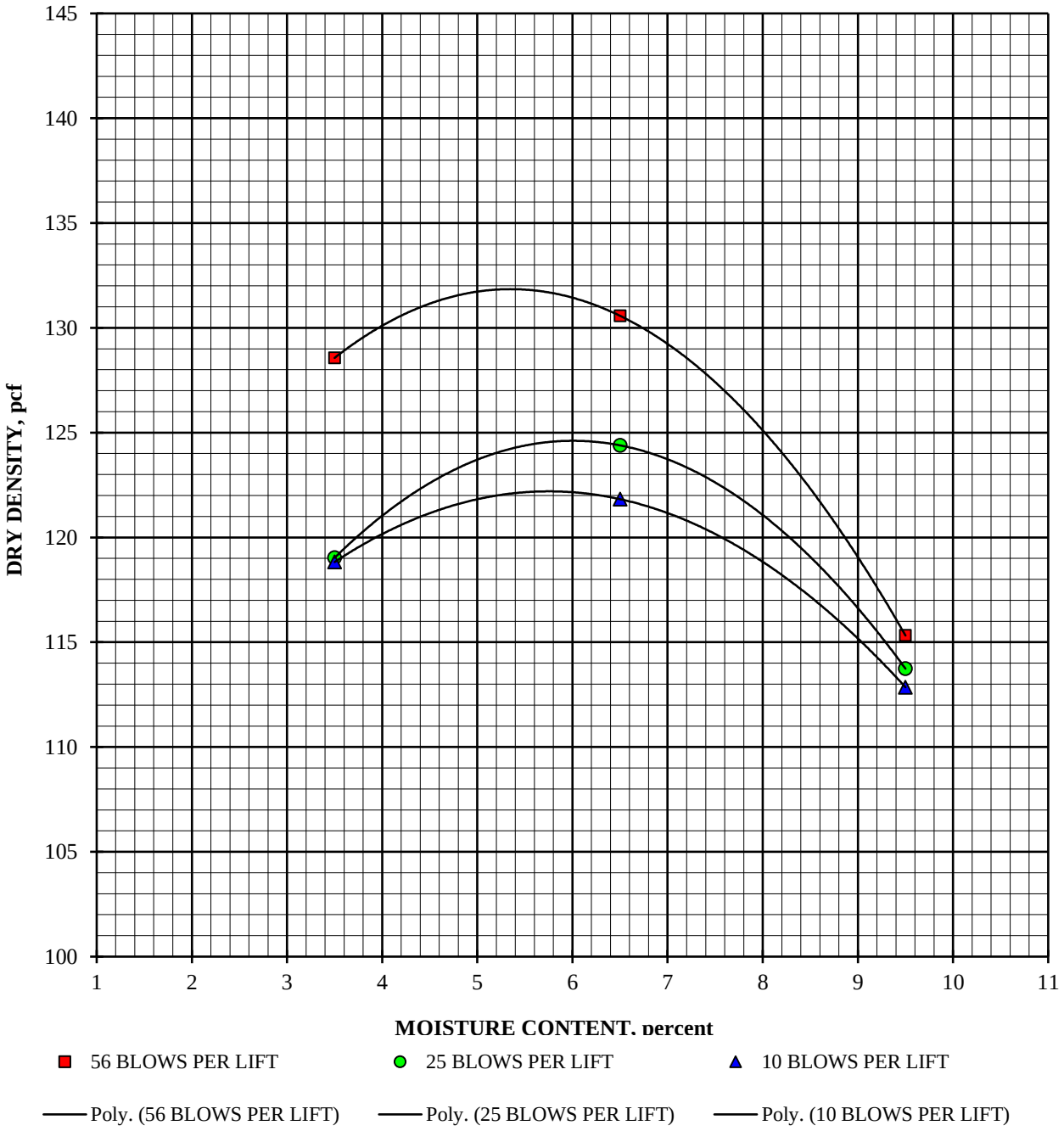


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #16; Boring #28 @ 0.5 - 1.5'

January 8, 2019

Brown Silty Gravel with Sand (GM)

DRY DENSITY vs. CBR

Arranged According to Moisture Content

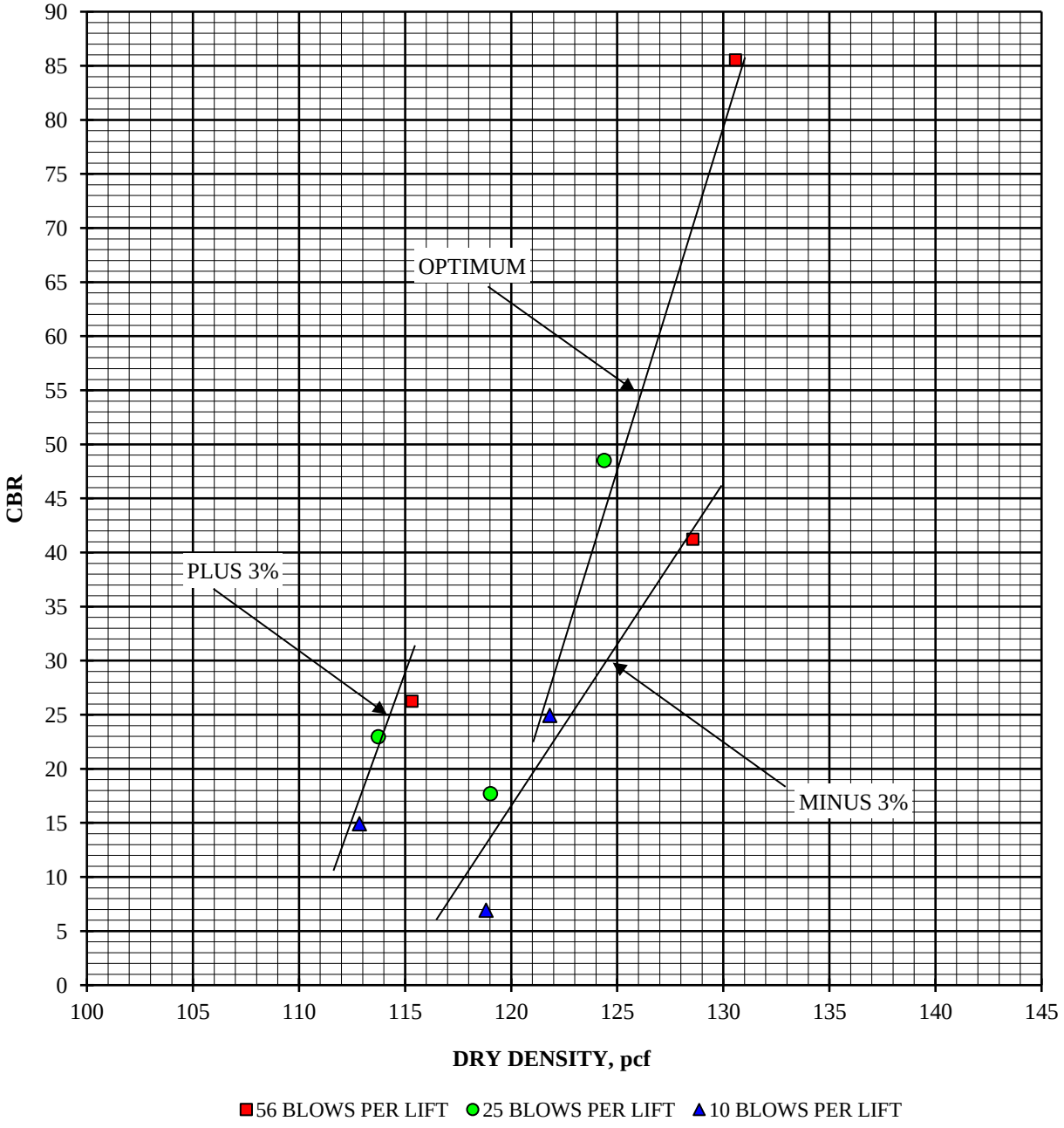


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #17; Boring #14 @ 0.5 - 1.5'
Brown Silty Sand with Gravel (SM)

January 8, 2019

10 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	120.4	121.9	114.0
Moisture content, %, before soak	2.8	5.8	8.8
Moisture content, %, after soak, avg.	12.8	9.3	9.5
Moisture content, %, after soak, top 1"	9.7	8.6	8.3
Expansion, %, 96 hour soak	0.0	0.0	0.0
Bearing Ratio, 0.100" penetration	12.2	18.5	14.7

25 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	121.5	129.2	114.5
Moisture content, %, before soak	2.8	5.8	8.8
Moisture content, %, after soak, avg.	12.2	8.1	10.8
Moisture content, %, after soak, top 1"	9.7	8.9	8.2
Expansion, %, 96 hour soak	0.0	0.0	0.0
Bearing Ratio, 0.100" penetration	12.6	52.9	23.0

56 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	121.9	129.7	116.2
Moisture content, %, before soak	2.8	5.8	8.8
Moisture content, %, after soak, avg.	9.7	8.6	9.4
Moisture content, %, after soak, top 1"	8.7	7.8	7.7
Expansion, %, 96 hour soak	0.0	0.0	0.0
Bearing Ratio, 0.100" penetration	48.4	82.9	19.9

Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #17; Boring #14 @ 0.5 - 1.5'

January 8, 2019

Brown Silty Sand with Gravel (SM)

DRY DENSITY vs. MOISTURE CONTENT

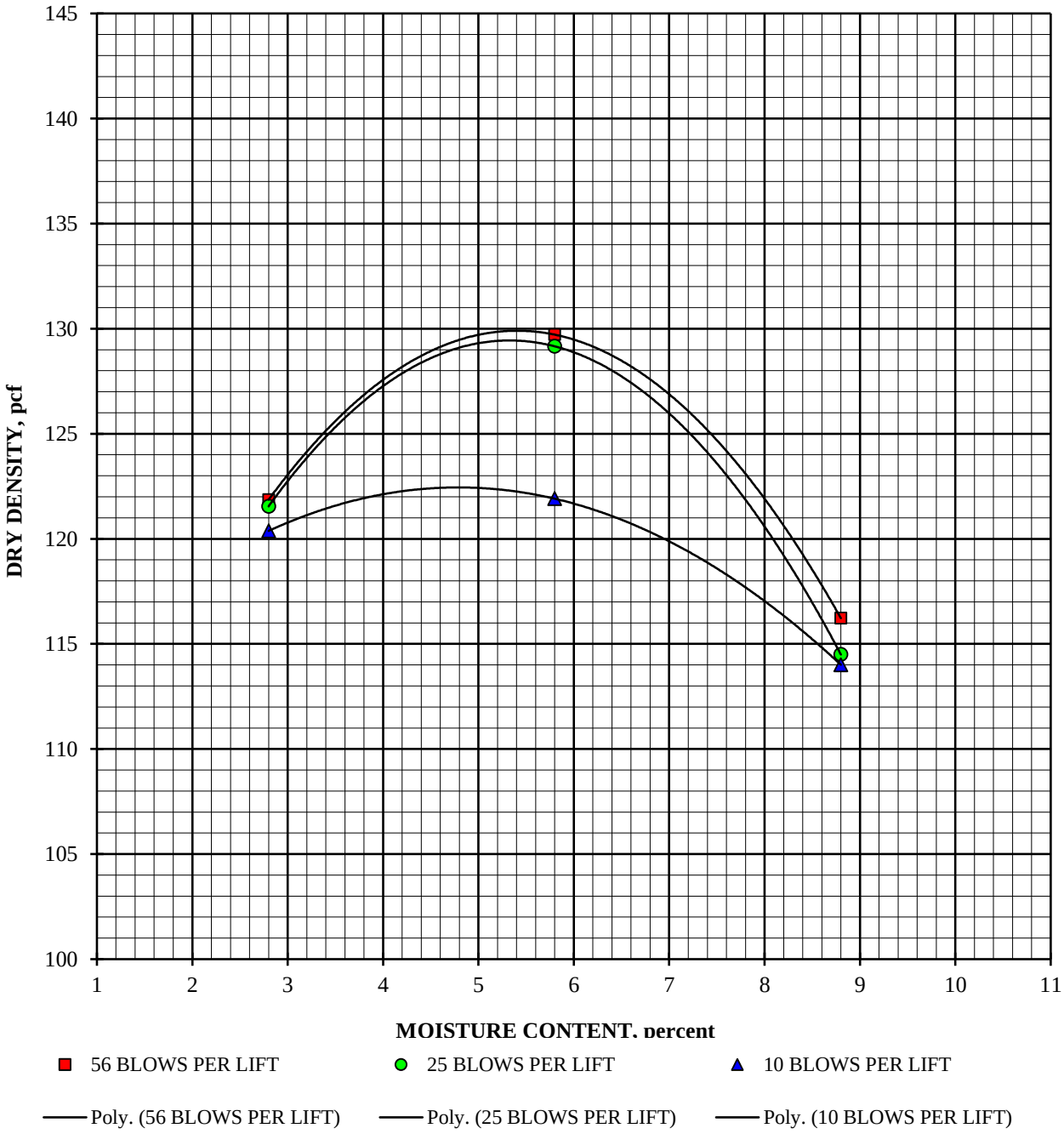


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #17; Boring #14 @ 0.5 - 1.5'

January 8, 2019

Brown Silty Sand with Gravel (SM)

CBR vs. MOISTURE CONTENT

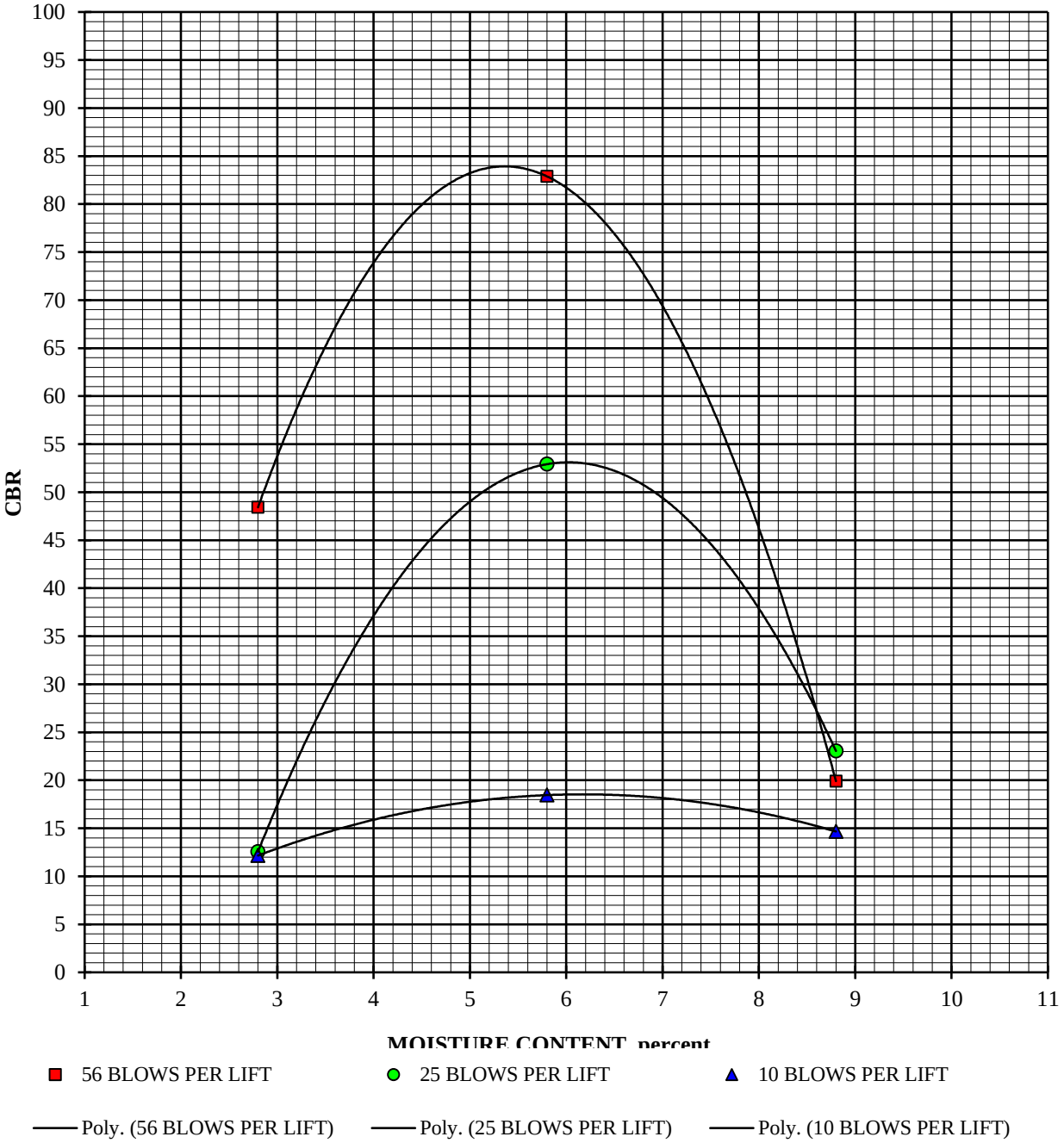


Exhibit 1

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements

302524-001

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

CBR #17; Boring #14 @ 0.5 - 1.5'

January 8, 2019

Brown Silty Sand with Gravel (SM)

DRY DENSITY vs. CBR

Arranged According to Moisture Content

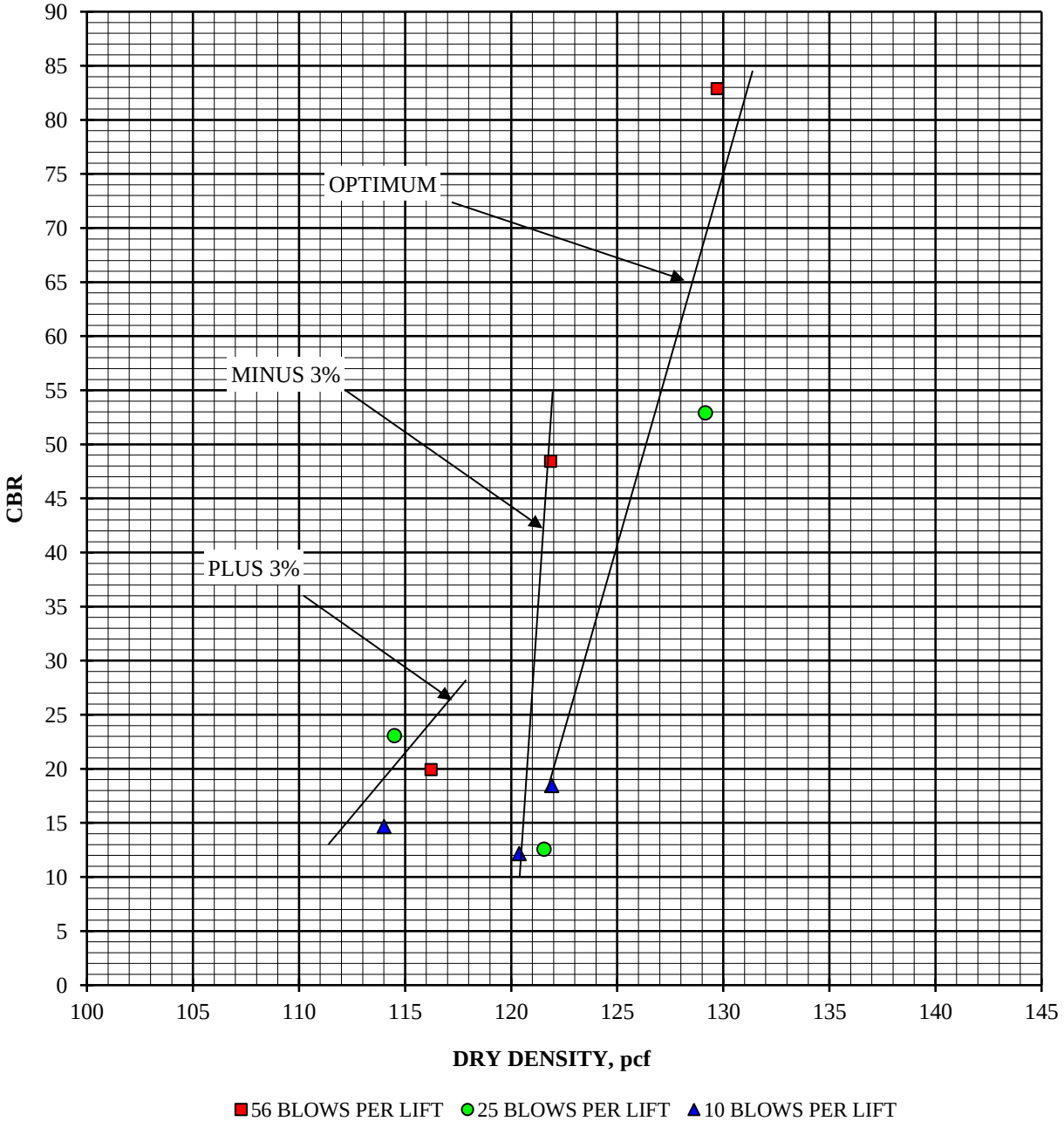


Exhibit 1

APPENDIX C

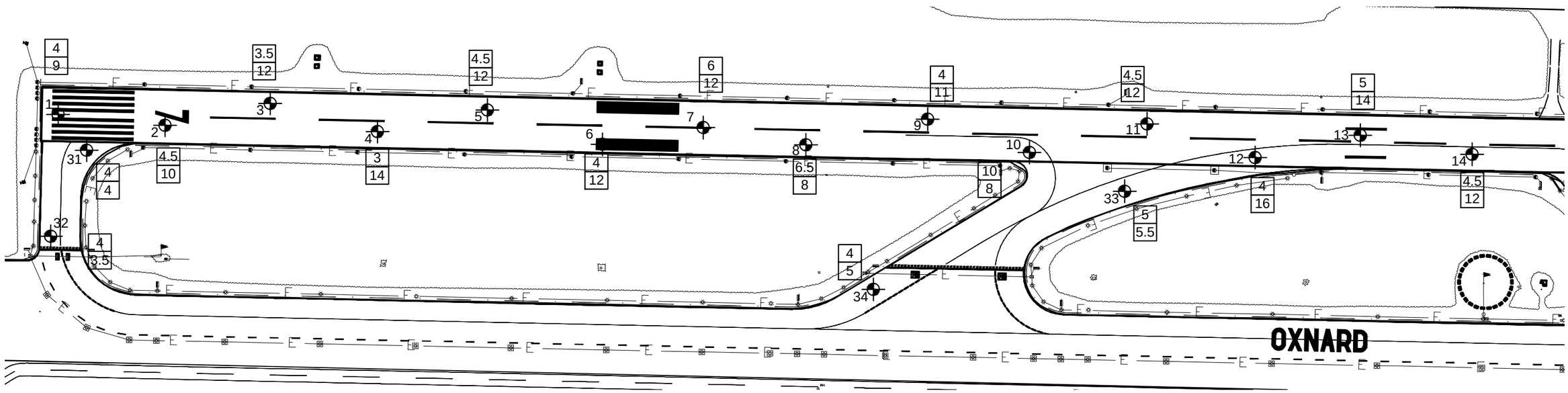
Figures 2a and 2b – Existing Pavement Section Thicknesses

Figures 3a and 3b – USCS Soil Types at Subgrade

Figures 4a and 4b – CBR Values – 95% Minimum Relative Compaction at Subgrade

Figures 5a and 5b – Approximate CBR Values Based on Existing Soil Density and Moisture Content at Subgrade

Figures 6a and 6b – Subgrade Soil Moisture Content



LEGEND

40 Boring Location (Approx.)

4	Asphalt Concrete (AC) - Inches
9	Miscellaneous Aggregate Base (mAB) - Inches

BASE MAP PROVIDED BY: MEAD AND HUNT, INC

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FIGURE 2A - EXISTING PAVEMENT SECTION THICKNESSES
Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements
2889 West 5th Street
Oxnard, California

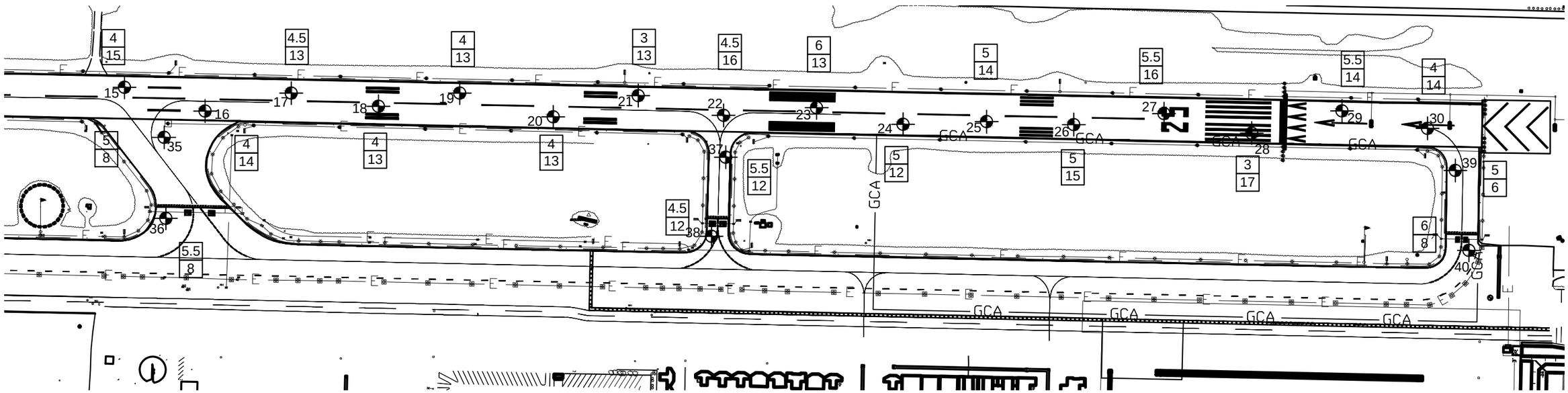
Exhibit 1

Date
February 2020

Project No.
302524-001

Sheet 1 of 2

OXNARDAIRPORT110518maps



LEGEND

40 Boring Location (Approx.)

4	Asphalt Concrete (AC) - Inches
9	Miscellaneous Aggregate Base (mAB) - Inches

BASE MAP PROVIDED BY: MEAD AND HUNT, INC

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FIGURE 2B - EXISTING PAVEMENT SECTION THICKNESSES

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements
2889 West 5th Street
Oxnard, California

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February 2020

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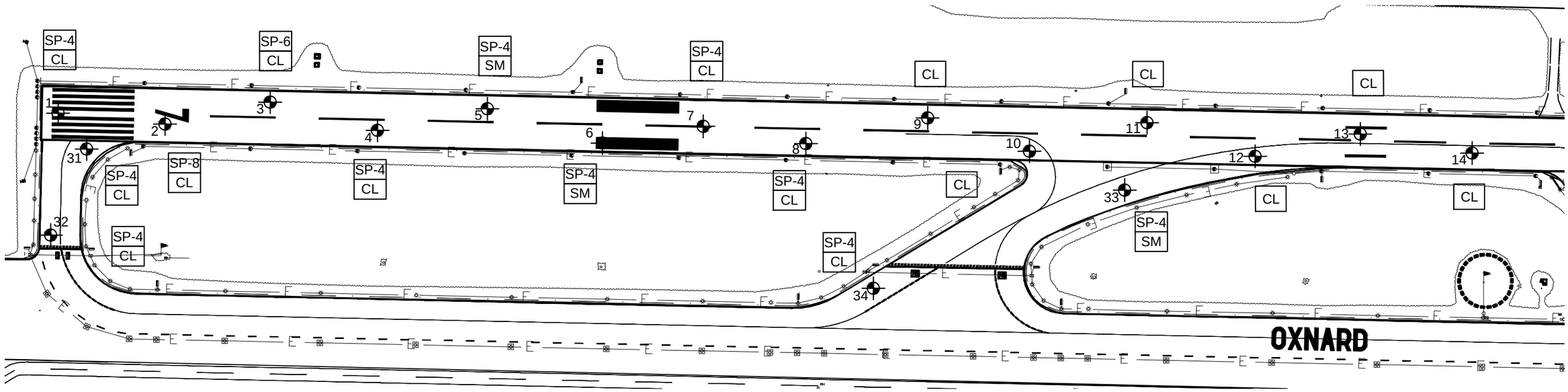

LEGEND

40 Boring Location (Approx.)

SP-X Poorly Graded Sand - "x" indicates thickness in inches where present below pavement section

CL SANDY LEAN CLAY

SM SILTY SAND

BASE MAP PROVIDED BY: MEAD AND HUNT, INC

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FIGURE 3A - USCS SOIL TYPES AT SUBGRADE

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements
2889 West 5th Street
Oxnard, California

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February 2020

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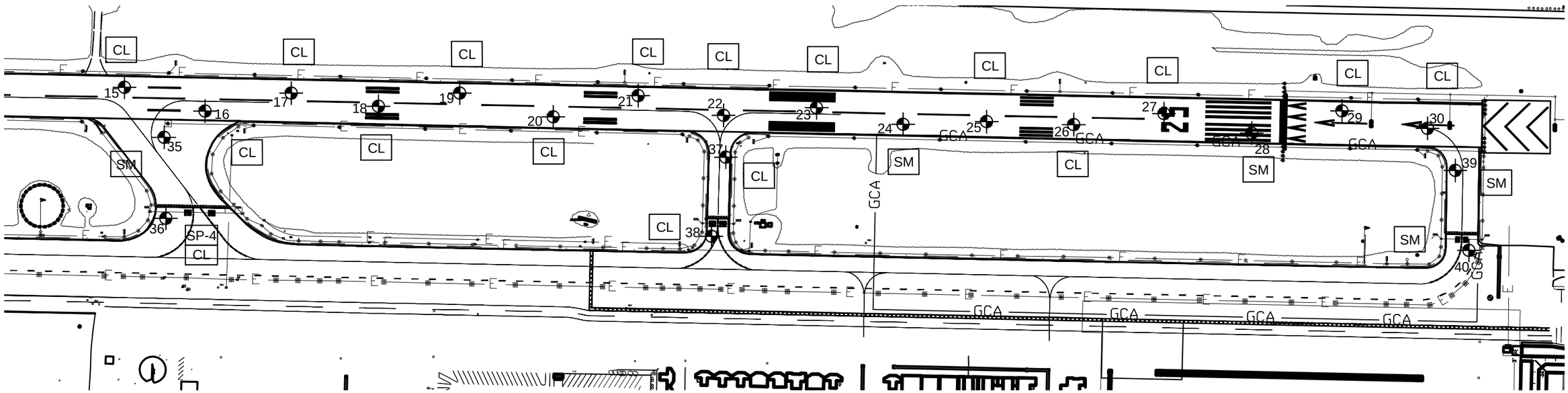

LEGEND

40 Boring Location (Approx.)

SP-X Poorly Graded SAND - "x" indicates thickness in inches where present below pavement section

CL SANDY LEAN CLAY

SM SILTY SAND

BASE MAP PROVIDED BY: MEAD AND HUNT, INC

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FIGURE 3B - USCS SOIL TYPES AT SUBGRADE

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements
2889 West 5th Street
Oxnard, California

Exhibit 1

Date
February 2020

Project No.
302524-001

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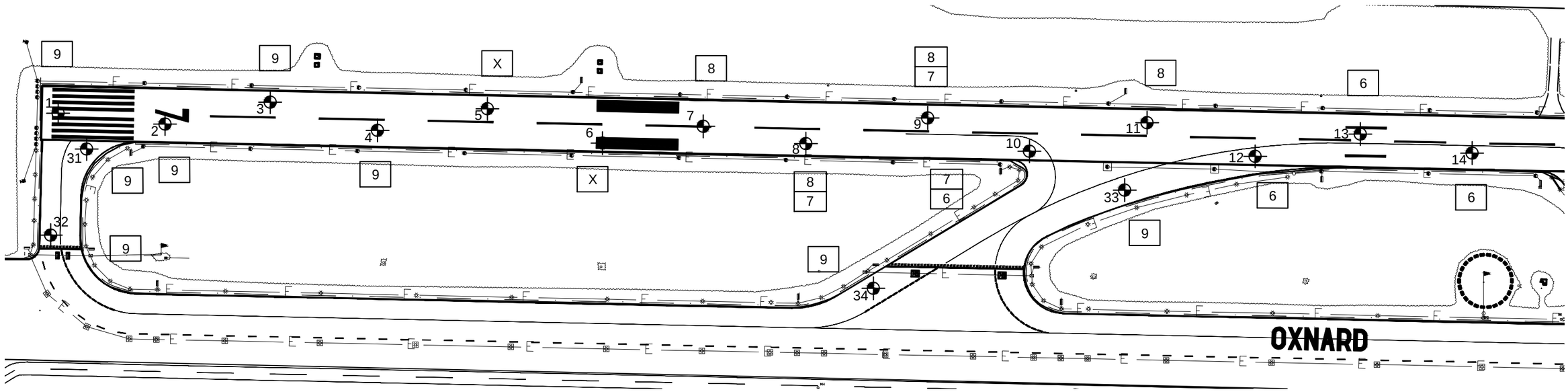
OXNARDAIRPORT110518maps



LEGEND

40 Boring Location (Approx.)

X — Subgrade soil from this boring lime treated at 3,5 and 7 percent by dry weight - See report text

9 — Recommended soil CBR value for reconstructed areas with subgrade compacted to a minimum of 95 percent relative compaction and soil moisture content in range of optimum +/- 2 percent. Thin (+/- 4 to 8 inch) poorly graded sand layers, where present, disregarded

8 / 7 — Upper Soil Layer 18 inches thick or less, CBR value possibly affected by underlying soil layer (Assumes underlying layer also compacted to 95 percent relative compaction at soil moisture content of optimum +/- 2 percent)

BASE MAP PROVIDED BY: MEAD AND HUNT, INC

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FIGURE 4A - CBR VALUES - 95% MINIMUM RELATIVE COMPACTION AT SUBGRADE

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements
2889 West 5th Street
Oxnard, California

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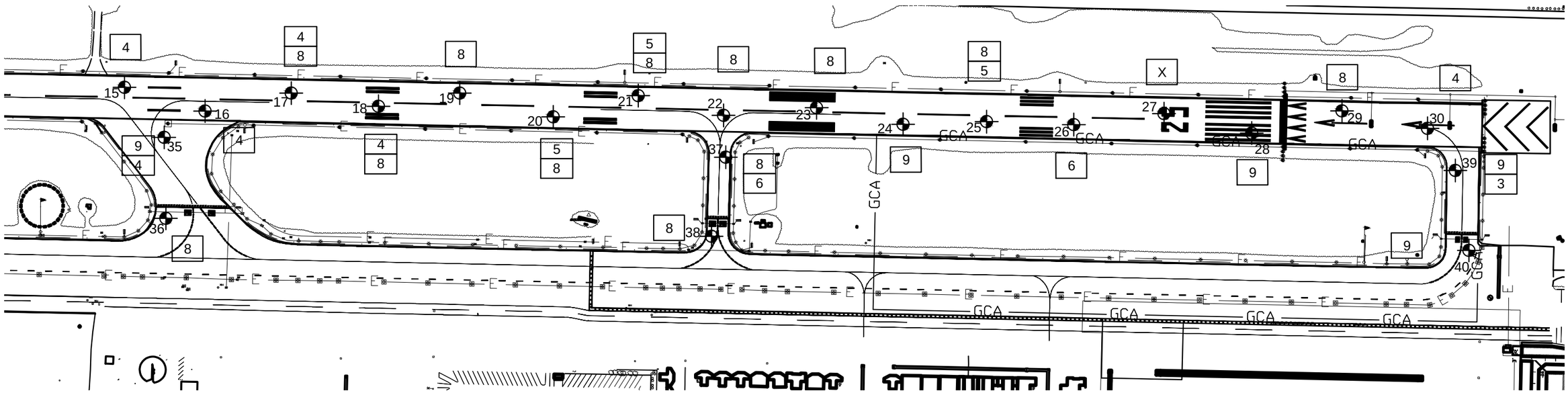
OXNARDAIRPORT110518maps



LEGEND

40 Boring Location (Approx.)

X — Subgrade soil from this boring lime treated at 3,5 and 7 percent by dry weight - See report text

9 — Recommended soil CBR value for reconstructed areas with subgrade compacted to a minimum of 95 percent relative compaction and soil moisture content in range of optimum +/- 2 percent. Thin (+/- 4 to 8 inch) poorly graded sand layers, where present, disregarded

8 / 7 — Upper Soil Layer 18 inches thick or less, CBR value possibly affected by underlying soil layer (Assumes underlying layer also compacted to 95 percent relative compaction at soil moisture content of optimum +/- 2 percent)

BASE MAP PROVIDED BY: MEAD AND HUNT, INC

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FIGURE 4B - CBR VALUES - 95% MINIMUM RELATIVE COMPACTION AT SUBGRADE

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements
2889 West 5th Street
Oxnard, California

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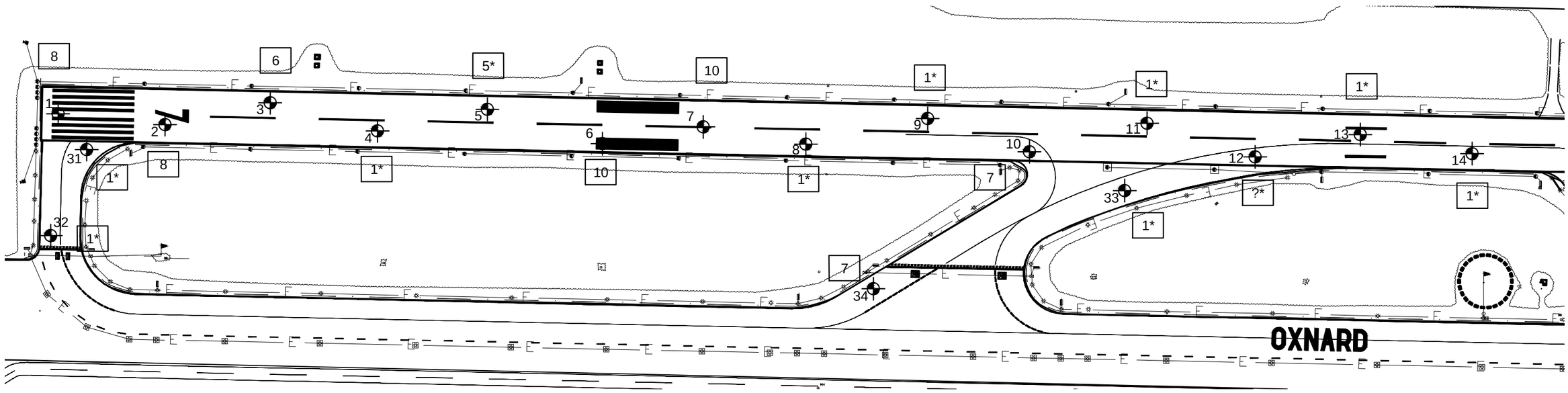

LEGEND

40 Boring Location (Approx.)

8 — Approximate CBR based on existing soil density and moisture content at subgrade. Thin (+/- 4 to 8 inch) poorly graded sand layers, where present, disregarded

1* — Asterisk indicates soil density and/or moisture content beyond laboratory data range - CBR value estimated only. Question mark (?) indicates no estimate possible from laboratory data.

BASE MAP PROVIDED BY: MEAD AND HUNT, INC

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FIGURE 5A - APPROXIMATE CBR VALUES BASED ON EXISTING SOIL DENSITY AND MOISTURE CONTENT AT SUBGRADE

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements
2889 West 5th Street
Oxnard, California

Exhibit 1

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February 2020

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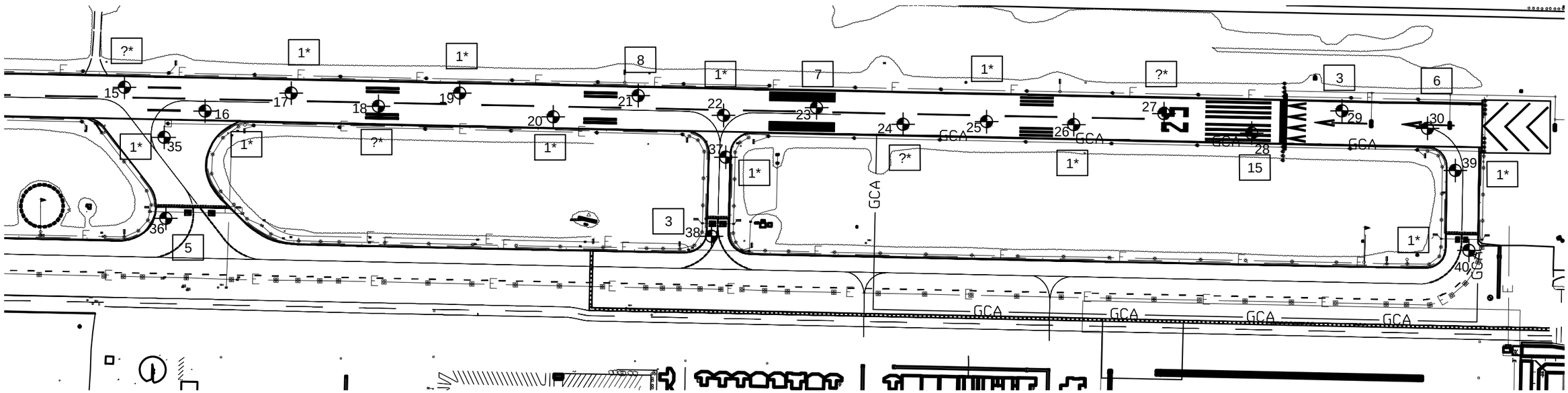

LEGEND

40 Boring Location (Approx.)

8 Approximate CBR based on existing soil density and moisture content at subgrade. Thin (+/- 4 to 8 inch) poorly graded sand layers, where present, disregarded

1* Asterisk indicates soil density and/or moisture content beyond laboratory data range - CBR value estimated only. Question mark (?) indicates no estimate possible from laboratory data.

BASE MAP PROVIDED BY: MEAD AND HUNT, INC

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FIGURE 5B - APPROXIMATE CBR VALUES BASED ON EXISTING SOIL DENSITY AND MOISTURE CONTENT AT SUBGRADE

Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements
2889 West 5th Street
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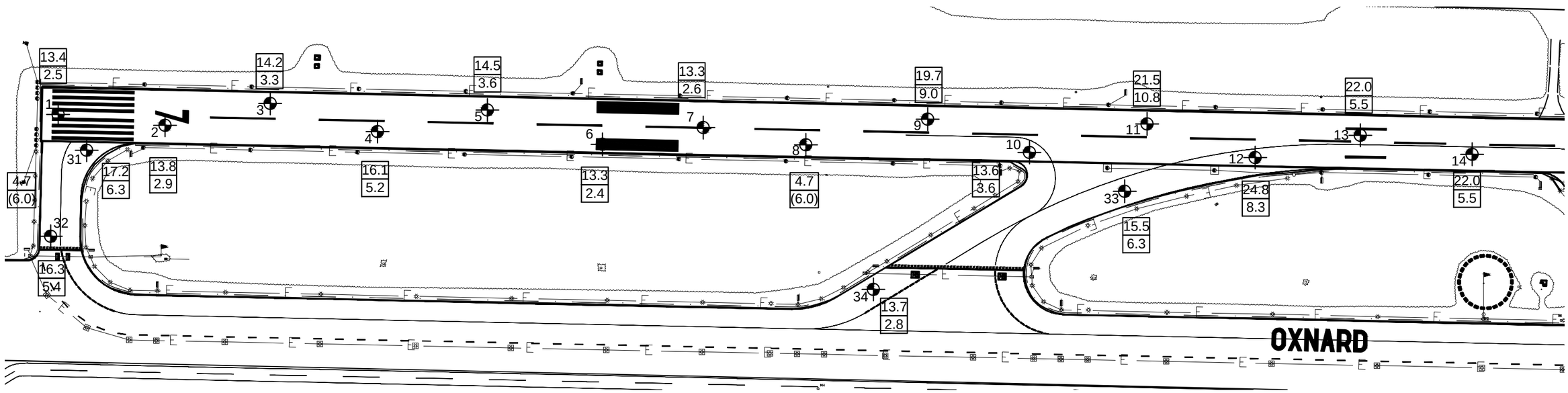

LEGEND

40 Boring Location (Approx.)

4.7	Subgrade soil moisture content at time of drilling, percent
(6.0)	Percent above (below) optimum moisture content

BASE MAP PROVIDED BY: MEAD AND HUNT, INC

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FIGURE 6A - SUBGRADE SOIL MOISTURE CONTENT
Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements
2889 West 5th Street
Oxnard, California

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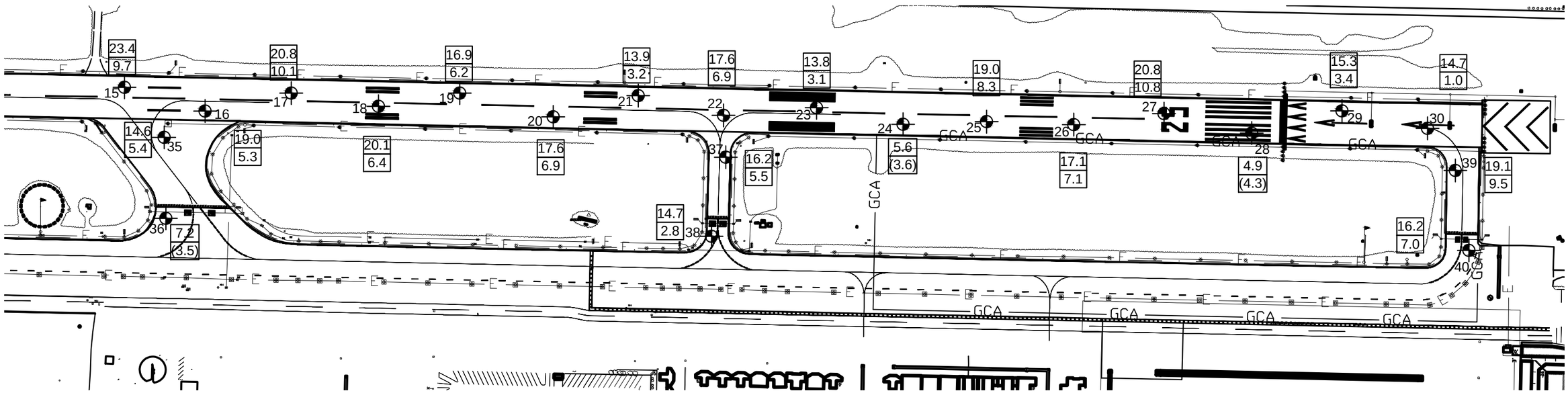

LEGEND

40 Boring Location (Approx.)

4.7 Subgrade soil moisture content at time of drilling , percent
(6.0) Percent above (below) optimum moisture content

BASE MAP PROVIDED BY: MEAD AND HUNT, INC

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FIGURE 6B - SUBGRADE SOIL MOISTURE CONTENT
Oxnard Airport - Runway 7-25 and Taxiway Connector Improvements
2889 West 5th Street
Oxnard, California

Exhibit 1

Date
February 2020

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302524-001

Sheet 2 of 2

OXNARDAIRPORT110518maps

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APPENDIX D

Estimates of Earthwork Shrinkage

Exhibit 1

OXNARD AIRPORT **ESP File No. 302524-001**
RUNWAY 7-25 AND TAXIWAY CONNECTOR IMPROVEMENTS
0

Estimates of Soil Shrinkage Using In-Place Density Values from Borings and Assumed Final Relative Compaction Values. All Calculations Based on Uniform Density, Moisture Content and Compaction Effort Negative Values Indicate Expansion (Bulking).

CBR No.	Boring No.	Depth	Material Description	USCS Classification	Maximum Density, pcf	Optimum Moisture, %
1	1	2.0 - 2.5 ft.	Dark Brown Sandy Lean Clay	CL	123.5	10.9
5	36	2.0 - 5.0 ft.	Dark Brown Sandy Lean Clay	CL	121.5	10.7
7	23	3.5 - 5.0 ft	Brown Lean Clay	CL	121.6	10.9
8	29	2.0 - 5.0 ft.	Brown/Gray Mottled Sandy Lean Clay	CL	123.1	11.9
11	16	2.0 - 4.0 ft	Dark Brown Sandy Lean Clay	CL	114.7	13.7
12	13	2.0 - 4.0 ft.	Dark Brown Sandy Lean Clay	CL	112.2	16.5
13	40	1.5 - 3.5 ft.	Brown Silty Sand	SM	126.5	9.2
14	39	2.0 - 5.0 ft.	Brown Sandy Fat Clay	CH	120.4	9.6

Boring	Depth, Ft. Below Ext. Grade	Moisture in Place, %	Dry Density in Place, pcf	Maximum Dens., pcf	Existing Rel.Comp. %	Shrinkage, % at 95.0 % Rel. Comp.	Shrinkage, % at 96.0 % Rel. Comp.	Shrinkage, % at 97.0 % Rel. Comp.	Shrinkage, % at 98.0 % Rel. Comp.	Shrinkage, % at 99.0 % Rel. Comp.	Shrinkage, % at 100.0 % Rel. Comp.
1	2-2.5	13.4	119.4	123.5	96.7	-1.7	-0.7	0.3	1.4	2.4	3.4
2	2.5-3	13.8	121.1	123.5	98.1	-3.1	-2.1	-1.1	-0.1	1.0	2.0
3	2.5-3	14.2	116.9	123.5	94.7	0.4	1.4	2.5	3.5	4.6	5.6
4	2.5-3	16.1	116.2	123.5	94.1	1.0	2.0	3.1	4.2	5.2	6.3
5	2.5-3	14.5	118.3	123.5	95.8	-0.8	0.2	1.3	2.3	3.4	4.4
6	2.5-3	13.3	121.5	123.5	98.4	-3.4	-2.4	-1.4	-0.4	0.6	1.6
7	2-2.5	13.3	121.9	121.5	100.3	-5.3	-4.3	-3.3	-2.3	-1.3	-0.3
8	2-2.5	4.7	118.1	121.5	97.2	-2.3	-1.2	-0.2	0.8	1.9	2.9
9	2.5-3	19.7	102.6	121.5	84.4	12.5	13.7	14.9	16.1	17.2	18.4
10	2.5-3	13.6	115.0	122.5	93.9	1.2	2.3	3.3	4.4	5.5	6.5
11	2.5-3	21.5	104.0	121.5	85.6	11.0	12.2	13.3	14.5	15.7	16.8
12	2.5-3	24.8	95.5	112.2	85.1	11.6	12.8	14.0	15.1	16.3	17.5
13	2.5-3	22.0	101.2	112.2	90.2	5.3	6.4	7.5	8.7	9.8	10.9
14	2.5-3	22.0	102.5	112.2	91.4	4.0	5.1	6.2	7.3	8.4	9.5
15	2.5-3	23.4	100.1	114.7	87.3	8.9	10.0	11.1	12.3	13.4	14.6
16	2.5-3	19.0	109.3	114.7	95.3	-0.3	0.7	1.8	2.8	3.9	4.9
17	2.5-3	20.8	104.8	121.5	86.3	10.1	11.3	12.5	13.6	14.8	15.9
18	2.5-3	20.1	103.2	114.7	90.0	5.6	6.7	7.8	8.9	10.0	11.1
19	2.5-3	16.9	113.4	121.5	93.3	1.8	2.9	3.9	5.0	6.1	7.1
20	2.5-3	17.6	111.7	121.5	91.9	3.3	4.4	5.5	6.6	7.7	8.8
21	2-2.5	13.9	119.5	121.5	98.4	-3.4	-2.4	-1.4	-0.4	0.7	1.7
22	3-3.5	17.6	114.0	121.5	93.8	1.3	2.3	3.4	4.4	5.5	6.6
23	2.5-3	13.8	118.5	121.5	97.5	-2.6	-1.6	-0.5	0.5	1.5	2.5
24	2.5-3	5.6	107.2	126.5	84.7	12.1	13.3	14.5	15.6	16.8	18.0
25	2.5-3	19.0	106.3	121.5	87.5	8.6	9.7	10.9	12.0	13.2	14.3
26	3-3.5	17.1	110.1	122.5	89.9	5.7	6.8	7.9	9.0	10.1	11.3
27	3-3.5	20.8	97.4	122.5	79.5	19.5	20.7	22.0	23.3	24.5	25.8
28	2.5-3	4.9	122.5	126.5	96.8	-1.9	-0.9	0.2	1.2	2.2	3.3
29	2.5-3	15.3	112.5	123.1	91.4	4.0	5.0	6.1	7.2	8.3	9.4
30	2.5-3	14.7	112.2	114.7	97.8	-2.9	-1.9	-0.8	0.2	1.2	2.2
31	2.5-3	17.2	110.6	123.5	89.6	6.1	7.2	8.3	9.4	10.5	11.7
32	2-2.5	16.3	110.8	123.5	89.7	5.9	7.0	8.1	9.2	10.3	11.5
33	2-2.5	15.5	115.3	126.5	91.1	4.2	5.3	6.4	7.5	8.6	9.7
34	2-2.5	13.7	118.4	123.5	95.9	-0.9	0.1	1.2	2.2	3.3	4.3
35	2-2.5	14.6	117.0	126.5	92.5	2.7	3.8	4.9	6.0	7.0	8.1
36	2-2.5	7.2	114.7	121.5	94.4	0.6	1.7	2.8	3.8	4.9	5.9
37	2.5-3	16.2	110.1	121.5	90.6	4.8	5.9	7.0	8.1	9.3	10.4
38	2.5-3	14.7	110.9	123.1	90.1	5.5	6.6	7.7	8.8	9.9	11.0
39	2-2.5	19.1	108.4	120.4	90.0	5.5	6.6	7.7	8.8	10.0	11.1
40	2.5-3	16.2	117.1	126.5	92.6	2.6	3.7	4.8	5.9	6.9	8.0
					Average Shrinkage, percent, all locations :	**3.4**	**4.5**	**5.6**	**6.7**	**7.8**	**8.9**
						At 95.0 % Rel. Comp.	**At 96.0 % Rel. Comp.**	**At 97.0 % Rel. Comp.**	**At 98.0 % Rel. Comp.**	**At 99.0 % Rel. Comp.**	**At 100.0 % Rel. Comp.**

Exhibit 1

GEOTECHNICAL ENGINEERING REPORT
OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 WEST 5TH STREET
OXNARD, CALIFORNIA
MEAD & HUNT, INC. PROJECT NO. 3138400-181115.03

July 10, 2020

Prepared for

Mr. Jeff Leonard, PE
Associate Practice Leader
Aviation Services
Mead & Hunt, Inc.

Prepared by

Earth Systems Pacific
4378 Old Santa Fe Road
San Luis Obispo, CA 93401

Exhibit 1

Earth Systems
4378 Old Santa Fe Road | San Luis Obispo, CA 93401 | Ph: 805.544.3276 | www.earthsystems.com

July 10, 2020

FILE NO.: 302524-002

Mr. Jeff Leonard, PE
Vice President
Mead & Hunt, Inc.
1360 19th Hole Drive, Suite 200
Windsor, CA 95492-7717

PROJECT: OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 WEST 5TH STREET
OXNARD, CALIFORNIA
MEAD & HUNT, INC. PROJECT NO. 3138400-181115.03

SUBJECT: Geotechnical Engineering Report

CONTRACT REFERENCE: Service Work Order No. 1, Oxnard Taxiway F, by Mead & Hunt, Inc., Referencing Proposal to Provide a Geotechnical Engineering Investigation and Recommendations, Oxnard Airport, Taxiway F Reconstruction, Oxnard, California, by Earth Systems Pacific, Doc. No. 1909-021.PRP, dated September 5, 2019

Dear Mr. Leonard:

As per the referenced Service Work Order, this geotechnical engineering report has been prepared for use in the design of the Taxiway F Improvements Project at Oxnard Airport in Oxnard, California. Boring logs and a boring location map, results of laboratory testing, and conclusions regarding CBR testing, earthwork shrinkage, and subsurface water and soil moisture contents are provided. This final report version incorporates responses to comments received from the client on a draft version issued on February 21, 2020.

We appreciate the opportunity to have provided geotechnical services for this project and look forward to working with you again in the future. If there are any questions concerning this report, please do not hesitate to contact the undersigned.

Sincerely,

Earth Systems Pacific

REGISTERED PROFESSIONAL ENGINEER
FREDERICK J. POTTHAST
No. GE 2368
Exp. 03/31/22
GEOTECHNICAL
STATE OF CALIFORNIA

Fred J. Potthast, GE
Principal Engineer

Copy to: Mead & Hunt, Inc., Attn.: Edoardo Barber, and Jannet Loera

Doc. No.: 2007-040.SER/cr

Exhibit 1

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APPENDICES

1.0 INTRODUCTION

This geotechnical engineering report has been completed for the client's use in the development of a preliminary pavement design for Taxiway F at Oxnard Airport in Oxnard, California. Previous investigations of the pavement on the Airport were provided by this firm (ESP 2015 and 2020) and by Miller Geosciences, Inc. (Miller 2014). Based on those reports, the existing pavement sections are known to consist of varying thicknesses of asphalt concrete (AC) over varying thicknesses of aggregate base (AB). Taxiway F is currently in regular use.

In general, this report contains logs of the subsurface conditions encountered in our exploratory borings, the results of laboratory tests, and conclusions regarding CBR testing, earthwork shrinkage, and subsurface water and soil moisture contents. We understand that this report, and the previous investigations, will be used by the client and the owner to determine if rehabilitation or reconstruction of Taxiway F will be necessary.

2.0 SCOPE OF SERVICES

The scope of work for this geotechnical engineering report included a general site reconnaissance, subsurface exploration, laboratory testing of soil samples, engineering evaluation of the data collected, and the preparation of this report. The investigation and subsequent recommendations were based on information and base maps provided by the client.

The report and recommendations are intended to be in general accordance with AC 150/5320-6F (FAA 2016), the client's requested work scope, and common geotechnical engineering practice in this area under similar conditions at this time. The tests were performed in general conformance with the standards noted, as modified by common geotechnical engineering practice in this area under similar conditions at this time.

It is our intent that this report be used exclusively by the client to determine if rehabilitation or reconstruction of the taxiway will be necessary. The information may also be used to develop plans for future projects; however, no other specific projects are planned at this time. Application beyond these intents is strictly at the user's risk. As there may be geotechnical issues yet to be resolved, the geotechnical engineer should be retained to provide consultation as the project progresses, to assist in verifying that pertinent geotechnical issues have been addressed and to aid in conformance with the intent of this report. In the event this report is used to develop project plans, it may also be advantageous to retain the geotechnical engineer to review the grading and drainage plans as they near completion to further aid in conformance of the plans with the intent of this report.

This report does not address issues in the domain of the contractor such as, but not limited to, site safety, excavatability, shoring, temporary slope angles, construction methods, etc. Analysis of site geology and of the soil for corrosive potential, radioisotopes, asbestos (either naturally occurring or in man-made products), lead or mold potential, hydrocarbons, or other chemical properties are beyond the scope of this investigation. Ancillary features beyond the pavement areas covered by this report are also not within our scope and are not addressed.

In the event that there are any changes in the nature of the work scope, or if any assumptions used in the preparation of this report prove to be incorrect, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and the conclusions of this report modified or verified in writing.

3.0 FIELD INVESTIGATION

On October 8 through October 11, 2019, a total of 30 borings were drilled on Taxiway F during night-shift closure periods. The borings were designated as Nos. 41 through 70, continuing the sequence started for the Runway 7-25 and Taxiway Connector Improvements Project Geotechnical Engineering Report by this firm (ESP 2020). The borings were extended to a maximum depth of 10.0 feet below the existing pavement surfaces with a Mobile Drill rig, Model B-53, equipped with 6-inch outside diameter hollow stem auger and an automatic hammer for sampling. The approximate locations of the borings are shown on the Exploration Location Maps – Figures 1A and 1B, in Appendix A.

The boring locations, which were provided to us on a base map by the client, were identified and marked in the field during a site visit with airport staff on September 27, 2019. During the field meeting, the general areas of all requested boring locations were determined by airport staff to be clear of underground utility lines, with only slight adjustments in a few locations made to increase setback distances.

As the borings were drilled, soil samples were obtained using a 3-inch outside diameter ring-lined barrel sampler (ASTM D 3550-17 with shoe similar to D 2937-17) at approximate subgrade elevation. Standard penetration tests (SPT) using a 2-inch outside diameter split-spoon sampler were also performed in the borings (ASTM D 1586-11) from 5 to 6.5 feet and from 8.5 to 10.0 feet in each boring. Bulk samples were secured from the auger cuttings.

The pavement sections at each boring location were noted by direct measurement of the material layers in the boring. The soils underlying the pavement sections were initially classified

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and logged in general accordance with the Unified Soils Classification System (ASTM D 2488-17). Final classifications of the soils in accordance with the Unified Soils Classification System (ASTM D 2487-17) were made following completion of laboratory testing. Copies of the boring logs and a boring log legend can also be found in Appendix A. In reviewing the boring logs and legend, the reader should recognize that the legend is intended as a guideline only, and there are a number of conditions that may influence the soil characteristics as observed during drilling. These include, but are not limited to, cementation, variations in soil moisture, presence of groundwater, and other factors. Consequently, the logger must exercise judgment in interpreting soil characteristics, possibly resulting in soils descriptions that vary somewhat from the legend. Following completion of drilling, the borings were backfilled with cement-treated auger spoils and gravel, and then patched at the surface with cold-mix AC (Instant Road Repair by International Roadway Research).

4.0 LABORATORY INVESTIGATION

In situ moisture content and unit dry weight (ASTM D 2937-17, as modified for ring liners) were determined for the ring samples. Six untreated bulk samples were tested for the following: maximum density and optimum moisture (ASTM D 1557-12, modified), particle size distribution (ASTM D 422-63/07; D 1140-17), plasticity index (ASTM D 4318-17), and CBR (ASTM D 1883-16, for a range of moisture contents, with ASTM D 1557-12 as the reference standard for maximum density). Two additional bulk samples were tested for the same series of parameters, except that CBR testing was completed with the soils lime treated at 5 percent by dry weight of soil and 3 percent above optimum moisture content only. One other bulk sample was tested for maximum density and optimum moisture (ASTM D 1557-12, modified) only, and three other bulk samples were tested for particle size distribution (ASTM D 422-63/07; D 1140-17) and plasticity index (ASTM D 4318-17) only. Please refer to Appendix B for the laboratory test results.

5.0 GENERAL SUBSURFACE PROFILE

Variations in the thicknesses of the existing pavement sections were observed throughout the borings drilled in the project area.

The AC thicknesses found in the borings varied from as little as 2 inches in Boring 51, to as much as 6 inches in Borings 41 and 58. The majority of the thicknesses measured in the other borings varied from 4 to 5.5 inches. The miscellaneous aggregate base (mAB) supporting the AC varied from 2.5 inches in Boring 55, to as much as 10 inches found in Boring 50.

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The pavement sections found in each of the borings are noted on Figures 2A and 2B - Existing Pavement Section Thicknesses, in Appendix C.

Below the pavement sections, layers of well graded sand with varying percentages of silt and gravel, and varying in thickness from 6 to 14 inches, were found in 20 of the 30 borings drilled for this project. Below the well graded sand, and below the pavement sections in all other borings, the underlying soil was sandy lean clay fill, which extended to depths ranging from 4 to 7 feet below the existing pavement surfaces. The consistency of the clays during drilling ranged from soft to very stiff.

Alluvium was found below the fill in all of the borings, to the maximum depth explored of 10 feet below the existing pavement surfaces. The alluvium consisted of very soft to stiff sandy lean clay and sandy silt, and loose silty clayey sand. A layer of loose poorly graded sand was found in Boring 70 from 4.5 to 6 feet.

The soils were described during drilling as being slightly moist to very moist. Subsurface water was not encountered in any of the borings, to the maximum depth explored of 10 feet below the existing pavement surface. However, caliche deposits, a residual mineral in the soil indicating the past presence of subsurface water, were found at various depths in 14 of the 30 borings drilled for this project.

Please refer to the logs in Appendix A for a more complete description of the subsurface conditions found in the borings.

Figures 3A and 3B – USCS Soil Types at Subgrade, in Appendix C, is a summary of the soil types found at or within 1.5 feet of subgrade (i.e., below the pavement sections) in the borings. The well graded sand layers, where found directly below the pavement sections, are also indicated on Figures 3A and 3B.

6.0 CONCLUSIONS

Existing Pavement Sections and Miscellaneous Aggregate Base

The existing pavement sections found in the borings were variable, with the thicknesses of the AC ranging from 2 inches to 6 inches. The miscellaneous aggregate base (mAB) supporting the AC varied from 2.5 inches to 10 inches. No pattern was evident with respect to the thicknesses of the AC or mAB across the project area.

The well graded sand (with variable percentages of silt and gravel) layers found in 20 of the 30 borings appeared to be leveling courses, and it is unclear if they were considered to be part of the overall pavement section when constructed. The material did appear to be from either a production quarry or some other relatively uniform.

The mAB found below the AC in all borings was not uniform and varied from clayey sand with gravel to silty sand with gravel, similar to the material found during our investigation for the Runway 7-25 and Taxiway Connector Improvements Project (ESP 2020). The mAB did not appear to be consistent with typical FAA P-209 or Caltrans Class 2 aggregate base material. Therefore, for the purposes of this report, the material was classified as "miscellaneous aggregate base (mAB)."

CBR Test Results

The laboratory test results indicate variability of the CBR values of the soils based on their USCS type and on their moisture contents. The CBR test results have been summarized on Figures 4a, 4b, 5a and 5b in Appendix C, and the following paragraphs are a discussion regarding use of the data on the maps. Determinations of the actual CBR values and elastic modulus (E) values to be used in either the design for reconstruction of pavement, or the evaluation for rehabilitation of existing pavement, are to be made by the project engineer.

Per AC 150/5320-6F (FAA 2016), Chapter 2.5.3, for flexible pavements, the elastic modulus E can be estimated from CBR test results using the following correlation: E (psi) = 1500 x CBR.

<u>Reconstructed Pavement over Existing Soils</u>

In general, the laboratory CBR test results indicate variations in the strengths of the soils tested based on their density and their moisture content. Variations in the CBR values were noted when moisture contents were above or below optimum moisture content for most of the samples. The summary of CBR values provided in the following paragraph is based on the assumption that the subgrade soils will be recompacted within a moisture conditioned range extending from 2 percent below optimum moisture content to 2 percent above optimum moisture content. If the subgrade soils are not maintained within this range, a reduction in the CBR value will occur. Assuming the CBR values provided in this report for pavement section reconstruction will be utilized for design, the project plans should fully indicate the relatively narrow moisture content range as a specification requirement, to allow the contractor to plan earthwork operations accordingly. Provisions should also be taken (e.g., proper surface drainage and flowlines away

from edges of pavement, regular maintenance of the pavement surface to fill any cracks that develop, etc.) to ensure that the moisture contents of the subgrade soils remain within the design range for the design life of the pavement sections. As noted in the "Subsurface Water and Soil Moisture Contents" Section below, edge drains should be considered to help maintain soil moisture contents following construction.

For fully reconstructed conditions, where the existing pavement sections will be removed and the underlying soils can be moisture conditioned and recompacted, the CBR values of the subgrade soils can be increased in some areas from their *in situ* conditions. However, where the existing conditions are already very well compacted or where a significant thickness of well graded sand fill was present, a *decrease* in the effective CBR value at that location could occur with moisture conditioning and recompaction to a lesser value than the existing conditions, or if the well graded sand fill was removed to expose the underlying sandy lean clay. The most important soil condition achieved with complete reconstruction will be uniformity of subgrade moisture and density. Per FAA AC 150/5320-6F, the degree of relative compaction required at subgrade for any pavement areas where complete reconstruction will be undertaken (and therefore the CBR value that can be used in the reconstruction design) is based on the cohesive/non-cohesive classification of the subgrade soils. Except for the variable thickness layers of well graded sand fill found directly below the pavement in many of the borings, the soils encountered at the site are considered cohesive (plasticity index of 3 or greater, per FAA AC 150/5320-6F, Chapter 3.9.3). Also per FAA AC 150/5320-6F, cohesive soils are required to be compacted at subgrade to a minimum of 95 percent of maximum dry density. Based on previous discussions with the client, given the scattered and inconsistent nature of the well graded sand fill, it was decided to consider all of the subgrade soils on the site as being cohesive, with a compaction standard of 95 percent of maximum dry density.

Figures 4A and 4B in Appendix C are summaries of the CBR values expected at the boring locations, based on the results of our laboratory testing and assuming the soils are compacted to a minimum of 95 percent of maximum dry density within 2 percent of optimum moisture content. Based on previous discussions with the client and reviewing the current laboratory CBR test results and previously developed information (ESP 2020), it is our opinion that an "approximate average" CBR value of 8 can be used in the design of reconstructed pavements for this project. If it is desired to further optimize the pavement design, the design CBR can be increased to 13 for the eastern end of the project area (i.e., the area of Borings 66 through 70).

Reconstructed Pavement over Lime Treated Soil

To provide better subgrade CBR values and to reduce the design section where pavement will be fully reconstructed, lime treatment can be utilized. The existing pavement sections (asphalt concrete - AC and miscellaneous aggregate base - mAB) can also be pulverized/milled in place and mixed with the subgrade, to reduce or even eliminate off-haul and disposal from demolition, and to provide a stronger subgrade material than the native soils. Milled pavement section material should be thoroughly mixed with the native soils using disks or other suitable equipment, prior to shaping to provide the design crowned subgrade section. Final mixing of the materials after shaping will be completed during the lime treatment process by pugmills. Lime treatment of the native soils mixed with milled AC/mAB material will likely provide a superior subgrade material for support of new pavement, when compared to untreated native soils, or to lime treated native soils without milled AC/mAB.

Samples of the subgrade soils only (without milled AC/mAB) from Boring 45 and Boring 62 were tested for CBR value with a lime treatment percentage of 5 percent by dry weight of soil, and at 3 percent above optimum moisture content. The lime treatment percentage was selected based on previous lab test results for the Runway 7-25 and Taxiway Connector Improvements Project (ESP 2020), and discussions with the client and a lime treatment contractor. The lime treatment percentage, as well as the moisture content at test, were also selected based on sulfate testing that was completed in parallel with the CBR tests. The results of the sulfate testing are provided under separate cover. Based on the laboratory test results, the CBR values for the site soils lime-treated at a minimum of 5 percent by dry weight, compacted to a minimum of 95 percent of maximum dry density, and with moisture contents as high as 3 percent over optimum, are expected to range from 40 to 50. If utilized, the lime treated soil layer should be 12 to 16 inches thick. A thicker section may be appropriate for areas of the site where in situ soil moisture contents are well above optimum and construction equipment traffic may cause instability. The actual thickness of lime treated soil to be utilized should be determined by the engineer.

If the existing pavement sections are milled and stockpiled for later reuse as mAB, it is anticipated that some or all of the well graded sand with silt and gravel layers found in 20 of the 30 borings drilled for this project will be removed in the process. To maintain uniformity for the lime treatment process, any well graded sand and/or mAB layers remaining after the milling process should be removed from the lime treatment zone and properly disposed off site or reused where acceptable on site. Alternately, if the quantity of well graded sand and/or mAB in the lime

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treatment zone is significant, the additive can be switched from lime to cement. The need to make this switch should be determined based on the conditions exposed at the time of construction.

CBR Value for Existing Miscellaneous Aggregate Base (mAB)

A sample of the miscellaneous aggregate base (mAB) from Boring 46 was also tested for CBR. As previously discussed with the client, considering its variability, it was decided that the mAB material was not consistent enough to be able to assume with any certainty that it would be capable of being compacted to 100 percent of maximum dry density with a reasonable amount of effort. Based on the test data, an approximate CBR value of 30 is recommended for the mAB material compacted to a minimum of 95 percent of maximum dry density within two percent of optimum moisture content.

Rehabilitation of Existing Pavements

Figures 5A and 5B in Appendix C show the estimated CBR values of the subgrade soils at each boring location, based on their existing density and moisture contents, and on the results of the laboratory CBR tests. Note that in 4 of the 30 borings, the existing soil moisture contents and/or densities were beyond the range of the data from the laboratory CBR tests; those locations are marked on the map with an asterisk. Where the CBR information appeared to follow a trend line beyond the data range, a rough estimate of the CBR value was provided. Where the soil moisture contents and/or density values were well out of the data range or did not appear to follow a trend line at all, no CBR value was provided, and the location was indicated with a question mark (?). Based on previous discussions with the client, and considering the variability of the in situ moisture, density and CBR test results, it is our opinion that a CBR value of only 1 or 2 should be used for the subgrade in its existing condition when evaluating the potential for rehabilitation of the existing pavement in the center and on the end of the taxiway (i.e., the vicinity of Borings 51 through 70). For the western portion of the taxiway (i.e., vicinity of Borings 41 through 50), the CBR value utilized for the evaluation could be increased to 5 or 6.

As noted in the "Subsurface Water and Soil Moisture Contents" Section below, edge drains should be considered to help maintain soil moisture contents following construction.

Swelling Soils

AC 150/5320-6F (FAA 2016) Chapter 3.10.1 describes the effects that swelling soils have on airport pavements, and recommends various treatments (removal and replacement, stabilization, modified compaction efforts and adequate drainage) to reduce the potential for damage to pavements due to swelling soils.

Chapter 3.10.2 (FAA 2016) indicates swelling soils "usually have liquid limits above 40 and plasticity indexes above 25." None of the soils tested for this project meet these criteria.

Chapter 3.10.3 (FAA 2016) indicates soils with a swell of greater than 3 percent when tested for CBR require treatment to reduce the potential for damage to pavements. Only one sample exhibited a swell of greater than 3 percent when tested for CBR value:

- Boring 66 from 4.0 to 5.0 feet. Expansion values ranged from 5.3 to 6.8 percent after soaking for the samples compacted at 3 percent below optimum moisture content. Samples compacted at optimum moisture content exhibited expansion values of 1.5 to 3.9 percent after soaking. Samples compacted at 3 percent above optimum exhibited expansion values of 0.9 percent or less after soaking.

Chapter 3.10.1 (FAA 2016) states "Local experience and judgment should be applied in dealing with swelling soils to achieve the best results." The material utilized for CBR testing from Boring 66 that exhibited swell in excess of 3 percent was found in the following borings: Boring 62 from 5.0 to 10.0 feet; Borings 63 through 69 from 4.0 to 10.0 feet; and in Boring 70 from 6.0 to 10 feet. It is our understanding that the pavement at Oxnard Airport does not exhibit pervasive evidence of damage due to swelling soils, i.e., significant edge cracking or random surface unevenness. Due to the lack of existing apparent damage due to swelling soils, and as this material was identified at depths of 4.0 feet or greater, in our opinion it is probably not worth considering in a standard pavement rehabilitation process (i.e., reconstruction with a conventional pavement section over compacted native soil, or rehabilitation of the existing pavement in place).

If the engineer elects to lime treat the native soils for the reconstruction process, the lime treatment will neutralize whatever potential swelling soils may be present in the subgrade treatment zone and no additional action would be necessary.

Earthwork Shrinkage

Soil volume loss, or "shrinkage", during earthwork can be attributed to three categories; soil loss due to stripping or demolition of existing improvements, subsidence of the underlying soils due to compaction, and shrinkage of fill soil as it is placed and compacted. These factors are partly due to the soil characteristics, but largely due to depths of cuts and fills, stripping techniques, type and weight of earthwork equipment, traffic pattern of earthwork equipment, and soil moisture at the time of grading.

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In paved areas that are to be reconstructed, removal of distinct AC and AB layers can result in less loss than from removal of vegetation in unpaved areas, if any. The amount of soil loss that will occur is largely dependent upon how careful the contractor is in stripping and demolition/removal operations.

Subsidence of the site due to compaction of the soils below a fill area also occurs. Subsidence due to compaction is likely to be in the range of 0.1 to 0.2 feet. The main zone of subsidence is typically the upper two to three feet. Deeper subsidence is not expected as earthwork operations for pavement reconstruction are expected to be limited to the upper 1 to 2 feet in the project area.

To estimate shrinkage of the subgrade, *in situ* soil density data from ring samples taken in the borings at approximate subgrade elevation were analyzed. Appendix D contains a summary of the existing relative compaction at each depth where a ring sample was secured, as well as calculated shrinkage assuming final relative compaction values ranging from 95 to 100 percent.

As loss, subsidence, and shrinkage are only partly due to the soil characteristics, and are largely influenced by the earthwork equipment, earthwork methods, and soil moisture, these factors cannot be precisely estimated.

Subsurface Water and Soil Moisture Contents

Subsurface water was not encountered in any of the borings to the maximum depth drilled of 10 feet below the existing pavement surface. However, caliche deposits, a residual mineral in the soil indicating the past presence of subsurface water, were found at various depths in 14 of the 30 borings drilled for this project. Caliche is an indicator that significant soil moisture contents have been present in the past. If soil moisture contents are well above optimum in pavement areas to be reconstructed, the soils could become unstable under equipment traffic. Unstable conditions hinder compaction efforts and are not acceptable to support fill or pavement section placement. All grading areas should be firm and unyielding following compaction operations and prior to placement of fill, aggregate base or pavement.

Depending on the time of year that construction operations take place, the most effective methods to deal with unstable conditions due to high soil moisture could be scarification and aeration, or the use of geotextile stabilization fabrics. Scarification and aeration may only be possible if the weather conditions are clear and if the project schedule permits.

If the project schedule will not allow drying of the soil naturally, stabilization fabric could be

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utilized. Additional excavation below subgrade may also be needed before the stabilization fabric is placed; the depth of overexcavation should be determined by the geotechnical engineer based on conditions exposed at the time of construction. After all excavations are complete, and prior to placement of the geotextiles, the exposed surfaces are typically back-dragged to a smooth condition to the degree practicable with light earthwork equipment. Geotextile stabilization fabric (Mirafi RS380i or similar material depending on the degree of instability) is typically placed in the excavated area and extended up the sidewalls of the excavation to within 2 inches of the bottom of the AC layer. Stabilization fabrics are rolled out along the long dimension of the reconstruction area (not perpendicular to it), and are stretched, overlapped and held in place according to the manufacturer's recommendations. Recycled subbase and/or imported aggregate base, per the overall pavement section design, is placed over the fabric in thin, moisture-conditioned lifts and compacted. Recycled subbase and/or aggregate base is placed by end-dumping on the fabric and spreading ahead of equipment; equipment traffic is typically not allowed to travel directly over the fabric. Initial lifts of subbase/base are spread and compacted by rubber-tired equipment; subsequent lifts are compacted using sheepsfoot and/or steel-drum equipment. Compaction equipment is usually operated in static mode only until base grade is reached, to reduce the potential for any free water in the underlying soils to be drawn through the fabric and into the subbase or aggregate base.

If it appears that stable conditions will not be created at base grade after the use of geotextiles, a layer of geogrid (Tensar TriAx TX-7 or similar material) can be placed according to the manufacturer's recommendations as additional reinforcement at the approximate mid-depth of the subbase/aggregate base layer. Often sufficient material may not be in place over the geotextile stabilization fabric at mid-depth of the design subbase/aggregate base layer to fully mobilize its strength characteristics and to determine if geogrid will be needed, therefore it may be necessary to construct a full-scale test strip of the pavement section, with and without geogrid reinforcement. This test strip will give an indication as to whether or not geogrids will be required in any reconstruction areas.

Figures 6A and 6B – Subgrade Soil Moisture Content in Appendix C show the soil moisture contents at the time of our field exploration, and percentage above (or below) optimum moisture content. These data show that in the majority of the boring locations, soil moisture contents were above optimum moisture content, with one location at 9 percent above optimum. As noted in the "CBR Test Results" Section of this report, the CBR values decrease significantly with increasing soil moisture contents. To reduce the potential for accumulated moisture in the

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subgrade and the subsequent loss of soil strength (CBR value), positive surface drainage away from all paved areas must be provided. Edge drains adjacent to the pavement are also recommended. The drains could consist of conventional geotextile-wrapped and gravel-filled trenches with perforated collection pipes, or prefabricated panel-type drainage systems that are placed in narrow trenches. The 3- to 4-inch diameter perforated collection pipes in conventional trenches have the advantage of being able to be fitted with cleanouts for system maintenance; however, this could be outweighed by the relatively low cost of a thin panel drain system, as gravel drains require excavation of wider trenches, trench spoil disposal, and gravel placement. The actual type of system to be utilized, if any, should be determined by the engineer. The drains should be placed, wherever practicable, to dewater the upper 2 to 3 feet of soil below the pavement sections.

Soil Erodibility

The site soils are considered to be erodible. It is essential that all surface drainage be controlled and directed to appropriate discharge points, and that surface soils, particularly those disturbed during construction, are stabilized by vegetation or other means during and following construction.

7.0 OBSERVATION AND TESTING

1. It must be recognized that the recommendations contained in this report are based on a limited number of borings and rely on continuity of the subsurface conditions encountered. Therefore, the geotechnical engineer should be retained to provide consultation during the design phase, to review plans as they near completion, to interpret this report during construction, and to provide construction monitoring in the form of testing and observation.

2. At a minimum, the following should be provided by the geotechnical engineer during construction:

   - Professional observation during grading
   - Oversight of special inspection during grading

3. Special inspection of grading should be provided as per the requirements of the FAA or Section 1705.6 and Table 1705.6 of the CBC; the soils special inspector should be under the direction of the geotechnical engineer. Subject to approval by the building official or other jurisdiction, special inspection requirements should be addressed by the

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geotechnical engineer during the preconstruction meeting (see below) prior to the start of grading operations.

At a minimum, the following items should be inspected and/or tested by the special inspector:

- Stripping and clearing of vegetation and existing pavement where planned for removal
- Excavations to subgrade in any pavement reconstruction areas, and corrective operations (scarification/aeration or placement of geotextile stabilization fabric) in any unstable areas
- Excavations to subgrade in any pavement reconstruction areas and scarification, moisture conditioning, and recompaction in stable areas
- Fill, milled/pulverized AC (if any) and imported aggregate base quality, placement, moisture conditioning, and compaction
- Utility trench backfill

4. A program of quality control should be developed prior to beginning grading. The contractor or project manager should determine any additional inspection items required by the architect/engineer or the governing jurisdiction.

5. Locations and frequency of compaction tests should be as per the recommendation of the geotechnical engineer at the time of construction. The recommended test location and frequency may be subject to modification by the geotechnical engineer, based upon soil and moisture conditions encountered, size and type of equipment used by the contractor, the general trend of the results of compaction tests, or other factors.

6. A preconstruction conference among the owner, the geotechnical engineer, the governing agency, the special inspector, the project inspector, the architect/engineer, and contractors is recommended to discuss planned construction procedures and quality control requirements.

7. The geotechnical engineer should be notified at least 48 hours prior to beginning construction operations. If Earth Systems Pacific is not retained to provide construction

observation and testing services, it shall not be responsible for the interpretation of the information by others or any consequences arising therefrom.

8.0 CLOSURE

Our intent was to perform the investigation in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing in the locality of this project and under similar conditions. No representation, warranty, or guarantee is either expressed or implied. This report is intended for the exclusive use by the client as discussed in the "Scope of Services" section. Application beyond the stated intent is strictly at the user's risk.

This report is valid for conditions as they exist at this time for the type of project described herein. The conclusions and recommendations contained in this report could be rendered invalid, either in whole or in part, due to changes in building codes, FAA regulations, standards of geotechnical or construction practice, changes in physical conditions, or the broadening of knowledge.

If changes with respect to development type or location become necessary, if items not addressed in this report are incorporated into plans, or if any of the assumptions used in the preparation of this report are not correct, this firm shall be notified for modifications to this report. Any items not specifically addressed in this report should comply with the FAA, the CBC and/or the requirements of the governing jurisdiction.

The preliminary recommendations of this report are based upon the geotechnical conditions encountered at the site and may be augmented by additional requirements of the engineer, or by additional recommendations provided by this firm based on conditions exposed at the time of construction.

This document, the data, conclusions, and recommendations contained herein are the property of Earth Systems Pacific. This report shall be used in its entirety, with no individual sections reproduced or used out of context. Copies may be made only by Earth Systems Pacific, the client, and the client's authorized agents for use exclusively on the subject project. Any other use is subject to federal copyright laws and the written approval of Earth Systems Pacific.

Thank you for this opportunity to have been of service. If you have any questions, please feel free to contact this office at your convenience.

End of Text.

Exhibit 1

TECHNICAL REFERENCES

ESP. (Earth Systems Pacific). December 31, 2015. Geotechnical Engineering Report, Taxiway and Apron PCN Calculations, Oxnard Airport, Oxnard, California. Mead & Hunt, Inc., Project No. 3138400-150628.01

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Miller. (Miller Geosciences, Inc.). August 28, 2014. Preliminary Geotechnical Explorations, Proposed Improvements, Oxnard Airport Runway, 2889 West 5th Street, Oxnard, California.

Exhibit 1

APPENDIX A

Figures 1A and 1B – Exploration Location Maps

Boring Log Legend

Boring Logs

Exhibit 1

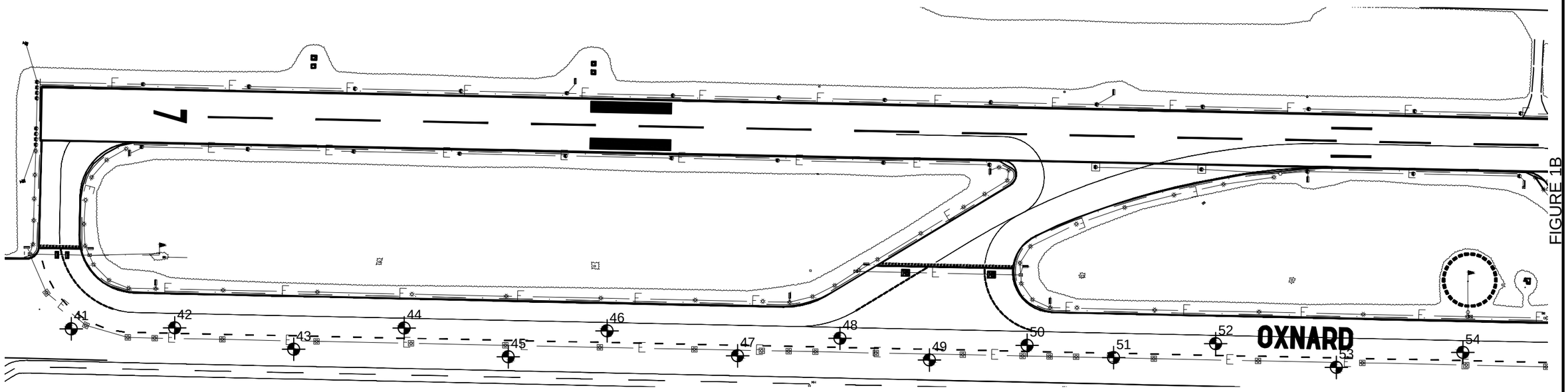

FIGURE 1B

LEGEND

41-70 Boring Location (Approx.)

BASE MAP PROVIDED BY: MEAD AND HUNT, INC

N

NOT TO SCALE

Earth Systems Pacific
4378 Old Santa Fe Road, San Luis Obispo, CA 93401
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FIGURE 1A - EXPLORATION LOCATION MAP
Oxnard Airport - Taxiway F Improvements
2889 West 5th Street
Oxnard, California

Exhibit 1

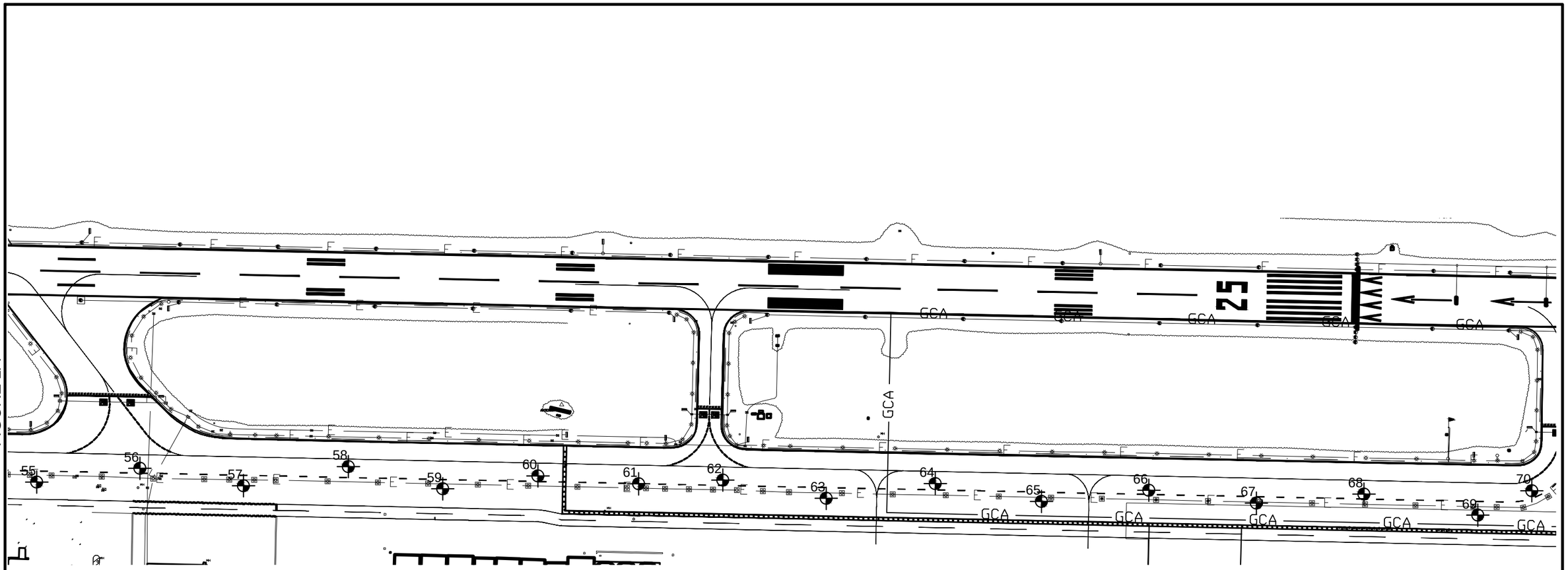
Date
February 2020

Project No.
302524-002

Sheet 1 of 2

OXNARD AIRPORT TAXIWAY F IMPROVEMENTS021320maps

FIGURE 1A



LEGEND

41-70 Boring Location (Approx.)

BASE MAP PROVIDED BY: MEAD AND HUNT, INC

N

NOT TO SCALE

Earth Systems Pacific
4378 Old Santa Fe Road, San Luis Obispo, CA 93401
www.earthsystems.com
(805) 544-3276 • Fax (805) 544-1786

FIGURE 1B - EXPLORATION LOCATION MAP
Oxnard Airport - Taxiway F Improvements
2889 West 5th Street
Oxnard, California

Exhibit 1

Date
February 2020

Project No.
302524-002

Sheet 2 of 2

OXNARD AIRPORT TAXIWAY F IMPROVEMENTS021320maps

Earth Systems Pacific

BORING LOG LEGEND

SAMPLE / SUBSURFACE WATER SYMBOLS	GRAPH. SYMBOL
CALIFORNIA MODIFIED	
STANDARD PENETRATION TEST (SPT)	
SHELBY TUBE	
BULK	
SUBSURFACE WATER DURING DRILLING	
SUBSURFACE WATER AFTER DRILLING	

UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487)

MAJOR DIVISIONS		GROUP SYMBOL	TYPICAL DESCRIPTIONS	GRAPH. SYMBOL
COARSE GRAINED SOILS	MORE THAN HALF OF MATERIAL IS LARGER THAN #200 SIEVE SIZE	GW	WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	
		GP	POORLY GRADED GRAVELS, OR GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	
		GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES, NON-PLASTIC FINES	
		GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES, PLASTIC FINES	
		SW	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES	
		SP	POORLY GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES	
		SM	SILTY SANDS, SAND-SILT MIXTURES, NON-PLASTIC FINES	
		SC	CLAYEY SANDS, SAND-CLAY MIXTURES, PLASTIC FINES	
FINE GRAINED SOILS	HALF OR MORE OF MATERIAL IS SMALLER THAN #200 SIEVE SIZE	ML	INORGANIC SILTS AND VERY FINE SANDS, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY	
		CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS	
		OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY	
		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS	
		CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS	
		OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS	
		PT	PEAT AND OTHER HIGHLY ORGANIC SOILS	

OBSERVED MOISTURE CONDITION

DRY	SLIGHTLY MOIST	MOIST	VERY MOIST	WET (SATURATED)

CONSISTENCY

COARSE GRAINED SOILS			FINE GRAINED SOILS		
BLOWS/FOOT		DESCRIPTIVE TERM	BLOWS/FOOT		DESCRIPTIVE TERM
SPT	CA SAMPLER		SPT	CA SAMPLER	
0-10	0-16	LOOSE	0-2	0-3	VERY SOFT
11-30	17-50	MEDIUM DENSE	3-4	4-7	SOFT
31-50	51-83	DENSE	5-8	8-13	MEDIUM STIFF
OVER 50	OVER 83	VERY DENSE	9-15	14-25	STIFF
			16-30	26-50	VERY STIFF
			OVER 30	OVER 50	HARD

GRAIN SIZES

U.S. STANDARD SERIES SIEVE				CLEAR SQUARE SIEVE OPENING		
# 200	# 40	# 10	# 4	3/4"	3"	12"

SILT & CLAY	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		

TYPICAL BEDROCK HARDNESS

MAJOR DIVISIONS	TYPICAL DESCRIPTIONS
EXTREMELY HARD	CORE, FRAGMENT, OR EXPOSURE CANNOT BE SCRATCHED WITH KNIFE OR SHARP PICK; CAN ONLY BE CHIPPED WITH REPEATED HEAVY HAMMER BLOWS
VERY HARD	CANNOT BE SCRATCHED WITH KNIFE OR SHARP PICK; CORE OR FRAGMENT BREAKS WITH REPEATED HEAVY HAMMER BLOWS
HARD	CAN BE SCRATCHED WITH KNIFE OR SHARP PICK WITH DIFFICULTY (HEAVY PRESSURE); HEAVY HAMMER BLOW REQUIRED TO BREAK SPECIMEN
MODERATELY HARD	CAN BE GROOVED 1/16 INCH DEEP BY KNIFE OR SHARP PICK WITH MODERATE OR HEAVY PRESSURE; CORE OR FRAGMENT BREAKS WITH LIGHT HAMMER BLOW OR HEAVY MANUAL PRESSURE
SOFT	CAN BE GROOVED OR GOUGED EASILY BY KNIFE OR SHARP PICK WITH LIGHT PRESSURE, CAN BE SCRATCHED WITH FINGERNAIL; BREAKS WITH LIGHT TO MODERATE MANUAL PRESSURE
VERY SOFT	CAN BE READILY INDENTED, GROOVED OR GOUGED WITH FINGERNAIL, OR CARVED WITH KNIFE; BREAKS WITH LIGHT MANUAL PRESSURE

TYPICAL BEDROCK WEATHERING

MAJOR DIVISIONS	TYPICAL DESCRIPTIONS
UNWEATHERED	NO DISCOLORATION, NOT OXIDIZED
SLIGHTLY WEATHERED	DISCOLORATION OR OXIDATION IS LIMITED TO SURFACE OF, OR SHORT DISTANCE FROM, FRACTURES: SOME FELDSPAR CRYSTALS ARE DULL
MODERATELY WEATHERED	DISCOLORATION OR OXIDATION EXTENDS FROM FRACTURES, USUALLY THROUGHOUT; Fe-Mg MINERALS ARE "RUSTY", FELDSPAR CRYSTALS ARE "CLOUDY"
HIGHLY WEATHERED	DISCOLORATION OR OXIDATION THROUGHOUT; FELDSPAR AND Fe-Mg MINERALS ARE ALTERED TO CLAY TO SOME EXTENT, OR CHEMICAL ALTERATION PRODUCES IN SITU DISAGGREGATION
DECOMPOSED	DISCOLORATION OR OXIDATION THROUGHOUT, BUT RESISTANT MINERALS SUCH AS QUARTZ MAY BE UNALTERED; FELDSPAR AND Fe-Mg MINERALS ARE COMPLETELY ALTERED TO CLAY

Exhibit 1

drafting/masters/Boring Log Legend 062719.dwg

Earth Systems Pacific

Boring No. 41

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

PAGE 1 OF 1
JOB NO.: 302524-002
DATE: 10/8/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			6.0" AC / 4.0" SILTY SAND with GRAVEL (Misc. AB)					
1	CL		SANDY LEAN CLAY; dark brown, stiff, moist (Fill)					
2				1.5 - 3.0	Ring	107.9	16.9	4 5 11
3				1.5 - 5.0	Grab			
4								
5			soft	5.0 - 6.5	SPT			2 0 1
6								
7	CL		SANDY LEAN CLAY; brown, medium stiff, moist (Alluvium)					
8				8.5 - 10.0	SPT			1 2 3
9								
10			TD: 10.0'					
11			No subsurface water encountered					
12			Backfilled with cuttings and tamped AC Patch					
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: Ring Sample Grab Sample Shelby Tube Sample SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 42

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

JOB NO.: 302524-002
DATE: 10/8/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			4.5" AC / 4.5" SILTY SAND with GRAVEL (Misc. AB)					
1	SW		WELL GRADED SAND with GRAVEL; light brown, loose, moist (Fill)					
2	CL		SANDY LEAN CLAY; dark brown, stiff, moist	1.5 - 3.0	Ring	112.3	15.5	7 9 12
3								
4								
5			medium stiff	5.0 - 6.5	SPT			4 3 3
6								
7	ML		SANDY SILT; light brown, medium stiff, moist (Alluvium)					
8								1
9				8.5 - 10.0	SPT			2 3
10								
11			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 43

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

PAGE 1 OF 1
JOB NO.: 302524-002
DATE: 10/8/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			5.5" AC / 5.0" SILTY SAND with GRAVEL (Misc. AB)					4 9 17
1	CL		SANDY LEAN CLAY; dark brown, stiff, moist	1.0 - 2.5	Ring Sample	115.9	15.1	
2								
3								
4			soft					1 2 2
5	CL		SANDY LEAN CLAY; brown, medium stiff, moist (Alluvium)	5.0 - 6.5	SPT			
6								
7								
8				8.5 - 10.0	SPT			0 1 1
9			very soft					
10			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: ■ Ring Sample ◯ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 44

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

JOB NO.: 302524-002
DATE: 10/8/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			4.0" AC / 6.5" SILTY SAND with GRAVEL (Misc. AB)					
1	SW		WELL GRADED SAND with GRAVEL; light brown, loose, moist (Fill)					
2	CL		SANDY LEAN CLAY; dark brown, very stiff, moist	1.5 - 3.0	■	120.7	6.9	10 13 17
3								
4								
5	CL		SANDY LEAN CLAY; brown, soft, moist (Alluvium)	5.0 - 6.5	●			1 2 2
6								
7								
8				8.5 - 10.0	●			0 1 3
9								
10			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 45

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

JOB NO.: 302524-002
DATE: 10/8/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			4.0" AC / 5.5" SILTY SAND with GRAVEL (Misc. AB)					
1	CL		SANDY LEAN CLAY; dark brown, stiff, moist (Fill)	1.0 - 2.5	Ring Sample	106.3	18.6	4 7 9
2								
3				1.0 - 5.0	Grab Sample			
4			soft					
5	ML		SANDY SILT; light brown, soft, moist (Alluvium)	5.0 - 6.5	SPT			1 1 3
6								
7								
8				8.5 - 10.0	SPT			0 2 2
9								
10			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: ■ Ring Sample ◯ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 46

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

PAGE 1 OF 1
JOB NO.: 302524-002
DATE: 10/8/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			4.0" AC / 6.0" SILTY SAND with GRAVEL (Misc. AB)					12
1	SW-SM		WELL GRADED SAND with SILT and GRAVEL; light brown, loose, moist (Fill)	1.0 - 2.5	Ring	117.1	3.7	16 17
2	CL		SANDY LEAN CLAY; dark brown, very stiff, moist	1.0 - 2.0	Grab			
3								
4								
5			soft	5.0 - 6.5	SPT			2 2 2
6	CL		SANDY LEAN CLAY; brown, soft, moist (Alluvium)					
7								
8				8.5 - 10.0	SPT			1 2 1
9			some oxidation					
10								
11			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: Ring Sample Grab Sample Shelby Tube Sample SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 47

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

PAGE 1 OF 1
JOB NO.: 302524-002
DATE: 10/8/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			4.0" AC / 7.0" SILTY SAND with GRAVEL (Misc. AB)					8 14 22
1	SW-SM		WELL GRADED SAND with SILT and GRAVEL; light brown, loose, moist (Fill)	1.0 - 2.5	▬	116.4	13.1	
2	CL		SANDY LEAN CLAY; dark brown, very stiff, moist					
5	ML		SANDY SILT; light brown, medium stiff, moist (Alluvium)	5.0 - 6.5	●			1 2 3
9			yellow brown to olive brown, soft	8.5 - 10.0	●			0 1 3
10			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					

LEGEND: ▬ Ring Sample ◯ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 48

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

JOB NO.: 302524-002
DATE: 10/9/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			5.0" AC / 3.5" SILTY SAND with GRAVEL (Misc. AB)					
1	SW-SM		WELL GRADED SAND with SILT and GRAVEL; light brown, loose, moist (Fill)	1.0 - 2.5	▬	114.8	12.1	4 8 8
2	CL		SANDY LEAN CLAY; dark brown, loose, moist					
3								
4			medium stiff					
5	CL		SANDY LEAN CLAY; brown, medium stiff, moist, caliche (Alluvium)	5.0 - 6.5	●			2 4 5
6								
7								
8	ML		SANDY SILT; light brown, soft	8.5 - 10.0	●			2 1 2
9								
10								
11			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: ▬ Ring Sample ◯ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 49

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

PAGE 1 OF 1
JOB NO.: 302524-002
DATE: 10/9/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			5.5" AC / 5.5" SILTY SAND with GRAVEL (Misc. AB)					3 6 8
1	CL		SANDY LEAN CLAY; dark brown, stiff, moist (Fill)	1.0 - 2.5	▬	114.7	12.9	
2								
3								
4								
5	CL		SANDY LEAN CLAY; brown, medium stiff, moist (Alluvium)	5.0 - 6.5	●			1 3 3
6								
7								
8	ML		SILT; light brown, medium stiff, moist	8.5 - 10.0	●			1 2 3
9								
10			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: ▬ Ring Sample ◯ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 50

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

JOB NO.: 302524-002
DATE: 10/9/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			4.5" AC / 10.0" SILTY SAND with GRAVEL (Misc. AB)					
1	CL		SANDY LEAN CLAY; dark brown, very stiff, moist (Fill)	1.0 - 2.5	▬	119.0	13.0	6 16 17
2								
3								
4			soft					
5	ML		SANDY SILT; light brown, very soft, moist, caliche (Alluvium)	5.0 - 6.5	●			1 0 1
6								
7								
8			yellow brown, soft	8.5 - 10.0	●			1 1 2
9								
10								
11			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: ▬ Ring Sample ◯ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 51

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

JOB NO.: 302524-002
DATE: 10/9/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			2.0" AC / 5.5" SILTY SAND with GRAVEL (Misc. AB)					
1	CL		SANDY LEAN CLAY; dark brown, stiff, moist (Fill)	1.0 - 2.5	Ring	111.4	15.8	4 6 11
5	CL		SANDY LEAN CLAY; brown, soft, moist, caliche (Alluvium)	5.0 - 6.5	SPT			1 2 2
8	ML		SANDY SILT; yellow brown, medium stiff, moist	8.5 - 10.0	SPT			1 2 3
10			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					

LEGEND: Ring Sample Grab Sample Shelby Tube Sample SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 52

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

JOB NO.: 302524-002
DATE: 10/9/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			4.5" AC / 6.0" SILTY SAND with GRAVEL (Misc. AB)					
1	SW		WELL GRADED SAND with GRAVEL; light brown, loose, moist (Fill)	1.5 - 3.0	▬	114.6	11.6	9 14 22
2	SC		SANDY LEAN CLAY; dark brown, very stiff, moist					
5	CL		SANDY LEAN CLAY; brown, medium stiff, moist, caliche (Alluvium)	5.0 - 6.5	●			1 2 4
8	ML		SANDY SILT; yellow brown, soft, moist	8.5 - 10.0	●			1 2 1
10			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					

LEGEND: ▬ Ring Sample ◯ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 53

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

JOB NO.: 302524-002
DATE: 10/9/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			3.5" AC / 5.0" SILTY SAND with GRAVEL (Misc. AB)					3
1	CL		SANDY LEAN CLAY; dark brown, stiff, moist (Fill)	1.0 - 2.5	Ring	110.1	15.3	9 14
2								
3								
4	CL		SANDY LEAN CLAY; light brown, soft, moist, caliche (Alluvium)					1
5				5.0 - 6.5	SPT			1 3
6								
7				7.5 - 10.0	Grab			
8								2
9				8.5 - 10.0	SPT			2 2
10								
11			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: Ring Sample Grab Sample Shelby Tube Sample SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 54

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

JOB NO.: 302524-002
DATE: 10/9/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			5.5" AC / 6.0" SILTY SAND with GRAVEL (Misc AB)					
1	SW		POORLY GRADED SAND with GRAVEL; light brown, loose, moist (Fill)	1.5 - 3.0	Ring Sample	124.3	5.2	8, 11, 15
2	CL		SANDY LEAN CLAY; dark brown, stiff, moist					
3								
4	CL		SANDY LEAN CLAY; brown, medium stiff, moist, (Alluvium)	4.0 - 5.0	Grab Sample			0, 2, 4
5				5.0 - 6.5	SPT			
6								
7								
8	ML		SANDY SILT; yellow brown, medium stiff, moist, caliche	8.5 - 10.0	SPT			3, 3, 3
9								
10								
11			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: Ring Sample Grab Sample Shelby Tube Sample SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 55

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

JOB NO.: 302524-002
DATE: 10/9/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			4.5" AC / 2.5" SILTY SAND with GRAVEL (Misc. AB)					
1	SW		POORLY GRADED SAND with GRAVEL; light brown, loose, moist (Fill)	1.0 - 2.5	Ring Sample	108.9	14.4	5 6 8
2	CL		SANDY LEAN CLAY; dark brown, medium stiff, moist	1.5 - 5.0	Grab Sample			
5	ML		SANDY SILT; light brown, stiff, moist, caliche (Alluvium)	5.0 - 6.5	SPT			1 3 6
8				8.5 - 10.0	SPT			1 3 3
9			medium stiff					
10			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					

LEGEND: Ring Sample Grab Sample Shelby Tube Sample SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 56

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

JOB NO.: 302524-002
DATE: 10/9/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			4.5" AC / 5.0" SILTY SAND with GRAVEL (Misc. AB)					
1	SW		POORLY GRADED SAND with GRAVEL; light brown, loose, moist (Fill)	1.5 - 3.0	Ring	116.0	12.0	7 7 7
2	CL		SANDY LEAN CLAY; dark brown, medium stiff, moist					
3								
4								
5	ML		SANDY SILT; light brown, medium stiff, moist, (Alluvium)	5.0 - 6.5	SPT			2 2 5
6								
7								
8				8.5 - 10.0	SPT			2 3 3
9			light brown to gray brown, caliche					
10								
11			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 57
PAGE 1 OF 1
JOB NO.: 302524-002
DATE: 10/10/19

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			3.5" AC / 9.0" SILTY SAND with GRAVEL (Misc. AB)					
1	SW		WELL GRADED SAND with GRAVEL; light brown, loose, moist (Fill)	1.0 - 2.5	Ring	117.6	2.7	8 9 11
2	CL		SANDY LEAN CLAY; dark brown, stiff, moist					
5	CL		SANDY LEAN CLAY; brown, soft, moist, caliche (Alluvium)	5.0 - 6.5	SPT			1 1 2
8			light brown, very soft	8.5 - 10.0	SPT			0 1 1
10			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					

LEGEND: Ring Sample; Grab Sample; Shelby Tube Sample; SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 58

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

JOB NO.: 302524-002
DATE: 10/10/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			6.0" AC / 7.0" SILTY SAND with GRAVEL (Misc. AB)					
1	SW		WELL GRADED SAND with GRAVEL; light brown, loose, moist (Fill)	1.5 - 3.0	Ring	115.5	12.1	5 7 11
2	CL		SANDY LEAN CLAY; dark brown, stiff, moist					
5	CL		SANDY LEAN CLAY; brown, very soft, moist (Alluvium)	5.0 - 6.5	SPT			0 1 1
7	ML		SILT; light brown, soft, moist	8.5 - 10.0	SPT			0 1 2
10			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					

LEGEND: Ring Sample Grab Sample Shelby Tube Sample SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 59

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

JOB NO.: 302524-002
DATE: 10/10/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			5.0" AC / 6.0" SILTY SAND with GRAVEL (Misc. AB)					
1	SW		WELL GRADED SAND with GRAVEL; light brown, loose, moist (Fill)	1.5 - 3.0	Ring	110.8	13.7	5, 11, 15
2	CL		SANDY LEAN CLAY; dark brown, stiff, moist					
3								
4								
5	CL		SANDY LEAN CLAY; brown, medium stiff, moist, caliche (Alluvium)	5.0 - 6.5	SPT			1, 3, 3
6								
7								
8				8.5 - 10.0	SPT			3, 4, 4
9	ML		SANDY SILT; light brown, slightly moist, medium stiff					
10								
11			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 60

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

JOB NO.: 302524-002
DATE: 10/10/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			4.5" AC / 6.5" SILTY SAND with GRAVEL (Misc. AB)					
1	SW		WELL GRADED SAND with GRAVEL; light brown, loose, moist (Fill)	1.0 - 2.5	Ring Sample	119.8	7.1	14 16 17
2	CL		SANDY LEAN CLAY; dark brown, very stiff, moist					
5	ML		SANDY SILT; light brown, soft, moist (Alluvium)	5.0 - 6.5	SPT			1 1 3
8	CL		SANDY LEAN CLAY; brown, very soft, moist, caliche	8.5 - 10.0	SPT			0 0 2
10			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					

LEGEND: Ring Sample Grab Sample Shelby Tube Sample SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 61

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

JOB NO.: 302524-002
DATE: 10/10/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			5.5" AC / 9.0" SILTY SAND with GRAVEL (Misc. AB)					
1	SW		WELL GRADED SAND with GRAVEL; light brown, loose, moist (Fill)	1.5 - 3.0	Ring	112.4	14.5	4 7 9
2	CL		SANDY LEAN CLAY; dark brown, stiff, moist					
3								
4	CL		SANDY LEAN CLAY; brown, soft, moist					
5				5.0 - 6.5	SPT			0 1 2
6								
7								
8				8.5 - 10.0	SPT			1 1 3
9			Caliche					
10								
11			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: Ring Sample Grab Sample Shelby Tube Sample SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 62

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

JOB NO.: 302524-002
DATE: 10/10/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			4.5" AC / 9.0" SILTY SAND with GRAVEL (Misc. AB)					
1	SW		WELL GRADED SAND with GRAVEL; light brown, loose, moist (Fill)	1.5 - 3.0	■	90.7	12.2	7 7 8
2	CL		SANDY LEAN CLAY; dark brown, stiff, moist					
3				2.0 - 5.0	○			
4								
5	SC -SM		SILTY, CLAYEY SAND; dark brown, loose, moist (Alluvium)	5.0 - 6.5	●			1 2 2
6								
7								
8			caliche	8.5 - 10.0	●			0 1 2
9								
10								
11			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 63

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

JOB NO.: 302524-002
DATE: 10/10/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			3.5" AC / 7.0" SILTY SAND with GRAVEL (Misc. AB)					
1	CL		SANDY LEAN CLAY; dark brown, very stiff, slightly moist (Fill)	1.0 - 2.5	Ring	77.9	12.4	29 17 14
4	SC -SM		SILTY, CLAYEY SAND; dark brown, loose, moist (Alluvium)	5.0 - 6.5	SPT			1 3 4
8				8.5 - 10.0	SPT			0 1 1
10			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					

LEGEND: Ring Sample Grab Sample Shelby Tube Sample SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 64

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

JOB NO.: 302524-002
DATE: 10/10/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			2.5" AC / 5.5" AC / 6.0" SILTY SAND with GRAVEL (Misc. AB)					
1	SW		WELL GRADED SAND with GRAVEL; light brown, loose, moist (Fill)	1.0 - 2.5	▬	104.3	3.4	7 4 6
2	CL		SANDY LEAN CLAY; dark brown, medium stiff, moist					
4	SC -SM		SILTY, CLAYEY SAND; brown, loose, moist, caliche (Alluvium)	5.0 - 6.5	●			0 2 3
8			soft	8.5 - 10.0	●			0 1 2
10			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					

LEGEND: ▬ Ring Sample ◯ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 65

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

JOB NO.: 302524-002
DATE: 10/11/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			3.0" AC / 6.0" SILTY SAND with GRAVEL (Misc. AB)					
1	CL		SANDY LEAN CLAY; dark brown, medium stiff, moist (Fill)	1.0 - 2.5	Ring	102.3	19.0	3 4 5
4	SC -SM		SILTY CLAYEY SAND; dark brown, loose, moist (Alluvium)	5.0 - 6.5	SPT			0 1 1
8				8.5 - 10.0	SPT			0 1 2
10			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					

LEGEND: Ring Sample Grab Sample Shelby Tube Sample SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 66

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

JOB NO.: 302524-002
DATE: 10/11/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			4.0" AC / 7.5" SILTY SAND with GRAVEL (Misc. AB)					
1	SW		WELL GRADED SAND with GRAVEL; light brown, loose, moist (Fill)	1.0 - 2.5	Ring	115.4	14.8	12 12 16
2	CL		SANDY LEAN CLAY; dark brown, very stiff, moist					
3								
4	SC -SM		SILTY, CLAYEY SAND; dark brown, loose, moist, caliche (Alluvium)	4.0 - 5.0	Grab			1 1 2
5				5.0 - 6.5	SPT			
6								
7								
8				8.5 - 10.0	SPT			0 2 2
9								
10			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: Ring Sample Grab Sample Shelby Tube Sample SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 67

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

JOB NO.: 302524-002
DATE: 10/11/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			5.0" AC / 7.0" SILTY SAND with GRAVEL (Misc. AB)					
1	CL		SANDY LEAN CLAY; brown, loose, moist (Fill)	1.0 - 2.5	Ring Sample	106.7	12.9	5 5 6
2								
3								
4	SC -SM		SILTY, CLAYEY SAND; dark brown, loose, moist (Alluvium)					
5				5.0 - 6.5	SPT			1 3 3
6								
7								
8				8.5 - 10.0	SPT			2 3 7
9								
10			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: Ring Sample Grab Sample Shelby Tube Sample SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 68

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

JOB NO.: 302524-002
DATE: 10/11/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			5.5" AC / 5.5" SILTY SAND with GRAVEL (Misc. AB)					
1	SW		WELL GRADED SAND with GRAVEL; light brown, loose, moist (Fill)	1.0 - 2.5	Ring	112.7	2.8	12 8 7
2	CL		SANDY LEAN CLAY; dark brown, stiff, moist					
4	SC -SM		SILTY CLAYEY SAND; dark brown, loose, moist (Alluvium)	5.0 - 6.5	SPT			2 3 4
8			brown, caliche	8.5 - 10.0	SPT			2 3 5
10			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					

LEGEND: Ring Sample Grab Sample Shelby Tube Sample SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 69

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

JOB NO.: 302524-002
DATE: 10/11/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			3.5" AC / 7.0" SILTY SAND with GRAVEL (Misc. AB)					
1	SW		WELL GRADED SAND with GRAVEL; light brown, loose, moist (Fill)	1.0 - 2.5	Ring	126.1	14.2	5 8 8
2	CL		SANDY LEAN CLAY; dark brown, stiff, moist					
3								
4	SC -SM		SILTY CLAYEY SAND; dark brown, loose, moist (Alluvium)	5.0 - 6.5	SPT			1 2 2
5								
6								
7								
8				8.5 - 10.0	SPT			1 3 5
9								
10								
11			TD: 10.0' No subsurface groundwater encountered Backfilled with cuttings and tamped AC Patch					
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

Earth Systems Pacific

Boring No. 70

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

JOB NO.: 302524-002
DATE: 10/11/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			5.0" AC / 6.5" SILTY SAND with GRAVEL (Misc. AB)					
1	SW		WELL GRADED SAND with GRAVEL; light brown, loose, moist (Fill)	1.0 - 2.5	Ring	118.0	13.2	12 13 20
2	CL		SANDY LEAN CLAY; dark brown, very stiff, moist					
3				1.5 - 4.5	Grab			
4								
5	SP		POORLY GRADED SAND; light brown, loose, moist (Alluvium)	5.0 - 6.5	SPT			2 2 1
6	SC -SM		SILTY, CLAYEY SAND; dark brown, loose, moist, caliche					
7								
8								0 1 1
9			caliche	8.5 - 10.0	SPT			
10								
11			TD: 10.0'					
12			No subsurface water encountered					
13			Backfilled with cuttings and tamped					
14			AC Patch					
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Exhibit 1

APPENDIX B

Laboratory Test Results

Exhibit 1

Oxnard Airport Taxiway F Improvements
Oxnard, California

302524-002

BULK DENSITY TEST RESULTS

ASTM D 2937-17 (modified for ring liners)

February 11, 2020

BORING NO.	DEPTH feet	MOISTURE CONTENT, %	WET DENSITY, pcf	DRY DENSITY, pcf
41	1.0 - 1.5	16.9	126.1	107.9
42	1.5 - 2.0	15.5	129.7	112.3
43	1.0 - 1.5	15.1	133.4	115.9
44	1.5 - 2.0	6.9	129.0	120.7
45	1.0 - 1.5	18.6	126.0	106.3
46	1.0 - 1.5	3.7	121.4	117.1
47	1.0 - 1.5	13.1	131.7	116.4
48	1.0 - 1.5	12.1	128.7	114.8
49	1.0 - 1.5	12.9	129.5	114.7
50	1.0 - 1.5	13.0	134.5	119.0
51	1.0 - 1.5	15.8	128.9	111.4
52	1.5 - 2.0	11.6	127.9	114.6
53	1.0 - 1.5	15.3	126.9	110.1
54	1.5 - 2.0	5.2	130.8	124.3
55	1.0 - 1.5	14.4	124.6	108.9
56	1.5 - 2.0	12.0	129.9	116.0
57	1.0 - 1.5	2.7	120.8	117.6
58	1.5 - 2.0	12.1	129.6	115.5
59	1.5 - 2.0	13.7	125.9	110.8
60	1.0 - 1.5	7.1	128.3	119.8
61	1.5 - 2.0	14.5	128.7	112.4
62	1.5 - 2.0	12.2	101.7	90.7
63	1.0 - 1.5	12.4	87.6	77.9
64	1.0 - 1.5	3.4	107.8	104.3
65	1.0 - 1.5	19.0	121.8	102.3
66	1.0 - 1.5	14.8	132.4	115.4
67	1.0 - 1.5	12.9	120.5	106.7
68	1.0 - 1.5	2.8	115.9	112.7
69	1.0 - 1.5	14.2	144.0	126.1
70	1.0 - 1.5	13.2	133.6	118.0

Oxnard Airport Taxiway F Improvements
Oxnard, California

302524-002

PARTICLE SIZE ANALYSIS

ASTM D 422-63/07

Boring #41 @ 1.5 - 5.0'

February 11, 2020

Dark Brown Sandy Lean Clay (CL)

Specific Gravity = 2.70 (assumed)

LL = 28; PL = 17; PI = 11

Gravel = 2%; Sand = 43%; Silt = 32%; Clay = 23%

Sieve size	% Retained	% Passing
1" (25.0-mm)	0	100
3/4" (19.0-mm)	0	100
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	1	99
#4 (4.75-mm)	2	98
#8 (2.36-mm)	3	97
#16 (1.18-mm)	5	95
#30 (600-µm)	7	93
#50 (300-µm)	12	88
#100 (150-µm)	28	72
#200 (75-µm)	45	55
Hydrometer Analysis		
46-µm		46
33-µm		41
21-µm		34
13-µm		29
9-µm		24
5.2-µm		23
3.2-µm		19
Colloids		16

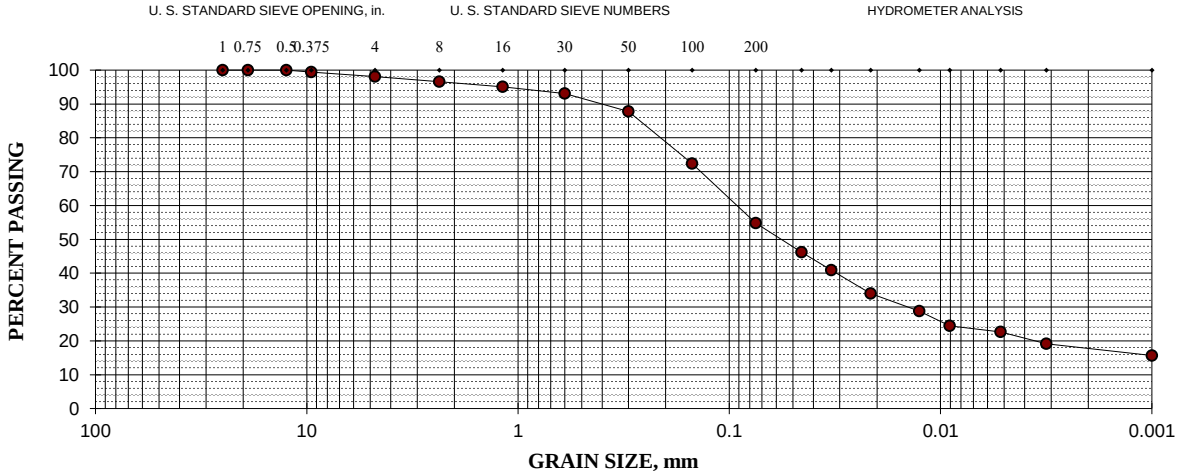


Exhibit 1

Oxnard Airport Taxiway F Improvements
Oxnard, California

302524-002

PARTICLE SIZE ANALYSIS

ASTM D 422-63/07

Boring #45 @ 1.0 - 5.0'

February 11, 2020

Dark Brown Sandy Lean Clay (CL)

Specific Gravity = 2.70 (assumed)

LL = 29; PL = 19; PI = 10

Gravel = 1%; Sand = 47%; Silt = 31%; Clay = 21%

Sieve size	% Retained	% Passing
1" (25.0-mm)	0	100
3/4" (19.0-mm)	0	100
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	1	99
#8 (2.36-mm)	3	97
#16 (1.18-mm)	5	95
#30 (600-µm)	7	93
#50 (300-µm)	14	86
#100 (150-µm)	30	70
#200 (75-µm)	48	52
Hydrometer Analysis		
48-µm		35
34-µm		31
22-µm		28
13-µm		26
9-µm		23
5.2-µm		21
3.1-µm		19
Colloids		13

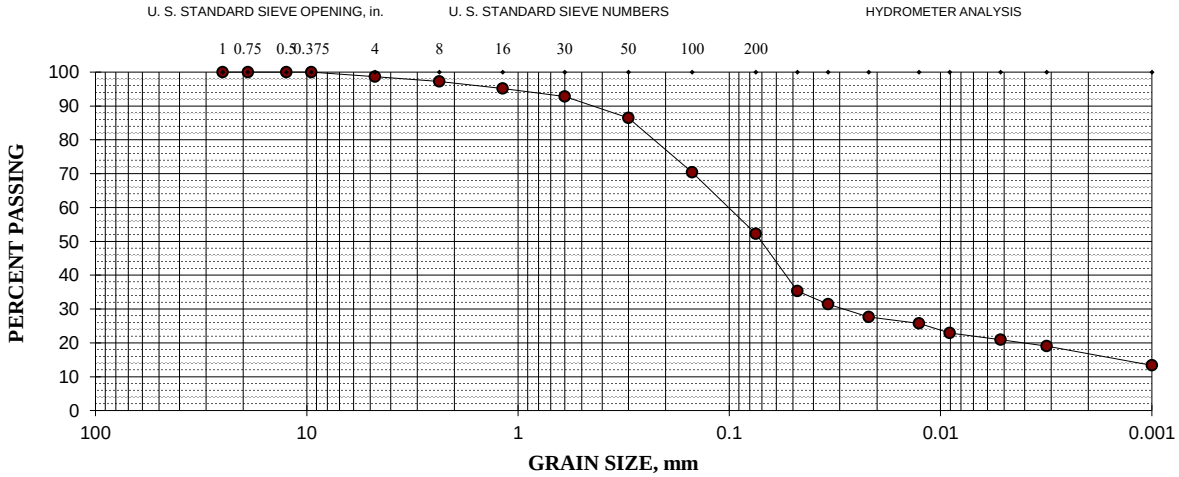


Exhibit 1

Oxnard Airport Taxiway F Improvements
Oxnard, California

302524-002

PARTICLE SIZE ANALYSIS

ASTM D 422-63/07

Boring #46 @ 1.0 - 2.0'

February 11, 2020

Light Brown Well-Graded Sand with Silt and Gravel (SW-SM)

Specific Gravity = 2.65 (assumed)

PI = NP (Non-plastic)

Gravel = 22%; Sand = 68%; Silt = 6%; Clay = 4%

Cu = 27.3; Cc = 1.7

Sieve size	% Retained	% Passing
1" (25.0-mm)	0	100
3/4" (19.0-mm)	5	95
1/2" (12.5-mm)	10	90
3/8" (9.5-mm)	13	87
#4 (4.75-mm)	22	78
#8 (2.36-mm)	31	69
#16 (1.18-mm)	42	58
#30 (600-µm)	56	44
#50 (300-µm)	73	27
#100 (150-µm)	84	16
#200 (75-µm)	90	10

Hydrometer Analysis	
50-µm	10
36-µm	8
23-µm	7
13-µm	7
9-µm	6
5.5-µm	4
3.3-µm	4
Colloids	3

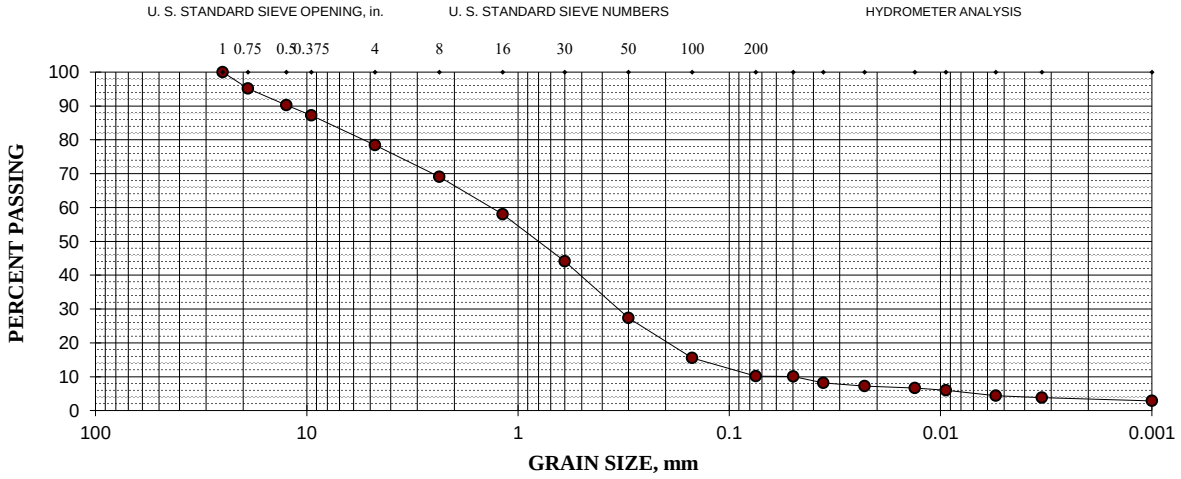


Exhibit 1

Oxnard Airport Taxiway F Improvements
Oxnard, California

302524-002

PARTICLE SIZE ANALYSIS

ASTM D 422-63/07

Boring #53 @ 7.5 - 10.0'

February 11, 2020

Light Brown Sandy Lean Clay (CL)

Specific Gravity = 2.70 (assumed)

LL = 36; PL = 19; PI = 17

Gravel = 0%; Sand = 26%; Silt = 45%; Clay = 29%

Sieve size	% Retained	% Passing
1" (25.0-mm)	0	100
3/4" (19.0-mm)	0	100
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	0	100
#8 (2.36-mm)	0	100
#16 (1.18-mm)	1	99
#30 (600-µm)	2	98
#50 (300-µm)	3	97
#100 (150-µm)	9	91
#200 (75-µm)	26	74
Hydrometer Analysis		
45-µm		55
32-µm		50
21-µm		46
12-µm		38
9-µm		35
5.1-µm		29
3.1-µm		27
Colloids		22

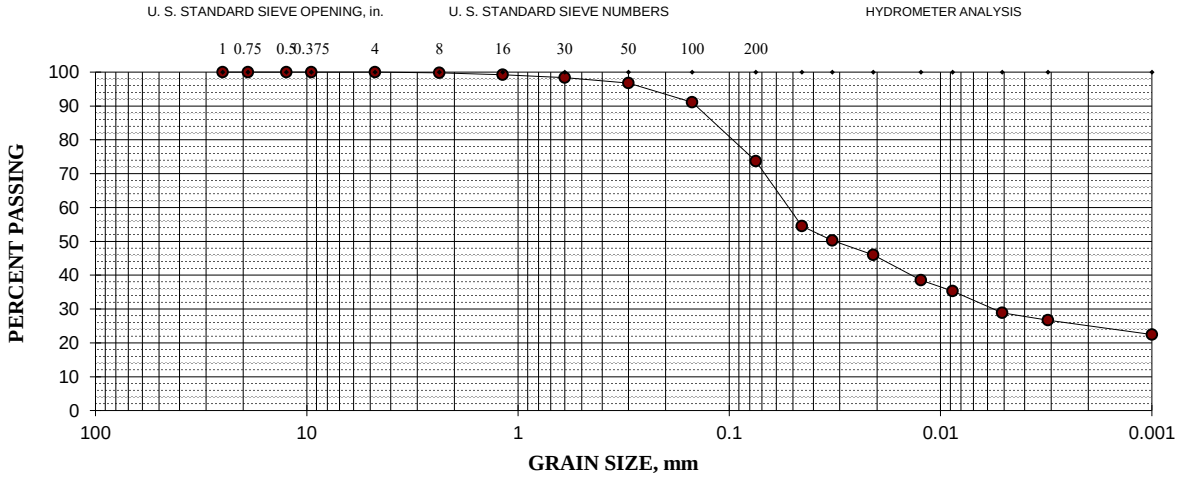


Exhibit 1

Oxnard Airport Taxiway F Improvements
Oxnard, California

302524-002

PARTICLE SIZE ANALYSIS

ASTM D 422-63/07

Boring #54 @ 4.0 - 5.0'

February 11, 2020

Dark Brown Sandy Lean Clay (CL)

Specific Gravity = 2.70 (assumed)

LL = 39; PL = 18; PI = 21

Gravel = 1%; Sand = 21%; Silt = 39%; Clay = 39%

Sieve size	% Retained	% Passing
1" (25.0-mm)	0	100
3/4" (19.0-mm)	0	100
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	1	99
#4 (4.75-mm)	1	99
#8 (2.36-mm)	1	99
#16 (1.18-mm)	1	99
#30 (600-µm)	2	98
#50 (300-µm)	3	97
#100 (150-µm)	10	90
#200 (75-µm)	22	78
Hydrometer Analysis		
40-µm		67
29-µm		62
19-µm		55
11-µm		47
8-µm		43
4.8-µm		39
3.0-µm		34
Colloids		21

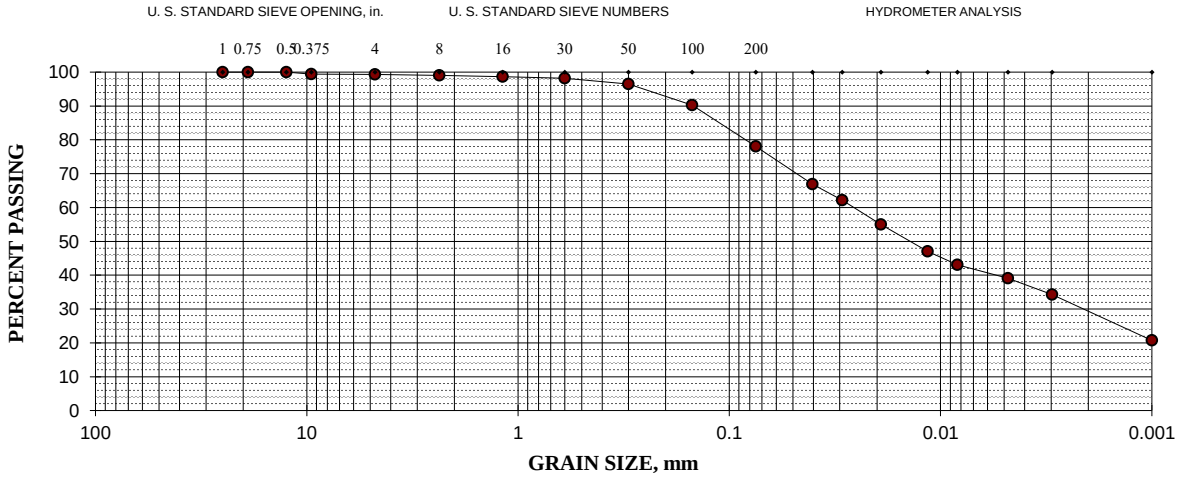


Exhibit 1

Oxnard Airport Taxiway F Improvements
Oxnard, California

302524-002

PARTICLE SIZE ANALYSIS

ASTM D 422-63/07

Boring #55 @ 1.5 - 5.0'

February 11, 2020

Dark Brown Sandy Lean Clay (CL)

Specific Gravity = 2.70 (assumed)

LL = 30; PL = 19; PI = 11

Gravel = 1%; Sand = 45%; Silt = 31%; Clay = 23%

Sieve size	% Retained	% Passing
1" (25.0-mm)	0	100
3/4" (19.0-mm)	0	100
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	1	99
#8 (2.36-mm)	1	99
#16 (1.18-mm)	4	96
#30 (600-µm)	6	94
#50 (300-µm)	12	88
#100 (150-µm)	28	72
#200 (75-µm)	46	54
Hydrometer Analysis		
47-µm		44
34-µm		39
21-µm		36
13-µm		31
9-µm		27
5.2-µm		23
3.1-µm		21
Colloids		17

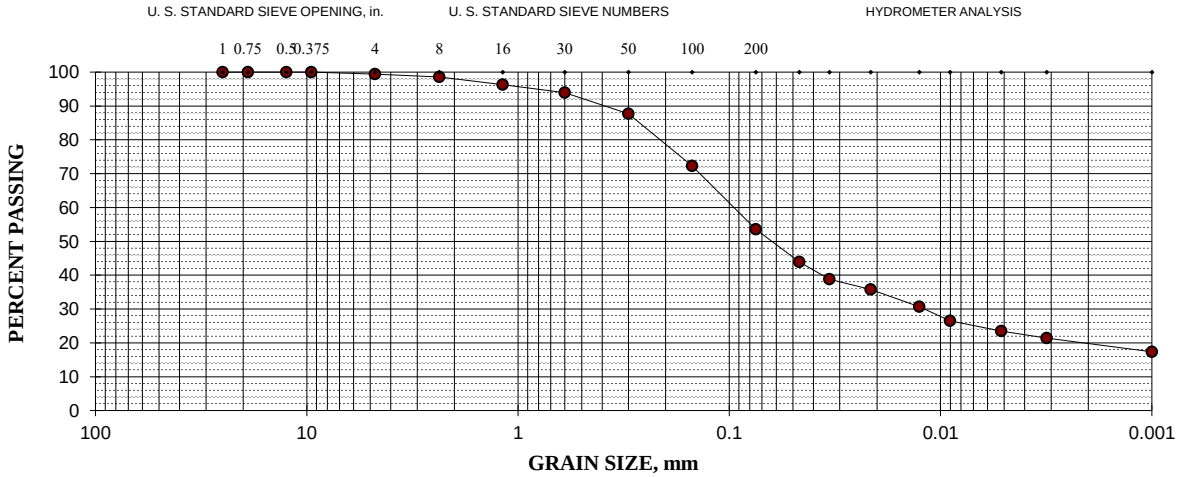


Exhibit 1

Oxnard Airport Taxiway F Improvements
Oxnard, California

302524-002

PARTICLE SIZE ANALYSIS

ASTM D 422-63/07

Boring #62 @ 2.0 - 5.0'

February 11, 2020

Dark Brown Sandy Lean Clay (CL)

Specific Gravity = 2.70 (assumed)

LL = 27; PL = 18; PI = 9

Gravel = 1%; Sand = 45%; Silt = 30%; Clay = 24%

Sieve size	% Retained	% Passing
1" (25.0-mm)	0	100
3/4" (19.0-mm)	0	100
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	1	99
#8 (2.36-mm)	2	98
#16 (1.18-mm)	5	95
#30 (600-µm)	7	93
#50 (300-µm)	15	85
#100 (150-µm)	30	70
#200 (75-µm)	46	54
Hydrometer Analysis		
45-µm		47
32-µm		45
21-µm		38
12-µm		32
9-µm		27
5.1-µm		24
3.1-µm		21
Colloids		18

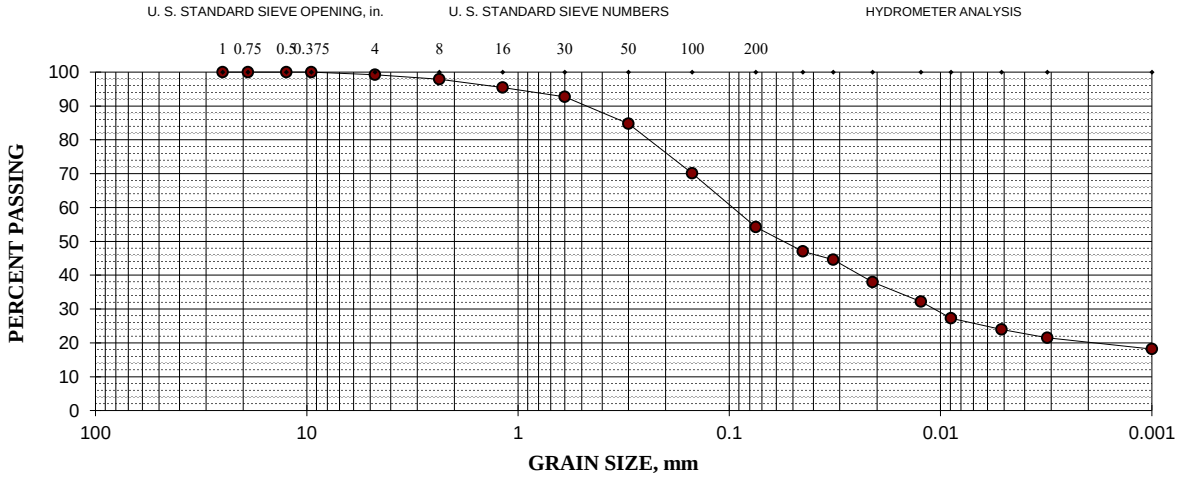


Exhibit 1

Oxnard Airport Taxiway F Improvements
Oxnard, California

302524-002

PARTICLE SIZE ANALYSIS

ASTM D 422-63/07

Boring #66 @ 4.0 - 5.0'
Dark Brown Silty, Clayey Sand (SC-SM)
LL = 27; PL = 21; PI = 6

February 11, 2020
Specific Gravity = 2.70 (assumed)
Gravel = 3%; Sand = 47%; Silt = 33%; Clay = 17%

Sieve size	% Retained	% Passing
1" (25.0-mm)	0	100
3/4" (19.0-mm)	0	100
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	1	99
#4 (4.75-mm)	3	97
#8 (2.36-mm)	5	95
#16 (1.18-mm)	8	92
#30 (600-µm)	12	88
#50 (300-µm)	17	83
#100 (150-µm)	32	68
#200 (75-µm)	50	50
Hydrometer Analysis		
45-µm		36
33-µm		32
21-µm		30
13-µm		23
9-µm		20
5.2-µm		17
3.1-µm		15
Colloids		11

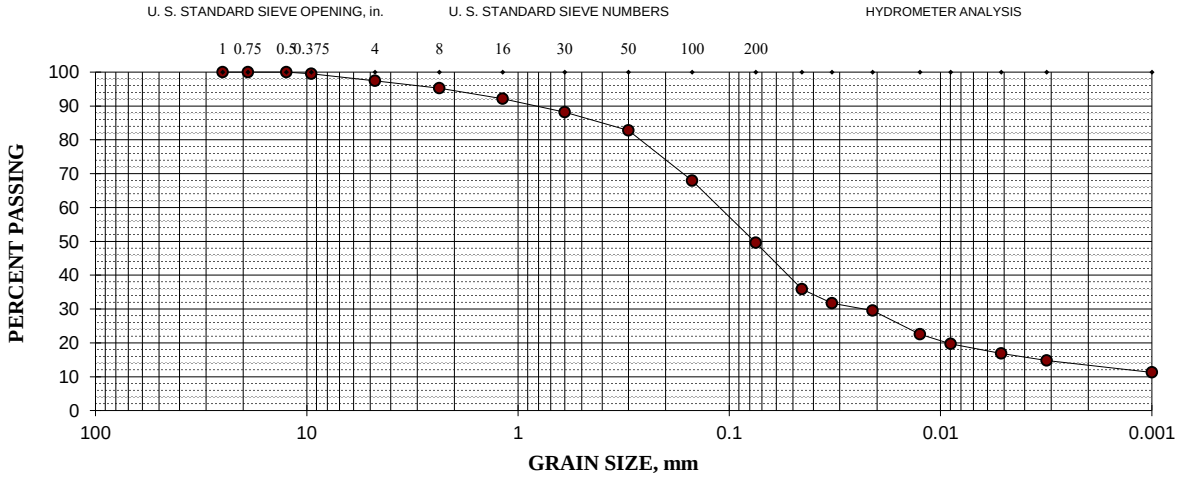


Exhibit 1

Oxnard Airport Taxiway F Improvements
Oxnard, California

302524-002

PARTICLE SIZE ANALYSIS

ASTM D 422-63/07

Boring #70 @ 1.5 - 4.5'

February 11, 2020

Dark Brown Sandy Lean Clay (CL)

Specific Gravity = 2.70 (assumed)

LL = 28; PL = 20; PI = 8

Gravel = 1%; Sand = 47%; Silt = 31%; Clay = 21%

Sieve size	% Retained	% Passing
1" (25.0-mm)	0	100
3/4" (19.0-mm)	0	100
1/2" (12.5-mm)	0	100
3/8" (9.5-mm)	0	100
#4 (4.75-mm)	1	99
#8 (2.36-mm)	4	96
#16 (1.18-mm)	7	93
#30 (600-µm)	10	90
#50 (300-µm)	13	87
#100 (150-µm)	28	72
#200 (75-µm)	48	52
Hydrometer Analysis		
45-µm		43
33-µm		36
21-µm		32
13-µm		25
9-µm		23
5.2-µm		21
3.1-µm		19
Colloids		15

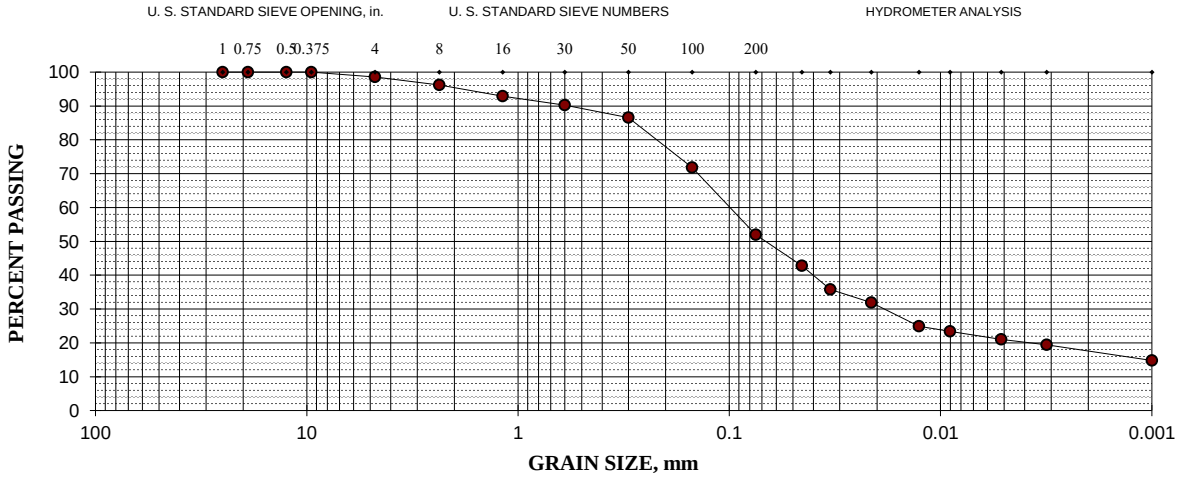


Exhibit 1

Oxnard Airport Taxiway F Improvements
Oxnard, California

302524-002

PLASTICITY INDEX

ASTM D 4318-17

February 11, 2020

Test No.:	1	2	3	4	5
Boring No.:	41	45	46	53	54
Sample Depth:	1.5 - 5.0'	1.0 - 5.0'	1.0 - 2.0'	7.5 - 10.0'	4.0 - 5.0'
Liquid Limit:	28	29	NL	36	39
Plastic Limit:	17	19	NP	19	18
Plasticity Index:	11	10	NP	17	21

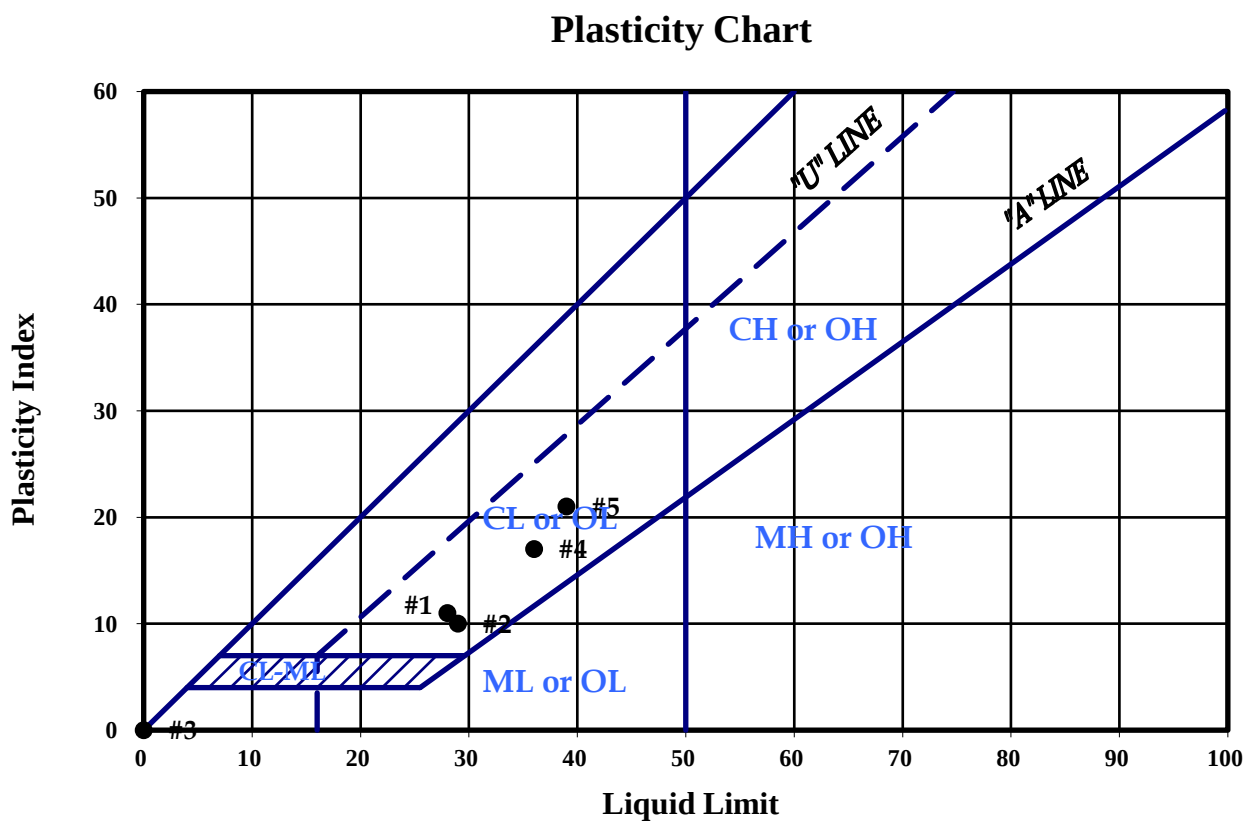


Exhibit 1

Oxnard Airport Taxiway F Improvements
Oxnard, California

302524-002

PLASTICITY INDEX

ASTM D 4318-17

February 11, 2020

Test No.:	6	7	8	9	10
Boring No.:	55	62	66	70	
Sample Depth:	1.5 - 5.0'	2.0 - 5.0'	4.0 - 5.0'	1.5 - 4.0'	
Liquid Limit:	30	27	27	28	
Plastic Limit:	19	18	21	20	
Plasticity Index:	11	9	6	8	

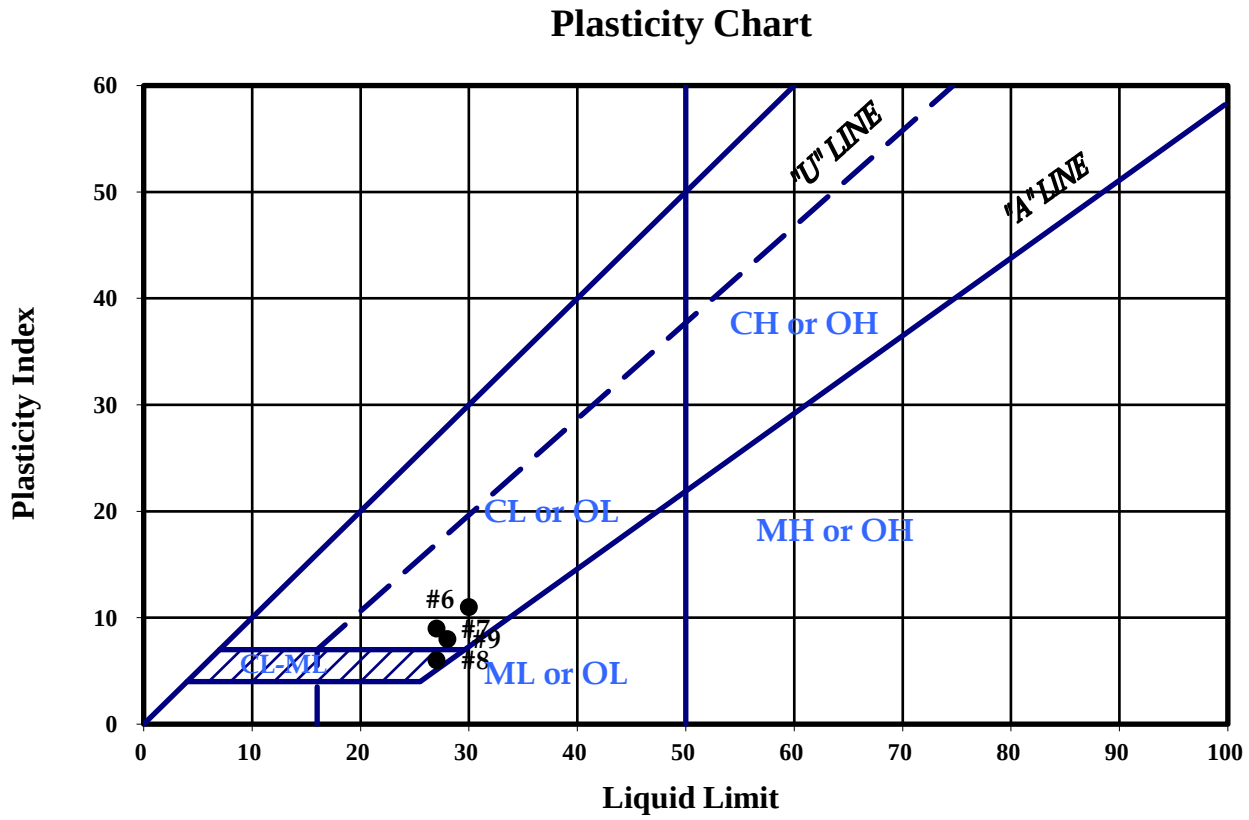


Exhibit 1

Oxnard Airport Taxiway F Improvements
Oxnard, California

302524-002

MOISTURE-DENSITY COMPACTION TEST with 5% Lime, B.D.W.

ASTM D 1557-12 (Modified)

PROCEDURE USED: A
PREPARATION METHOD: Moist
RAMMER TYPE: Mechanical
SPECIFIC GRAVITY: 2.70 (assumed)

February 11, 2020
Boring #41 @ 1.5 - 5.0'
Dark Brown Sandy Lean Clay (CL)
With 5% Lime by Dry Weight

SIEVE DATA:

Sieve Size	% Retained (Cumulative)
3/4"	0
3/8"	1
#4	2

MAXIMUM DRY DENSITY: 116.6 pcf
OPTIMUM MOISTURE: 13.0%

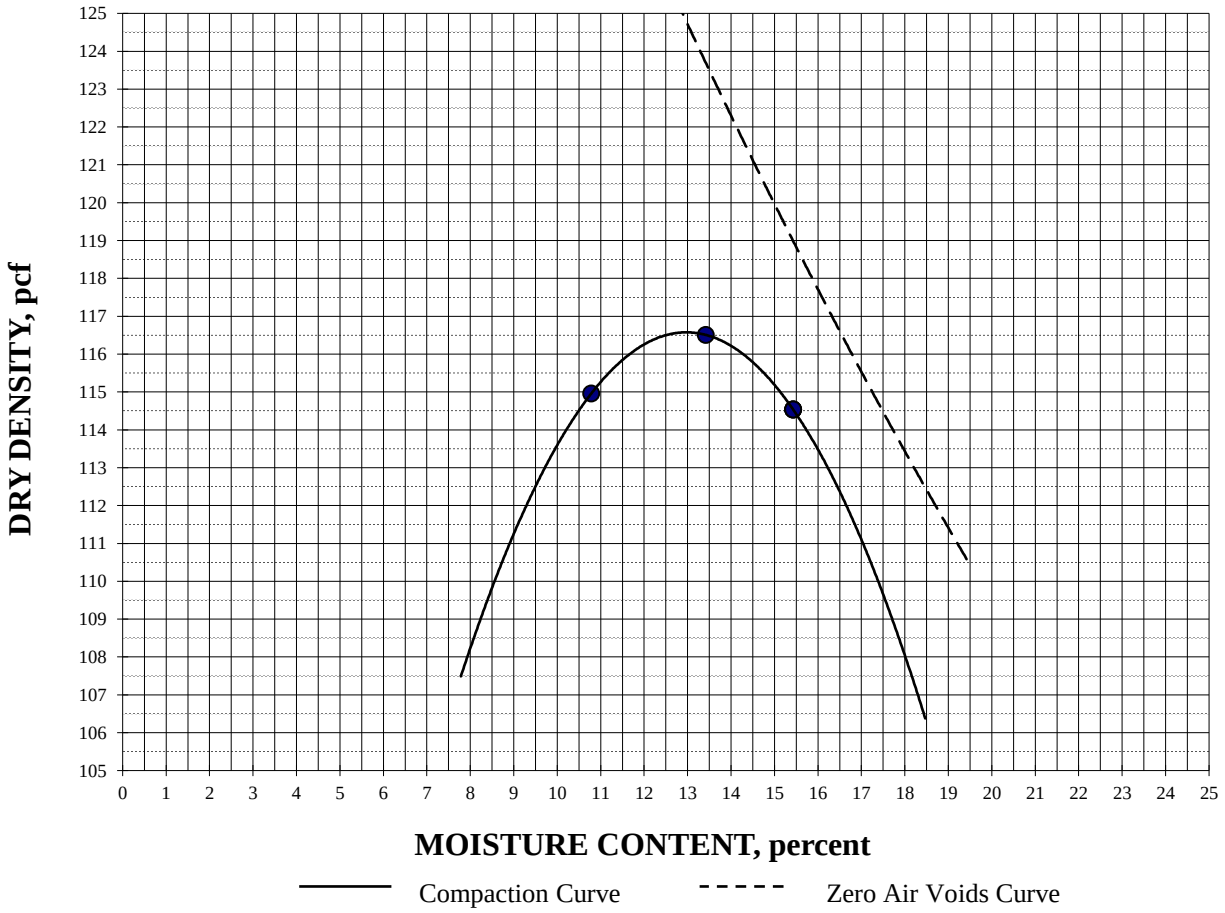


Exhibit 1

Oxnard Airport Taxiway F Improvements
Oxnard, California

302524-002

MOISTURE-DENSITY COMPACTION TEST

ASTM D 1557-12 (Modified)

PROCEDURE USED: A
PREPARATION METHOD: Moist
RAMMER TYPE: Mechanical
SPECIFIC GRAVITY: 2.70 (assumed)

February 11, 2020
Boring #45 @ 1.0 - 5.0'
Dark Brown Sandy Lean Clay (CL)

SIEVE DATA:

Sieve Size	% Retained (Cumulative)
3/4"	0
3/8"	0
#4	1

MAXIMUM DRY DENSITY: 123.1 pcf
OPTIMUM MOISTURE: 11.3%

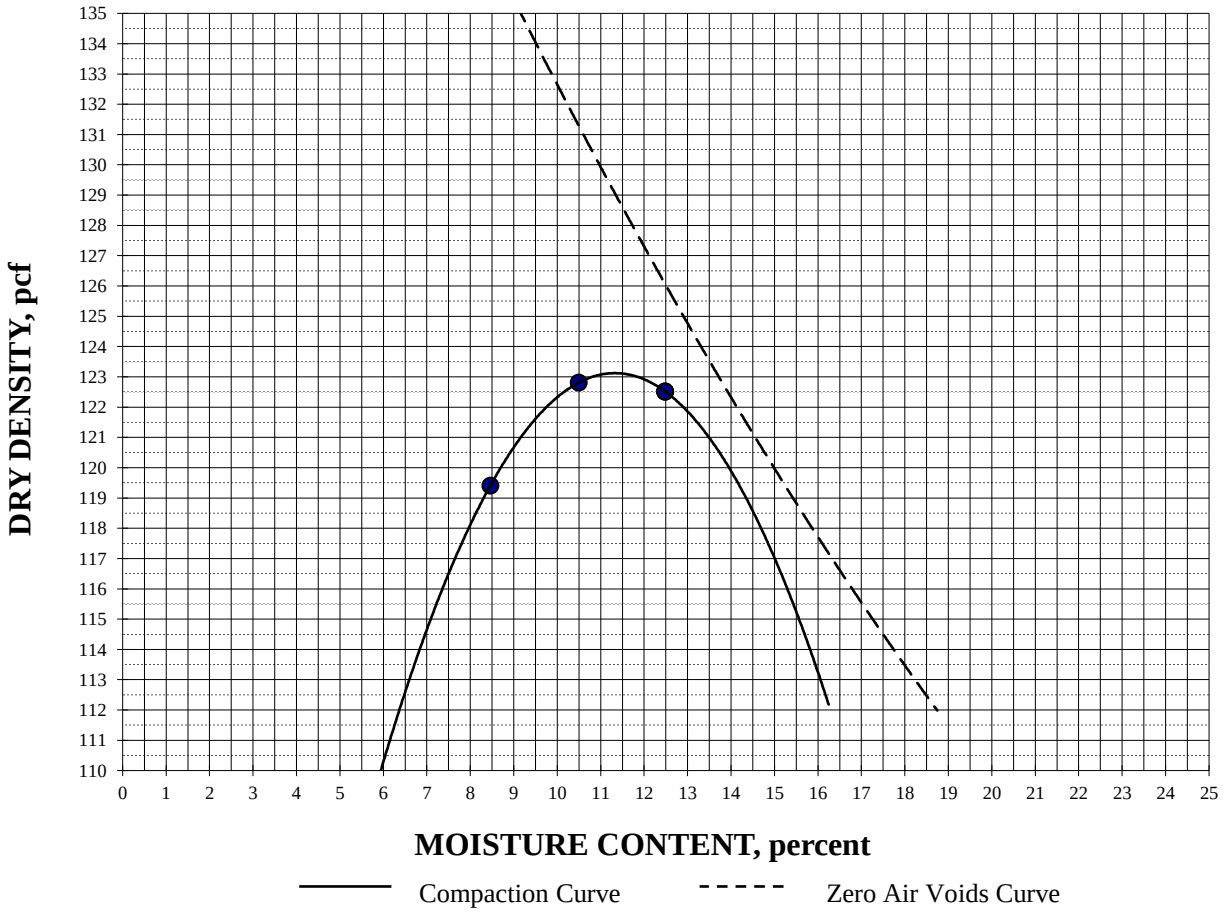


Exhibit 1

Oxnard Airport Taxiway F Improvements
Oxnard, California

302524-002

MOISTURE-DENSITY COMPACTION TEST

ASTM D 1557-12 (Modified)

PROCEDURE USED: B

PREPARATION METHOD: Moist

RAMMER TYPE: Mechanical

SPECIFIC GRAVITY: 2.65 (assumed)

February 11, 2020

Boring #46 @ 1.0 - 2.0'

Light Brown Well-Graded Sand with Silt and Gravel (SW-SM)

SIEVE DATA:

Sieve Size	% Retained (Cumulative)
3/4"	5
3/8"	13
#4	22

MAXIMUM DRY DENSITY: 128.7 pcf

OPTIMUM MOISTURE: 8.3%

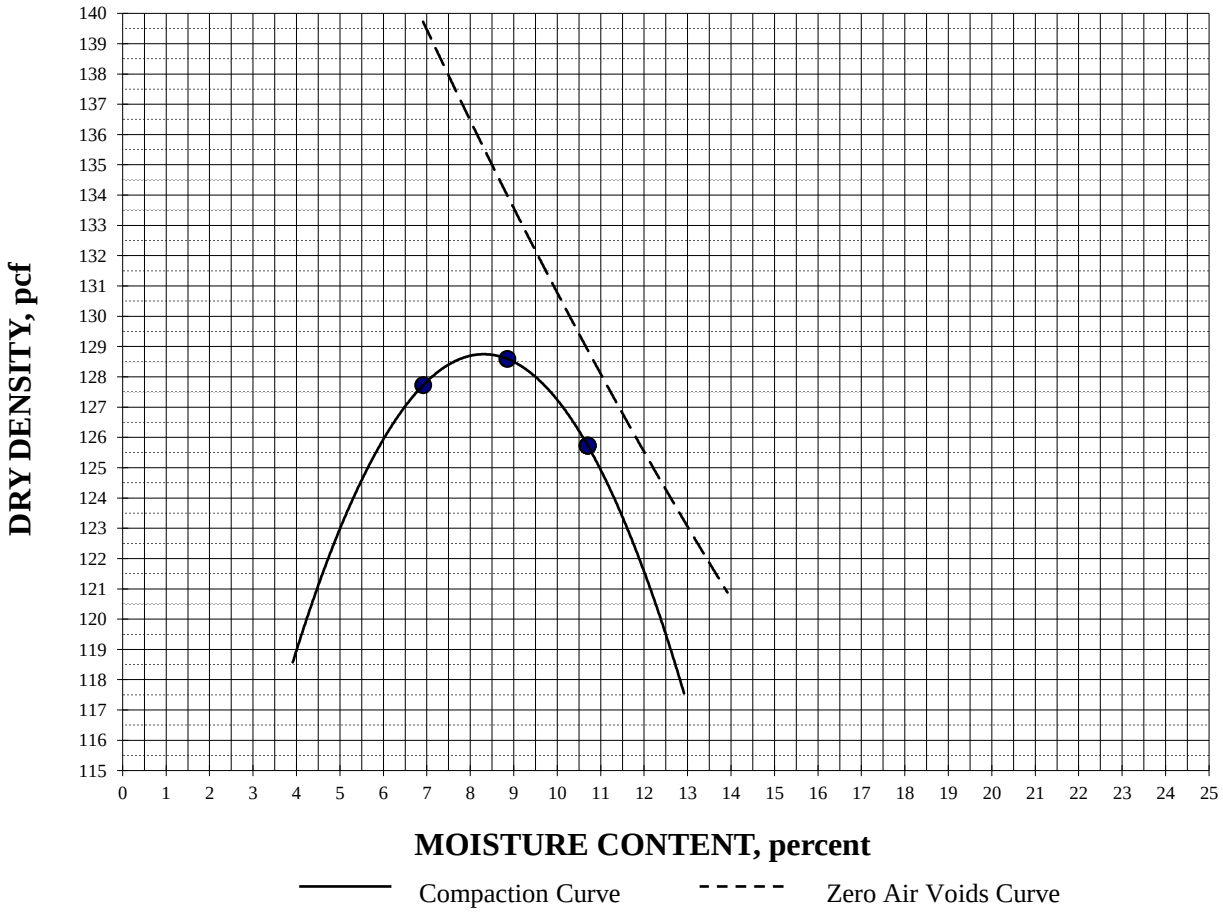


Exhibit 1

Oxnard Airport Taxiway F Improvements
Oxnard, California

302524-002

MOISTURE-DENSITY COMPACTION TEST

ASTM D 1557-12 (Modified)

PROCEDURE USED: A
PREPARATION METHOD: Moist
RAMMER TYPE: Mechanical
SPECIFIC GRAVITY: 2.70 (assumed)

February 11, 2020
Boring #53 @ 7.5 - 10.0'
Light Brown Sandy Lean Clay (CL)

SIEVE DATA:

Sieve Size	% Retained (Cumulative)
3/4"	0
3/8"	0
#4	0

MAXIMUM DRY DENSITY: 123.2 pcf
OPTIMUM MOISTURE: 11.8%

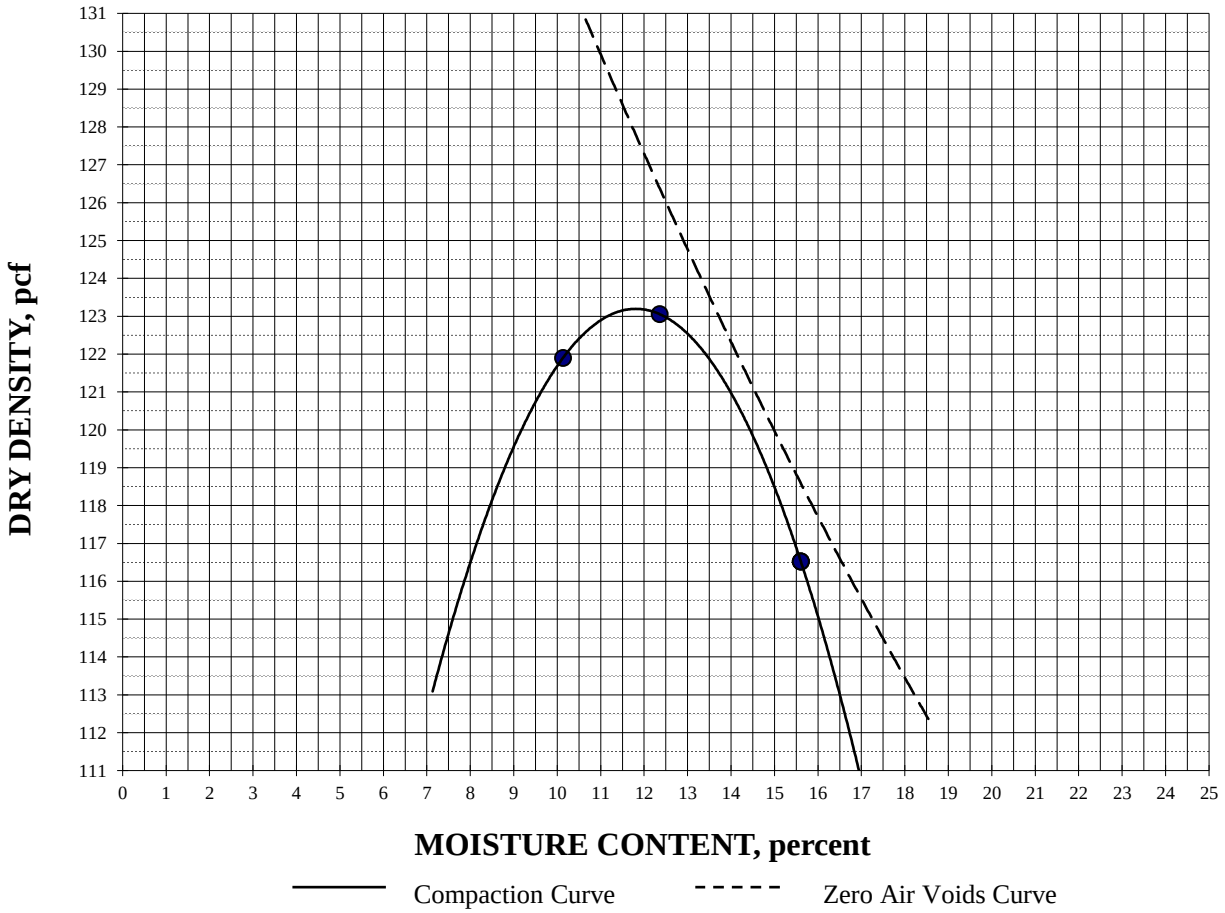


Exhibit 1

Oxnard Airport Taxiway F Improvements
Oxnard, California

302524-002

MOISTURE-DENSITY COMPACTION TEST

ASTM D 1557-12 (Modified)

PROCEDURE USED: A

PREPARATION METHOD: Moist

RAMMER TYPE: Mechanical

SPECIFIC GRAVITY: 2.70 (assumed)

February 11, 2020

Boring #54 @ 4.0 - 5.0'

Dark Brown Sandy Lean Clay (CL)

SIEVE DATA:

Sieve Size	% Retained (Cumulative)
3/4"	0
3/8"	1
#4	1

MAXIMUM DRY DENSITY: 117.5 pcf

OPTIMUM MOISTURE: 13.8%

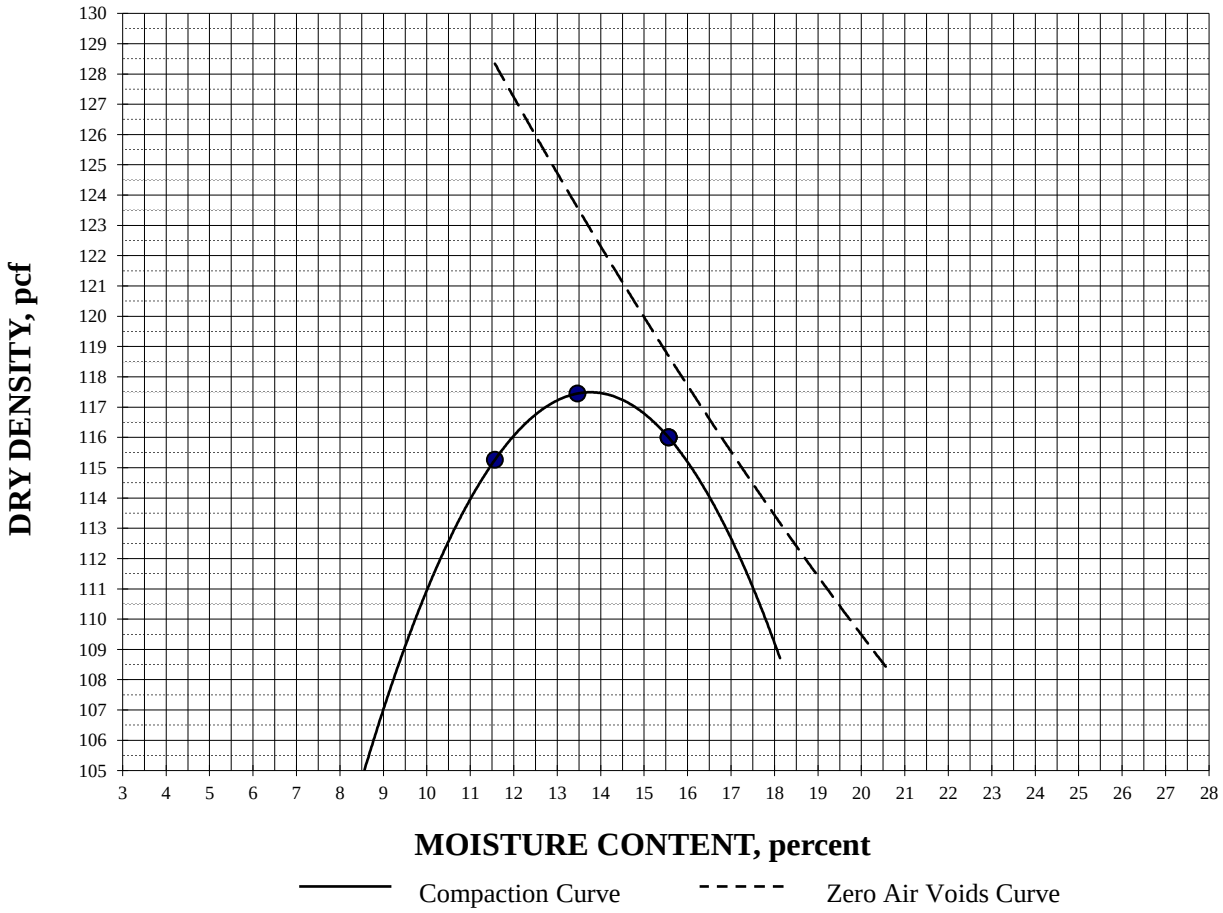


Exhibit 1

Oxnard Airport Taxiway F Improvements
Oxnard, California

302524-002

MOISTURE-DENSITY COMPACTION TEST

ASTM D 1557-12 (Modified)

PROCEDURE USED: A
PREPARATION METHOD: Moist
RAMMER TYPE: Mechanical
SPECIFIC GRAVITY: 2.70 (assumed)

February 11, 2020
Boring #55 @ 1.5 - 5.0'
Dark Brown Sandy Lean Clay (CL)

SIEVE DATA:

Sieve Size	% Retained (Cumulative)
3/4"	0
3/8"	0
#4	1

MAXIMUM DRY DENSITY: 125.4 pcf
OPTIMUM MOISTURE: 10.0%

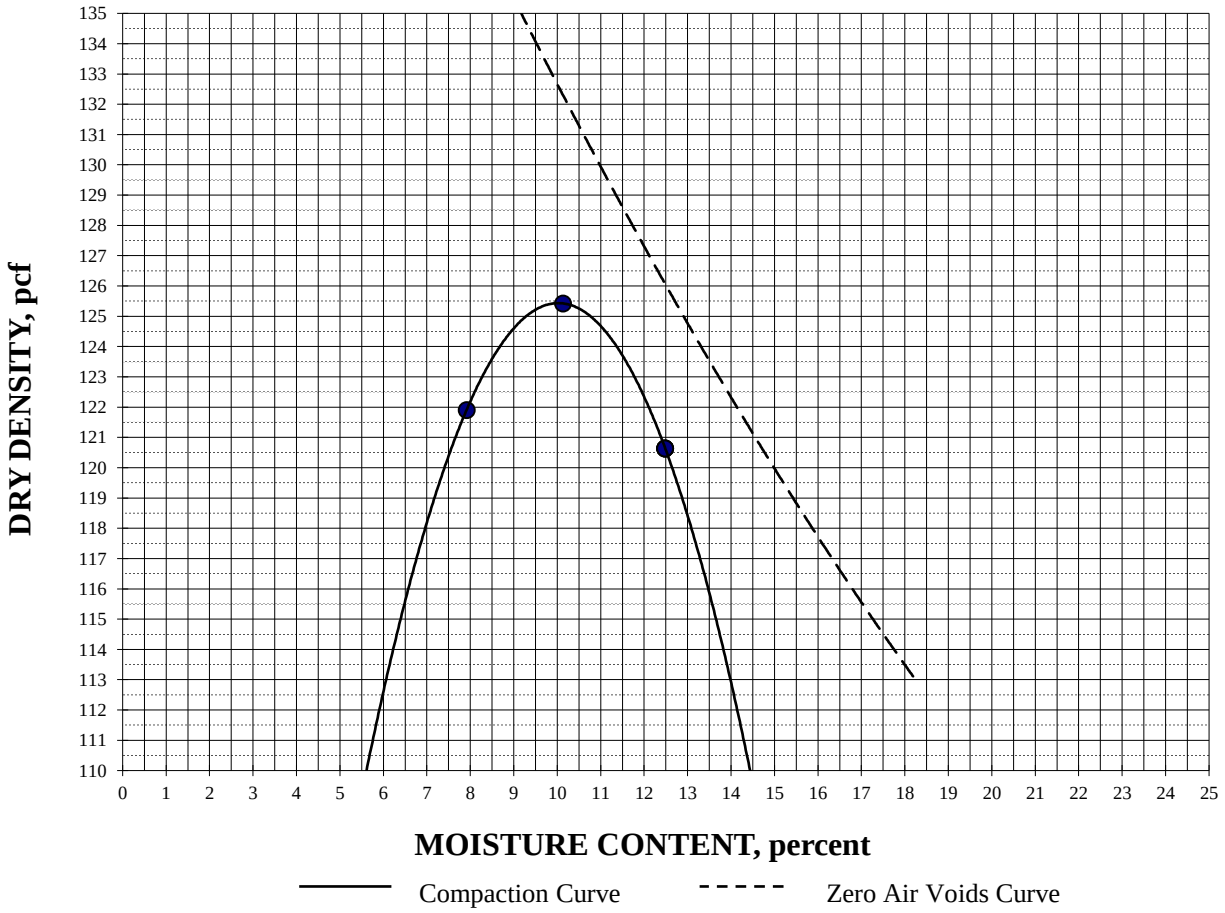


Exhibit 1

Oxnard Airport Taxiway F Improvements
Oxnard, California

302524-002

MOISTURE-DENSITY COMPACTION TEST

ASTM D 1557-12 (Modified)

PROCEDURE USED: A
PREPARATION METHOD: Moist
RAMMER TYPE: Mechanical
SPECIFIC GRAVITY: 2.70 (assumed)

February 11, 2020
Boring #62 @ 2.0 - 5.0'
Dark Brown Sandy Lean Clay (CL)

SIEVE DATA:

Sieve Size	% Retained (Cumulative)
3/4"	0
3/8"	1
#4	2

MAXIMUM DRY DENSITY: 124.7 pcf
OPTIMUM MOISTURE: 10.9%

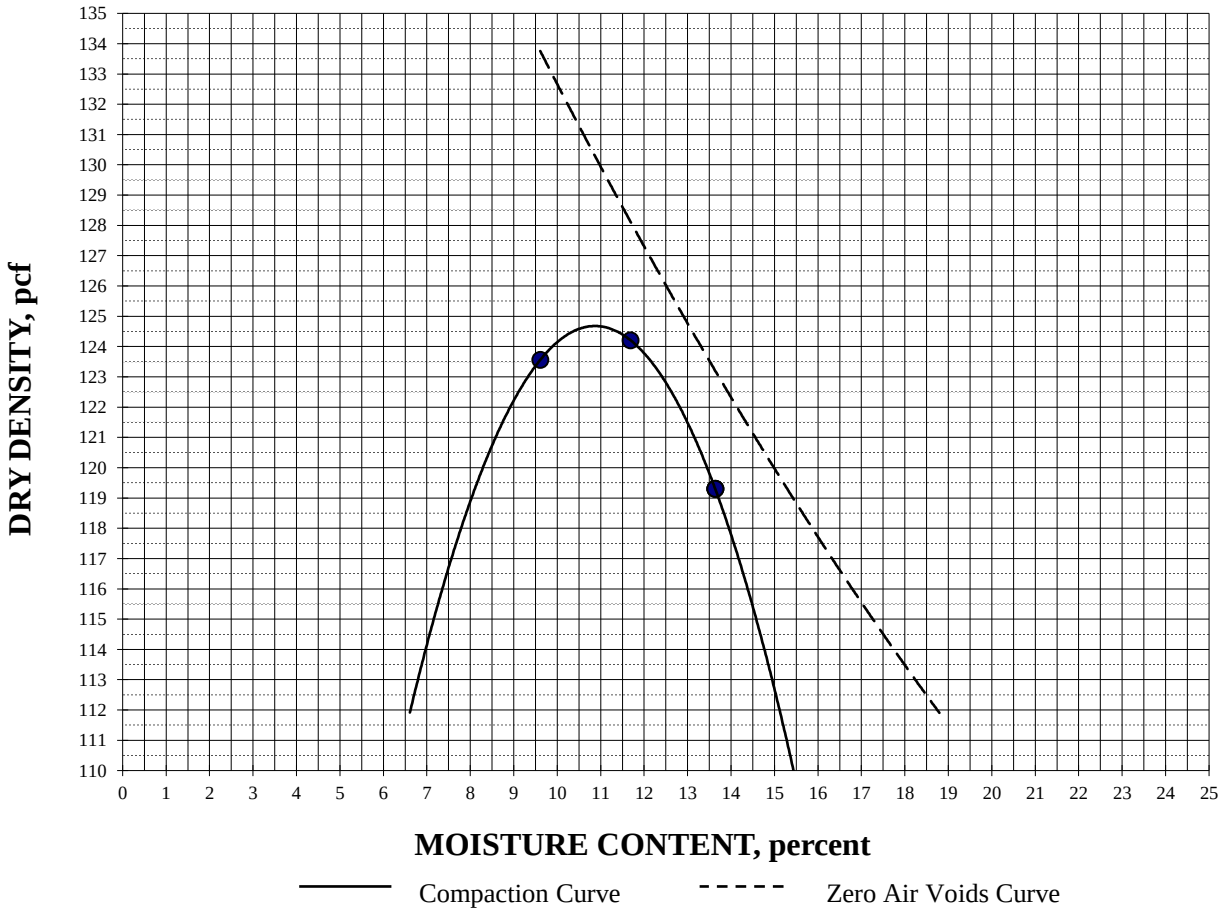


Exhibit 1

Oxnard Airport Taxiway F Improvements
Oxnard, California

302524-002

MOISTURE-DENSITY COMPACTION TEST

ASTM D 1557-12 (Modified)

PROCEDURE USED: A

PREPARATION METHOD: Moist

RAMMER TYPE: Mechanical

SPECIFIC GRAVITY: 2.68 (assumed)

February 11, 2020

Boring #66 @ 4.0 - 5.0'

Dark Brown Silty, Clayey Sand (SC-SM)

SIEVE DATA:

Sieve Size	% Retained (Cumulative)
3/4"	0
3/8"	1
#4	3

MAXIMUM DRY DENSITY: 119.8 pcf

OPTIMUM MOISTURE: 13.5%

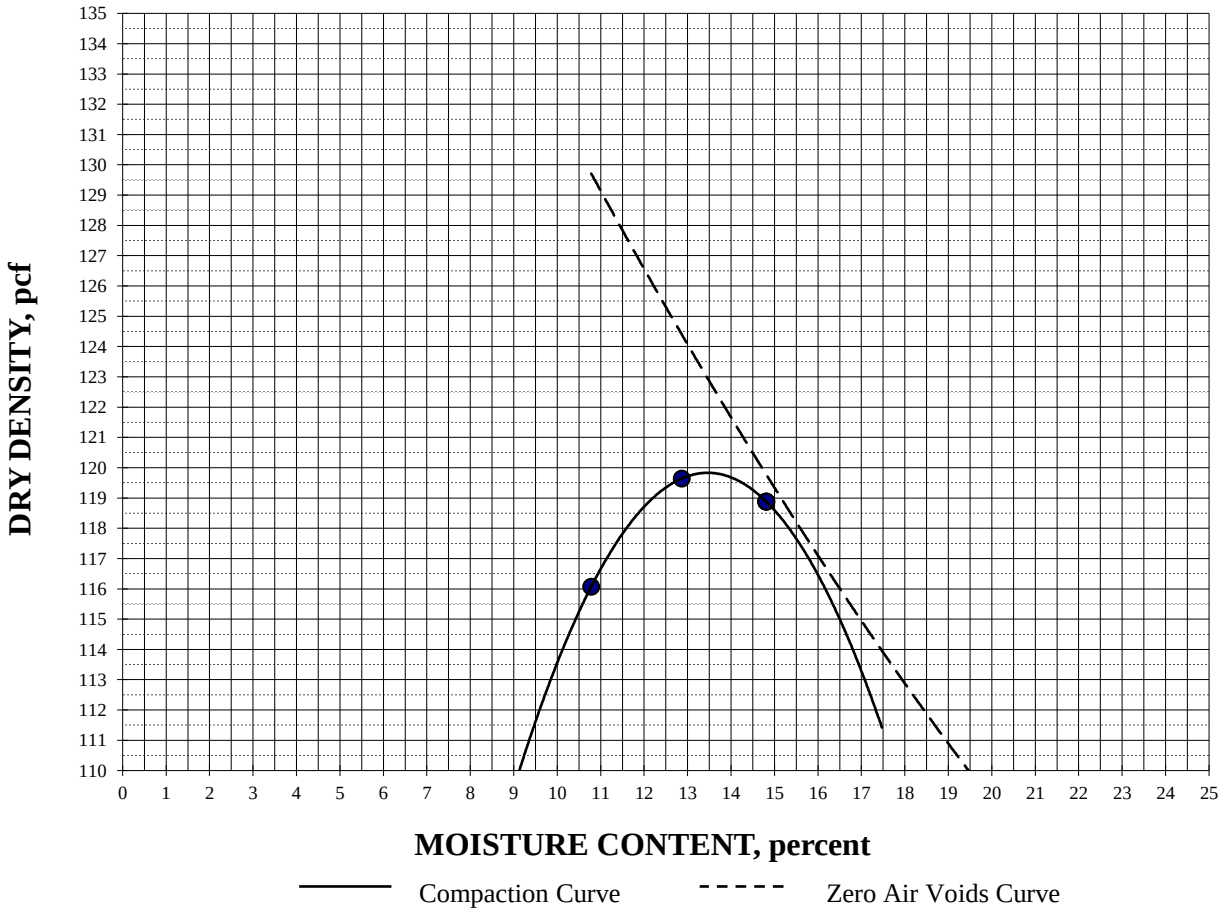


Exhibit 1

Oxnard Airport Taxiway F Improvements
Oxnard, California

302524-002

MOISTURE-DENSITY COMPACTION TEST

ASTM D 1557-12 (Modified)

PROCEDURE USED: A
PREPARATION METHOD: Moist
RAMMER TYPE: Mechanical
SPECIFIC GRAVITY: 2.70 (assumed)

February 11, 2020
Boring #70 @ 1.5 - 4.5'
Dark Brown Sandy Lean Clay (CL)

SIEVE DATA:

Sieve Size	% Retained (Cumulative)
3/4"	0
3/8"	0
#4	1

MAXIMUM DRY DENSITY: 124.1 pcf
OPTIMUM MOISTURE: 10.2%

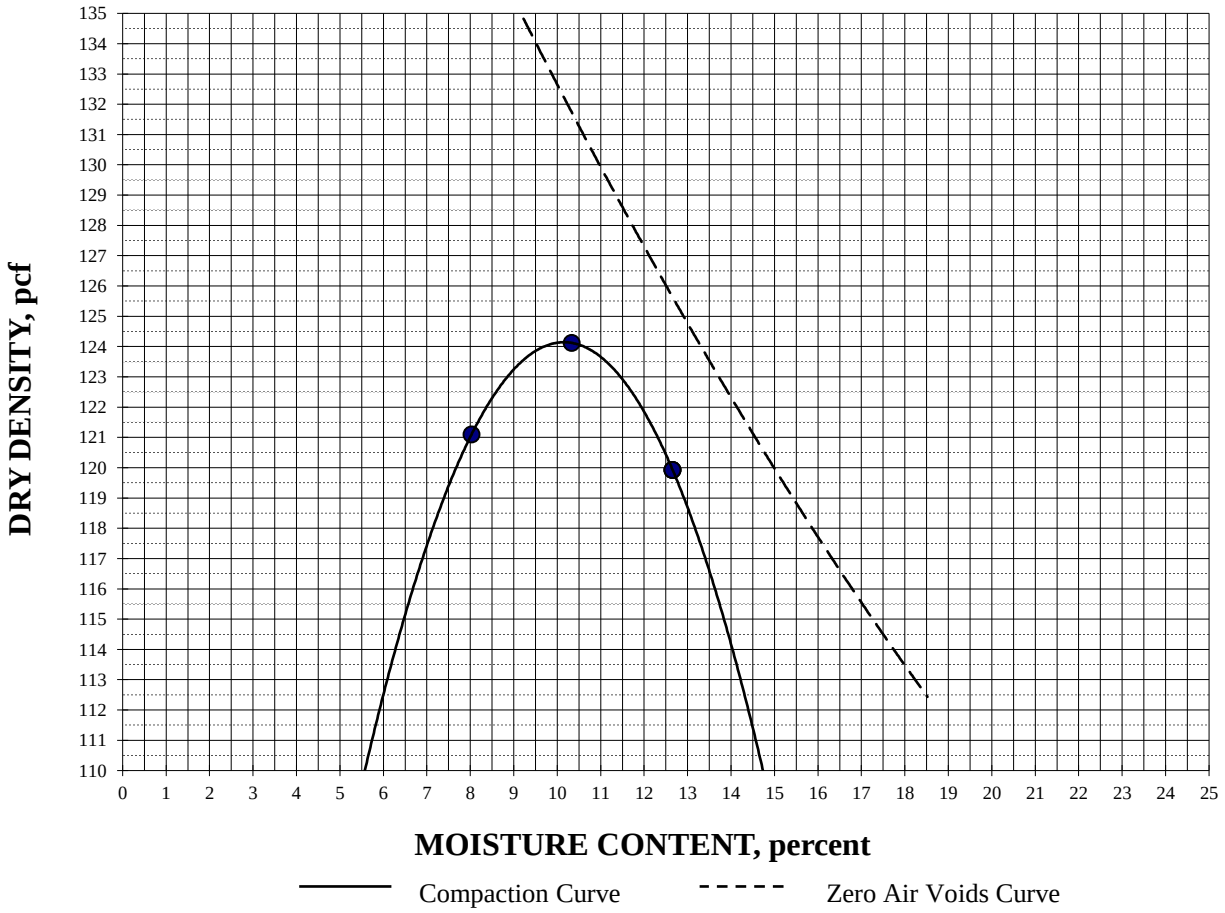


Exhibit 1

Oxnard Airport Taxiway F Improvements
Oxnard, California

302524-002

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

Boring #41 @ 1.5 - 5.0'
Dark Brown Sandy Lean Clay (CL)

February 11, 2020

10 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	101.9	106.5	111.6
Moisture content, %, before soak	8.5	11.5	14.5
Moisture content, %, after soak, avg.	21.5	18.4	15.6
Moisture content, %, after soak, top 1"	22.1	21.5	18.2
Expansion, %, 96 hour soak	0.0	0.0	0.0
Bearing Ratio, 0.100" penetration	2.7	5.1	7.0

25 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	110.0	110.5	116.1
Moisture content, %, before soak	8.5	11.5	14.5
Moisture content, %, after soak, avg.	19.1	15.9	16.3
Moisture content, %, after soak, top 1"	20.3	21.0	16.8
Expansion, %, 96 hour soak	0.0	0.2	0.0
Bearing Ratio, 0.100" penetration	5.1	6.6	10.1

75 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	119.9	121.4	118.3
Moisture content, %, before soak	8.5	11.5	14.5
Moisture content, %, after soak, avg.	15.7	15.0	16.4
Moisture content, %, after soak, top 1"	20.0	17.8	16.5
Expansion, %, 96 hour soak	0.2	0.5	0.0
Bearing Ratio, 0.100" penetration	10.3	20.3	10.4

Exhibit 1

Oxnard Airport Taxiway F Improvements
Oxnard, California

302524-002

MOISTURE-DENSITY COMPACTION TEST

ASTM D 1557-12 (Modified)

PROCEDURE USED: A
PREPARATION METHOD: Moist
RAMMER TYPE: Mechanical
SPECIFIC GRAVITY: 2.70 (assumed)

February 11, 2020
Boring #41 @ 1.5 - 5.0'
Dark Brown Sandy Lean Clay (CL)

SIEVE DATA:

Sieve Size	% Retained (Cumulative)
3/4"	0
3/8"	1
#4	2

MAXIMUM DRY DENSITY: 122.7 pcf
OPTIMUM MOISTURE: 11.5%

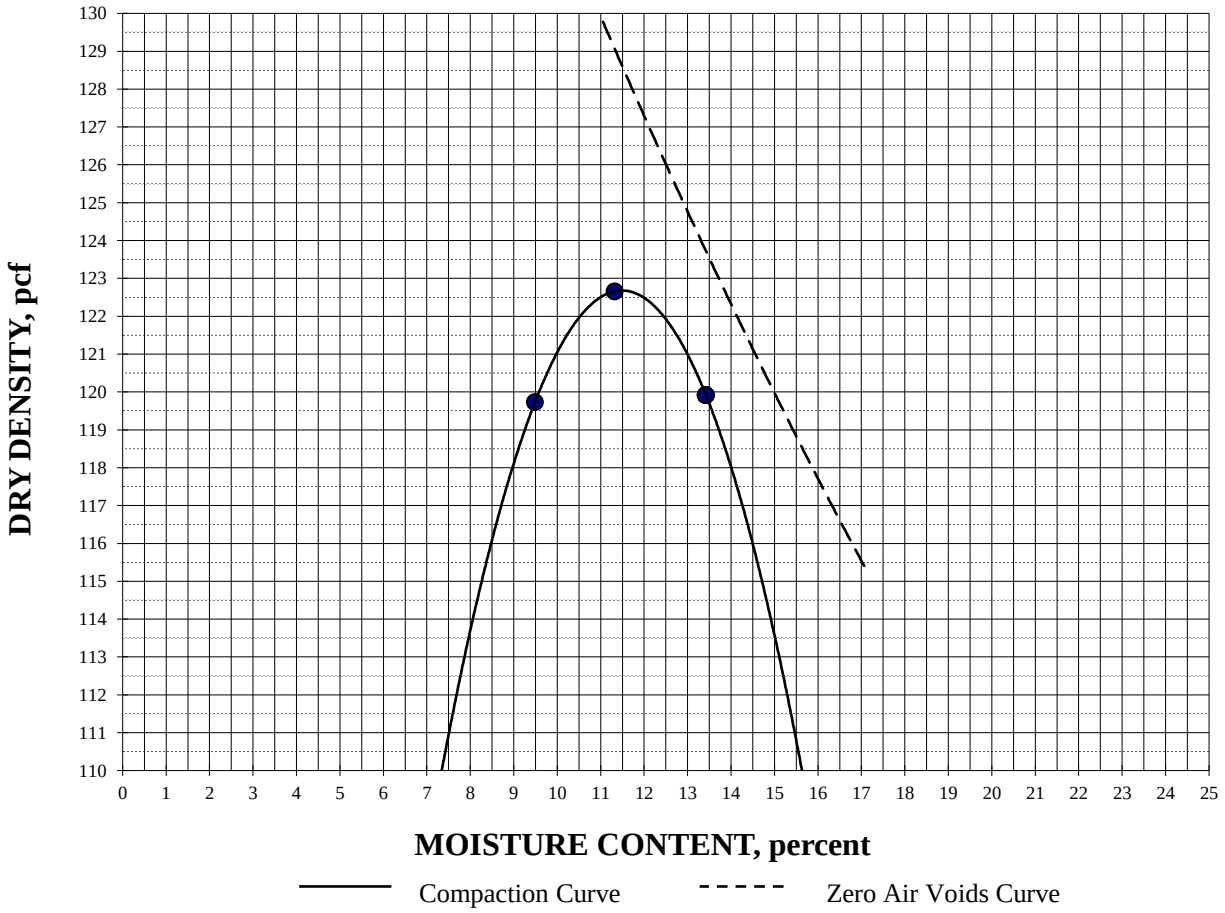


Exhibit 1

Oxnard Airport Taxiway F Improvements
Oxnard, California

302524-002

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

Boring #41 @ 1.5 - 5.0'

February 11, 2020

Dark Brown Sandy Lean Clay (CL)

CBR vs. MOISTURE CONTENT

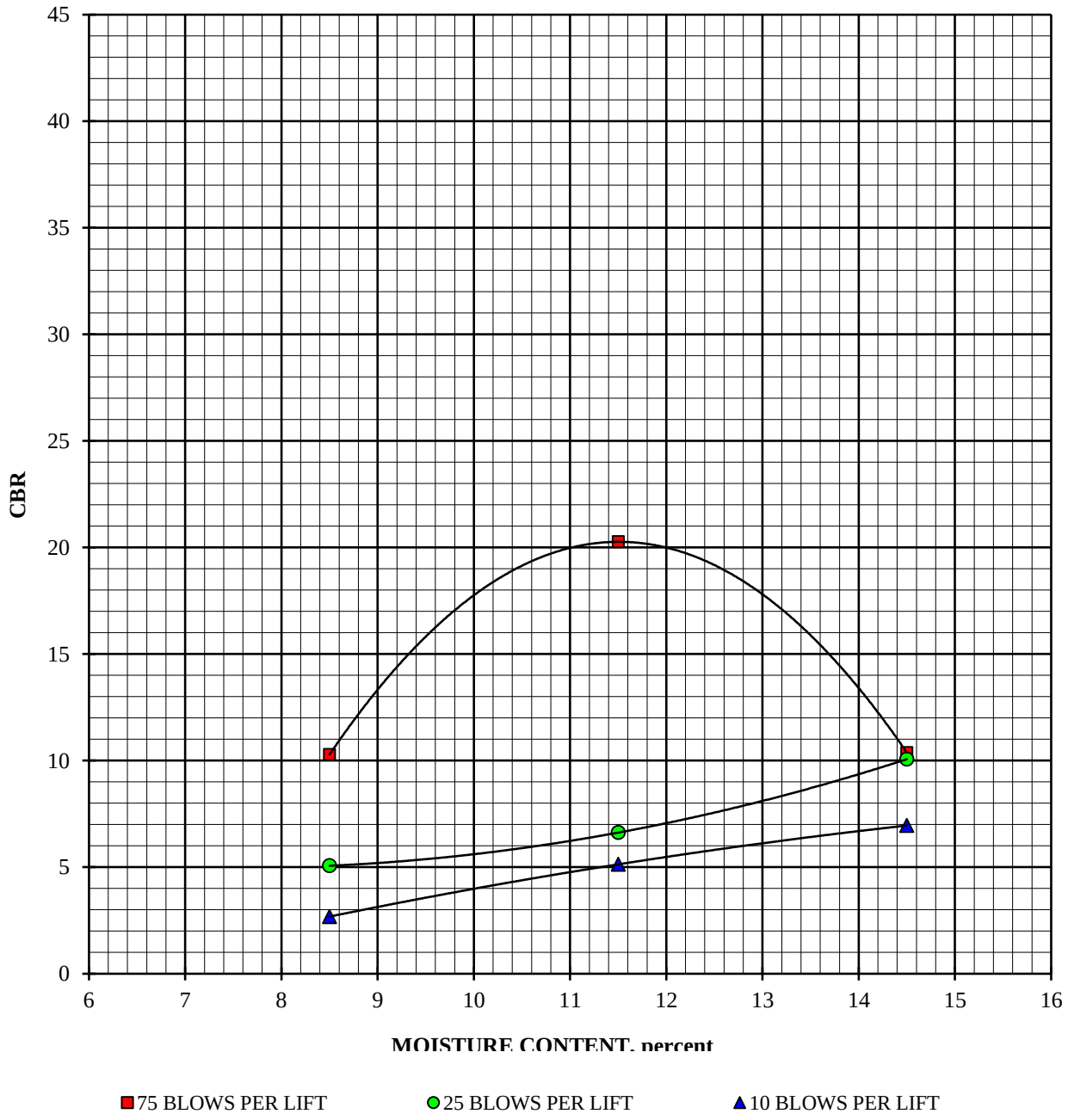


Exhibit 1

Oxnard Airport Taxiway F Improvements
Oxnard, California

302524-002

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

Boring #41 @ 1.5 - 5.0'

February 11, 2020

Dark Brown Sandy Lean Clay (CL)

DRY DENSITY vs. MOISTURE CONTENT

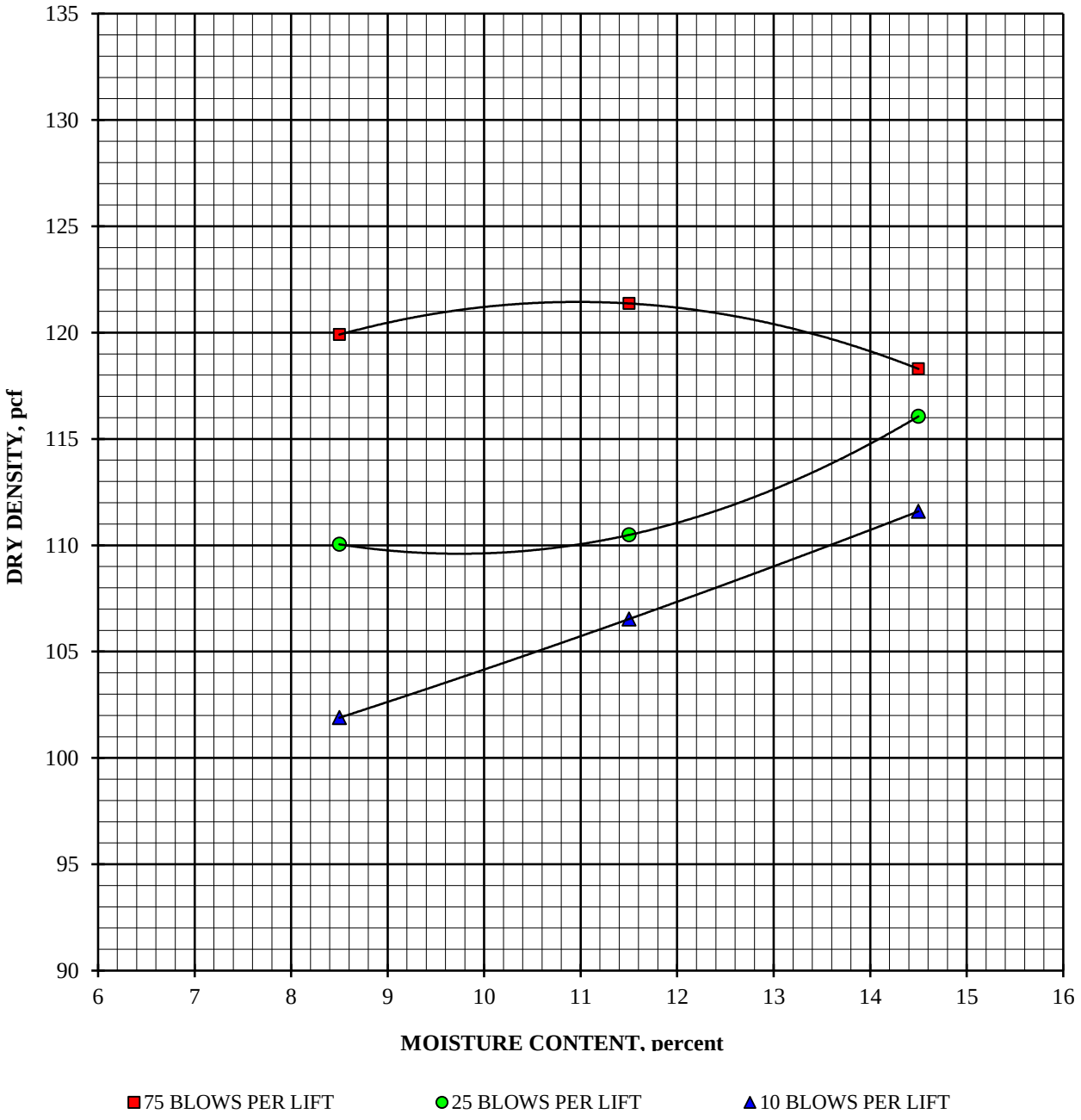


Exhibit 1

Oxnard Airport Taxiway F Improvements
Oxnard, California

302524-002

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

Boring #41 @ 1.5 - 5.0'

February 11, 2020

Dark Brown Sandy Lean Clay (CL)

DRY DENSITY vs. CBR

Arranged According to Moisture Content

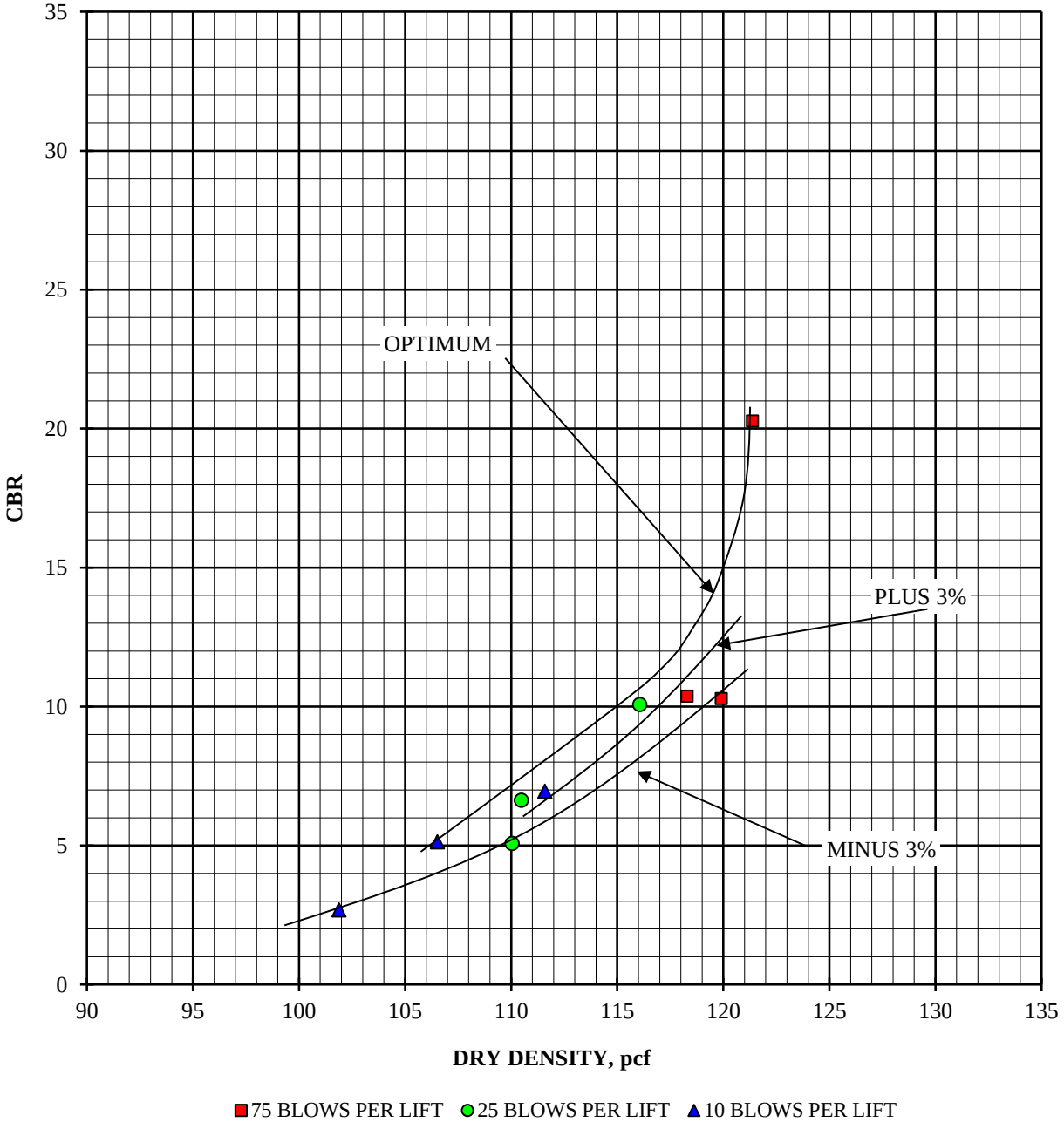


Exhibit 1

Oxnard Airport Taxiway F Improvements 302524-002
Oxnard, California

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

Boring #45 @ 1.0 - 5.0' February 11, 2020
Dark Brown Sandy Lean Clay (CL) With 5% Lime by Dry Weight

10 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak			104.5
Moisture content, %, before soak			14.3
Moisture content, %, after soak, avg.			17.2
Moisture content, %, after soak, top 1"			16.4
Expansion, %, 96 hour soak			0.1
Bearing Ratio, 0.100" penetration			22.6

25 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak			111.3
Moisture content, %, before soak			14.3
Moisture content, %, after soak, avg.			17.2
Moisture content, %, after soak, top 1"			18.3
Expansion, %, 96 hour soak			0.0
Bearing Ratio, 0.100" penetration			57.7

75 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak			116.4
Moisture content, %, before soak			14.3
Moisture content, %, after soak, avg.			15.2
Moisture content, %, after soak, top 1"			22.0
Expansion, %, 96 hour soak			0.3
Bearing Ratio, 0.100" penetration			72.5

Exhibit 1

Oxnard Airport Taxiway F Improvements
Oxnard, California

302524-002

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

Boring #45 @ 1.0 - 5.0'

February 11, 2020

Dark Brown Sandy Lean Clay (CL)

With 5% Lime by Dry Weight

CBR vs. MOISTURE CONTENT

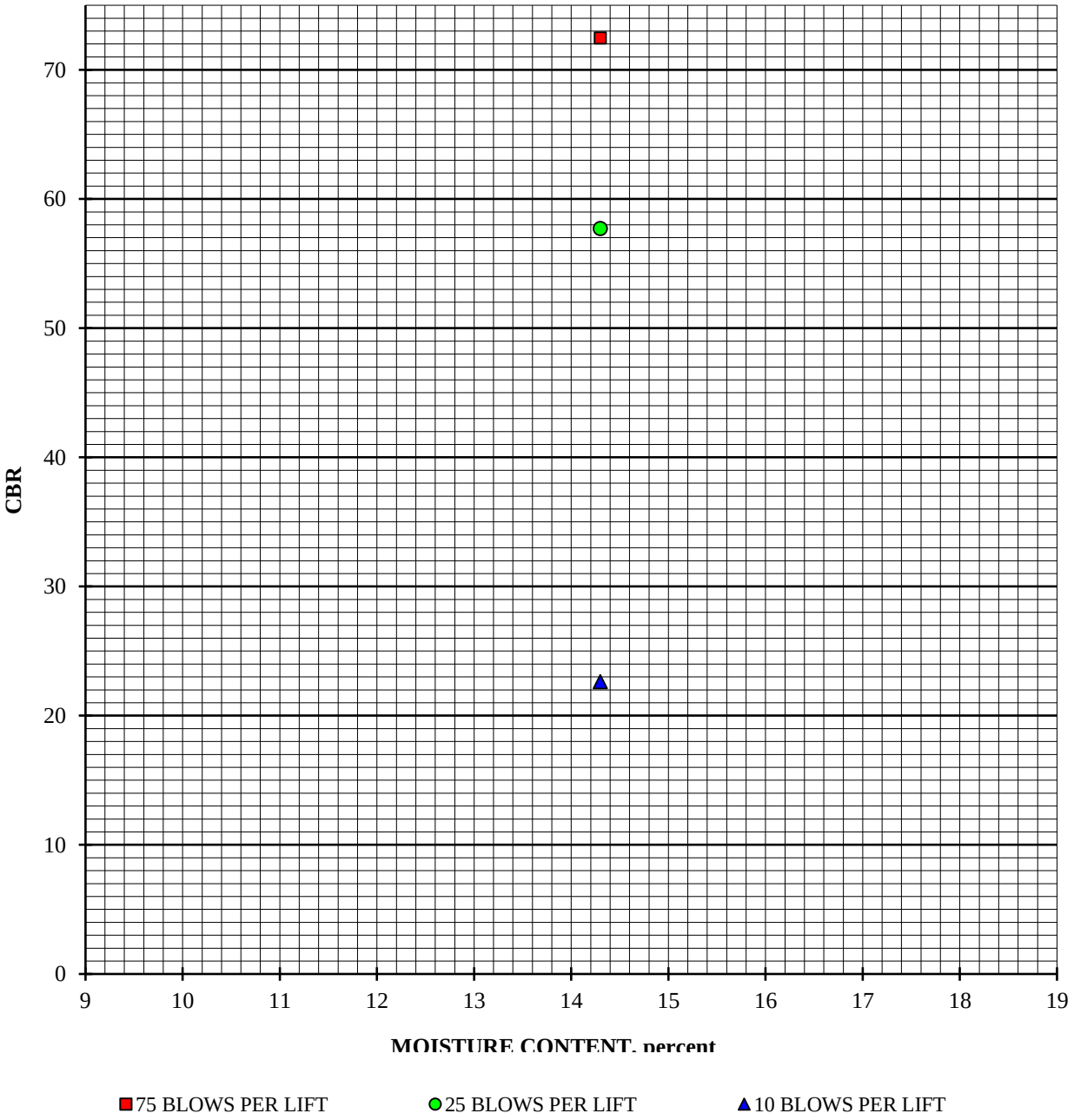


Exhibit 1

Oxnard Airport Taxiway F Improvements
Oxnard, California

302524-002

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

Boring #45 @ 1.0 - 5.0'

February 11, 2020

Dark Brown Sandy Lean Clay (CL)

With 5% Lime by Dry Weight

DRY DENSITY vs. MOISTURE CONTENT

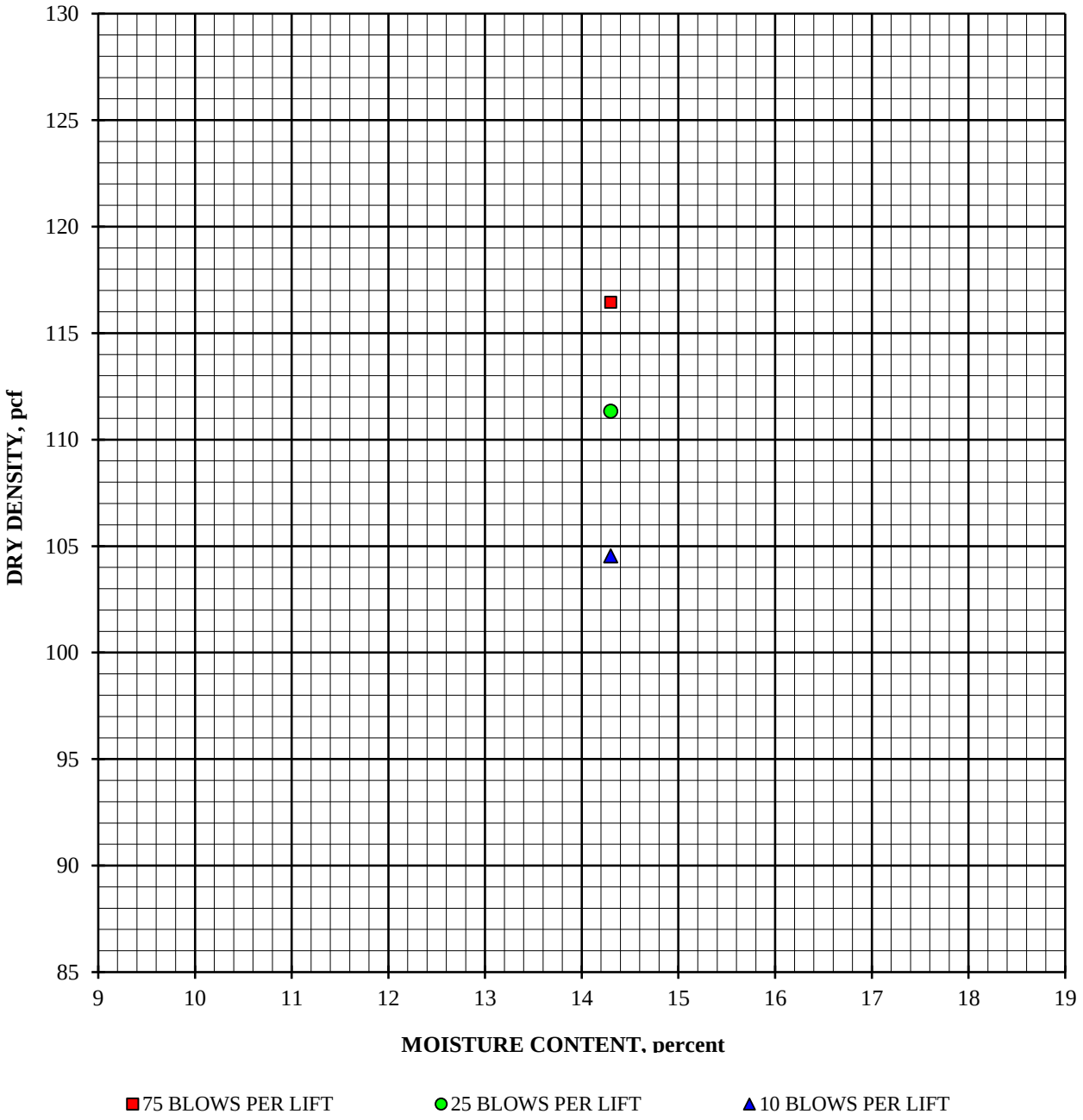


Exhibit 1

Oxnard Airport Taxiway F Improvements
Oxnard, California

302524-002

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

Boring #45 @ 1.0 - 5.0'

February 11, 2020

Dark Brown Sandy Lean Clay (CL)

With 5% Lime by Dry Weight

DRY DENSITY vs. CBR

Arranged According to Moisture Content

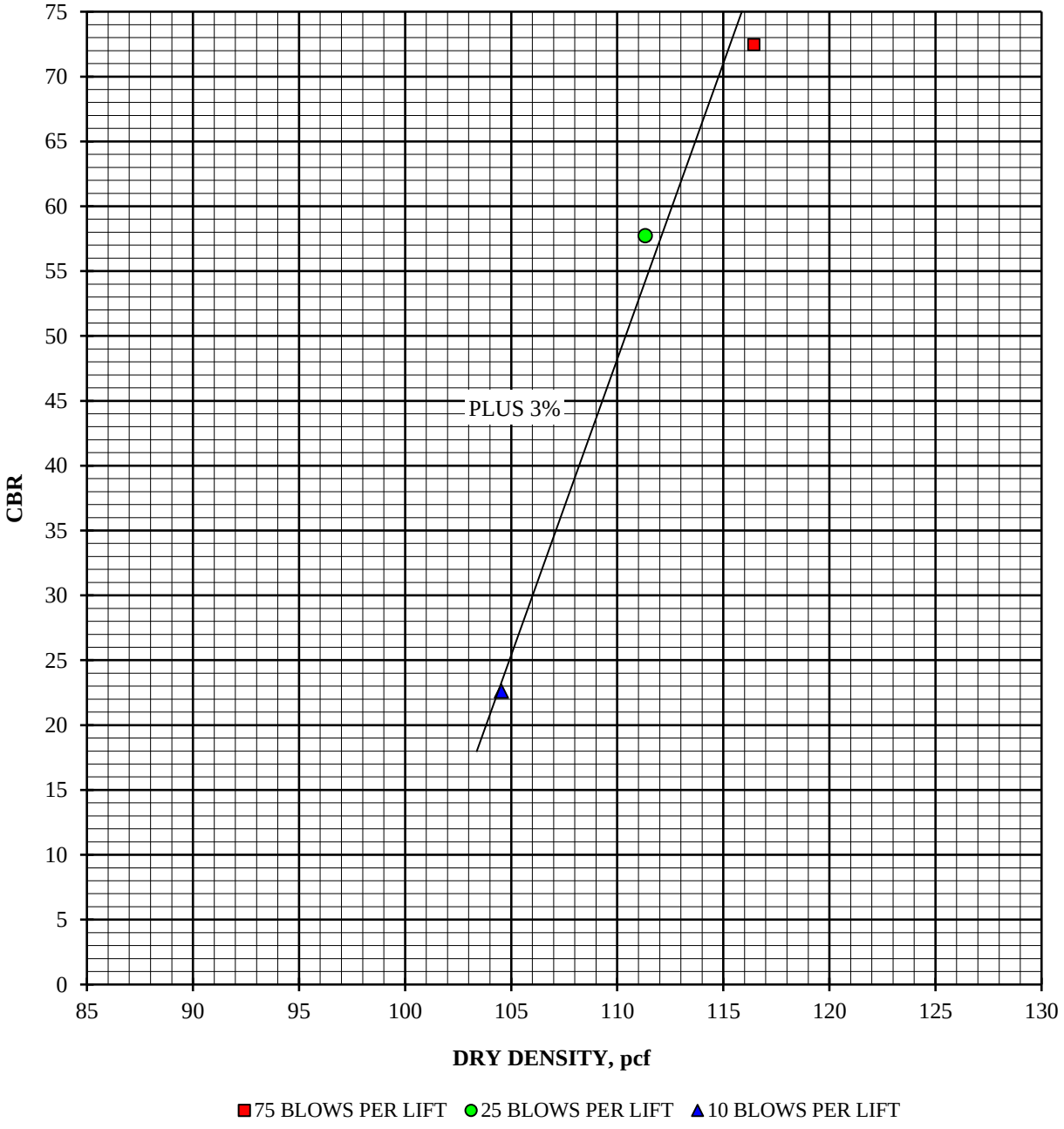


Exhibit 1

Oxnard Airport Taxiway F Improvements
Oxnard, California

302524-002

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

Boring #46 @ 1.0 - 2.0'
Light Brown Well-Graded Sand with Silt and Gravel (SW-SM)

February 11, 2020

10 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	112.6	120.2	118.6
Moisture content, %, before soak	5.3	8.3	11.3
Moisture content, %, after soak, avg.	9.9	10.0	13.8
Moisture content, %, after soak, top 1"	13.2	11.6	13.1
Expansion, %, 96 hour soak	0.3	0.9	0.2
Bearing Ratio, 0.100" penetration	9.8	32.5	23.0

25 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	117.3	123.9	121.8
Moisture content, %, before soak	5.3	8.3	11.3
Moisture content, %, after soak, avg.	10.0	9.4	12.3
Moisture content, %, after soak, top 1"	12.1	10.0	11.0
Expansion, %, 96 hour soak	0.2	0.8	0.3
Bearing Ratio, 0.100" penetration	19.4	54.9	20.3

75 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	122.1	128.9	124.3
Moisture content, %, before soak	5.3	8.3	11.3
Moisture content, %, after soak, avg.	11.9	9.2	12.7
Moisture content, %, after soak, top 1"	10.5	8.8	10.9
Expansion, %, 96 hour soak	0.3	0.6	0.1
Bearing Ratio, 0.100" penetration	37.2	109.6	32.1

Exhibit 1

Oxnard Airport Taxiway F Improvements
Oxnard, California

302524-002

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

Boring #46 @ 1.0 - 2.0'

February 11, 2020

Light Brown Well-Graded Sand with Silt and Gravel (SW-SM)

CBR vs. MOISTURE CONTENT

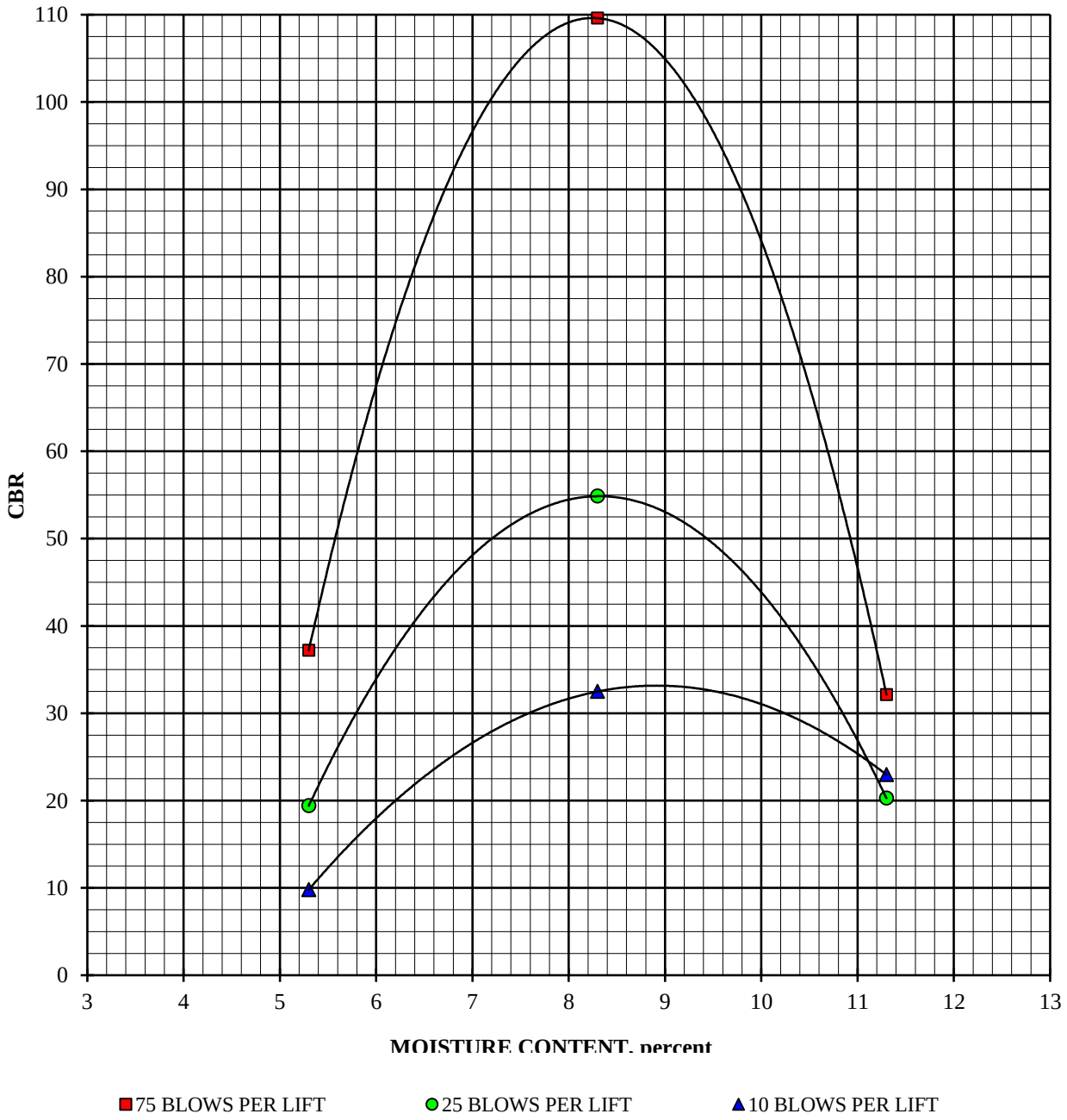


Exhibit 1

Oxnard Airport Taxiway F Improvements
Oxnard, California

302524-002

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

Boring #46 @ 1.0 - 2.0'

February 11, 2020

Light Brown Well-Graded Sand with Silt and Gravel (SW-SM)

DRY DENSITY vs. MOISTURE CONTENT

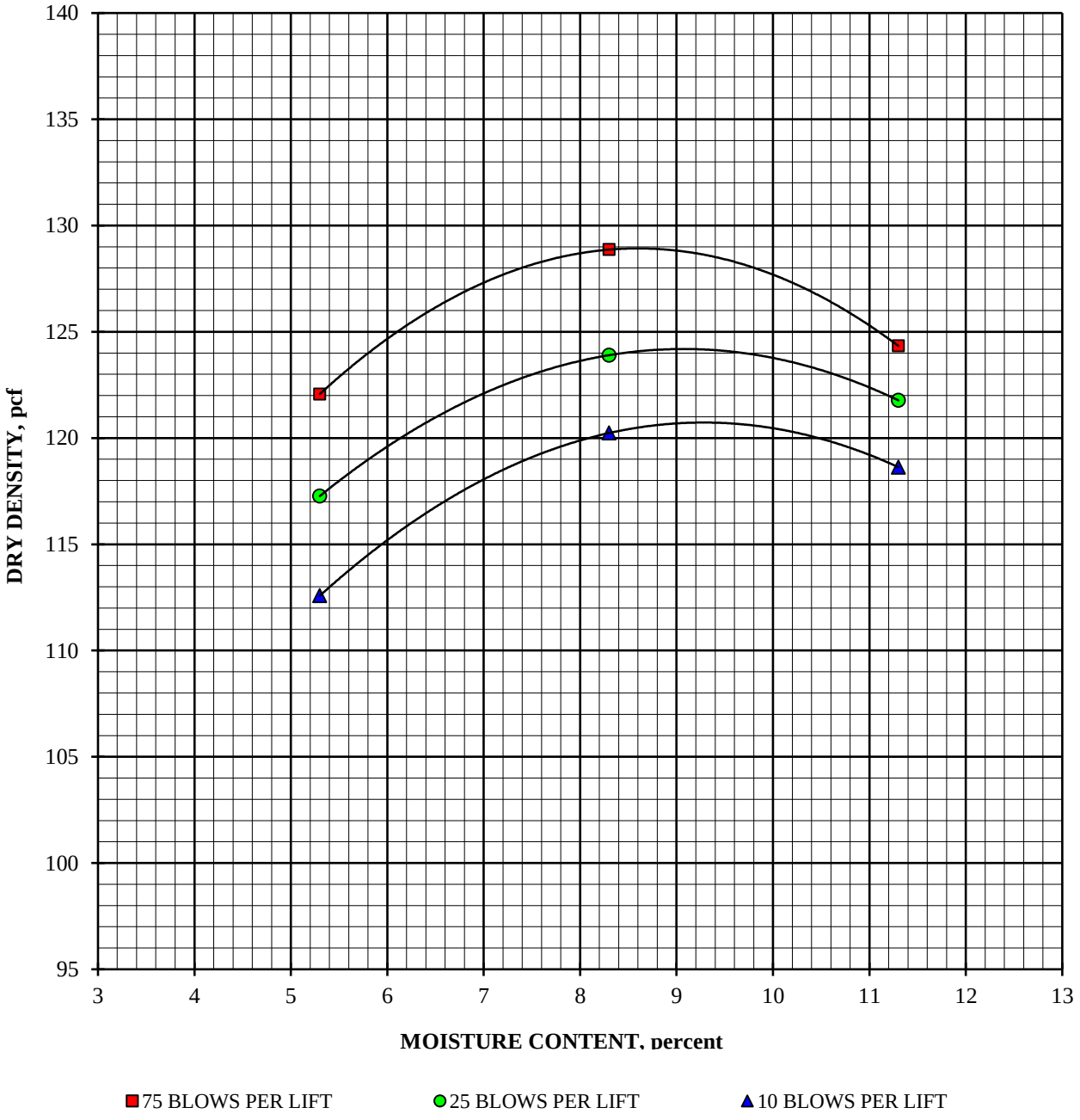


Exhibit 1

Oxnard Airport Taxiway F Improvements
Oxnard, California

302524-002

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

Boring #46 @ 1.0 - 2.0'

February 11, 2020

Light Brown Well-Graded Sand with Silt and Gravel (SW-SM)

DRY DENSITY vs. CBR

Arranged According to Moisture Content

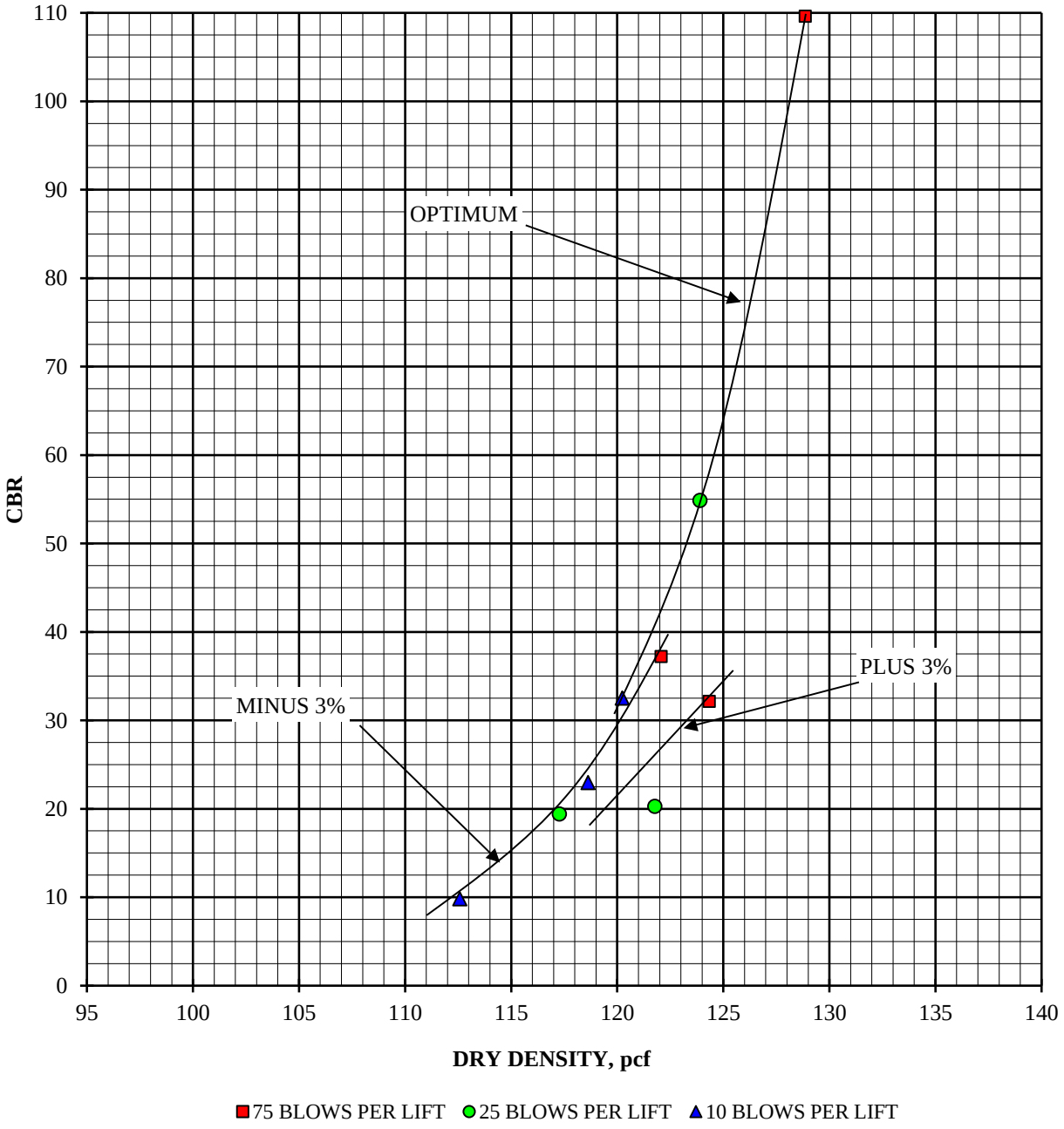


Exhibit 1

Oxnard Airport Taxiway F Improvements
Oxnard, California

302524-002

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

Boring #54 @ 4.0 - 5.0'
Dark Brown Sandy Lean Clay (CL)

February 11, 2020

10 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	98.6	103.4	108.2
Moisture content, %, before soak	10.8	13.8	16.8
Moisture content, %, after soak, avg.	21.9	23.0	20.0
Moisture content, %, after soak, top 1"	23.6	25.4	24.3
Expansion, %, 96 hour soak	2.8	1.3	0.0
Bearing Ratio, 0.100" penetration	2.3	2.6	6.9

25 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	109.6	113.4	112.8
Moisture content, %, before soak	10.8	13.8	16.8
Moisture content, %, after soak, avg.	9.8	18.5	20.6
Moisture content, %, after soak, top 1"	23.5	23.2	20.9
Expansion, %, 96 hour soak	1.9	0.8	0.1
Bearing Ratio, 0.100" penetration	5.3	6.9	9.6

75 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	117.0	119.8	109.2
Moisture content, %, before soak	10.8	13.8	16.8
Moisture content, %, after soak, avg.	17.2	15.1	23.6
Moisture content, %, after soak, top 1"	26.7	21.0	20.3
Expansion, %, 96 hour soak	2.0	0.6	0.3
Bearing Ratio, 0.100" penetration	4.2	15.5	7.5

Oxnard Airport Taxiway F Improvements
Oxnard, California

302524-002

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

Boring #54 @ 4.0 - 5.0'

February 11, 2020

Dark Brown Sandy Lean Clay (CL)

CBR vs. MOISTURE CONTENT

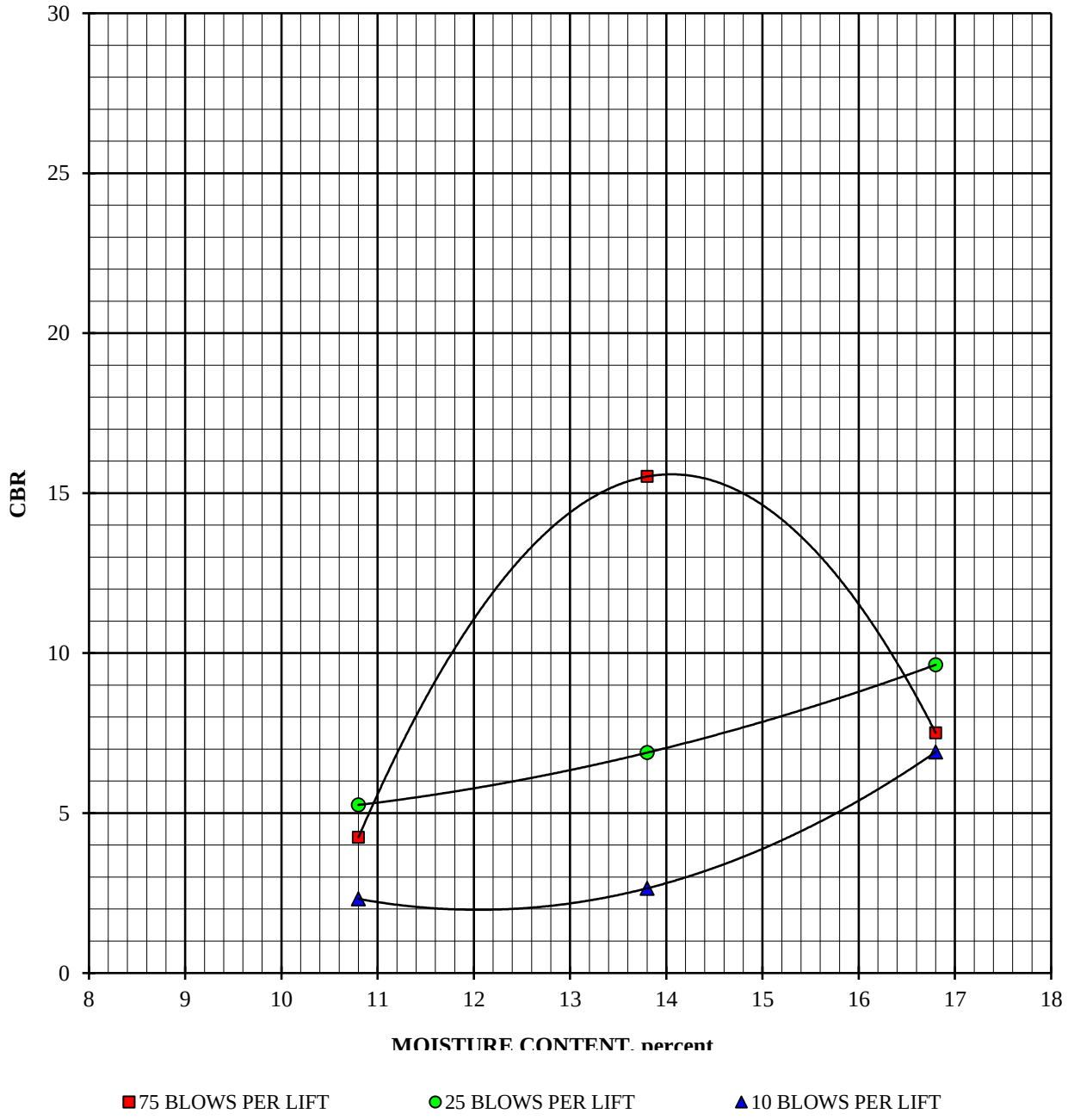


Exhibit 1

Oxnard Airport Taxiway F Improvements
Oxnard, California

302524-002

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

Boring #54 @ 4.0 - 5.0'

February 11, 2020

Dark Brown Sandy Lean Clay (CL)

DRY DENSITY vs. MOISTURE CONTENT

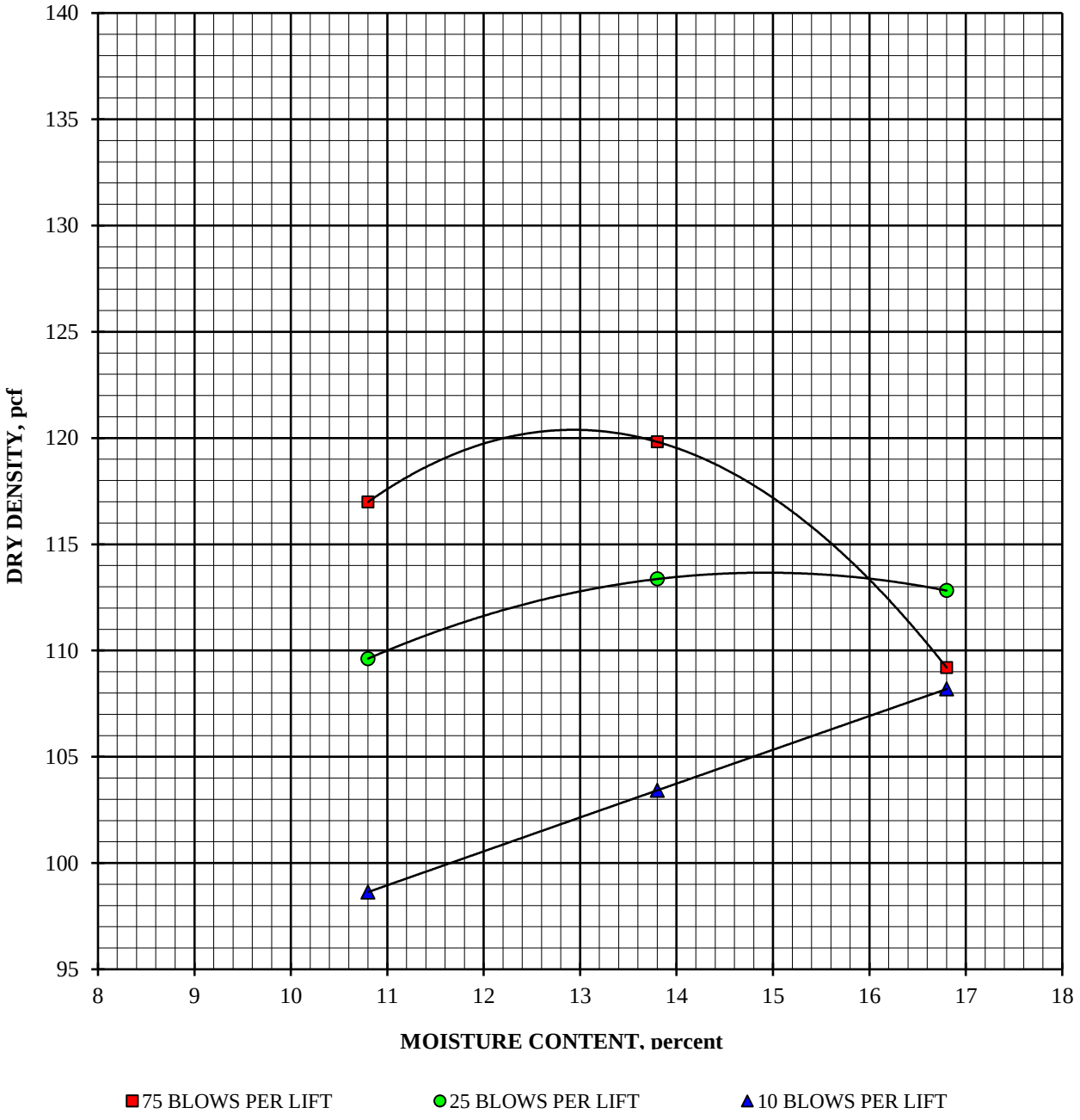


Exhibit 1

Oxnard Airport Taxiway F Improvements
Oxnard, California

302524-002

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

Boring #54 @ 4.0 - 5.0'

February 11, 2020

Dark Brown Sandy Lean Clay (CL)

DRY DENSITY vs. CBR

Arranged According to Moisture Content

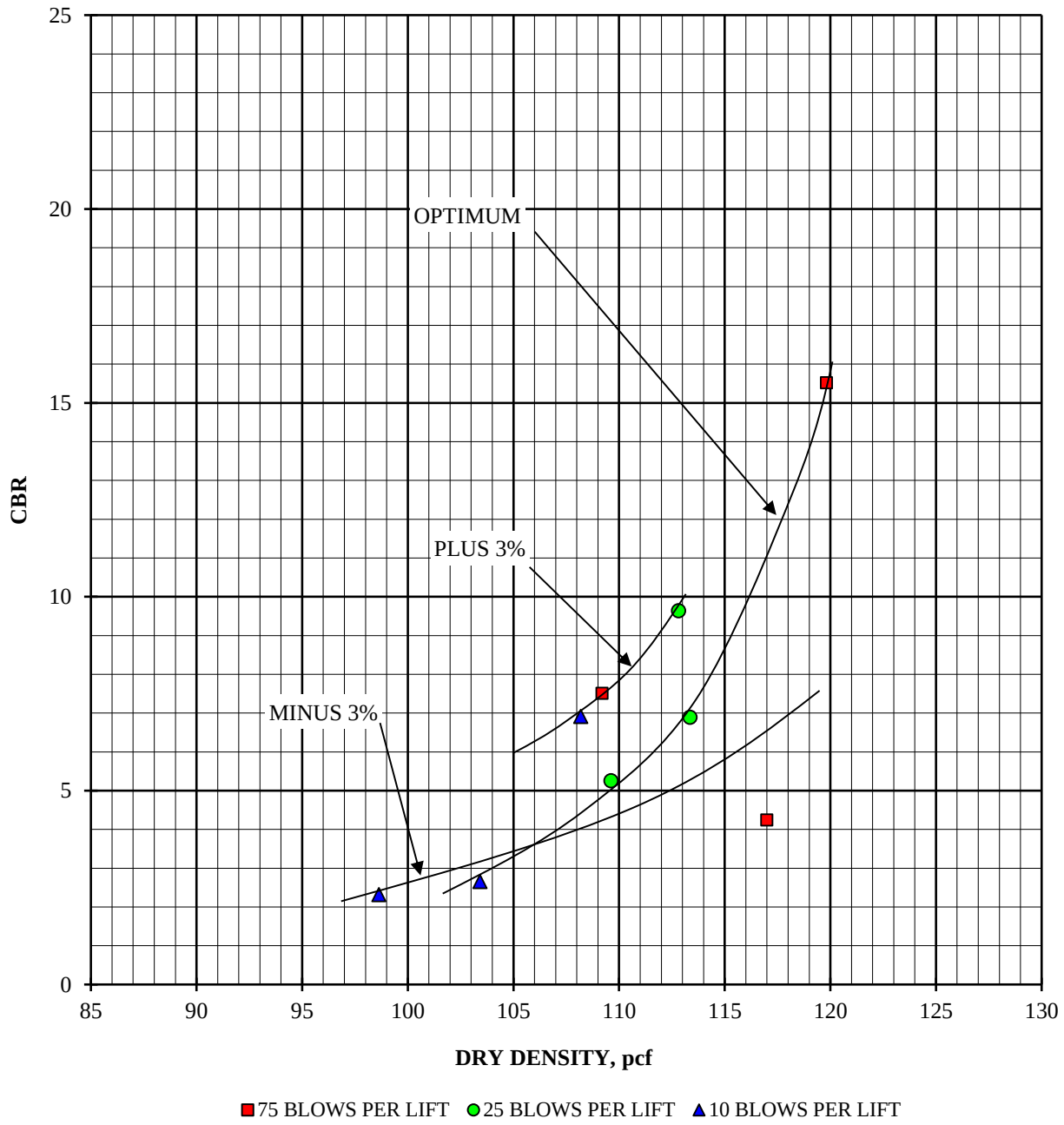


Exhibit 1

Oxnard Airport Taxiway F Improvements
Oxnard, California

302524-002

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

Boring #55 @ 1.5 - 5.0'
Dark Brown Sandy Lean Clay (CL)

February 11, 2020

10 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	107.0	114.1	111.1
Moisture content, %, before soak	7.0	10.0	13.0
Moisture content, %, after soak, avg.	18.3	11.4	15.3
Moisture content, %, after soak, top 1"	20.1	15.0	15.1
Expansion, %, 96 hour soak	0.3	0.2	0.0
Bearing Ratio, 0.100" penetration	2.7	9.3	5.0

25 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	115.5	122.5	117.7
Moisture content, %, before soak	7.0	10.0	13.0
Moisture content, %, after soak, avg.	10.7	11.3	13.8
Moisture content, %, after soak, top 1"	19.2	17.2	14.5
Expansion, %, 96 hour soak	0.2	0.2	0.1
Bearing Ratio, 0.100" penetration	6.2	14.1	6.0

75 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	124.4	125.5	117.5
Moisture content, %, before soak	7.0	10.0	13.0
Moisture content, %, after soak, avg.	10.7	10.1	13.7
Moisture content, %, after soak, top 1"	16.2	15.6	13.3
Expansion, %, 96 hour soak	0.1	0.2	0.1
Bearing Ratio, 0.100" penetration	13.2	15.5	5.0

Exhibit 1

Oxnard Airport Taxiway F Improvements
Oxnard, California

302524-002

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

Boring #55 @ 1.5 - 5.0'

February 11, 2020

Dark Brown Sandy Lean Clay (CL)

CBR vs. MOISTURE CONTENT

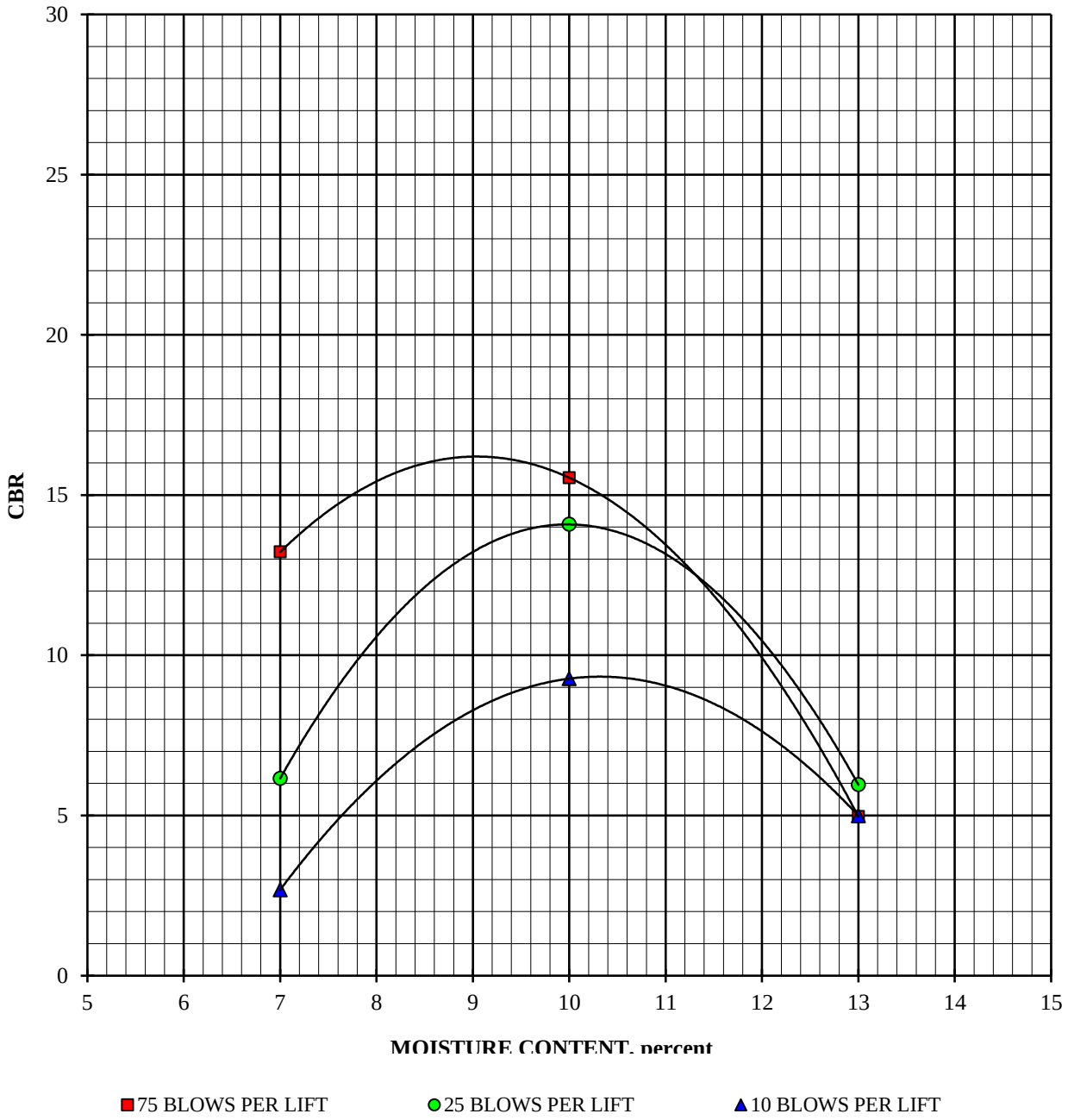


Exhibit 1

Oxnard Airport Taxiway F Improvements
Oxnard, California

302524-002

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

Boring #55 @ 1.5 - 5.0'

February 11, 2020

Dark Brown Sandy Lean Clay (CL)

DRY DENSITY vs. MOISTURE CONTENT

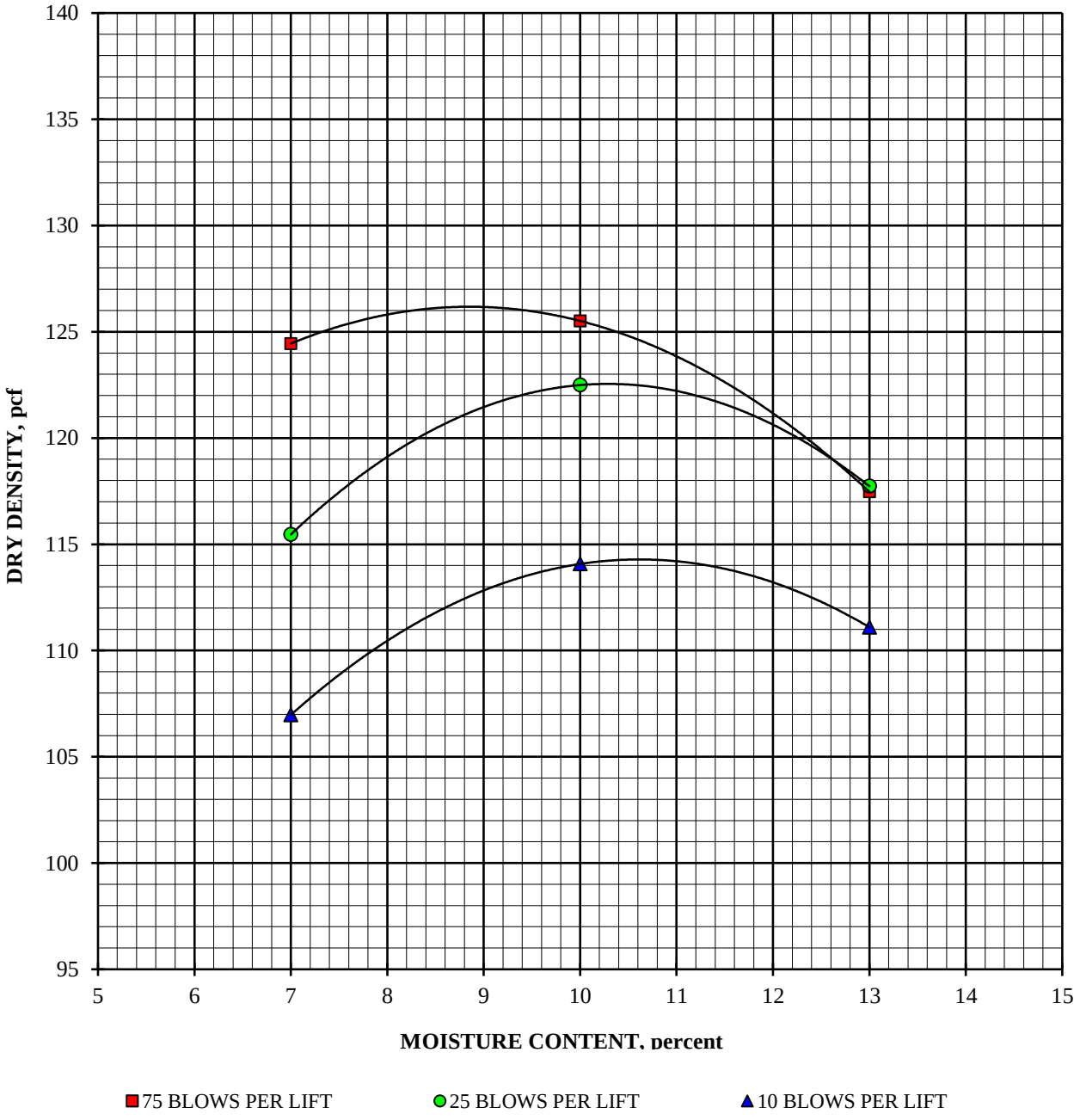


Exhibit 1

Oxnard Airport Taxiway F Improvements
Oxnard, California

302524-002

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

Boring #55 @ 1.5 - 5.0'

February 11, 2020

Dark Brown Sandy Lean Clay (CL)

DRY DENSITY vs. CBR

Arranged According to Moisture Content

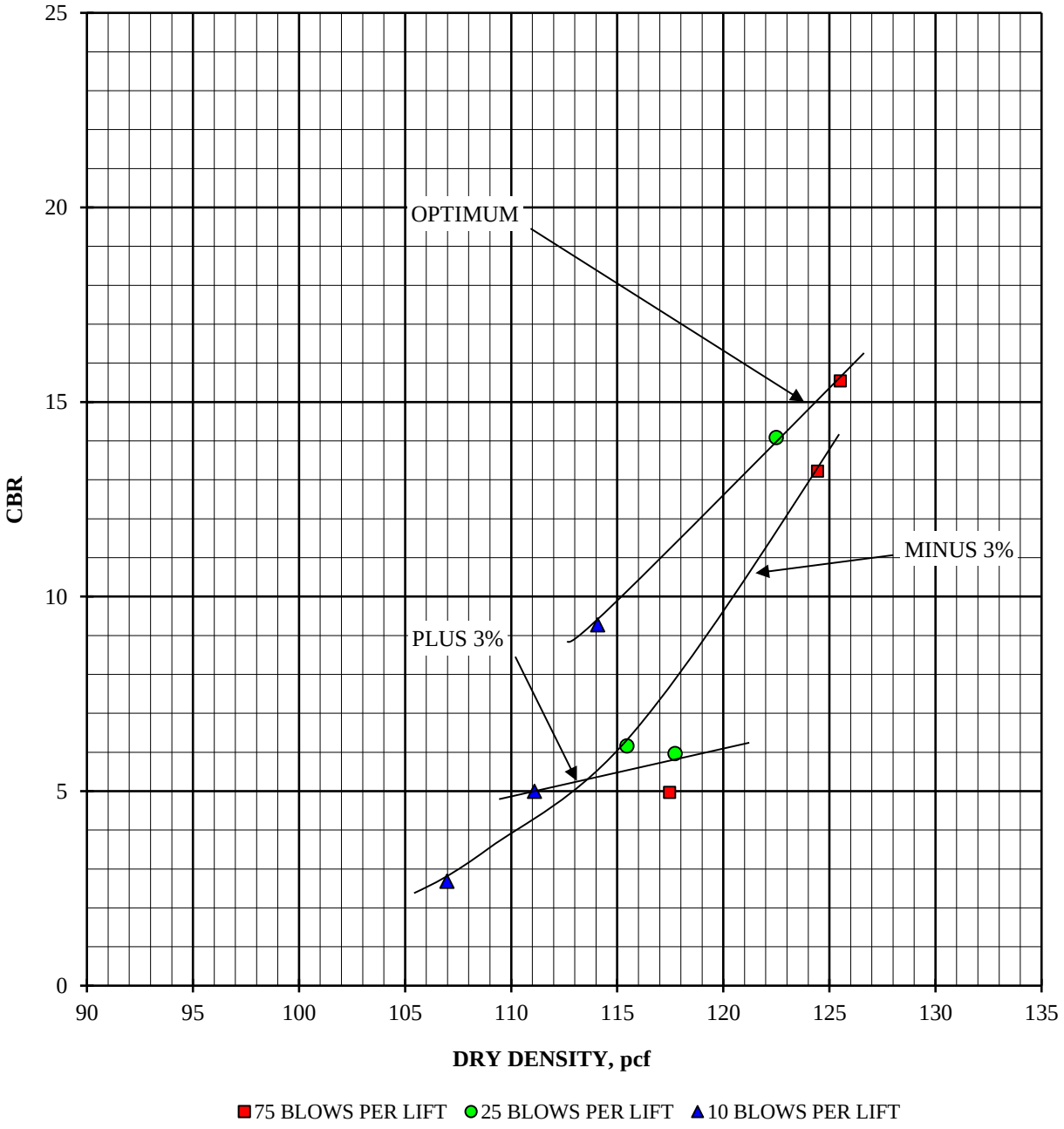


Exhibit 1

Oxnard Airport Taxiway F Improvements 302524-002
Oxnard, California

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

Boring #62 @ 2.0 - 5.0' February 11, 2020
Dark Brown Sandy Lean Clay (CL) With 5% Lime by Dry Weight

10 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak			105.2
Moisture content, %, before soak			13.9
Moisture content, %, after soak, avg.			19.0
Moisture content, %, after soak, top 1"			16.9
Expansion, %, 96 hour soak			0.0
Bearing Ratio, 0.100" penetration			38.8

25 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak			111.5
Moisture content, %, before soak			13.9
Moisture content, %, after soak, avg.			15.7
Moisture content, %, after soak, top 1"			17.2
Expansion, %, 96 hour soak			0.0
Bearing Ratio, 0.100" penetration			48.4

75 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak			114.6
Moisture content, %, before soak			13.9
Moisture content, %, after soak, avg.			15.2
Moisture content, %, after soak, top 1"			22.0
Expansion, %, 96 hour soak			1.2
Bearing Ratio, 0.100" penetration			58.1

Exhibit 1

Oxnard Airport Taxiway F Improvements
Oxnard, California

302524-002

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

Boring #62 @ 2.0 - 5.0'

February 11, 2020

Dark Brown Sandy Lean Clay (CL)

With 5% Lime by Dry Weight

CBR vs. MOISTURE CONTENT

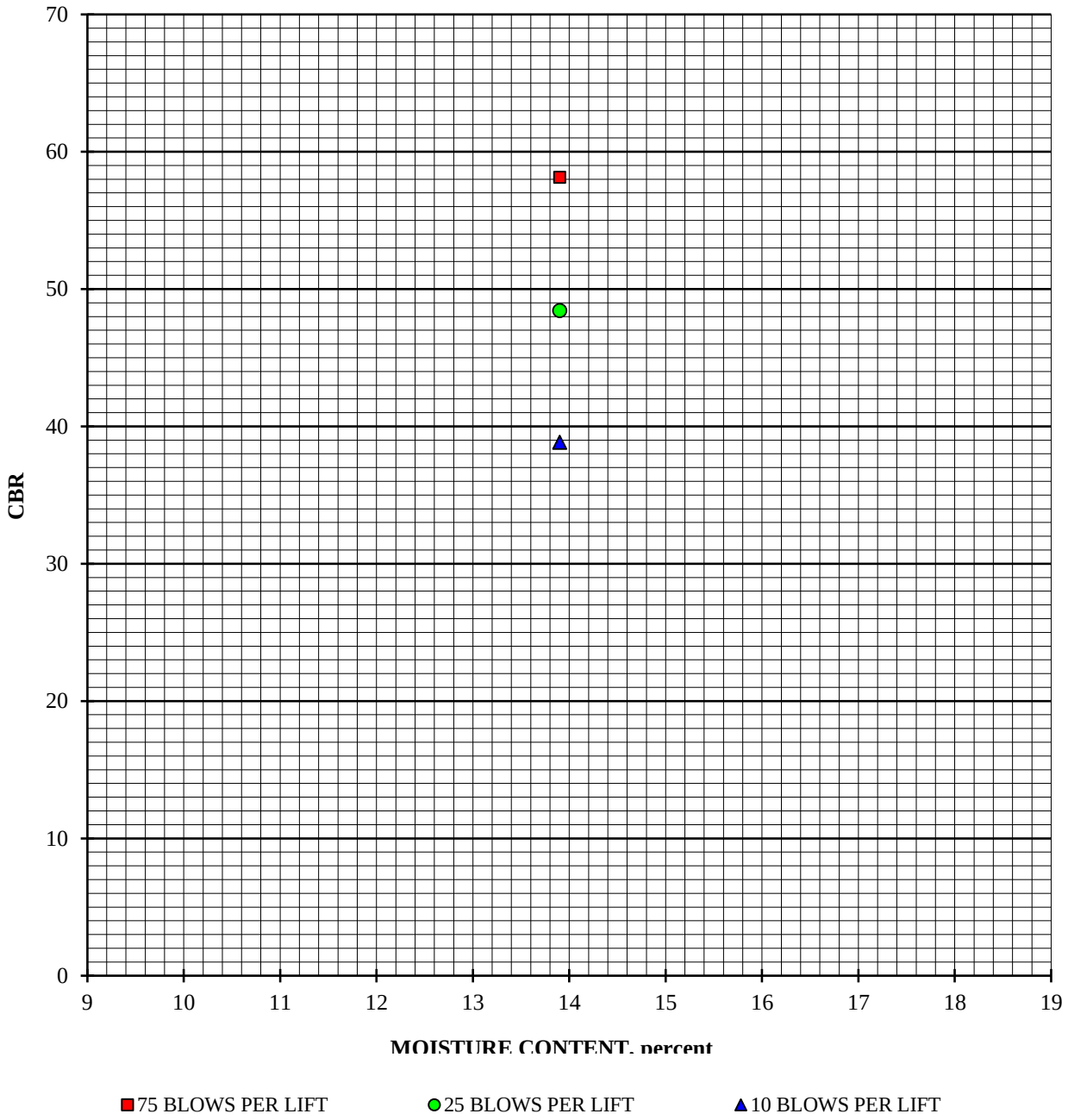


Exhibit 1

Oxnard Airport Taxiway F Improvements
Oxnard, California

302524-002

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

Boring #62 @ 2.0 - 5.0'

February 11, 2020

Dark Brown Sandy Lean Clay (CL) With 5% Lime by Dry Weight

DRY DENSITY vs. MOISTURE CONTENT

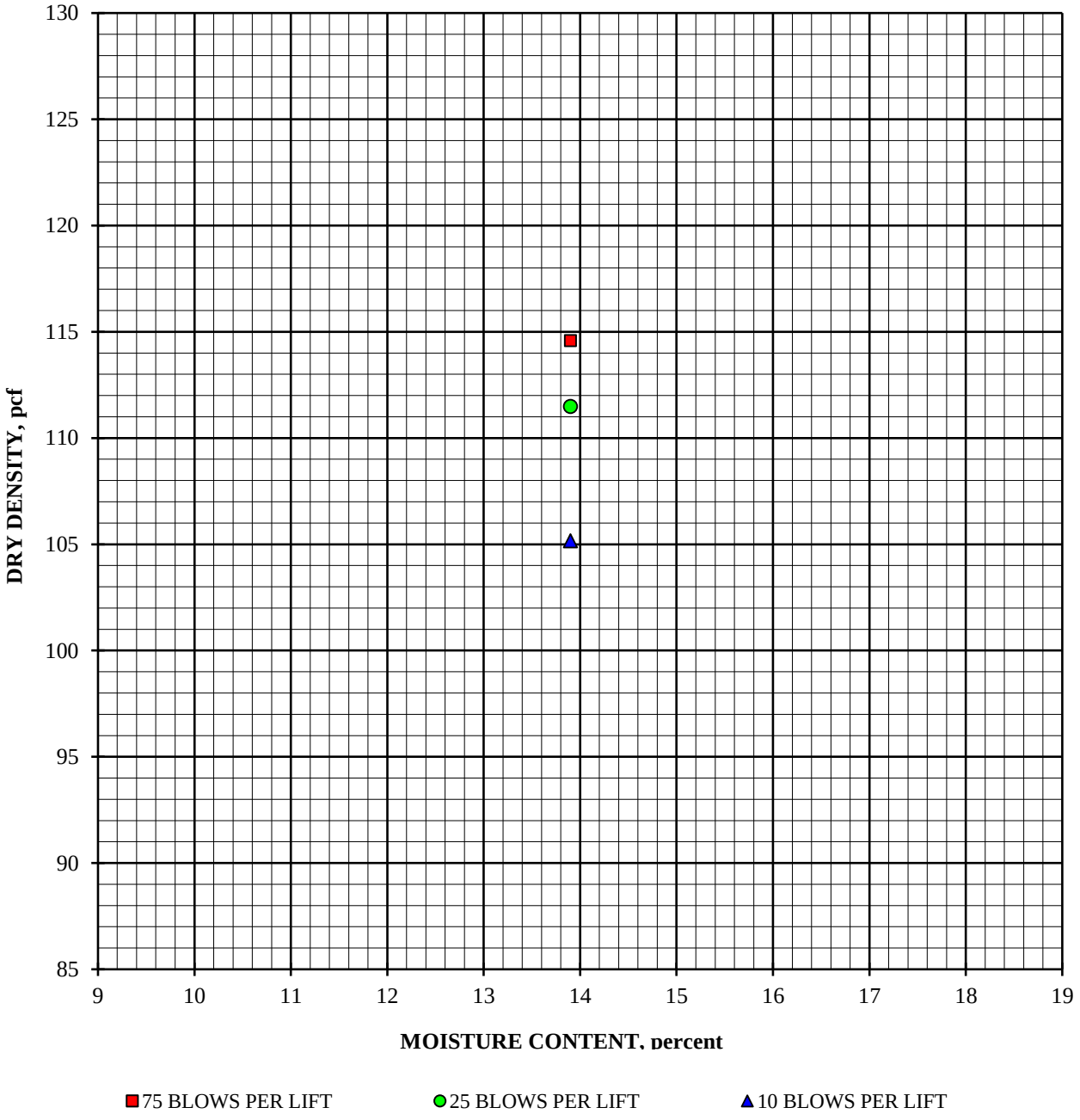


Exhibit 1

Oxnard Airport Taxiway F Improvements
Oxnard, California

302524-002

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

Boring #62 @ 2.0 - 5.0'

February 11, 2020

Dark Brown Sandy Lean Clay (CL)

With 5% Lime by Dry Weight

DRY DENSITY vs. CBR

Arranged According to Moisture Content

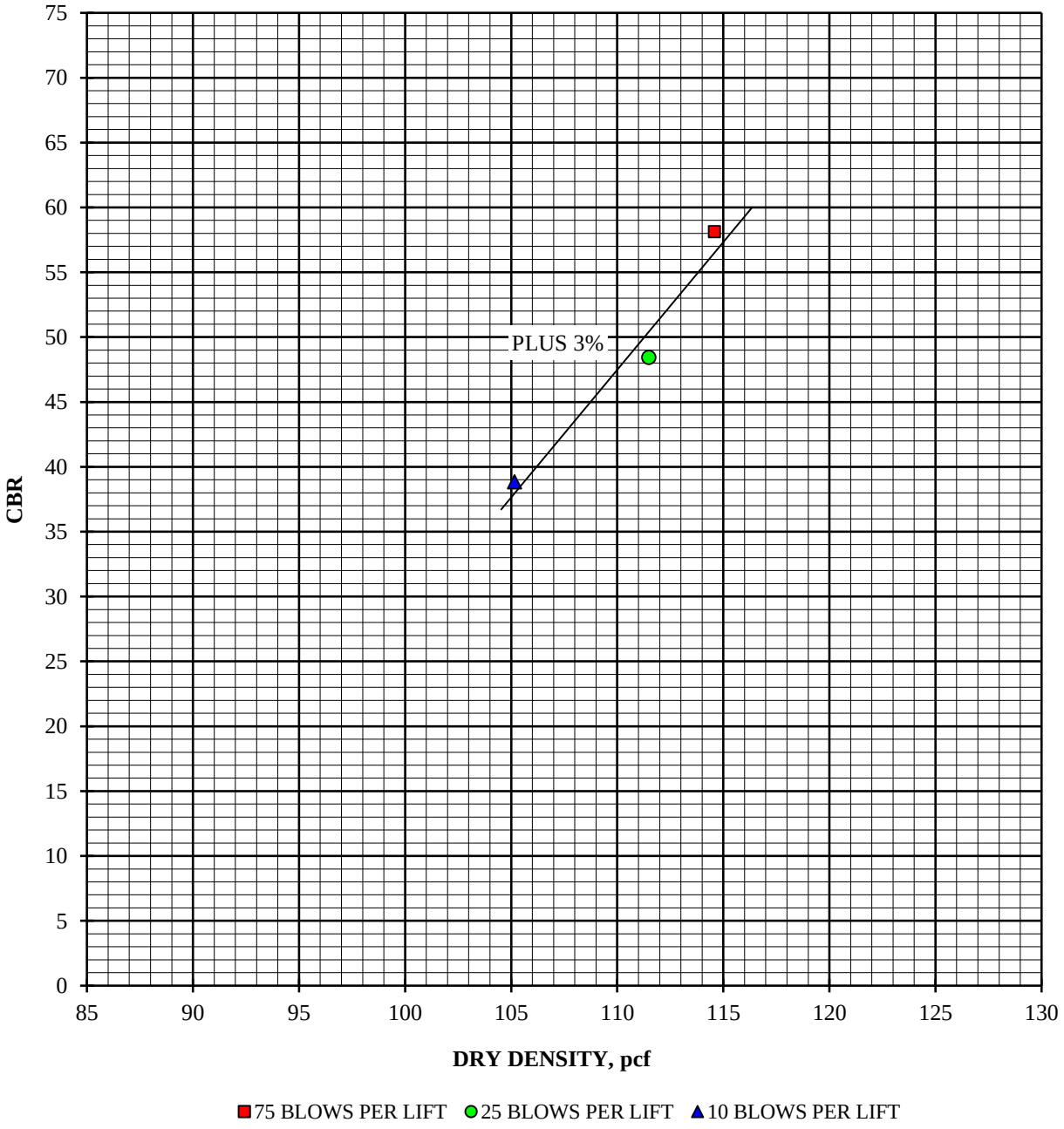


Exhibit 1

Oxnard Airport Taxiway F Improvements
Oxnard, California

302524-002

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

Boring #66 @ 4.0 - 5.0'
Dark Brown Silty, Clayey Sand (SC-SM)

February 11, 2020

10 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	99.2	101.9	109.0
Moisture content, %, before soak	10.5	13.5	16.5
Moisture content, %, after soak, avg.	26.1	25.6	20.1
Moisture content, %, after soak, top 1"	26.5	25.4	21.1
Expansion, %, 96 hour soak	6.8	1.5	0.2
Bearing Ratio, 0.100" penetration	2.4	3.3	3.7

25 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	108.6	111.8	113.6
Moisture content, %, before soak	10.5	13.5	16.5
Moisture content, %, after soak, avg.	21.9	19.4	-188.3
Moisture content, %, after soak, top 1"	22.9	19.0	19.1
Expansion, %, 96 hour soak	8.0	3.9	0.9
Bearing Ratio, 0.100" penetration	5.4	17.5	12.1

75 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	115.0	120.1	115.1
Moisture content, %, before soak	10.5	13.5	16.5
Moisture content, %, after soak, avg.	18.2	16.7	18.8
Moisture content, %, after soak, top 1"	18.7	18.1	17.4
Expansion, %, 96 hour soak	5.3	3.2	0.2
Bearing Ratio, 0.100" penetration	16.5	22.8	8.5

Exhibit 1

Oxnard Airport Taxiway F Improvements
Oxnard, California

302524-002

CALIFORNIA BEARING RATIO

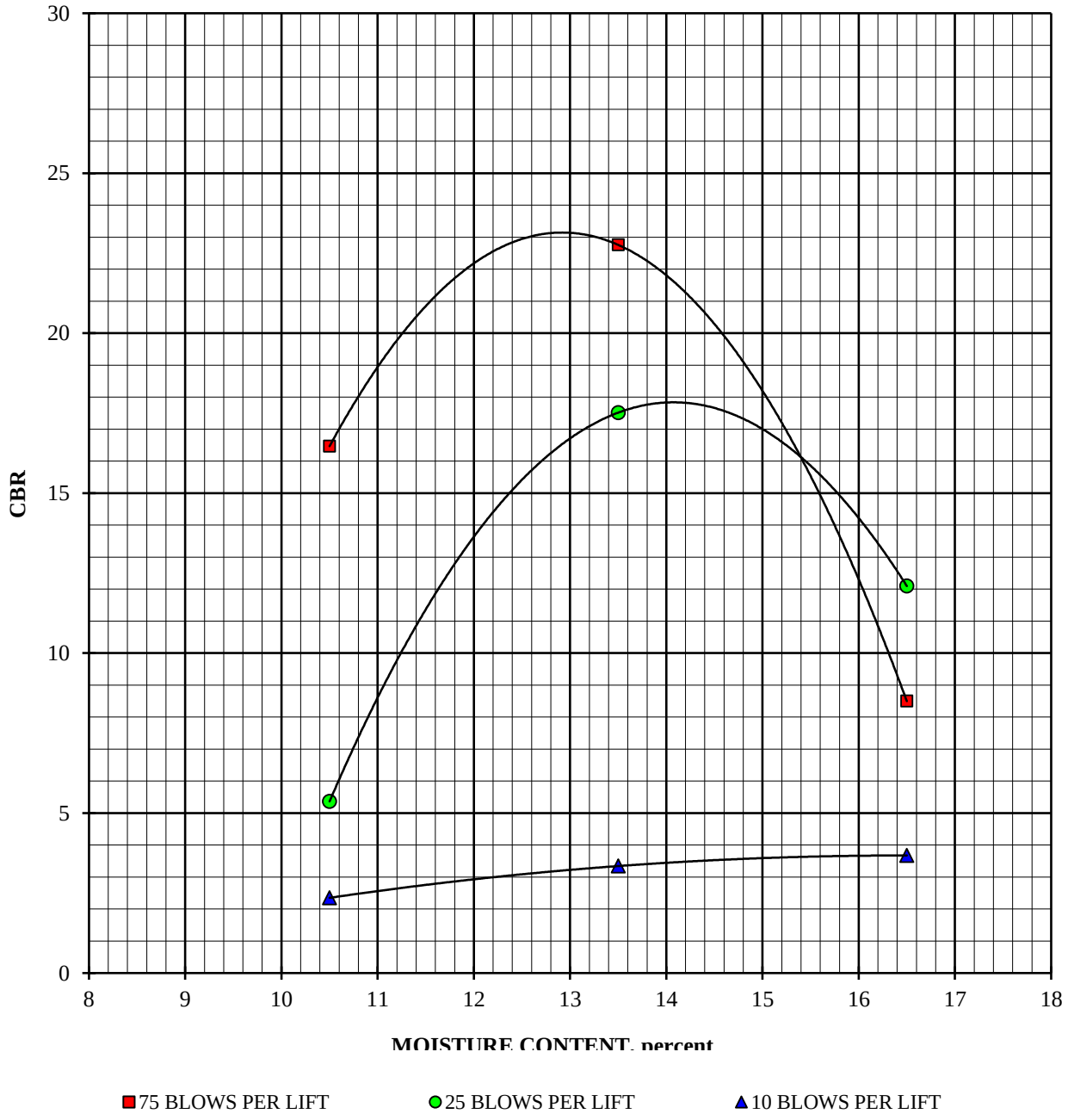
ASTM D 1883-16 (For a Range of Moisture Contents)

Boring #66 @ 4.0 - 5.0'

February 11, 2020

Dark Brown Silty, Clayey Sand (SC-SM)

CBR vs. MOISTURE CONTENT



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Oxnard Airport Taxiway F Improvements
Oxnard, California

302524-002

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

Boring #66 @ 4.0 - 5.0'

February 11, 2020

Dark Brown Silty, Clayey Sand (SC-SM)

DRY DENSITY vs. MOISTURE CONTENT

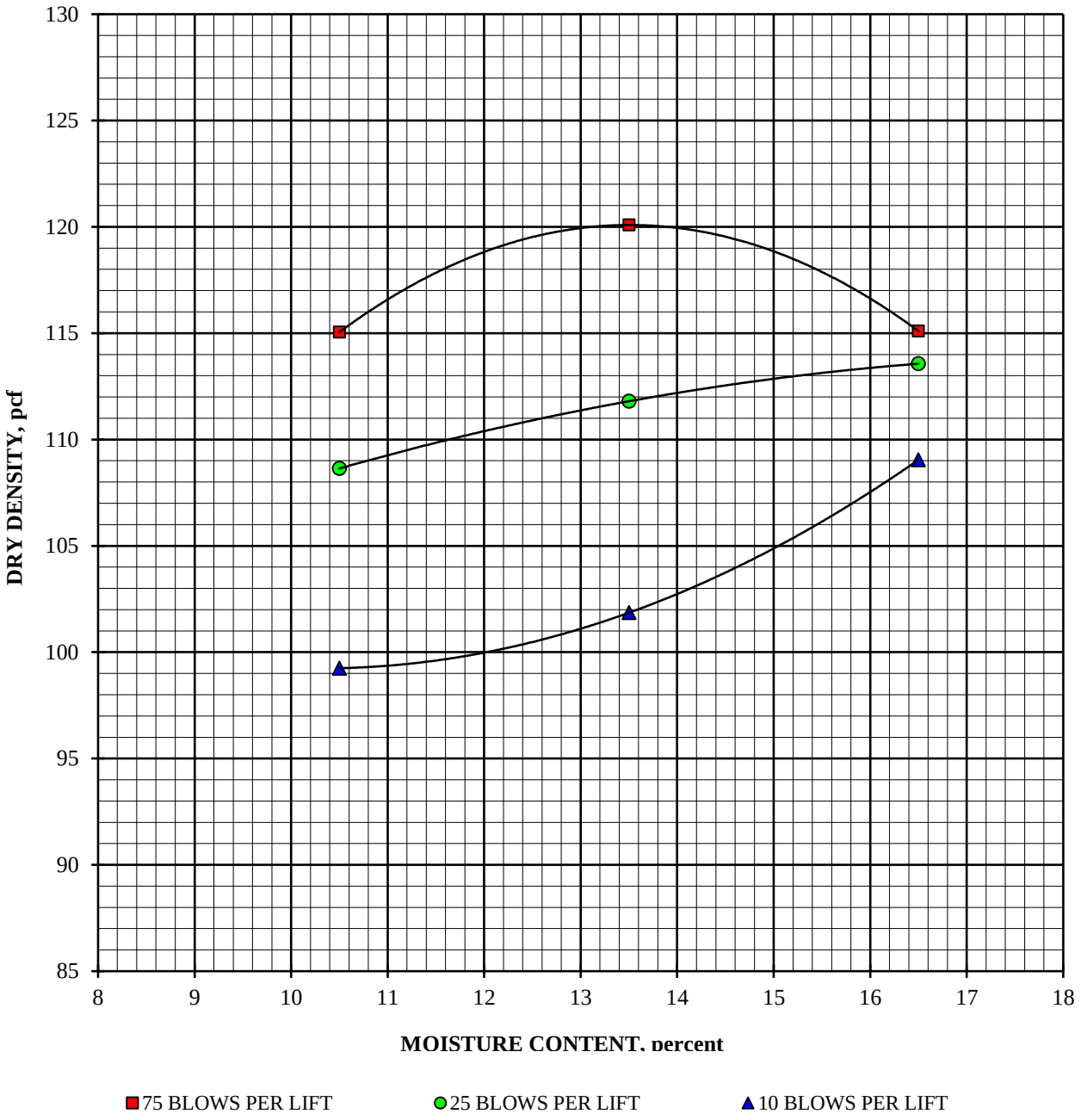

Exhibit 1

Oxnard Airport Taxiway F Improvements
Oxnard, California

302524-002

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

Boring #66 @ 4.0 - 5.0'

February 11, 2020

Dark Brown Silty, Clayey Sand (SC-SM)

DRY DENSITY vs. CBR

Arranged According to Moisture Content

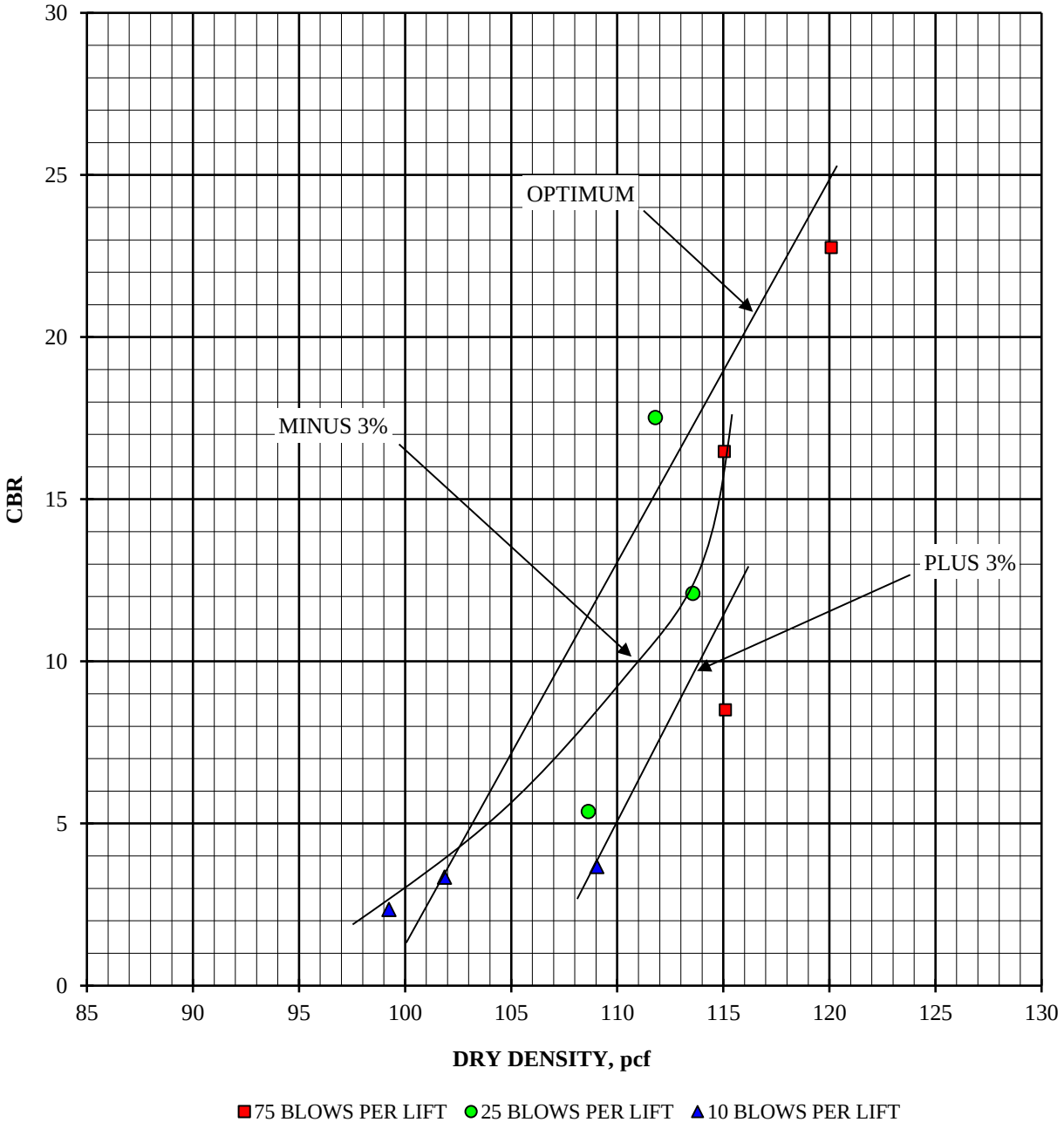

Exhibit 1

Oxnard Airport Taxiway F Improvements
Oxnard, California

302524-002

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

Boring #70 @ 1.5 - 4.5'
Dark Brown Sandy Lean Clay (CL)

February 11, 2020

10 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	107.1	111.0	115.4
Moisture content, %, before soak	7.2	10.2	13.2
Moisture content, %, after soak, avg.	18.9	11.7	14.7
Moisture content, %, after soak, top 1"	22.7	19.8	17.6
Expansion, %, 96 hour soak	1.4	2.4	0.1
Bearing Ratio, 0.100" penetration	4.2	10.1	4.2

25 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	116.8	119.8	117.7
Moisture content, %, before soak	7.2	10.2	13.2
Moisture content, %, after soak, avg.	10.7	11.6	13.9
Moisture content, %, after soak, top 1"	18.6	17.7	16.4
Expansion, %, 96 hour soak	1.1	1.6	0.1
Bearing Ratio, 0.100" penetration	16.2	33.4	9.6

75 BLOWS PER LIFT

	-3 Percent	Optimum Moisture	+ 3 percent
Dry density, pcf, before soak	121.8	125.2	117.3
Moisture content, %, before soak	7.2	10.2	13.2
Moisture content, %, after soak, avg.	13.2	12.7	15.1
Moisture content, %, after soak, top 1"	16.9	14.9	14.5
Expansion, %, 96 hour soak	1.6	0.4	0.2
Bearing Ratio, 0.100" penetration	19.4	44.9	6.2

Exhibit 1

Oxnard Airport Taxiway F Improvements
Oxnard, California

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CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

Boring #70 @ 1.5 - 4.5'

February 11, 2020

Dark Brown Sandy Lean Clay (CL)

CBR vs. MOISTURE CONTENT

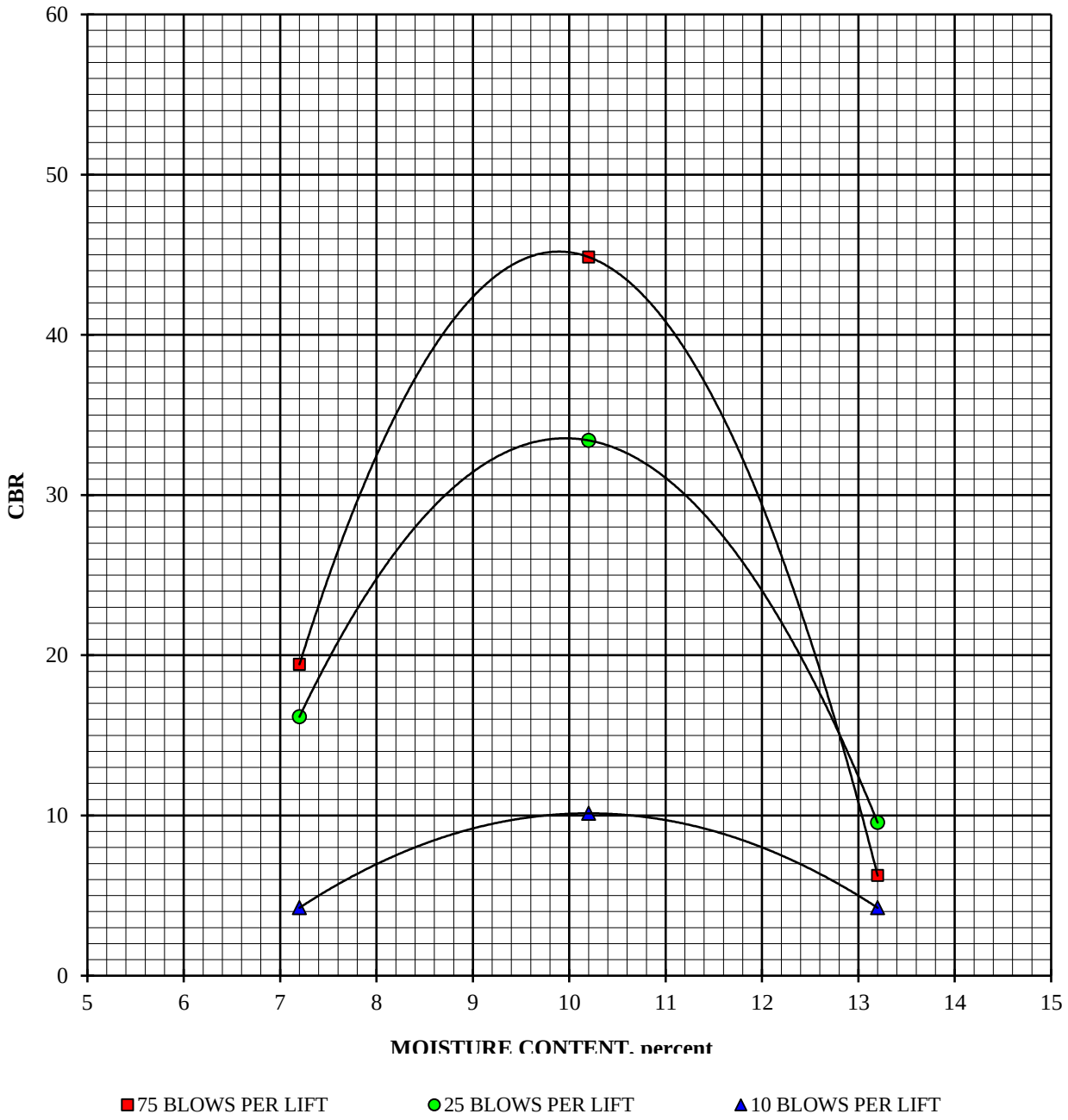

Exhibit 1

Oxnard Airport Taxiway F Improvements
Oxnard, California

302524-002

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

Boring #70 @ 1.5 - 4.5'

February 11, 2020

Dark Brown Sandy Lean Clay (CL)

DRY DENSITY vs. MOISTURE CONTENT

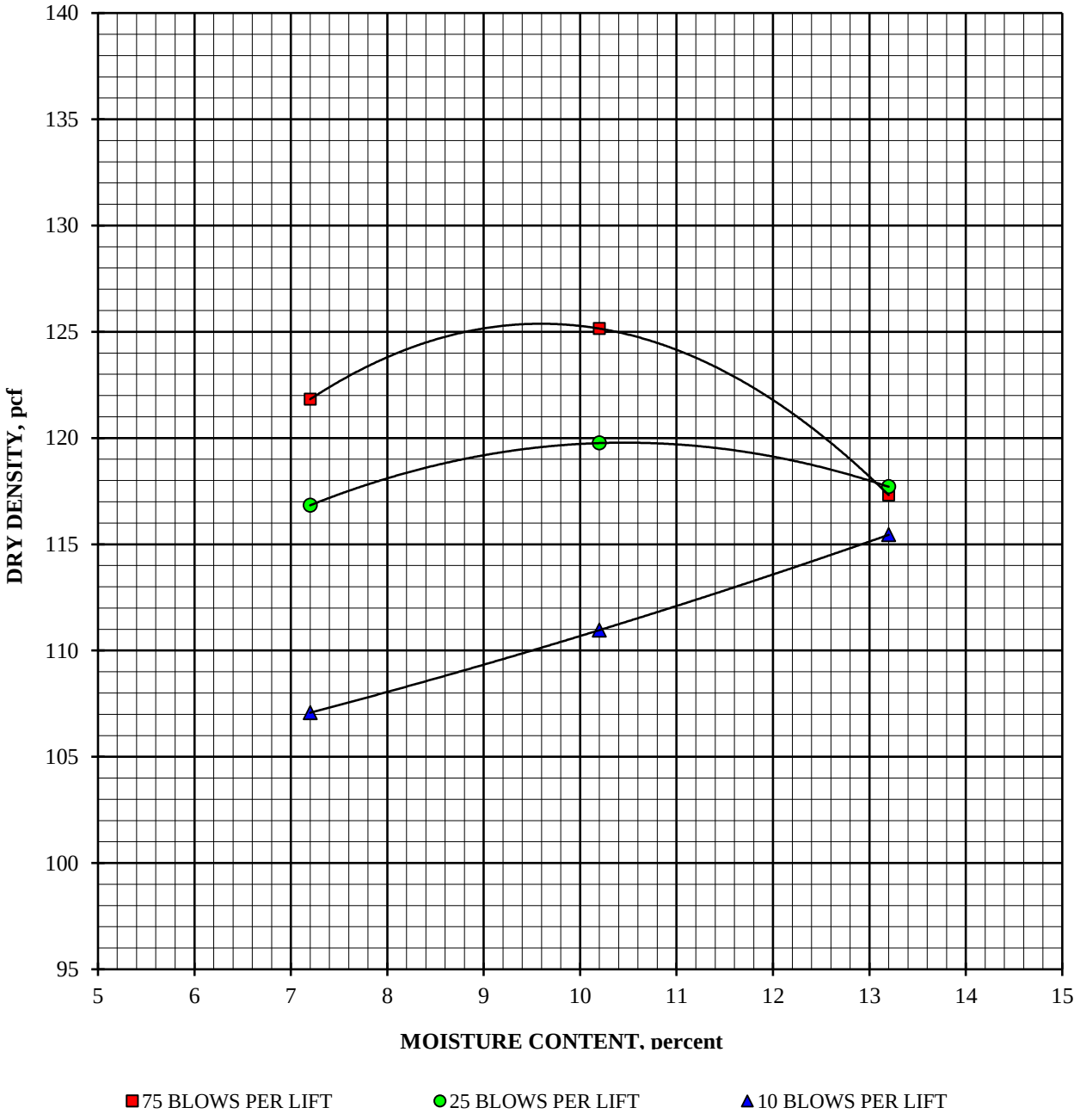

Exhibit 1

Oxnard Airport Taxiway F Improvements
Oxnard, California

302524-002

CALIFORNIA BEARING RATIO

ASTM D 1883-16 (For a Range of Moisture Contents)

Boring #70 @ 1.5 - 4.5'

February 11, 2020

Dark Brown Sandy Lean Clay (CL)

DRY DENSITY vs. CBR

Arranged According to Moisture Content

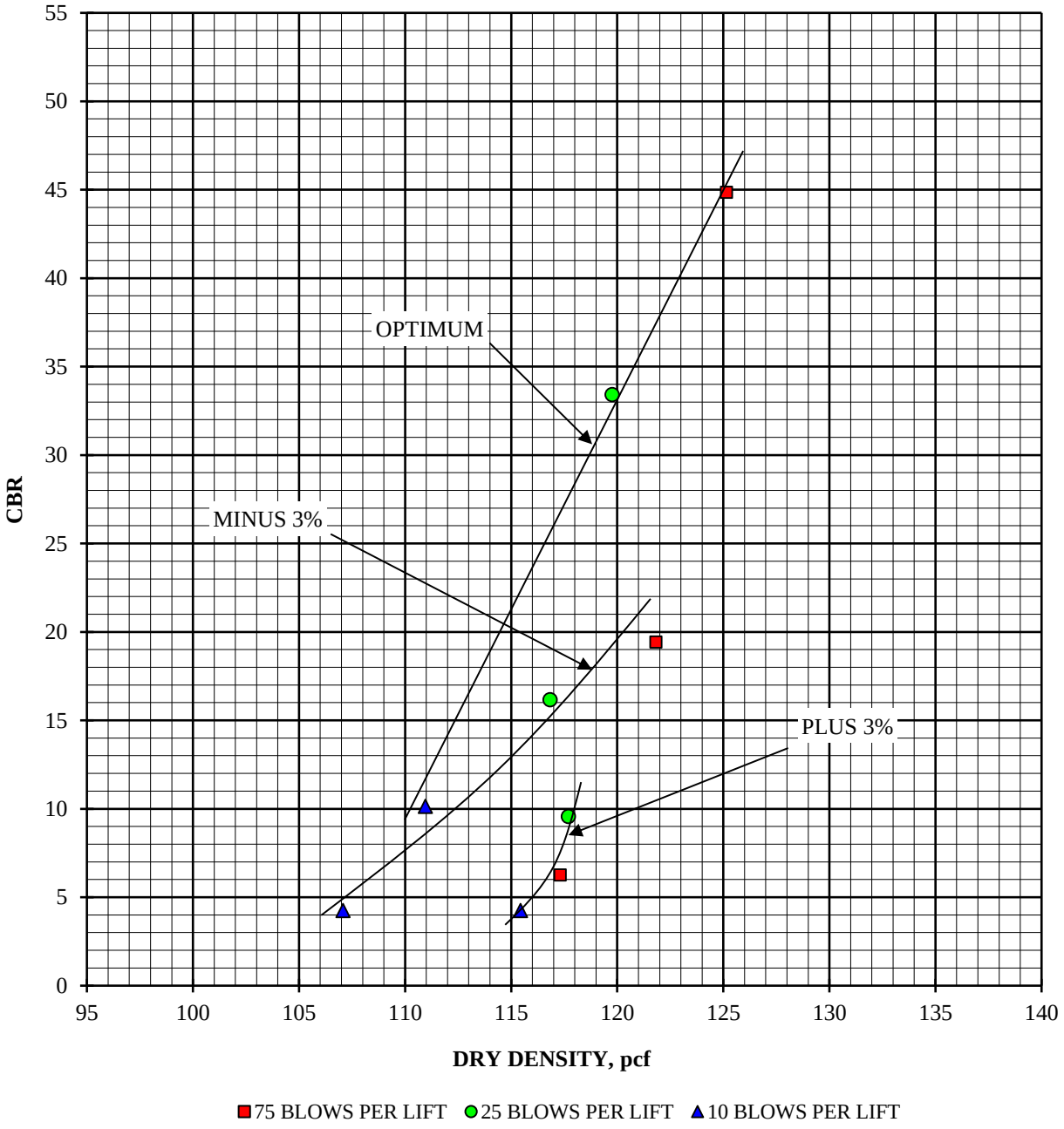

Exhibit 1

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APPENDIX C

Figures 2A and 2B – Existing Pavement Section Thicknesses

Figures 3A and 3B – USCS Soil Types at Subgrade

Figures 4A and 4B – CBR Values – 95% Minimum Relative Compaction at Subgrade

Figures 5A and 5B – Approximate CBR Values Based on Existing Soil Density and Moisture Content at Subgrade

Figures 6A and 6B – Subgrade Soil Moisture Content

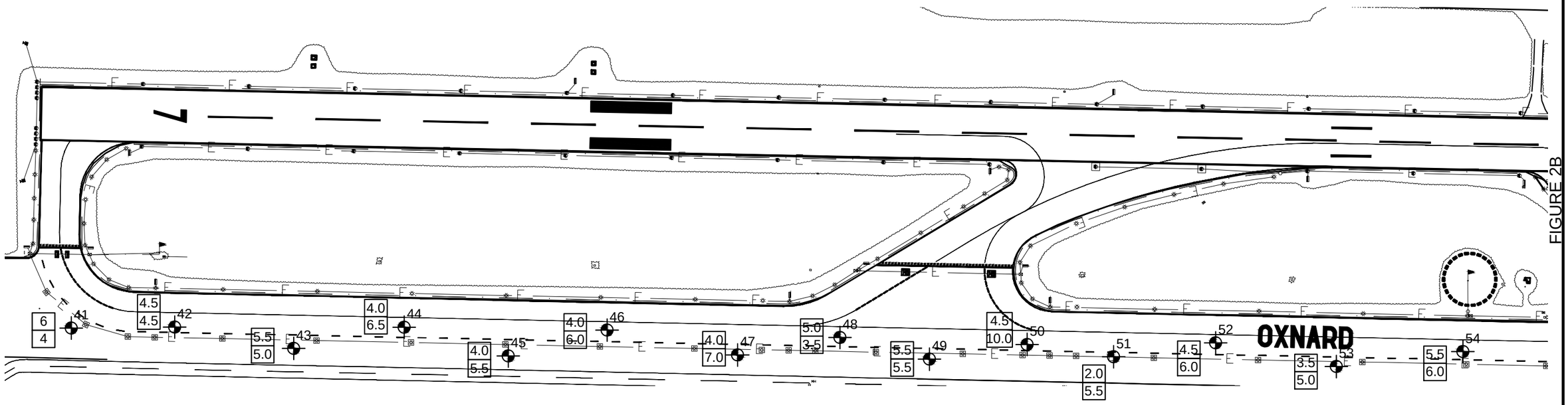

FIGURE 2B

LEGEND

41-70 Boring Location (Approx.)

4	Asphalt Concrete (AC) - Inches
9	Miscellaneous Aggregate Base (mAB) - Inches

BASE MAP PROVIDED BY: MEAD AND HUNT, INC

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FIGURE 2A - EXISTING PAVEMENT SECTION THICKNESSES

Oxnard Airport - Taxiway F Improvements
2889 West 5th Street
Oxnard, California

Exhibit 1

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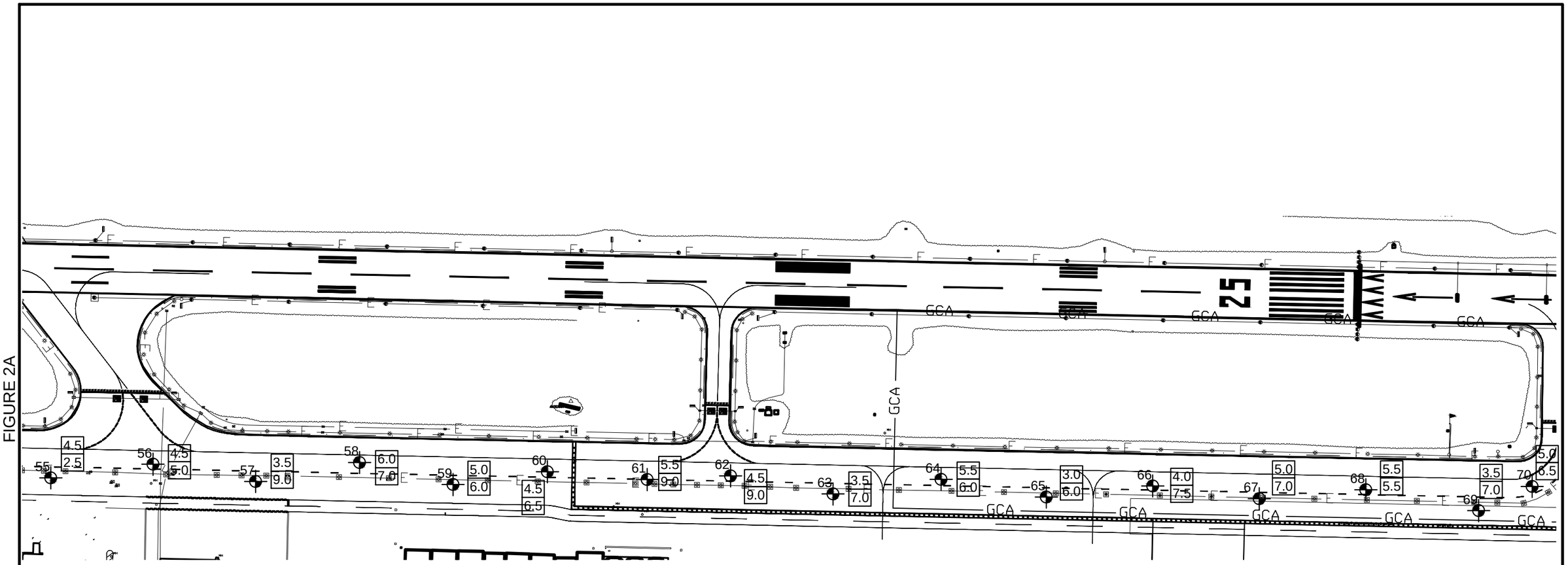
OXNARD AIRPORT TAXIWAY F IMPROVEMENTS021320maps

FIGURE 2A



LEGEND

41-70 Boring Location (Approx.)

4	Asphalt Concrete (AC) - Inches
9	Miscellaneous Aggregate Base (mAB) - Inches

BASE MAP PROVIDED BY: MEAD AND HUNT, INC

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FIGURE 2B - EXISTING PAVEMENT SECTION THICKNESSES
Oxnard Airport - Taxiway F Improvements
2889 West 5th Street
Oxnard, California

Exhibit 1

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OXNARD AIRPORT TAXIWAY F IMPROVEMENTS021320maps

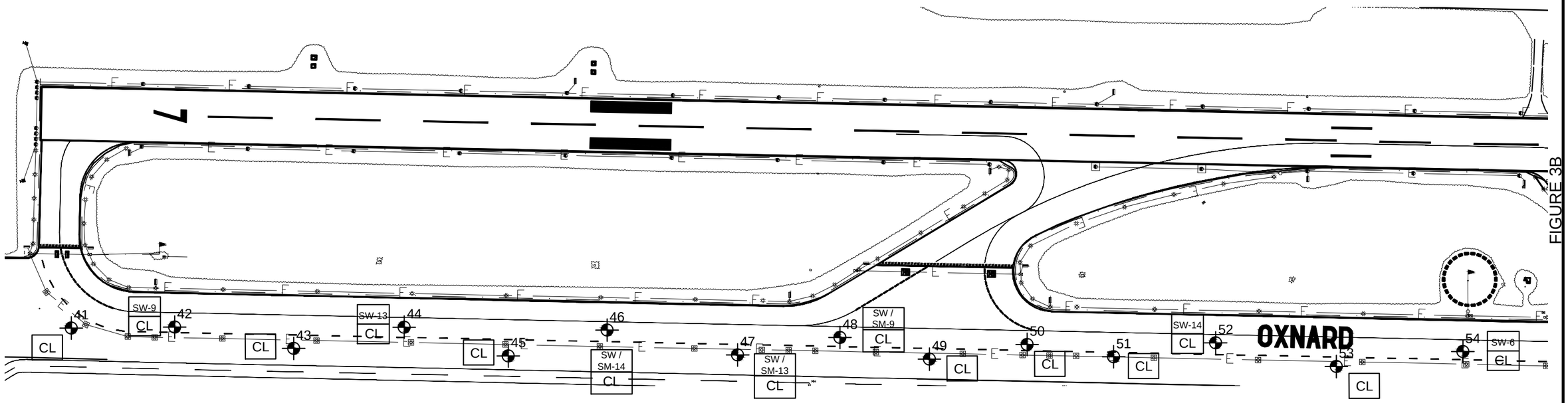

FIGURE 3B

LEGEND

41-70 Boring Location (Approx.)

SW-X WELL GRADED SAND (with or without silt and/or gravel) - "X" indicates thickness in inches where present below pavement section

CL SANDY LEAN CLAY

BASE MAP PROVIDED BY: MEAD AND HUNT, INC

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FIGURE 3A - USCS SOIL TYPES AT SUBGRADE

Oxnard Airport - Taxiway F Improvements
2889 West 5th Street
Oxnard, California

Exhibit 1

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February 2020

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302524-002

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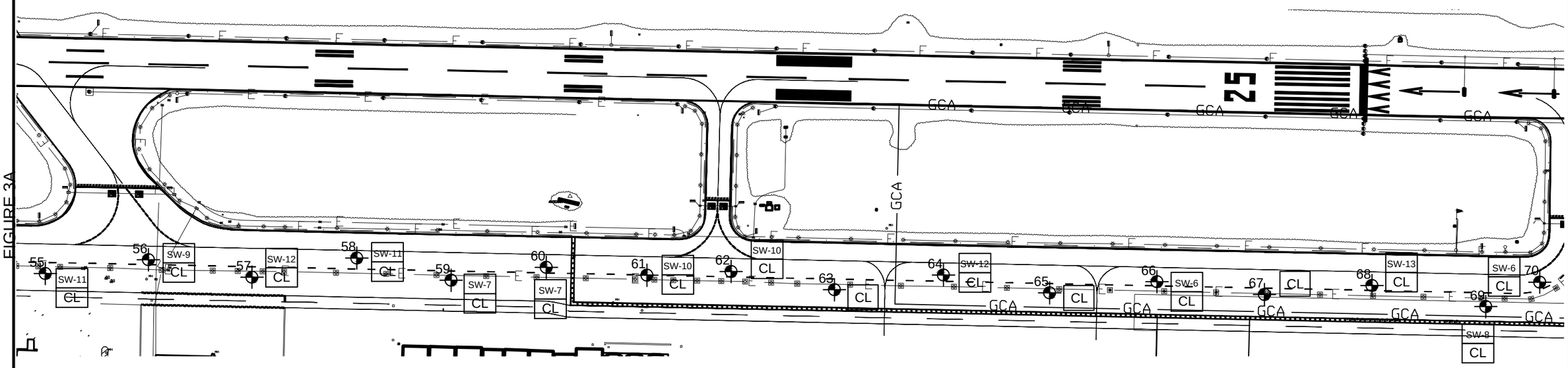
OXNARD AIRPORT TAXIWAY F IMPROVEMENTS021320maps



LEGEND

41-70 Boring Location (Approx.)

SP-X WELL GRADED SAND (with or without silt and/or gravel) - "X" indicates thickness in inches where present below pavement section

CL SANDY LEAN CLAY

BASE MAP PROVIDED BY: MEAD AND HUNT, INC

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FIGURE 3B - USCS SOIL TYPES AT SUBGRADE

Oxnard Airport - Taxiway F Improvements
2889 West 5th Street
Oxnard, California

Exhibit 1

Date
February 2020

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FIGURE 3A

OXNARD AIRPORT TAXIWAY F IMPROVEMENTS021320maps

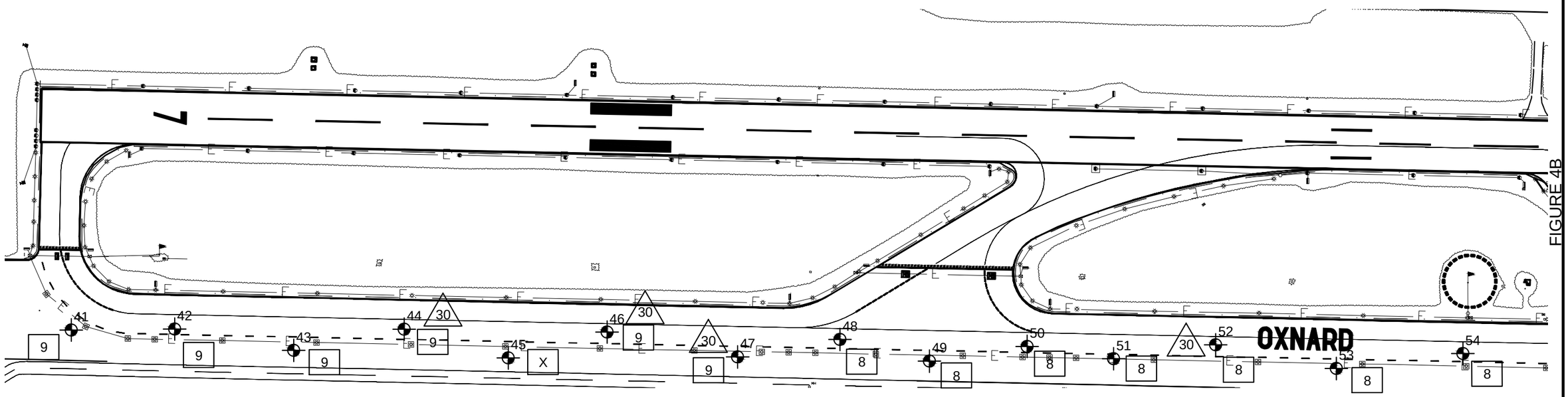

FIGURE 4B

LEGEND

41-70 Boring Location (Approx.)

X Subgrade soil from this boring lime treated at 5 percent by dry weight - See report text

9 Recommended soil CBR value for reconstructed areas with subgrade compacted to a minimum of 95 percent relative compaction and moisture content in range of optimum +/- 2 percent. Well graded sand layers, where present, disregarded

30 Recommended soil CBR value for well graded sand layer (Fill), directly below AC/mAB pavement section, where 10 inches or thicker, compacted to a minimum of 95 percent relative compaction, and moisture content in range of optimum +/- 2 percent.

BASE MAP PROVIDED BY: MEAD AND HUNT, INC

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FIGURE 4A - CBR VALUES - 95% MINIMUM RELATIVE COMPACTION AT SUBGRADE

Oxnard Airport - Taxiway F Improvements
2889 West 5th Street
Oxnard, California

Exhibit 1

Date
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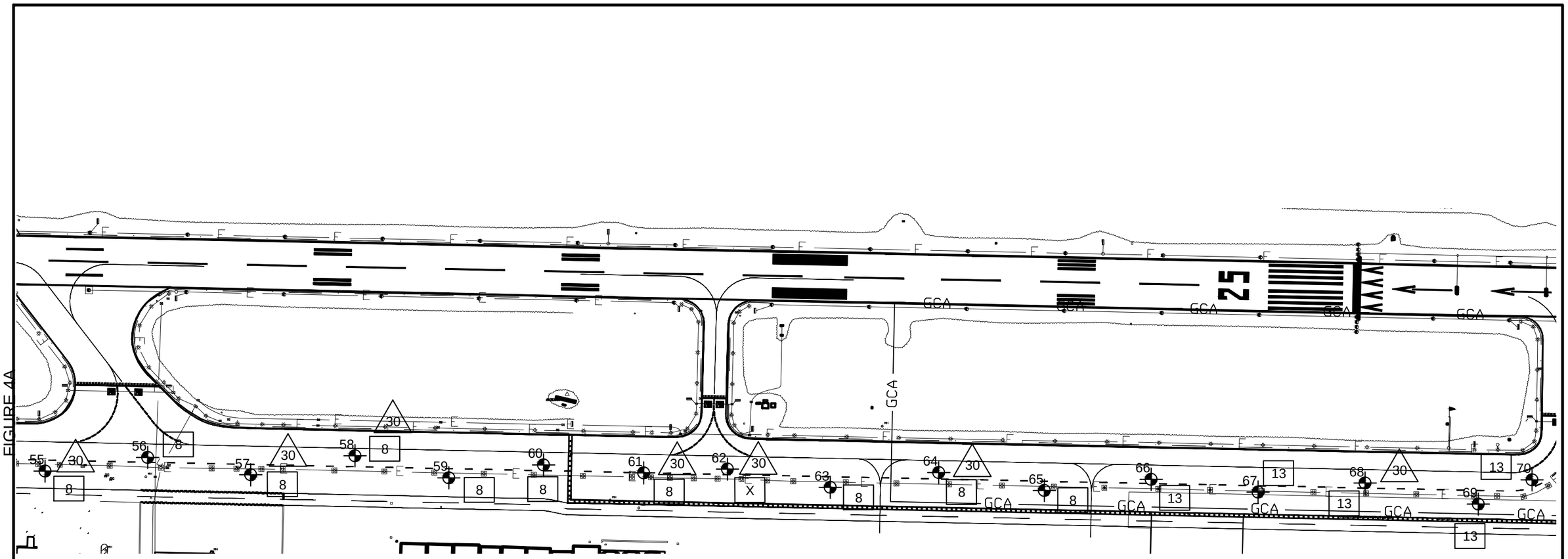
OXNARD AIRPORT TAXIWAY F IMPROVEMENTS021320maps



LEGEND

41-70 Boring Location (Approx.)

X — Subgrade soil from this boring lime treated at 5 percent by dry weight - See report text

9 — Recommended soil CBR value for reconstructed areas with subgrade compacted to a minimum of 95 percent relative compaction and moisture content in range of optimum +/- 2 percent. Well graded sand layers, where present, disregarded

30 — Recommended soil CBR value for well graded sand layer (Fill), directly below AC/mAB pavement section, where 10 inches or thicker, compacted to a minimum of 95 percent relative compaction, and moisture content in range of optimum +/- 2 percent.

BASE MAP PROVIDED BY: MEAD AND HUNT, INC

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FIGURE 4B - CBR VALUES - 95% MINIMUM RELATIVE COMPACTION AT SUBGRADE

Oxnard Airport - Taxiway F Improvements
2889 West 5th Street
Oxnard, California

Exhibit 1

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OXNARD AIRPORT TAXIWAY F IMPROVEMENTS021320maps

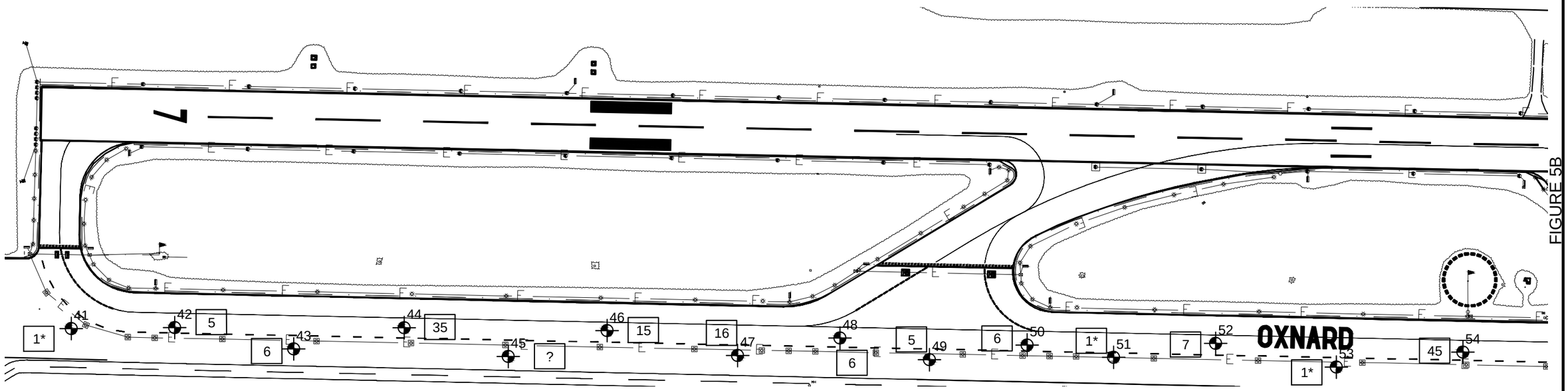

FIGURE 5B

LEGEND

41-70 Boring Location (Approx.)

8 Approximate CBR based on existing soil density and moisture content at subgrade. Thin well graded sand layers directly below misc. AB, where present, disregarded if less than 10 inches. If well graded sand layer is 10 inches or greater, value shown is for that layer.

1* Asterisk indicates soil density and/or moisture content beyond laboratory data range - CBR value estimated only. Question mark (?) indicates no estimate possible from laboratory data.

BASE MAP PROVIDED BY: MEAD AND HUNT, INC

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FIGURE 5A - APPROXIMATE CBR VALUES BASED ON EXISTING SOIL DENSITY AND MOISTURE CONTENT AT SUBGRADE

Oxnard Airport - Taxiway F Improvements
2889 West 5th Street
Oxnard, California

Exhibit 1

Date
February 2020

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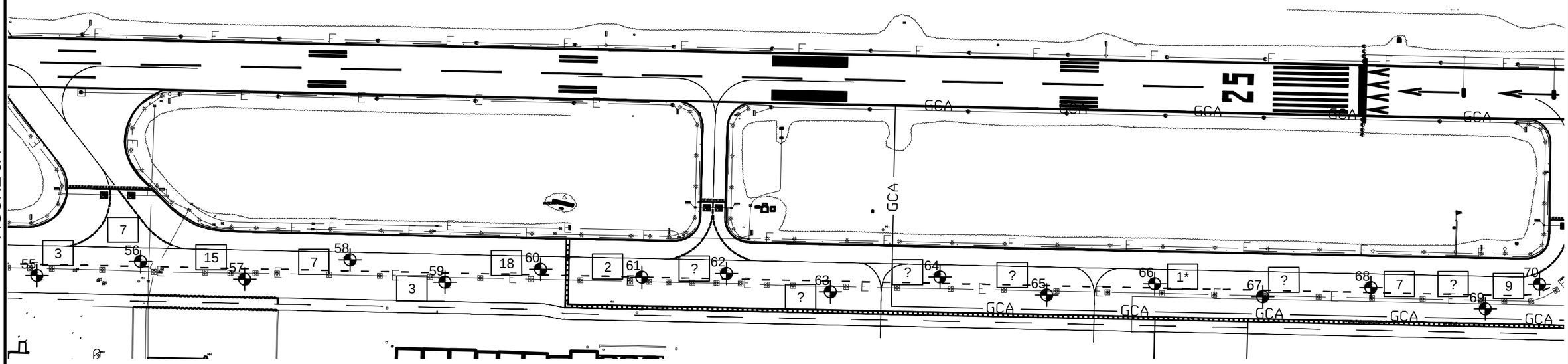
OXNARD AIRPORT TAXIWAY F IMPROVEMENTS021320maps

FIGURE 5A



LEGEND

41-70 Boring Location (Approx.)

8 Approximate CBR based on existing soil density and moisture content at subgrade. Thin well graded sand layers directly below misc. AB, where present, disregarded if less than 10 inches. If well graded sand layer is 10 inches or greater, value shown is for that layer.

1* Asterisk indicates soil density and/or moisture content beyond laboratory data range - CBR value estimated only. Question mark (?) indicates no estimate possible from laboratory data.

BASE MAP PROVIDED BY: MEAD AND HUNT, INC

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FIGURE 5B - APPROXIMATE CBR VALUES BASED ON EXISTING SOIL DENSITY AND MOISTURE CONTENT AT SUBGRADE

Oxnard Airport Runway and Taxiway Rehabilitation/Reconstruction

Exhibit 1

Oxnard, California

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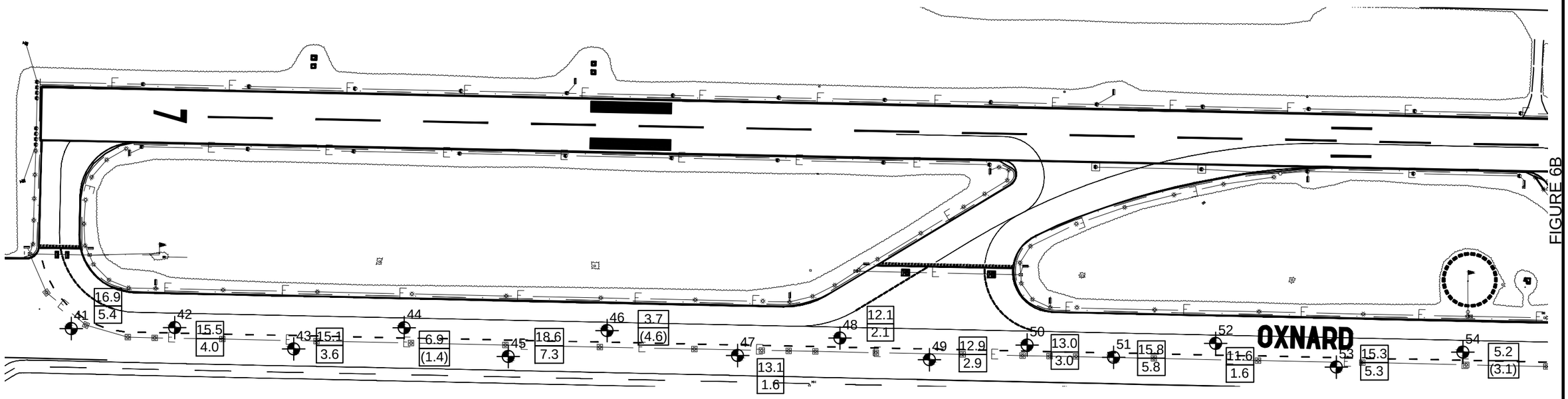

FIGURE 6B

LEGEND

41-70 Boring Location (Approx.)

4.7 Subgrade soil moisture content at time of drilling, percent

(6.0) Percent above (below) optimum moisture content

BASE MAP PROVIDED BY: MEAD AND HUNT, INC

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FIGURE 6A - SUBGRADE SOIL MOISTURE CONTENT

Oxnard Airport - Taxiway F Improvements
2889 West 5th Street
Oxnard, California

Exhibit 1

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OXNARD AIRPORT TAXIWAY F IMPROVEMENTS021320maps

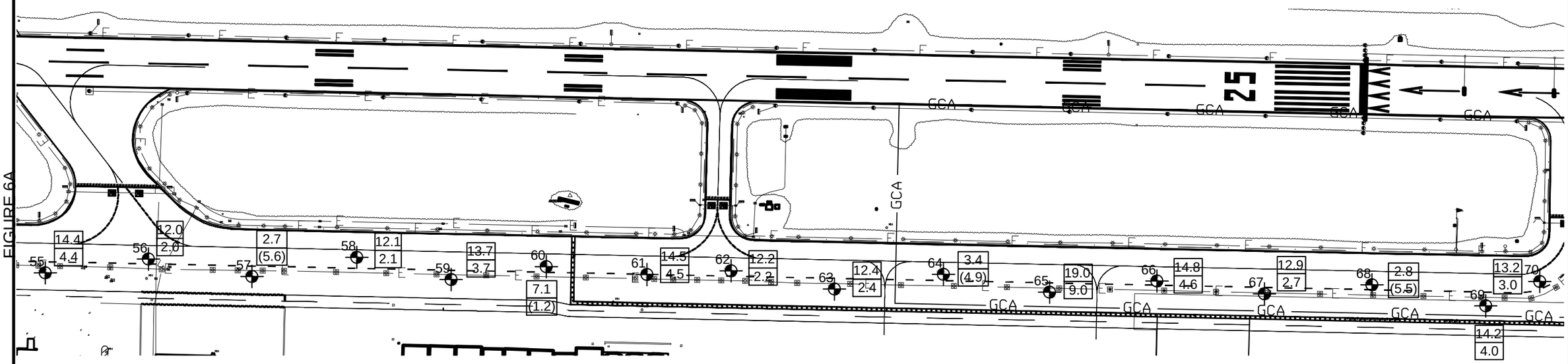

FIGURE 6A

LEGEND

41-70 Boring Location (Approx.)

4.7	Subgrade soil moisture content at time of drilling, percent
(6.0)	Percent above (below) optimum moisture content

BASE MAP PROVIDED BY: MEAD AND HUNT, INC

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FIGURE 6B - SUBGRADE SOIL MOISTURE CONTENT

Oxnard Airport - Taxiway F Improvements
2889 West 5th Street
Oxnard, California

Exhibit 1

Date
February 2020

Project No.
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OXNARD_AIRPORT_TAXIWAY_F_IMPROVEMENTS021320maps

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APPENDIX D

Estimates of Earthwork Shrinkage

Exhibit 1

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS

ESP File No. 302524-002

Estimates of Soil Shrinkage Using In-Place Density Values from Borings and Assumed Final Relative Compaction Values. All Calculations Based on Uniform Density, Moisture Content and Compaction Effort Negative Values Indicate Expansion (Bulking).

Boring No.	Depth	Material Description	USCS Classificatior	Maximum Density, pcf	Optimum Moisture, %
41	1.5 - 5.0 ft	Dark Brown Sandy Lean Clay	CL	122.7	11.5
45	1.0 - 5.0 ft	Dark Brown Sandy Lean Clay	CL	123.1	11.3
46	1.0 - 2.0 ft	Lt Brn Well Gra Sand w/ Silt and Grav	SW-SM	128.7	8.3
54	4.0 - 5.0 ft	Dark Brown Sandy Lean Clay	CL	117.5	13.8
55	1.5 - 5.0 ft	Dark Brown Sandy Lean Clay	CL	125.4	10.0
62	2.0 - 5.0 ft.	Dark Brown Sandy Lean Clay	CL	124.7	10.9
66	4.0 - 5.0 ft	Dark Brown Silty, Clayey Sand	SC-SM	119.8	13.5
70	1.5 - 4.5	Dark Brown Sandy Lean Clay	CL	124.1	10.2

Boring	Depth, Ft. Below Ext. Grade	Moisture in Place, %	Dry Density in Place, pcf	Maximum Dens., pcf	Existing Rel.Comp. %	Shrinkage, % at 95.0 % Rel. Comp.	Shrinkage, % at 96.0 % Rel. Comp.	Shrinkage, % at 97.0 % Rel. Comp.	Shrinkage, % at 98.0 % Rel. Comp.	Shrinkage, % at 99.0 % Rel. Comp.	Shrinkage, % at 100.0 % Rel. Comp.
41	1.0 - 1.5	16.9	107.9	122.7	87.9	8.0	9.2	10.3	11.4	12.6	13.7
42	1.5 - 2.0	15.5	112.3	122.7	91.5	3.8	4.9	6.0	7.1	8.2	9.3
43	1.0 - 1.5	15.1	115.9	122.7	94.5	0.6	1.6	2.7	3.7	4.8	5.9
44	1.5 - 2.0	6.9	120.7	128.7	93.8	1.3	2.4	3.4	4.5	5.6	6.6
45	1.0 - 1.5	18.6	106.3	123.1	86.4	10.0	11.2	12.3	13.5	14.6	15.8
46	1.0 - 1.5	3.7	117.1	128.7	91.0	4.4	5.5	6.6	7.7	8.8	9.9
47	1.0 - 1.5	13.1	116.4	122.7	94.9	0.1	1.2	2.3	3.3	4.4	5.4
48	1.0 - 1.5	12.1	114.8	125.4	91.5	3.8	4.9	6.0	7.0	8.1	9.2
49	1.0 - 1.5	12.9	114.7	125.4	91.5	3.9	5.0	6.0	7.1	8.2	9.3
50	1.0 - 1.5	13.0	119.0	125.4	94.9	0.1	1.2	2.2	3.3	4.3	5.4
51	1.0 - 1.5	15.8	111.4	125.4	88.8	6.9	8.1	9.2	10.3	11.4	12.6
52	1.5 - 2.0	11.6	114.6	125.4	91.4	4.0	5.0	6.1	7.2	8.3	9.4
53	1.0 - 1.5	15.3	110.1	125.4	87.8	8.2	9.3	10.5	11.6	12.8	13.9
54	1.5 - 2.0	5.2	124.3	128.7	96.6	-1.6	-0.6	0.4	1.5	2.5	3.5
55	1.0 - 1.5	14.4	108.9	125.4	86.8	9.4	10.5	11.7	12.8	14.0	15.2
56	1.5 - 2.0	12.0	116.0	125.4	92.5	2.7	3.8	4.9	5.9	7.0	8.1
57	1.0 - 1.5	2.7	117.6	128.7	91.4	4.0	5.1	6.2	7.3	8.3	9.4
58	1.5 -2.0	12.1	115.5	125.4	92.1	3.1	4.2	5.3	6.4	7.5	8.6
59	1.5 -2.0	13.7	110.8	125.4	88.4	7.5	8.6	9.8	10.9	12.0	13.2
60	1.0 - 1.5	7.1	119.8	128.7	93.1	2.1	3.1	4.2	5.3	6.4	7.4
61	1.5 - 2.0	14.5	112.4	125.4	89.6	6.0	7.1	8.2	9.3	10.5	11.6
62	1.5 - 2.0	12.2	90.7	124.7	72.7	30.6	32.0	33.4	34.7	36.1	37.5
63	1.0 - 1.5	12.4	77.9	125.4	62.1	52.9	54.5	56.1	57.8	59.4	61.0
64	1.0 - 1.5	3.4	104.3	128.7	81.0	17.2	18.5	19.7	20.9	22.2	23.4
65	1.0 - 1.5	19.0	102.3	125.4	81.6	16.5	17.7	18.9	20.1	21.4	22.6
66	1.0 - 1.5	14.8	115.4	124.1	93.0	2.2	3.2	4.3	5.4	6.5	7.5
67	1.0 - 1.5	12.9	106.7	124.1	86.0	10.5	11.7	12.8	14.0	15.1	16.3
68	1.0 - 1.5	2.8	112.7	128.7	87.6	8.5	9.6	10.8	11.9	13.1	14.2
69	1.0 - 1.5	14.2	126.1	124.1	101.6	-6.5	-5.5	-4.5	-3.6	-2.6	-1.6
70	1.0 - 1.5	13.2	118.0	124.1	95.1	-0.1	1.0	2.0	3.1	4.1	5.2
					Average Shrinkage, percent, all locations :	7.3	8.5	9.6	10.7	11.9	13.0
						At 95.0 % Rel. Comp.	At 96.0 % Rel. Comp.	At 97.0 % Rel. Comp.	At 98.0 % Rel. Comp.	At 99.0 % Rel. Comp.	At 100.0 % Rel. Comp.

Exhibit 1

Earth Systems
4378 Old Santa Fe Road | San Luis Obispo, CA 93401 | Ph: 805.544.3276 | www.earthsystems.com

July 10, 2020 FILE NO.: 302524-001 and 302524-002

Mr. Jeffrey Leonard, PE
Vice President
Mead & Hunt, Inc.
1360 19th Hole Drive, Suite 200
Windsor, CA 95492

PROJECT: OXNARD AIRPORT
2889 WEST 5TH STREET
OXNARD, CALIFORNIA

RUNWAY 7-25 AND TAXIWAY CONNECTOR IMPROVEMENTS
TAXIWAY F IMPROVEMENTS

SUBJECT: Addendum to Geotechnical Engineering Reports – Sulfate Testing of Subgrade Soils for Evaluation of Lime Treatment Option

TECHNICAL REFS: Attached

Dear Mr. Leonard:

As authorized, we have completed sulfate testing on samples of anticipated subgrade soils secured during the field investigations for our geotechnical engineering reports (ESP 2020a and 2020b) for these two projects. The purpose of testing was to satisfy the cautionary note in the introduction to Item P-155 Lime Treated Subgrade (FAA 2018) which states: "…The Engineer must check the soluble sulfate contents of the soils during design to determine if stabilization with lime can react and induce heave…"

As noted in *Recommended Practice for Stabilization of Sulfate-Rich Subgrade Soils* (NAP 2009), "…Even though stabilization improves engineering properties, problems can arise when calcium-based stabilizers (i.e., lime) are used in soils rich in sulfate-bearing minerals. Stabilization of sulfate-rich soils in the presence of excess moisture may lead to the formation of minerals such as ettringite and/or thaumasite and can cause distress in or even destruction of pavement structures due to heaving. However, the extent of such distress varies among soils and is dependent on factors including the strength of the soil matrix and the spatial distribution and arrangement of ettringite (and/or thaumasite) crystals in the matrix…Ettringite precipitation is a complex problem related not only to soil composition but also to construction methods, availability of water, ion migration, and void structures in pavements." This publication also

Exhibit 1

provides a table indicating the level of risk associated with the use of calcium-based (lime) stabilizers in sulfate rich soils. A partial reproduction of the table (sulfate concentrations listed in parts per million (ppm) rather than percent by dry weight) is as follows:

Risk Involved	Soluble Sulfate Concentrations - ppm
Low Risk	Below 3,000 ppm
Moderate Risk	Between 3,000 and 5,000 ppm
Moderate to High Risk	Between 5,000 and 8,000 ppm
High to Unacceptable Risk	Greater than 8,000 ppm
Unacceptable Risk	Greater than 10,000 ppm

On October 16, 2019, four samples from the Taxiway F Improvements project area were sent to HDR, Inc., of Claremont, California for soluble sulfate testing. The Chain of Custody & Request for Laboratory Testing documentation for these samples, as well as the test results, are included in Appendix A.

After the results from this initial round of sulfate testing were received and reviewed, it was noted that one of the samples showed a significant level (23,500 ppm) of soluble sulfates. Per the table above, the material would therefore have an unacceptable level of risk associated with calcium-based lime treatment. The other three samples had soluble sulfate levels of 3,930 ppm, 1,100 ppm and 169 ppm. This nonuniformity and significant disparity among the results led to consideration for additional testing.

To further characterize the subgrade soils, a second set of six total samples were authorized to be sent to HDR, Inc., for soluble sulfate testing. Four samples were selected from material maintained in our laboratory from the Runway 7-25 and Taxiway Connector Improvements project area, and two additional samples were from the Taxiway F Improvements area. The intent of the additional samples was to provide data for the entire extent of <u>both</u> project areas, and to determine, if possible, if the sulfate-rich conditions were only present in an isolated area. The Chain of Custody & Request for Laboratory Testing documentation for this second round of samples, as well as the test results, are included in Appendix B. This second round of testing yielded a similar disparity in the results, with values ranging from a low of 740 ppm to a high of 20,200 ppm.

Exhibit 1

The results from both rounds of soluble sulfate testing are plotted on a map of the combined projects in Appendix C. The map also indicates the locations of the exploratory borings performed for the two reports by this firm (ESP 2020a and 2020b).

Based on information contained in *Recommended Practice for Stabilization of Sulfate-Rich Subgrade Soils* (NAP 2009), a limited program of swell testing was completed to determine, if possible, the effect of extended mellowing time and remixing on a samples of lime treated soil prior to compaction. For this test, the soil sample with the greatest soluble sulfate content (Boring 41 from 1.5 to 5.0 feet below existing grade) was treated with 5 percent lime by dry weight (BDW), in single and full stages, with the following modified mellowing time periods:

- 1 stage - 5 percent lime treatment BDW, 1 day mellowing period
- 2 stage – 2.5 percent lime treatment BDW, 2 days mellowing period; 2.5 percent additional lime treatment, 1 day additional mellowing period
- 2 stage – 2.5 percent lime treatment BDW, 4 days mellowing period; 2.5 percent additional lime treatment, 1 day additional mellowing period
- 2 stage – 2.5 percent lime treatment BDW, 6 days mellowing period; 2.5 percent additional lime treatment, 1 day additional mellowing period

During the mellowing period, the treated soil was maintained in sealed plastic bags with moisture contents of 3 to 4 percent above optimum moisture. After completion of the various mellowing periods, the samples were recompacted at 95 percent of maximum dry density as standard one-dimensional consolidation samples (ASTM D 2435/D 2435M-11). The samples were then loaded with a surcharge of 100 psf (to simulate an overlying AC/AB pavement section approximately 8 to 9 inches thick), and fully inundated. All samples collapsed under the surcharge loading prior to swelling. Initial collapse values ranged from 0.0010 to 0.0015-inch. As of January 27, 2020, all four samples appeared to have reached a steady state condition, with no swell or collapse (measured to the nearest 0.0001-inch) for at least 2 days prior to final readings.

The results of the swell tests are provided in the summary graph in Appendix C. The graph is not a complete depiction of all swell readings taken over time for all samples, but rather a plot of the maximum swell values observed as of January 27, 2020, vs. the time for mellowing and additional

Exhibit 1

mixing prior to recompaction. The graph does indicate that, as noted in *Recommended Practice for Stabilization of Sulfate-Rich Subgrade Soils* (NAP 2009), the potential for swell is reduced with additional mellowing and mixing time.

As a final check on the effect of lime treatment, a sample of the 2-stage lime treated soil (5 percent total BDW) from Boring 41 at 1 to 5 feet that had mellowed for 13 days was sent to HDR, Inc., for soluble sulfate testing. The intent of this testing was to determine the residual sulfate level in the soil after lime treatment. The Chain of Custody & Request for Laboratory Testing documentation for this final round of testing, as well as the test results, are included in Appendix D. The result of this test was a residual soluble sulfate level of 677 ppm, a considerable reduction from the initially tested value (before lime treatment) of 23,500 ppm.

Based on this testing program, and on information obtained from *Recommended Practice for Stabilization of Sulfate-Rich Subgrade Soils* (NAP 2009), we recommend the following be incorporated in the plans for this project if it is elected to utilize lime treatment for improvement of subgrade soil strength and a subsequent reduction in the design pavement section. Information regarding subgrade soil strengths in the untreated and treated condition, and all other soil parameters, are contained in our project soil engineering reports (ESP 2020a and 2020b).

1. The minimum percentage of lime treatment should be 5 percent by dry weight of material (BDW).

2. The *Recommended Practice for Stabilization of Sulfate-Rich Subgrade Soils* (NAP 2009) indicates that in Texas, a single full application of lime should be utilized, rather than a split application. Discussions with a lime treatment contractor in this area indicates split applications appear to be more successful for higher lime treatment percentages. For this project, we recommend that the lime treatment should be performed in two stages, slightly weighted more to the initial treatment (i.e., 3 percent initial and 2 percent secondary).

3. A minimum mellowing period of 7 days should be used for the initial stage, prior to the secondary lime treatment operation. During this initial mellowing period the lime-treated soil moisture content should be maintained at 4 to 5 percent above optimum as a

Exhibit 1

minimum. The lime treated soil moisture content should be checked frequently, and additional moisture added as necessary to maintain the chemical reaction. During the initial mellowing period, the lime treated soil should be remixed a minimum of 3 times after the initial mixing period. Adequate water during the mellowing process is critical, and all efforts should be made to keep the soil moisture contents as high as possible without sacrificing construction workability and quality.

4. After the initial mellowing and mixing period is complete, the second stage lime treatment process can be completed. The secondary mellowing period should be a minimum of 48 hours; the lime treated soil should be maintained at 4 to 5 percent above optimum as a minimum, and the soil should be remixed at least 1 additional time following the final lime treatment/mixing operation, prior to final compaction.

5. To assure plenty of soil moisture during the treatment/mixing/mellowing operation, the contractor should consider lime application via slurry rather than in dry form.

6. Consideration should be given to testing the source of construction water available for the contractor during the lime treatment process, to verify that sulfates will not be added to the lime treated soil during the moisture conditioning process.

7. During final compaction operations, the lime treated soil should be maintained at as high a moisture content as possible (i.e., 3 to 5 percent above optimum moisture content, or more), while still achieving the required relative compaction, and maintaining firm and stable conditions during proofrolling.

8. To reduce the potential for the introduction of moisture into the compacted and completed overall pavement section, which can contribute to degradation of the lime treated soil layer, proper drainage of the pavement section, shoulders and adjacent infield areas is essential. Pavement edge drains should also be considered, to create a dewatered drainage flow line that is at least 3 feet below subgrade elevation.

9. Quality control testing (swell and/or residual sulfates) of the finished lime treated soil should be completed prior to compaction, to assure that the application, mixing and mellowing processes have been successful.

Exhibit 1

End of Addendum 1.

Please attach a copy of this addendum to each copy of the referenced report that you may have.

If there are any questions regarding this addendum, please feel free to contact the undersigned.

Sincerely,

Earth Systems Pacific

Fred J. Potthast, GE
Principal Engineer

Attachments: Appendix A – Chain of Custody/Request for Laboratory Testing, Samples Sent 10/16/19 to HDR, Inc. (1 page)
Laboratory Test Results for Samples Sent 10/16/19 to HDR, Inc. (2 pages)

Appendix B – Chain of Custody/Request for Laboratory Testing, Samples Sent 11/26/19 to HDR, Inc. (1 page)
Laboratory Test Results for Samples Sent 11/26/19 to HDR, Inc. (2 pages)

Appendix C – Soluble Sulfates Test Results Map (2 sheets)
Summary graph of Swell Test Data (1 page)

Appendix D – Chain of Custody/Request for Laboratory Testing, Samples Sent 1/16/20 to HDR, Inc. (1 page)
Laboratory Test Results for Samples Sent 1/16/20 to HDR, Inc. (2 pages)

Doc No.: 2002-053.ADD1/cr

Exhibit 1

TECHNICAL REFERENCE LIST

ESP (Earth Systems Pacific). January 21, 2020a. Geotechnical Engineering Report, Oxnard Airport, Runway and Taxiway Connector Rehabilitation/Reconstruction, Oxnard, California. Doc. No. 1901-103.SER.REV. File No. 302324-001

ESP (Earth Systems Pacific). July 10, 2020b. Geotechnical Engineering Report, Oxnard Airport, Taxiway F Improvements, Oxnard, California. Doc. No. 2007-040.SER. File No. 302324-002

FAA (U.S. Department of Transportation, Federal Aviation Administration). December 21, 2018. Standard Specifications for Construction of Airports. Advisory Circular 150/5370-10H.

NAP (The National Academies Press). 2009. Recommended Practice for Stabilization of Sulfate-Rich Subgrade Soils.

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APPENDIX A

Chain of Custody/Lab Test Request for Samples Sent to HDR, Inc. on 10/16/19

Laboratory Test Results for Samples Sent to HDR, Inc. on 10/16/19

Exhibit 1

HDR

www.hdrinc.com

CHAIN OF CUSTODY & REQUEST FOR LABORATORY TESTING

DATE SENT: 10/1619

TESTING REQUESTED BY:

Name Fred J. Potthast, GE

Phone: 805-544-3276 x-3

Company Name Earth Systems Pacific

Fax: 805-544-1786

Address 4378 Old Santa Fe Road

Email: fred@earthsystems.com

City San Luis Obispo State CA Zip 93401

SEND RESULTS TO: Same as above

Name Fred J. Potthast, GE

Address Earth Systems Pacific

City San Luis Obispo State CA Zip 93401

Email: fred@earthsystems.com

SEND INVOICE TO: ☑ Same as above

Name

Address

City State Zip

Email:

PROJECT INFORMATION:

P.O. NO: 302524-002 *JOB NAME:* Oxnard Airport - Taxiway F Improvements *JOB NO:* 302524-002

Site Address 2889 West 5th Street

Site City OxnardBoring Site State CA

TESTS DESIRED:

General Building Materials Corrosivity Testing (resistivity+pH, soluble salts analysis e.g. chlorides, sulfates, ammonium, nitrate)

CalTrans Corrosivity Testing (resistivity+pH per CTM 643, soluble salts analysis with chloride & sulfate per CTM 422 & 417)

Other (Please be specific) Soluable sulfates only

RESULTS DESIRED:

☐ SOIL CORROSIVITY REPORT (with test results)*

☑ TEST RESULTS ONLY (no report)

☐ Expedite turn-around **(additional cost per sample)**. Expedited date required?

- **ARE THESE SAMPLES FROM A QUARANTINE AREA?** YES ☐ NO ☑

Boring ID	Depth	Type of Soil	Boring ID	Depth	Type of Soil
Boring 41	1.5 - 5	Dark Brown Clayey Sand (SC)			
Boring 55	1.5 - 5	Dark Brown Clayey Sand (SC)			
Boring 70	1.5 - 4.5	Brown Clayey Sand (SC)			
Boring 46	1 - 2	LTBr. Poorly grded Sand (SP)			

CHAIN OF CUSTODY

Signature	Print Name	Company	Date	Time
Collected/Relinquished By	Sean Hemmer	Earth Systems Pacific	10/11/19	PM
Received By:	Terry Reyes	Earth Systems Pacific	10/11/19	PM
Relinquished By:	Terry Reyes	Earth Systems Pacific	10/16/19	pm
Received By:				
Relinquished By:				
Received By Laboratory:				

*IF SOIL CORROSIVITY REPORT IS REQUESTED PLEASE FILL OUT PAGE 2

Exhibit 1

TRANSMITTAL LETTER

DATE: November 19, 2019

ATTENTION: **Fred J. Potthast**

TO: Earth Systems Pacific
4378 Old Santa Fe Road
San Luis Obispo, CA 93401

SUBJECT: Laboratory Test Data
Oxnard Airport - Taxiway F Improvements
Your #302524-002, HDR Lab #19-0799LAB

COMMENTS: Enclosed are the results for the subject project.

James T. Keegan, MD
Corrosion and Lab Services Section Manager

431 West Baseline Road · Claremont, CA 91711
Phone: 909.962.5485 · Fax: 909.626.3316

Exhibit 1

Table 1 - Laboratory Tests on Soil Samples

Earth Systems Pacific
Oxnard Airport - Taxiway F Improvements
Your #302524-002, HDR Lab #19-0799LAB
19-Nov-19

Sample ID			Boring 41 @ 1.5-5'	Boring 55 @ 1.5-5'	Boring 70 @ 1.5-4.5'	Boring 46 @ 1-2'
Resistivity		**Units**				
as-received		ohm-cm	na	na	na	na
saturated		ohm-cm	na	na	na	na
pH			na	na	na	na
Electrical Conductivity		mS/cm	3.78	1.40	0.18	0.48
Chemical Analyses						
Cations						
calcium	Ca^{2+}	mg/kg	na	na	na	na
magnesium	Mg^{2+}	mg/kg	na	na	na	na
sodium	Na^{1+}	mg/kg	na	na	na	na
potassium	K^{1+}	mg/kg	na	na	na	na
Anions						
carbonate	CO_3^{2-}	mg/kg	na	na	na	na
bicarbonate	HCO_3^{1-}	mg/kg	na	na	na	na
fluoride	F^{1-}	mg/kg	na	na	na	na
chloride	Cl^{1-}	mg/kg	na	na	na	na
sulfate	SO_4^{2-}	mg/kg	23,500	3,930	169	1,100
phosphate	PO_4^{3-}	mg/kg	na	na	na	na
Other Tests						
ammonium	NH_4^{1+}	mg/kg	na	na	na	na
nitrate	NO_3^{1-}	mg/kg	na	na	na	na
sulfide	S^{2-}	qual	na	na	na	na
Redox		mV	na	na	na	na

Resistivity per ASTM G187, Cations per ASTM D6919, Anions per ASTM D4327, and Alkalinity per APHA 2320-B.
Electrical conductivity in millisiemens/cm and chemical analyses were made on a 1:5 soil-to-water extract.
mg/kg = milligrams per kilogram (parts per million) of dry soil.
Redox = oxidation-reduction potential in millivolts
ND = not detected
na = not analyzed

431 West Baseline Road · Claremont, CA 91711
Phone: 909.962.5485 · Fax: 909.626.3316

Exhibit 1

APPENDIX B

Chain of Custody/Lab Test Request for Samples Sent to HDR, Inc. on 11/26/19

Laboratory Test Results for Samples Sent to HDR, Inc. on 11/26/19

Exhibit 1

HDR

www.hdrinc.com

CHAIN OF CUSTODY & REQUEST FOR LABORATORY TESTING

DATE SENT: 11/26/19

TESTING REQUESTED BY:

Name: Fred J. Potthast, GE
Phone: 805-544-3276 x-3
Company Name: Earth Systems Pacific
Fax: 805-544-1786
Address: 4378 Old Santa Fe Road
Email: fred@earthsystems.com
City: San Luis Obispo State: CA Zip: 93401

SEND RESULTS TO: Same as above

Name: Fred J. Potthast, GE
Address: Earth Systems Pacific
City: San Luis Obispo State: CA Zip: 93401
Email: fred@earthsystems.com

SEND INVOICE TO: ☑ Same as above

Name
Address
City State Zip
Email:

PROJECT INFORMATION:

P.O. NO: 302524-002 JOB NAME: Oxnard Airport - Runway and Taxiway Improvements JOB NO: 302524-002
Site Address: 2889 West 5th Street
Site City: Oxnard Site State: CA

TESTS DESIRED:

General Building Materials Corrosivity Testing (resistivity+pH, soluble salts analysis e.g. chlorides, sulfates, ammonium, nitrate)
CalTrans Corrosivity Testing (resistivity+pH per CTM 643, soluble salts analysis with chloride & sulfate per CTM 422 & 417)
Other (Please be specific) Soluable sulfates only

RESULTS DESIRED:

☐ SOIL CORROSIVITY REPORT (with test results)*
☑ TEST RESULTS ONLY (no report)
☐ Expedite turn-around **(additional cost per sample)**. Expedited date required? _____

- **ARE THESE SAMPLES FROM A QUARANTINE AREA?** YES ☐ NO ☑

Boring ID	Depth	Type of Soil	Boring ID	Depth	Type of Soil
1	2 - 5	Dark Brown Sandy Lean Clay (CL)			
5	2 - 4	Dark Brown Silty Sand (SM)			
13	2 - 4	Dark Brown Sandy Lean Clay (CL)			
27	2 - 4	Dark Brown Sandy Lean Clay (CL)			
45	1 - 5	Dark Brown Clayey Sand (SC)			
62	2 - 5	Dark Brown Clayey Sand (SC)			

CHAIN OF CUSTODY

Signature	Print Name	Company	Date	Time
Collected/Relinquished By	R. Wagner/S. Hemmer	Earth Systems Pacific	Nov. '18 / Oct '19	PM
Received By:	Terry Reyes	Earth Systems Pacific	Nov. '18 / Oct '19	PM
Relinquished By:	Terry Reyes	Earth Systems Pacific	11/26/19	PM
Received By:				
Relinquished By:				
Received By Laboratory:				

*IF SOIL CORROSIVITY REPORT IS REQUESTED PLEASE FILL OUT PAGE 2

Exhibit 1

TRANSMITTAL LETTER

DATE: December 10, 2019

ATTENTION: **Fred J. Potthast**

TO: Earth Systems Pacific
4378 Old Santa Fe Road
San Luis Obispo, CA 93401

SUBJECT: Laboratory Test Data
Oxnard Airport - Runway & Taxiway
Your #302524-002, HDR Lab #19-0860LAB

COMMENTS: Enclosed are the results for the subject project.

James T. Keegan, MD
Corrosion and Lab Services Section Manager

431 West Baseline Road · Claremont, CA 91711
Phone: 909.962.5485 · Fax: 909.626.3316

Exhibit 1

Table 1 - Laboratory Tests on Soil Samples

Earth Systems Pacific
Oxnard Airport - Runway & Taxiway Improvements
Your #302524-002, HDR Lab #19-0860LAB
10-Dec-19

Sample ID			B1 @ 2-5'	B5 @ 2-4'	B13 @ 2-4'	B27 @ 2-4'	B45 @ 1-5'
Resistivity		**Units**					
as-received		ohm-cm	na	na	na	na	na
saturated		ohm-cm	na	na	na	na	na
pH			na	na	na	na	na
Electrical Conductivity		mS/cm	0.56	0.32	3.09	4.71	0.73
Chemical Analyses							
Cations							
calcium	Ca^{2+}	mg/kg	na	na	na	na	na
magnesium	Mg^{2+}	mg/kg	na	na	na	na	na
sodium	Na^{1+}	mg/kg	na	na	na	na	na
potassium	K^{1+}	mg/kg	na	na	na	na	na
Anions							
carbonate	CO_3^{2-}	mg/kg	na	na	na	na	na
bicarbonate	HCO_3^{1-}	mg/kg	na	na	na	na	na
fluoride	F^{1-}	mg/kg	na	na	na	na	na
chloride	Cl^{1-}	mg/kg	na	na	na	na	na
sulfate	SO_4^{2-}	mg/kg	1,200	740	11,400	20,200	1,960
phosphate	PO_4^{3-}	mg/kg	na	na	na	na	na
Other Tests							
ammonium	NH_4^{1+}	mg/kg	na	na	na	na	na
nitrate	NO_3^{1-}	mg/kg	na	na	na	na	na
sulfide	S^{2-}	qual	na	na	na	na	na
Redox		mV	na	na	na	na	na

Sulfate per ASTM D4327.
Electrical conductivity in millisiemens/cm and chemical analyses were made on a 1:5 soil-to-water extract.
mg/kg = milligrams per kilogram (parts per million) of dry soil.
Redox = oxidation-reduction potential in millivolts
ND = not detected
na = not analyzed

431 West Baseline Road · Claremont, CA 91711
Phone: 909.962.5485 · Fax: 909.626.3316

Exhibit 1

Table 1 - Laboratory Tests on Soil Samples

Earth Systems Pacific
Oxnard Airport - Runway & Taxiway Improvements
Your #302524-002, HDR Lab #19-0860LAB
10-Dec-19

Sample ID			B62 @ 2-5'
Resistivity		**Units**	
as-received		ohm-cm	na
saturated		ohm-cm	na
pH			na
Electrical Conductivity		mS/cm	0.59
Chemical Analyses			
Cations			
calcium	Ca^{2+}	mg/kg	na
magnesium	Mg^{2+}	mg/kg	na
sodium	Na^{1+}	mg/kg	na
potassium	K^{1+}	mg/kg	na
Anions			
carbonate	CO_3^{2-}	mg/kg	na
bicarbonate	HCO_3^{1-}	mg/kg	na
fluoride	F^{1-}	mg/kg	na
chloride	Cl^{1-}	mg/kg	na
sulfate	SO_4^{2-}	mg/kg	1,510
phosphate	PO_4^{3-}	mg/kg	na
Other Tests			
ammonium	NH_4^{1+}	mg/kg	na
nitrate	NO_3^{1-}	mg/kg	na
sulfide	S^{2-}	qual	na
Redox		mV	na

Sulfate per ASTM D4327.
Electrical conductivity in millisiemens/cm and chemical analyses were made on a 1:5 soil-to-water extract.
mg/kg = milligrams per kilogram (parts per million) of dry soil.
Redox = oxidation-reduction potential in millivolts
ND = not detected
na = not analyzed

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Exhibit 1

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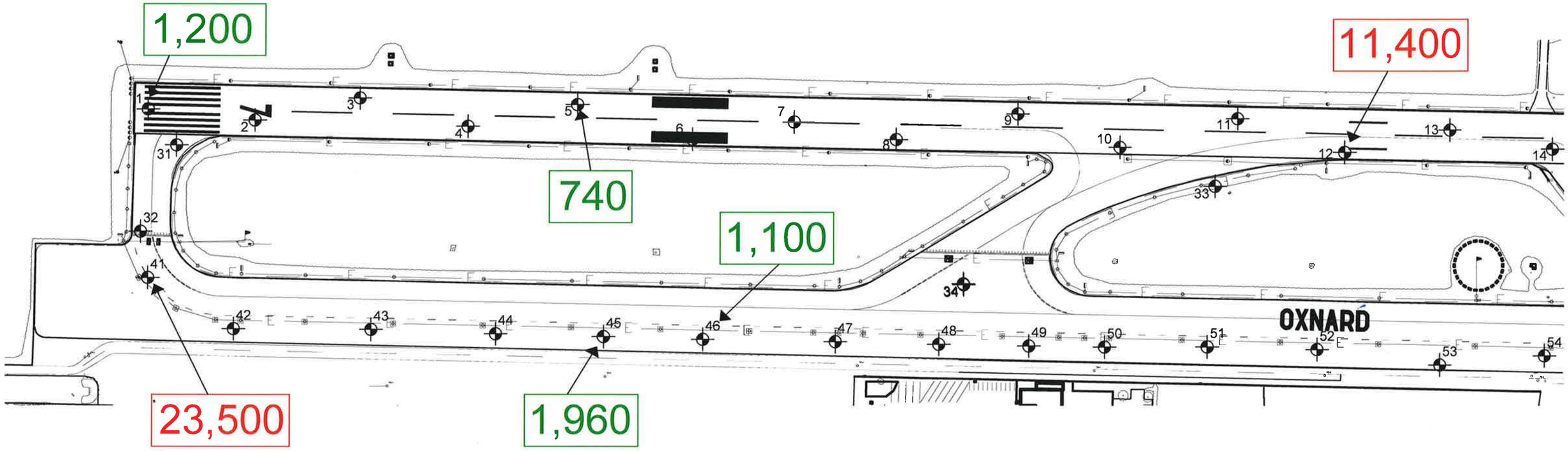
APPENDIX C

Soluble Sulfate Test Results Map

Summary Graph of Swell Test Data

Exhibit 1



LEGEND

70 Boring Location (Approx.)

23,500 Soluble Sulfate Content of Subgrade Soil (ppm)
Red (≥ 3000ppm) Green (< 3000ppm)

BASE MAP PROVIDED BY: MEAD AND HUNT, INC

N

NOT TO SCALE

OXNARDAIRPORT110518mcps

Earth Systems Pacific
4378 Old Santa Fe Road, San Luis Obispo, CA 93401
www.earthsystems.com
(805) 544-3276 • Fax (805) 544-1786

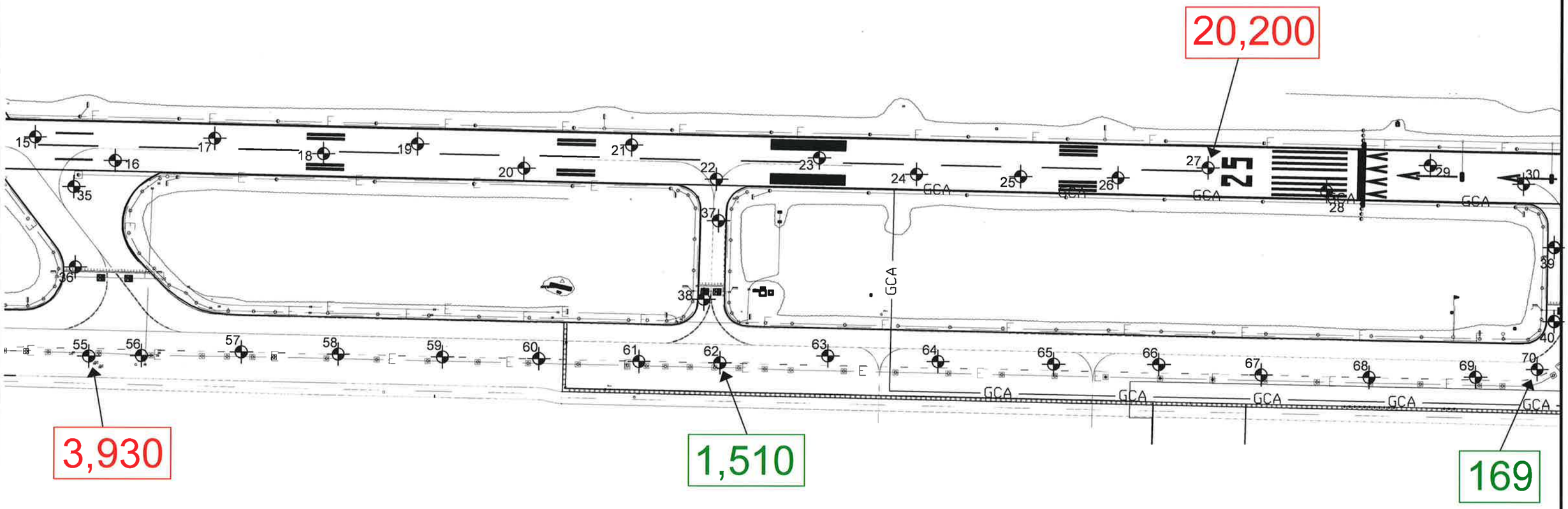
SOLUBLE SULFATE TEST RESULTS MAP
Oxnard Airport Runway 7-25 and Taxiway Connector Improvements
Taxiway F Improvements
Oxnard, California

Exhibit 1

Date
February 2020

Project No.
302524-001, 002

Sheet 1 of 2



LEGEND

70 Boring Location (Approx.)

23,500 Soluble Sulfate Content of Subgrade Soil (ppm)
Red (≥ 3000ppm) Green (< 3000ppm)

BASE MAP PROVIDED BY: MEAD AND HUNT, INC

N

NOT TO SCALE

OXNARDAIRPORT110518maps

Earth Systems Pacific
4378 Old Santa Fe Road, San Luis Obispo, CA 93401
www.earthsystems.com
(805) 544-3276 • Fax (805) 544-1786

SOLUBLE SULFATE TEST RESULTS MAP
Oxnard Airport Runway 7-25 and Taxiway Connector Improvements
Taxiway F Improvements
Oxnard, California

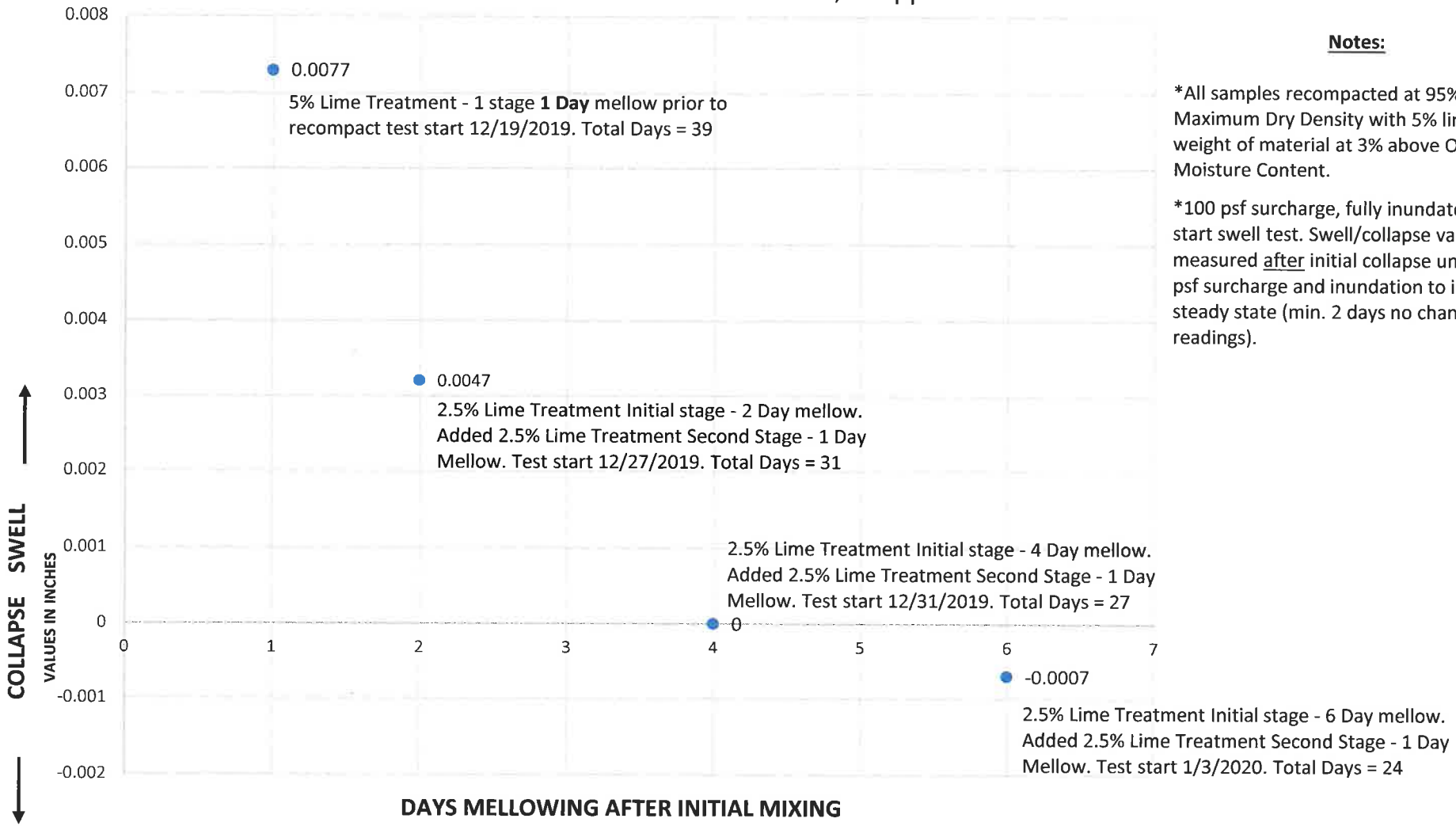
Exhibit 1

Date
February 2020

Project No.
302524-001, 002

Sheet 2 of 2

Oxnard Airport Taxiway F Improvements
Summary of Swell Test Data on Lime Treated Samples as of 1/27/2020
Sample ID: Boring 41 @ 1.5 - 5.0 ft.
Sulfate Content: 23,500 ppm



Notes:

*All samples recompacted at 95% of Maximum Dry Density with 5% lime by dry weight of material at 3% above Optimum Moisture Content.

*100 psf surcharge, fully inundated to start swell test. Swell/collapse values measured after initial collapse under 100 psf surcharge and inundation to initial steady state (min. 2 days no change in readings).

Earth Systems Pacific

4378 Old Santa Fe Road
San Luis Obispo, CA 93401-8116
(805) 544-3276 ◦ FAX (805) 544-1786
E-mail: esp@earthsystems.com

February 21, 2020

File No.: 302524-002 and 001

Exhibit 1

APPENDIX D

Chain of Custody/Lab Test Request for Samples Sent to HDR, Inc. on 1/16/2020

Laboratory Test Results for Samples Sent to HDR, Inc. on 1/16/2020

Exhibit 1

HDR

www.hdrinc.com

CHAIN OF CUSTODY & REQUEST FOR LABORATORY TESTING

DATE SENT: 1/16/20

TESTING REQUESTED BY:

Name Fred J. Potthast, GE

Phone: 805-544-3276 x-3

Company Name Earth Systems Pacific

Fax: 805-544-1786

Address 4378 Old Santa Fe Road

Email: fred@earthsystems.com

City San Luis Obispo State CA Zip 93401

SEND RESULTS TO: Same as above

Name Fred J. Potthast, GE

Address Earth Systems Pacific

City San Luis Obispo State CA Zip 93401

Email: fred@earthsystems.com

SEND INVOICE TO: ☑ Same as above

Name

Address

City State Zip

Email:

PROJECT INFORMATION:

P.O. NO: 302524-002 *JOB NAME:* Oxnard Airport - Runway and Taxiway Improvements *JOB NO:* 302524-002

Site Address 2889 West 5th Street

Site City Oxnard Site State CA

TESTS DESIRED:

General Building Materials Corrosivity Testing (resistivity+pH, soluble salts analysis e.g. chlorides, sulfates, ammonium, nitrate)

CalTrans Corrosivity Testing (resistivity+pH per CTM 643, soluble salts analysis with chloride & sulfate per CTM 422 & 417)

Other (Please be specific) Soluable sulfates only - per my phone call 1/16/20 at 0830 with James Keegan

RESULTS DESIRED:

☐ SOIL CORROSIVITY REPORT (with test results)*

☑ TEST RESULTS ONLY (no report)

☐ Expedite turn-around **(additional cost per sample)**. Expedited date required?

- **ARE THESE SAMPLES FROM A QUARANTINE AREA?** YES ☐ NO ☑

Boring ID	Depth	Type of Soil	Boring ID	Depth	Type of Soil
41	1- 5	DkBrn Clayey Sand (SC)	This sample has been	lime treated	at 5% by dry
			weight in 2 stages - 2.5%	mellow for	6 days, then
			another 2.5 %. Total	mellowing	time as of 1/16/20
			is 13 days		

CHAIN OF CUSTODY

Signature	Print Name	Company	Date	Time
Collected/Relinquished By	R. Wagner/S. Hemmer	Earth Systems Pacific	Nov. '18 / Oct '19	PM
Received By:	Terry Reyes	Earth Systems Pacific	Nov. '18 / Oct '19	PM
Relinquished By:	Terry Reyes	Earth Systems Pacific	1/16/20	AM
Received By:				
Relinquished By:				
Received By Laboratory:				

*IF SOIL CORROSIVITY REPORT IS REQUESTED PLEASE FILL OUT PAGE 2

Exhibit 1

TRANSMITTAL LETTER

DATE: January 27, 2020

ATTENTION: **Fred J. Potthast**

TO: Earth Systems Pacific
4378 Old Santa Fe Road
San Luis Obispo, CA 93401

SUBJECT: Laboratory Test Data
Oxnard Airport - Runway and Taxiway
Your #302524-002, HDR Lab #20-0032LAB

COMMENTS: Enclosed are the results for the subject project.

James T. Keegan, MD
Corrosion and Lab Services Section Manager

431 West Baseline Road · Claremont, CA 91711
Phone: 909.962.5485 · Fax: 909.626.3316

Exhibit 1

Table 1 - Laboratory Tests on Soil Samples

Earth Systems Pacific
Oxnard Airport - Runway and Taxiway Improvements
Your #302524-002, HDR Lab #20-0032LAB
27-Jan-20

Sample ID			41 @ 1-5 DkBrn Clayey Sand (SC)
Resistivity		**Units**	
as-received		ohm-cm	na
saturated		ohm-cm	na
pH			12.5
Electrical Conductivity		mS/cm	8.30
Chemical Analyses			
Cations			
calcium	Ca^{2+}	mg/kg	4,620
magnesium	Mg^{2+}	mg/kg	23
sodium	Na^{1+}	mg/kg	91
potassium	K^{1+}	mg/kg	38
Anions			
hydroxide	OH^{1-}	mg/kg	3,350
carbonate	CO_3^{2-}	mg/kg	282
bicarbonate	HCO_3^{1-}	mg/kg	ND
fluoride	F^{1-}	mg/kg	95
chloride	Cl^{1-}	mg/kg	29
sulfate	SO_4^{2-}	mg/kg	677
phosphate	PO_4^{3-}	mg/kg	ND
Other Tests			
ammonium	NH_4^{1+}	mg/kg	28
nitrate	NO_3^{1-}	mg/kg	103
sulfide	S^{2-}	qual	na
Redox		mV	na

Resistivity per ASTM G187, Cations per ASTM D6919, Anions per ASTM D4327, and Alkalinity per APHA 2320-B.
Electrical conductivity in millisiemens/cm and chemical analyses were made on a 1:5 soil-to-water extract.
mg/kg = milligrams per kilogram (parts per million) of dry soil.
Redox = oxidation-reduction potential in millivolts
ND = not detected
na = not analyzed

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Phone: 909.962.5485 · Fax: 909.626.3316

Exhibit 1

CONSTRUCTION PLANS FOR IMPROVEMENTS TO

COUNTY OF VENTURA DEPARTMENT OF AIRPORTS - OXNARD AIRPORT

OXNARD, CALIFORNIA

JVIATION PROJECT NO. 2023.OXR.01

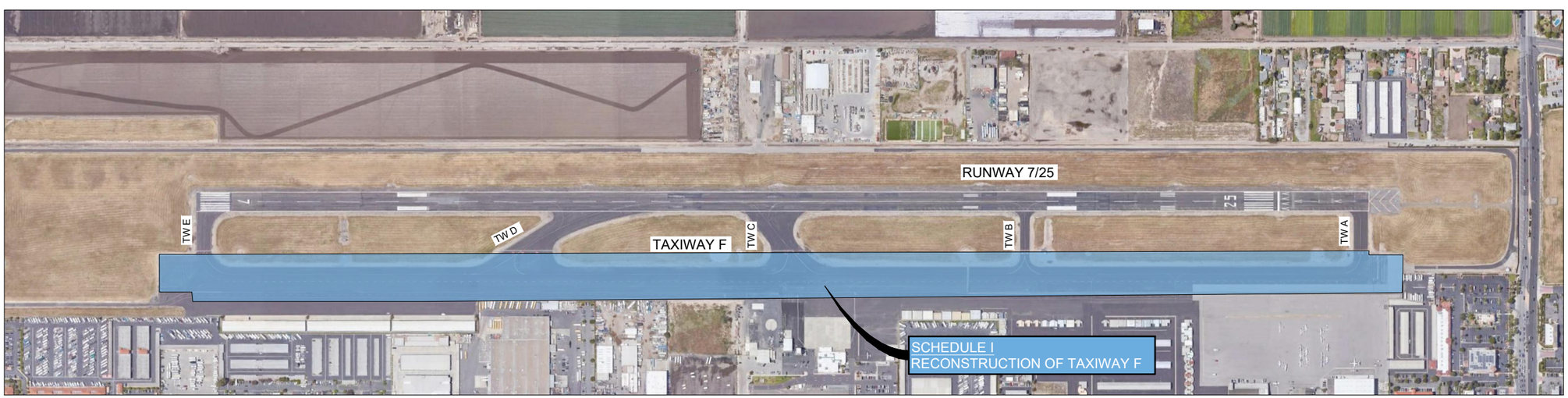
SPECIFICATION NO. DOA 23-03

COUNTY OF VENTURA PROJECT NO. OXR-150

AIP PROJECT NO. 3-06-0179-043-2023

• SCHEDULE I •
RECONSTRUCTION OF TAXIWAY F

GRAPHIC SCALE
300 0 300 600
(IN FEET)



JVIATION®
A WOOLPERT COMPANY

1300 Eastman Ave.
Suite 214
Ventura, CA 93003

Phone: 303.524.3030

jviation.com

SPONSORED BY
- COUNTY OF VENTURA CALIFORNIA
- FEDERAL AVIATION ADMINISTRATION
- CALIFORNIA DEPARTMENT OF TRANSPORTATION AVIATION DIVISION

PREPARED FOR:
COUNTY OF VENTURA DEPARTMENT OF AIRPORTS - OXNARD AIRPORT
2889 W 5TH ST
OXNARD, CA 93030

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF TAXIWAY F

COVER SHEET

AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME G001

SHEET NO. 1 of 89

DRAWING NO. 1586-DOA

Plotted May 25, 2023 @ 9:35 AM by: Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\000-OXR-043-G001-COVR.dwg

SUMMARY OF APPROXIMATE QUANTITIES

ITEM NO.	ITEM DESCRIPTION	UNITS	SCHEDULE I ESTIMATE	SCHEDULE I AS BUILT
C-100a	Contractor Quality Control Program (CQCP)	LS	1	
C-105a	Mobilization (10% Maximum)	LS	1	
SP-100a	Airfield Safety and Traffic Control	LS	1	
SP-100b	Construction Staking and Survey Layout	LS	1	
SP-100c	Airport Access and Haul Route Repair	SY	4,500	
SP-100d	In-Place Drying Techniques	SY	6,400	
SP-100e	Subgrade Stabilization, Excavation Below Subgrade	CY	1,300	
SP-100f	Multi-Axial Geogrid	SY	2,000	
SP-100g	Underground Utility Investigation and Potholing	HR	24	
SP-100h	Install Checkpoint Marker	LS	1	
SP-100i	Excess Unclassified Excavation Stockpile Management	LS	1	
SP-102a	Compliance with Pollution, Erosion, and Siltation Control	LS	1	
SP-126a	Demolish Conduit, Cable, and Counterpoise	LF	6,500	
SP-126b	Demolish Concrete Encased Conduit, Cable, and Counterpoise	LF	7,200	
SP-126c	Remove Existing Cable and Counterpoise	LF	400	
SP-126d	Demolish Electrical Pullbox	EA	7	
SP-126e	Demolish FAA Pullbox	EA	5	
SP-126f	Demolish Airfield Sign and Pad	EA	9	
SP-126g	Demolish Elevated Taxiway Edge Light and Can. Salvage Existing Fixture	EA	69	
SP-126h	Demolish In-pavement Taxiway Edge Light and Can. Salvage Existing Fixture	EA	71	
SP-126i	Demolish Abandoned Waterline, if Encountered	LF	400	
SP-126j	Demolish Concrete Valley Gutter	LF	130	
P-101a	Demolish Asphalt Pavement	SY	90,000	
P-101b	Asphalt Crack Repair (under 1.5" width)	LF	2,100	
P-101c	Asphalt Crack Repair (over 1.5" width)	SF	200	
P-101d	Cold Mill, Variable Depth (2 inches maximum)	SY	3,500	
P-101e	Removal of Existing Underdrain Pipe, Complete	LF	1,120	
P-101f	Removal of Underdrain Cleanout, Complete	EA	12	
P-101g	Removal of Underdrain Inspection Pit, Complete	EA	3	
P-152a	Unclassified Excavation and Haul-Off	CY	15,030	
P-152b	Embankment in Place	CY	1,085	
P-152c	Subgrade Preparation	SY	140	
P-152d	Unclassified Excavation and Stockpile Onsite	CY	7,510	
P-155a	Lime Treated Subgrade, 16-Inch Depth	SY	63,500	
P-155b	Lime	TON	1,500	
P-156a	Cement Treated Subgrade, 16-Inch Depth	SY	63,500	
P-156b	Cement	TON	1,250	
P-209a	Crushed Aggregate Base Course	CY	11,100	
P-401a	Asphalt Surface Course (PG 70-10)	TON	15,100	
P-620a	Surface Preparation (Obliteration)	SF	5,450	
P-620b	Marking, 2 Coats with Beads (All Colors)	SF	22,000	
P-620c	Marking, Single Coat with No Beads (All Colors)	SF	58,300	
P-620d	Marking, Single Coat with Beads (All Colors)	SF	12,000	
P-620e	12-Foot Single Designation Surface Painted Holding Position Signs	EA	4	
P-620f	9-Foot Double Designation Surface Painted Holding Position Signs	EA	3	
P-620g	12-Foot Double Designation Surface Painted Holding Position Signs	EA	4	
P-621a	Grooving	SY	270	
D-701a	18-inch RCP, Class IV, Complete	LF	570	
D-705a	Underdrain Pipe, 6-Inch	LF	9,300	
D-705b	Underdrain Pipe Cleanout	EA	38	
D-751a	Storm Manhole	EA	14	
D-751b	Storm Inlet	EA	2	
D-751c	Connect to Existing Manhole/Inlet/Cleanout/Underdrain	EA	10	
D-751d	Adjust Existing Inlet to Grade	EA	1	
D-754a	Construct Concrete Valley Gutter and Apron	LF	130	
T-901a	Seeding	AC	12	
T-905a	Topsoil (Imported)	CY	4,650	
L-108a	Install #8 AWG, L-824C, 5000V, Wire	LF	20,500	
L-108b	Install #6 AWG, Bare Copper Counterpoise Including Ground Rods and Terminations	LF	14,250	
L-110a	Install 1-2" SCH. 40 PVC Conduit, Direct Earth Buried (DEB)	LF	7,400	
L-110b	Install 1-2" SCH. 40 PVC Conduit, Concrete Encased (CE)	LF	6,600	
L-110c	Install 5-2" SCH. 40 PVC Conduit, Concrete Encased (CE)	LF	100	
L-110d	Concrete Encase Existing FAA Line Under Proposed Pavement	LF	400	
L-115a	Install Electrical Pullbox, 4'x4', Aircraft Rated	EA	4	
L-115b	Install L-867B Junction Box, Complete	EA	2	
L-125a	Install LED L-861T Taxiway Edge Light, Complete	EA	70	
L-125b	Install In-Pavement LED L-852T Taxiway Edge Light, Complete	EA	66	
L-125c	Install LED L-858 Guidance Sign, Size 1, 2 Module, Complete	EA	1	
L-125d	Reinstall LED L-858 Guidance Sign, Size 1, 3 Module on New Foundation, Complete	EA	8	
CVSS DOA 9-4	Execution of Release on Contract	LS	1	

SHEET LIST DESCRIPTION

SHEET NO.	SHEET NAME	DRAWING NUMBER	SHEET DESCRIPTION
1	G001	1586-DOA	COVER SHEET
2	G002	1587-DOA	INDEX OF DRAWINGS & SUMMARY
3	G003A	1588-DOA	GENERAL NOTES
4	G003B	1589-DOA	GENERAL NOTES
5	G004	1590-DOA	MASTER LEGEND & ABBREVIATION
6	G005	1591-DOA	SURVEY CONTROL PLAN
7	G006	1592-DOA	GEOTECHNICAL INVESTIGATION PLAN
8	G007	1593-DOA	SOIL BORING LOGS
9	G008	1594-DOA	SOIL BORING LOGS
10	G009	1595-DOA	SOIL BORING LOGS
11	G010	1596-DOA	SOIL BORING LOGS
12	G011	1597-DOA	SOIL BORING LOGS
13	G050	1598-DOA	CONSTRUCTION SAFETY NOTES & DETAILS
14	G051	1599-DOA	CONSTRUCTION SAFETY OVERALL PHASING PLAN
15	G052	1600-DOA	CONSTRUCTION SAFETY AND PHASING PLAN SCHEDULE I PRECONSTRUCTION MOBILIZATION
16	G053	1601-DOA	CONSTRUCTION SAFETY AND PHASING PLAN SCHEDULE I, PHASE 1
17	G054	1602-DOA	CONSTRUCTION SAFETY AND PHASING PLAN SCHEDULE I, PHASE 2
18	G055	1603-DOA	CONSTRUCTION SAFETY AND PHASING PLAN SCHEDULE I, PHASE 3
19	G100	1604-DOA	ENVIRONMENTAL REQUIREMENTS
20	C100	1605-DOA	DEMOLITION PLAN STA. 98+00 TO STA. 111+00 RUNWAY 7/25
21	C101	1606-DOA	DEMOLITION PLAN STA. 111+00 TO STA. 124+00 RUNWAY 7/25
22	C102	1607-DOA	DEMOLITION PLAN STA. 124+00 TO STA. 137+00 RUNWAY 7/25
23	C103	1608-DOA	DEMOLITION PLAN STA. 137+00 TO STA. 150+00 RUNWAY 7/25
24	C104	1609-DOA	DEMOLITION PLAN STA. 150+00 TO STA. 163+00 RUNWAY 7/25
25	C150	1610-DOA	DEMOLITION DETAILS
26	C200	1611-DOA	GEOMETRIC LAYOUT PLAN STA. 98+00 TO STA. 111+00 RUNWAY 7/25
27	C201	1612-DOA	GEOMETRIC LAYOUT PLAN STA. 111+00 TO STA. 124+00 RUNWAY 7/25
28	C202	1613-DOA	GEOMETRIC LAYOUT PLAN STA. 124+00 TO STA. 137+00 RUNWAY 7/25
29	C203	1614-DOA	GEOMETRIC LAYOUT PLAN STA. 137+00 TO STA. 150+00 RUNWAY 7/25
30	C204	1615-DOA	GEOMETRIC LAYOUT PLAN STA. 150+00 TO STA. 163+00 RUNWAY 7/25
31	C220	1616-DOA	TYPICAL SECTIONS
32	C221	1617-DOA	TYPICAL SECTIONS
33	C222	1618-DOA	TYPICAL SECTIONS
34	C223	1619-DOA	TYPICAL SECTIONS
35	C300	1620-DOA	OVERALL GRADING PLAN
36	C301	1621-DOA	GRADING PLAN STA. 98+00 TO STA. 111+00 RUNWAY 7/25
37	C302	1622-DOA	GRADING PLAN STA. 111+00 TO STA. 124+00 RUNWAY 7/25
38	C303	1623-DOA	GRADING PLAN STA. 124+00 TO STA. 137+00 RUNWAY 7/25
39	C304	1624-DOA	GRADING PLAN STA. 137+00 TO STA. 150+00 RUNWAY 7/25
40	G305	1625-DOA	GRADING PLAN STA. 150+00 TO STA. 163+00 RUNWAY 7/25
41	C400	1626-DOA	SPOT ELEVATION PLAN STA. 98+00 TO STA. 111+00 RUNWAY 7/25
42	C401	1627-DOA	SPOT ELEVATION PLAN STA. 111+00 TO STA. 124+00 RUNWAY 7/25
43	C402	1628-DOA	SPOT ELEVATION PLAN STA. 124+00 TO STA. 137+00 RUNWAY 7/25
44	C403	1629-DOA	SPOT ELEVATION PLAN STA. 137+00 TO STA. 150+00 RUNWAY 7/25
45	C404	1630-DOA	SPOT ELEVATION PLAN STA. 150+00 TO STA. 163+00 RUNWAY 7/25
46	C405	1631-DOA	PCC VALLEY GUTTER
47	C500	1632-DOA	PAVEMENT PLAN AND PROFILE STA. 98+00 TO STA. 111+00 TAXIWAY F
48	C501	1633-DOA	PAVEMENT PLAN AND PROFILE STA. 111+00 TO STA. 124+00 TAXIWAY F
49	C502	1634-DOA	PAVEMENT PLAN AND PROFILE STA. 124+00 TO STA. 137+00 TAXIWAY F
50	C503	1635-DOA	PAVEMENT PLAN AND PROFILE STA. 137+00 TO STA. 150+00 TAXIWAY F
51	C504	1636-DOA	PAVEMENT PLAN AND PROFILE STA. 150+00 TO STA. 163+00 TAXIWAY F
52	C600	1637-DOA	UNDERDRAIN AND STORM SEWER LAYOUT PLAN STA. 98+00 TO STA. 111+00 RUNWAY 7/25
53	C601	1638-DOA	UNDERDRAIN AND STORM SEWER LAYOUT PLAN STA. 111+00 TO STA. 124+00 RUNWAY 7/25
54	C602	1639-DOA	UNDERDRAIN AND STORM SEWER LAYOUT PLAN STA. 124+00 TO STA. 137+00 RUNWAY 7/25
55	C603	1640-DOA	UNDERDRAIN AND STORM SEWER LAYOUT PLAN STA. 137+00 TO STA. 150+00 RUNWAY 7/25
56	C604	1641-DOA	UNDERDRAIN AND STORM SEWER LAYOUT PLAN STA. 150+00 TO STA. 163+00 RUNWAY 7/25
57	C650	1642-DOA	UNDERDRAIN AND STORM SEWER DETAILS
58	C651	1643-DOA	UNDERDRAIN AND STORM SEWER DETAILS
59	C652	1644-DOA	UNDERDRAIN AND STORM SEWER DETAILS
60	C700	1645-DOA	PAVEMENT GROOVING PLAN
61	C750	1646-DOA	PAVEMENT GROOVING DETAILS
62	C800	1647-DOA	PAVEMENT MARKING PLAN STA. 98+00 TO STA. 111+00 RUNWAY 7/25
63	C801	1648-DOA	PAVEMENT MARKING PLAN STA. 111+00 TO STA. 124+00 RUNWAY 7/25
64	C802	1649-DOA	PAVEMENT MARKING PLAN STA. 124+00 TO STA. 137+00 RUNWAY 7/25
65	C803	1650-DOA	PAVEMENT MARKING PLAN STA. 137+00 TO STA. 150+00 RUNWAY 7/25
66	C804	1651-DOA	PAVEMENT MARKING PLAN STA. 150+00 TO STA. 163+00 RUNWAY 7/25
67	C850	1652-DOA	PAVEMENT MARKING DETAILS
68	C851	1653-DOA	PAVEMENT MARKING DETAILS
69	C900	1654-DOA	SEEDING AND EROSION PLAN STA. 98+00 TO STA. 111+00 RUNWAY 7/25
70	C901	1655-DOA	SEEDING AND EROSION CONTROL PLAN STA. 111+00 TO STA. 124+00 RUNWAY 7/25
71	C902	1656-DOA	SEEDING AND EROSION CONTROL PLAN STA. 124+00 TO STA. 137+00 RUNWAY 7/25
72	C903	1657-DOA	SEEDING AND EROSION CONTROL PLAN STA. 137+00 TO STA. 150+00 RUNWAY 7/25
73	C904	1658-DOA	SEEDING AND EROSION CONTROL PLAN STA. 150+00 TO STA. 163+00 RUNWAY 7/25
74	C950	1659-DOA	EROSION CONTROL DETAIL

SHEET LIST DESCRIPTION

SHEET NO.	SHEET NAME	DRAWING NUMBER	SHEET DESCRIPTION
75	E001	1660-DOA	ELECTRICAL LEGEND AND GENERAL NOTES
76	E100	1661-DOA	ELECTRICAL DEMOLITION PLAN STA. 98+00 TO STA. 111+00 RUNWAY 7/25
77	E101	1662-DOA	ELECTRICAL DEMOLITION PLAN STA. 111+00 TO STA. 124+00 RUNWAY 7/25
78	E102	1663-DOA	ELECTRICAL DEMOLITION PLAN STA. 124+00 TO STA. 137+00 RUNWAY 7/25
79	E103	1664-DOA	ELECTRICAL DEMOLITION PLAN STA. 137+00 TO STA. 150+00 RUNWAY 7/25
80	E104	1665-DOA	ELECTRICAL DEMOLITION PLAN STA. 150+00 TO STA. 163+00 RUNWAY 7/25
81	E200	1666-DOA	ELECTRICAL LAYOUT PLAN STA. 98+00 TO STA. 111+00 RUNWAY 7/25
82	E201	1667-DOA	ELECTRICAL LAYOUT PLAN STA. 111+00 TO STA. 124+00 RUNWAY 7/25
83	E202	1668-DOA	ELECTRICAL LAYOUT PLAN STA. 124+00 TO STA. 137+00 RUNWAY 7/25
84	E203	1669-DOA	ELECTRICAL LAYOUT PLAN STA. 137+00 TO STA. 150+00 RUNWAY 7/25
85	E204	1670-DOA	ELECTRICAL LAYOUT PLAN STA. 150+00 TO STA. 163+00 RUNWAY 7/25
86	E250	1671-DOA	ELECTRICAL DETAILS
87	E251	1672-DOA	ELECTRICAL DETAILS
88	E252	1673-DOA	ELECTRICAL DETAILS
89	E253	1674-DOA	ELECTRICAL DETAILS

APPROXIMATE EARTHWORK VOLUME SUMMARY

AREA DESCRIPTION	CUT (CY)	FILL (CY)
SCHEDULE I		
TAXIWAY F RECONSTRUCTION	15,840	1,085
OVEREXCAVATION FOR TOPSOIL PLACEMENT (4-INCH DEPTH)	6,700	0
SCHEDULE I SUBTOTAL	22,540	1,085
PROJECT TOTAL	***22,540***	***1,085***

EARTHWORK NOTES:

1. EARTHWORK VOLUMES ARE RAW AND UNADJUSTED. EARTHWORK QUANTITIES MAY VARY ±10% DEPENDING ON THE SOIL CONDITIONS ENCOUNTERED AND/OR THE ACTUAL SWELL/SHRINK FACTORS.
2. QUANTITIES PROVIDED ARE ESTIMATES BASED ON THE AVAILABLE INFORMATION AT THE TIME; CONTRACTOR TO DETERMINE QUANTITIES VIA SURVEY.
3. THE CONTRACTOR WILL BE REQUIRED TO STOCKPILE THE PFAS CONTAMINATED UNCLASSIFIED EXCAVATION ONSITE WITHIN THE AIRPORT BOUNDARY AT THE LOCATION SHOWN ON SHEET G051 PER SP-100-1.30 AND P-152D. THE CONTRACTOR WILL BE PERMITTED TO HAUL THE CLEARED, UNCONTAMINATED UNCLASSIFIED EXCAVATION MATERIAL OFFSITE PER P-152A.

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF
TAXIWAY F

INDEX OF DRAWINGS & SUMMARY

AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME
G002

SHEET NO.
2 of 89

DRAWING NO.
1587-DOA

Plotted May 25, 2023 @ 9:35 AM by Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\000-OXR-043-G002-INDX.dwg

GENERAL NOTES

1. IF DURING THE CONSTRUCTION PROCESS, CONDITIONS ARE ENCOUNTERED WHICH COULD INDICATE A SITUATION THAT IS NOT IDENTIFIED IN THE PLANS OR SPECIFICATIONS, OR REPRESENT A SIGNIFICANT DIFFERENCE BETWEEN THE CONTRACT DOCUMENTS AND FIELD CONDITIONS, THE CONTRACTOR SHALL CONTACT THE ENGINEER IMMEDIATELY.

2. ALL REFERENCES TO ANY PUBLISHED STANDARDS SHALL REFER TO THE LATEST REVISION OF SAID STANDARD, UNLESS SPECIFICALLY STATED OTHERWISE.

3. PROJECT PAY ITEMS PROVIDED ARE TO BE INCLUSIVE OF ALL WORK TO BE PERFORMED AS SHOWN. ALL WORK NOT IDENTIFIED WITH A SPECIFIC PAY ITEM SHALL BE CONSIDERED REQUIRED WORK TO COMPLETE THE PROJECT AND IS TO BE INCIDENTAL TO THE COST OF PROJECT PAY ITEMS PROVIDED.

4. WHENEVER, IN THE CONTRACT DOCUMENTS, THE WORDS "PROVIDE", "FURNISH", "INSTALL", "FURNISH AND INSTALL", OR SIMILAR WORDS ARE USED, IT SHALL BE UNDERSTOOD THAT THE INTENT OF THE CONTRACT DOCUMENTS IS TO PROVIDE FOR THE CONSTRUCTION AND COMPLETION IN EVERY DETAIL THE WORK DESCRIBED. IT IS FURTHER INTENDED THAT THE CONTRACTOR SHALL FURNISH ALL LABOR, SUPERVISION, MATERIALS, EQUIPMENT, TOOLS, TRANSPORTATION, SUPPLIES, TESTING, AND INCIDENTALS REQUIRED TO COMPLETE THE WORK IN ACCORDANCE WITH THE DRAWINGS (PLANS), SPECIFICATIONS, AND TERMS OF THE CONTRACT.

5. CONTRACTOR SHALL KEEP A SET OF AS-BUILT DRAWINGS ON-SITE AND MAKE AVAILABLE TO THE ENGINEER AT ALL TIMES. AS-BUILT SET SHALL BE SUBMITTED TO THE ENGINEER AT THE COMPLETION OF THE JOB. CONTRACTOR SHALL BE RESPONSIBLE FOR RECORDING ALL AS-BUILT INFORMATION DURING THE PROJECT. THE CONTRACTOR SHALL NOTE, AND BRING TO THE ENGINEER'S ATTENTION, ANY DISCREPANCIES BETWEEN THE CONTRACT DOCUMENTS AND ACTUAL FIELD CONDITIONS.

6. ALL DAMAGE TO UTILITIES, PAVEMENT OUTSIDE OF THE HAUL ROUTE MARKED AND APPROVED FOR REPAIR, EQUIPMENT, OR STRUCTURES FROM CONSTRUCTION ACTIVITIES SHALL BE IMMEDIATELY REPORTED TO THE RESIDENT ENGINEER. THE RESIDENT ENGINEER SHALL DETERMINE WHETHER REPAIR OR REPLACEMENT IS NECESSARY. ALL REPAIR METHODS SHALL BE SUBMITTED TO THE RESIDENT ENGINEER FOR REVIEW AND APPROVAL PRIOR TO INITIATING THE WORK. REPAIRS SHALL BE MADE AT NO ADDITIONAL COST TO THE SPONSOR AND TO THE APPROVAL OF THE ENGINEER.

7. THE CONTRACTOR SHALL PROVIDE WORKMANSHIP AND MATERIALS THAT ARE OF GOOD QUALITY AND COMPLY WITH THE REQUIREMENTS OF THE CONTRACT DOCUMENTS.

8. CONTRACTOR SHALL PROVIDE WORK, EQUIPMENT AND MATERIALS THAT COMPLY WITH FAA REQUIREMENTS, NATIONAL ELECTRICAL CODE, NATIONAL ELECTRICAL SAFETY CODE, AND ALL LOCAL CODES.

9. CONTRACTOR SHALL PROVIDE THE NECESSARY NUMBER OF RADIOS FOR HIS/HER WORKFORCE.

10. SWEEPER(S) SHALL BE AVAILABLE AT ALL TIMES TO CLEAN FOREIGN OBJECT DEBRIS (FOD) FROM HAUL ROUTE OR OTHER AREAS ADJACENT TO CONSTRUCTION ACTIVITY. CONTRACTOR SHALL CONSTANTLY MONITOR AIRCRAFT MOVEMENT AREAS FOR FOD AND IMMEDIATELY REMOVE ALL DEBRIS.

11. PRIOR TO OPENING OR CLOSING A RUNWAY OR TAXIWAY, THE CONTRACTOR MUST, THROUGH THE AIRPORT, GIVE NOTICE USING THE NOTICE TO AIRMAN (NOTAM) SYSTEM OF PROPOSED LOCATION, TIME AND DATE OF COMMENCEMENT OF CONSTRUCTION AND THE DURATION OF THE CLOSURE.

12. THIS PROJECT WILL GENERATE QUANTITIES OF ASPHALT MILLINGS. THE CONTRACTOR SHALL HAUL ALL GENERATED MILLINGS OFF-SITE IN ACCORDANCE WITH ITEM P-101. THE HAUL-OFF OF MILLINGS SHALL BE CONSIDERED INCIDENTAL TO ITEM P-101.

13. DESIGNS CONTAINED HEREIN ARE BASED ON SPECIFIED EQUIPMENT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY REDESIGN FOR EQUIPMENT SUBSTITUTIONS TO THE APPROVED SPECIFICATIONS AT NO ADDITIONAL COST TO THE SPONSOR. THE CONTRACTOR SHALL PROVIDE MATERIAL SUBMITTALS,SAMPLES AND DESIGN DRAWINGS FOR THE ENGINEER'S APPROVAL A MINIMUM OF SEVEN (7) DAYS PRIOR TO ORDERING.

14. THE AIRPORT RESERVES THE RIGHT TO LOAD, HAUL, AND STOCKPILE, WITH THEIR OWN EQUIPMENT, ANY AND/OR ALL ASPHALT MILLINGS GENERATED FROM DEMOLITION OPERATIONS.

15. ALL MATERIALS, WORKMANSHIP, AND CONSTRUCTION OF PUBLIC IMPROVEMENTS SHALL MEET OR EXCEED THE STANDARDS AND SPECIFICATIONS SET FORTH IN THE CALIFORNIA PUBLIC WORKS REGULATIONS, AND APPLICABLE STATE AND FEDERAL REGULATIONS. WHERE THERE IS CONFLICT BETWEEN THESE PLANS AND THE SPECIFICATIONS, OR ANY APPLICABLE STANDARDS, THE HIGHER QUALITY STANDARD SHALL APPLY. ALL WORK SHALL BE INSPECTED AND APPROVED BY THE RESIDENT ENGINEER.

16. DIMENSIONING FOR LAYOUTS AND CONSTRUCTION ARE NOT TO BE SCALED FROM ANY DRAWINGS. IF PERTINENT DIMENSIONS ARE NOT SHOWN, CONTACT THE ENGINEER FOR CLARIFICATION AND RECORD DIMENSIONS ON AS-BUILT DRAWINGS.

17. TOPSOIL SHALL BE REMOVED AND STOCKPILED PRIOR TO GRADING OPERATIONS. RE-HANDLING OF TOPSOIL SHALL NOT BE MEASURED FOR PAYMENT.

18. ALL WASTE GENERATED FROM CLEARING AND GRUBBING SHALL BE REMOVED OFF SITE AND ALL ASSOCIATED COST SHALL BE INCIDENTAL TO CONSTRUCTION AND WILL NOT BE PAID SEPARATELY.

19. CONTRACTOR SHALL HAVE A COPY OF THE CURRENT FAA ADVISORY CIRCULAR AC 150/5340-1 (CURRENT VERSION) "STANDARDS FOR AIRPORT MARKINGS" ON SITE AT ALL TIMES. ANY DISCREPANCY BETWEEN INFORMATION SHOWN ON THE PLAN SHEETS AND THE ADVISORY CIRCULAR SHALL BE COORDINATED WITH THE ENGINEER FOR DIRECTION.

20. CONTRACTOR IS RESPONSIBLE FOR HOOKING UP POWER TO THE QA TESTING TRAILER AND ENGINEER FIELD TRAILER. THIS WORK IS CONSIDERED INCIDENTAL TO THE PROJECT.

QUALITY CONTROL/QUALITY ASSURANCE

1. FOURTEEN (14) DAYS PRIOR TO THE BEGINNING OF WORK, THE CONTRACTOR SHALL SUBMIT A QUALITY CONTROL PLAN WHICH INCLUDES A WORK SCHEDULE AND PROPOSED CONSTRUCTION METHODS CONSISTENT WITH THE PHASING PLAN STATED IN THE DESIGN.

2. THE CONTRACTOR SHALL HAVE A MINIMUM OF ONE (1) CURRENT COPY OF THE APPROVED PLANS (INCLUDING ANY CHANGE ORDERS, SUPPLEMENTAL AGREEMENTS, FIELD DIRECTIVES, ETC.), ONE (1) CURRENT COPY OF THE APPROPRIATE STANDARDS AND SPECIFICATIONS, AND A COPY OF ANY PERMITS AND EXTENSION AGREEMENTS NEEDED FOR THE JOB, ON SITE AT ALL TIMES.

PERMITTING

1. PRELIMINARY PERMITTING INFORMATION WILL BE SUBMITTED BY THE ENGINEER PRIOR TO AWARD OF CONTRACT. SPECIFIC ITEMS THAT WILL NEED TO BE COMPLETED BY THE CONTRACTOR INCLUDE BUT ARE NOT LIMITED TO SUPPLYING NECESSARY BONDING, PAYMENT OF ALL FEES, REVIEW OF ALL CALCULATIONS AND ASSUMPTIONS MADE BY THE ENGINEER PRIOR TO AWARD. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS INCLUDING, BUT NOT LIMITED TO, AN FAA 7460-1 NOTICE OF PROPOSED CONSTRUCTION OR ALTERATION, A NPDES STORMWATER PERMIT, SWPPP, AND A FUGITIVE DUST PERMIT. THE CONTRACTOR SHALL BE RESPONSIBLE TO PAY FOR THE COST TO OBTAIN ALL PERMITS.

2. THE CONTRACTOR SHALL SUBMIT A COPY OF ALL PERMITS REQUIRED FOR THE PROJECT TO THE ENGINEER, FOR HIS/HER REVIEW.

SITE ACCESS AND STAGING

1. THE CONTRACTOR IS REQUIRED TO OBTAIN A WATER METER FROM THE CITY OF OXNARD WATER SERVICE DIVISION FOR ACCESS TO CONSTRUCTION WATER FROM AN ON AIRPORT LOCATION. THE CONTACT PHONE NUMBER IS 805-385-7816. A WATER SOURCE ON AIRPORT PROPERTY AND THE PRICE OF WATER WILL BE COORDINATED AT THE TIME OF BIDDING.

2. DURING CONSTRUCTION, THE CONTRACTOR SHALL MINIMIZE DISTURBANCES TO ALL CONSTRUCTION AREAS AND ACCESS ROUTES. THIS INCLUDES EQUIPMENT AND VEHICULAR RUTS CREATED IN ANY PAVEMENTS, ANY HAUL/ACCESS ROADS, OR ANY INFIELD/SAFETY AREAS. HAUL ROAD REPAIR TO THE SATISFACTION OF THE ENGINEER WILL BE PAID FOR UNDER ITEM SP-100 WITH PRIOR AUTHORIZATION BY THE ENGINEER FOR SPECIFIC AREAS IDENTIFIED.

3. SITE ACCESS AND HAUL ROUTES HAVE BEEN MARKED ON THE PHASING PLANS. TO UTILIZE ANY ADDITIONAL SITE ACCESS AND HAUL ROUTES, THE CONTRACTOR SHALL OBTAIN APPROVAL FROM THE ENGINEER. WHEN POSSIBLE, ACCESS/HAUL ROUTES SHALL UTILIZE EXISTING ROADS. THE CONTRACTOR SHALL MAINTAIN AIRPORT SECURITY AT ALL TIMES.

4. CONTRACTOR SHALL EXAMINE THE EXISTING PAVEMENTS THAT WILL BE USED FOR HAULING OF MATERIAL AND EQUIPMENT, AND DETERMINE THE PAVEMENTS ABILITY TO WITHSTAND CONTRACTOR OPERATIONS WITHOUT CAUSING DAMAGE TO THE PAVEMENT. ANY DAMAGE CAUSED BY THE CONTRACTOR SHALL BE REPAIRED BY THE CONTRACTOR TO THE APPROVAL OF THE ENGINEER AND PAID FOR PER ITEM SP-100 ONCE PRIOR AUTHORIZATION IS RECEIVED BY THE RESIDENT ENGINEER FOR SPECIFIC AREAS IDENTIFIED.

5. CONTRACTOR SHALL BE REQUIRED TO PROVIDED NON-POTABLE WATER FOR CONSTRUCTION PURPOSES. CONTRACTOR SHALL BE RESPONSIBLE FOR STORAGE OF NON-POTABLE WATER. ANY STRUCTURES ERECTED IN SUPPORT OF WATERING OPERATIONS SHALL MEET FAA FAR PART 77 CLEARANCES FOR ALL AIRCRAFT AND BE APPROPRIATELY LIT AS A HAZARD TO THE FLYING PUBLIC. NON-POTABLE WATER USED FOR P-152 OR DUST CONTROL SHALL BE INCIDENTAL TO THE PROJECT BID ITEMS.

6. DURING ANY NIGHTTIME OPERATIONS ALL AREA LIGHTING SHALL FACE IN DIRECTIONS AS DIRECTED BY THE ENGINEER. AT NO TIME SHALL LIGHT PLANTS BE LEFT RUNNING WHEN CONSTRUCTION OPERATIONS ARE NOT IN PROCESS.

7. ALL AREAS THAT ARE DISTURBED BY CONTRACTOR OPERATIONS OUTSIDE OF THE SEEDING LIMITS, SHALL BE SEEDED PER T-901 SEEDING AND EROSION CONTROL AND COSTS ARE INCIDENTAL TO CONSTRUCTION AND WILL NOT BE PAID SEPARATELY.

8. ALL CONTRACTOR EMPLOYEES SHALL BE REQUIRED TO PARK IN THE CONTRACTORS DESIGNATED STAGING AREA ONLY AND SHALL BE DRIVEN TO THE PROJECT SITE BY DESIGNATED CONSTRUCTION VEHICLES.

9. CRAWLER TRACKED VEHICLES SHALL NOT BE ALLOWED ON PAVED SURFACES. TRACKED VEHICLES MUST BE MOVED ACROSS PAVED SURFACES ON A WHEELED VEHICLE.

10. WHENEVER CONSTRUCTION TRAFFIC IS REQUIRED TO CROSS AN ACTIVE RUNWAY, TAXIWAY, TAXILANE, OR INTERRUPT NORMAL TRAFFIC FLOW ON APRONS OR RAMPS, THE CONTRACTOR SHALL PROVIDE FLAGGERS AT THE CROSSING(S) AS REQUIRED BY THE CONSTRUCTION PHASING DRAWINGS OR AS DIRECTED BY THE ENGINEER OR THE AIRPORT (INCIDENTAL TO ITEM C-105).

UTILITIES

1. PRIOR TO COMMENCING WORK, IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO CONTACT THE APPROPRIATE UTILITY AGENCIES, UTILITY NOTIFICATION CENTERS, AND TO FIELD VERIFY THE LOCATIONS AND DEPTHS, THROUGH UTILITY LOCATES AND POTHOLES, OF ALL EXISTING UTILITIES WITHIN THE PROJECT LIMITS, STAGING, AND HAUL ROUTE AREAS.

2. THE EXISTING UTILITY LOCATIONS SHOWN ON THE PLANS ARE APPROXIMATE AND SHALL NOT BE SCALED FOR EXACT LOCATION. LOCATION OF EXISTING DUCT BANK, CIRCUITING, UTILITIES AND STRUCTURES SHOWN ON THESE DRAWINGS IS BASED ON AVAILABLE INFORMATION AND IS NOT WARRANTED TO BE EXACT, NOR IS IT WARRANTED THAT ALL OF THESE ITEMS ARE SHOWN.

3. CONTRACTOR SHALL CONTACT AND COORDINATE WITH THE APPROPRIATE UTILITY AGENCIES WHEN WORKING ON OR WITHIN THE PROXIMITY OF AN AGENCIES UTILITY. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES THAT CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THESE PLANS.

4. ANY INTERRUPTION OF AN EXISTING SYSTEM OR UTILITY SERVICE SHALL BE COORDINATED AND APPROVED BY THE AIRPORT AND THE AUTHORITY, AGENCY, OR UTILITY HAVING JURISDICTION, PRIOR TO STARTING WORK INCLUDING CONTACTING THE AIRPORT AND FAA.

5. CONTRACTOR IS RESPONSIBLE FOR DAMAGES TO EXISTING UTILITIES. REPAIRS DEEMED NECESSARY BY THE ENGINEER WILL BE COMPLETED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE SPONSOR. SEE SECTION 50 OF THE CONTRACT DOCUMENTS AND THE "CONSTRUCTION STAKING AND LAYOUT" NOTES CONTAINED IN THESE GENERAL NOTES SHEETS FOR ADDITIONAL NOTES REGARDING UTILITY LOCATES.

6. THE CONTRACTOR SHALL COORDINATE AND COOPERATE WITH THE CITY, COUNTY, AND ALL UTILITY COMPANIES INVOLVED, WITH REGARD TO RELOCATIONS OR ADJUSTMENTS OF EXISTING UTILITIES DURING CONSTRUCTION, AND TO ASSURE THAT THE WORK IS ACCOMPLISHED IN A TIMELY FASHION AND WITH A MINIMUM DISRUPTION OF SERVICE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING ALL PARTIES AFFECTED BY ANY DISRUPTION OF ANY SERVICE.

7. WHERE NEW DUCT BANKS OR OTHER UTILITIES ARE NEAR EXISTING UTILITIES, THE CONTRACTOR SHALL HAND EXCAVATE AROUND THE EXISTING UTILITIES IN ORDER T0 PREVENT DAMAGE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR IMMEDIATELY REPAIRING ANY UTILITY DAMAGED DURING CONSTRUCTION.

8. WHEN INSTALLING NEW UTILITIES UNDER EXISTING PAVEMENT THE CONTRACTOR SHALL NEATLY SAW CUT AND REMOVE THE EXISTING PAVEMENT PRIOR TO INSTALLING THE CONDUIT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPLACING ANY PAVEMENT REMOVED OR DAMAGED DURING THE UTILITY INSTALLATION PROCESS. ALL WORK REQUIRED TO REMOVE AND REPAIR PAVEMENT SHALL BE INCLUDED IN THE INSTALL NEW UTILITY BID ITEM.

9. THE CONTRACTOR SHALL SEQUENCE INSTALLATION OF UTILITIES IN SUCH A MANNER AS TO MINIMIZE POTENTIAL UTILITY CONFLICTS. IN GENERAL, STORM SEWER AND SANITARY SEWER SHOULD BE CONSTRUCTED PRIOR TO INSTALLATION OF THE WATER LINES AND DRY UTILITIES.

10. CONTRACTOR SHOULD EXPECT TO ENCOUNTER WATER IN LIGHT CANS, JUNCTION CANS AND STRUCTURES. CONTRACTOR RESPONSIBLE FOR DEWATERING AT NO ADDITIONAL COST TO THE OWNER.

11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ALL UNDERGROUND UTILITIES PRIOR TO BEGINNING CONSTRUCTION. THE CONTRACTOR MAY UTILIZE THE FOLLOWING TOLL FREE TELEPHONE NUMBER PROVIDED BY UNDERGROUND SERVICE ALERT OF SOUTHERN CALIFORNIA: 811.

SUBMITTALS

1. THE CONTRACTOR SHALL SUBMIT A DETAILED LISTING OF ALL SUBMITTALS (E.G., MIX DESIGNS, MATERIAL CERTIFICATION, AND PRODUCT INFORMATION) AND SHOP DRAWINGS REQUIRED BY THE TECHNICAL SPECIFICATIONS.

2. THE CONTRACTOR SHALL REVIEW THE CONTRACT DOCUMENTS SECTION 100-05 AND THE SPECIAL PROVISION ITEMS FOR SUBMITTAL SCHEDULE REQUIREMENTS.

3. THE CONTRACTOR SHALL PROVIDE MATERIAL SUBMITTALS FOR THE ENGINEER'S APPROVAL AT LEAST SEVEN (7) DAYS PRIOR TO ORDERING.

TRAFFIC CONTROL

1. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING AND PROVIDING ALL REQUIRED TRAFFIC CONTROL FOR THE PROJECT'S ACCESS LOCATIONS, INCLUDING ANY REQUIREMENTS OF CALIFORNIA DEPARTMENT OF TRANSPORTATION OR COUNTY OF VENTURA. ALL ASSOCIATED COSTS ARE INCIDENTAL TO CONSTRUCTION AND WILL NOT BE PAID SEPARATELY.

2. THE CONTRACTOR SHALL SUBMIT A TRAFFIC CONTROL PLAN IN ACCORDANCE WITH LOCAL JURISDICTIONAL REQUIREMENTS FOR APPROVAL PRIOR TO THE START OF ANY CONSTRUCTION ACTIVITIES. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AND MAINTAINING ANY AND ALL TRAFFIC CONTROL DEVICES.

MATERIAL SUPPLY AND DISPOSAL

1. ALL MATERIALS MUST BE OBTAINED FROM AN UNDESIGNATED SOURCE UNLESS OTHERWISE IDENTIFIED IN THE PLANS OR SPECIFICATIONS.

2. ALL WASTE MATERIALS SHALL BE REMOVED FROM THE AIRPORT PROPERTY AT NO COST TO THE SPONSOR UNLESS OTHERWISE DIRECTED BY THE SPONSOR.

3. THE CONTRACTOR SHALL INDICATE TO THE AIRPORT WHEN SALVAGED ITEMS ARE STOCKPILED AND ALLOW THE AIRPORT 30 DAYS TO SALVAGE ANY ITEMS. THE CONTRACTOR SHALL DISPOSE OF ANY FIXTURES, TRANSFORMERS AND OTHER EQUIPMENT REMAINING AFTER THE 30-DAY SALVAGE PERIOD.

WORKING NEAR STRUCTURES

1. THE STRUCTURES SHOWN OR DEFINED IN THE CONTRACT DOCUMENTS AND PLANS HAS BEEN DESIGNED ONLY FOR LOADS ANTICIPATED ON THE STRUCTURE DURING ITS SERVICE LIFE. CONTRACTOR SHALL PROVIDE ALL REQUIRED ENGINEERING AND OTHER MEASURES TO ACHIEVE THE MEANS, METHODS, AND SEQUENCES OF WORK. REQUIRED ENGINEERING MAY INCLUDE, BUT IS NOT LIMITED TO:

- LAYOUT
- DESIGN FOR FORMWORK, SHORING, AND RESHORING
- DESIGN OF CONCRETE MIXES
- ERECTION PROCEDURES WHICH ADDRESS STABILITY OF THE FRAME DURING CONSTRUCTION
- WELD PROCEDURES
- DESIGN OF TEMPORARY BRACING OF WALLS FOR WIND, SEISMIC, OR SOIL LOADS
- SURVEYING TO VERIFY CONSTRUCTION TOLERANCES
- EVALUATION OF TEMPORARY CONSTRUCTION LOADS ON STRUCTURE DUE TO EQUIPMENT AND MATERIALS
- STRUCTURAL ENGINEERING TO RESIST ANY OTHER LOADS NOT IDENTIFIED ON DESIGN DRAWINGS.

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF
TAXIWAY F

GENERAL NOTES

AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME
G003A

SHEET NO.
3 of 89

DRAWING NO.
1588-DOA

Plotted May 25, 2023 @ 9:35 AM by Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\000-OXR-043-G003-NOTE.dwg

SAFETY

1. DURING CONSTRUCTION, THE CONTRACTOR SHALL COMPLY WITH FAA ADVISORY CIRCULAR (AC) 150/5370-2 (CURRENT VERSION), "OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION".

2. THE CONTRACTOR SHALL REVIEW THE CONSTRUCTION SAFETY AND PHASING PLAN (CSPP) CONTAINED IN THE CONTRACT DOCUMENTS, AND PREPARE FOR APPROVAL BY THE ENGINEER, A SAFETY PLAN COMPLIANCE DOCUMENT (SPCD) PRIOR TO NOTICE TO PROCEED, AS REQUIRED PER ADVISORY CIRCULAR (AC) 150/5370-2 (CURRENT VERSION), "OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION".

3. THE CONTRACTOR SHALL PROCURE THREE LIGHTED RUNWAY CLOSURE MARKERS (RCM). RCM'S ARE PORTABLE, TRAILER MOUNTED, DIESEL GENERATOR POWERED UNITS, CAPABLE OF PRODUCING A LIGHTED, FLASHING CROSS. THE RCM'S SHALL BE CERTIFIED TO MEET THE REQUIREMENTS OF FAA SPECIFICATION L-893. THE CONTRACTOR SHALL PLACE THE MARKERS OVER THE RUNWAY 7/25 DESIGNATION NUMBER AT ALL TIMES WHEN RUNWAY IS CLOSED TO AIR TRAFFIC. THE CONTRACTOR SHALL MAKE SURE THE RCM'S ARE PROPERLY ANCHORED, SO THEY CANNOT MOVE IN HEAVY WINDS. THE CONTRACTOR SHALL FURNISH ALL DIESEL FUELS, OIL CHANGES, FILTERS, LAMPS, MAINTENANCE AND REPAIRS ENCOUNTERED DURING THE PROJECT. SEE RUNWAY CLOSURE MARKING (RCM) NOTES ON SHEET G050 FOR ADDITIONAL INFORMATION. RCM'S SHALL BE TRANSFERRED AND STORED ON AN IMPROVED SURFACE. ALL COSTS ASSOCIATED WITH PROCURING, DELIVERY, USE, OPERATION, AND MAINTENANCE OF RCM'S SHALL BE INCLUDED IN ITEM SP-100a.

4. ALL VEHICLES AND EQUIPMENT WORKING ON THE SITE SHALL BE EQUIPPED WITH STANDARD FAA MARKINGS PER FAA ADVISORY CIRCULAR 150/5210-5 (CURRENT VERSION) OR BE ESCORTED BY A PROPERLY MARKED VEHICLE. ANY VEHICLE OR EQUIPMENT OPERATING WITHIN THE AIRPORT'S PERIMETER FENCE NOT PROPERLY MARKED OR ESCORTED MAY NOT OPERATE ON THE SITE AND MUST BE REMOVED IMMEDIATELY. ANY DELAY OR COST TO CONTRACTOR OPERATIONS FROM UNMARKED OR UNESCORTED VEHICLES OR EQUIPMENT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR. STANDARD FAA VEHICLE FLAGS (3 FOOT BY 3 FOOT ORANGE AND WHITE) MAY BE USED DURING DAYTIME HOURS. FLASHING BEACONS MAY BE USED AT ANY TIME. BACKUP ALARMS ARE REQUIRED AND SHALL BE PROXIMITY BASED AND ADJUSTED FROM SURROUNDING NOISE LEVELS. SEE THE CONSTRUCTION SAFETY AND PHASING PLAN (CSPP) FOR MORE DETAILS.

5. CONTRACTOR SHALL MAINTAIN AIRPORT PERIMETER SECURITY FOR THE DURATION OF THE PROJECT. ANY REVISIONS TO FENCE ALIGNMENT SHALL BE COORDINATED WITH ENGINEER FOR APPROVAL AT LEAST ONE WEEK PRIOR TO CONSTRUCTION. ALL COSTS SHALL BE INCIDENTAL TO PROJECT BID ITEMS.

6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ASPECTS OF SAFETY INCLUDING, BUT NOT LIMITED TO, EXCAVATION, TRENCHING, SHORING, TRAFFIC CONTROL, AND SECURITY.

7. CONTRACTOR SHALL MAINTAIN EMERGENCY ACCESS THROUGH PROJECT SITE AT ALL TIMES. ALL ROADWAYS (TEMPORARY OR PERMANENT) SHALL BE MAINTAINED BY CONTRACTOR.

EROSION CONTROL

1. THE CONTRACTOR SHALL COMPLY WITH ALL TERMS AND CONDITIONS OF THE CALIFORNIA PERMIT FOR STORM WATER DISCHARGE, THE STORM WATER MANAGEMENT PLAN, THE EROSION CONTROL PLAN, AND ALL REQUIREMENTS OF THE LOCAL DRAINAGE AUTHORITY.

2. ALL STRUCTURAL EROSION CONTROL MEASURES SHALL BE INSTALLED, AT THE LIMITS OF CONSTRUCTION, PRIOR TO ANY OTHER GROUND-DISTURBING ACTIVITY. ALL EROSION CONTROL MEASURES SHALL BE MAINTAINED IN GOOD REPAIR BY THE CONTRACTOR, UNTIL SUCH TIME AS THE ENTIRE DISTURBED AREA IS STABILIZED WITH HARD SURFACE OR LANDSCAPING.

3. CONTRACTOR SHALL MAINTAIN POSITIVE DUST CONTROL DURING THE ENTIRE PROJECT DURATION. THE METHOD OF DUST CONTROL EMPLOYED DURING ALL PHASES SHALL BE SUBMITTED FOR APPROVAL BY THE ENGINEER. DUST CONTROL SHALL BE EMPLOYED DURING ANY PROJECT SHUTDOWN PERIODS, WINTER OR OTHERWISE. PAYMENT FOR THIS WORK SHALL BE INCIDENTAL TO THE VARIOUS ITEMS OF WORK, AND NO SEPARATE PAYMENT WILL BE MADE.

4. ANY EROSION CONTROL FACILITY DAMAGED OR DESTROYED PREMATURELY, BY ANY MEANS, SHALL BE IMMEDIATELY REPAIRED BY THE CONTRACTOR.

5. A WATER TRUCK SHALL BE KEPT ON SITE AT ALL TIMES DURING EARTHWORK ACTIVITIES FOR DUST ABATEMENT.

6. THE STORMWATER BMPS SHOWN IN THE ISSUED FOR CONSTRUCTION EROSION CONTROL SHEETS ARE TO BE USED AS A GUIDE FOR THE CONTRACTOR WHEN DEVELOPING THEIR STORMWATER MANAGEMENT PLAN. FIELD CONDITIONS MAY WARRANT MORE, LESS OR DIFFERENT BMP INSTALLATION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO DEVELOP A STORMWATER AND EROSION CONTROL PLAN THAT MEETS ALL LOCAL, STATE, AND FEDERAL REQUIREMENTS ASSOCIATED WITH THE STORMWATER PERMIT.

7. SILT AND SEDIMENT SHALL BE REMOVED AFTER EACH SUBSTANTIAL RAINFALL.

8. NEGATIVE IMPACTS TO DOWNSTREAM AREAS CAUSED BY GRADING ARE TO BE MONITORED AND CORRECTED BY THE CONTRACTOR. ANY OFF-SITE CLEAN-UP, DIRECTED BY THE PUBLIC WORKS INSPECTOR, (INCLUDING STREET CLEANING), SHALL BE COMPLETED WITHIN 24-HOURS OF WRITTEN INSTRUCTION, OR RISK CONSTRUCTION STOPPAGE.

9. TEMPORARY EROSION CONTROL MEASURES SHALL NOT BE REMOVED UNTIL SUCH TIME AS ALL TRIBUTARY-DISTURBED AREAS ARE SUFFICIENTLY STABILIZED IN THE OPINION OF THE PUBLIC WORKS INSPECTOR OR RESIDENT ENGINEER, TO MINIMIZE EROSION POTENTIAL.

10. WHEN TEMPORARY EROSION CONTROL MEASURES ARE REMOVED, THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CLEAN-UP AND REMOVAL OF ALL SEDIMENT AND DEBRIS FROM ALL DRAINAGE AND OTHER PUBLIC FACILITIES.

11. ALL AREAS FOR SEEDING SHALL BE TILLED TO BREAK UP ROOTING RESTRICTIVE LAYERS, HAVE A MINIMUM OF 4" OF TOPSOIL REAPPLIED, AND THEN BE HARROWED, AND ROLLED OR PACKED, TO PREPARE THE REQUIRED FIRM SEED BED.

QUANTITIES

1. ALL STATED QUANTITIES ARE CONSIDERED APPROXIMATE. ACTUAL QUANTITIES WILL BE DETERMINED BY THE ENGINEER FROM WORK IN-PLACE.

2. ACTUAL RATES OF APPLICATION WILL BE DETERMINED BY THE ENGINEER.

3. THE PROJECT PAY ITEMS PROVIDED ARE TO BE INCLUSIVE OF ALL WORK TO BE PERFORMED AS SHOWN IN THE CONTRACT DOCUMENTS. ALL WORK NOT IDENTIFIED WITH A SPECIFIC PAY ITEM IS TO BE CONSIDERED REQUIRED WORK TO COMPLETE THE PROJECT, AND IS TO BE INCIDENTAL TO THE COST OF PROJECT PAY ITEMS PROVIDED.

4. ALL PAVEMENT REMOVAL SHALL BE MEASURED AND PAID TO NEAT LINE DIMENSIONS.

5. IF THE CONTRACTOR CHOOSES TO OVERBUILD PAVEMENT LAYERS BEYOND THE DIMENSIONS SHOWN ON THE PLANS FOR CONSTRUCTABILITY, NO PAYMENT WILL BE MADE FOR THIS ADDITIONAL MATERIAL.

6. PIPE LENGTHS SHOWN ON PLANS ARE FROM CENTER OF STRUCTURE TO CENTER OF STRUCTURE.

7. THE FOLLOWING RATES WERE USED TO CALCULATE ESTIMATED QUANTITIES:

   7.1. BITUMINOUS PAVEMENT COURSE AT THE RATE OF 150 LBS PER CUBIC FOOT.

   7.2. ASPHALT ROTOMILLING IS BASED ON SQUARE YARD REGARDLESS OF ASPHALT DEPTH.

SURVEY

1. TWO WEEKS PRIOR TO START OF CONSTRUCTION, THE CONTRACTOR SHALL PROVIDE THE ENGINEER WITH A PRE-CONSTRUCTION SURVEY VERIFYING EXISTING ELEVATIONS OF ALL PAVEMENT AREAS AND OTHER CRITICAL AREAS DETERMINED BY THE ENGINEER. THE SURVEY SHALL BE PERFORMED USING SPECIFIED PROJECT CONTROL AND SHALL PROVIDE SUFFICIENT SHOTS TO ACCURATELY REPRESENT THE EXISTING SURFACE. SURVEY SHALL BE PROVIDED TO THE ENGINEER IN ELECTRONIC FORMAT THAT IS ACCEPTABLE TO THE ENGINEER. THIS SURVEY WILL BE USED TO DETERMINE IF ANY MODIFICATIONS TO DESIGN GRADES ARE REQUIRED. THIS SURVEY WILL BE INCIDENTAL TO SP-100b. PRE-CONSTRUCTION SURVEY SHALL BE PERFORMED BY A STATE LICENSED LAND SURVEYOR. SEE SECTION 50 OF THE CONTRACT DOCUMENTS AND THE "CONSTRUCTION STAKING AND LAYOUT" NOTES CONTAINED IN THESE GENERAL NOTES SHEETS FOR ADDITIONAL SURVEY INFORMATION.

2. BEFORE AND DURING THE PROJECT, ANY DISCREPANCIES IN EXISTING CONDITIONS DISCOVERED BY THE CONTRACTOR SHALL BE IMMEDIATELY IDENTIFIED TO THE ENGINEER.

3. ALL SURVEY PROVIDED TO THE ENGINEER FOR PRE-CONSTRUCTION SURVEYS AND VERIFICATION SURVEYS SHALL BE PROVIDED ELECTRONICALLY AND SHALL INCLUDE POINT NUMBERS, NORTHING, EASTINGS, ELEVATIONS, AND DESCRIPTIONS (PNEZD, COMMA DELINEATED FORMAT).

4. DAILY FIELD SURVEY NOTES SHALL BE GIVEN TO THE ENGINEER SO THAT PERIODIC CHECKS FOR CONFORMANCE WITH PLAN GRADES, ALIGNMENTS, AND GRADE TOLERANCES CAN BE REVIEWED.

5. ALL REQUIRED SURVEY WILL BE INCIDENTAL TO OTHER BID ITEMS.

6. THE HORIZONTAL AND VERTICAL COORDINATES ARE BASED ON THE HORIZONTAL DATUM NAD 83 AND VERTICAL DATUM NAV 88.

CONSTRUCTION STAKING AND LAYOUT

1. DRAINAGE SWALES SLOPE STAKES AND FLOW LINE BLUE TOPS AT 50-FOOT (15-M) STATIONS.

2. SUBGRADE BLUE TOPS AT 50-FOOT STATIONS WITH A 50-FOOT OFFSET DISTANCE (MAXIMUM) AND AT THE EDGE OF PAVEMENT.

3. SUBBASE AND BASE COURSE BLUE TOPS AT 50-FOOT STATIONS WITH A 50-FOOT OFFSET DISTANCE (MAXIMUM) AND AT THE EDGE OF PAVEMENT.

4. PAVEMENT AREAS:

   4.1. EDGE OF PAVEMENT HUBS AND TACKS (FOR STRINGLINE BY CONTRACTOR) AT 100-FOOT STATIONS

   4.2. BETWEEN LIFTS AT 50-FOOT STATIONS FOR RUNWAYS (EACH PAVING LANE WIDTH), TAXIWAYS (EACH PAVING LANE WIDTH), AND HOLDING AREAS (EACH PAVING LANE WIDTH)

   4.3. AFTER FINISH PAVING OPERATIONS AT 50-FOOT STATIONS (FOR GRADE ACCEPTANCE VERIFICATION) AT ALL PAVED AREAS AT THE EDGE OF EACH PAVING LANE AND ALL GRADE BREAKS PRIOR TO NEXT PAVING LOT

   4.4. SHOULDER AND SAFETY AREA BLUE TOPS AT 50-FOOT STATIONS AND AT ALL BREAK POINTS WITH MAXIMUM OF 50-FOOT OFFSETS

5. REQUIRED VERIFICATION/AS-BUILT SURVEY SHALL BE PROVIDED ELECTRONICALLY IN AN ENGINEER APPROVED FORMAT AND SHALL INCLUDE POINT NUMBER, NORTHING, EASTING, ELEVATION, AND DESCRIPTION (PNEZD, COMMA DELIMITED FORMAT).

6. THE CONTRACTOR SHALL PROVIDE VERIFICATION SURVEY TO THE ENGINEER FOR ALL LOCATIONS WHERE PROPOSED CONSTRUCTION WILL TIE INTO ANY EXISTING STRUCTURES AND PAVEMENTS. THIS SURVEY SHALL BE USED FOR VERIFICATION OF EXISTING CONDITIONS AND SHALL BE SUBMITTED PRIOR TO COMMENCING CONSTRUCTION ACTIVITIES IN THE AREAS OF THE EXISTING INFRASTRUCTURE. THIS SURVEY SHALL BE CONSIDERED INCIDENTAL TO CONSTRUCTION OPERATIONS AND SHALL BE PROVIDED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE SPONSOR. WORK IN THESE AREAS SHALL NOT BE ALLOWED TO COMMENCE UNTIL THIS SURVEY VERIFICATION HAS BEEN SUPPLIED BY THE CONTRACTOR TO THE ENGINEER AND THE ENGINEER HAS PROVIDED ACCEPTANCE, BASED ON A TIMELY REVIEW OF THE VERIFICATION SURVEY.

7. IN ADDITION TO ALL REQUIRED UTILITY LOCATES, THE CONTRACTOR SHALL BE REQUIRED TO VERIFY THE ELEVATIONS OF ALL UTILITY CROSSINGS BEFORE COMMENCING CONSTRUCTION OPERATIONS. FOR EXAMPLE, BEFORE THE CONTRACTOR BEGINS WORK ON A PROPOSED STORM DRAIN, THE ELEVATION, BOTH TOP AND BOTTOM, OF ALL UTILITIES THAT CROSS THE PROPOSED PIPE SHALL BE VERIFIED AND PROVIDED TO THE ENGINEER. THIS VERIFICATION SHALL BE CONSIDERED INCIDENTAL TO CONSTRUCTION OPERATIONS AND SHALL BE PROVIDED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE SPONSOR. WORK IN THESE AREAS SHALL NOT BE ALLOWED TO COMMENCE UNTIL THESE UTILITY VERIFICATIONS HAVE BEEN SUPPLIED BY THE CONTRACTOR TO THE ENGINEER AND THE ENGINEER HAS PROVIDED ACCEPTANCE, BASED ON A TIMELY REVIEW OF THE VERIFICATION SURVEY.

8. AREAS WHERE EXCAVATIONS OR EMBANKMENTS ARE TO BE CONSTRUCTED, THE CONTRACTOR SHALL PROVIDE VERIFICATION SURVEY OF THE INITIAL AND FINAL CONDITIONS FOR USE IN THE DETERMINATION OF FINAL EARTHWORK QUANTITIES FOR PAYMENT. THE CONTRACTOR SHALL FURNISH THE INITIAL SURVEY BEFORE CONSTRUCTION OPERATIONS COMMENCE AND THE FINAL SURVEY AFTER CONSTRUCTION OPERATIONS HAVE CONCLUDED TO THE ENGINEER FOR QUANTITY DETERMINATION. IN PAVEMENT AREAS, THE FINAL SURFACE SHALL BE THE TOP OF APPROVED SUBGRADE. SURVEYS SHALL PROVIDE SUFFICIENT SHOTS TO ACCURATELY REPRESENT BOTH INITIAL AND FINAL SURFACES. IF ENGINEER DETERMINES THAT THE SUBMITTED SURVEY IS DEFICIENT IN ACCURATELY DETAILING SURVEYED SURFACES, THE CONTRACTOR SHALL PERFORM ADDITIONAL SURVEY TO THE SATISFACTION OF THE ENGINEER. ALL SURVEY SHALL BE CONSIDERED INCIDENTAL TO CONSTRUCTION OPERATIONS AND SHALL BE PROVIDED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE SPONSOR. SHOULD THE CONTRACTOR FAIL TO PROVIDE THESE INITIAL AND FINAL SURVEYS TO THE ENGINEER, THE EXISTING AND PROPOSED DESIGN SURFACES THAT ARE SHOWN IN THE PLANS SHALL BE USED FOR QUANTITY DETERMINATION.

9. ADDITIONAL STAKES OR MARKINGS SHALL BE REQUIRED AT AN INTERVAL TO CLEARLY DEFINE GRADES FOR SUB-GRADE AND ALL MATERIAL LIFTS REQUIRED FOR THE PAVEMENT STRUCTURE INCLUDING ALL SUBBASES, BASES, AND PAVEMENTS. ADDITIONAL STAKING AND CONTROLS SHALL BE PLACED AS NEEDED FOR CONSTRUCTION TO MEET THE DESIGN AS REQUIRED BY THE SPECIFICATIONS OR SHOWN ON THE DRAWINGS. IN ADDITION TO LOCATIONS STATED ABOVE, STAKING FOR LAYOUT AND SURVEY FOR GRADE VERIFICATIONS SHALL BE PROVIDED AT LOCATIONS OF ALL SPOT ELEVATIONS WHEN PROVIDED FOR IN THE PLANS.

10. ON ALL PAVEMENT LIFTS AND MILLED SURFACES, CONTRACTOR SHALL SPRAY PAINT ON THE PAVEMENT SURFACES FILL DEPTHS TO FINAL SURFACE GRADES SO THE ENGINEER CAN VISUALLY VERIFY PAVEMENT GRADES AND THICKNESSES. FILL LOCATIONS SHALL MATCH ALL SPOT ELEVATIONS AND STAKING AND LAYOUT LOCATIONS DISCUSSED IN THIS SECTION.

11. THE ESTABLISHMENT OF SURVEY CONTROL AND/OR REESTABLISHMENT OF SURVEY CONTROL SHALL BE BY A STATE LICENSED LAND SURVEYOR.

12. CONTROLS AND STAKES DISTURBED OR SUSPECT OF HAVING BEEN DISTURBED SHALL BE CHECKED AND/OR RESET AS DIRECTED BY THE ENGINEER WITHOUT ADDITIONAL COST TO THE OWNER.

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF
TAXIWAY F

GENERAL NOTES

AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME
G003B

SHEET NO.
4 of 89

DRAWING NO.
1589-DOA

Plotted May 25, 2023 @ 9:35 AM by Bell, Robert
L:\OXR\OXR AIP 943 Taxiway F Reconstruction\CAD\PLANS\000-OXR-043-G003-NOTE.dwg

MASTER LEGEND

SITE

- EXISTING PAVEMENT
- EXISTING CENTERLINE
- 6590 EXISTING MAJOR CONTOUR
- 6589 EXISTING MINOR CONTOUR
- EXISTING SWALE FLOW LINE
- EXISTING FENCE
- EXISTING FENCE (BARBED WIRE)
- EXISTING FENCE (SPLIT RAIL)
- EXISTING GUARD RAIL
- EXISTING PROPERTY LINE
- EXISTING RIGHT-OF-WAY LINE
- EXISTING EASEMENT LINE
- EXISTING LEASE LINE
- XXXXXX REMOVE ITEM
- ABANDON ITEM
- EXISTING ASPHALT PAVEMENT
- EXISTING CONCRETE PAVEMENT
- EXISTING GRAVEL AREA
- EXISTNG ASPHALT MILLINGS AREA
- EXISTING WETLAND AREA
- EXISTING BUILDING
- EXISTING PAINT MARKING
- EXISTING WAY FINDING SIGN
- AIRCRAFT TIE DOWN
- EXISTING SURVEY MONUMENT
- FENCE POST
- SINGLE GATE
- DOUBLE GATE
- GC GATE CONTROLER
- CR CARD READER

SAFETY & NAVAIDS

- RSA EXISTING RUNWAY SAFETY AREA
- ROFA EXISTING RUNWAY OBJECT FREE AREA
- TSA EXISTING TAXIWAY SAFETY AREA
- TOFA EXISTING TAXIWAY OBJECT FREE AREA
- RPZ EXISTING RUNWAY PROTECTION ZONE
- NAVAID CRITICAL AREA
- BRL EXISTING BUILDING RESTRICTION LINE
- GCA GLIDE SLOPE CRITICAL AREA
- EXISTING AIRPORT BEACON
- EXISTING PAPI SYSTEM
- EXISTING MALS LIGHT
- EXISTING MALS LIGHT BAR
- EXISTING MALS STROBE LIGHT
- EXISTING MALS STROBE LIGHT BAR
- EXISTING LOCALIZER SYSTEM
- EXISTING VASI SYSTEM
- EXISTING WIND CONE
- EXISTING WIND SOCK
- EXISTING REIL
- EXISTING AWOS SYSTEM
- EXISTING VOR SYSTEM
- EXISTING AIRFIELD ANTENNA
- EXISTING TORNADO SIREN

COMMUNICATIONS

- CBL EXISTING CABLE LINE
- COM EXISTING COMMUNICATION LINE
- OPT EXISTING FIBER OPTIC LINE
- TEL EXISTING TELEPHONE LINE
- CATV EXISTING CABLE MANHOLE
- CATV EXISTING CABLE PEDESTAL
- FOPT EXISTING FIBER OPTIC MANHOLE
- EXISTING TELEPHONE JUNCTION BOX
- TMH EXISTING TELEPHONE MANHOLE
- TP EXISTING TELEPHONE POLE
- EXISTING TELEPHONE PEDESTAL

ELECTRICAL

- EL EXISTING ELECTRICAL LINE
- EXISTING ELECTRICAL DUCT (CE)
- EXISTING ELECTRICAL DUCT (DEB)
- EXISTING TAXIWAY GUIDANCE SIGN
- EXISTING RUNWAY DISTANCE REMAINING SIGN
- EXISTING RUNWAY EDGE LIGHT (IN PAVEMENT)
- EXISTING RUNWAY EDGE LIGHT (ELEVATED)
- EXISTING RUNWAY END LIGHT (IN PAVEMENT)
- EXISTING RUNWAY END LIGHT (ELEVATED)
- EXISTING RUNWAY CENTER LIGHT
- EXISTING RUNWAY GUARD LIGHT
- EXISTING TAXIWAY EDGE LIGHT (IN PAVEMENT)
- EXISTING TAXIWAY EDGE LIGHT (ELEVATED)
- EXISTING TAXIWAY CENTER LIGHT
- EXISTING APRON FLOODLIGHT
- EXISTING TAXIWAY EDGE REFLECTOR (IN PAVE.)
- EXISTING TAXIWAY EDGE REFLECTOR (ELEVATED)
- EXISTING L-824C CONDUCTOR (1)
- EXISTING L-824C CONDUCTORS (2)
- EXISTING CIRCUIT INDICATOR
- EXISTING POWER MARKER
- EXISTING ELECTRIC VAULT
- EMH EXISTING ELECTRICAL MANHOLE
- EXISTING ELECTRICAL HANDHOLE
- EXISTING ELECTRICAL JUNCTION BOX
- ET EXISTING PAD MOUNTED TRANSFORMER
- EXISTING TRANSFORMER BANK
- EXISTING GROUND ROD
- EXISTING POWER POLE
- EXISTING ELECTRIC METER
- PF EXISTING ELECTRIC POWER FRAME
- EXISTING SINGLE PARKING LOT LIGHT
- EXISTING DOUBLE PARKING LOT LIGHT
- EXISTING STREET LIGHT

NATURAL GAS

- GAS EXISTING NATURAL GAS LINE
- EXISTING NATURAL GAS METER
- EXISTING NATURAL GAS VALVE
- EXISTING NATURAL GAS MANHOLE
- EXISTING NATURAL GAS LINE MARKER
- EXISTING NATURAL GAS CATHODIC PROTECTION

SANITARY SEWER

- SAN EXISTING SANITARY SEWER LINE
- EXISTING SANITARY SEWER
- EXISTING SANITARY SEWER

STORM SEWER & UNDERDRAIN

- EXISTING STORM SEWER
- EXISTING TRENCH DRAIN
- UD EXISTING UNDERDRAIN
- EXISTING STORM INLET
- EXISTING STORM FLARED END SECTION
- EXISTING STORM MANHOLE
- EXISTING STORM HEADWALL
- EXISTING UNDERDRAIN CLEANOUT
- UMH EXISTING UNDERDRAIN MANHOLE
- EXISTING UNDERDRAIN INSPECTION PIT
- ADF EXISTING DEICING FLUID INLET
- ADF EXISTING DEICING FLUID MANHOLE
- EXISTING DEICING FLUID VALVE

WATER & IRRIGATION

- WAT EXISTING WATER LINE
- IRG EXISTING IRRIGATION LINE
- EXISTING WATER FIRE HYDRANT
- EXISTING WATER METER
- EXISTING WATER MANHOLE
- PFW EXISTING WATER LINE MARKER
- EXISTING WATER WELL
- EXISTING WATER VALVE
- EXISTING WATER TEST STATION
- EXISTING WATER CATHODIC PROTECTION
- EXISTING WATER AIR VALVE
- EXISTING IRRIGATION VALVE
- SPR CON EXISTING IRRIGATION CONTROL BOX

ABBREVIATIONS

AB	ABANDONED
AC	ACRE
ADG	AIRPORT DESIGN GROUP
ARFF	AIRPORT RESCUE AND FIRE FIGHTING
AOA	AIRPORT OPERATIONS AREA
BMPS	BEST MANAGEMENT PRACTICES
BP	BEGINNING POINT OF ALIGNMENT
C	CURVE
CL	CENTERLINE
CY	CUBIC YARD
Δ	DELTA ANGLE
DIP	DUCTILE IRON PIPE
DIW	DIRTY INDUSTRIAL WASTE
E	EASTING COORDINATE
EA	EACH
EDB	ELECTRICAL DUCT BANK
EF	EACH FACE EL ELEVATION
EL	ELECTRICAL LINES
EOP	EDGE OF PAVEMENT
EP	ENDING POINT OF ALIGNMENT
EW	EACH WAY
FAA	FEDERAL AVIATION ADMINISTRATION
FES	FLARED END SECTION
FID	FLIGHT INFORMATION DUCT (FAA)
FOD	FOREIGN OBJECT DEBRIS
FOMO	FIXED OR MOVEABLE OBJECT
GAL	GALLON
HDPE	HIGH DENSITY POLYETHYLENE PIPE
ID	INSIDE DIAMETER
ILS	INSTRUMENT LANDING SYSTEM
INV	INVERT
INT	INTERSECTION
JFD	JET FUEL DISTRIBUTION
L	LENGTH
LF	LINEAL FEET
LLWAS	LOW LEVEL WIND SHEAR ALERT SYSTEM
LS	LUMP SUM
MGAL	THOUSAND GALLON
MH	MANHOLE
MO	MONTH
N	NORTHING COORDINATE
NGS	NATURAL GAS
NO.	NUMBER
NOAA	NATIONAL OCEANOGRAPHIC & ATMOSPHERIC ADMINISTRATION
NIC	NOT IN THIS CONTRACT
NTP	NOTICE TO PROCEED
NTS	NOT TO SCALE
OC	ON CENTER
OH	OVERHEAD LINES
OS	OFFSET FROM ALIGNMENT
OSHA	OCCUPATIONAL SAFETY & HEALTH ADMINISTRATION
OXR	OXNARD AIRPORT
PB	ELECTRICAL PULL BOX
PC	POINT OF CURVATURE
PCR	POINT OF REVERSE CURVATURE
PGL	PROFILE GRADE LINE
PI	POINT OF INTERSECTION
PPVC	PERFORATED UNDERDRAIN PIPE
PT	POINT OF TANGENT
PVC	POINT OF VERTICAL CURVATURE
PVC	POLYVINYL CHLORIDE
PVI	POINT OF VERTICAL INTERSECTION
PVT	POINT OF VERTICAL TANGENT
R	RADIUS
RCP	REINFORCED CONCRETE PIPE
ROFA	RUNWAY OBJECT FREE AREA
RPZ	RUNWAY PROTECTION ZONE
RSA	RUNWAY SAFETY AREA
RW	RUNWAY
SAF	SANITARY SEWER (FORCE MAIN)
SAG	SANITARY SEWER (GRAVITY)
SDG	STORM WATER DRAINAGE (GRAVITY)
SF	SQUARE FEET
SHT	SHEET
SOI	SAND/OIL INTERCEPTOR
SPA	SPACES
STA	STATION
STL	STEEL
SY	SQUARE YARD
T1F	TYPE 1 DE-ICING FLUID
TW	TAXIWAY
TOFA	TAXIWAY OBJECT FREE AREA
TSA	TAXIWAY SAFETY AREA
TYP	TYPICAL
UG	UNDERGROUND
UMH	UNDERDRAIN MANHOLE
VC	VERTICAL CURVE
VSR	VEHICLE SERVICE ROAD
WMD	WASTE WATER MANAGEMENT
WWF	WELDED WIRE FABRIC

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF
TAXIWAY F

MASTER LEGEND & ABBREVIATION

AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME G004
SHEET NO. 5 of 89
DRAWING NO. 1590-DOA

Plotted May 25, 2023 @ 9:36 AM by Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\000-OXR-043-G004-LGND.dwg

CONTROL POINT TABLE				
POINT #	DESCRIPTION	ELEVATION	NORTHING	EASTING
1	SET 60D MAG	32.26	1897454.66	6193644.96
2	SET 60D MAG	35.51	1897405.90	6196572.84
11	SET 60D MAG NAIL	33.75	1897420.89	6195480.51
14	SET 60D MAD NAIL	40.10	1897339.60	6197910.92
15	SET 60D MAG	42.78	1897301.09	6199519.13
20	SET 60D MAG NAIL	32.48	1897388.67	6194065.98
21	SET 60D MAG NAIL	33.05	1897379.66	6194400.93
22	SET 60D MAG	33.05	1897370.89	6194713.96
23	SET 60D MAG	33.14	1897373.41	6195090.21
24	SET 60D MAG	34.17	1897359.12	6195524.38
25	SET 60D MAG	38.75	1897313.75	6197435.26
26	SET 60D MAG	34.90	1897345.39	6195935.33
27	SET 60D MAG	40.22	1897309.42	6197803.31
28	SET 60D MAG	35.28	1897339.14	6196233.20
29	SET 60D MAG	40.59	1897299.43	6198124.30
30	SET 60D MAG	35.97	1897353.25	6196544.81
31	SET 60D MAG	41.12	1897293.56	6198414.66
32	SET 60D MAG	35.99	1897340.25	6196851.66
33	SET 60D MAG	41.36	1897285.79	6198739.53
34	SET 60D MAG	37.40	1897317.51	6197128.07
35	SET 60D MAG	42.01	1897278.27	6199096.67
36	SET 60D MAG	42.50	1897270.78	6199489.45
202	FND SCN1	37.14	1896916.47	6197153.78
203	FND ASCN 4	30.17	1897122.13	6194624.64

GRAPHIC SCALE
250 0 250 500
(IN FEET)

RUNWAY END DATA					
RW END	STATION	NORTHING	EASTING	ELEVATION	DESCRIPTION
7	100+00	1897713.74	6193665.86	34.13' (G)	BRASS RUNWAY END MONUMENT
25	159+53	1897587.95	6199617.47	45.18' (G)	BRASS RUNWAY END MONUMENT

(BM) ELEVATION BENCHMARK, (G) GPS DERIVED ELEVATION, (P) PUBLISHED ELEVATION

BASIS OF SURVEY:

PROJECT CONTROL - HORIZONTAL

THE BASIS OF BEARINGS AND COORDINATES FOR THIS SURVEY IS CCS83, ZONE V, DEFINED LOCALLY PER TIES TO THE VENTURA COUNTY AIRPORT CONTROL MAP. THE EPOCH OF THE SOURCE CONTROL IS NOT PUBLISHED OR KNOWN. THIS SURVEY CONSTRAINED AIRPORT SURVEY CONTROL POINTS 1 AND 4 (POINTS 202 & 203 RESPECTIVELY).

PROJECT CONTROL - VERTICAL

THE VERTICAL FOR THIS SURVEY IS THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), BASED ON TIES TO SAID AIRPORT CONTROL MAP.

SURVEY NOTES:

1. THIS SURVEY CONTROL PLAN IS FROM THE AIP 38 PLAN SET PREPARED BY MEAD AND HUNT. RUNWAY END MONUMENTS WERE SURVEYED BY ADKAN.
2. FIELD SURVEY TAKEN ON 11/12/2018, 12/20/2019, AND 10/22/2020
3. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR PROVIDING THEIR OWN PROJECT SURVEY AND CONSTRUCTION LAYOUT IN ACCORDANCE WITH THE SPECIFICATIONS

GENERAL NOTES:

THE MONUMENTS, NAILS, AND OTHER SURVEY TIE-INS SHOWN ON THIS SHEET ARE THE ESTABLISHED HORIZONTAL AND VERTICAL CONTROLS REFERENCED IN GENERAL PROVISIONS SECTION 50-07 CONSTRUCTION LAYOUT AND STAKES. CONTRACTOR SHALL TIE-IN TO THESE POINTS.

SURVEY LEGEND	
⊕ XX	CONTROL POINT
△	RUNWAY END MONUMENT

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

JOHN DUANE INGRAM	PE - C 058505	5/25/2023
NAME	REG. NO.	DATE

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

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OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
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Exhibit 1

RECONSTRUCTION OF
TAXIWAY F

SURVEY CONTROL PLAN

AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME
G005

SHEET NO.
6 of 89

DRAWING NO.
1591-DOA

Plotted May 25, 2023 @ 9:36 AM by: Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\000-OXR-043-G005-SURV.dwg

GEOTECHNICAL LEGEND	
30	BORE HOLE LOCATION

GEOTECHNICAL INVESTIGATION NOTES

1. FIELD INVESTIGATION COMPLETED BY EARTH SYSTEMS PACIFIC ON OCTOBER 8, 2019.
2. REFER TO GENERAL NOTES FOR ADDITIONAL INFORMATION.
3. REFER TO CONSTRUCTION SAFETY PLAN FOR SAFETY REQUIREMENTS.
4. THE BORING INFORMATION PROVIDED IS FOR INFORMATIONAL PURPOSES ONLY AND THE CONTRACTOR IS RESPONSIBLE FOR IDENTIFYING EXISTING CONDITIONS AS NECESSARY PRIOR TO THE START OF CONSTRUCTION.

N

GRAPHIC SCALE
200 0 200 400
(IN FEET)

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

JOHN DUANE INGRAM	PE - C 058505	5/25/2023
NAME	REG. NO.	DATE

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF
TAXIWAY F

GEOTECHNICAL INVESTIGATION PLAN

AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME
G006

SHEET NO.
7 of 89

DRAWING NO.
1592-DOA

Plotted May 25, 2023 @ 9:36 AM by Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\000-OXR-043-G006-G011-BORE.dwg

Earth Systems Pacific

Boring No. 41

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

PAGE 1 OF 1
JOB NO.: 302524-002
DATE: 10/8/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
			6.0" AC / 4.0" SILTY SAND with GRAVEL (Misc. AB)					
	CL		SANDY LEAN CLAY; dark brown, stiff, moist (Fill)	1.5 - 3.0	Ring	107.9	16.9	4 5 11
				1.5 - 5.0	Grab			
			soft	5.0 - 6.5	SPT			2 0 1
	CL		SANDY LEAN CLAY; brown, medium stiff, moist (Alluvium)	8.5 - 10.0	SPT			1 2 3
			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					

LEGEND: Ring Sample, Grab Sample, Shelby Tube Sample, SPT
NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 42

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

PAGE 1 OF 1
JOB NO.: 302524-002
DATE: 10/8/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
			4.5" AC / 4.5" SILTY SAND with GRAVEL (Misc. AB)					
	SW		WELL GRADED SAND with GRAVEL; light brown, loose, moist (Fill)					
	CL		SANDY LEAN CLAY; dark brown, stiff, moist	1.5 - 3.0	Ring	112.3	15.5	7 9 12
			medium stiff	5.0 - 6.5	SPT			4 3 3
	ML		SANDY SILT; light brown, medium stiff, moist (Alluvium)	8.5 - 10.0	SPT			1 2 3
			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					

LEGEND: Ring Sample, Grab Sample, Shelby Tube Sample, SPT
NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 43

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

PAGE 1 OF 1
JOB NO.: 302524-002
DATE: 10/8/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
			5.5" AC / 5.0" SILTY SAND with GRAVEL (Misc. AB)					
	CL		SANDY LEAN CLAY; dark brown, stiff, moist	1.0 - 2.5	Ring	115.9	15.1	4 9 17
			soft	5.0 - 6.5	SPT			1 2 2
	CL		SANDY LEAN CLAY; brown, medium stiff, moist (Alluvium)	8.5 - 10.0	SPT			0 1 1
			very soft					
			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					

LEGEND: Ring Sample, Grab Sample, Shelby Tube Sample, SPT
NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 44

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

PAGE 1 OF 1
JOB NO.: 302524-002
DATE: 10/8/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
			4.0" AC / 6.5" SILTY SAND with GRAVEL (Misc. AB)					
	SW		WELL GRADED SAND with GRAVEL; light brown, loose, moist (Fill)					
	CL		SANDY LEAN CLAY; dark brown, very stiff, moist	1.5 - 3.0	Ring	120.7	6.9	10 13 17
	CL		SANDY LEAN CLAY; brown, soft, moist (Alluvium)	5.0 - 6.5	SPT			1 2 2
				8.5 - 10.0	SPT			0 1 3
			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					

LEGEND: Ring Sample, Grab Sample, Shelby Tube Sample, SPT
NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 45

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

PAGE 1 OF 1
JOB NO.: 302524-002
DATE: 10/8/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
			4.0" AC / 5.5" SILTY SAND with GRAVEL (Misc. AB)					
	CL		SANDY LEAN CLAY; dark brown, stiff, moist (Fill)	1.0 - 2.5	Ring	106.3	18.6	4 7 9
				1.0 - 5.0	Grab			
			soft					1 1 3
	ML		SANDY SILT; light brown, soft, moist (Alluvium)	5.0 - 6.5	SPT			
				8.5 - 10.0	SPT			0 2 2
			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					

LEGEND: Ring Sample, Grab Sample, Shelby Tube Sample, SPT
NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 46

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

PAGE 1 OF 1
JOB NO.: 302524-002
DATE: 10/8/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
			4.0" AC / 6.0" SILTY SAND with GRAVEL (Misc. AB)					
	SW -SM		WELL GRADED SAND with SILT and GRAVEL; light brown, loose, moist (Fill)	1.0 - 2.5	Ring	117.1	3.7	12 16 17
	CL		SANDY LEAN CLAY; dark brown, very stiff, moist	1.0 - 2.0	Grab			
			soft	5.0 - 6.5	SPT			2 2 2
	CL		SANDY LEAN CLAY; brown, soft, moist (Alluvium)	8.5 - 10.0	SPT			1 2 1
			some oxidation					
			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					

LEGEND: Ring Sample, Grab Sample, Shelby Tube Sample, SPT
NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 47

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

PAGE 1 OF 1
JOB NO.: 302524-002
DATE: 10/8/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
			4.0" AC / 7.0" SILTY SAND with GRAVEL (Misc. AB)					
	SW -SM		WELL GRADED SAND with SILT and GRAVEL; light brown, loose, moist (Fill)	1.0 - 2.5	Ring	116.4	13.1	8 14 22
	CL		SANDY LEAN CLAY; dark brown, very stiff, moist					
	ML		SANDY SILT; light brown, medium stiff, moist (Alluvium)	5.0 - 6.5	SPT			1 2 3
			yellow brown to olive brown, soft	8.5 - 10.0	SPT			0 1 3
			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					

LEGEND: Ring Sample, Grab Sample, Shelby Tube Sample, SPT
NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

GEOTECHNICAL INVESTIGATION NOTES

1. TAXIWAY CONNECTOR PAVEMENTS WERE CONSTRUCTED IN THE SUMMER OF 2023 TO TIE INTO TAXIWAY F GRADES THAT RESULTED IN AN INCREASE OF THICKNESS GRADES.

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF
TAXIWAY F

SOIL BORING LOGS

AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME
G007

SHEET NO.
8 of 89

DRAWING NO.
1593-DOA

Plotted May 25, 2023 @ 9:36 AM by: Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\000-OXR-043-G006-G911-BORE.dwg

Earth Systems Pacific

Boring No. 48
PAGE 1 OF 1
LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem
JOB NO.: 302524-002
DATE: 10/9/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			5.0" AC / 3.5" SILTY SAND with GRAVEL (Misc. AB)					
1	SW / SM		WELL GRADED SAND with SILT and GRAVEL; light brown, loose, moist (Fill)	1.0 - 2.5	▬	114.8	12.1	4 8 8
2	CL		SANDY LEAN CLAY; dark brown, loose, moist					
4			medium stiff					
5	CL		SANDY LEAN CLAY; brown, medium stiff, moist, caliche (Alluvium)	5.0 - 6.5	●			2 4 5
8	ML		SANDY SILT; light brown, soft	8.5 - 10.0	●			2 1 2
10			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					

LEGEND: ▬ Ring Sample ◯ Grab Sample ▭ Shelby Tube Sample ● SPT
NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 49
PAGE 1 OF 1
LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem
JOB NO.: 302524-002
DATE: 10/9/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			5.5" AC / 5.5" SILTY SAND with GRAVEL (Misc. AB)					
1	CL		SANDY LEAN CLAY; dark brown, stiff, moist (Fill)	1.0 - 2.5	▬	114.7	12.9	3 6 8
5	CL		SANDY LEAN CLAY; brown, medium stiff, moist (Alluvium)	5.0 - 6.5	●			1 3 3
8	ML		SILT; light brown, medium stiff, moist	8.5 - 10.0	●			1 2 3
10			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					

LEGEND: ▬ Ring Sample ◯ Grab Sample ▭ Shelby Tube Sample ● SPT
NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 50
PAGE 1 OF 1
LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem
JOB NO.: 302524-002
DATE: 10/9/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			4.5" AC / 10.0" SILTY SAND with GRAVEL (Misc. AB)					
1	CL		SANDY LEAN CLAY; dark brown, very stiff, moist (Fill)	1.0 - 2.5	▬	119.0	13.0	6 16 17
4			soft					
5	ML		SANDY SILT; light brown, very soft, moist, caliche (Alluvium)	5.0 - 6.5	●			1 0 1
8			yellow brown, soft	8.5 - 10.0	●			1 1 2
10			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					

LEGEND: ▬ Ring Sample ◯ Grab Sample ▭ Shelby Tube Sample ● SPT
NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 51
PAGE 1 OF 1
LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem
JOB NO.: 302524-002
DATE: 10/9/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			2.0" AC / 5.5" SILTY SAND with GRAVEL (Misc. AB)					
1	CL		SANDY LEAN CLAY; dark brown, stiff, moist (Fill)	1.0 - 2.5	▬	111.4	15.8	4 6 11
5	CL		SANDY LEAN CLAY; brown, soft, moist, caliche (Alluvium)	5.0 - 6.5	●			1 2 2
8	ML		SANDY SILT; yellow brown, medium stiff, moist	8.5 - 10.0	●			1 2 3
10			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					

LEGEND: ▬ Ring Sample ◯ Grab Sample ▭ Shelby Tube Sample ● SPT
NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 52
PAGE 1 OF 1
LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem
JOB NO.: 302524-002
DATE: 10/9/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			4.5" AC / 6.0" SILTY SAND with GRAVEL (Misc. AB)					
1	SW		WELL GRADED SAND with GRAVEL; light brown, loose, moist (Fill)	1.5 - 3.0	▬	114.6	11.6	9 14 22
2	SC		SANDY LEAN CLAY; dark brown, very stiff, moist					
5	CL		SANDY LEAN CLAY; brown, medium stiff, moist, caliche (Alluvium)	5.0 - 6.5	●			1 2 4
8	ML		SANDY SILT; yellow brown, soft, moist	8.5 - 10.0	●			1 2 1
10			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					

LEGEND: ▬ Ring Sample ◯ Grab Sample ▭ Shelby Tube Sample ● SPT
NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 53
PAGE 1 OF 1
LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem
JOB NO.: 302524-002
DATE: 10/9/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			3.5" AC / 5.0" SILTY SAND with GRAVEL (Misc. AB)					
1	CL		SANDY LEAN CLAY; dark brown, stiff, moist (Fill)	1.0 - 2.5	▬	110.1	15.3	3 9 14
5	CL		SANDY LEAN CLAY; light brown, soft, moist, caliche (Alluvium)	5.0 - 6.5	●			1 1 3
				7.5 - 10.0	◯			
8				8.5 - 10.0	●			2 2 2
10			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					

LEGEND: ▬ Ring Sample ◯ Grab Sample ▭ Shelby Tube Sample ● SPT
NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 54
PAGE 1 OF 1
LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem
JOB NO.: 302524-002
DATE: 10/9/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0			5.5" AC / 6.0" SILTY SAND with GRAVEL (Misc AB)					
1	SW / CL		POORLY GRADED SAND with GRAVEL; light brown, loose, moist (Fill)	1.5 - 3.0	▬	124.3	5.2	8 11 15
2			SANDY LEAN CLAY; dark brown, stiff, moist					
4	CL		SANDY LEAN CLAY; brown, medium stiff, moist, (Alluvium)	4.0 - 5.0	◯			
5				5.0 - 6.5	●			0 2 4
8	ML		SANDY SILT; yellow brown, medium stiff, moist, caliche	8.5 - 10.0	●			3 3 3
10			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					

LEGEND: ▬ Ring Sample ◯ Grab Sample ▭ Shelby Tube Sample ● SPT
NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

GEOTECHNICAL INVESTIGATION NOTES

1. TAXIWAY CONNECTOR PAVEMENTS WERE CONSTRUCTED IN THE SUMMER OF 2023 TO TIE INTO TAXIWAY F GRADES THAT RESULTED IN AN INCREASE OF THICKNESS GRADES.

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF
TAXIWAY F

SOIL BORING LOGS

AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME: G008
SHEET NO.: 9 of 89
DRAWING NO.: 1594-DOA

Plotted May 25, 2023 @ 9:36 AM by: Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\000-OXR-043-G008-G011-BORE.dwg

Earth Systems Pacific

Boring No. 55

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

PAGE 1 OF 1
JOB NO.: 302524-002
DATE: 10/9/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
			4.5" AC / 2.5" SILTY SAND with GRAVEL (Misc. AB)					
1	SW		POORLY GRADED SAND with GRAVEL; light brown, loose, moist (Fill)	1.0 - 2.5	▬	108.9	14.4	5 6 8
2	CL		SANDY LEAN CLAY; dark brown, medium stiff, moist	1.5 - 5.0	○			
5	ML		SANDY SILT; light brown, stiff, moist, caliche (Alluvium)	5.0 - 6.5	●			1 3 6
8			medium stiff	8.5 - 10.0	●			1 3 3
10			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					

LEGEND: ▬ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT
NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 56

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

PAGE 1 OF 1
JOB NO.: 302524-002
DATE: 10/9/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
			4.5" AC / 5.0" SILTY SAND with GRAVEL (Misc. AB)					
1	SW		POORLY GRADED SAND with GRAVEL; light brown, loose, moist (Fill)	1.5 - 3.0	▬	116.0	12.0	7 7 7
2	CL		SANDY LEAN CLAY; dark brown, medium stiff, moist					
5	ML		SANDY SILT; light brown, medium stiff, moist, (Alluvium)	5.0 - 6.5	●			2 2 5
8			light brown to gray brown, caliche	8.5 - 10.0	●			2 3 3
10			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					

LEGEND: ▬ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT
NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 57

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

PAGE 1 OF 1
JOB NO.: 302524-002
DATE: 10/10/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
			3.5" AC / 9.0" SILTY SAND with GRAVEL (Misc. AB)					
1	SW		WELL GRADED SAND with GRAVEL; light brown, loose, moist (Fill)	1.0 - 2.5	▬	117.6	2.7	8 9 11
2	CL		SANDY LEAN CLAY; dark brown, stiff, moist					
5	CL		SANDY LEAN CLAY; brown, soft, moist, caliche (Alluvium)	5.0 - 6.5	●			1 1 2
8			light brown, very soft	8.5 - 10.0	●			0 1 1
10			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					

LEGEND: ▬ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT
NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 58

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

PAGE 1 OF 1
JOB NO.: 302524-002
DATE: 10/10/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
			6.0" AC / 7.0" SILTY SAND with GRAVEL (Misc. AB)					
1	SW		WELL GRADED SAND with GRAVEL; light brown, loose, moist (Fill)	1.5 - 3.0	▬	115.5	12.1	5 7 11
2	CL		SANDY LEAN CLAY; dark brown, stiff, moist					
5	CL		SANDY LEAN CLAY; brown, very soft, moist (Alluvium)	5.0 - 6.5	●			0 1 1
8	ML		SILT; light brown, soft, moist	8.5 - 10.0	●			0 1 2
10			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					

LEGEND: ▬ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT
NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 59

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

PAGE 1 OF 1
JOB NO.: 302524-002
DATE: 10/10/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
			5.0" AC / 6.0" SILTY SAND with GRAVEL (Misc. AB)					
1	SW		WELL GRADED SAND with GRAVEL; light brown, loose, moist (Fill)	1.5 - 3.0	▬	110.8	13.7	5 11 15
2	CL		SANDY LEAN CLAY; dark brown, stiff, moist					
5	CL		SANDY LEAN CLAY; brown, medium stiff, moist, caliche (Alluvium)	5.0 - 6.5	●			1 3 3
8	ML		SANDY SILT; light brown, slightly moist, medium stiff	8.5 - 10.0	●			3 4 4
10			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					

LEGEND: ▬ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT
NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 60

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

PAGE 1 OF 1
JOB NO.: 302524-002
DATE: 10/10/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
			4.5" AC / 6.5" SILTY SAND with GRAVEL (Misc. AB)					
1	SW		WELL GRADED SAND with GRAVEL; light brown, loose, moist (Fill)	1.0 - 2.5	▬	119.8	7.1	14 16 17
2	CL		SANDY LEAN CLAY; dark brown, very stiff, moist					
5	ML		SANDY SILT; light brown, soft, moist (Alluvium)	5.0 - 6.5	●			1 1 3
8	CL		SANDY LEAN CLAY; brown, very soft, moist, caliche	8.5 - 10.0	●			0 0 2
10			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					

LEGEND: ▬ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT
NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 61

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

PAGE 1 OF 1
JOB NO.: 302524-002
DATE: 10/10/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
			5.5" AC / 9.0" SILTY SAND with GRAVEL (Misc. AB)					
1	SW		WELL GRADED SAND with GRAVEL; light brown, loose, moist (Fill)	1.5 - 3.0	▬	112.4	14.5	4 7 9
2	CL		SANDY LEAN CLAY; dark brown, stiff, moist					
5	CL		SANDY LEAN CLAY; brown, soft, moist	5.0 - 6.5	●			0 1 2
8			Caliche	8.5 - 10.0	●			1 1 3
10			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					

LEGEND: ▬ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT
NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

GEOTECHNICAL INVESTIGATION NOTES

1. TAXIWAY CONNECTOR PAVEMENTS WERE CONSTRUCTED IN THE SUMMER OF 2023 TO TIE INTO TAXIWAY F GRADES THAT RESULTED IN AN INCREASE OF THICKNESS GRADES.

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF
TAXIWAY F

SOIL BORING LOGS

AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME
G009

SHEET NO.
10 of 89

DRAWING NO.
1595-DOA

Plotted May 25, 2023 @ 9:36 AM by: Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\000-OXR-043-G006-G011-BORE.dwg

Earth Systems Pacific

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

Boring No. 62
PAGE 1 OF 1
JOB NO.: 302524-002
DATE: 10/10/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
			4.5" AC / 9.0" SILTY SAND with GRAVEL (Misc. AB)					
	SW		WELL GRADED SAND with GRAVEL; light brown, loose, moist (Fill)	1.5 - 3.0	▬	90.7	12.2	7 7 8
	CL		SANDY LEAN CLAY; dark brown, stiff, moist	2.0 - 5.0	○			
	SC -SM		SILTY, CLAYEY SAND; dark brown, loose, moist (Alluvium)	5.0 - 6.5	●			1 2 2
			caliche	8.5 - 10.0	●			0 1 2
			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					

LEGEND: ▬ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT
NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

Boring No. 63
PAGE 1 OF 1
JOB NO.: 302524-002
DATE: 10/10/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
			3.5" AC / 7.0" SILTY SAND with GRAVEL (Misc. AB)					
	CL		SANDY LEAN CLAY; dark brown, very stiff, slightly moist (Fill)	1.0 - 2.5	▬	77.9	12.4	29 17 14
	SC -SM		SILTY, CLAYEY SAND; dark brown, loose, moist (Alluvium)	5.0 - 6.5	●			1 3 4
				8.5 - 10.0	●			0 1 1
			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					

LEGEND: ▬ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT
NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

Boring No. 64
PAGE 1 OF 1
JOB NO.: 302524-002
DATE: 10/10/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
			2.5" AC / 5.5" AC / 6.0" SILTY SAND with GRAVEL (Misc. AB)					
	SW		WELL GRADED SAND with GRAVEL; light brown, loose, moist (Fill)	1.0 - 2.5	▬	104.3	3.4	7 4 6
	CL		SANDY LEAN CLAY; dark brown, medium stiff, moist					
	SC -SM		SILTY, CLAYEY SAND; brown, loose, moist, caliche (Alluvium)	5.0 - 6.5	●			0 2 3
			soft	8.5 - 10.0	●			0 1 2
			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					

LEGEND: ▬ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT
NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

Boring No. 65
PAGE 1 OF 1
JOB NO.: 302524-002
DATE: 10/11/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
			3.0" AC / 6.0" SILTY SAND with GRAVEL (Misc. AB)					
	CL		SANDY LEAN CLAY; dark brown, medium stiff, moist (Fill)	1.0 - 2.5	▬	102.3	19.0	3 4 5
	SC -SM		SILTY CLAYEY SAND; dark brown, loose, moist (Alluvium)	5.0 - 6.5	●			0 1 1
				8.5 - 10.0	●			0 1 2
			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					

LEGEND: ▬ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT
NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

Boring No. 66
PAGE 1 OF 1
JOB NO.: 302524-002
DATE: 10/11/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
			4.0" AC / 7.5" SILTY SAND with GRAVEL (Misc. AB)					
	SW		WELL GRADED SAND with GRAVEL; light brown, loose, moist (Fill)	1.0 - 2.5	▬	115.4	14.8	12 12 16
	CL		SANDY LEAN CLAY; dark brown, very stiff, moist	4.0 - 5.0	○			
	SC -SM		SILTY, CLAYEY SAND; dark brown, loose, moist, caliche (Alluvium)	5.0 - 6.5	●			1 1 2
				8.5 - 10.0	●			0 2 2
			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					

LEGEND: ▬ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT
NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

Boring No. 67
PAGE 1 OF 1
JOB NO.: 302524-002
DATE: 10/11/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
			5.0" AC / 7.0" SILTY SAND with GRAVEL (Misc. AB)					
	CL		SANDY LEAN CLAY; brown, loose, moist (Fill)	1.0 - 2.5	▬	106.7	12.9	5 5 6
	SC -SM		SILTY, CLAYEY SAND; dark brown, loose, moist (Alluvium)	5.0 - 6.5	●			1 3 3
				8.5 - 10.0	●			2 3 7
			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					

LEGEND: ▬ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT
NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

Boring No. 68
PAGE 1 OF 1
JOB NO.: 302524-002
DATE: 10/11/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
			5.5" AC / 5.5" SILTY SAND with GRAVEL (Misc. AB)					
	SW		WELL GRADED SAND with GRAVEL; light brown, loose, moist (Fill)	1.0 - 2.5	▬	112.7	2.8	12 8 7
	CL		SANDY LEAN CLAY; dark brown, stiff, moist					
	SC -SM		SILTY CLAYEY SAND; dark brown, moist (Alluvium)	5.0 - 6.5	●			2 3 4
			brown, caliche	8.5 - 10.0	●			2 3 5
			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					

LEGEND: ▬ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT
NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

GEOTECHNICAL INVESTIGATION NOTES

1. TAXIWAY CONNECTOR PAVEMENTS WERE CONSTRUCTED IN THE SUMMER OF 2023 TO TIE INTO TAXIWAY F GRADES THAT RESULTED IN AN INCREASE OF THICKNESS GRADES.

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF
TAXIWAY F

SOIL BORING LOGS

AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME
G010
SHEET NO.
11 of 89
DRAWING NO.
1596-DOA

Plotted May 25, 2023 @ 9:36 AM by: Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\000-OXR-043-G006-G011-BORE.dwg

Earth Systems Pacific

Boring No. 69

LOGGED BY: S. Hemmer — PAGE 1 OF 1
DRILL RIG: Mobile B-53 with Automatic Hammer — JOB NO.: 302524-002
AUGER TYPE: 6" Hollow Stem — DATE: 10/11/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 0 IN.
0			3.5" AC / 7.0" SILTY SAND with GRAVEL (Misc. AB)					
1	SW		WELL GRADED SAND with GRAVEL; light brown, loose, moist (Fill)	1.0 - 2.5	▬	126.1	14.2	5 8 8
2	CL		SANDY LEAN CLAY: dark brown, stiff, moist					
5	SC -SM		SILTY CLAYEY SAND; dark brown, loose, moist (Alluvium)	5.0 - 6.5	●			1 2 2
8				8.5 - 10.0	●			1 3 5
10			TD: 10.0' No subsurface groundwater encountered Backfilled with cuttings and tamped AC Patch					

LEGEND: ▬ Ring Sample ◯ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 70

LOGGED BY: S. Hemmer — PAGE 1 OF 1
DRILL RIG: Mobile B-53 with Automatic Hammer — JOB NO.: 302524-002
AUGER TYPE: 6" Hollow Stem — DATE: 10/11/19

OXNARD AIRPORT
TAXIWAY F IMPROVEMENTS
2889 West 5th Street
Oxnard, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 0 IN.
0			5.0" AC / 6.5" SILTY SAND with GRAVEL (Misc. AB)					
1	SW		WELL GRADED SAND with GRAVEL; light brown, loose, moist (Fill)	1.0 - 2.5	▬	118.0	13.2	12 13 20
2	CL		SANDY LEAN CLAY: dark brown, very stiff, moist					
				1.5 - 4.5	◯			
5	SP		POORLY GRADED SAND; light brown, loose, moist (Alluvium)	5.0 - 6.5	●			2 2 1
6	SC -SM		SILTY, CLAYEY SAND; dark brown, loose, moist, caliche					
8			caliche	8.5 - 10.0	●			0 1 1
10			TD: 10.0' No subsurface water encountered Backfilled with cuttings and tamped AC Patch					

LEGEND: ▬ Ring Sample ◯ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

GEOTECHNICAL INVESTIGATION NOTES

1. TAXIWAY CONNECTOR PAVEMENTS WERE CONSTRUCTED IN THE SUMMER OF 2023 TO TIE INTO TAXIWAY F GRADES THAT RESULTED IN AN INCREASE OF THICKNESS GRADES.

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER — JOHN DUANE INGRAM — No. C058505 — 05/23/2023 — CIVIL — STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION® A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF TAXIWAY F

SOIL BORING LOGS

AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME: G011
SHEET NO.: 12 of 89
DRAWING NO.: 1597-DOA

Plotted May 25, 2023 @ 9:36 AM by Ball, Robert
L:\OXR\OXR AIP\043 Taxiway F Reconstruction\CAD\PLANS\000-OXR-043-G006-G011-BORE.dwg

1. COORDINATION

ALL COORDINATION WILL TAKE PLACE THROUGH THE RESIDENT ENGINEER, OXNARD AIRPORT (OXR) OPERATIONS MANAGER, AND COUNTY OF VENTURA DEPARTMENT OF AIRPORTS PROJECT ADMINISTRATOR. NO CLOSURES WITHIN THE MOVEMENT AREAS WILL BE PERMITTED WITHOUT A NOTAM IN PLACE FOR EACH SPECIFIC CLOSURE. PRIOR TO COMMENCEMENT OF ANY WORK, THE CONTRACTOR SHALL GIVE 72 HOURS ADVANCE NOTICE TO THE RESIDENT ENGINEER AND AIRPORT OPERATIONS FOR FILING OF ALL NOTAMS.

A WEEKLY CONSTRUCTION PROGRESS MEETING WILL BE REQUIRED TO DISCUSS ALL OPERATIONAL SAFETY TOPICS THAT HAVE BEEN AFFECTED OR WILL BE AFFECTED IN THE NEAR FUTURE. IN ATTENDANCE WILL BE THE CONTRACTOR, ENGINEER, AND OXR PERSONNEL.

ANY CHANGES TO SCOPE OR SCHEDULE MUST BE NOTIFIED TO THE ENGINEER, OXNARD AIRPORT (OXR) OPERATIONS MANAGER, AND COUNTY OF VENTURA DEPARTMENT OF AIRPORTS PROJECT ADMINISTRATOR. ALL PARTIES WILL EVALUATE THE IMPACT OF THE CHANGE AND WILL DETERMINE THE MEASURES NEEDED TO MAINTAIN A SAFE CONSTRUCTION SITE.

THE FAA AIR TRAFFIC OPERATORS WILL BE NOTIFIED IMMEDIATELY IF ANY CHANGES AFFECT AIRCRAFT MOVEMENT. ALL COMMUNICATIONS WITH THE FAA TOWER WILL BY HANDLED BY AIRPORT OPERATIONS.

AIRPORT RUNWAYS AND TAXIWAYS SHOULD REMAIN IN USE BY AIRCRAFT TO THE MAXIMUM EXTENT POSSIBLE.

AIRCRAFT USE OF AREAS NEAR THE CONTRACTOR'S WORK SHOULD BE CONTROLLED TO MINIMIZE DISTURBANCE TO THE CONTRACTOR'S OPERATION.

CONSTRUCTION THAT IS WITHIN THE SAFETY AREA OF AN ACTIVE RUNWAY, TAXIWAY, OR APRON MUST BE PERFORMED WHEN THE RUNWAY, TAXIWAY, OR APRON IS CLOSED OR USE-RESTRICTED AND INITIATED ONLY WITH PRIOR PERMISSION FROM THE AIRPORT OPERATOR AND WITH PROPER NOTAMS IN PLACE.

THE CONTRACTING OFFICER, AIRPORT OPERATOR, OR OTHER DESIGNATED AIRPORT REPRESENTATIVE MAY ORDER THE CONTRACTOR TO SUSPEND OPERATIONS; MOVE PERSONNEL, EQUIPMENT, AND MATERIALS TO A SAFE LOCATION; BARRICADE ANY OPEN TRENCHES AND STAND BY UNTIL AIRCRAFT USE IS COMPLETED.

2. PHASING

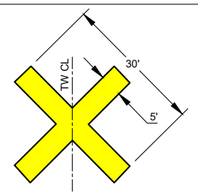
THIS PROJECT CONSISTS OF ONE SCHEDULE WORK AND THREE PHASES. SEE CONSTRUCTION SAFETY DRAWINGS FOR PHASING REQUIREMENTS.

CONTRACTOR TO NOTIFY ENGINEER, OXNARD AIRPORT (OXR) OPERATIONS MANAGER, AND COUNTY OF VENTURA DEPARTMENT OF AIRPORTS PROJECT ADMINISTRATOR IF A CHANGE IN SCHEDULE IS NEEDED.

3. AREAS AND OPERATIONS AFFECTED BY CONSTRUCTION ACTIVITY

ALL WORK WITHIN AIRPORT OPERATIONS AREA (AOA) SHALL CONFORM TO ADVISORY CIRCULAR 150/5370-2G, OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION.

CONTRACTOR SHALL ADHERE TO REQUIREMENTS AS MENTIONED ON THIS SHEET, THE CONSTRUCTION SAFETY AND PHASING PLAN (CSPP), AND CONSTRUCTION SAFETY DRAWINGS. THESE REQUIREMENTS INCLUDE, BUT ARE NOT LIMITED TO, LIFE & SAFETY ACCESS ROUTES, AIRCRAFT ROUTES, PEDESTRIAN ROUTES, CONSTRUCTION ACCESS ROUTES, CONSTRUCTION LIMITS, AND BARRICADE LOCATIONS.



CONSTRUCT CLOSED TAXIWAY "X" WITH ANY OF THE FOLLOWING: DOUBLE-LAYERED PAINTED SNOW FENCE, COLORED PLASTIC, PAINTED SHEETS OF PLYWOOD OR SIMILAR MATERIALS. CONTRACTOR TO ENSURE THAT MATERIALS ARE PROPERLY CONFIGURED AND SECURED TO PREVENT MOVEMENT FROM JET BLAST OR WIND. CLOSED TAXIWAY "X" SHALL BE LESS THAN 3-INCHES THICK.

1 TAXIWAY CLOSURE "X" DETAIL

NOT TO SCALE

1. THE CONTRACTOR SHALL OBTAIN THREE (INCLUDES 1 SPARE) LIGHTED RUNWAY CLOSURE MARKERS (RCM'S). THE RCM'S SHALL BE CERTIFIED TO MEET THE REQUIREMENT TO SCALE OF FAA SPECIFICATION L-893. ACCEPTANCE OF THE RCM'S SHALL BE MADE BY THE ENGINEER UPON DELIVERY TO THE PROJECT. DURING CONSTRUCTION, THE CONTRACTOR SHALL PLACE THE MARKERS OVER RUNWAY DESIGNATION NUMBERS AT ALL TIMES WHEN THE RUNWAYS ARE CLOSED TO AIR TRAFFIC. THE CONTRACTOR SHALL FURNISH ALL ALL DIESEL FUELS, OIL CHANGES, FILTERS, LAMPS MAINTENANCE AND REPAIRS ENCOUNTERED DURING THE PROJECT. ANY DAMAGE WHICH RESULTS FROM THE CONTRACTOR'S NEGLIGENCE, SHALL BE REPAIRED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE AIRPORT. RCM'S SHALL BE TRANSFERRED AND STORED ON AN IMPROVED SURFACE. ALL COSTS ASSOCIATED WITH THE PROCUREMENT/RENTAL DELIVERY. USE, OPERATION, AND MAINTENANCE OF RCM'S SHALL BE INCLUDED IN ITEM SP-100a.
2. RCM'S SHALL BE PORTABLE, TRAILER MOUNTED, GENERATOR POWERED UNIT, CAPABLE OF PRODUCING A LIGHTED, FLASHING CROSS, MANUFACTURED BY SHERWIN INDUSTRIES, OR AN APPROVED EQUAL.
3. CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO THE RCMS CAUSED BY CONTRACTOR OPERATIONS.

2 LIGHTED RUNWAY CLOSURE "X" NOTE

NOT TO SCALE

4. PROTECTION OF NAVIGATION AIDS (NAVAIDS)

NAVIGATIONAL AIDS INCLUDE INSTRUMENT LANDING SYSTEM (ILS) COMPONENTS, MEDIUM INTENSITY APPROACH LIGHTING SYSTEM (MALSF), PRECISION APPROACH PATH INDICATORS (PAPI) AND AIRPORT SURVEILLANCE RADAR. SUCH RESTRICTED AREAS ARE DEPICTED ON CONSTRUCTION PLANS. DURING CONSTRUCTION, NO NAVAID EQUIPMENT WILL BE RELOCATED. THE CONTRACTOR WILL BE RESPONSIBLE FOR ANY DAMAGE TO THE EXISTING NAVAIDS AND WILL BE REPAIRED BY THE CONTRACTOR AT NO COST TO THE AIRPORT.

5. CONTRACTOR ACCESS

CONTRACTOR HAS ACCESS TO TWO (2) GATES TO ENTER THE AIRPORT AND ONE (1) GATE TO ACCESS THE QA/QC TRAILERS. SEE CONSTRUCTION SAFETY DRAWINGS FOR GATE LOCATION. CONTRACTOR SHALL PROVIDE A GATE GUARD AT THIS GATE AT ALL TIMES WHEN GATE IS NOT CLOSED AND LOCKED.

CONTRACTOR MOVEMENT SHALL BE RESTRICTED TO THE PRE-DETERMINED ACCESS ROUTES AS SHOWN ON CONSTRUCTION SAFETY DRAWINGS.

ALL VEHICLES AND EQUIPMENT OPERATING IN THE AOA MUST BE IDENTIFIED CLEARLY WITH 8-INCH (MINIMUM) BLOCK-TYPE CHARACTERS OF A CONTRASTING COLOR AND EASY TO READ. IN ADDITION, VEHICLES MUST DISPLAY IDENTIFICATION MEDIA, AS SPECIFIED IN THE APPROVED AIRPORT SECURITY PLAN.

ALL VEHICLES AND EQUIPMENT OPERATING IN THE AOA MUST HAVE FLAG (DAY ONLY) OR BEACON (DAY AND NIGHT) ATTACHED TO THE VEHICLE.

CONTRACTOR IS REQUIRED TO ADHERE TO ALL RULES AND REGULATIONS AS SET BY OXR AND ADVISORY CIRCULAR 150/5370-2G, OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION.

ALL APPROVED DRIVERS MUST ATTEND THE AIRPORT DRIVING CLASS. THIS TRAINING IS REQUIRED FOR ALL PERSONNEL THAT ARE REQUIRED TO OPERATE A VEHICLE IN THE AOA WITHOUT AN ESCORT.

VEHICLE TRAFFIC LOCATED IN OR CROSSING AN ACTIVE MOVEMENT AREA MUST BE ESCORTED BY THE RESIDENT PROJECT REPRESENTATIVE OR A KEY CONTRACTOR PERSONNEL WHO HAS ATTENDED THE AIRPORT DRIVER DRAINING WHO WILL BE IN RADIO CONTACT WITH THE TOWER. THE DRIVER, THROUGH PERSONAL OBSERVATION, SHOULD CONFIRM THAT NO AIRCRAFT IS APPROACHING THE VEHICLE POSITION. CONTRACTOR PERSONNEL MAY OPERATE IN THE MOVEMENT AREA WITHOUT TWO-WAY RADIO COMMUNICATION PROVIDED A NOTAM IS ISSUED CLOSING THE AREA AND THE AREA IS PROPERLY MARKED TO PREVENT INCURSIONS.

5. CONTRACTOR ACCESS (CONTINUED)

CONTINUOUS MONITORING IS REQUIRED ONLY WHEN EQUIPMENT MOVEMENT IS NECESSARY IN CERTAIN AREAS. CONTRACTOR SHALL NOT COMMUNICATE DIRECTLY WITH THE TOWER OR CTAF. ALL TOWER COMMUNICATION SHALL BE PERFORMED BY AIRPORT OPERATIONS.

CONTRACTOR IS REQUIRED TO NOTIFY AND COORDINATE WITH THE RESIDENT ENGINEER AND AIRPORT OPERATIONS PRIOR TO ENTERING ANY ACTIVE SURFACE SAFETY AREAS OR OBJECT FREE AREAS.

CONTRACTOR, SUBCONTRACTOR, AND SUPPLIER EMPLOYEES OR ANY UNAUTHORIZED PERSONS ARE RESTRICTED FROM ENTERING AN AIRPORT AREA THAT WOULD BE HAZARDOUS.

6. WILDLIFE MANAGEMENT

CONTRACTOR SHALL ADHERE TO ALL WILDLIFE MANAGEMENT PRACTICES AS STATED IN ADVISORY CIRCULAR 150/5200-33 (LATEST EDITION), HAZARDOUS WILDLIFE ATTRACTIONS ON OR NEAR AIRPORTS, AND CERTALERT 98-08, GRASSES ATTRACTIVE TO HAZARDOUS WILDLIFE.

CONTRACTOR IS RESPONSIBLE FOR COMPLETING A DAILY INSPECTION FOR TRASH, FOREIGN OBJECTS, AND STANDING WATER ON THE CONSTRUCTION SITE THAT MIGHT ATTRACT WILDLIFE.

CONTRACTOR SHALL MAINTAIN ALL FENCES AND GATES THROUGHOUT THE PROJECT TO THE SATISFACTION OF THE RESIDENT ENGINEER.

CONTRACTOR SHALL NOTIFY THE RESIDENT ENGINEER WHEN A WILDLIFE SIGHTING HAS OCCURRED ON THE PROJECT SITE.

7. FOREIGN OBJECT DEBRIS (FOD) MANAGEMENT

CONTRACTOR SHALL KEEP ALL PAVEMENTS IN THE AOA INCLUDING APRONS, TAXIWAYS, AND RUNWAYS FREE FROM FOD AT ALL TIMES TO PREVENT ANY DEBRIS FROM BEING INGESTED INTO AN AIRCRAFT'S ENGINE OR ANY DEBRIS FROM BEING LAUNCHED DUE TO JET BLAST.

CONTRACTOR IS REQUIRED TO CONTINUOUSLY MONITOR AND MAINTAIN FOD TO THE SATISFACTION OF THE RESIDENT ENGINEER.

PRIOR TO OPENING ANY PAVEMENT TO AIRCRAFT, THE CONTRACTOR, RESIDENT ENGINEER, AND AIRPORT OPERATIONS SHALL CONDUCT A SWEEP OF THE PAVEMENT TO VERIFY THAT THE PAVEMENT IS FREE FROM FOD.

THE CONTRACTOR IS ADVISED THAT DUST CONTROL, CLEANUP OF ACTIVE PAVEMENTS, TRACKING DEBRIS ONTO ACTIVE PAVEMENT AND GENERAL JOBSITE CLEANLINESS IS A SERIOUS SAFETY CONCERN. FOREIGN OBJECT DEBRIS (FOD) IS CONSIDERED AS ANY ITEM THAT COULD POSSIBLY IMPACT THE OPERATIONS OF AN AIRPORT OR ROADWAY. FOD COULD CAUSE INJURY OR DEATH THROUGH INGESTION IN MOVING AIRCRAFT ENGINES. SPECIFIC ITEMS OF CONCERN INCLUDE, BUT ARE NOT LIMITED TO; ANY PACKAGING FROM MATERIAL INSTALLATION, GRAVEL LEFT ON ACTIVE PAVEMENTS, DUST TRACKED ONTO ACTIVE PAVEMENTS, HAND TOOLS, HARDWARE DROPPED, ETC.

8. HAZARDOUS MATERIAL (HAZMAT) MANAGEMENT

CONTRACTOR SHALL NOTIFY RESIDENT ENGINEER AND AIRPORT EMERGENCY PERSONNEL IF HAZARDOUS MATERIALS ARE ENCOUNTERED ON THIS PROJECT.

9. NOTIFICATION OF CONSTRUCTION ACTIVITIES

AGENCY NAME	AGENCY TYPE	TELEPHONE
AIRPORT EMERGENCY	AIRCRAFT RESCUE AND FIRE FIGHTING	(805) 947-6804 OR 911
OXNARD POLICE DEPARTMENT	POLICE DEPARTMENT	(805) 385-7600 OR 911
OXNARD FIRE DEPARTMENT	FIRE RESCUE	911
VENTURA COUNTY MEDICAL CENTER	HOSPITAL	(805) 652-6000 OR 911
AIRPORT OPERATIONS	AIRPORT OPERATIONS	(805) 947-6804
JVIATION CONSTRUCTION MANAGER	CONSTRUCTION MANAGEMENT	TBD

BEFORE BEGINNING ANY CONSTRUCTION ACTIVITY, THE CONTRACTOR MUST, THROUGH THE RESIDENT ENGINEER AND AIRPORT OPERATIONS, GIVE NOTICE USING THE NOTICE TO AIR MISSIONS (NOTAM) SYSTEM OF PROPOSED LOCATION, TIME, AND DATE OF COMMENCEMENT OF CONSTRUCTION. THE NOTAM SHOULD STATE THAT, "PERSONNEL AND EQUIPMENT ARE WORKING ADJACENT TO RUNWAY 7/25 AND ASSOCIATED TAXIWAY CONNECTORS." ALL NOTAMS SHALL BE ISSUED BY OXR . UPON COMPLETION OF WORK AND RETURN OF ALL SUCH AREAS TO STANDARD CONDITIONS, THE CONTRACTOR MUST COORDINATE WITH THE RESIDENT ENGINEER AND VERIFY THE CANCELLATION OF ALL NOTICES ISSUED VIA THE NOTAM SYSTEM. THROUGHOUT THE PROJECT DURATION, THE CONTRACTOR MUST:

9. NOTIFICATION OF CONSTRUCTION ACTIVITIES (CONTINUED)

A. BE AWARE OF AND UNDERSTAND THE SAFETY PROBLEMS AND HAZARDS DESCRIBED IN ADVISORY CIRCULAR 150/5370-2G, OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION.
B. CONDUCT ACTIVITIES SO AS NOT TO VIOLATE ANY SAFETY STANDARDS CONTAINED IN ADVISORY CIRCULAR 150/5370-2G OR ANY OF THE REFERENCES THEREIN.
C. INSPECT ALL CONSTRUCTION AND STORAGE AREAS AS OFTEN AS NECESSARY TO BE AWARE OF CONDITIONS.
D. PROMPTLY TAKE ALL ACTIONS NECESSARY TO PREVENT OR REMEDY ANY UNSAFE OR POTENTIALLY UNSAFE CONDITIONS AS SOON AS THEY ARE DISCOVERED.
E. THE CONTRACTOR SHALL ADHERE TO THE REQUIREMENTS, PROVISIONS, AND PROCEDURES OUTLINED IN CONSTRUCTION SAFETY PHASING PLAN (SEE DIV. 6 OF THE CONTRACT DOCUMENTS).

ANY CHANGES TO SCOPE OR SCHEDULE MUST BE NOTIFIED TO THE RESIDENT ENGINEER AND OXNARD AIRPORT OPERATIONS MANAGER SO THAT NOTAMS CAN BE ISSUED, MAINTAINED, AND CANCELED. IN AN EVENT OF AN EMERGENCY, CONTRACTOR SHALL NOTIFY THE RESIDENT ENGINEER, OXNARD AIRPORT OPERATIONS MANAGER, AND AIRPORT EMERGENCY.

10. INSPECTION REQUIREMENTS

CONTRACTOR SHALL COMPLETE A DAILY INSPECTION FOR SAFETY ON THE PROJECT SITE BY COMPLETING THE CHECKLIST PROVIDED IN ADVISORY CIRCULAR 150/5370-2G, APPENDIX D, CONSTRUCTION PROJECT DAILY SAFETY INSPECTION CHECKLIST.

THE CONTRACTOR, RESIDENT ENGINEER AND AIRPORT OPERATOR MUST PERFORM ONSITE INSPECTIONS THROUGHOUT THE PROJECT, WITH IMMEDIATE REMEDY OF ANY DEFICIENCIES, WHETHER CAUSED BY NEGLIGENCE, OVERSIGHT, OR SCOPE CHANGE.

CONTRACTOR SHALL COMPLETE A FINAL INSPECTION FOR SAFETY ON THE PROJECT SITE AT THE END OF EACH PHASE.

11. RUNWAY AND TAXIWAY VISUAL AIDS

FLASHER BARRICADES, CLOSED 'X' MARKINGS AND RUNWAY CLOSURE MARKERS (RCMS) ARE TO BE PLACED AS DETAILED IN THE PLANS AND IN ALL DESIGNATED AREAS AS SHOWN ON THE CONSTRUCTION SAFETY DRAWINGS.

APPROVED FLASHER BARRICADES SHALL BE PROVIDED AND MAINTAINED BY THE CONTRACTOR.

CLOSED 'X' MARKINGS AND RCMS SHALL BE PROVIDED BY THE CONTRACTOR AND MAINTAINED BY THE CONTRACTOR.

CONTRACTOR TO COVER ALL TAXIWAY EDGE LIGHTS, TAXIWAY SIGNS, RUNWAY SIGNS, AND APRON EDGE LIGHTS FOR AREAS CLOSED BY NOTAM TO THE APPROVAL OF THE RESIDENT ENGINEER.

12. MARKING AND SIGNS FOR ACCESS ROUTES

ALL REQUIRED SIGNS AND MARKINGS SHALL CONFORM TO ADVISORY CIRCULAR 150/5340-18 (LATEST EDITION), STANDARD FOR AIRPORT SIGN SYSTEMS, OR THE FEDERAL HIGHWAY ADMINISTRATION MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).

ALL SIGNS ADJACENT TO AREAS USED BY AIRCRAFT MUST COMPLY WITH THE FRANGIBLE REQUIREMENTS AS STATED IN ADVISORY CIRCULAR 150/5220-23, FRANGIBLE CONNECTIONS.

13. HAZARD MARKINGS AND LIGHTING

PRIOR TO CLOSING ANY AREAS IN THE AOA TO AIRCRAFT OR EMERGENCY TRAFFIC, CONTRACTOR MUST CLEARLY DEFINE CLOSED AREAS WITH WARNING LIGHTS, BARRICADES, CLOSED 'X' MARKINGS, RCMS, AND FLAGS TO THE APPROVAL OF THE RESIDENT ENGINEER. CONTRACTOR TO REFER TO CONSTRUCTION SAFETY DRAWINGS.

HAZARDOUS AREAS ON THE MOVEMENT AREA WILL BE MARKED WITH FLASHER BARRICADES. THESE BARRICADES RESTRICT ACCESS AND MAKE HAZARDS OBVIOUS TO AIRCRAFT, PERSONNEL, AND VEHICLES. DURING PERIODS OF LOW VISIBILITY AND AT NIGHT, IDENTIFY HAZARDOUS AREAS WITH RED FLASHING LIGHTS.

OPEN TRENCHES AND EXCAVATIONS MUST BE PROMINENTLY MARKED WITH RED OR ORANGE FLAGS AND LIGHTS AS APPROVED BY THE RESIDENT ENGINEER.

14. PROTECTION OF RUNWAY AND TAXIWAY AREAS

SAFETY AREAS - CONTRACTOR SHALL NOT IMPEDE ON THE SAFETY AREAS WITHOUT A CLOSURE OF THE RUNWAY/TAXIWAY BY MEANS OF A NOTAM.

OBJECT FREE AREAS - CONTRACTOR SHALL NOT PLACE EQUIPMENT, MATERIAL, OR STOCKPILES IN THIS AREA. ALL OBJECTS OR MATERIALS ADJACENT TO THIS AREA SHALL BE PROPERLY MARKED/LIT PER ADVISORY CIRCULAR 150/5370-2G. CONTRACTOR CANNOT WORK IN ACTIVE TAXIWAY OBJECT FREE AREA WITHOUT WING WALKERS TO MAINTAIN A 5' CLEARANCE FROM THE WINGSPAN OF THE AIRCRAFT TO CONSTRUCTION EQUIPMENT OR MATERIAL.

OBSTACLE FREE ZONE- CONTRACTOR TO PREVENT PERSONNEL, MATERIAL, AND/OR EQUIPMENT FROM PENETRATING THE OBSTACLE FREE ZONE AS DEFINED IN ADVISORY CIRCULAR 150/5300-13B.

15. AIRPORT SECURITY

CONTRACTOR SHALL ADHERE TO AIRPORT SECURITY REQUIREMENTS AT ALL TIMES. KEY CONSTRUCTION SUPERINTENDENTS AND ANY OTHER PERSONNEL DEEMED NECESSARY BY THE AIRPORT/CONTRACTOR SHALL ATTEND THE DRIVER CONSTRUCTION TRAINING TO OBTAIN AN AIRPORT ELECTRONIC ENTRY CARD AT THE EXPENSE OF THE CONTRACTOR PRIOR TO CONSTRUCTION. ALL OTHER CONSTRUCTION PERSONNEL SHALL BE ESCORTED AT ALL TIMES DURING AIRSIDE CONSTRUCTION.

16. OTHER LIMITATIONS ON CONSTRUCTION

PROHIBITING OPEN-FLAME WELDING OR TORCH CUTTING OPERATIONS UNLESS ADEQUATE FIRE SAFETY PRECAUTIONS ARE PROVIDED AND THESE OPERATIONS HAVE BEEN AUTHORIZED BY THE AIRPORT OPERATOR (AS TAILORED TO CONFORM TO LOCAL REQUIREMENTS AND RESTRICTIONS).

PROMINENTLY MARKING OPEN TRENCHES, EXCAVATIONS, AND STOCKPILED MATERIALS AT THE CONSTRUCTION AND LIGHTING THESE OBSTACLES DURING HOURS OF RESTRICTED VISIBILITY AND DARKNESS.

MARKING AND LIGHTING CLOSED, DECEPTIVE, AND HAZARDOUS AREAS ON AIRPORTS, AS APPROPRIATE. CONSTRAINING STOCKPILED MATERIAL TO PREVENT ITS MOVEMENT AS A RESULT OF THE MAXIMUM ANTICIPATED AIRCRAFT BLAST AND FORECAST WIND CONDITIONS.

NO USE OF TALL EQUIPMENTS (CRANES, CONCRETE PUMPS, AND SO ON) UNLESS A FAA 7460-1 DETERMINATION LETTER IS ISSUED FOR SUCH EQUIPMENT.

NO USE OF ELECTRICAL BLASTING CAPS ON OR WITHIN 1,000' OF THE AIRPORT PROPERTY.

NO USE OF FLARE POTS WITHIN THE AOA.

17. DUST CONTROL

CONTRACTOR IS RESPONSIBLE FOR CONTROLLING DUST FROM THE CONSTRUCTION SITE AT ALL TIMES. CONTRACTOR SHALL HAVE A WATER TRUCK AND OPERATOR AVAILABLE 24 HOURS A DAY TO CONTROL DUST. THE PROJECT'S LOCATION IS NEAR ACTIVE RUNWAYS AND HIGHWAYS AND IS IN A LOCATION THAT EXPERIENCES HIGH WIND. IT IS CRITICAL FOR THE CONTRACTOR TO KEEP DUST TO AN ABSOLUTE MINIMUM BOTH DURING CONSTRUCTION, AND AFTER CONSTRUCTION UNTIL THE EXPOSED SURFACES CONTAIN SUSTAINABLE VEGETATION. CONTRACTOR SHALL PROVIDE THE RESIDENT ENGINEER AND AIRPORT OPERATIONS WITH A CONTACT FOR 24 HOUR DUST CONTROL.

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF
TAXIWAY F

CONSTRUCTION SAFETY NOTES & DETAILS

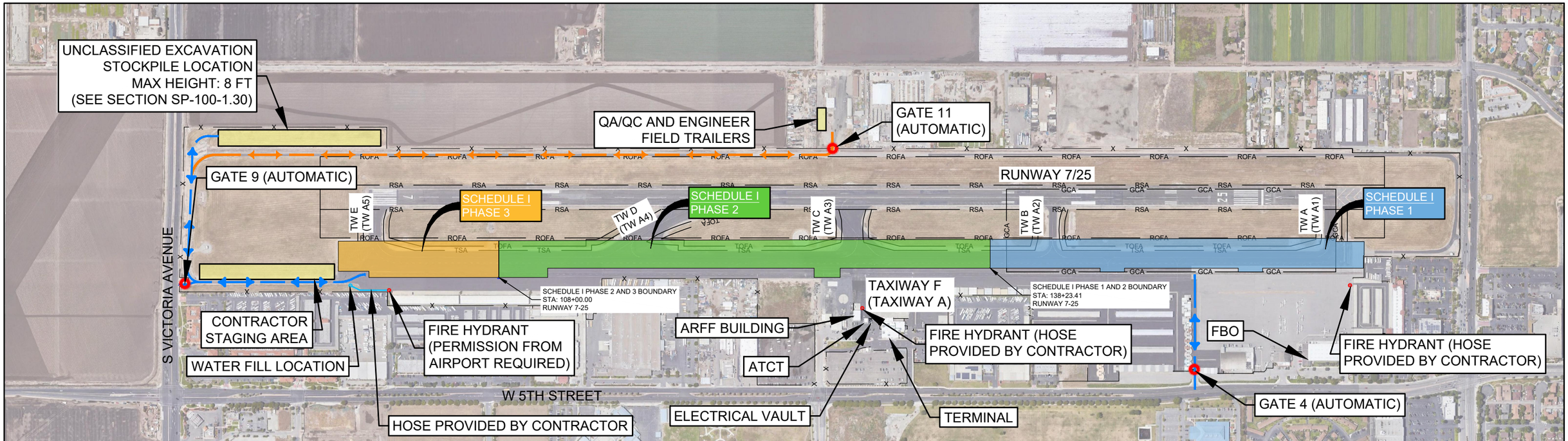
AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME
G050

SHEET NO.
13 of 89

DRAWING NO.
1598-DOA

Plotted May 25, 2023 @ 9:37 AM by: Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\000-OXR-043-G050-SAFE.dwg



MOBILIZATION AND CONSTRUCTION SCHEDULE - 90 CALENDAR DAYS

SCHEDULE / PHASE	DURATION
SCHEDULE I	90 CALENDAR DAYS
SCHEDULE I, PRECONSTRUCTION MOBILIZATION	10 CALENDAR DAYS
SCHEDULE I, PHASE 1	28 CALENDAR DAYS
SCHEDULE I, PHASE 2	32 CALENDAR DAYS
SCHEDULE I, PHASE 3	20 CALENDAR DAYS

0 20 40 60 80 100 120

PHASING LEGEND

- CONTRACTOR HAUL ROUTE
- QC/QA TRAILER ACCESS ROUTE
- RSA — RUNWAY SAFETY AREA
- ROFA — RUNWAY OBJECT FREE AREA
- TSA — TAXIWAY SAFETY AREA (PROPOSED)
- TOFA — TAXIWAY OBJECT FREE AREA (PROPOSED)
- RPZ — RUNWAY PROTECTION ZONE
- GCA — GLIDE SLOPE CRITICAL AREA
- NAVAID CRITICAL AREA
- X — AOA FENCE
- CONTRACTOR GATE ACCESS
- FLAG PERSONNEL / GATE GUARD
- TAXIWAY TEMPORARY CLOSURE "X" (MATERIAL PER DETAIL 1/G050)
- RUNWAY CLOSURE LIGHTED "X"

SAFETY & OBJECT FREE AREAS

RUNWAY 7/25 - ADG B-II	
RUNWAY SAFETY AREA (RSA)	75' FROM RW CENTERLINE
RUNWAY OBJECT FREE AREA (ROFA)	250' FROM RW CENTERLINE
TAXIWAYS - TDG 2	
TAXIWAY SAFETY AREA (TSA)	39.5' FROM TW CENTERLINE
TAXIWAY OBJECT FREE AREA (TOFA)	62' FROM TW CENTERLINE

TAXIWAY NAME CHANGES

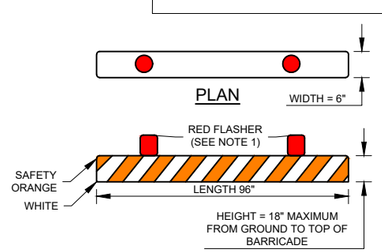
EXISTING DESIGNATOR*	PROPOSED DESIGNATOR
TAXIWAY F	TAXIWAY A
TAXIWAY A	TAXIWAY A1
TAXIWAY B	TAXIWAY A2
TAXIWAY C	TAXIWAY A3
TAXIWAY D	TAXIWAY A4
TAXIWAY E	TAXIWAY A5

* EXISTING TAXIWAY DESIGNATORS WILL CHANGE TO PROPOSED TAXIWAY DESIGNATORS AS PART OF THE OXNARD AIRPORT TAXIWAY A-E RECONSTRUCTION PROJECT SET TO BE COMPLETED BY AUGUST, 2023.

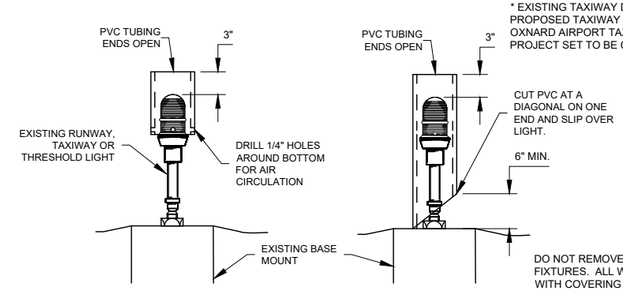
N

GRAPHIC SCALE
300 0 300 600
(IN FEET)

1. FLASHER BARRICADES SHALL HAVE SOLAR FLASHING LIGHTS PER SP-100-1.12 AND WILL BE PROVIDED AND MAINTAINED BY THE CONTRACTOR AT ALL TIMES. CONTRACTOR SHALL ALSO PROVIDE SPARE BARRICADES, BATTERIES, AND LIGHT BULBS FOR MAINTENANCE DURING NIGHTTIME HOURS.
2. LOW-PROFILE BARRICADES TO BE PLACED AT 4' INTERVALS ADJACENT TO CONSTRUCTION, AS DIRECTED BY THE ENGINEER AND AS SHOWN ON THE PHASING SHEETS.
3. BARRICADES ARE TO BE PLACED IN LOCATIONS SHOWN ON THE PLANS AND AS DIRECTED BY THE ENGINEER THROUGHOUT ALL PHASES OF THE PROJECT. THE BARRICADE LOCATIONS PROVIDED ON THIS SHEET SHALL REMAIN THROUGHOUT CONSTRUCTION. ADDITIONAL BARRICADES WILL BE REQUIRED ACROSS PHASE SPECIFIC AREAS OF CLOSED PAVEMENT, AND ARE SHOWN ON PHASING SHEETS.
4. FLASHER BARRICADES WILL BE REQUIRED ALONG THE EDGE OF ANY VERTICAL DROP OFF GREATER THAN 3". AIRPORT OPERATIONS WILL ISSUE NOTAM TO ADVISE AIRCRAFT OF THIS CONDITION.
5. FLASHER BARRICADES ARE TO BE ADEQUATELY WEIGHTED SO THEY WILL REMAIN IN PLACE DURING TIMES OF HIGH WINDS OR AS APPROVED BY THE ENGINEER.



1 FLASHER BARRICADE DETAIL
NOT TO SCALE



2 TYPICAL COVERED LIGHT DETAILS
NTS

DO NOT REMOVE LIGHT BULBS FROM FIXTURES. ALL WORK ASSOCIATED WITH COVERING LIGHT FIXTURES SHALL BE CONSIDERED INCIDENTAL TO CONSTRUCTION OPERATIONS.

LOCATIONS OF COVERED LIGHT FIXTURES ARE LOCATED WITHIN THE CLOSURES ASSOCIATED WITH THE PHASING PLANS AND AS DIRECTED BY THE RPR OR AIRPORT.

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER JOHN DUANE INGRAM No. C058505 05/23/2023 CIVIL STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION® A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF TAXIWAY F

CONSTRUCTION SAFETY OVERALL PHASING PLAN

AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME G051
SHEET NO. 14 of 89
DRAWING NO. 1599-DOA

Plotted May 25, 2023 @ 9:37 AM by Bell, Robert
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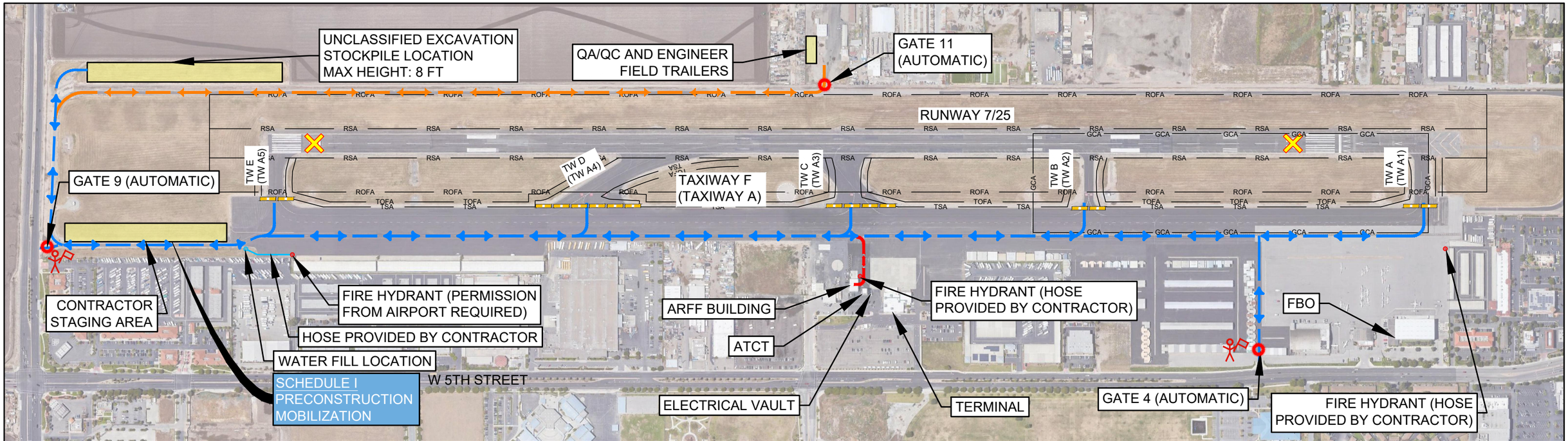


CONSTRUCTION PHASING NOTES

SCHEDULE 1 - PRECONSTRUCTION MOBILIZATION

DURATION
10 CALENDAR DAYS WITH 2 NIGHT CLOSURES DURING THIS PHASE

CONTRACTOR ACCESS TIMES (DAYTIME OPERATIONS)

- 24 HOUR ACCESS TO STAGING AREAS
- ALL AIRPORT OPERATION AREAS SHALL BE OPEN AND UNAFFECTED DURING THIS PHASE EXCEPT FOR NIGHTTIME WORK

CONTRACTOR ACCESS TIMES (NIGHTTIME OPERATIONS)

- NIGHTTIME ACCESS TO APPROVED WORK AREAS. THE CLOSURE WILL BEGIN NO EARLIER THAN 2200 AND WILL END NO LATER THAN 0600 ON THE FOLLOWING DAY. CONTRACTOR WORK HOURS WILL BE FROM 2200 TO 0600 TO ALLOW TIME FOR CLEANUP, AIRPORT INSPECTION AND TO ENSURE THAT RUNWAY 7/25 IS READY FOR DAYTIME OPENING AND ALL NAVAIDS ARE OPERATIONAL. THE CONTRACTOR MUST BE COMPLETELY OFF RUNWAY 7/25 AND ALL TRENCHES FILLED BY 0600.
- ALL AIRPORT OPERATION AREAS SHALL BE CLOSED DURING NIGHT TIME CLOSURES.
- TAXIWAY CONNECTOR BARRICADES SHALL BE REMOVED PRIOR TO OPENING THE RUNWAY EACH MORNING.

MAJOR WORK TO BE COMPLETED

MOBILIZATION

1. CONSTRUCTION EQUIPMENT AND MATERIAL MOBILIZATION

UTILITY

1. UTILITY POTHOLING

IMPACTS ON OPERATIONS

1. THE CONTRACTOR SHALL GIVE RIGHT OF WAY TO ALL AIRCRAFT AND EMERGENCY VEHICLES AT ALL TIMES.
2. THE CONTRACTOR SHALL MAINTAIN EMERGENCY VEHICLE ACCESS TO THE RUNWAY AT ALL TIMES.
3. IF AN EMERGENCY SITUATION ARISES REQUIRING AN AIRCRAFT TO UTILIZE THE RUNWAY AND/OR TAXIWAY DURING CONSTRUCTION, ALL EQUIPMENT AND PERSONNEL SHALL IMMEDIATELY EXIT THE RUNWAY AND/OR TAXIWAY AND STAGE OUTSIDE THE OBJECT FREE AREA.
4. NO WORK, OPEN EXCAVATIONS, EQUIPMENT, STOCKPILES, OR PERSONNEL ARE ALLOWED IN THE SAFETY AREAS OR OBJECT FREE AREAS FOR ANY ACTIVE TAXIWAY OR SAFETY AREAS FOR AN ACTIVE RUNWAY WHEN THE AIRPORT IS OPEN AND OPERATIONAL.
5. PRIOR TO OPENING THE RUNWAY OR TAXIWAY EACH MORNING TO AIRCRAFT, ALL AIRFIELD PAVEMENT WHERE WORK HAS OCCURRED OR EQUIPMENT HAS TRAVERSED SHALL BE SWEPT OR CLEARED WITH APPROVED EQUIPMENT TO REMOVE ANY FOD. ALL EXCAVATIONS AND TRENCHES IN THE SAFETY AREAS SHALL BE BACKFILLED AND COMPACTED TO P-152 SPECIFICATIONS. GRADING WITHIN THE SAFETY AREA SHALL CONFORM TO AC 150/5300-13 (CURRENT VERSION), CHAPTER 3. NO DROPS GREATER THAN 3-INCHES ARE ALLOWED IN THE RUNWAY SAFETY AREA. IF AREAS ARE FOUND TO BE DEFICIENT, THE CONTRACTOR MUST IMMEDIATELY CORRECT THE DEFICIENCY TO THE SATISFACTION OF THE RPR OR OXR STAFF. APPROVAL TO REOPEN TO AIRCRAFT TRAFFIC WILL BE PROVIDED BY AIRPORT OPERATIONS OR THE RPR.
6. AIRPORT PERIMETER SECURITY SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE QUALIFIED GATE GUARDS ALONG CONSTRUCTION ACCESS POINTS AT AIRPORT PERIMETER GATE LOCATIONS. GATES SHALL BE SECURELY CLOSED OR LOCKED AT ALL TIMES IF GATE GUARD IS NOT PRESENT OR GATES ARE NOT IN USE.
7. CONTRACTOR TO PROVIDE RUNWAY CLOSURE MARKERS (RCM's). CONTRACTOR SHALL INSTALL RUNWAY CLOSURE MARKERS ON THE "7" AND "25" RUNWAY DESIGNATIONS FOR THE DURATION OF EACH SCHEDULED RUNWAY CLOSURE. CONTRACTOR IS RESPONSIBLE FOR FUEL AND MAINTENANCE OF RUNWAY X'S.
8. CONSTRUCTION MARKERS, BARRICADES, AND RUNWAY CLOSURE MARKERS SHALL BE INSTALLED PER PHASING PLANS AND AS REQUIRED BY AC 150/5370-2 (CURRENT VERSION) OR AS DIRECTED BY THE RPR.
9. ALL STOCKPILES OR EQUIPMENT ADJACENT TO OBJECT FREE AREAS SHALL BE MARKED AND LIGHTED PER AC 150/5370-2 (CURENT VERSION).
10. THE CONTRACTOR SHALL HAVE A SWEEPER OR VACUUM TRUCK ON SITE AT ALL TIMES TO CLEAN DEBRIS FROM HAUL ROUTES, CONSTRUCTION ACCESS POINTS, OR AREAS ADJACENT TO CONSTRUCTION.
11. THE CONTRACTOR SHALL KEEP ALL CONSTRUCTION TRAFFIC LIMITED TO THE APPROVED HAUL ROUTES AS SHOWN ON THE PLANS OR AS APPROVED BY THE RPR. THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE CAUSED ALONG THE HAUL ROUTES OR CONSTRUCTION ACCESS ROUTES TO THE PROJECT SITE. HAUL ROADS WILL BE MAINTAINED AND RESTORED TO THEIR ORIGINAL CONDITION BY THE CONTRACTOR AT NO EXPENSE TO THE SPONSOR.
12. THE CONTRACTOR SHALL MINIMIZE DISTURBANCE IN AND AROUND FAA NAVIGATIONAL AIDS.
13. CONTRACTOR SHALL PARK ALL EQUIPMENT AND VEHICLES IN THE STAGING AREA AT NIGHT AND DURING PERIODS WHEN NO CONSTRUCTION ACTIVITIES ARE TAKING PLACE. NO EQUIPMENT SHALL BE LEFT UNATTENDED WITHIN THE RUNWAY OBJECT FREE AREA (ROFA).

OTHER NOTES

1. AIRPORT MANAGEMENT PERSONNEL WILL ISSUE NOTAM FOR ANY CONTRACTOR SCHEDULED ACTIVITIES AT LEAST 72 HOURS IN ADVANCE OF SAID ACTIVITY.
2. CONSTRUCTION EQUIPMENT THAT MAY DAMAGE AIRFIELD PAVEMENT WHILE CROSSING IT TO ACCESS WORK AREAS, SUCH AS THOSE WITH TRACKS, SHALL PROTECT THE PAVEMENT USING A METHOD APPROVED BY THE RPR.
3. OXR ATCT OPERATION HOURS: 7:00 AM - 9:00 PM LOCAL TIME
   MONITOR OXR GROUND - 121.9 MHZ.

   OXR ATCT CLOSURE HOURS: 9:00 PM TO 7:00 AM LOCAL TIME
   MONITOR OXR CTAF - 134.95 MHZ.
4. CONTRACTOR SHALL PROTECT ALL FAA COMMUNICATION LINES AND ESPECIALLY WHEN WORKING WITHIN EXISTING STORM DRAIN INFRASTRUCTURE. NOTIFY ENGINEER IMMEDIATELY IF DAMAGE OCCURS BY CONTRACTOR OPERATIONS.

PHASING LEGEND

- CONTRACTOR HAUL ROUTE
- QA/QC ACCESS ROUTE
- LIFE & SAFETY ROUTE
- AIRCRAFT TAXI ROUTE
- RSA — RUNWAY SAFETY AREA
- ROFA — RUNWAY OBJECT FREE AREA
- TSA — TAXIWAY SAFETY AREA (PROPOSED)
- TOFA — TAXIWAY OBJECT FREE AREA (PROPOSED)
- GCA — GLIDE SLOPE CRITICAL AREA
- FLASHER BARRICADE
- FLAG PERSONNEL / GATE GUARD
- CONTRACTOR GATE ACCESS
- RUNWAY CLOSURE LIGHTED "X"
- TAXIWAY TEMPORARY CLOSURE "X" (MATERIAL PER AC 150/5370-2 CURRENT EDITION)

N

GRAPHIC SCALE
250 0 250 500
(IN FEET)

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF TAXIWAY F

CONSTRUCTION SAFETY AND PHASING PLAN
SCHEDULE I PRECONSTRUCTION MOBILIZATION

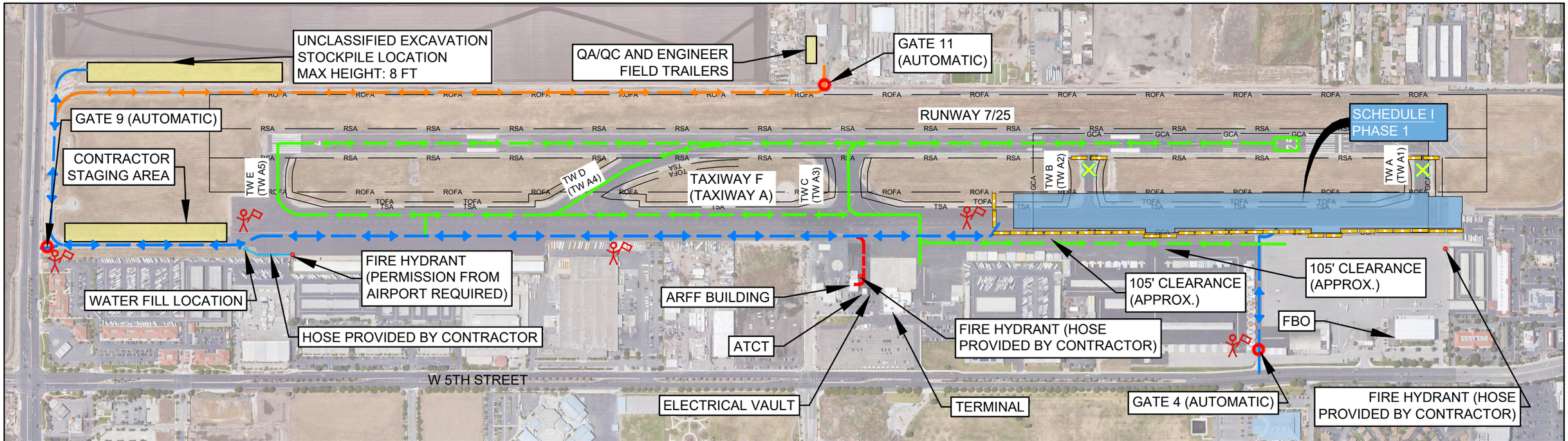
AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME
G052

SHEET NO.
15 of 89

DRAWING NO.
1600-DOA

Plotted May 25, 2023 @ 9:37 AM by Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\000-OXR-043-G052-PHAS.dwg



CONSTRUCTION PHASING NOTES

SCHEDULE I - PHASE 1

DURATION
28 CALENDAR DAYS

CONTRACTOR ACCESS TIMES

- ACCESS TO APPROVED AREAS FROM 0700 TO 1900 EACH DAY.
- ALL AIRPORT OPERATION AREAS SHALL BE OPEN AND UNAFFECTED DURING THIS PHASE EXCEPT FOR THE PORTION OF TAXIWAY F AND CONNECTOR TAXIWAYS SHOWN TO BE CLOSED DURING THIS PHASE.

MAJOR WORK TO BE COMPLETED

SITE PREPARATION

1. EROSION CONTROL MEASURES
2. FULL DEPTH PAVEMENT REMOVALS
3. PARTIAL DEPTH PAVEMENT REMOVALS
4. EXCAVATE FOR PAVEMENT SECTION
5. ELECTRICAL REMOVALS
6. UNDERDRAIN AND STRUCTURE REMOVALS
7. STORM DRAIN REMOVALS

UTILITY

1. INSTALL UNDERDRAIN PIPE, CLEANOUTS, AND MANHOLES
2. CONNECT UNDERDRAIN PIPE TO EXISTING OUTFALLS
3. INSTALLATION OF LIGHT FIXTURES, GUIDANCE SIGNS, INFORMATIONAL SIGN, DUCT BANKS, AND CABLES
4. INSTALL STORM DRAIN PIPE

EARTHWORK

1. UNCLASSIFIED EXCAVATION
2. EMBANKMENT

PAVEMENT SECTION

1. AGGREGATE BASE COURSE
2. LIME AND CEMENT TREATED SUBGRADE
3. ASPHALT PAVING
4. PAVEMENT MARKINGS

SITE RECLAMATION

1. SEEDING WITH HYDROMULCH
2. TOPSOIL
3. EROSION CONTROL MEASURES

IMPACTS ON OPERATIONS

1. THE CONTRACTOR SHALL GIVE RIGHT OF WAY TO ALL AIRCRAFT AND EMERGENCY VEHICLES AT ALL TIMES.
2. THE CONTRACTOR SHALL MAINTAIN EMERGENCY VEHICLE ACCESS TO THE RUNWAY AT ALL TIMES.
3. IF AN EMERGENCY SITUATION ARISES REQUIRING AN AIRCRAFT TO UTILIZE THE RUNWAY AND/OR TAXIWAY DURING CONSTRUCTION, ALL EQUIPMENT AND PERSONNEL SHALL IMMEDIATELY EXIT THE RUNWAY AND/OR TAXIWAY AND STAGE OUTSIDE THE OBJECT FREE AREA.
4. NO WORK, OPEN EXCAVATIONS, EQUIPMENT, STOCKPILES, OR PERSONNEL ARE ALLOWED IN THE SAFETY AREAS OR OBJECT FREE AREAS FOR ANY ACTIVE TAXIWAY OR SAFETY AREAS FOR AN ACTIVE RUNWAY WHEN THE AIRPORT IS OPEN AND OPERATIONAL.
5. AIRPORT PERIMETER SECURITY SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE QUALIFIED GATE GUARDS ALONG CONSTRUCTION ACCESS POINTS AT AIRPORT PERIMETER GATE LOCATIONS. GATES SHALL BE SECURELY CLOSED OR LOCKED AT ALL TIMES IF GATE GUARD IS NOT PRESENT OR GATES ARE NOT IN USE.
6. CONSTRUCTION MARKERS, BARRICADES, AND TAXIWAY CLOSURE MARKERS SHALL BE INSTALLED PER PHASING PLANS AND AS REQUIRED BY AC 150/5370-2 (CURRENT VERSION) OR AS DIRECTED BY THE RPR.
7. ALL STOCKPILES OR EQUIPMENT ADJACENT TO OBJECT FREE AREAS SHALL BE MARKED AND LIGHTED PER AC 150/5370-2 (CURENT VERSION).
8. THE CONTRACTOR SHALL HAVE A SWEEPER OR VACUUM TRUCK ON SITE AT ALL TIMES TO CLEAN DEBRIS FROM HAUL ROUTES, CONSTRUCTION ACCESS POINTS, OR AREAS ADJACENT TO CONSTRUCTION.
9. THE CONTRACTOR SHALL KEEP ALL CONSTRUCTION TRAFFIC LIMITED TO THE APPROVED HAUL ROUTES AS SHOWN ON THE PLANS OR AS APPROVED BY THE RPR. THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE CAUSED ALONG THE HAUL ROUTES OR CONSTRUCTION ACCESS ROUTES TO THE PROJECT SITE. HAUL ROADS WILL BE MAINTAINED AND RESTORED TO THEIR ORIGINAL CONDITION BY THE CONTRACTOR AT NO EXPENSE TO THE SPONSOR.
10. THE CONTRACTOR SHALL MINIMIZE DISTURBANCE IN AND AROUND FAA NAVIGATIONAL AIDS.
11. CONTRACTOR SHALL PARK ALL EQUIPMENT AND VEHICLES IN THE STAGING AREA AT NIGHT AND DURING PERIODS WHEN NO CONSTRUCTION ACTIVITIES ARE TAKING PLACE. NO EQUIPMENT SHALL BE LEFT UNATTENDED WITHIN THE RUNWAY OBJECT FREE AREA (ROFA).
12. ALL LIGHTS AND/OR GUIDANCE SIGNS LEADING TO AND WITHIN CLOSED AREAS SHALL BE DEACTIVATED OR COVERED.

OTHER NOTES

1. AIRPORT MANAGEMENT PERSONNEL WILL ISSUE NOTAM FOR ANY CONTRACTOR SCHEDULED ACTIVITIES AT LEAST 72 HOURS IN ADVANCE OF SAID ACTIVITY.
2. CONSTRUCTION EQUIPMENT THAT MAY DAMAGE AIRFIELD PAVEMENT WHILE CROSSING IT TO ACCESS WORK AREAS, SUCH AS THOSE WITH TRACKS, SHALL PROTECT THE PAVEMENT USING A METHOD APPROVED BY THE RPR.
3. OXR ATCT OPERATION HOURS: 7:00 AM - 9:00 PM LOCAL TIME
   MONITOR OXR GROUND - 121.9 MHZ.

   OXR ATCT CLOSURE HOURS: 9:00 PM TO 7:00 AM LOCAL TIME
   MONITOR OXR CTAF - 134.95 MHZ.
4. CONTRACTOR SHALL PROTECT ALL FAA COMMUNICATION LINES AND ESPECIALLY WHEN WORKING WITHIN EXISTING STORM DRAIN INFRASTRUCTURE. NOTIFY ENGINEER IMMEDIATELY IF DAMAGE OCCURS BY CONTRACTOR OPERATIONS.

PHASING LEGEND

- CONTRACTOR HAUL ROUTE
- QA/QC ACCESS ROUTE
- LIFE & SAFETY ROUTE
- AIRCRAFT TAXI ROUTE
- RSA — RUNWAY SAFETY AREA
- ROFA — RUNWAY OBJECT FREE AREA
- TSA — TAXIWAY SAFETY AREA (PROPOSED)
- TOFA — TAXIWAY OBJECT FREE AREA (PROPOSED)
- GCA — GLIDE SLOPE CRITICAL AREA
- FLASHER BARRICADE
- FLAG PERSONNEL / GATE GUARD
- CONTRACTOR GATE ACCESS
- TAXIWAY TEMPORARY CLOSURE "X" (MATERIAL PER AC 150/5370-2 CURRENT EDITION)

N

GRAPHIC SCALE
250 0 250 500
(IN FEET)

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF TAXIWAY F

CONSTRUCTION SAFETY AND PHASING PLAN
SCHEDULE I, PHASE 1

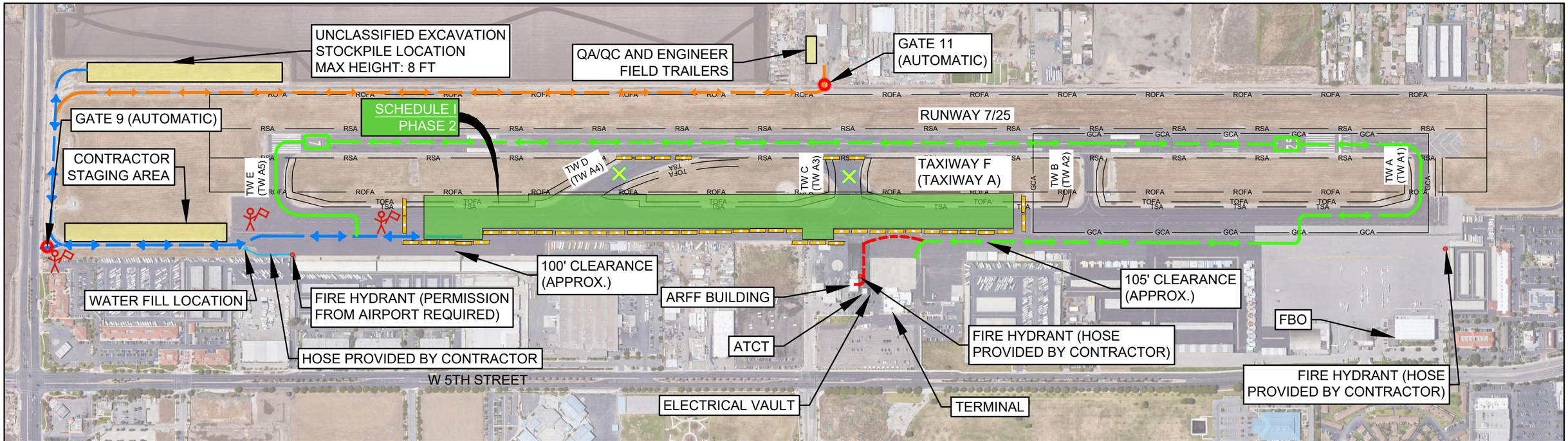
AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME
G053

SHEET NO.
16 of 89

DRAWING NO.
1601-DOA

Plotted May 25, 2023 @ 9:37 AM by Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\000-OXR-043-G053-PHAS.dwg



CONSTRUCTION PHASING NOTES

SCHEDULE I - PHASE 2

DURATION
32 CALENDAR DAYS

CONTRACTOR ACCESS TIMES

- ACCESS TO APPROVED AREAS FROM 0700 TO 1900 EACH DAY.
- ALL AIRPORT OPERATION AREAS SHALL BE OPEN AND UNAFFECTED DURING THIS PHASE EXCEPT FOR THE PORTION OF TAXIWAY F AND CONNECTOR TAXIWAYS SHOWN TO BE CLOSED DURING THIS PHASE.

MAJOR WORK TO BE COMPLETED

SITE PREPARATION

1. EROSION CONTROL MEASURES
2. FULL DEPTH PAVEMENT REMOVALS
3. PARTIAL DEPTH PAVEMENT REMOVALS
4. EXCAVATE FOR PAVEMENT SECTION
5. ELECTRICAL REMOVALS
6. UNDERDRAIN AND STRUCTURE REMOVALS
7. STORM DRAIN REMOVALS

UTILITY

1. INSTALL UNDERDRAIN PIPE, CLEANOUTS, AND MANHOLES
2. CONNECT UNDERDRAIN PIPE TO EXISTING OUTFALLS
3. INSTALLATION OF LIGHT FIXTURES, GUIDANCE SIGNS, INFORMATIONAL SIGN, DUCT BANKS, AND CABLES
4. INSTALL STORM DRAIN PIPE

EARTHWORK

1. UNCLASSIFIED EXCAVATION
2. EMBANKMENT

PAVEMENT SECTION

1. AGGREGATE BASE COURSE
2. LIME AND CEMENT TREATED SUBGRADE
3. ASPHALT PAVING
4. PAVEMENT MARKINGS

SITE RECLAMATION

1. SEEDING WITH HYDROMULCH
2. TOPSOIL
3. EROSION CONTROL MEASURES

IMPACTS ON OPERATIONS

1. THE CONTRACTOR SHALL GIVE RIGHT OF WAY TO ALL AIRCRAFT AND EMERGENCY VEHICLES AT ALL TIMES.
2. THE CONTRACTOR SHALL MAINTAIN EMERGENCY VEHICLE ACCESS TO THE RUNWAY AT ALL TIMES.
3. IF AN EMERGENCY SITUATION ARISES REQUIRING AN AIRCRAFT TO UTILIZE THE RUNWAY AND/OR TAXIWAY DURING CONSTRUCTION, ALL EQUIPMENT AND PERSONNEL SHALL IMMEDIATELY EXIT THE RUNWAY AND/OR TAXIWAY AND STAGE OUTSIDE THE OBJECT FREE AREA.
4. NO WORK, OPEN EXCAVATIONS, EQUIPMENT, STOCKPILES, OR PERSONNEL ARE ALLOWED IN THE SAFETY AREAS OR OBJECT FREE AREAS FOR ANY ACTIVE TAXIWAY OR SAFETY AREAS FOR AN ACTIVE RUNWAY WHEN THE AIRPORT IS OPEN AND OPERATIONAL.
5. AIRPORT PERIMETER SECURITY SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE QUALIFIED GATE GUARDS ALONG CONSTRUCTION ACCESS POINTS AT AIRPORT PERIMETER GATE LOCATIONS. GATES SHALL BE SECURELY CLOSED OR LOCKED AT ALL TIMES IF GATE GUARD IS NOT PRESENT OR GATES ARE NOT IN USE.
6. CONSTRUCTION MARKERS, BARRICADES, AND TAXIWAY CLOSURE MARKERS SHALL BE INSTALLED PER PHASING PLANS AND AS REQUIRED BY AC 150/5370-2 (CURRENT VERSION) OR AS DIRECTED BY THE RPR.
7. ALL STOCKPILES OR EQUIPMENT ADJACENT TO OBJECT FREE AREAS SHALL BE MARKED AND LIGHTED PER AC 150/5370-2 (CURENT VERSION).
8. THE CONTRACTOR SHALL HAVE A SWEEPER OR VACUUM TRUCK ON SITE AT ALL TIMES TO CLEAN DEBRIS FROM HAUL ROUTES, CONSTRUCTION ACCESS POINTS, OR AREAS ADJACENT TO CONSTRUCTION.
9. THE CONTRACTOR SHALL KEEP ALL CONSTRUCTION TRAFFIC LIMITED TO THE APPROVED HAUL ROUTES AS SHOWN ON THE PLANS OR AS APPROVED BY THE RPR. THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE CAUSED ALONG THE HAUL ROUTES OR CONSTRUCTION ACCESS ROUTES TO THE PROJECT SITE. HAUL ROADS WILL BE MAINTAINED AND RESTORED TO THEIR ORIGINAL CONDITION BY THE CONTRACTOR AT NO EXPENSE TO THE SPONSOR.
10. THE CONTRACTOR SHALL MINIMIZE DISTURBANCE IN AND AROUND FAA NAVIGATIONAL AIDS.
11. CONTRACTOR SHALL PARK ALL EQUIPMENT AND VEHICLES IN THE STAGING AREA AT NIGHT AND DURING PERIODS WHEN NO CONSTRUCTION ACTIVITIES ARE TAKING PLACE. NO EQUIPMENT SHALL BE LEFT UNATTENDED WITHIN THE RUNWAY OBJECT FREE AREA (ROFA).
12. ALL LIGHTS AND/OR GUIDANCE SIGNS LEADING TO AND WITHIN CLOSED AREAS SHALL BE DEACTIVATED OR COVERED.

OTHER NOTES

1. AIRPORT MANAGEMENT PERSONNEL WILL ISSUE NOTAM FOR ANY CONTRACTOR SCHEDULED ACTIVITIES AT LEAST 72 HOURS IN ADVANCE OF SAID ACTIVITY.
2. CONSTRUCTION EQUIPMENT THAT MAY DAMAGE AIRFIELD PAVEMENT WHILE CROSSING IT TO ACCESS WORK AREAS, SUCH AS THOSE WITH TRACKS, SHALL PROTECT THE PAVEMENT USING A METHOD APPROVED BY THE RPR.
3. OXR ATCT OPERATION HOURS: 7:00 AM - 9:00 PM LOCAL TIME
   MONITOR OXR GROUND - 121.9 MHZ.

   OXR ATCT CLOSURE HOURS: 9:00 PM TO 7:00 AM LOCAL TIME
   MONITOR OXR CTAF - 134.95 MHZ.
4. CONTRACTOR SHALL PROTECT ALL FAA COMMUNICATION LINES AND ESPECIALLY WHEN WORKING WITHIN EXISTING STORM DRAIN INFRASTRUCTURE. NOTIFY ENGINEER IMMEDIATELY IF DAMAGE OCCURS BY CONTRACTOR OPERATIONS.

PHASING LEGEND

- CONTRACTOR HAUL ROUTE
- QA/QC ACCESS ROUTE
- LIFE & SAFETY ROUTE
- AIRCRAFT TAXI ROUTE
- RSA — RUNWAY SAFETY AREA
- ROFA — RUNWAY OBJECT FREE AREA
- TSA — TAXIWAY SAFETY AREA (PROPOSED)
- TOFA — TAXIWAY OBJECT FREE AREA (PROPOSED)
- GCA — GLIDE SLOPE CRITICAL AREA
- FLASHER BARRICADE
- FLAG PERSONNEL / GATE GUARD
- CONTRACTOR GATE ACCESS
- TAXIWAY TEMPORARY CLOSURE "X" (MATERIAL PER AC 150/5370-2 CURRENT EDITION)

N

GRAPHIC SCALE
250 0 250 500
(IN FEET)

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF TAXIWAY F

CONSTRUCTION SAFETY AND PHASING PLAN
SCHEDULE I, PHASE 2

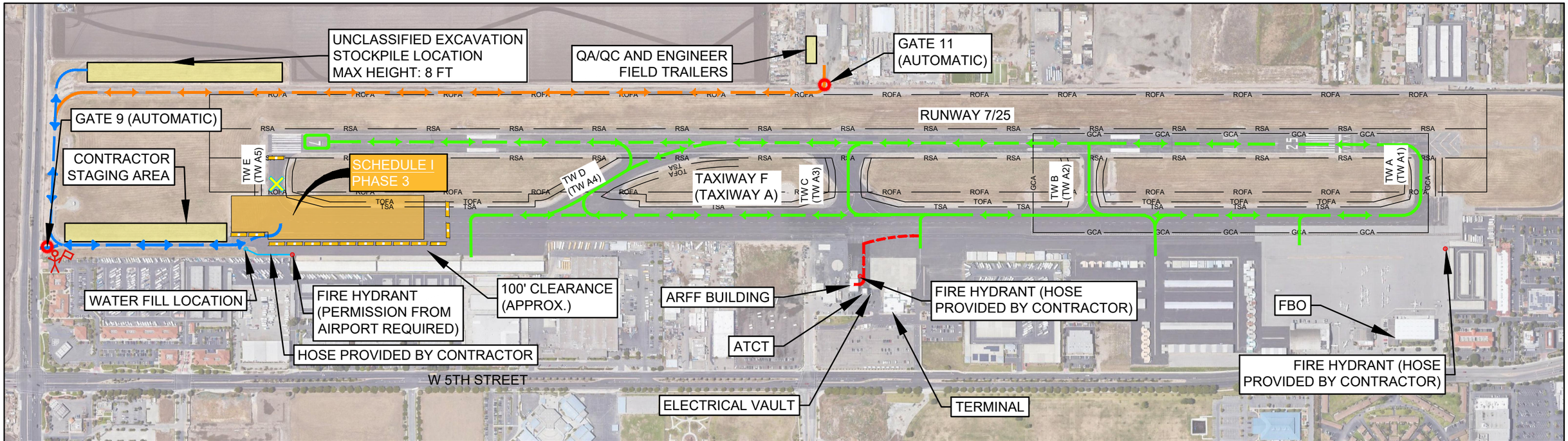
AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME
G054

SHEET NO.
17 of 89

DRAWING NO.
1602-DOA

Plotted May 25, 2023 @ 9:39 AM by Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\000-OXR-043-G054-PHAS.dwg



CONSTRUCTION PHASING NOTES

SCHEDULE I - PHASE 3

DURATION
20 CALENDAR DAYS

CONTRACTOR ACCESS TIMES

- ACCESS TO APPROVED AREAS FROM 0700 TO 1900 EACH DAY.
- ALL AIRPORT OPERATION AREAS SHALL BE OPEN AND UNAFFECTED DURING THIS PHASE EXCEPT FOR THE PORTION OF TAXIWAY F AND CONNECTOR TAXIWAYS SHOWN TO BE CLOSED DURING THIS PHASE.

MAJOR WORK TO BE COMPLETED

SITE PREPARATION

1. EROSION CONTROL MEASURES
2. FULL DEPTH PAVEMENT REMOVALS
3. PARTIAL DEPTH PAVEMENT REMOVALS
4. EXCAVATE FOR PAVEMENT SECTION
5. ELECTRICAL REMOVALS
6. UNDERDRAIN AND STRUCTURE REMOVALS
7. STORM DRAIN REMOVALS

UTILITY

1. INSTALL UNDERDRAIN PIPE, CLEANOUTS, AND MANHOLES
2. CONNECT UNDERDRAIN PIPE TO EXISTING OUTFALLS
3. INSTALLATION OF LIGHT FIXTURES, GUIDANCE SIGNS, INFORMATIONAL SIGN, DUCT BANKS, AND CABLES
4. INSTALL STORM DRAIN PIPE

EARTHWORK

1. UNCLASSIFIED EXCAVATION
2. EMBANKMENT
3. SUBGRADE PREPARATION

PAVEMENT SECTION

1. AGGREGATE BASE COURSE
2. LIME AND CEMENT TREATED SUBGRADE
3. ASPHALT PAVING
4. PAVEMENT MARKINGS

SITE RECLAMATION

1. SEEDING WITH HYDROMULCH
2. TOPSOIL
3. EROSION CONTROL MEASURES

IMPACTS ON OPERATIONS

1. THE CONTRACTOR SHALL GIVE RIGHT OF WAY TO ALL AIRCRAFT AND EMERGENCY VEHICLES AT ALL TIMES.
2. THE CONTRACTOR SHALL MAINTAIN EMERGENCY VEHICLE ACCESS TO THE RUNWAY AT ALL TIMES.
3. IF AN EMERGENCY SITUATION ARISES REQUIRING AN AIRCRAFT TO UTILIZE THE RUNWAY AND/OR TAXIWAY DURING CONSTRUCTION, ALL EQUIPMENT AND PERSONNEL SHALL IMMEDIATELY EXIT THE RUNWAY AND/OR TAXIWAY AND STAGE OUTSIDE THE OBJECT FREE AREA.
4. NO WORK, OPEN EXCAVATIONS, EQUIPMENT, STOCKPILES, OR PERSONNEL ARE ALLOWED IN THE SAFETY AREAS OR OBJECT FREE AREAS FOR ANY ACTIVE TAXIWAY OR SAFETY AREAS FOR AN ACTIVE RUNWAY WHEN THE AIRPORT IS OPEN AND OPERATIONAL.
5. AIRPORT PERIMETER SECURITY SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE QUALIFIED GATE GUARDS ALONG CONSTRUCTION ACCESS POINTS AT AIRPORT PERIMETER GATE LOCATIONS. GATES SHALL BE SECURELY CLOSED OR LOCKED AT ALL TIMES IF GATE GUARD IS NOT PRESENT OR GATES ARE NOT IN USE.
6. CONSTRUCTION MARKERS, BARRICADES, AND TAXIWAY CLOSURE MARKERS SHALL BE INSTALLED PER PHASING PLANS AND AS REQUIRED BY AC 150/5370-2 (CURRENT VERSION) OR AS DIRECTED BY THE RPR.
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8. THE CONTRACTOR SHALL HAVE A SWEEPER OR VACUUM TRUCK ON SITE AT ALL TIMES TO CLEAN DEBRIS FROM HAUL ROUTES, CONSTRUCTION ACCESS POINTS, OR AREAS ADJACENT TO CONSTRUCTION.
9. THE CONTRACTOR SHALL KEEP ALL CONSTRUCTION TRAFFIC LIMITED TO THE APPROVED HAUL ROUTES AS SHOWN ON THE PLANS OR AS APPROVED BY THE RPR. THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE CAUSED ALONG THE HAUL ROUTES OR CONSTRUCTION ACCESS ROUTES TO THE PROJECT SITE. HAUL ROADS WILL BE MAINTAINED AND RESTORED TO THEIR ORIGINAL CONDITION BY THE CONTRACTOR AT NO EXPENSE TO THE SPONSOR.
10. THE CONTRACTOR SHALL MINIMIZE DISTURBANCE IN AND AROUND FAA NAVIGATIONAL AIDS.
11. CONTRACTOR SHALL PARK ALL EQUIPMENT AND VEHICLES IN THE STAGING AREA AT NIGHT AND DURING PERIODS WHEN NO CONSTRUCTION ACTIVITIES ARE TAKING PLACE. NO EQUIPMENT SHALL BE LEFT UNATTENDED WITHIN THE RUNWAY OBJECT FREE AREA (ROFA).
12. ALL LIGHTS AND/OR GUIDANCE SIGNS LEADING TO AND WITHIN CLOSED AREAS SHALL BE DEACTIVATED OR COVERED.

OTHER NOTES

1. AIRPORT MANAGEMENT PERSONNEL WILL ISSUE NOTAM FOR ANY CONTRACTOR SCHEDULED ACTIVITIES AT LEAST 72 HOURS IN ADVANCE OF SAID ACTIVITY.
2. CONSTRUCTION EQUIPMENT THAT MAY DAMAGE AIRFIELD PAVEMENT WHILE CROSSING IT TO ACCESS WORK AREAS, SUCH AS THOSE WITH TRACKS, SHALL PROTECT THE PAVEMENT USING A METHOD APPROVED BY THE RPR.
3. OXR ATCT OPERATION HOURS: 7:00 AM - 9:00 PM LOCAL TIME
   MONITOR OXR GROUND - 121.9 MHZ.

   OXR ATCT CLOSURE HOURS: 9:00 PM TO 7:00 AM LOCAL TIME
   MONITOR OXR CTAF - 134.95 MHZ.
4. CONTRACTOR SHALL PROTECT ALL FAA COMMUNICATION LINES AND ESPECIALLY WHEN WORKING WITHIN EXISTING STORM DRAIN INFRASTRUCTURE. NOTIFY ENGINEER IMMEDIATELY IF DAMAGE OCCURS BY CONTRACTOR OPERATIONS.

PHASING LEGEND

- CONTRACTOR HAUL ROUTE
- QA/QC ACCESS ROUTE
- LIFE & SAFETY ROUTE
- AIRCRAFT TAXI ROUTE
- RSA — RUNWAY SAFETY AREA
- ROFA — RUNWAY OBJECT FREE AREA
- TSA — TAXIWAY SAFETY AREA (PROPOSED)
- TOFA — TAXIWAY OBJECT FREE AREA (PROPOSED)
- GCA — GLIDE SLOPE CRITICAL AREA
- FLASHER BARRICADE
- FLAG PERSONNEL / GATE GUARD
- CONTRACTOR GATE ACCESS
- TAXIWAY TEMPORARY CLOSURE "X" (MATERIAL PER AC 150/5370-2 CURRENT EDITION)

N

GRAPHIC SCALE
250 0 250 500
(IN FEET)

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF TAXIWAY F

CONSTRUCTION SAFETY AND PHASING PLAN
SCHEDULE I, PHASE 3

AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME
G055

SHEET NO.
18 of 89

DRAWING NO.
1603-DOA

Plotted May 25, 2023 @ 9:39 AM by Bell, Robert
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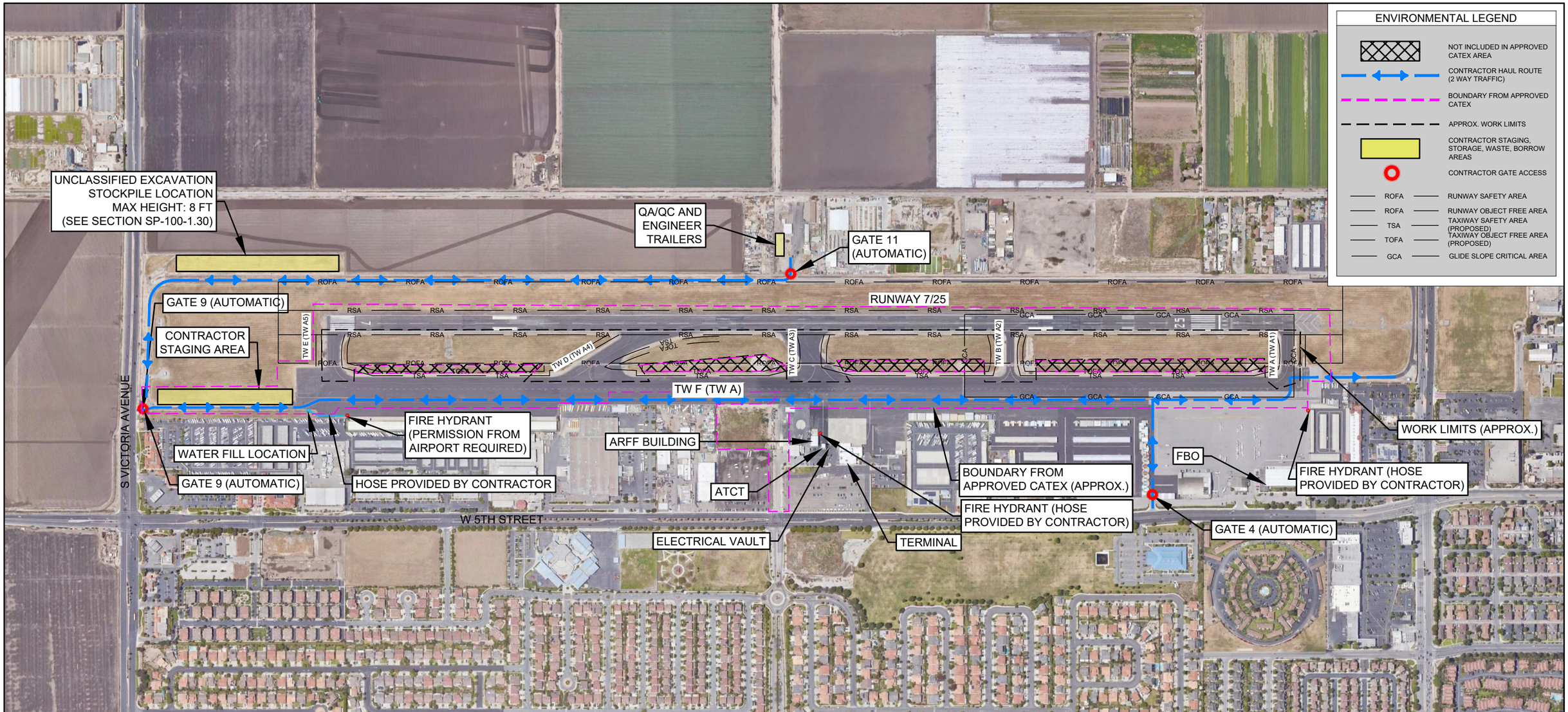

NOTES:

1. THE CONTRACTOR SHALL ENSURE CONFORMANCE WITH SPECIFIC ENVIRONMENTAL REQUIREMENTS FROM THE APPROVED ENVIRONMENTAL DOCUMENTATION:
   - 1.1. WILDLIFE SPECIFIC REQUIREMENTS
   - 1.2. WETLANDS SPECIFIC REQUIREMENTS
   - 1.3. WATERWAYS SPECIFIC REQUIREMENTS
   - 1.4. CULTURAL SITE SPECIFIC REQUIREMENTS
2. THE CONTRACTOR IS REQUIRED TO CONFORM TO THE SITE LAYOUT, AS INDICATED IN THE CONSTRUCTION PLANS. THIS INCLUDES: PROJECT WORK LIMITS, HAUL ROUTES, STAGING AREAS, STORAGE AREAS, WASTE AREAS, AND BORROW AREAS.
3. ALL CHANGES TO THE SITE LAYOUT SHALL BE REVIEWED AND APPROVED BY THE RPR PRIOR TO MAKING ANY CHANGES:
   - 3.1. CONTRACTOR TO SUBMIT, IN WRITING TO THE RPR, A REQUEST TO MODIFY THE SITE LAYOUT (PROJECT WORK LIMITS, HAUL ROUTES, STAGING & STORAGE AREAS, BORROW & WASTE AREAS). IT IS THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE ENOUGH DOCUMENTATION TO JUSTIFY THE CHANGE.
   - 3.2. THE PROPOSED CHANGE WILL BE REVIEWED BY THE RPR AND THE SPONSOR.
   - 3.3. THE RPR WILL COORDINATE WITH FAA ENVIRONMENTAL TO OBTAIN CLEARANCE. ALLOW AT LEAST 2 WEEKS FOR FAA APPROVAL. NO ADDITIONAL DAYS WILL BE PROVIDED FOR THE REVIEW & APPROVAL PERIOD.
   - 3.4. SHOULD THE FAA DETERMINE THAT ADDITIONAL ENVIRONMENTAL REVIEWS ARE REQUIRED AS A RESULT OF THE PROPOSED CHANGES, THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COST AND COORDINATION FOR ANY ENVIRONMENTAL REVIEWS.
   - 3.5. A REVISED SITE LAYOUT PLAN WILL BE PRODUCED TO DOCUMENT THE CHANGE.
4. FOR DETAILED WORK LIMITS:
   - 4.1. REFER TO SHEET SERIES C100 FOR DEMOLITION LIMITS
   - 4.2. REFER TO SHEET SERIES C200 FOR GEOMETRY LIMITS
   - 4.3. REFER TO SHEET SERIES C300 FOR GRADING LIMITS
   - 4.4. REFER TO SHEET SERIES C900 FOR EROSION CONTROL LIMITS

N

GRAPHIC SCALE
300 0 300 600
(IN FEET)

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER JOHN DUANE INGRAM No. C058505 05/23/2023 CIVIL STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION® A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF TAXIWAY F

ENVIRONMENTAL REQUIREMENTS

AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME G100

SHEET NO. 19 of 89

DRAWING NO. 1604-DOA

Plotted May 25, 2023 @ 9:38 AM by Ball, Robert
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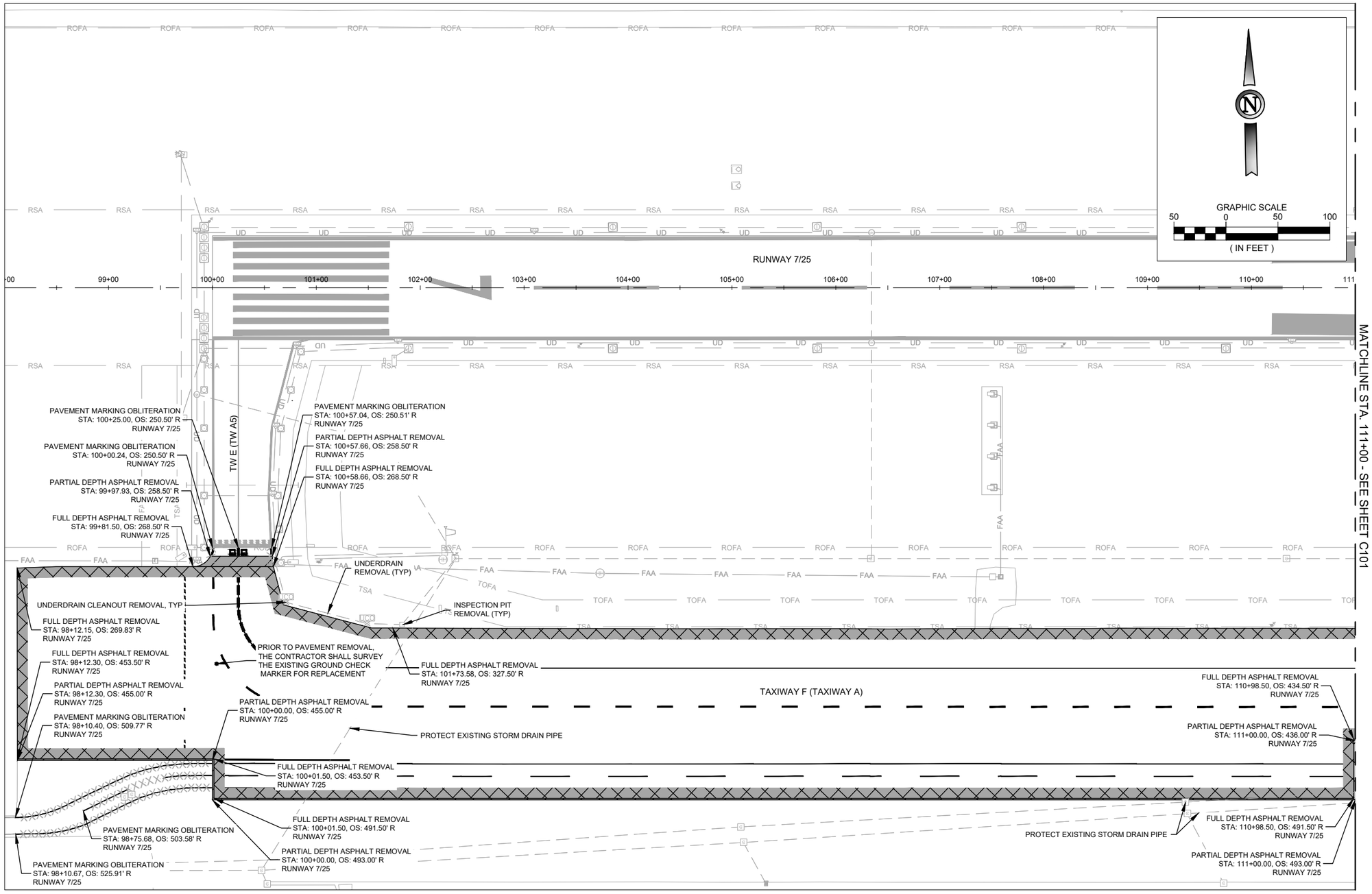

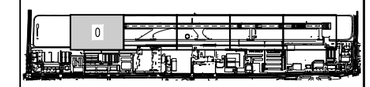

DEMOLITION LEGEND

- FULL DEPTH ASPHALT PAVEMENT REMOVAL
- 2" PARTIAL DEPTH ASPHALT PAVEMENT REMOVAL
- XXXXXX PAVEMENT MARKING OBLITERATION
- EXISTING UNDERDRAIN REMOVAL
- UNDERDRAIN CLEANOUT REMOVAL
- INSPECTION PIT REMOVAL

NOTES:

1. DEMOLITION OF EXISTING PAVEMENTS SHALL BE PERFORMED WITHIN THE CONSTRUCTION PHASING PLAN PARAMETERS. SEE PHASING SHEETS.
2. CONTRACTOR SHALL SUBMIT A PROCEDURE FOR REMOVING EXISTING PAVEMENT AT THE CORNERS OF THE PARTIAL REMOVAL AREA TO THE ENGINEER NO LATER THAN SEVEN (7) DAYS PRIOR TO THE START OF THE ROTOMILLING OPERATIONS.
3. CONTRACTOR MAY ELECT TO SAW ALTERNATE BUTT JOINT WIDTH TO ACCOMMODATE PAVING EQUIPMENT, SUBJECT TO APPROVAL OF THE RESIDENT ENGINEER. ADDITIONAL MATERIAL WILL NOT BE DIRECTLY PAID FOR, BUT WILL BE INCIDENTAL TO THE CONSTRUCTION OF THE BUTT JOINT.
4. CONTRACTOR SHALL LOCATE ALL EXISTING UTILITIES PRIOR TO DEMOLITION ACTIVITIES. ANY DAMAGE TO EXISTING UTILITIES SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE.
5. SEE SHEET G051 FOR LOCATIONS OF ON-SITE STOCKPILE LOCATIONS FOR THE DURATION OF THE PROJECT ONLY. CONTAMINATED EXCESS UNCLASSIFIED EXCAVATION SHALL BE HAULED TO THE ONSITE LOCATION MARKED ON SHEET G051. ALL OTHER EXCESS MATERIAL SHALL BE DISPOSED OF OFF SITE AT A SITE DETERMINED BY THE CONTRACTOR.
6. ANY PAVEMENT DAMAGED DURING REMOVAL OUTSIDE THE PROPOSED REMOVAL LIMITS SHALL BE SQUARED OFF TO THE SATISFACTION OF THE ENGINEER. ALL COSTS ASSOCIATED WITH THE ADDITIONAL REMOVAL AND RECONSTRUCTION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
7. FULL DEPTH ASPHALT PAVEMENT REMOVAL INCLUDES THE REMOVAL OF ANY UNDERLYING ASPHALT PAVEMENT AND STABILIZED BASE LAYERS.
8. PAVEMENT REMOVAL SHALL BE PAID PER SQUARE YARD AND IS INDEPENDENT OF DEPTH AND THICKNESS.
9. UNCLASSIFIED EXCAVATION INCLUDES THE REMOVAL AND DISPOSAL OF STABILIZED SOILS.
10. SEE SHEET C150 FOR DEMOLITION DETAILS.

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF TAXIWAY F

DEMOLITION PLAN
STA. 98+00 TO STA. 111+00
RUNWAY 7/25

AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME C100
SHEET NO. 20 of 89
DRAWING NO. 1605-DOA

Plotted May 25, 2023 @ 9:39 AM by Bell, Robert
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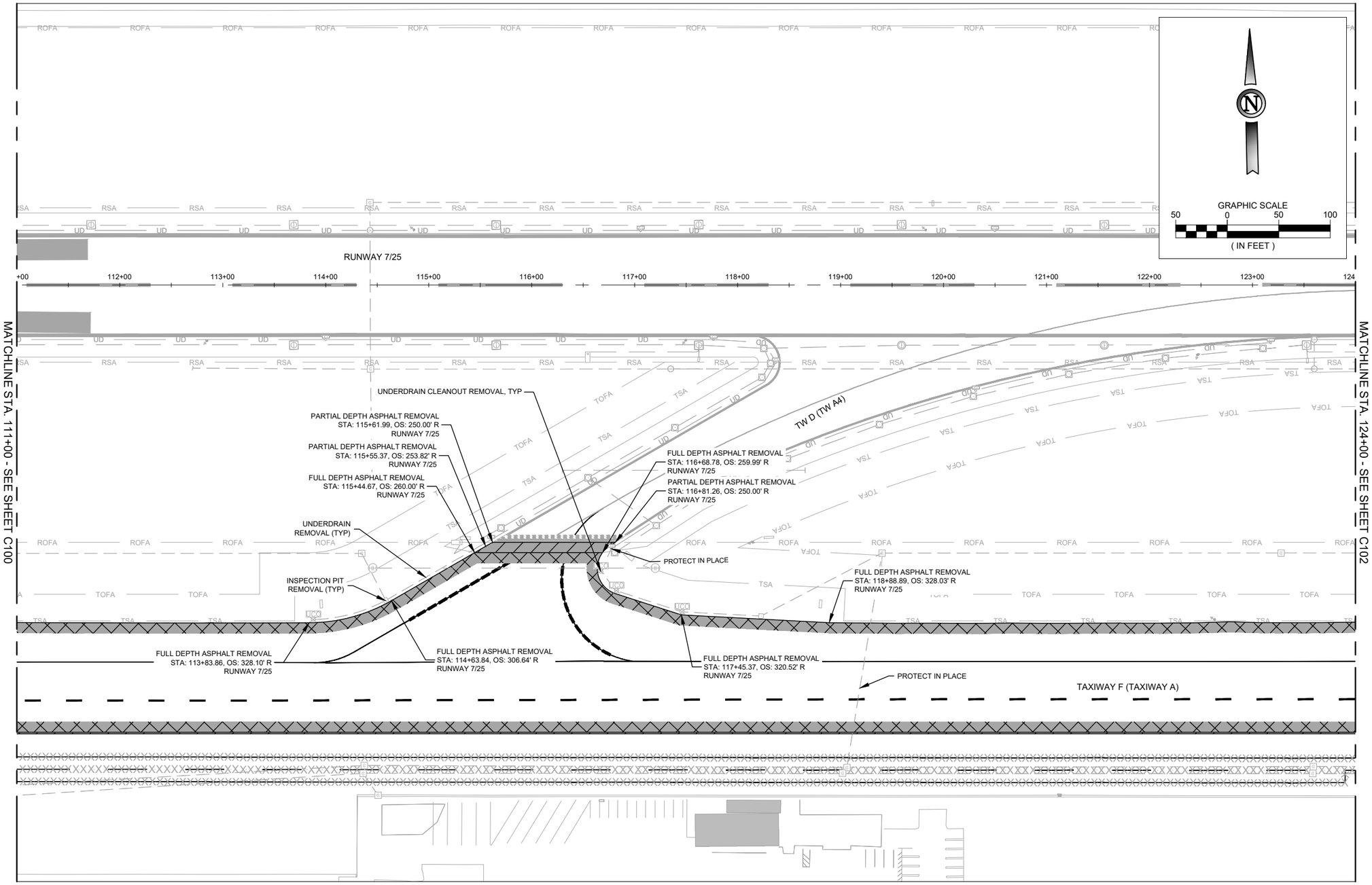

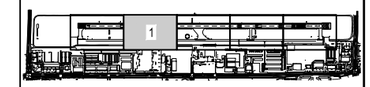

DEMOLITION LEGEND

- FULL DEPTH ASPHALT PAVEMENT REMOVAL
- 2" PARTIAL DEPTH ASPHALT PAVEMENT REMOVAL
- XXXXXX PAVEMENT MARKING OBLITERATION
- EXISTING UNDERDRAIN REMOVAL
- UNDERDRAIN CLEANOUT REMOVAL
- INSPECTION PIT REMOVAL

NOTES:

1. DEMOLITION OF EXISTING PAVEMENTS SHALL BE PERFORMED WITHIN THE CONSTRUCTION PHASING PLAN PARAMETERS. SEE PHASING SHEETS.
2. CONTRACTOR SHALL SUBMIT A PROCEDURE FOR REMOVING EXISTING PAVEMENT AT THE CORNERS OF THE PARTIAL REMOVAL AREA TO THE ENGINEER NO LATER THAN SEVEN (7) DAYS PRIOR TO THE START OF THE ROTOMILLING OPERATIONS.
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8. PAVEMENT REMOVAL SHALL BE PAID PER SQUARE YARD AND IS INDEPENDENT OF DEPTH AND THICKNESS.
9. UNCLASSIFIED EXCAVATION INCLUDES THE REMOVAL AND DISPOSAL OF STABILIZED SOILS.
10. SEE SHEET C150 FOR DEMOLITION DETAILS.

ISSUED FOR BID

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF
TAXIWAY F

DEMOLITION PLAN
STA. 111+00 TO STA. 124+00
RUNWAY 7/25

AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME
C101

SHEET NO.
21 of 89

DRAWING NO.
1606-DOA

Plotted May 25, 2023 @ 9:39 AM by Bell, Robert
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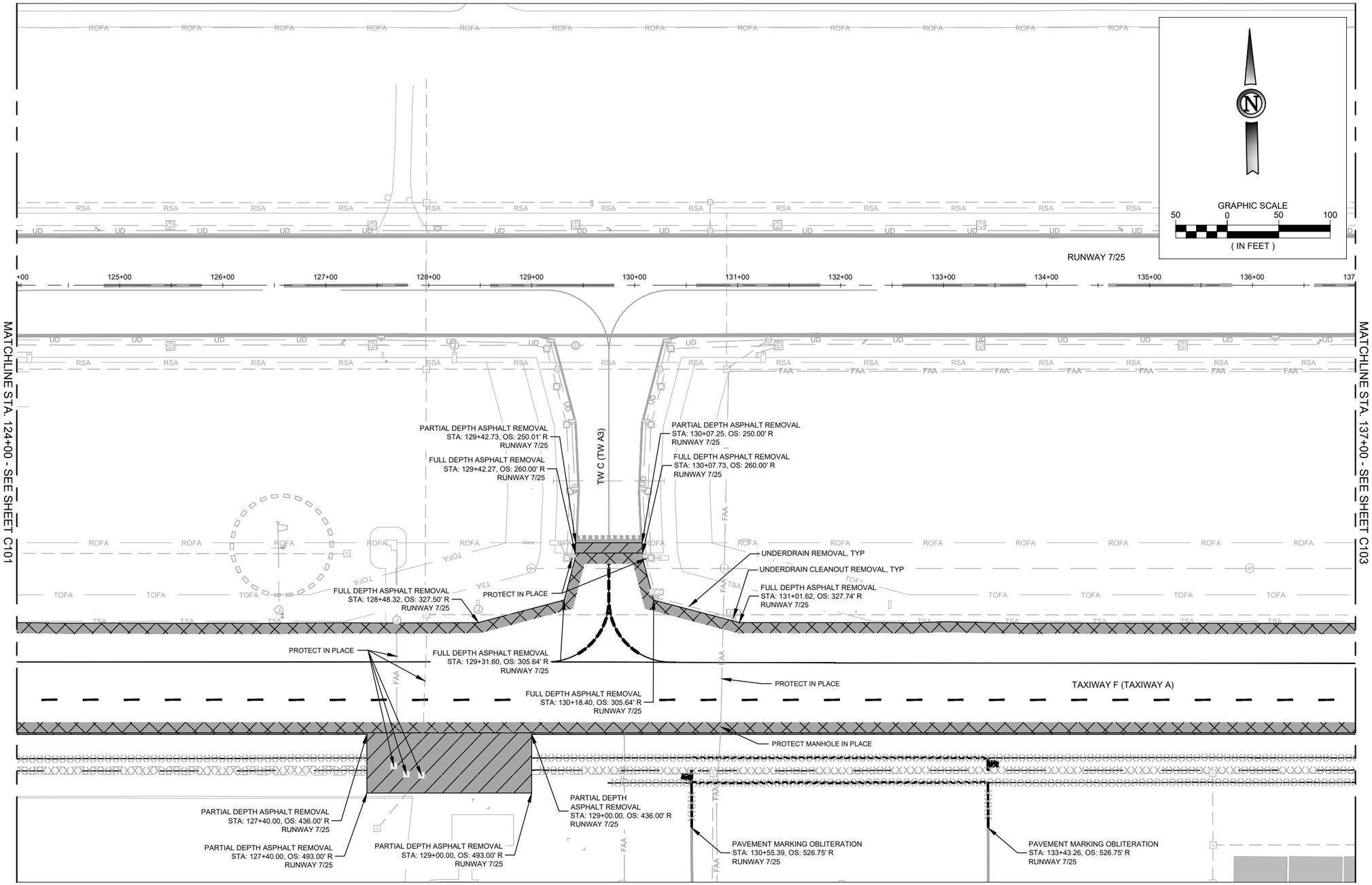

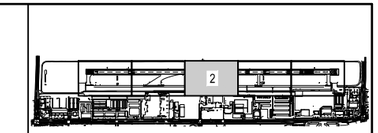

DEMOLITION LEGEND

- FULL DEPTH ASPHALT PAVEMENT REMOVAL
- 2" PARTIAL DEPTH ASPHALT PAVEMENT REMOVAL
- XXXXXX PAVEMENT MARKING OBLITERATION
- EXISTING UNDERDRAIN REMOVAL
- UNDERDRAIN CLEANOUT REMOVAL
- INSPECTION PIT REMOVAL

NOTES:

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9. UNCLASSIFIED EXCAVATION INCLUDES THE REMOVAL AND DISPOSAL OF STABILIZED SOILS.
10. SEE SHEET C150 FOR DEMOLITION DETAILS.

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF TAXIWAY F

DEMOLITION PLAN
STA. 124+00 TO STA. 137+00
RUNWAY 7/25

AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME C102
SHEET NO. 22 of 89
DRAWING NO. 1607-DOA

Plotted May 25, 2023 @ 9:39 AM by Bell, Robert
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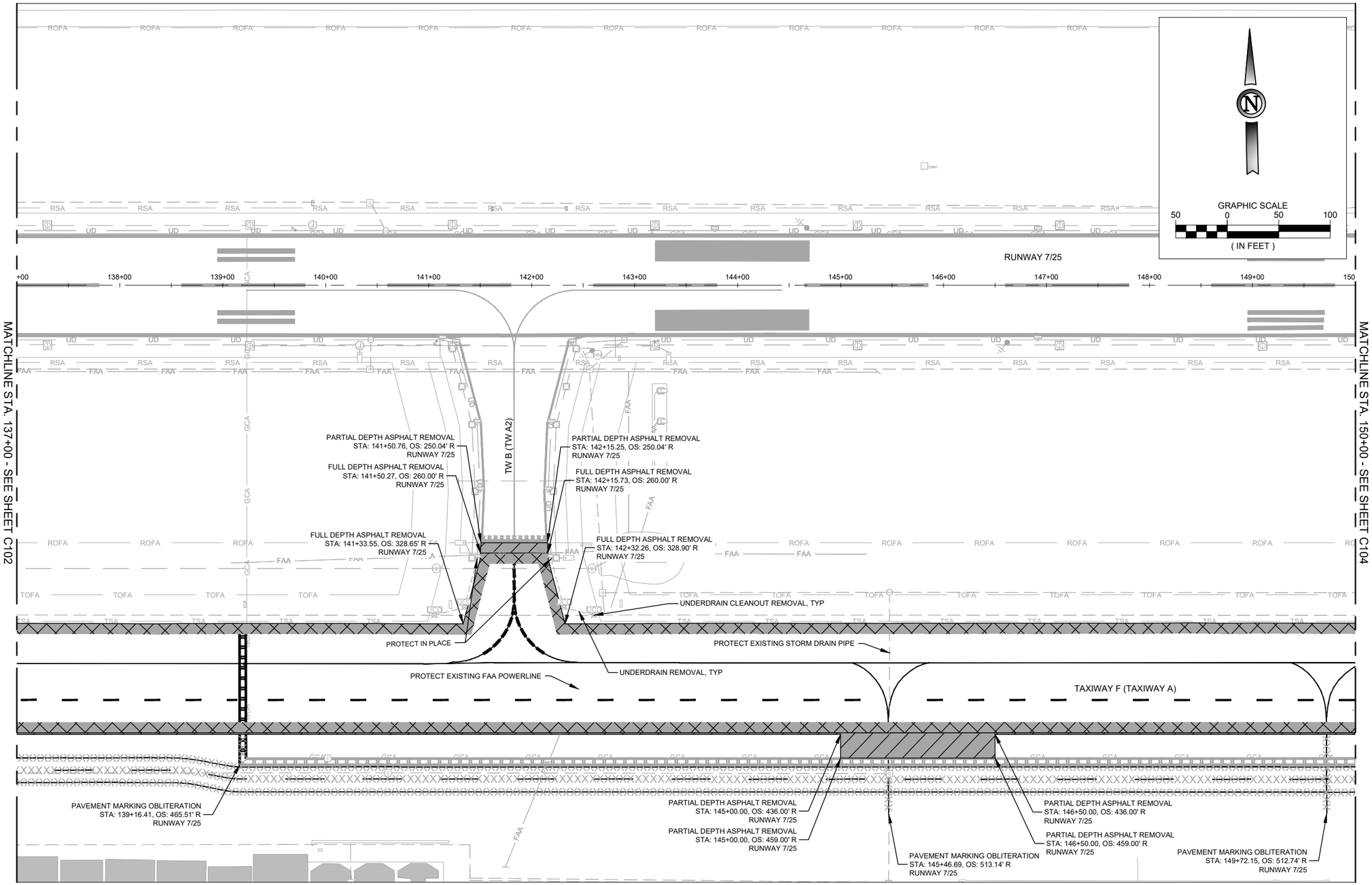

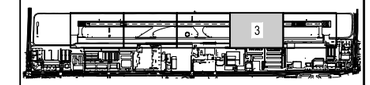

DEMOLITION LEGEND

- FULL DEPTH ASPHALT PAVEMENT REMOVAL
- 2" PARTIAL DEPTH ASPHALT PAVEMENT REMOVAL
- XXXXXX PAVEMENT MARKING OBLITERATION
- EXISTING UNDERDRAIN REMOVAL
- UNDERDRAIN CLEANOUT REMOVAL
- INSPECTION PIT REMOVAL

NOTES:

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9. UNCLASSIFIED EXCAVATION INCLUDES THE REMOVAL AND DISPOSAL OF STABILIZED SOILS.
10. SEE SHEET C150 FOR DEMOLITION DETAILS.

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF
TAXIWAY F

DEMOLITION PLAN
STA. 137+00 TO STA. 150+00
RUNWAY 7/25

AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME
C103

SHEET NO.
23 of 89

DRAWING NO.
1608-DOA

Plotted May 25, 2023 @ 9:39 AM by: Bell, Robert
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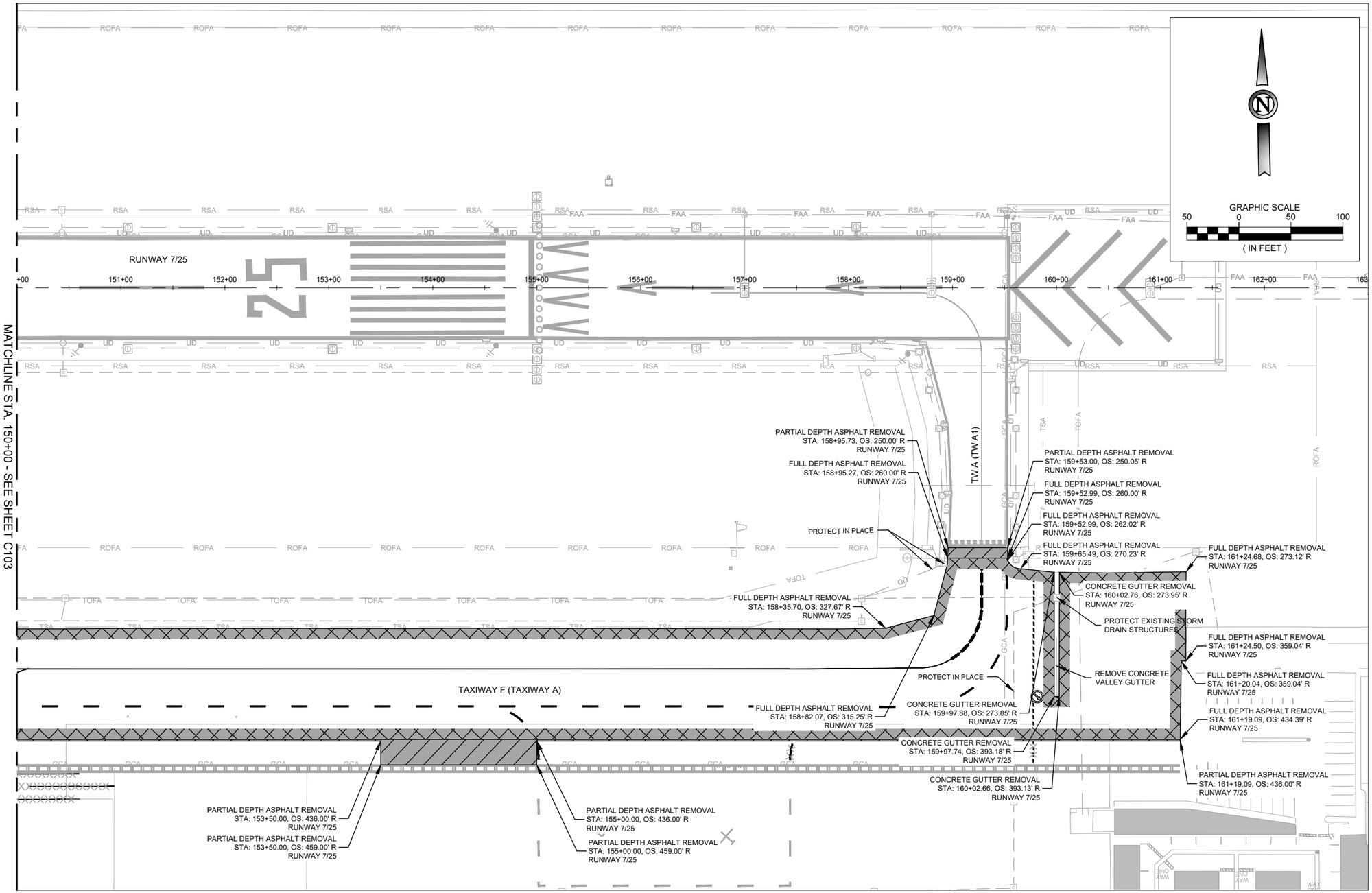
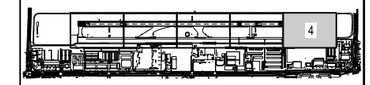




DEMOLITION LEGEND

- FULL DEPTH ASPHALT PAVEMENT REMOVAL
- 2" PARTIAL DEPTH ASPHALT PAVEMENT REMOVAL
- XXXXXX PAVEMENT MARKING OBLITERATION
- EXISTING UNDERDRAIN REMOVAL
- UNDERDRAIN CLEANOUT REMOVAL
- INSPECTION PIT REMOVAL

NOTES:

1. DEMOLITION OF EXISTING PAVEMENTS SHALL BE PERFORMED WITHIN THE CONSTRUCTION PHASING PLAN PARAMETERS. SEE PHASING SHEETS.
2. CONTRACTOR SHALL SUBMIT A PROCEDURE FOR REMOVING EXISTING PAVEMENT AT THE CORNERS OF THE PARTIAL REMOVAL AREA TO THE ENGINEER NO LATER THAN SEVEN (7) DAYS PRIOR TO THE START OF THE ROTOMILLING OPERATIONS.
3. CONTRACTOR MAY ELECT TO SAW ALTERNATE BUTT JOINT WIDTH TO ACCOMMODATE PAVING EQUIPMENT, SUBJECT TO APPROVAL OF THE RESIDENT ENGINEER. ADDITIONAL MATERIAL WILL NOT BE DIRECTLY PAID FOR, BUT WILL BE INCIDENTAL TO THE CONSTRUCTION OF THE BUTT JOINT.
4. CONTRACTOR SHALL LOCATE ALL EXISTING UTILITIES PRIOR TO DEMOLITION ACTIVITIES. ANY DAMAGE TO EXISTING UTILITIES SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE.
5. SEE SHEET G051 FOR LOCATIONS OF ON-SITE STOCKPILE LOCATIONS FOR THE DURATION OF THE PROJECT ONLY. CONTAMINATED EXCESS UNCLASSIFIED EXCAVATION SHALL BE HAULED TO THE ONSITE LOCATION MARKED ON SHEET G051. ALL OTHER EXCESS MATERIAL SHALL BE DISPOSED OF OFF SITE AT A SITE DETERMINED BY THE CONTRACTOR.
6. ANY PAVEMENT DAMAGED DURING REMOVAL OUTSIDE THE PROPOSED REMOVAL LIMITS SHALL BE SQUARED OFF TO THE SATISFACTION OF THE ENGINEER. ALL COSTS ASSOCIATED WITH THE ADDITIONAL REMOVAL AND RECONSTRUCTION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
7. FULL DEPTH ASPHALT PAVEMENT REMOVAL INCLUDES THE REMOVAL OF ANY UNDERLYING ASPHALT PAVEMENT AND STABILIZED BASE LAYERS.
8. PAVEMENT REMOVAL SHALL BE PAID PER SQUARE YARD AND IS INDEPENDENT OF DEPTH AND THICKNESS.
9. UNCLASSIFIED EXCAVATION INCLUDES THE REMOVAL AND DISPOSAL OF STABILIZED SOILS.
10. SEE SHEET C150 FOR DEMOLITION DETAILS.

ISSUED FOR BID

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION® A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

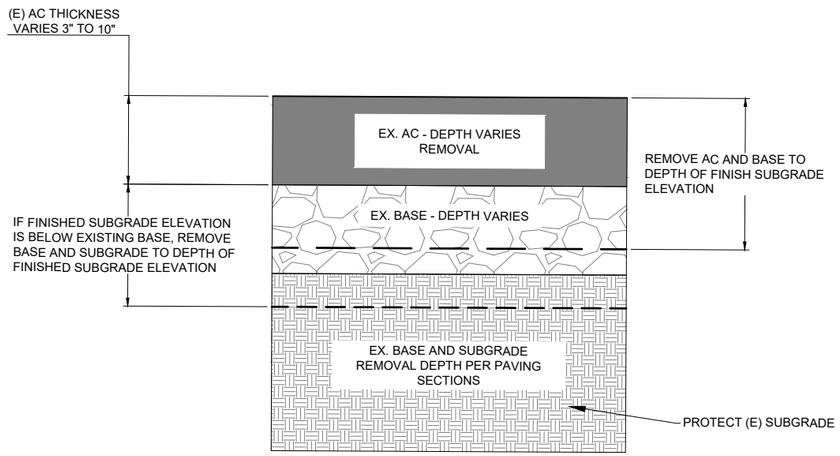
RECONSTRUCTION OF TAXIWAY F

DEMOLITION PLAN
STA. 150+00 TO STA. 163+00
RUNWAY 7/25

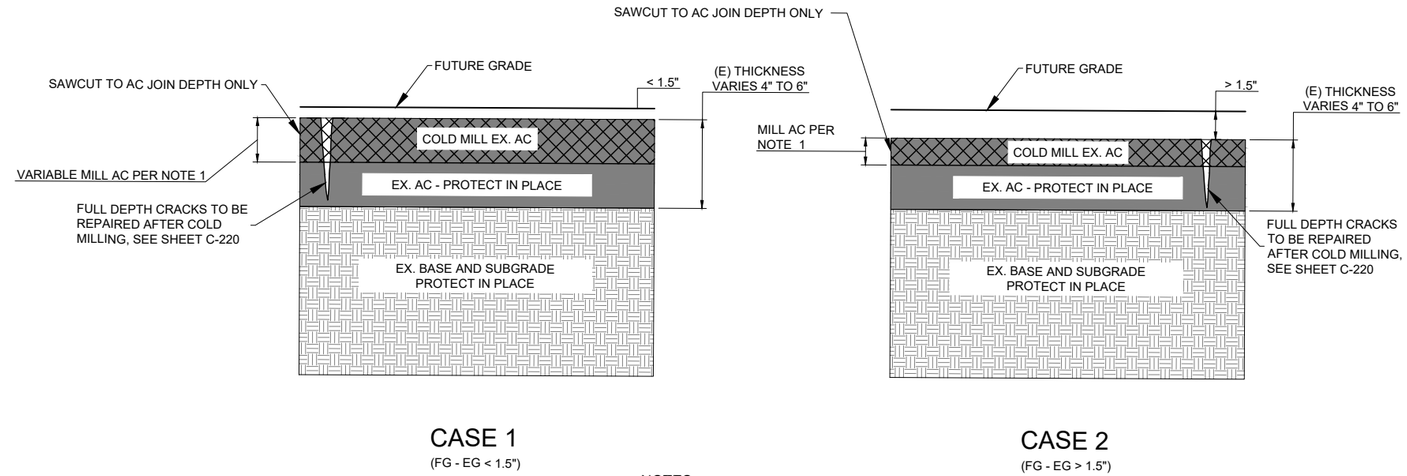
AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME C104
SHEET NO. 24 of 89
DRAWING NO. 1609-DOA

Plotted May 25, 2023 @ 9:39 AM by Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\010-OXR-043-C100-C104-DEMO.dwg



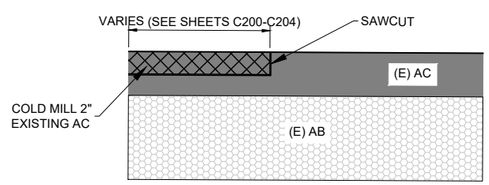
1 AC DEMOLITION
NOT TO SCALE



NOTES:

1. MILL EXISTING AC TO A MINIMUM OF FG - 2" (MIN. 0.5" OF EXISTING REMOVAL) FG WILL VARY FROM EXISTING ELEVATION. SEE SHEETS C-400 TO C-404 FOR FG PAVEMENT ELEVATIONS.
2. CONTRACTOR TO IDENTIFY EXTENTS OF CASE 1 VERSUS CASE 2 AFTER CONSTRUCTION SURVEY.

2 AC MILL
NOT TO SCALE



3 MILL FOR PAVEMENT JOINT
NOT TO SCALE

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF
TAXIWAY F

DEMOLITION DETAILS

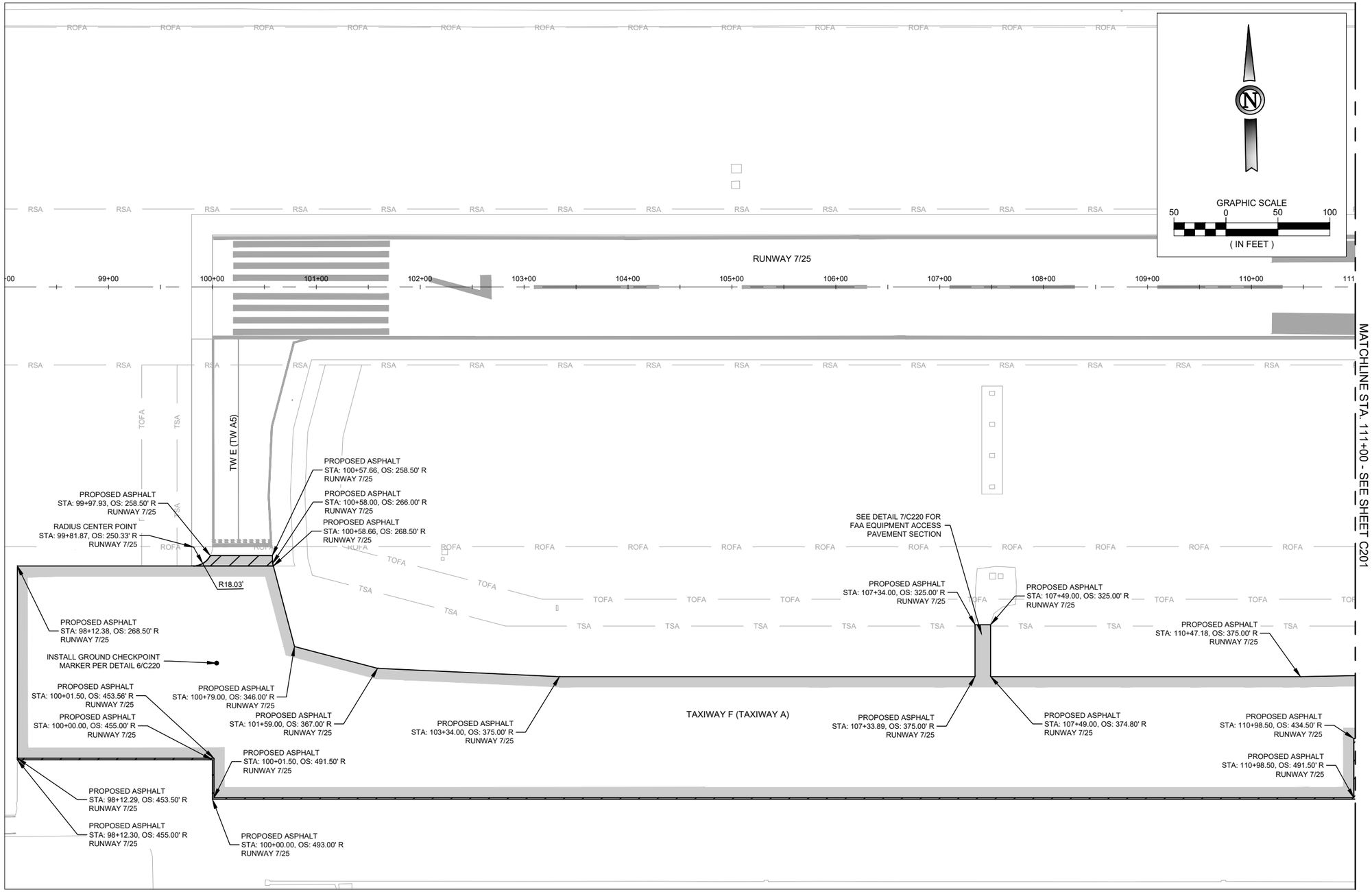
AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

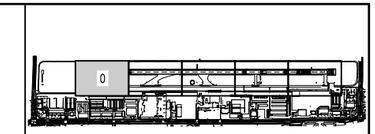
SHEET NAME
C150

SHEET NO.
25 of 89

DRAWING NO.
1610-DOA

Plotted May 25, 2023 @ 9:39 AM by Ball, Robert
L:\OXR\OXR AIP\043 Taxiway F Reconstruction\CAD\PLANS\010-OXR-043-C150-DEMO-DETL.dwg





GEOMETRY LEGEND

- FULL DEPTH ASPHALT PAVEMENT
- PARTIAL DEPTH ASPHALT PAVEMENT
- P-209 CRUSHED AGGREGATE BASE COURSE
- D-754 CONCRETE VALLEY GUTTER AND APRON

NOTES

1. CONTRACTOR TO USE SURVEY CONTROL POINTS AS SHOWN ON SHEET G005 SURVEY CONTROL PLAN LAYOUT.
2. ALL LINE AND CURVE CALLOUTS ARE AT EDGE OF ASPHALT UNLESS OTHERWISE NOTED.
3. SEE SHEETS G050 THRU G056 FOR CONSTRUCTION PHASING.
4. SEE SHEETS C600 THRU C604 FOR GEOMETRIC CONTROL OF DRAINAGE STRUCTURES.
5. SEE SHEET C220 THRU C223 FOR TYPICAL PAVEMENT SECTIONS.
6. SEE SHEETS C800 THRU C804 FOR PAVEMENT MARKING INFORMATION.
7. ANY PAVEMENT DAMAGE DURING CONSTRUCTION OUTSIDE THE PROPOSED PROJECT REMOVAL LIMITS SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER. ALL COSTS ASSOCIATED WITH RECONSTRUCTION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
8. CONTRACTOR SHALL LOCATE AND PROTECT ALL EXISTING UTILITIES.

ISSUED FOR BID

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF
TAXIWAY F

GEOMETRIC LAYOUT PLAN
STA. 98+00 TO STA. 111+00
RUNWAY 7/25

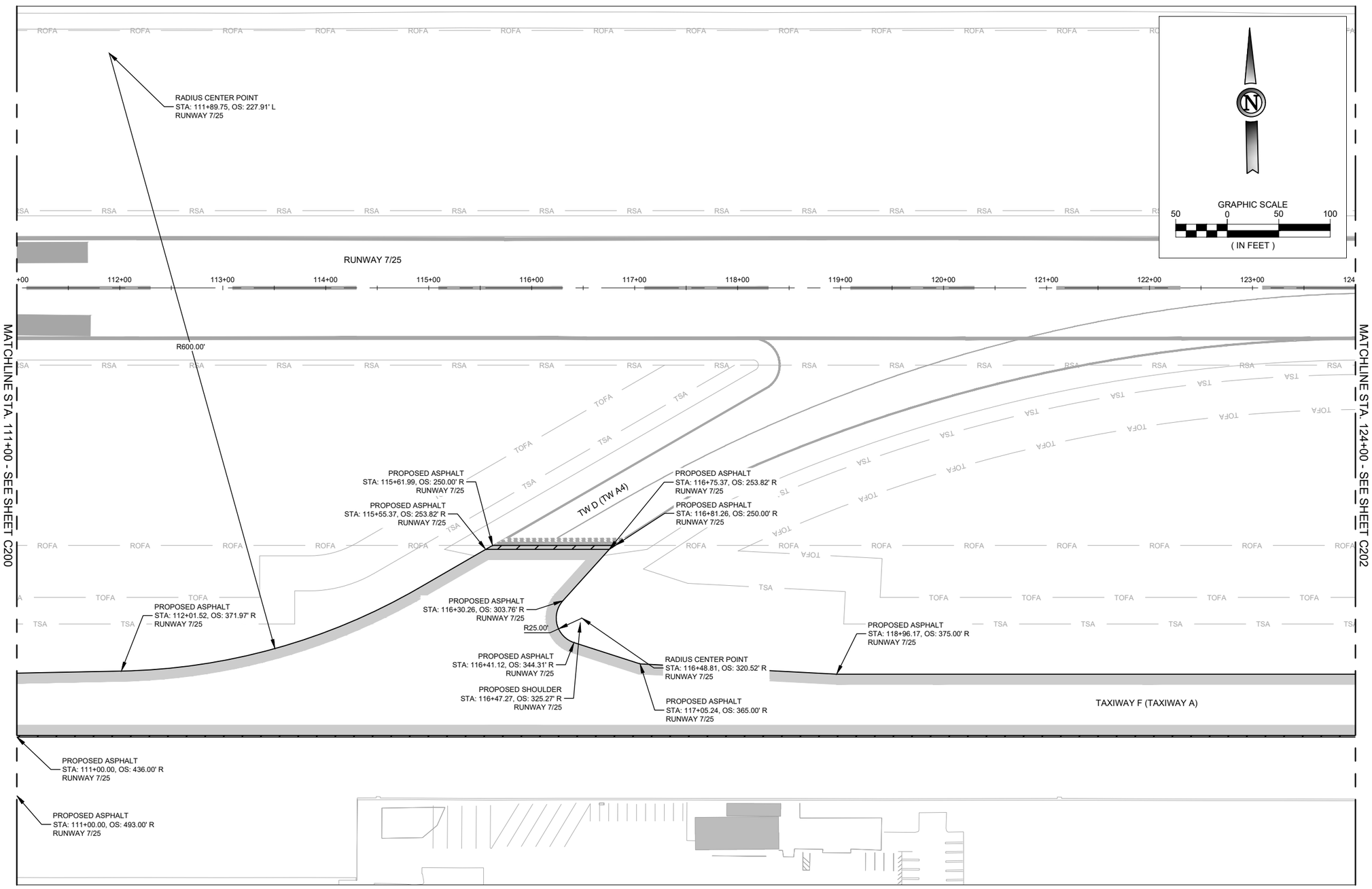
AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

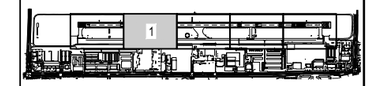
SHEET NAME
C200

SHEET NO.
26 of 89

DRAWING NO.
1611-DOA

Plotted May 25, 2023 @ 9:40 AM by Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\020-OXR-043-C200-C204-GEOM.dwg





GEOMETRY LEGEND

- FULL DEPTH ASPHALT PAVEMENT
- PARTIAL DEPTH ASPHALT PAVEMENT
- P-209 CRUSHED AGGREGATE BASE COURSE
- D-754 CONCRETE VALLEY GUTTER AND APRON

NOTES

1. CONTRACTOR TO USE SURVEY CONTROL POINTS AS SHOWN ON SHEET G005 SURVEY CONTROL PLAN LAYOUT.
2. ALL LINE AND CURVE CALLOUTS ARE AT EDGE OF ASPHALT UNLESS OTHERWISE NOTED.
3. SEE SHEETS G050 THRU G056 FOR CONSTRUCTION PHASING.
4. SEE SHEETS C600 THRU C604 FOR GEOMETRIC CONTROL OF DRAINAGE STRUCTURES.
5. SEE SHEET C220 THRU C223 FOR TYPICAL PAVEMENT SECTIONS.
6. SEE SHEETS C800 THRU C804 FOR PAVEMENT MARKING INFORMATION.
7. ANY PAVEMENT DAMAGE DURING CONSTRUCTION OUTSIDE THE PROPOSED PROJECT REMOVAL LIMITS SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER. ALL COSTS ASSOCIATED WITH RECONSTRUCTION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
8. CONTRACTOR SHALL LOCATE AND PROTECT ALL EXISTING UTILITIES.

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF
TAXIWAY F

GEOMETRIC LAYOUT PLAN
STA. 111+00 TO STA. 124+00
RUNWAY 7/25

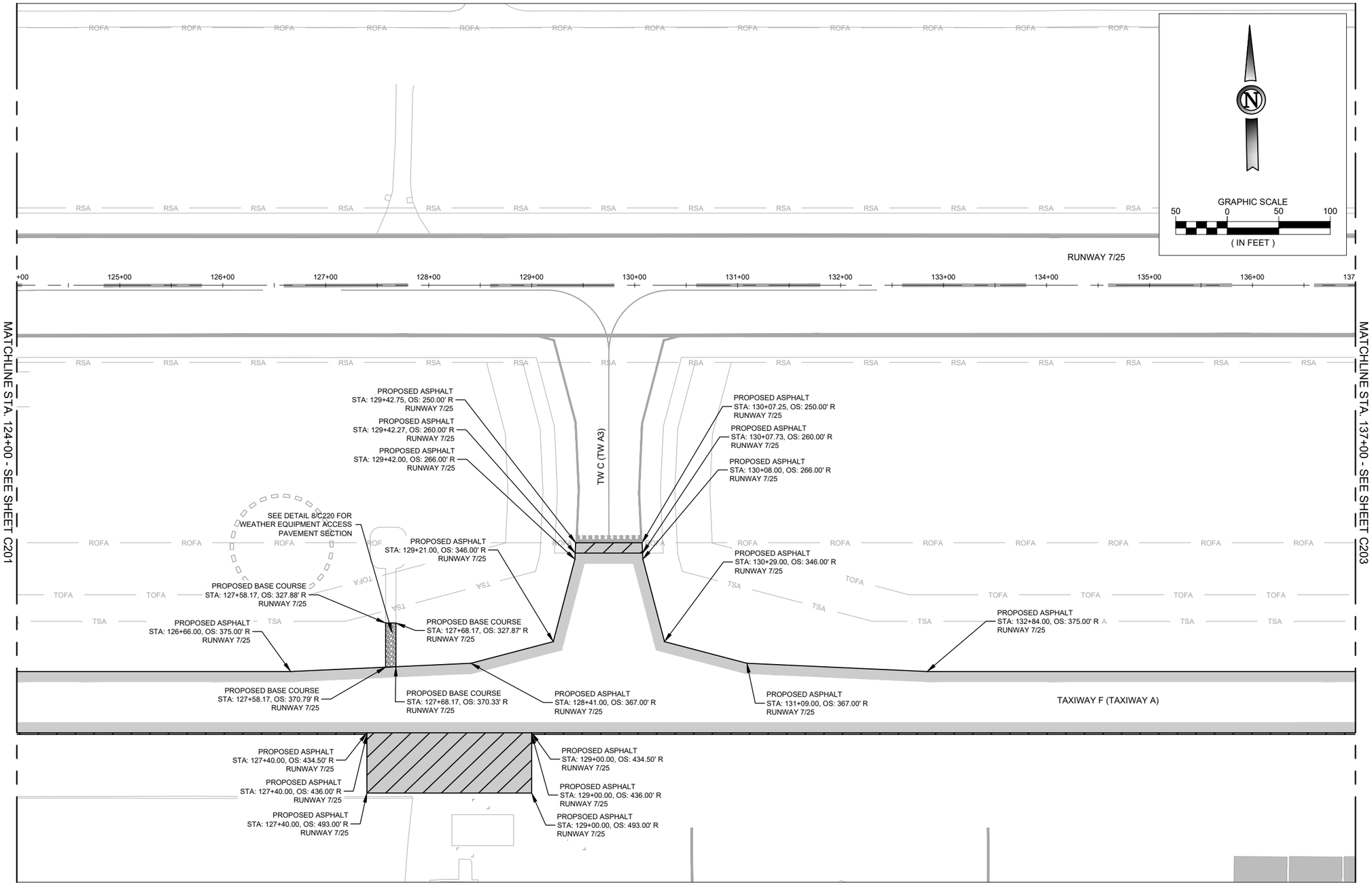
AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

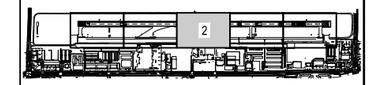
SHEET NAME
C201

SHEET NO.
27 of 89

DRAWING NO.
1612-DOA

Plotted May 25, 2023 @ 9:40 AM by Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\020-OXR-043-C200-C204-GEOM.dwg





GEOMETRY LEGEND

- FULL DEPTH ASPHALT PAVEMENT
- PARTIAL DEPTH ASPHALT PAVEMENT
- P-209 CRUSHED AGGREGATE BASE COURSE
- D-754 CONCRETE VALLEY GUTTER AND APRON

NOTES

1. CONTRACTOR TO USE SURVEY CONTROL POINTS AS SHOWN ON SHEET G005 SURVEY CONTROL PLAN LAYOUT.
2. ALL LINE AND CURVE CALLOUTS ARE AT EDGE OF ASPHALT UNLESS OTHERWISE NOTED.
3. SEE SHEETS G050 THRU G056 FOR CONSTRUCTION PHASING.
4. SEE SHEETS C600 THRU C604 FOR GEOMETRIC CONTROL OF DRAINAGE STRUCTURES.
5. SEE SHEET C220 THRU C223 FOR TYPICAL PAVEMENT SECTIONS.
6. SEE SHEETS C800 THRU C804 FOR PAVEMENT MARKING INFORMATION.
7. ANY PAVEMENT DAMAGE DURING CONSTRUCTION OUTSIDE THE PROPOSED PROJECT REMOVAL LIMITS SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER. ALL COSTS ASSOCIATED WITH RECONSTRUCTION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
8. CONTRACTOR SHALL LOCATE AND PROTECT ALL EXISTING UTILITIES.

ISSUED FOR BID

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF
TAXIWAY F

GEOMETRIC LAYOUT PLAN
STA. 124+00 TO STA. 137+00
RUNWAY 7/25

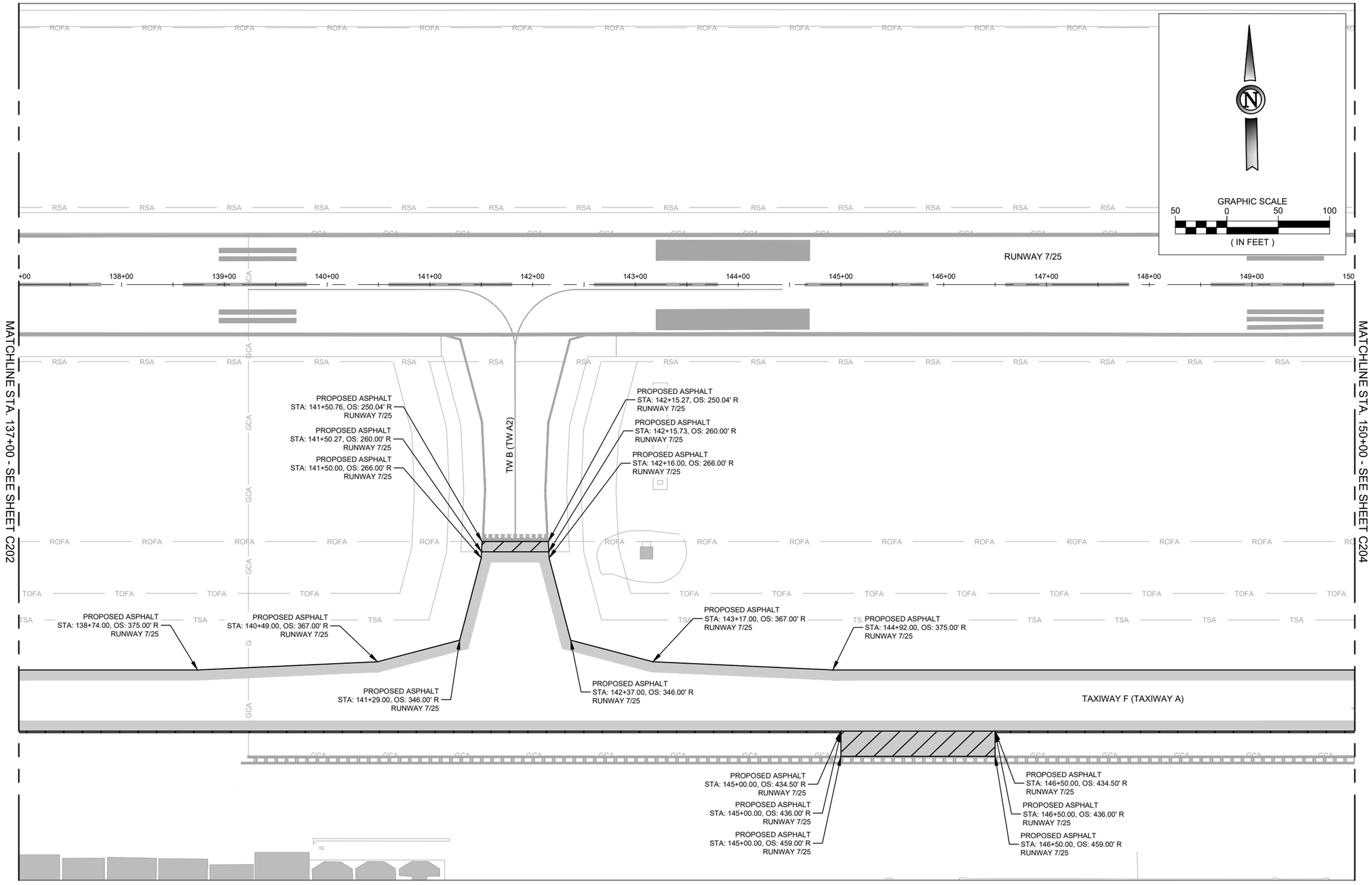
AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

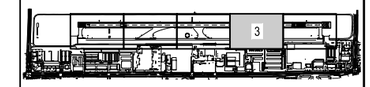
SHEET NAME
C202

SHEET NO.
28 of 89

DRAWING NO.
1613-DOA

Plotted May 25, 2023 @ 9:40 AM by Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\020-OXR-043-C200-C204-GEOM.dwg





GEOMETRY LEGEND

- FULL DEPTH ASPHALT PAVEMENT
- PARTIAL DEPTH ASPHALT PAVEMENT
- P-209 CRUSHED AGGREGATE BASE COURSE
- D-754 CONCRETE VALLEY GUTTER AND APRON

NOTES

1. CONTRACTOR TO USE SURVEY CONTROL POINTS AS SHOWN ON SHEET G005 SURVEY CONTROL PLAN LAYOUT.
2. ALL LINE AND CURVE CALLOUTS ARE AT EDGE OF ASPHALT UNLESS OTHERWISE NOTED.
3. SEE SHEETS G050 THRU G056 FOR CONSTRUCTION PHASING.
4. SEE SHEETS C600 THRU C604 FOR GEOMETRIC CONTROL OF DRAINAGE STRUCTURES.
5. SEE SHEET C220 THRU C223 FOR TYPICAL PAVEMENT SECTIONS.
6. SEE SHEETS C800 THRU C804 FOR PAVEMENT MARKING INFORMATION.
7. ANY PAVEMENT DAMAGE DURING CONSTRUCTION OUTSIDE THE PROPOSED PROJECT REMOVAL LIMITS SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER. ALL COSTS ASSOCIATED WITH RECONSTRUCTION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
8. CONTRACTOR SHALL LOCATE AND PROTECT ALL EXISTING UTILITIES.

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

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OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

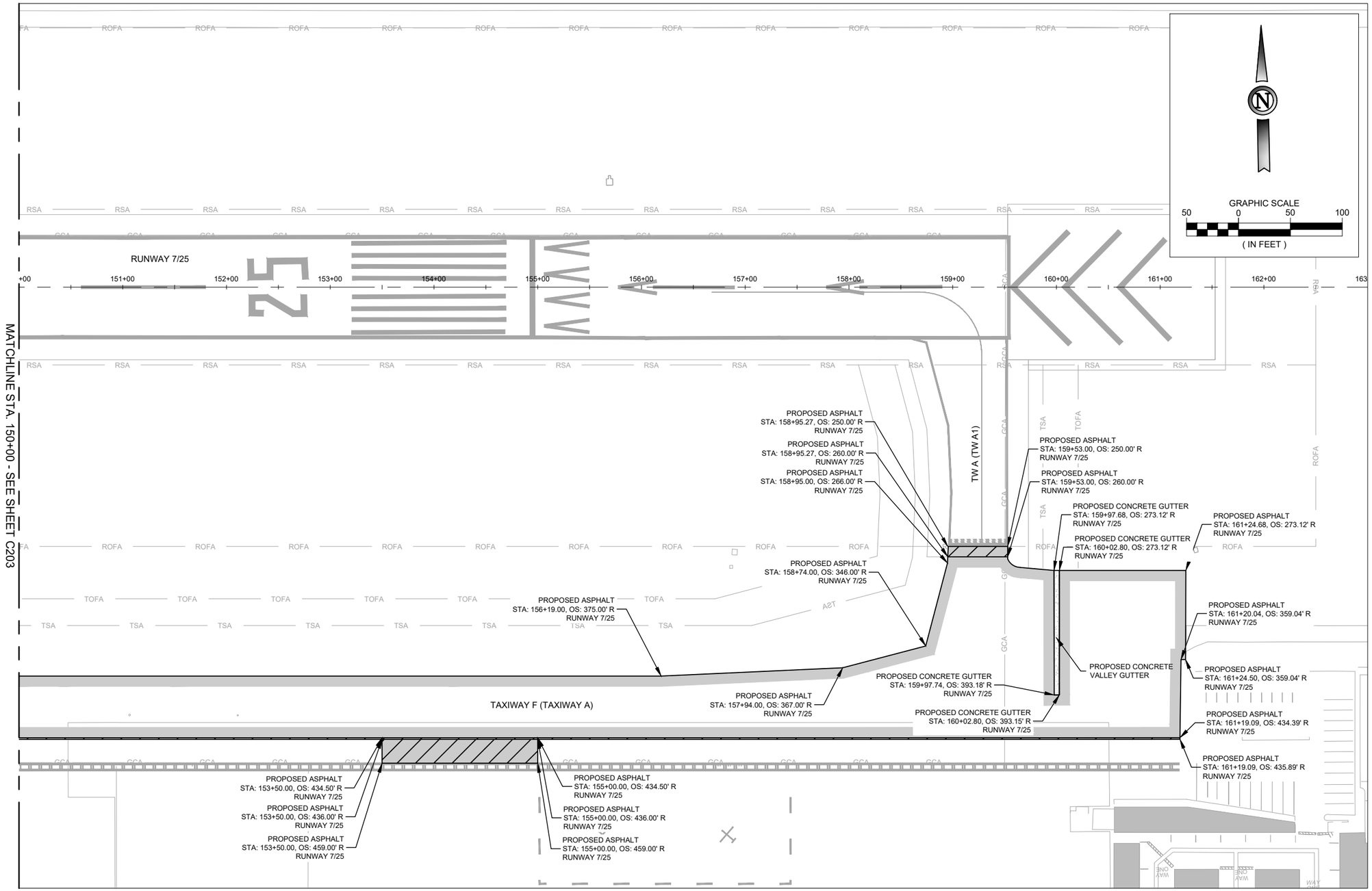
RECONSTRUCTION OF TAXIWAY F

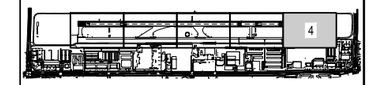
GEOMETRIC LAYOUT PLAN
STA. 137+00 TO STA. 150+00
RUNWAY 7/25

AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME C203
SHEET NO. 29 of 89
DRAWING NO. 1614-DOA

Plotted May 25, 2023 @ 9:40 AM by: Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\020-OXR-043-C200-C204-GEOM.dwg





GEOMETRY LEGEND

- FULL DEPTH ASPHALT PAVEMENT
- PARTIAL DEPTH ASPHALT PAVEMENT
- P-209 CRUSHED AGGREGATE BASE COURSE
- D-754 CONCRETE VALLEY GUTTER AND APRON

NOTES

1. CONTRACTOR TO USE SURVEY CONTROL POINTS AS SHOWN ON SHEET G005 SURVEY CONTROL PLAN LAYOUT.
2. ALL LINE AND CURVE CALLOUTS ARE AT EDGE OF ASPHALT UNLESS OTHERWISE NOTED.
3. SEE SHEETS G050 THRU G056 FOR CONSTRUCTION PHASING.
4. SEE SHEETS C600 THRU C604 FOR GEOMETRIC CONTROL OF DRAINAGE STRUCTURES.
5. SEE SHEET C220 THRU C223 FOR TYPICAL PAVEMENT SECTIONS.
6. SEE SHEETS C800 THRU C804 FOR PAVEMENT MARKING INFORMATION.
7. ANY PAVEMENT DAMAGE DURING CONSTRUCTION OUTSIDE THE PROPOSED PROJECT REMOVAL LIMITS SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER. ALL COSTS ASSOCIATED WITH RECONSTRUCTION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
8. CONTRACTOR SHALL LOCATE AND PROTECT ALL EXISTING UTILITIES.

ISSUED FOR BID

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF TAXIWAY F

GEOMETRIC LAYOUT PLAN
STA. 150+00 TO STA. 163+00
RUNWAY 7/25

AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME: C204
SHEET NO. 30 of 89
DRAWING NO. 1615-DOA

Plotted May 25, 2023 @ 9:40 AM by: Ball, Robert
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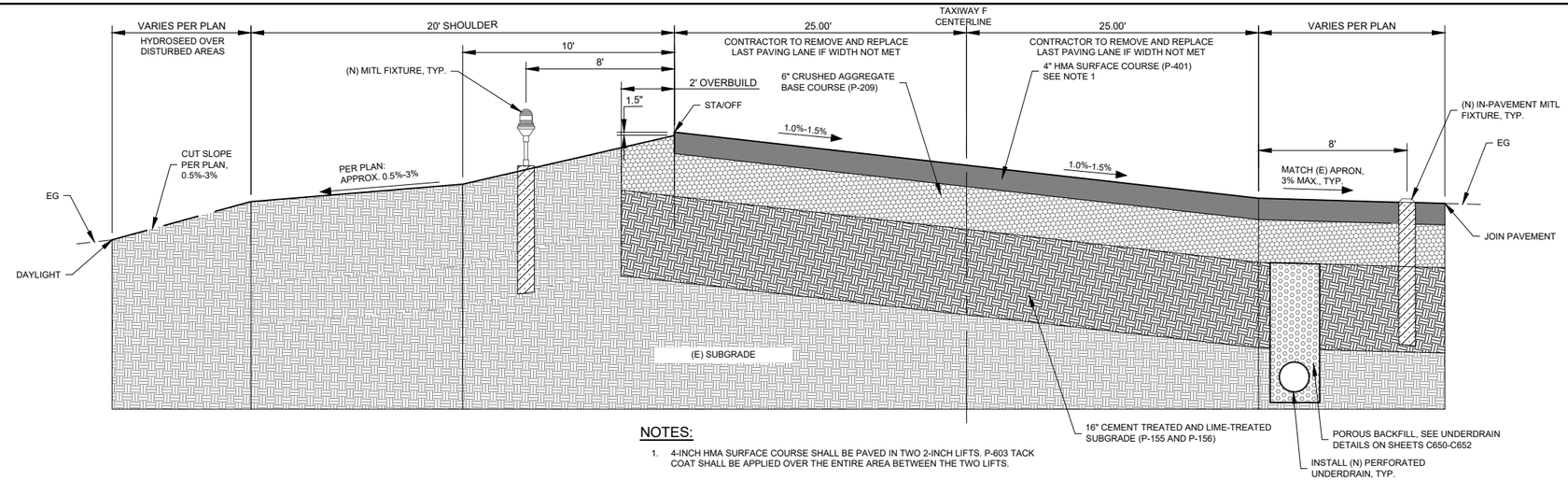
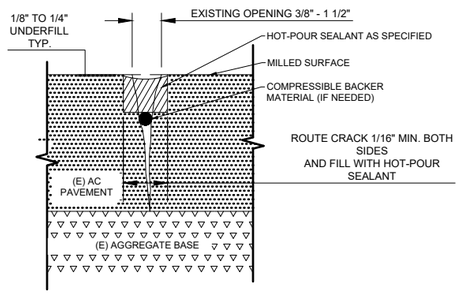


NOTES:

1. 4-INCH HMA SURFACE COURSE SHALL BE PAVED IN TWO 2-INCH LIFTS. P-603 TACK COAT SHALL BE APPLIED OVER THE ENTIRE AREA BETWEEN THE TWO LIFTS.

1 TAXIWAY F TYPICAL SECTION

NOT TO SCALE

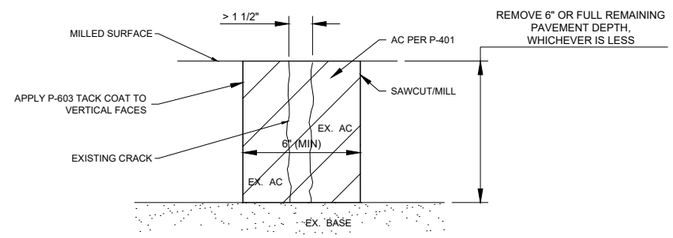


CRACK REPAIR NOTES:

1. ROUTE CRACK AS SHOWN.
2. CLEAN CRACK AND REMOVE LOOSE, NON-COMPRESSIBLE MATERIAL. BLOW WITH COMPRESSED AIR.
3. PLACE COMPRESSIBLE FILLER MATERIAL CONTINUOUSLY THROUGH CRACK. (AS NEEDED)
4. SEAL CRACK WITH HOT-POUR SEALANT PER P-605 SPECIFICATION.
5. USE MANUFACTURER'S RECOMMENDATIONS FOR BACKER MATERIAL TO FORM RESERVOIR FLOOR.
6. HOT-POUR SEALANT SHALL BE COMPATIBLE WITH SURFACE TREATMENT MATERIAL.
7. THIS ITEM WILL BE PAID FOR UNDER CRACK REPAIR, AS IDENTIFIED IN THE BID FORM.
8. EXTENTS TO BE DETERMINED BY RPR IN THE FIELD.
9. SEE SPEC. P-101

2 CRACK REPAIR (UNDER 1-1/2" WIDTH)

NOT TO SCALE

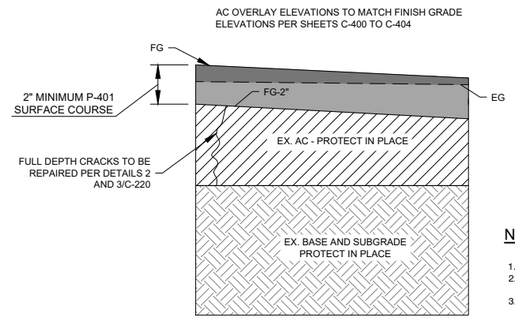


NOTES:

1. FULL DEPTH SAWCUT
2. REMOVE ALL ASPHALT MATERIAL
3. APPLY SOIL STERILANT
4. PLACE AND COMPACT AC PER P-401 SURFACE COURSE A.C.
5. EXTENTS TO BE DETERMINED IN THE FIELD BY RPR
6. SEE SPEC. P-101

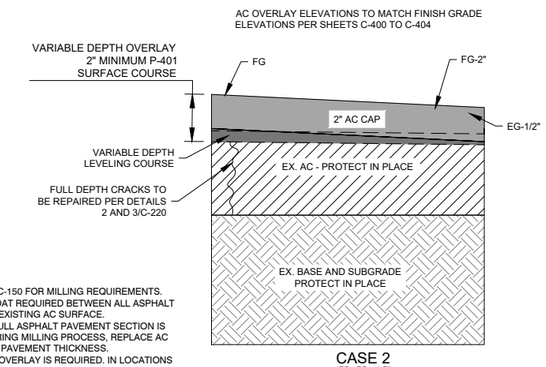
3 CRACK REPAIR (OVER 1-1/2" WIDTH)

NOT TO SCALE



CASE 1

(FG - EG < 1.5")



CASE 2

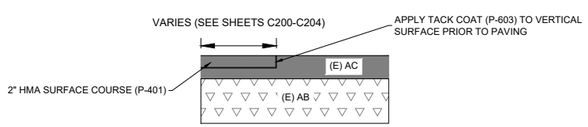
(FG - EG > 1.5")

NOTES:

1. SEE DETAIL 2/C-150 FOR MILLING REQUIREMENTS.
2. P-603 TACK COAT REQUIRED BETWEEN ALL ASPHALT LIFTS AND TO EXISTING AC SURFACE.
3. WHERE THE FULL ASPHALT PAVEMENT SECTION IS REMOVED DURING MILLING PROCESS, REPLACE AC TO ADJACENT PAVEMENT THICKNESS.
4. A MINIMUM 2" OVERLAY IS REQUIRED. IN LOCATIONS WHERE EG IS WITHIN 1.5" OF FG, EG MUST BE MILLED TO ALLOW FOR A 2" AC SECTION. IN LOCATIONS WHERE FG IS 1.5" HIGHER THAN EG MILL 1/2".

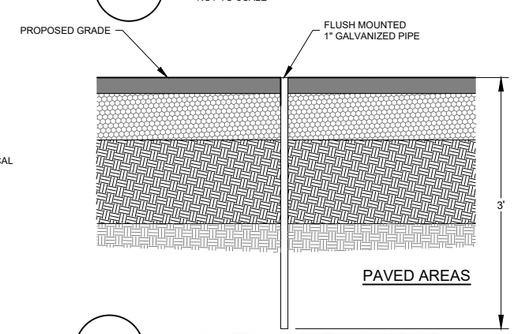
4 P-401 AC OVERLAY

NOT TO SCALE



5 AC PAVEMENT JOIN

NOT TO SCALE

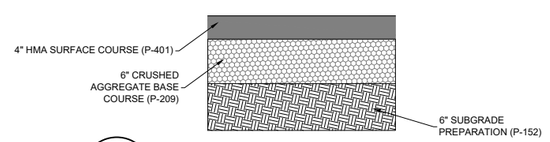


6 LOCALIZER CHECK POINT MARKER

NOT TO SCALE

NOTES:

1. CONTRACTOR MAY INSTALL CHECK POINT MARKER SIMILAR TO THE OTHER CHECK POINT MARKERS ALONG RUNWAY 7-25 AND TAXIWAY E. SEE RPR FOR DETAILS.

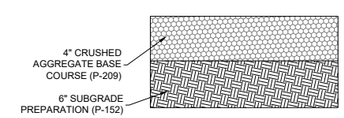


7 FAA EQUIPMENT ACCESS PAVEMENT SECTION

NOT TO SCALE

NOTES:

1. 4-INCH HMA SURFACE COURSE SHALL BE PAVED IN TWO 2-INCH LIFTS. P-603 TACK COAT SHALL BE APPLIED OVER THE ENTIRE AREA BETWEEN THE TWO LIFTS.



8 WEATHER EQUIPMENT ACCESS PAVEMENT SECTION

NOT TO SCALE

ISSUED FOR BID

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION® A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF TAXIWAY F

TYPICAL SECTIONS

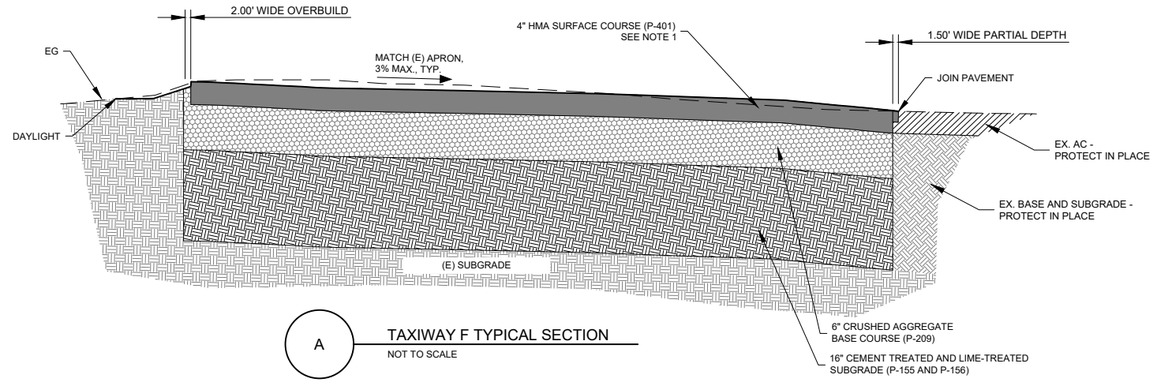
AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME C220

SHEET NO. 31 of 89

DRAWING NO. 1616-DOA

Plotted May 25, 2023 @ 9:41 AM by Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\020-OXR-043-C220-TYPS.dwg



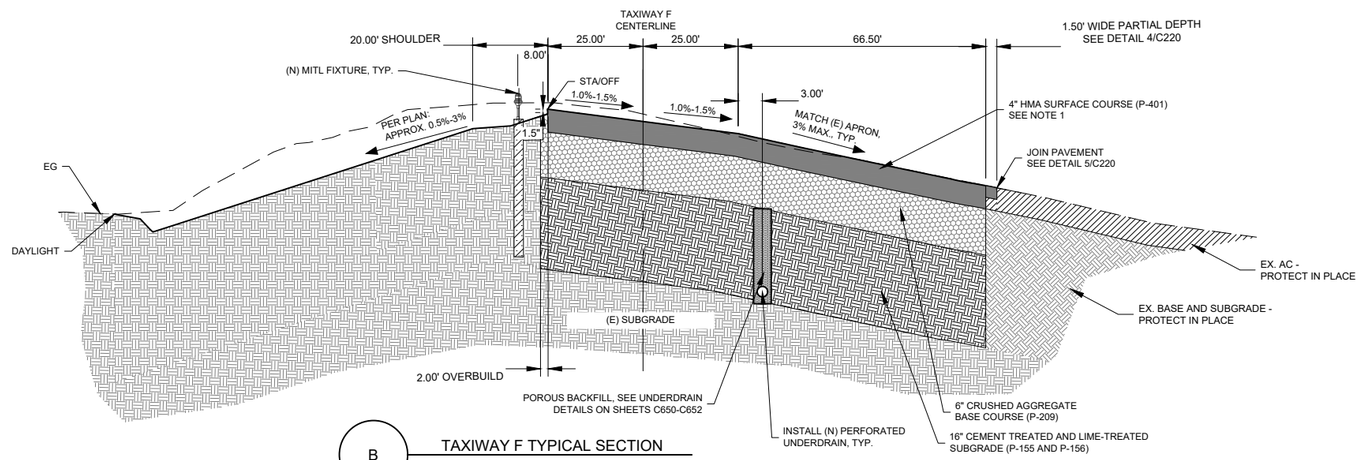
A

TAXIWAY F TYPICAL SECTION

NOT TO SCALE

NOTES:

1. 4-INCH HMA SURFACE COURSE SHALL BE PAVED IN TWO 2-INCH LIFTS. P-603 TACK COAT SHALL BE APPLIED OVER THE ENTIRE AREA BETWEEN THE TWO LIFTS.



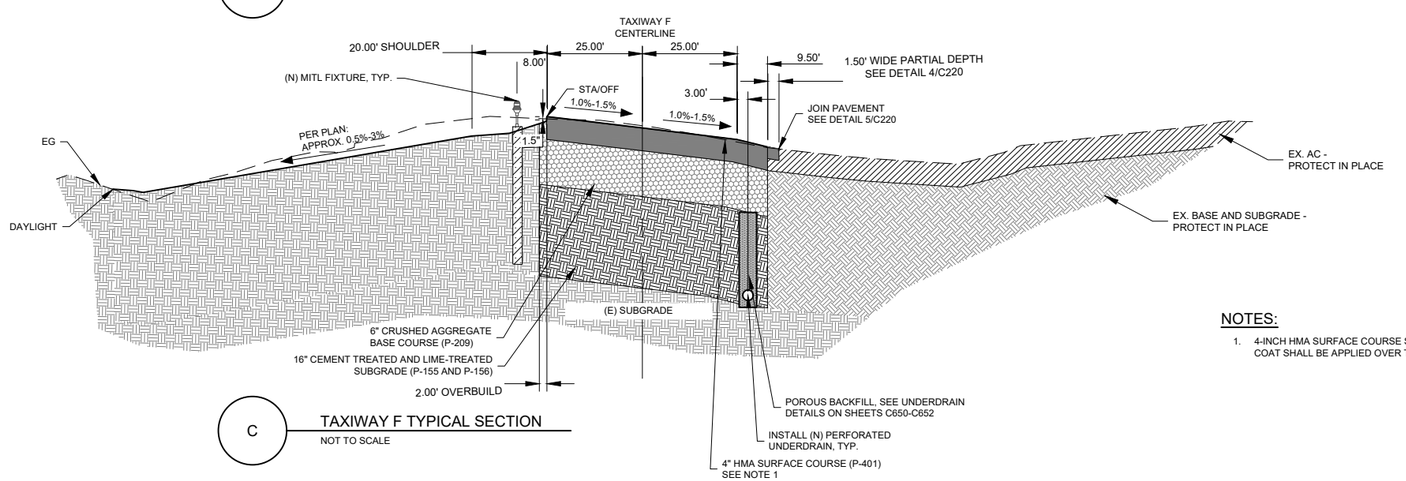
B

TAXIWAY F TYPICAL SECTION

NOT TO SCALE

NOTES:

1. 4-INCH HMA SURFACE COURSE SHALL BE PAVED IN TWO 2-INCH LIFTS. P-603 TACK COAT SHALL BE APPLIED OVER THE ENTIRE AREA BETWEEN THE TWO LIFTS.



C

TAXIWAY F TYPICAL SECTION

NOT TO SCALE

NOTES:

1. 4-INCH HMA SURFACE COURSE SHALL BE PAVED IN TWO 2-INCH LIFTS. P-603 TACK COAT SHALL BE APPLIED OVER THE ENTIRE AREA BETWEEN THE TWO LIFTS.

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

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A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

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NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF
TAXIWAY F

TYPICAL SECTIONS

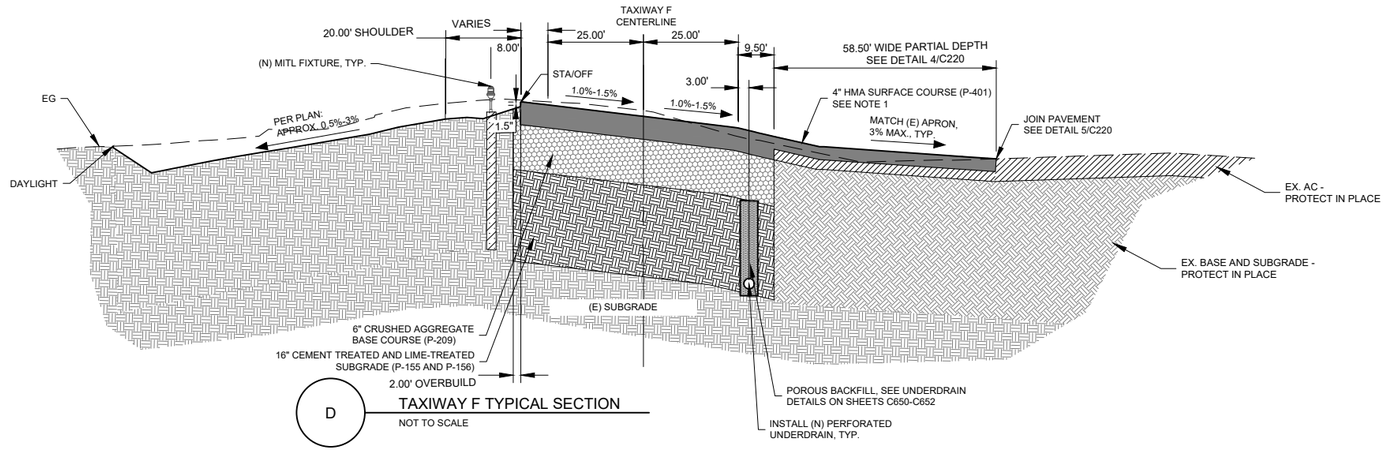
AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME
C221

SHEET NO.
32 of 89

DRAWING NO.
1617-DOA

Plotted May 25, 2023 @ 9:41 AM by: Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\020-OXR-043-C220-TYPS.dwg



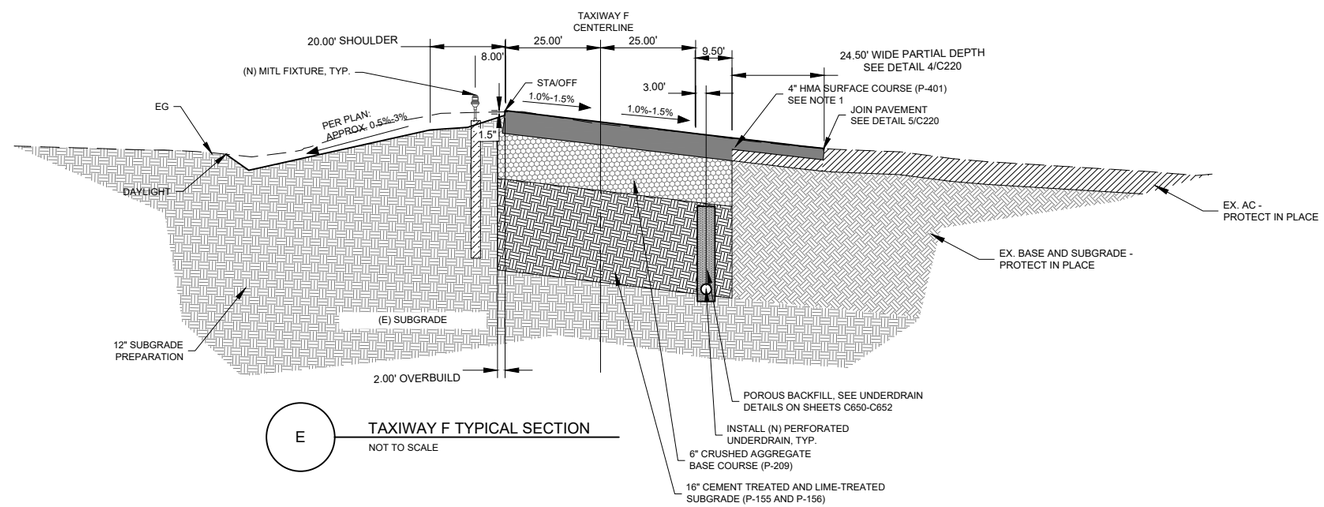
D

TAXIWAY F TYPICAL SECTION

NOT TO SCALE

NOTES:

1. 4-INCH HMA SURFACE COURSE SHALL BE PAVED IN TWO 2-INCH LIFTS. P-603 TACK COAT SHALL BE APPLIED OVER THE ENTIRE AREA BETWEEN THE TWO LIFTS.



E

TAXIWAY F TYPICAL SECTION

NOT TO SCALE

NOTES:

1. 4-INCH HMA SURFACE COURSE SHALL BE PAVED IN TWO 2-INCH LIFTS. P-603 TACK COAT SHALL BE APPLIED OVER THE ENTIRE AREA BETWEEN THE TWO LIFTS.

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

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DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF
TAXIWAY F

TYPICAL SECTIONS

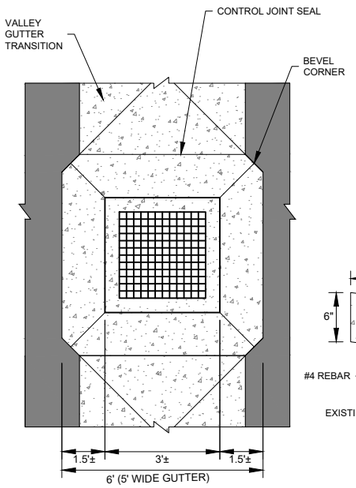
AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME
C222

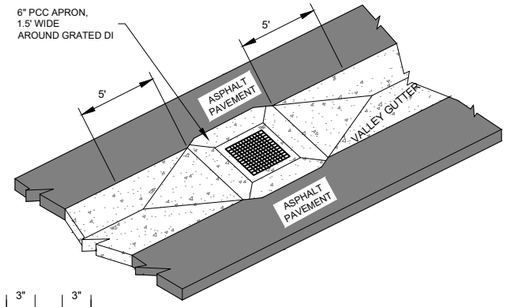
SHEET NO.
33 of 89

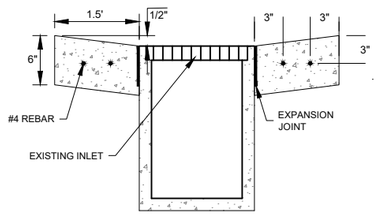
DRAWING NO.
1618-DOA

Plotted May 25, 2023 @ 9:41 AM by: Bell, Robert
L:\OX\ROXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\020-OXR-043-C220-TYPS.dwg

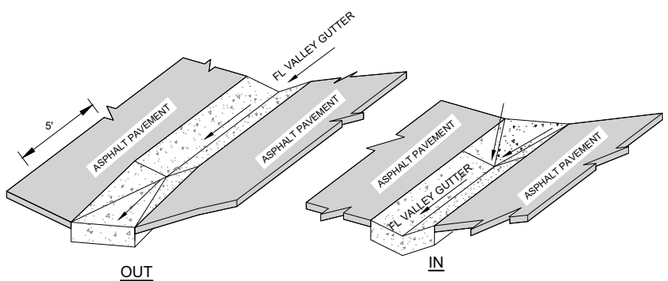


PLAN VIEW (PAVED AREA CATCH BASIN)



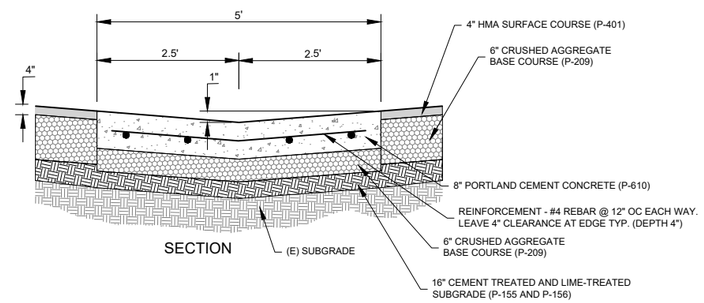


SECTION
VALLEY GUTTER APRON AT CATCH BASIN



OUT IN

VALLEY GUTTER TRANSITION



SECTION

NOTES:

1. TOOLED CONTROL JOINTS 8'-0" O.C. MAX.
2. MEDIUM BROOM FINISH CONCRETE PARALLEL TO FLOWLINE

1 PCC VALLEY GUTTER AND APRON

NOT TO SCALE

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF TAXIWAY F

TYPICAL SECTIONS

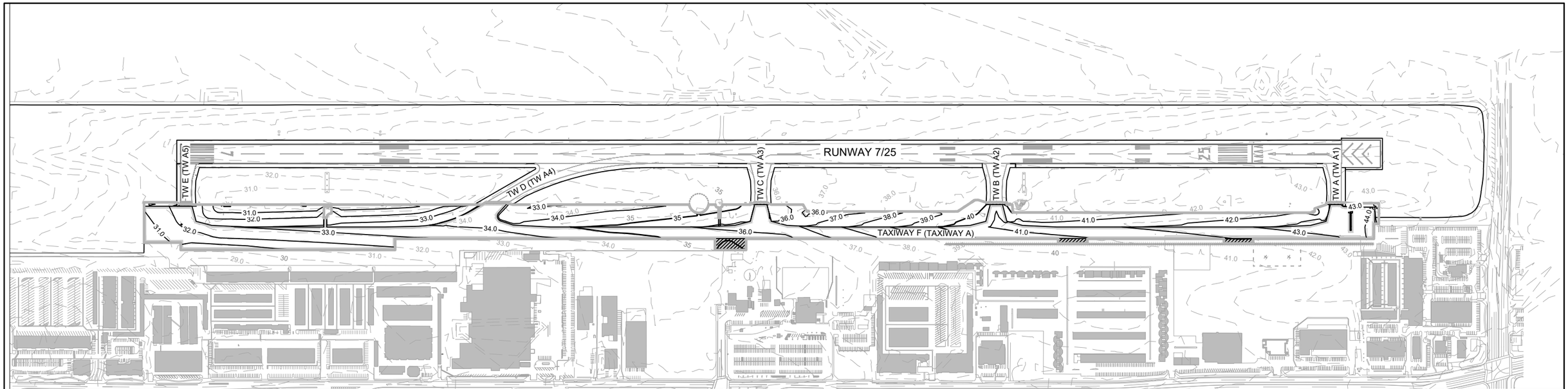
AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME C223

SHEET NO. 34 of 89

DRAWING NO. 1619-DOA

Plotted May 25, 2023 @ 9:41 AM by Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\020-OXR-043-C220-TYPS.dwg



GRADING LEGEND

- FULL DEPTH ASPHALT PAVEMENT
- PARTIAL DEPTH ASPHALT PAVEMENT
- P-209 CRUSHED AGGREGATE BASE COURSE
- 36 — EXISTING INDEX CONTOUR
- 38.5 — EXISTING INTERMEDIATE CONTOUR
- 36 — PROPOSED INDEX CONTOUR
- 38.5 — PROPOSED INTERMEDIATE CONTOUR
- PROJECT GRADING LIMITS

N

GRAPHIC SCALE
200 0 200 400
(IN FEET)

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

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OXNARD AIRPORT
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DR: R.L.B.
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APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF
TAXIWAY F

OVERALL GRADING PLAN

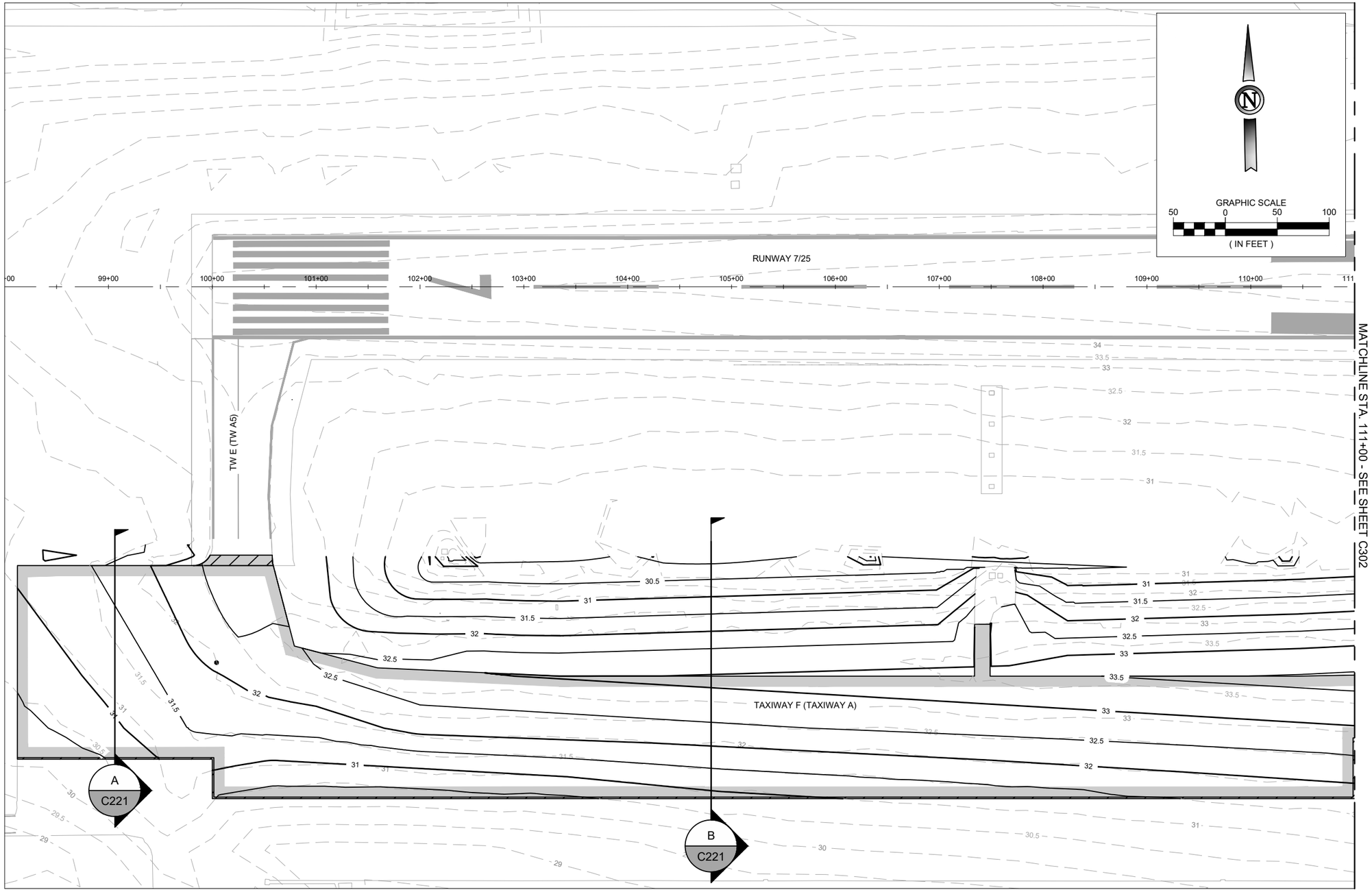
AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

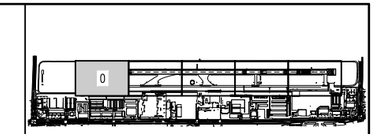
SHEET NAME
C300

SHEET NO.
35 of 89

DRAWING NO.
1620-DOA

Plotted May 25, 2023 @ 9:41 AM by: Ball, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\030-OXR-043-C300-GRAD-OVER.dwg





GRADING LEGEND

- FULL DEPTH ASPHALT PAVEMENT
- PARTIAL DEPTH ASPHALT PAVEMENT
- P-209 CRUSHED AGGREGATE BASE COURSE
- D-754 CONCRETE VALLEY GUTTER AND APRON
- 36 — EXISTING INDEX CONTOUR
- 38.5 — EXISTING INTERMEDIATE CONTOUR
- 36 — PROPOSED INDEX CONTOUR
- 38.5 — PROPOSED INTERMEDIATE CONTOUR
- PROJECT GRADING LIMITS

NOTES

1. LIMITS OF GRADING ARE APPROXIMATE AND DO NOT CONSTITUTE LIMITS OF DISTURBANCE. THE CONTRACTOR SHALL BE RESPONSIBLE TO RESTORE ALL AREAS DISTURBED BY CONSTRUCTION OPERATIONS AT NO ADDITIONAL COST TO THE SPONSOR.
2. CONTRACTOR SHALL USE CAUTION AND PROTECT ALL EXISTING UNDERGROUND UTILITIES.
3. IN THE EVENT OF ANY CONFLICT WITHIN THESE PLANS, THE INFORMATION IN THE PROFILES SHALL GOVERN OVER THE SPOT ELEVATIONS AND CROSS SECTIONS.
4. PROPOSED CONTOURS REFLECT FINAL DESIGN ELEVATIONS. IN NON-PAVEMENT AREAS, FINAL ELEVATIONS SHALL INCLUDE DEPTH OF FINAL TOPSOIL LAYER.
5. ALL INLETS, MANHOLES, PULL BOXES, AND LIKE, SHALL BE PROTECTED FROM INFILTRATION OF SILT AND WATER WITHIN OR ADJACENT TO CONTRACTOR'S GRADING OPERATIONS.
6. PRIOR TO THE START OF GRADING OPERATIONS, ALL LIMITS OF GRADING SHALL BE CLEARED AND GRUBBED PER SECTION P-151.
7. CONTAMINATED EXCESS UNCLASSIFIED EXCAVATION SHALL BE HAULED TO THE ONSITE LOCATION MARKED ON SHEET G051. ALL OTHER EXCESS MATERIAL SHALL BE DISPOSED OF.
8. SEE SHEET C223 FOR TYPICAL SECTIONS.
9. SEE C500 TO C504 FOR PLAN AND PROFILE SHEETS.
10. SEE C400 TO C404 FOR SPOT ELEVATION SHEETS.

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

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OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
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APP: J.D.I.

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NO.	BY	DATE	DESCRIPTION
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Exhibit 1

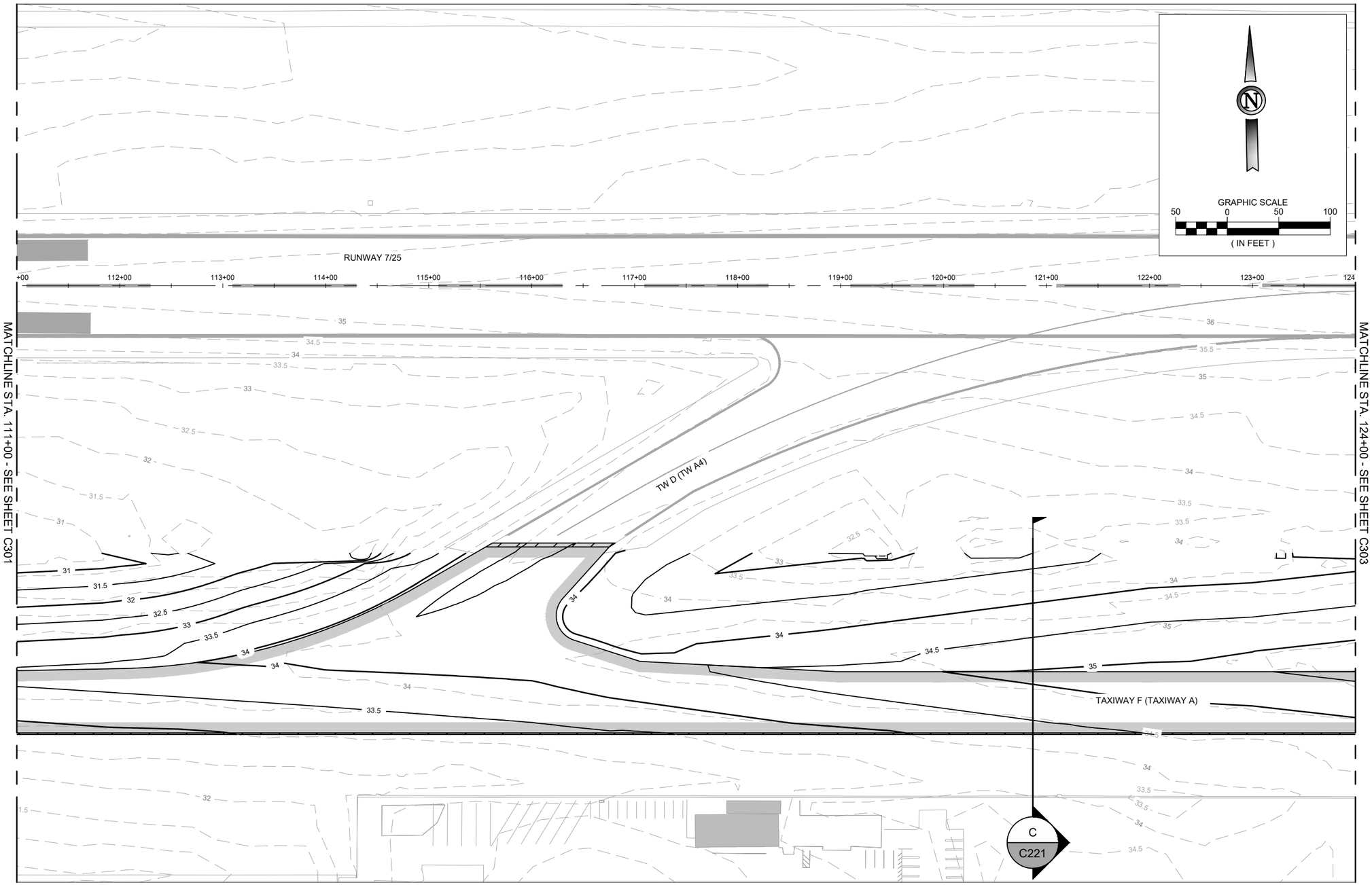
RECONSTRUCTION OF
TAXIWAY F

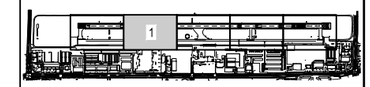
GRADING PLAN
STA. 98+00 TO STA. 111+00
RUNWAY 7/25

AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME C301
SHEET NO. 36 of 89
DRAWING NO. 1621-DOA

Plotted May 25, 2023 @ 9:41 AM by: Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\030-OXR-043-C300-C304-GRAD.dwg





GRADING LEGEND

- FULL DEPTH ASPHALT PAVEMENT
- PARTIAL DEPTH ASPHALT PAVEMENT
- P-209 CRUSHED AGGREGATE BASE COURSE
- D-754 CONCRETE VALLEY GUTTER AND APRON
- 36 — EXISTING INDEX CONTOUR
- 38.5 — EXISTING INTERMEDIATE CONTOUR
- 36 — PROPOSED INDEX CONTOUR
- 38.5 — PROPOSED INTERMEDIATE CONTOUR
- PROJECT GRADING LIMITS

NOTES

1. LIMITS OF GRADING ARE APPROXIMATE AND DO NOT CONSTITUTE LIMITS OF DISTURBANCE. THE CONTRACTOR SHALL BE RESPONSIBLE TO RESTORE ALL AREAS DISTURBED BY CONSTRUCTION OPERATIONS AT NO ADDITIONAL COST TO THE SPONSOR.
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3. IN THE EVENT OF ANY CONFLICT WITHIN THESE PLANS, THE INFORMATION IN THE PROFILES SHALL GOVERN OVER THE SPOT ELEVATIONS AND CROSS SECTIONS.
4. PROPOSED CONTOURS REFLECT FINAL DESIGN ELEVATIONS. IN NON-PAVEMENT AREAS, FINAL ELEVATIONS SHALL INCLUDE DEPTH OF FINAL TOPSOIL LAYER.
5. ALL INLETS, MANHOLES, PULL BOXES, AND LIKE, SHALL BE PROTECTED FROM INFILTRATION OF SILT AND WATER WITHIN OR ADJACENT TO CONTRACTOR'S GRADING OPERATIONS.
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8. SEE SHEET C223 FOR TYPICAL SECTIONS.
9. SEE C500 TO C504 FOR PLAN AND PROFILE SHEETS.
10. SEE C400 TO C404 FOR SPOT ELEVATION SHEETS.

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

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A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF
TAXIWAY F

GRADING PLAN
STA. 111+00 TO STA. 124+00
RUNWAY 7/25

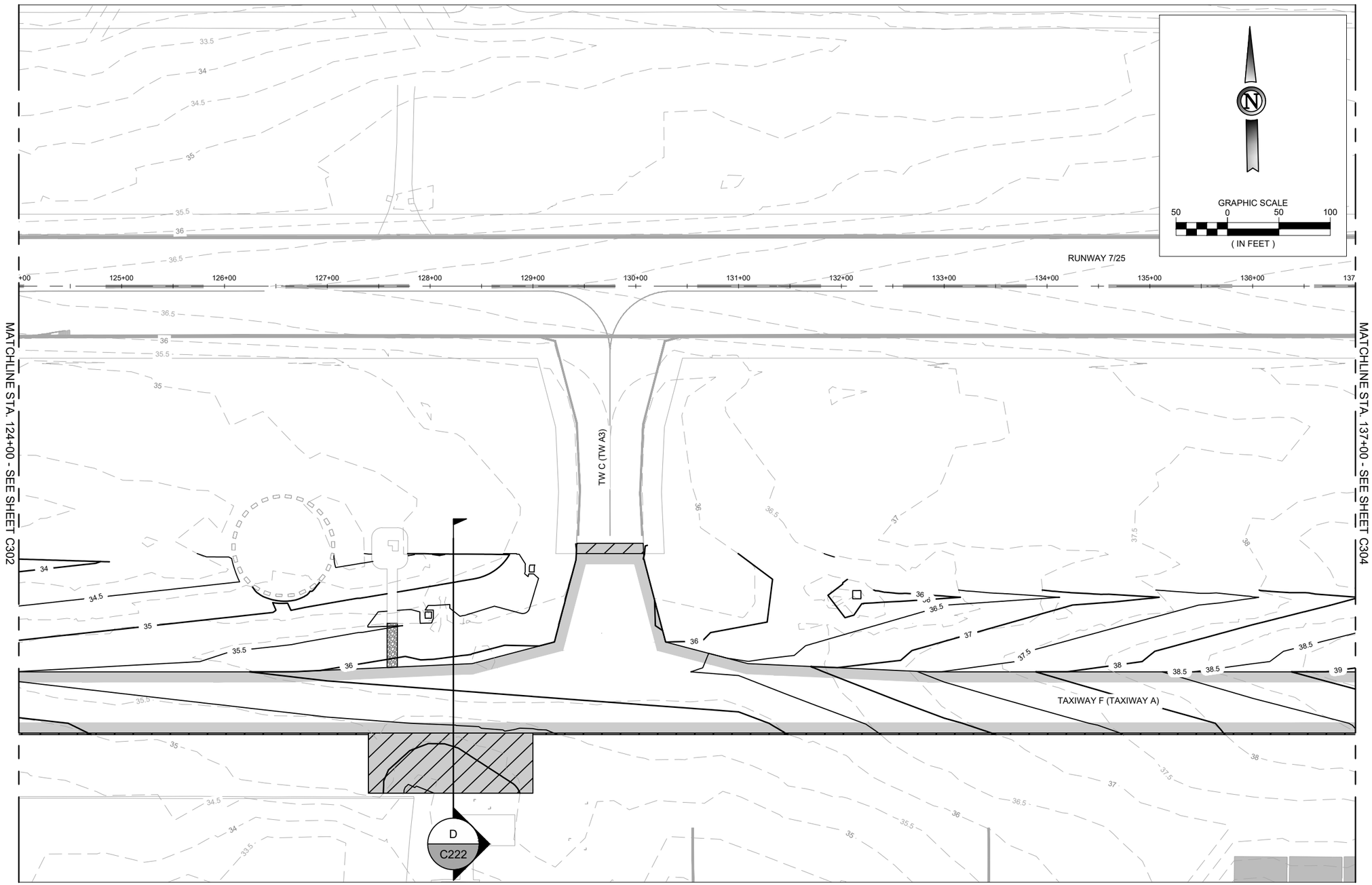
AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

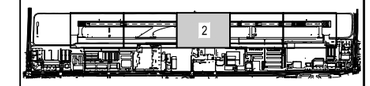
SHEET NAME
C302

SHEET NO.
37 of 89

DRAWING NO.
1622-DOA

Plotted May 25, 2023 @ 9:41 AM by: Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\030-OXR-043-C300-C304-GRAD.dwg





GRADING LEGEND

- FULL DEPTH ASPHALT PAVEMENT
- PARTIAL DEPTH ASPHALT PAVEMENT
- P-209 CRUSHED AGGREGATE BASE COURSE
- D-754 CONCRETE VALLEY GUTTER AND APRON
- 36 — EXISTING INDEX CONTOUR
- 38.5 — EXISTING INTERMEDIATE CONTOUR
- 36 — PROPOSED INDEX CONTOUR
- 38.5 — PROPOSED INTERMEDIATE CONTOUR
- PROJECT GRADING LIMITS

NOTES

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9. SEE C500 TO C504 FOR PLAN AND PROFILE SHEETS.
10. SEE C400 TO C404 FOR SPOT ELEVATION SHEETS.

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF
TAXIWAY F

GRADING PLAN
STA. 124+00 TO STA. 137+00
RUNWAY 7/25

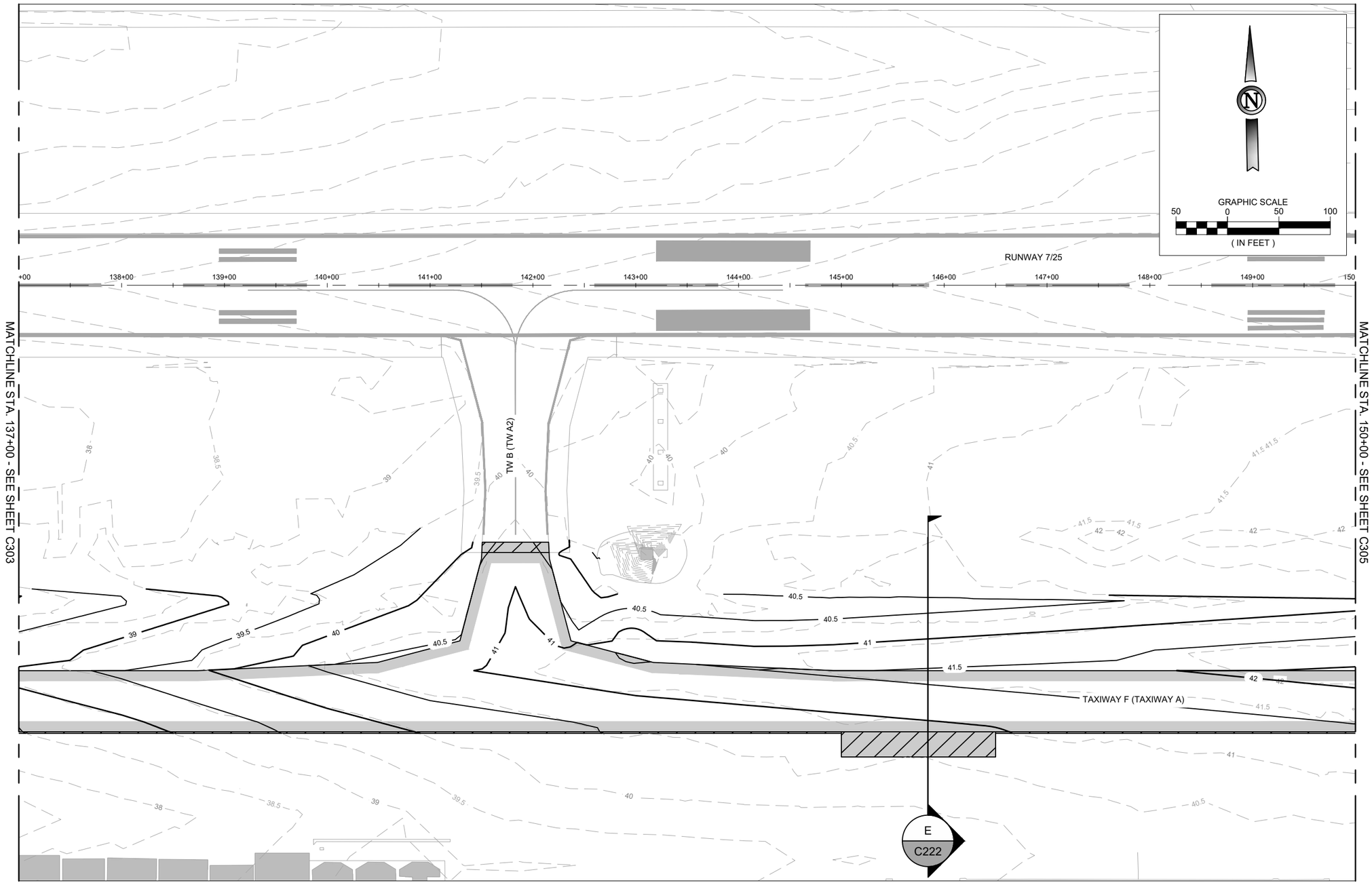
AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

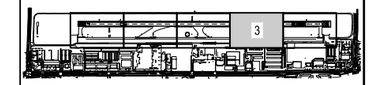
SHEET NAME
C303

SHEET NO.
38 of 89

DRAWING NO.
1623-DOA

Plotted May 25, 2023 @ 9:41 AM by Ball, Robert
L:\OXR\OXR AIP\043 Taxiway F Reconstruction\CAD\PLANS\030-OXR-043-C300-C304-GRAD.dwg





GRADING LEGEND

- FULL DEPTH ASPHALT PAVEMENT
- PARTIAL DEPTH ASPHALT PAVEMENT
- P-209 CRUSHED AGGREGATE BASE COURSE
- D-754 CONCRETE VALLEY GUTTER AND APRON
- 36 — EXISTING INDEX CONTOUR
- 38.5 — EXISTING INTERMEDIATE CONTOUR
- 36 — PROPOSED INDEX CONTOUR
- 38.5 — PROPOSED INTERMEDIATE CONTOUR
- PROJECT GRADING LIMITS

NOTES

1. LIMITS OF GRADING ARE APPROXIMATE AND DO NOT CONSTITUTE LIMITS OF DISTURBANCE. THE CONTRACTOR SHALL BE RESPONSIBLE TO RESTORE ALL AREAS DISTURBED BY CONSTRUCTION OPERATIONS AT NO ADDITIONAL COST TO THE SPONSOR.
2. CONTRACTOR SHALL USE CAUTION AND PROTECT ALL EXISTING UNDERGROUND UTILITIES.
3. IN THE EVENT OF ANY CONFLICT WITHIN THESE PLANS, THE INFORMATION IN THE PROFILES SHALL GOVERN OVER THE SPOT ELEVATIONS AND CROSS SECTIONS.
4. PROPOSED CONTOURS REFLECT FINAL DESIGN ELEVATIONS. IN NON-PAVEMENT AREAS, FINAL ELEVATIONS SHALL INCLUDE DEPTH OF FINAL TOPSOIL LAYER.
5. ALL INLETS, MANHOLES, PULL BOXES, AND LIKE, SHALL BE PROTECTED FROM INFILTRATION OF SILT AND WATER WITHIN OR ADJACENT TO CONTRACTOR'S GRADING OPERATIONS.
6. PRIOR TO THE START OF GRADING OPERATIONS, ALL LIMITS OF GRADING SHALL BE CLEARED AND GRUBBED PER SECTION P-151.
7. CONTAMINATED EXCESS UNCLASSIFIED EXCAVATION SHALL BE HAULED TO THE ONSITE LOCATION MARKED ON SHEET G051. ALL OTHER EXCESS MATERIAL SHALL BE DISPOSED OF.
8. SEE SHEET C223 FOR TYPICAL SECTIONS.
9. SEE C500 TO C504 FOR PLAN AND PROFILE SHEETS.
10. SEE C400 TO C404 FOR SPOT ELEVATION SHEETS.

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
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Exhibit 1

RECONSTRUCTION OF
TAXIWAY F

GRADING PLAN
STA. 137+00 TO STA. 150+00
RUNWAY 7/25

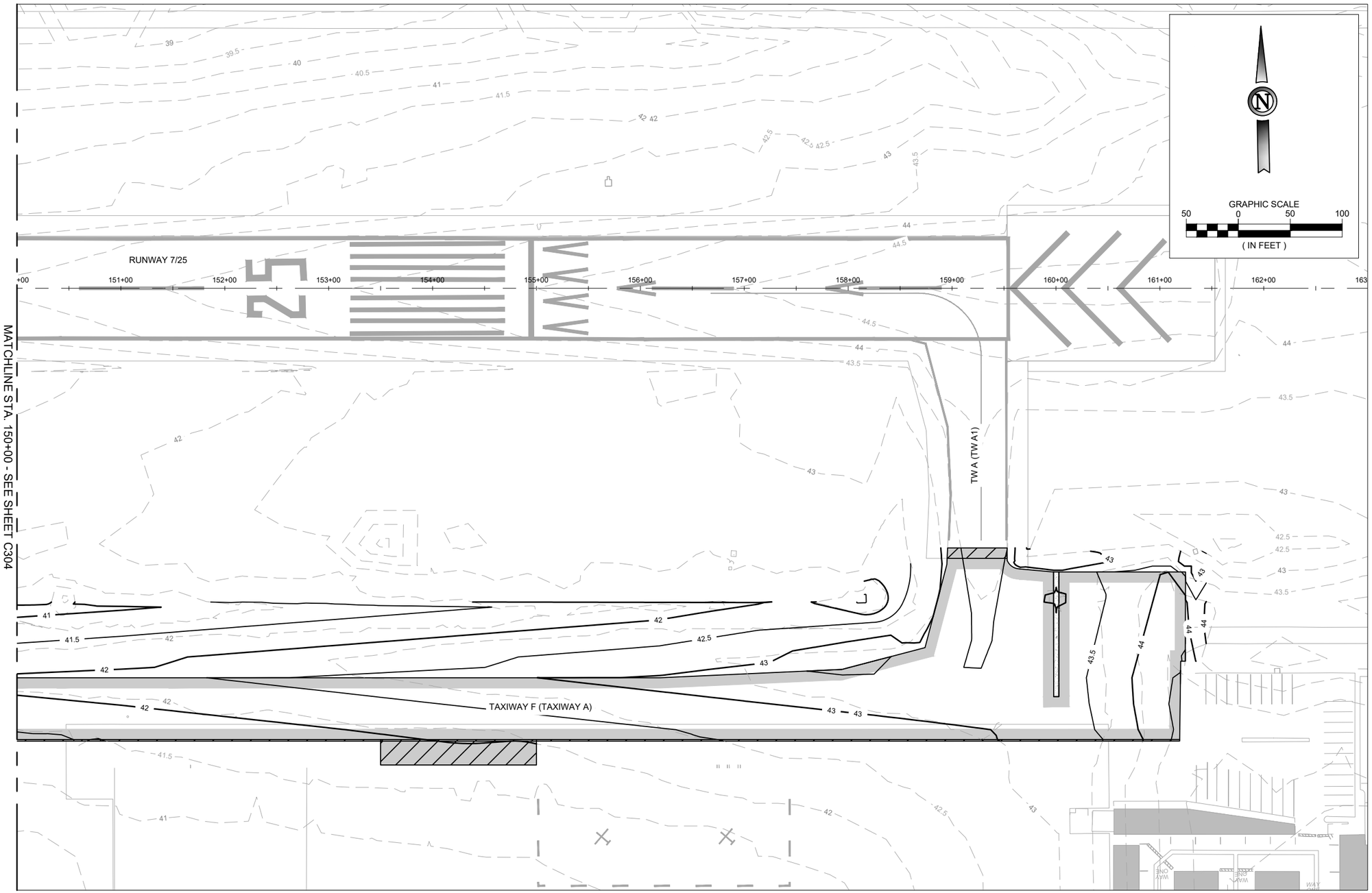
AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

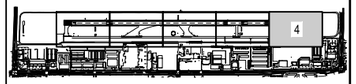
SHEET NAME
C304

SHEET NO.
39 of 89

DRAWING NO.
1624-DOA

Plotted May 25, 2023 @ 9:42 AM by Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\030-OXR-043-C300-C304-GRAD.dwg





GRADING LEGEND

- FULL DEPTH ASPHALT PAVEMENT
- PARTIAL DEPTH ASPHALT PAVEMENT
- P-209 CRUSHED AGGREGATE BASE COURSE
- D-754 CONCRETE VALLEY GUTTER AND APRON
- 36 — EXISTING INDEX CONTOUR
- 38.5 — EXISTING INTERMEDIATE CONTOUR
- 36 — PROPOSED INDEX CONTOUR
- 38.5 — PROPOSED INTERMEDIATE CONTOUR
- PROJECT GRADING LIMITS

NOTES

1. LIMITS OF GRADING ARE APPROXIMATE AND DO NOT CONSTITUTE LIMITS OF DISTURBANCE. THE CONTRACTOR SHALL BE RESPONSIBLE TO RESTORE ALL AREAS DISTURBED BY CONSTRUCTION OPERATIONS AT NO ADDITIONAL COST TO THE SPONSOR.
2. CONTRACTOR SHALL USE CAUTION AND PROTECT ALL EXISTING UNDERGROUND UTILITIES.
3. IN THE EVENT OF ANY CONFLICT WITHIN THESE PLANS, THE INFORMATION IN THE PROFILES SHALL GOVERN OVER THE SPOT ELEVATIONS AND CROSS SECTIONS.
4. PROPOSED CONTOURS REFLECT FINAL DESIGN ELEVATIONS. IN NON-PAVEMENT AREAS, FINAL ELEVATIONS SHALL INCLUDE DEPTH OF FINAL TOPSOIL LAYER.
5. ALL INLETS, MANHOLES, PULL BOXES, AND LIKE, SHALL BE PROTECTED FROM INFILTRATION OF SILT AND WATER WITHIN OR ADJACENT TO CONTRACTOR'S GRADING OPERATIONS.
6. PRIOR TO THE START OF GRADING OPERATIONS, ALL LIMITS OF GRADING SHALL BE CLEARED AND GRUBBED PER SECTION P-151.
7. CONTAMINATED EXCESS UNCLASSIFIED EXCAVATION SHALL BE HAULED TO THE ONSITE LOCATION MARKED ON SHEET G051. ALL OTHER EXCESS MATERIAL SHALL BE DISPOSED OF.
8. SEE SHEET C223 FOR TYPICAL SECTIONS.
9. SEE C500 TO C504 FOR PLAN AND PROFILE SHEETS.
10. SEE C400 TO C404 FOR SPOT ELEVATION SHEETS.

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF
TAXIWAY F

GRADING PLAN
STA. 150+00 TO STA. 163+00
RUNWAY 7/25

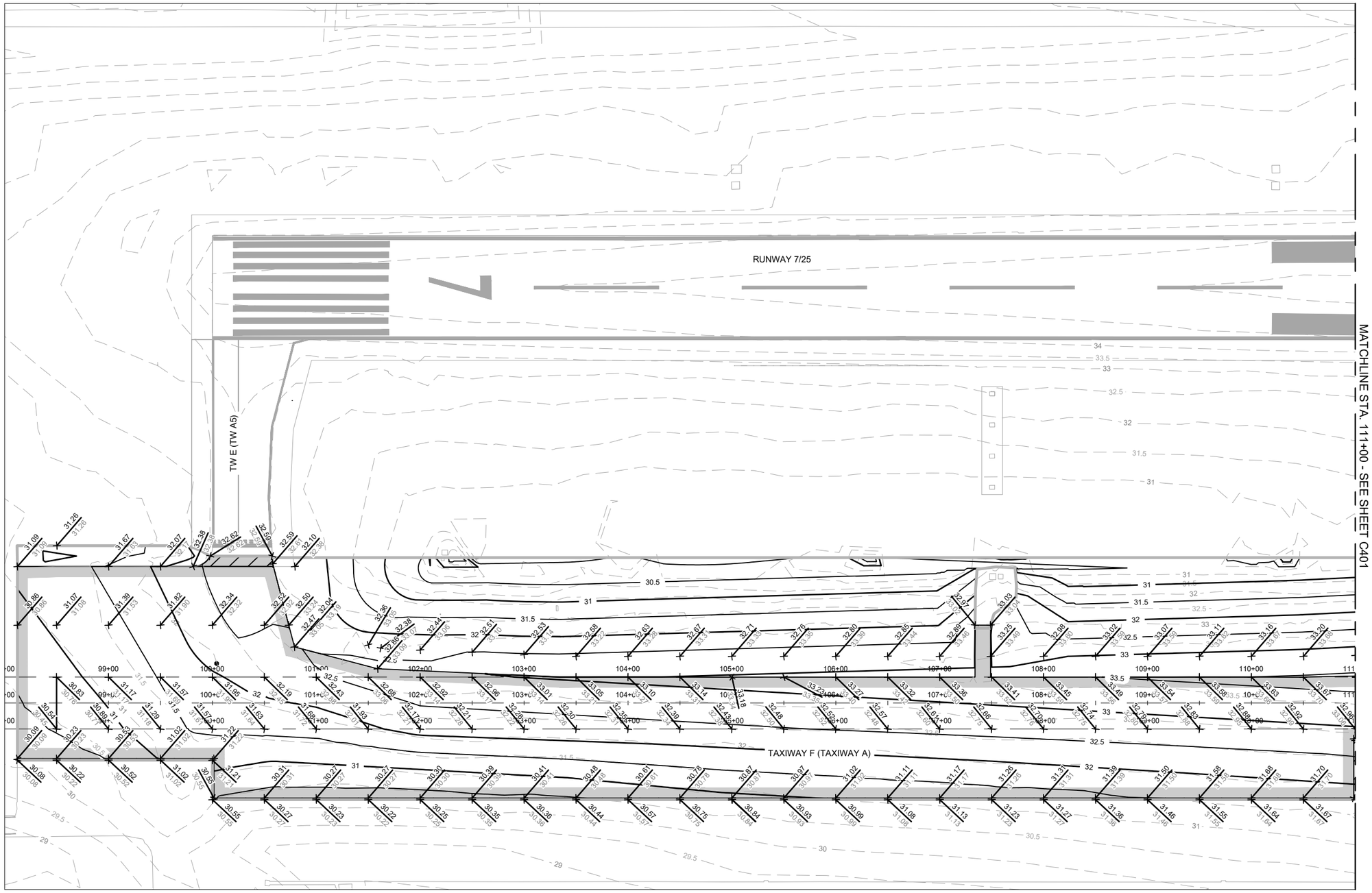
AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

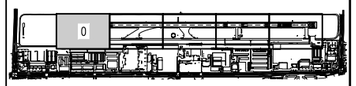
SHEET NAME
G305

SHEET NO.
40 of 89

DRAWING NO.
1625-DOA

Plotted May 25, 2023 @ 9:42 AM by: Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\030-OXR-043-C300-C304-GRAD.dwg





SPOT LEGEND

- FULL DEPTH ASPHALT PAVEMENT
- PARTIAL DEPTH ASPHALT PAVEMENT
- P-209 CRUSHED AGGREGATE BASE COURSE
- D-754 CONCRETE VALLEY GUTTER AND APRON
- PROJECT GRADING LIMITS
- 36.05 / 36.00 — SPOT ELEVATION PLAN

NOTES

1. ALL SPOT ELEVATIONS ARE AT ASPHALT, CONCRETE, BASE COURSE, OR GROUND LOCATIONS UNLESS NOTED OTHERWISE.
2. THE CONTRACTOR SHALL REPAIR ALL AREAS DISTURBED BY THEIR OPERATIONS OUTSIDE OF THE GRADING LIMITS AT THEIR OWN EXPENSE.
3. SEE PLAN AND PROFILE SHEETS C500 - C504 FOR ADDITIONAL INFORMATION.

GRAPHIC SCALE
50 0 50 100
(IN FEET)

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

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OXNARD AIRPORT
OXNARD,CA

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DES: T.A.R.
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ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF
TAXIWAY F

SPOT ELEVATION PLAN
STA. 98+00 TO STA. 111+00
RUNWAY 7/25

AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME
C400

SHEET NO.
41 of 89

DRAWING NO.
1626-DOA

Plotted May 25, 2023 @ 9:42 AM by Ball, Robert
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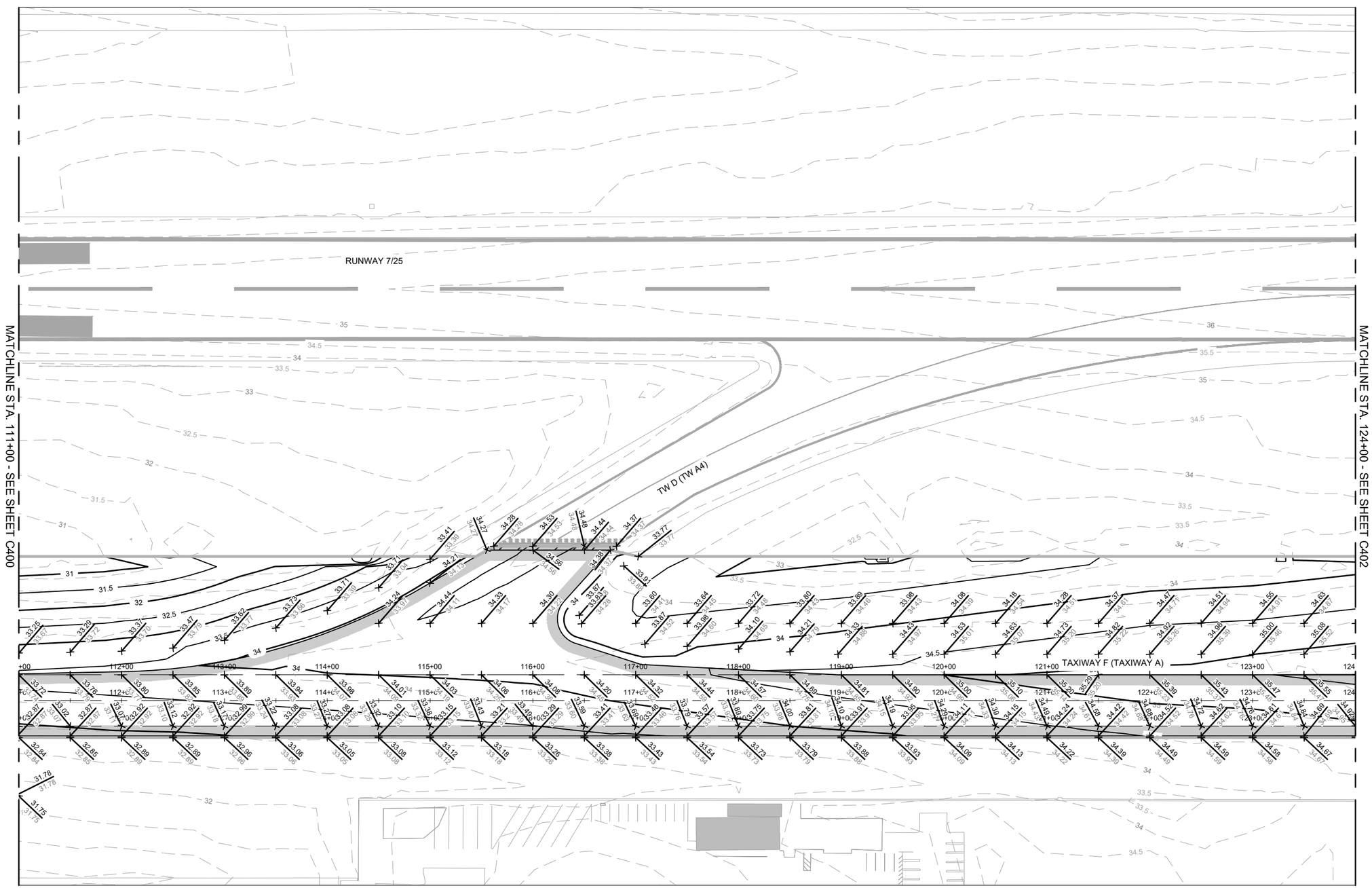

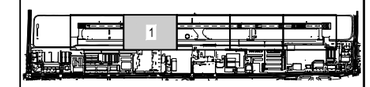

SPOT LEGEND

- FULL DEPTH ASPHALT PAVEMENT
- PARTIAL DEPTH ASPHALT PAVEMENT
- P-209 CRUSHED AGGREGATE BASE COURSE
- D-754 CONCRETE VALLEY GUTTER AND APRON
- PROJECT GRADING LIMITS
- 36.05 / 36.00 — SPOT ELEVATION PLAN

NOTES

1. ALL SPOT ELEVATIONS ARE AT ASPHALT, CONCRETE, BASE COURSE, OR GROUND LOCATIONS UNLESS NOTED OTHERWISE.
2. THE CONTRACTOR SHALL REPAIR ALL AREAS DISTURBED BY THEIR OPERATIONS OUTSIDE OF THE GRADING LIMITS AT THEIR OWN EXPENSE.
3. SEE PLAN AND PROFILE SHEETS C500 - C504 FOR ADDITIONAL INFORMATION.

GRAPHIC SCALE
50 0 50 100
(IN FEET)

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

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OXNARD AIRPORT
OXNARD,CA

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DES: T.A.R.
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APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF
TAXIWAY F

SPOT ELEVATION PLAN
STA. 111+00 TO STA. 124+00
RUNWAY 7/25

AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME C401
SHEET NO. 42 of 89
DRAWING NO. 1627-DOA

Plotted May 25, 2023 @ 9:42 AM by: Bell, Robert
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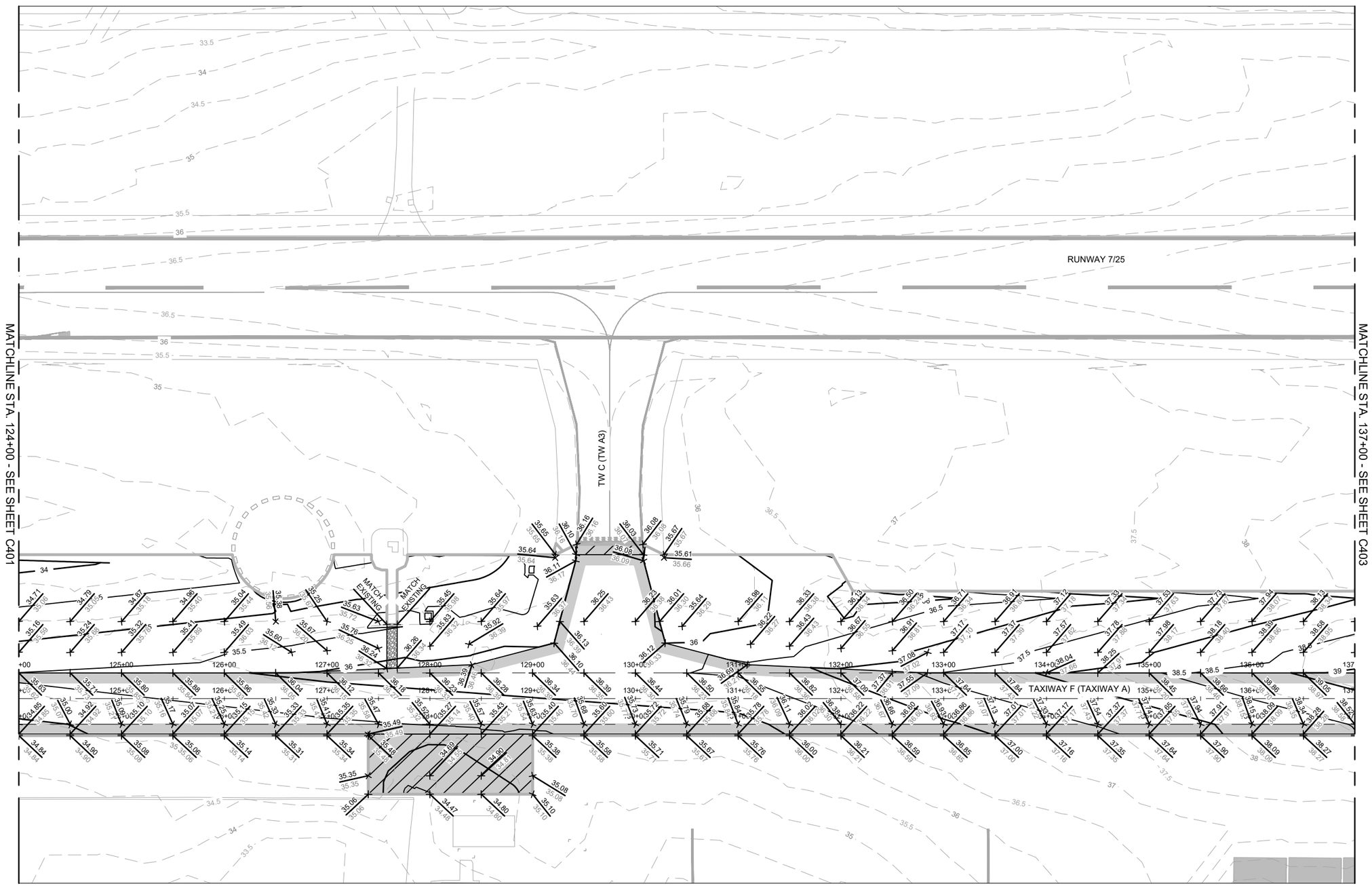

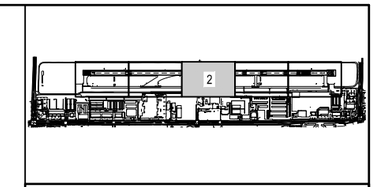

SPOT LEGEND

- FULL DEPTH ASPHALT PAVEMENT
- PARTIAL DEPTH ASPHALT PAVEMENT
- P-209 CRUSHED AGGREGATE BASE COURSE
- D-754 CONCRETE VALLEY GUTTER AND APRON
- PROJECT GRADING LIMITS
- 36.05 / 36.00 — SPOT ELEVATION PLAN

NOTES

1. ALL SPOT ELEVATIONS ARE AT ASPHALT, CONCRETE, BASE COURSE, OR GROUND LOCATIONS UNLESS NOTED OTHERWISE.
2. THE CONTRACTOR SHALL REPAIR ALL AREAS DISTURBED BY THEIR OPERATIONS OUTSIDE OF THE GRADING LIMITS AT THEIR OWN EXPENSE.
3. SEE PLAN AND PROFILE SHEETS C500 - C504 FOR ADDITIONAL INFORMATION.

GRAPHIC SCALE
50 0 50 100
(IN FEET)

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

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OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
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DES: T.A.R.
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1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF
TAXIWAY F

SPOT ELEVATION PLAN
STA. 124+00 TO STA. 137+00
RUNWAY 7/25

AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME C402
SHEET NO. 43 of 89
DRAWING NO. 1628-DOA

Plotted May 25, 2023 @ 9:42 AM by: Bell, Robert
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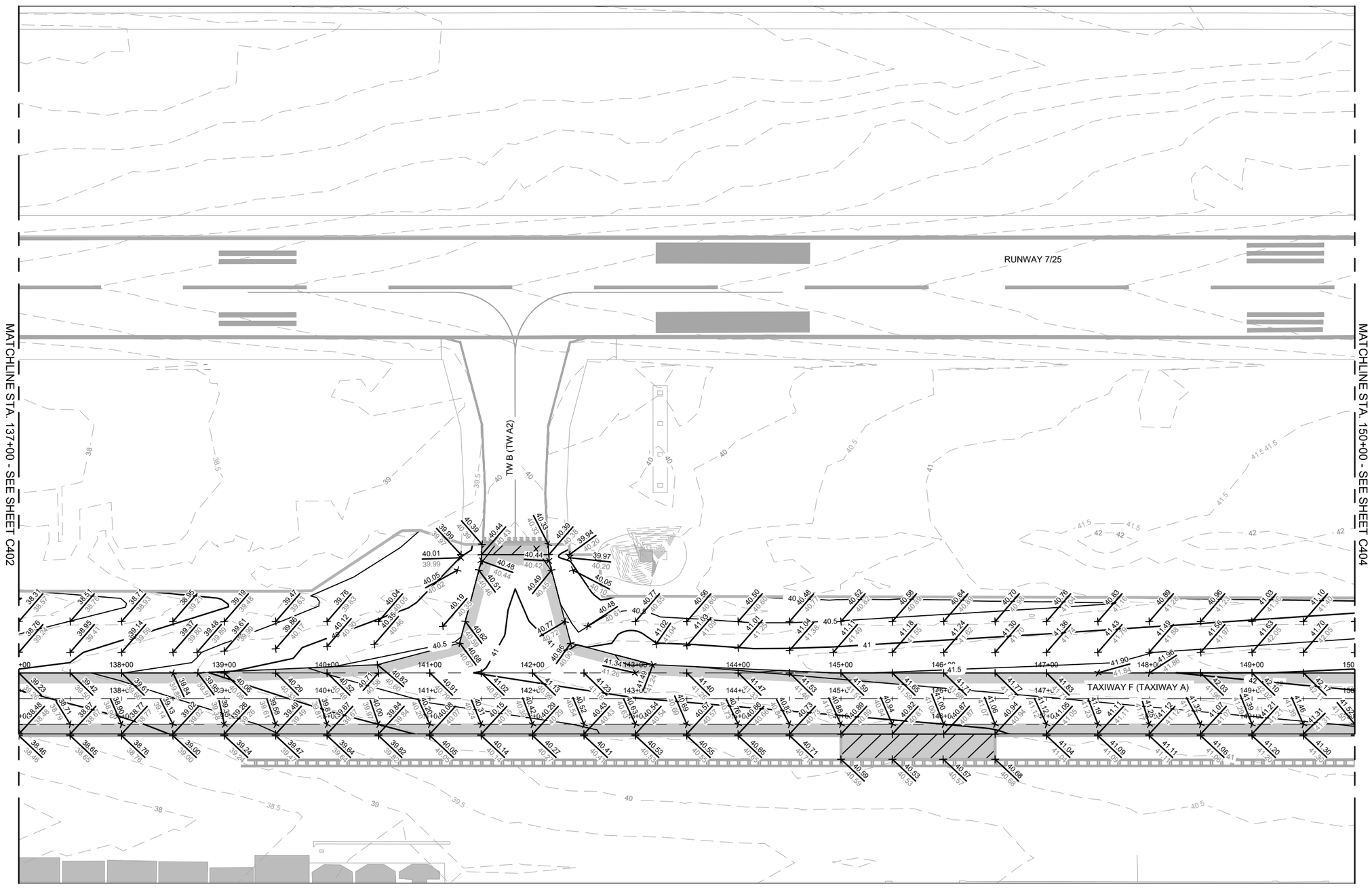

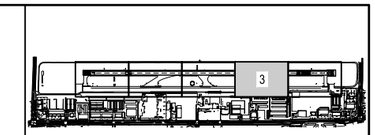

SPOT LEGEND

- FULL DEPTH ASPHALT PAVEMENT
- PARTIAL DEPTH ASPHALT PAVEMENT
- P-209 CRUSHED AGGREGATE BASE COURSE
- D-754 CONCRETE VALLEY GUTTER AND APRON
- PROJECT GRADING LIMITS
- 36.05 / 36.00 — SPOT ELEVATION PLAN

NOTES

1. ALL SPOT ELEVATIONS ARE AT ASPHALT, CONCRETE, BASE COURSE, OR GROUND LOCATIONS UNLESS NOTED OTHERWISE.
2. THE CONTRACTOR SHALL REPAIR ALL AREAS DISTURBED BY THEIR OPERATIONS OUTSIDE OF THE GRADING LIMITS AT THEIR OWN EXPENSE.
3. SEE PLAN AND PROFILE SHEETS C500 - C504 FOR ADDITIONAL INFORMATION.

GRAPHIC SCALE
50 0 50 100
(IN FEET)

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
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APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
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Exhibit 1

RECONSTRUCTION OF
TAXIWAY F

SPOT ELEVATION PLAN
STA. 137+00 TO STA. 150+00
RUNWAY 7/25

AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME
C403

SHEET NO.
44 of 89

DRAWING NO.
1629-DOA

Plotted May 25, 2023 @ 9:42 AM by: Bell, Robert
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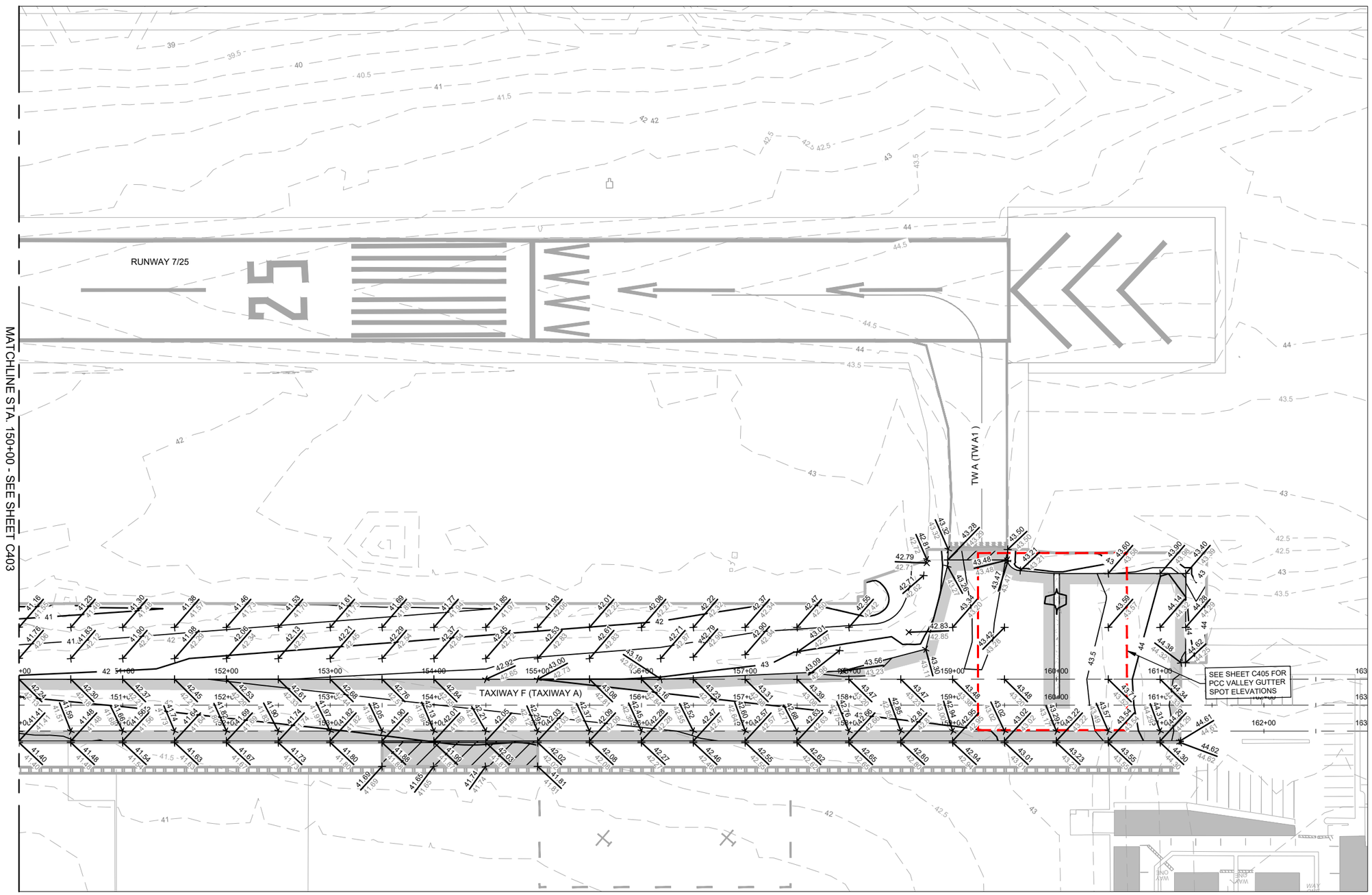
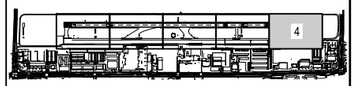




SPOT LEGEND

- FULL DEPTH ASPHALT PAVEMENT
- PARTIAL DEPTH ASPHALT PAVEMENT
- P-209 CRUSHED AGGREGATE BASE COURSE
- D-754 CONCRETE VALLEY GUTTER AND APRON
- PROJECT GRADING LIMITS
- 36.05 / 36.00 SPOT ELEVATION PLAN

NOTES

1. ALL SPOT ELEVATIONS ARE AT ASPHALT, CONCRETE, BASE COURSE, OR GROUND LOCATIONS UNLESS NOTED OTHERWISE.
2. THE CONTRACTOR SHALL REPAIR ALL AREAS DISTURBED BY THEIR OPERATIONS OUTSIDE OF THE GRADING LIMITS AT THEIR OWN EXPENSE.
3. SEE PLAN AND PROFILE SHEETS C500 - C504 FOR ADDITIONAL INFORMATION.

GRAPHIC SCALE
50 0 50 100
(IN FEET)

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF
TAXIWAY F

SPOT ELEVATION PLAN
STA. 150+00 TO STA. 163+00
RUNWAY 7/25

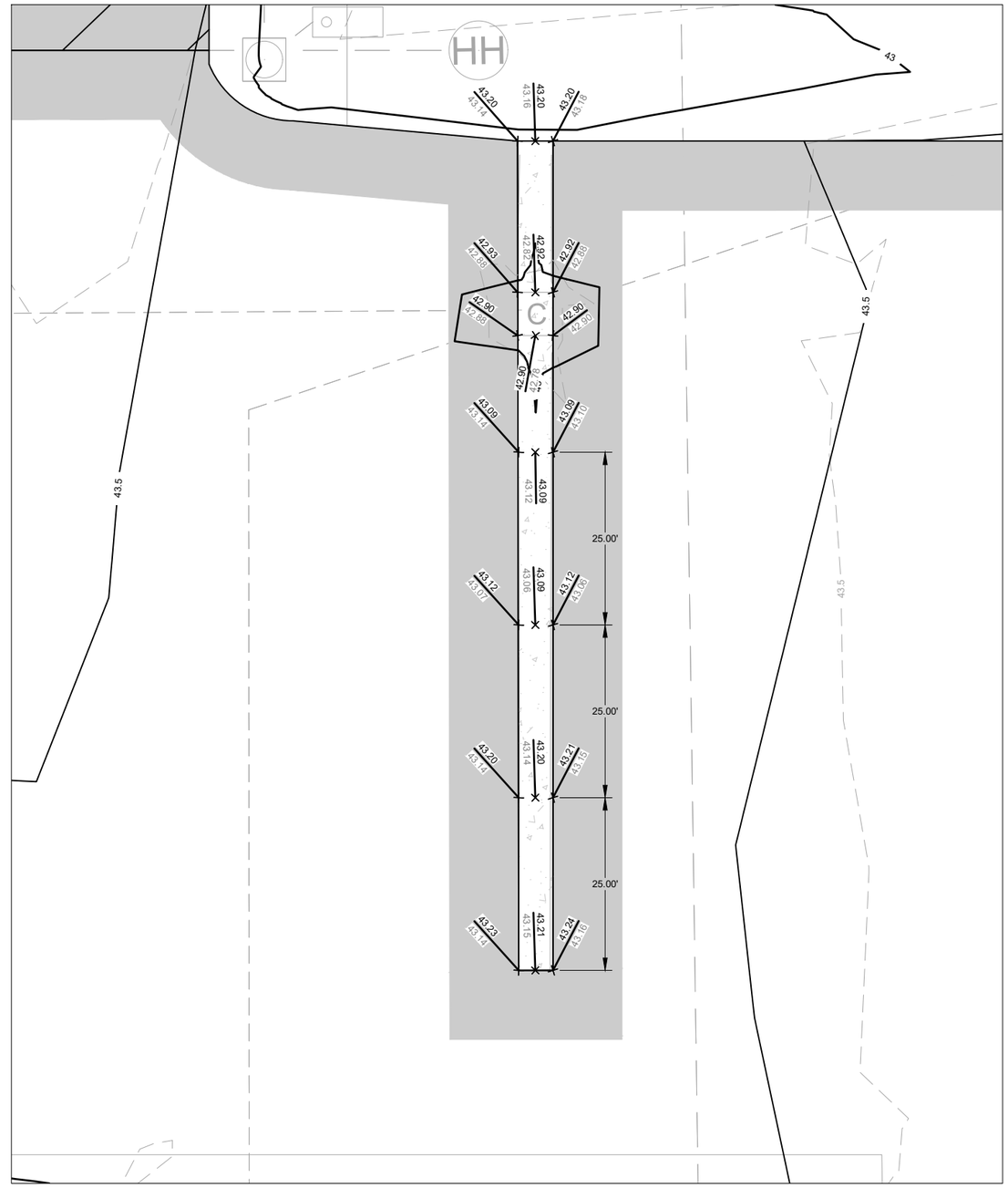
AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

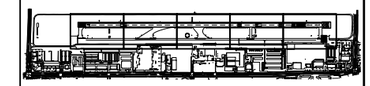
SHEET NAME
C404

SHEET NO.
45 of 89

DRAWING NO.
1630-DOA

Plotted May 25, 2023 @ 9:43 AM by: Ball, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\040-OXR-043-C400-C404-SPOT.dwg





SPOT LEGEND

- FULL DEPTH ASPHALT PAVEMENT
- PARTIAL DEPTH ASPHALT PAVEMENT
- P-209 CRUSHED AGGREGATE BASE COURSE
- D-754 CONCRETE VALLEY GUTTER AND APRON
- PROJECT GRADING LIMITS
- 36.05 / 36.00 — SPOT ELEVATION PLAN

NOTES

1. ALL SPOT ELEVATIONS ARE AT ASPHALT, CONCRETE, BASE COURSE, OR GROUND LOCATIONS UNLESS NOTED OTHERWISE.
2. THE CONTRACTOR SHALL REPAIR ALL AREAS DISTURBED BY THEIR OPERATIONS OUTSIDE OF THE GRADING LIMITS AT THEIR OWN EXPENSE.
3. SEE PLAN AND PROFILE SHEETS C500 - C504 FOR ADDITIONAL INFORMATION.

GRAPHIC SCALE
10 0 10 20
(IN FEET)

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF
TAXIWAY F

PCC VALLEY GUTTER

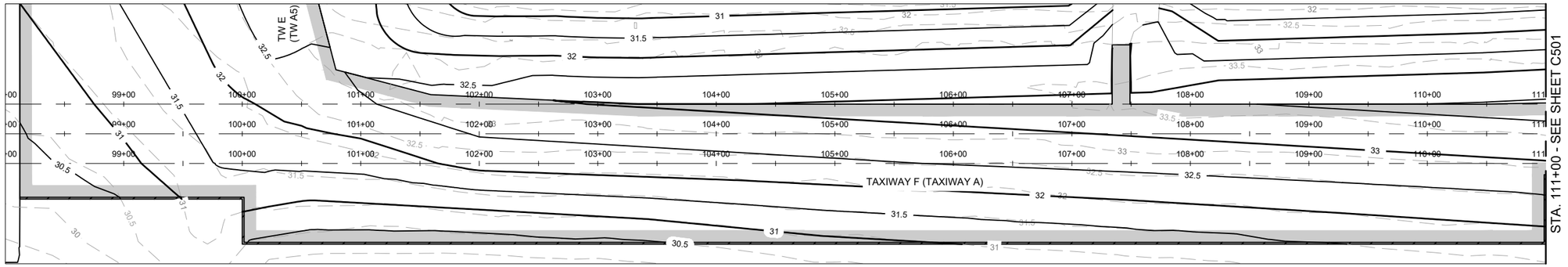
AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

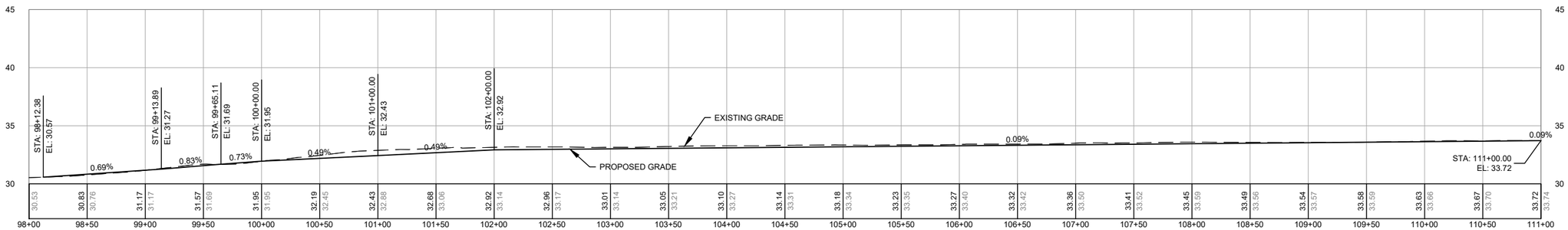
SHEET NAME
C405

SHEET NO.
46 of 89

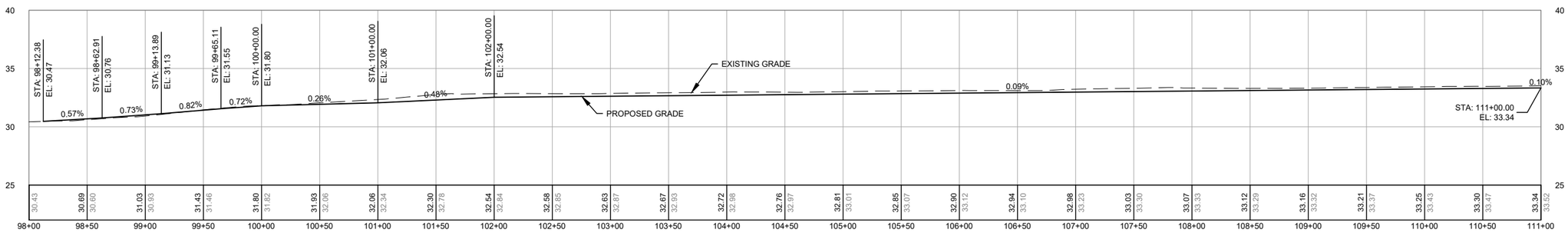
DRAWING NO.
1631-DOA

Plotted May 25, 2023 @ 9:43 AM by: Ball, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\040-OXR-043-C405-SPOT.dwg

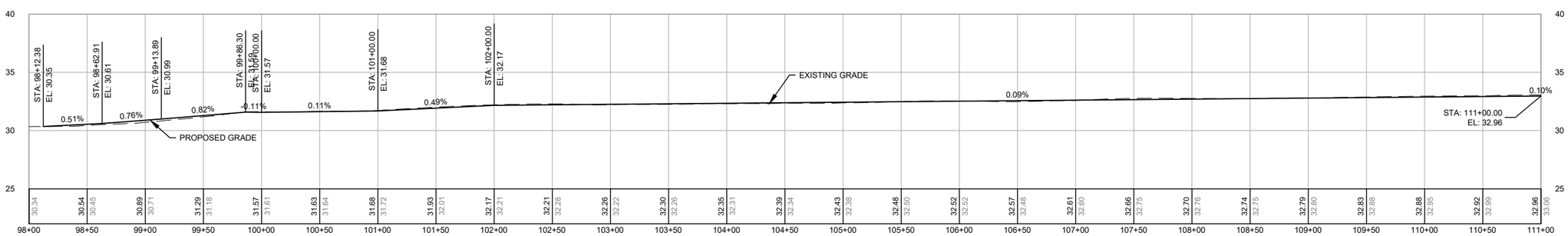




TW F - 25' LT - C50 PROFILE SCALE HORZ: 1"=100', VERT: 1"=10'



TW F - CL - C500 PROFILE SCALE HORZ: 1"=100', VERT: 1"=10'



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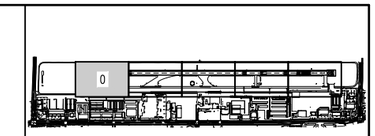


PLAN LEGEND

- FULL DEPTH ASPHALT PAVEMENT
- PARTIAL DEPTH ASPHALT PAVEMENT
- D-754 CONCRETE VALLEY GUTTER AND APRON
- 5680 — EXISTING MAJOR CONTOUR
- 5680 — EXISTING MINOR CONTOUR
- 5690 — PROPOSED MAJOR CONTOUR
- 5690 — PROPOSED MINOR CONTOUR

PROFILE LEGEND

- PROPOSED GRADE
- EXISTING GROUND
- 230.50 / 230.47 — PROFILE BAND
- EXISTING ELEVATION
- PROPOSED ELEVATION

NOTES

1. REFER TO SHEETS C220 THRU C223 FOR TYPICAL SECTIONS.
2. REFER TO SHEETS C400 THRU C404 FOR ADDITIONAL SPOT ELEVATIONS.
3. IN THE EVENT OF ANY CONFLICT WITH THESE PLANS, THE INFORMATION IN THE PROFILES SHALL GOVERN OVER SPOT ELEVATIONS.
4. CONTRACTOR SHALL VERIFY EXISTING TIE POINTS AND NOTIFY THE ENGINEER OF DISCREPANCIES.
5. CONTRACTOR TO VERIFY ALL EXISTING STORM PIPE ELEVATIONS, LOCATION, MATERIAL, AND DIMENSIONS AND PROTECT THE EXISTING STORM PIPE IN PLACE.

GRAPHIC SCALE
50 0 50 100
(IN FEET)

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF
TAXIWAY F

PAVEMENT PLAN AND PROFILE
STA. 98+00 TO STA. 111+00
TAXIWAY F

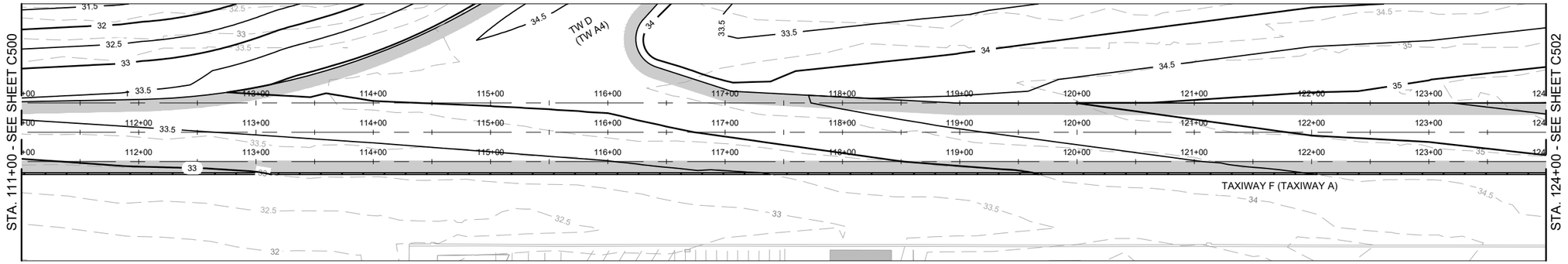
AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

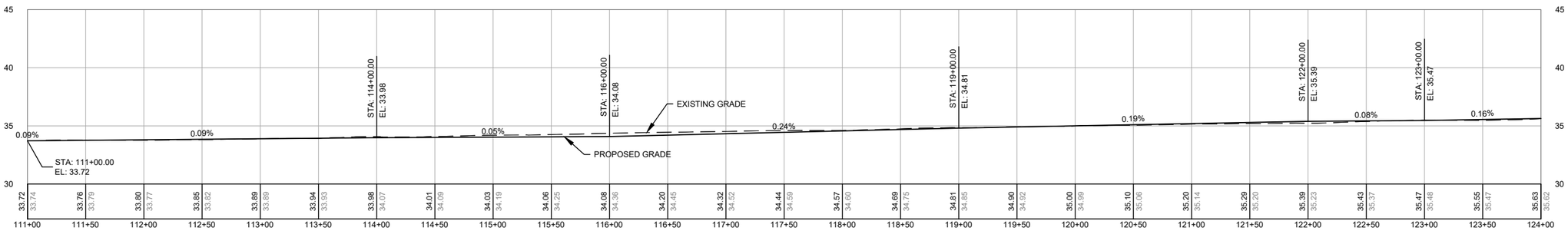
SHEET NAME
C500

SHEET NO.
47 of 89

DRAWING NO.
1632-DOA

Plotted May 25, 2023 @ 9:43 AM by: Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\050-OXR-043-C500-C504-PROF.dwg





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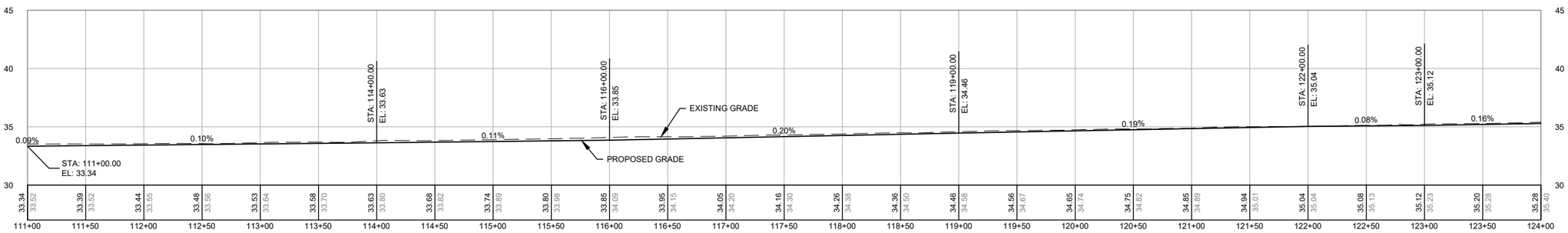
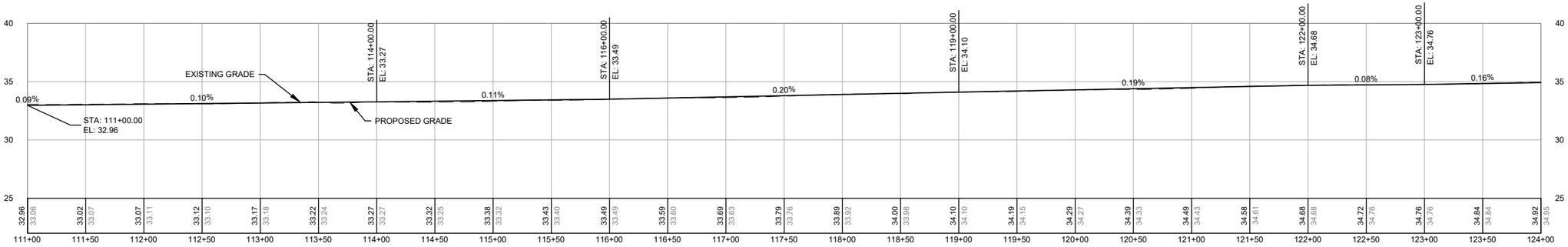


TW F - CL - C501 PROFILE SCALE HORZ: 1"=100', VERT: 1"=10'



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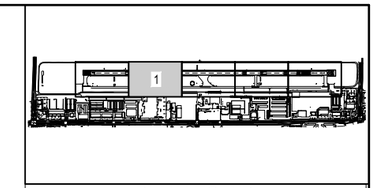


PLAN LEGEND

- FULL DEPTH ASPHALT PAVEMENT
- PARTIAL DEPTH ASPHALT PAVEMENT
- D-754 CONCRETE VALLEY GUTTER AND APRON
- 5680 — EXISTING MAJOR CONTOUR
- 5680 — EXISTING MINOR CONTOUR
- 5690 — PROPOSED MAJOR CONTOUR
- 5690 — PROPOSED MINOR CONTOUR

PROFILE LEGEND

- PROPOSED GRADE
- EXISTING GROUND
- 230.50 / 230.47 — PROFILE BAND
- EXISTING ELEVATION
- PROPOSED ELEVATION

NOTES

1. REFER TO SHEETS C220 THRU C223 FOR TYPICAL SECTIONS.
2. REFER TO SHEETS C400 THRU C404 FOR ADDITIONAL SPOT ELEVATIONS.
3. IN THE EVENT OF ANY CONFLICT WITH THESE PLANS, THE INFORMATION IN THE PROFILES SHALL GOVERN OVER SPOT ELEVATIONS.
4. CONTRACTOR SHALL VERIFY EXISTING TIE POINTS AND NOTIFY THE ENGINEER OF DISCREPANCIES.
5. CONTRACTOR TO VERIFY ALL EXISTING STORM PIPE ELEVATIONS, LOCATION, MATERIAL, AND DIMENSIONS AND PROTECT THE EXISTING STORM PIPE IN PLACE.

GRAPHIC SCALE
50 0 50 100
(IN FEET)

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF
TAXIWAY F

PAVEMENT PLAN AND PROFILE
STA. 111+00 TO STA. 124+00
TAXIWAY F

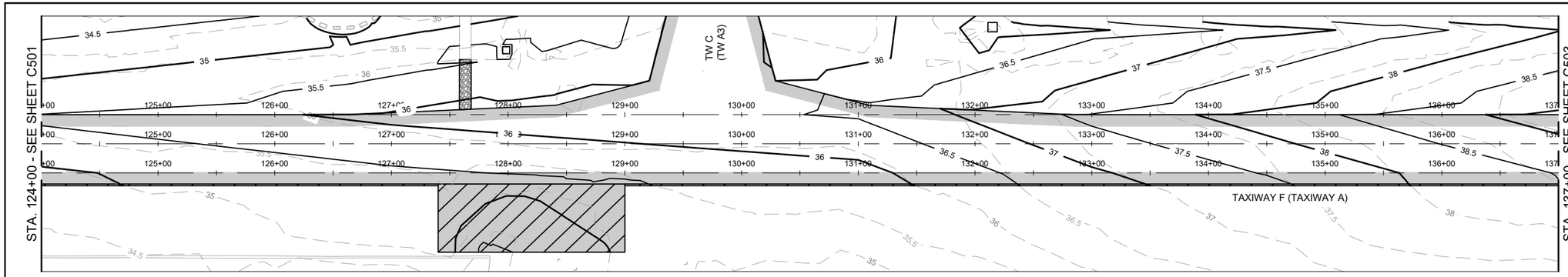
AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

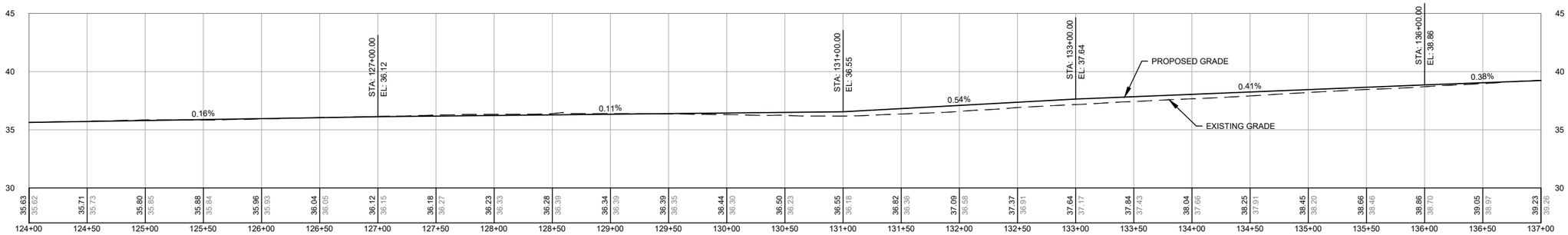
SHEET NAME
C501

SHEET NO.
48 of 89

DRAWING NO.
1633-DOA

Plotted May 25, 2023 @ 9:44 AM by: Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\050-OXR-043-C500-C504-PROF.dwg





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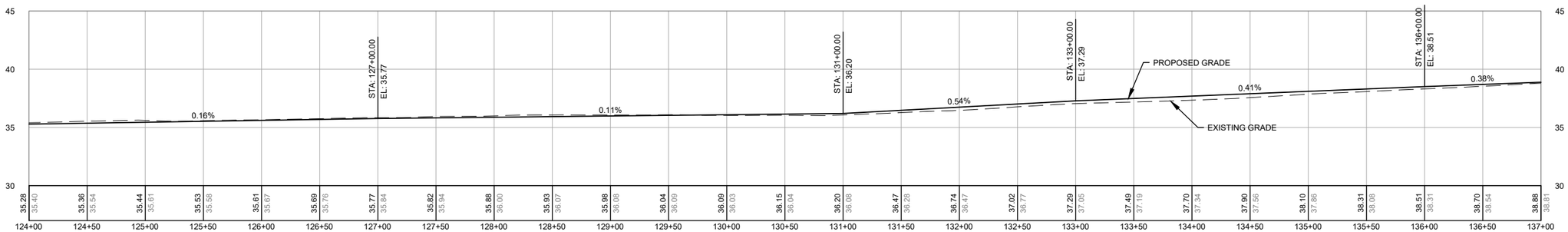
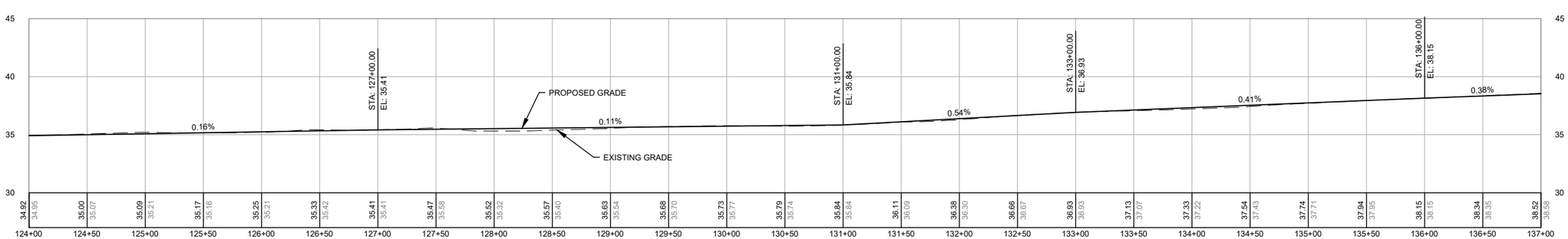


TW F - CL - C502 PROFILE SCALE HORZ: 1"=100', VERT: 1"=10'



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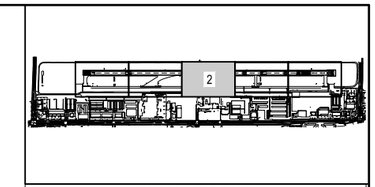


PLAN LEGEND

- FULL DEPTH ASPHALT PAVEMENT
- PARTIAL DEPTH ASPHALT PAVEMENT
- D-754 CONCRETE VALLEY GUTTER AND APRON
- 5680 — EXISTING MAJOR CONTOUR
- 5680 — EXISTING MINOR CONTOUR
- 5690 — PROPOSED MAJOR CONTOUR
- 5690 — PROPOSED MINOR CONTOUR

PROFILE LEGEND

- PROPOSED GRADE
- EXISTING GROUND
- PROFILE BAND (230.50 / 230.47)
- EXISTING ELEVATION
- PROPOSED ELEVATION

NOTES

1. REFER TO SHEETS C220 THRU C223 FOR TYPICAL SECTIONS.
2. REFER TO SHEETS C400 THRU C404 FOR ADDITIONAL SPOT ELEVATIONS.
3. IN THE EVENT OF ANY CONFLICT WITH THESE PLANS, THE INFORMATION IN THE PROFILES SHALL GOVERN OVER SPOT ELEVATIONS.
4. CONTRACTOR SHALL VERIFY EXISTING TIE POINTS AND NOTIFY THE ENGINEER OF DISCREPANCIES.
5. CONTRACTOR TO VERIFY ALL EXISTING STORM PIPE ELEVATIONS, LOCATION, MATERIAL, AND DIMENSIONS AND PROTECT THE EXISTING STORM PIPE IN PLACE.

GRAPHIC SCALE
50 0 50 100
(IN FEET)

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF
TAXIWAY F

PAVEMENT PLAN AND PROFILE
STA. 124+00 TO STA. 137+00
TAXIWAY F

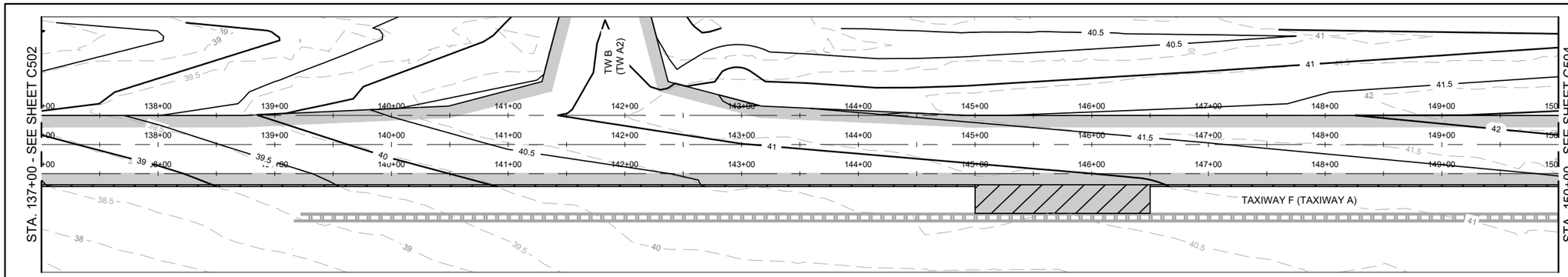
AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

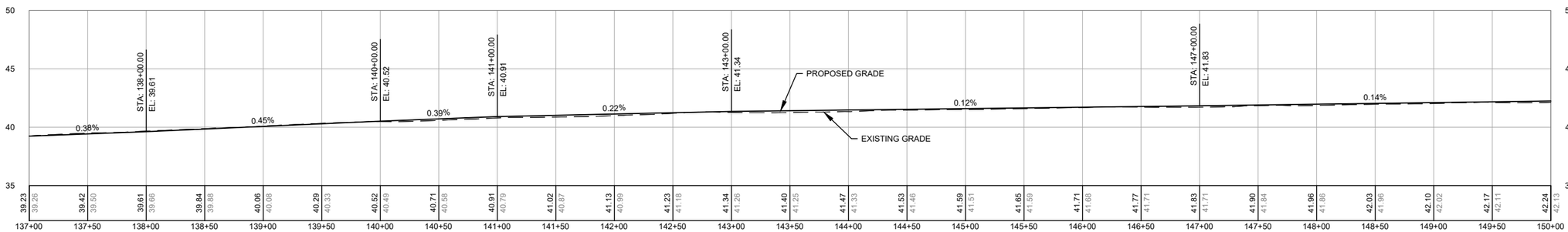
SHEET NAME
C502

SHEET NO.
49 of 89

DRAWING NO.
1634-DOA

Plotted May 25, 2023 @ 9:44 AM by: Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\050-OXR-043-C500-C504-PROF.dwg





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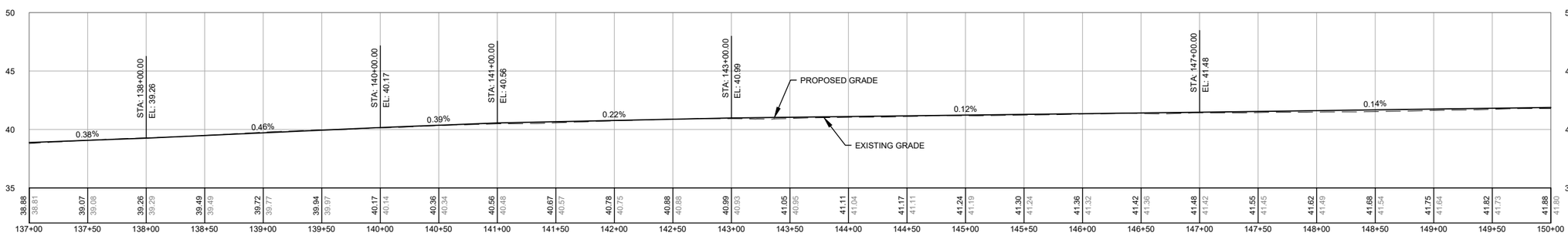

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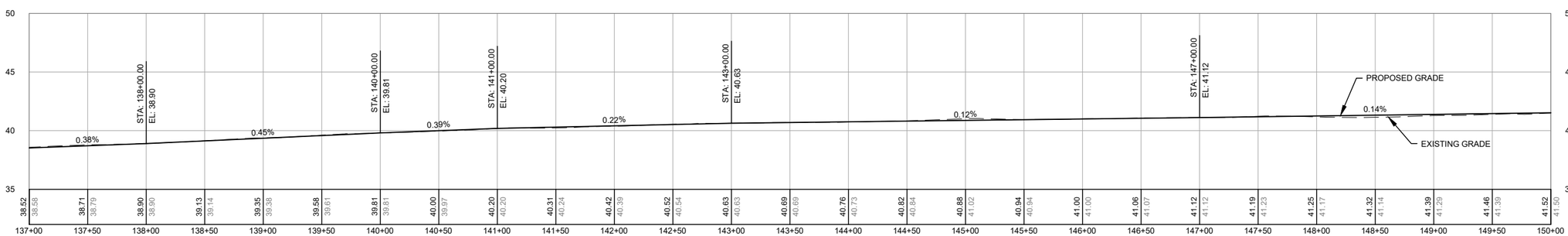
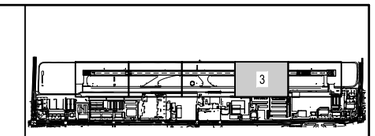


TW F - 25' RT - C503 PROFILE SCALE HORZ: 1"=100', VERT: 1"=10'



PLAN LEGEND

- FULL DEPTH ASPHALT PAVEMENT
- PARTIAL DEPTH ASPHALT PAVEMENT
- D-754 CONCRETE VALLEY GUTTER AND APRON
- 5680 — EXISTING MAJOR CONTOUR
- 5680 — EXISTING MINOR CONTOUR
- 5690 — PROPOSED MAJOR CONTOUR
- 5690 — PROPOSED MINOR CONTOUR

PROFILE LEGEND

- PROPOSED GRADE
- EXISTING GROUND
- 230.50 / 230.47 — PROFILE BAND
- EXISTING ELEVATION
- PROPOSED ELEVATION

NOTES

1. REFER TO SHEETS C220 THRU C223 FOR TYPICAL SECTIONS.
2. REFER TO SHEETS C400 THRU C404 FOR ADDITIONAL SPOT ELEVATIONS.
3. IN THE EVENT OF ANY CONFLICT WITH THESE PLANS, THE INFORMATION IN THE PROFILES SHALL GOVERN OVER SPOT ELEVATIONS.
4. CONTRACTOR SHALL VERIFY EXISTING TIE POINTS AND NOTIFY THE ENGINEER OF DISCREPANCIES.
5. CONTRACTOR TO VERIFY ALL EXISTING STORM PIPE ELEVATIONS, LOCATION, MATERIAL, AND DIMENSIONS AND PROTECT THE EXISTING STORM PIPE IN PLACE.

GRAPHIC SCALE
50 0 50 100
(IN FEET)

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

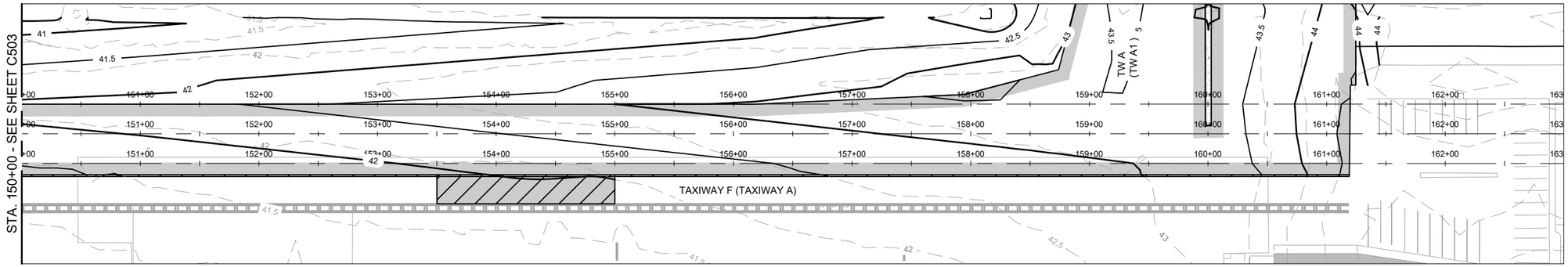
RECONSTRUCTION OF
TAXIWAY F

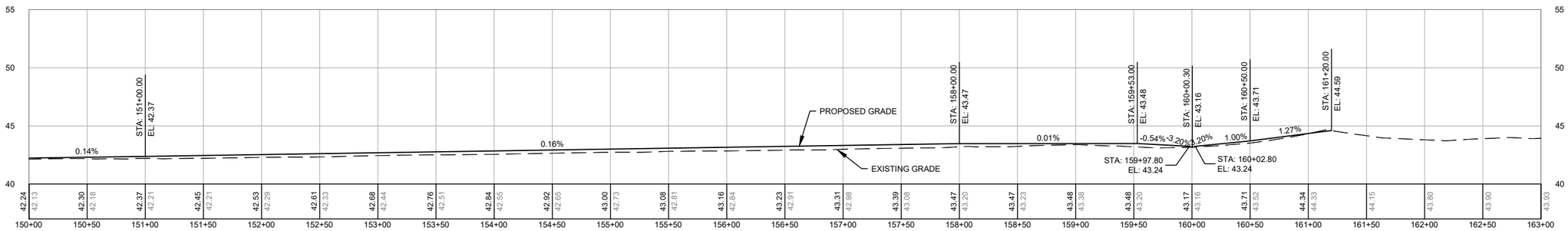
PAVEMENT PLAN AND PROFILE
STA. 137+00 TO STA. 150+00
TAXIWAY F

AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME C503
SHEET NO. 50 of 89
DRAWING NO. 1635-DOA

Plotted May 25, 2023 @ 9:44 AM by: Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\050-OXR-043-C500-C504-PROF.dwg





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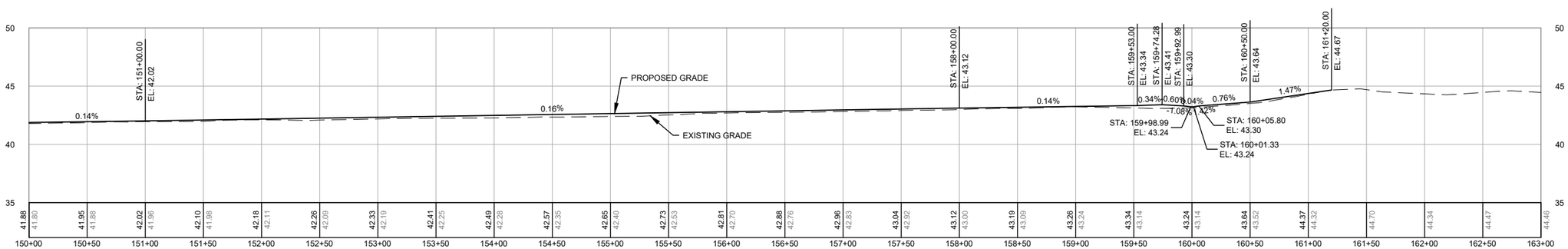

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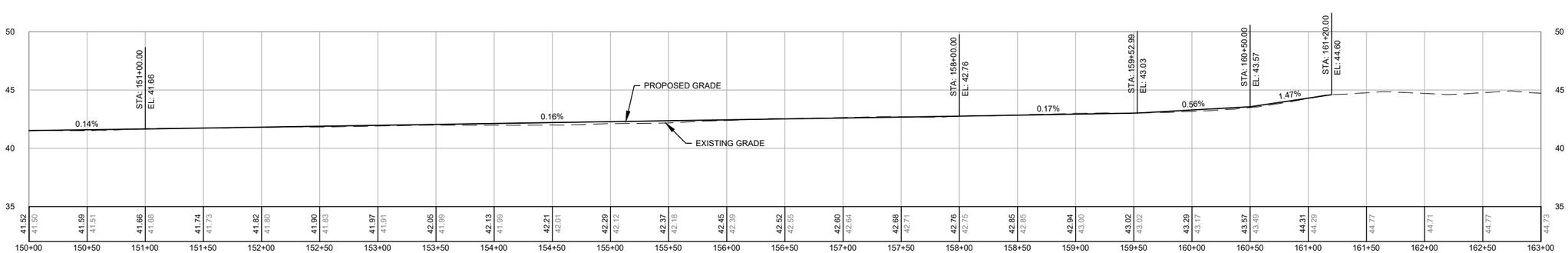
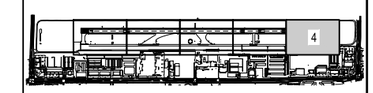


TW F - 25' RT - C504 PROFILE SCALE HORZ: 1"=100', VERT: 1"=10'



PLAN LEGEND

- FULL DEPTH ASPHALT PAVEMENT
- PARTIAL DEPTH ASPHALT PAVEMENT
- D-754 CONCRETE VALLEY GUTTER AND APRON
- 5680 — EXISTING MAJOR CONTOUR
- 5680 — EXISTING MINOR CONTOUR
- 5690 — PROPOSED MAJOR CONTOUR
- 5690 — PROPOSED MINOR CONTOUR

PROFILE LEGEND

- PROPOSED GRADE
- EXISTING GROUND
- 230.50 / 230.47 — PROFILE BAND
- EXISTING ELEVATION
- PROPOSED ELEVATION

NOTES

1. REFER TO SHEETS C220 THRU C223 FOR TYPICAL SECTIONS.
2. REFER TO SHEETS C400 THRU C404 FOR ADDITIONAL SPOT ELEVATIONS.
3. IN THE EVENT OF ANY CONFLICT WITH THESE PLANS, THE INFORMATION IN THE PROFILES SHALL GOVERN OVER SPOT ELEVATIONS.
4. CONTRACTOR SHALL VERIFY EXISTING TIE POINTS AND NOTIFY THE ENGINEER OF DISCREPANCIES.
5. CONTRACTOR TO VERIFY ALL EXISTING STORM PIPE ELEVATIONS, LOCATION, MATERIAL, AND DIMENSIONS AND PROTECT THE EXISTING STORM PIPE IN PLACE.

GRAPHIC SCALE
50 0 50 100
(IN FEET)

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF
TAXIWAY F

PAVEMENT PLAN AND PROFILE
STA. 150+00 TO STA. 163+00
TAXIWAY F

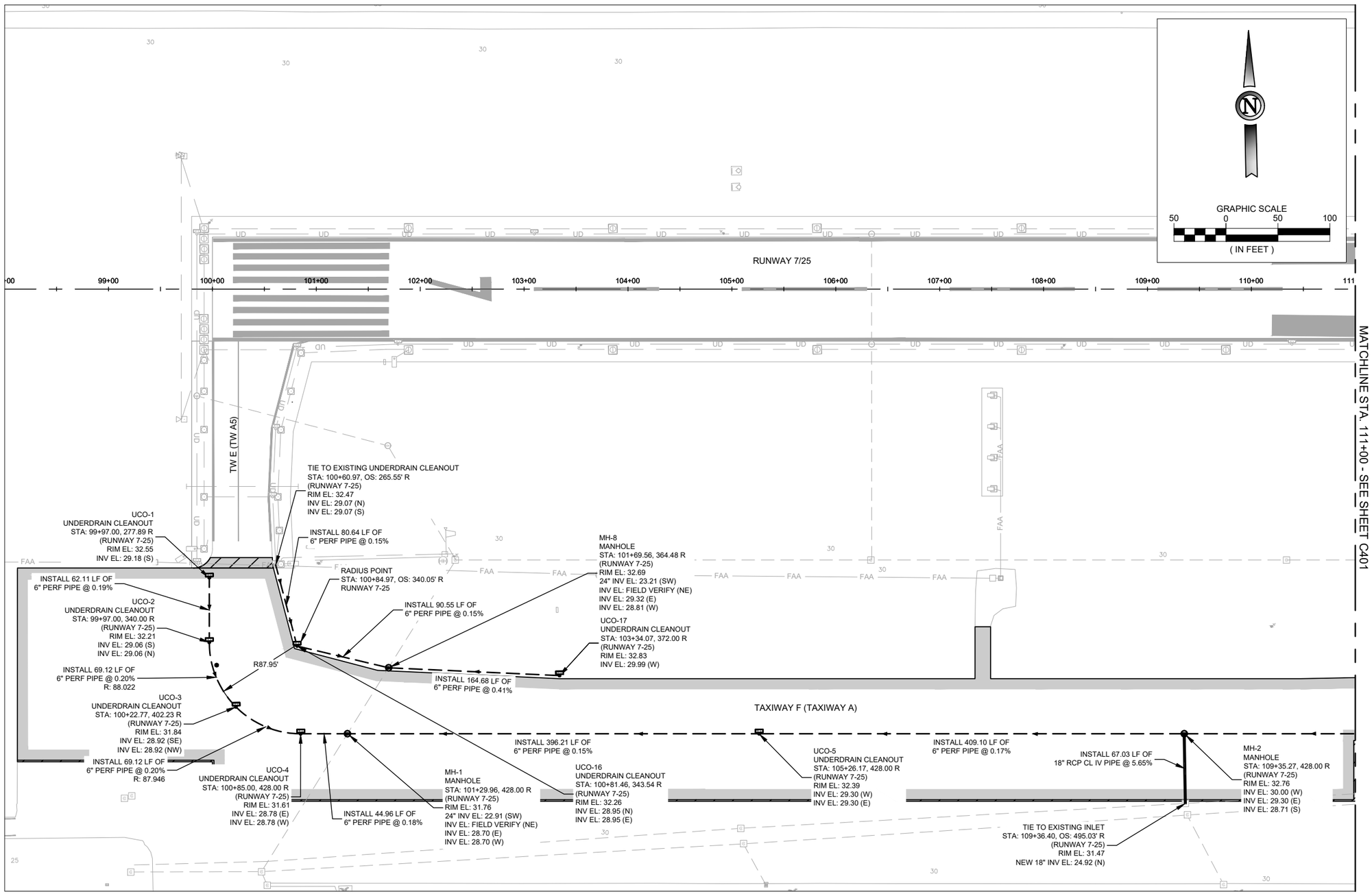
AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

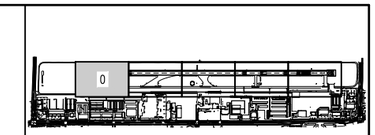
SHEET NAME
C504

SHEET NO.
51 of 89

DRAWING NO.
1636-DOA

Plotted May 25, 2023 @ 9:44 AM by: Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\050-OXR-043-C500-C504-PROF.dwg





UNDERDRAIN & STORM SEWER LEGEND

- ASPHALT PAVEMENT
- P-209 CRUSHED AGGREGATE BASE COURSE
- D-754 CONCRETE VALLEY GUTTER AND APRON
- PROPOSED UNDERDRAIN PIPE
- PROPOSED UNDERDRAIN CLEANOUT
- PROPOSED INLET
- PROPOSED STORM MANHOLE
- PROPOSED RCP STORM PIPE

NOTES

1. CONTRACTOR TO VERIFY EXISTING TIE/CONNECTION POINTS PRIOR TO CONSTRUCTION AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES.
2. ALL STATIONING FOR STORM PIPE IS AT CENTERLINE OF STORM PIPE.
3. PRIOR TO CONSTRUCTION OR PRECAST OF DRAINAGE STRUCTURES. CONTRACTOR SHALL VERIFY EXISTING UTILITY LOCATIONS, DEPTHS, AND SIZES FOR ENTIRE PROPOSED UTILITY ALIGNMENT.
4. ALL REQUIRED UTILITY ADJUSTMENTS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. CONTRACTOR WILL VERIFY ANY UTILITY DEVICES CONFLICTING WITH PROPOSED IMPROVEMENTS AND VERIFY WITH THE FIELD ENGINEER FOR PROPER ADJUSTMENTS REQUIRED.
5. DISTANCE IS MEASURED FROM CENTER TO CENTER OF STRUCTURE.
6. SLOPES ARE CALCULATED FROM CENTER TO CENTER OF STRUCTURE.
7. FOR UNDERDRAIN AND TRENCH DRAIN DETAILS, SEE SHEET C650 THRU C652.
8. CONTRACTOR TO COORDINATE UNDERDRAIN CROSSINGS WITH ELECTRICAL AND OTHER UTILITIES IN THE VICINITY TO ELIMINATE POTENTIAL CONFLICTS.
9. CONNECTING EXISTING UNDERDRAIN PIPES TO PROPOSED UNDERDRAIN SYSTEM AND PROPOSED UNDERDRAIN SYSTEM TO THE EXISTING STORM SEWER PIPES WILL BE INCIDENTAL TO THE UNDERDRAIN PIPE BID ITEMS.
10. CONTRACTOR SHALL PROTECT ALL EXISTING UNDERGROUND UTILITIES IN PLACE, UNLESS OTHERWISE NOTED.

ISSUED FOR BID

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF
TAXIWAY F

UNDERDRAIN AND STORM SEWER LAYOUT PLAN
STA. 98+00 TO STA. 111+00
RUNWAY 7/25

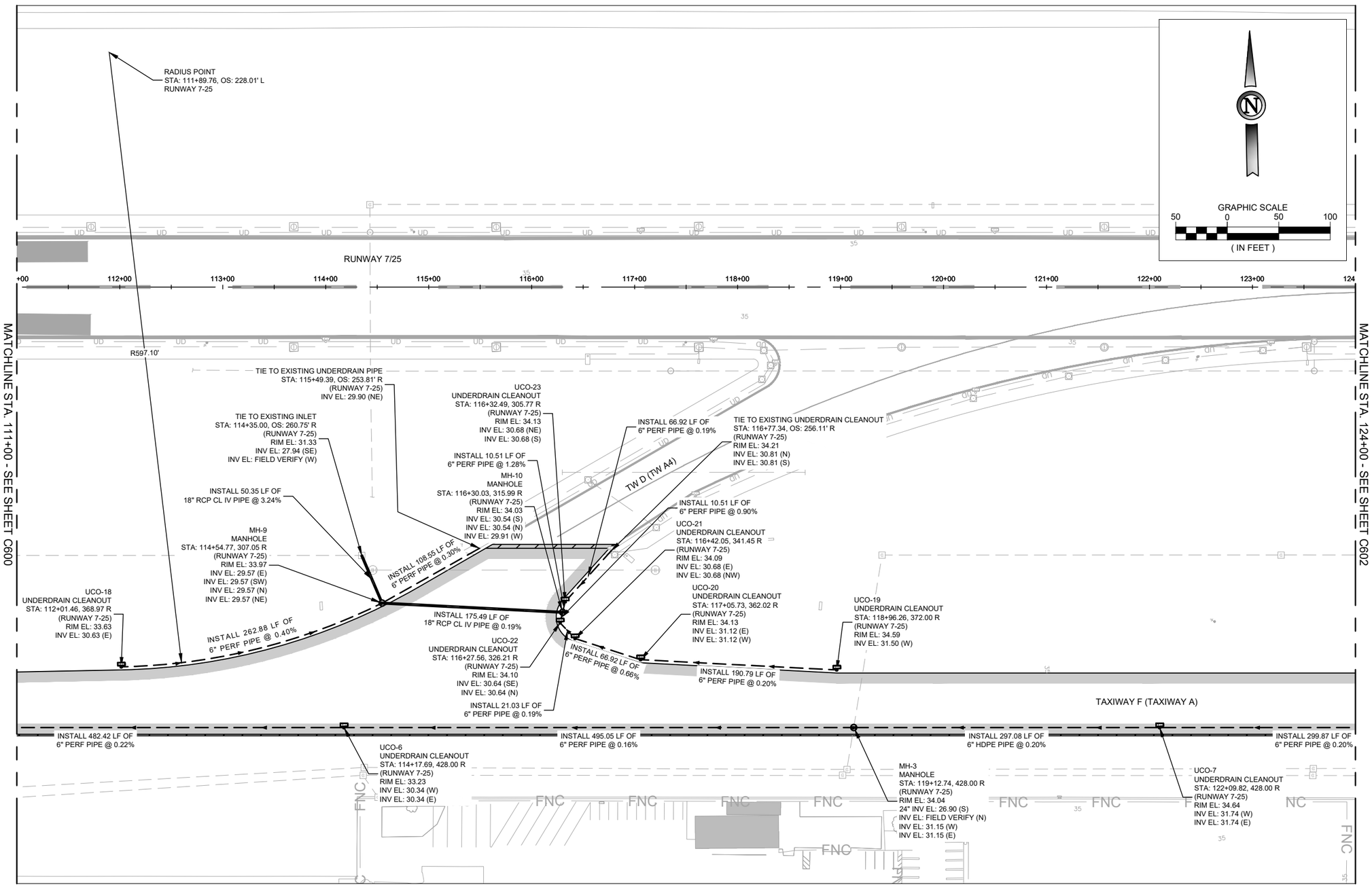
AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

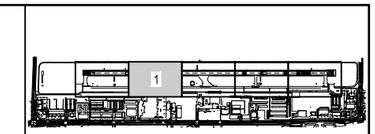
SHEET NAME
C600

SHEET NO.
52 of 89

DRAWING NO.
1637-DOA

Plotted May 25, 2023 @ 9:44 AM by Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\060-OXR-043-C600-C604-UNDR-STRM.dwg





UNDERDRAIN & STORM SEWER LEGEND

- ASPHALT PAVEMENT
- P-209 CRUSHED AGGREGATE BASE COURSE
- D-754 CONCRETE VALLEY GUTTER AND APRON
- PROPOSED UNDERDRAIN PIPE
- PROPOSED UNDERDRAIN CLEANOUT
- PROPOSED INLET
- PROPOSED STORM MANHOLE
- PROPOSED RCP STORM PIPE

NOTES

1. CONTRACTOR TO VERIFY EXISTING TIE/CONNECTION POINTS PRIOR TO CONSTRUCTION AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES.
2. ALL STATIONING FOR STORM PIPE IS AT CENTERLINE OF STORM PIPE.
3. PRIOR TO CONSTRUCTION OR PRECAST OF DRAINAGE STRUCTURES. CONTRACTOR SHALL VERIFY EXISTING UTILITY LOCATIONS, DEPTHS, AND SIZES FOR ENTIRE PROPOSED UTILITY ALIGNMENT.
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6. SLOPES ARE CALCULATED FROM CENTER TO CENTER OF STRUCTURE.
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8. CONTRACTOR TO COORDINATE UNDERDRAIN CROSSINGS WITH ELECTRICAL AND OTHER UTILITIES IN THE VICINITY TO ELIMINATE POTENTIAL CONFLICTS.
9. CONNECTING EXISTING UNDERDRAIN PIPES TO PROPOSED UNDERDRAIN SYSTEM AND PROPOSED UNDERDRAIN SYSTEM TO THE EXISTING STORM SEWER PIPES WILL BE INCIDENTAL TO THE UNDERDRAIN PIPE BID ITEMS.
10. CONTRACTOR SHALL PROTECT ALL EXISTING UNDERGROUND UTILITIES IN PLACE, UNLESS OTHERWISE NOTED.

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF
TAXIWAY F

UNDERDRAIN AND STORM SEWER LAYOUT PLAN
STA. 111+00 TO STA. 124+00
RUNWAY 7/25

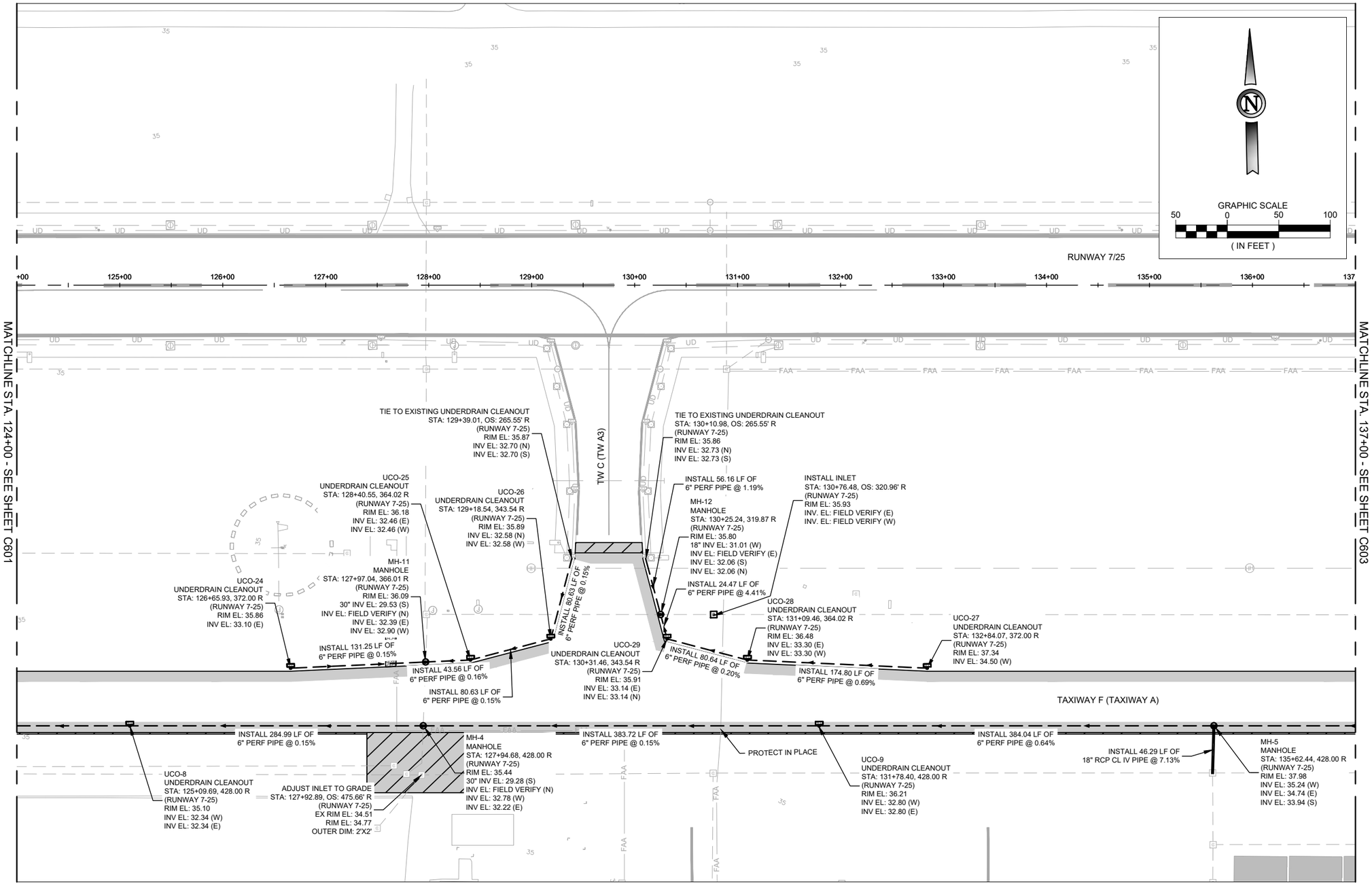
AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

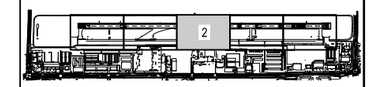
SHEET NAME
C601

SHEET NO.
53 of 89

DRAWING NO.
1638-DOA

Plotted May 25, 2023 @ 9:45 AM by Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\060-OXR-043-C600-C604-UNDR-STRM.dwg





UNDERDRAIN & STORM SEWER LEGEND

- ASPHALT PAVEMENT
- P-209 CRUSHED AGGREGATE BASE COURSE
- D-754 CONCRETE VALLEY GUTTER AND APRON
- PROPOSED UNDERDRAIN PIPE
- PROPOSED UNDERDRAIN CLEANOUT
- PROPOSED INLET
- PROPOSED STORM MANHOLE
- PROPOSED RCP STORM PIPE

NOTES

1. CONTRACTOR TO VERIFY EXISTING TIE/CONNECTION POINTS PRIOR TO CONSTRUCTION AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES.
2. ALL STATIONING FOR STORM PIPE IS AT CENTERLINE OF STORM PIPE.
3. PRIOR TO CONSTRUCTION OR PRECAST OF DRAINAGE STRUCTURES. CONTRACTOR SHALL VERIFY EXISTING UTILITY LOCATIONS, DEPTHS, AND SIZES FOR ENTIRE PROPOSED UTILITY ALIGNMENT.
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6. SLOPES ARE CALCULATED FROM CENTER TO CENTER OF STRUCTURE.
7. FOR UNDERDRAIN AND TRENCH DRAIN DETAILS, SEE SHEET C650 THRU C652.
8. CONTRACTOR TO COORDINATE UNDERDRAIN CROSSINGS WITH ELECTRICAL AND OTHER UTILITIES IN THE VICINITY TO ELIMINATE POTENTIAL CONFLICTS.
9. CONNECTING EXISTING UNDERDRAIN PIPES TO PROPOSED UNDERDRAIN SYSTEM AND PROPOSED UNDERDRAIN SYSTEM TO THE EXISTING STORM SEWER PIPES WILL BE INCIDENTAL TO THE UNDERDRAIN PIPE BID ITEMS.
10. CONTRACTOR SHALL PROTECT ALL EXISTING UNDERGROUND UTILITIES IN PLACE, UNLESS OTHERWISE NOTED.

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF
TAXIWAY F

UNDERDRAIN AND STORM SEWER LAYOUT PLAN
STA. 124+00 TO STA. 137+00
RUNWAY 7/25

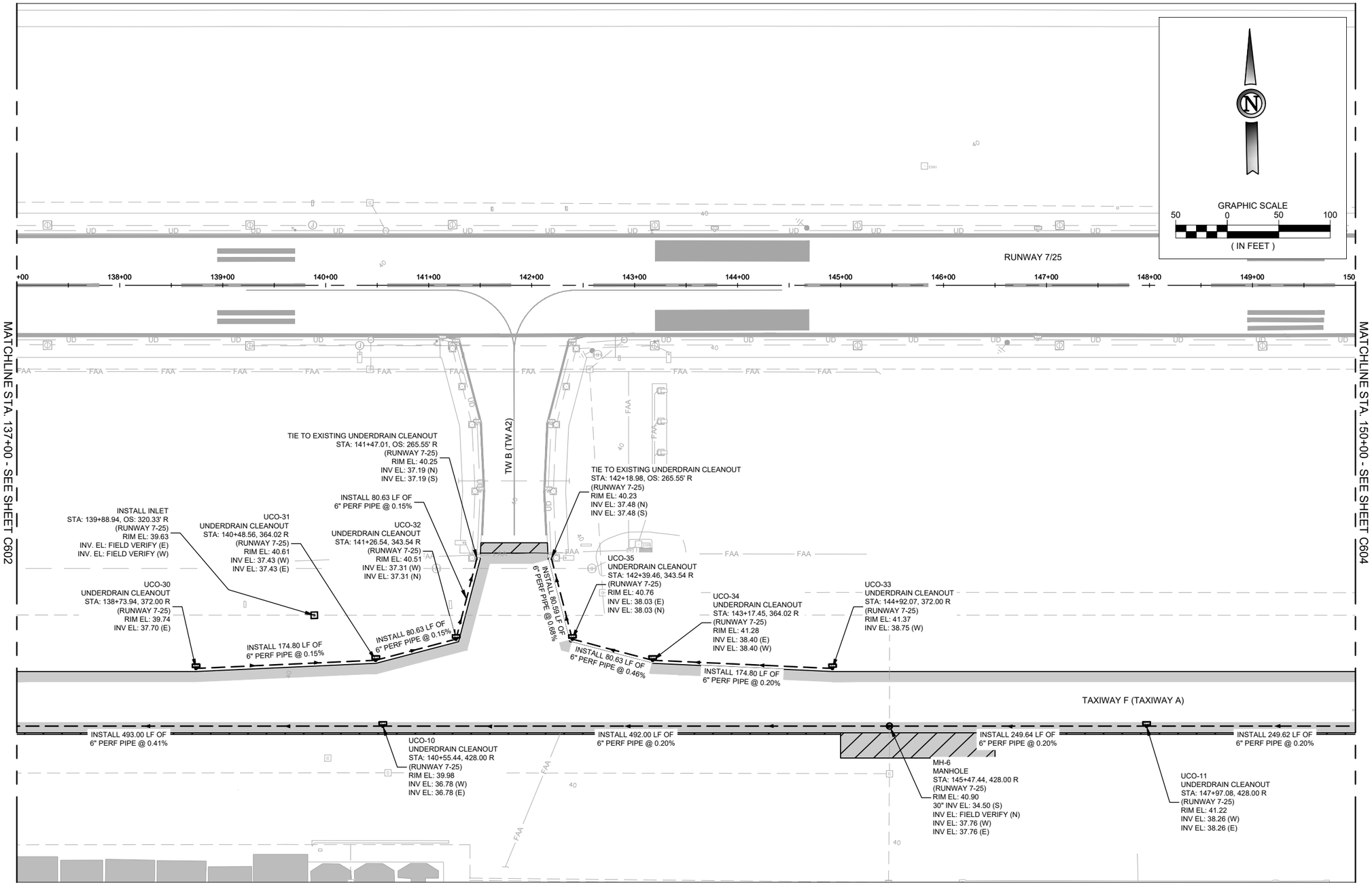
AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

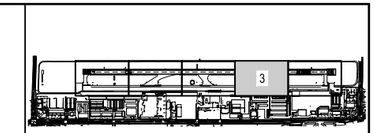
SHEET NAME
C602

SHEET NO.
54 of 89

DRAWING NO.
1639-DOA

Plotted May 25, 2023 @ 9:45 AM by Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\060-OXR-043-C600-C604-UNDR-STRM.dwg





UNDERDRAIN & STORM SEWER LEGEND

- ASPHALT PAVEMENT
- P-209 CRUSHED AGGREGATE BASE COURSE
- D-754 CONCRETE VALLEY GUTTER AND APRON
- PROPOSED UNDERDRAIN PIPE
- PROPOSED UNDERDRAIN CLEANOUT
- PROPOSED INLET
- PROPOSED STORM MANHOLE
- PROPOSED RCP STORM PIPE

NOTES

1. CONTRACTOR TO VERIFY EXISTING TIE/CONNECTION POINTS PRIOR TO CONSTRUCTION AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES.
2. ALL STATIONING FOR STORM PIPE IS AT CENTERLINE OF STORM PIPE.
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9. CONNECTING EXISTING UNDERDRAIN PIPES TO PROPOSED UNDERDRAIN SYSTEM AND PROPOSED UNDERDRAIN SYSTEM TO THE EXISTING STORM SEWER PIPES WILL BE INCIDENTAL TO THE UNDERDRAIN PIPE BID ITEMS.
10. CONTRACTOR SHALL PROTECT ALL EXISTING UNDERGROUND UTILITIES IN PLACE, UNLESS OTHERWISE NOTED.

ISSUED FOR BID

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF
TAXIWAY F

UNDERDRAIN AND STORM SEWER LAYOUT PLAN
STA. 137+00 TO STA. 150+00
RUNWAY 7/25

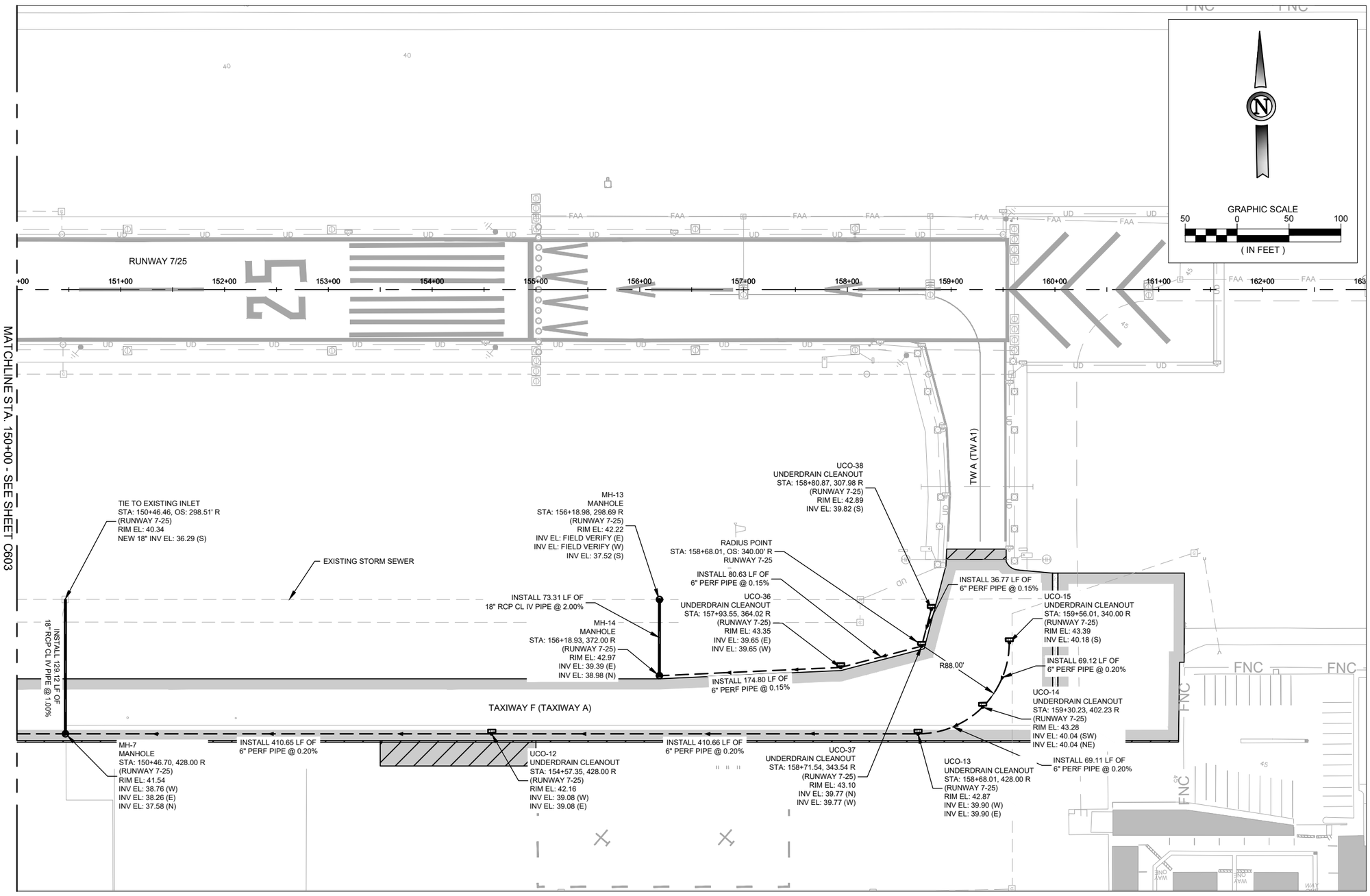
AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

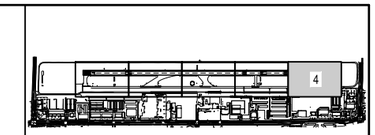
SHEET NAME
C603

SHEET NO.
55 of 89

DRAWING NO.
1640-DOA

Plotted May 25, 2023 @ 9:45 AM by Ball, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\060-OXR-043-C600-C604-UNDR-STRM.dwg





UNDERDRAIN & STORM SEWER LEGEND

- ASPHALT PAVEMENT
- P-209 CRUSHED AGGREGATE BASE COURSE
- D-754 CONCRETE VALLEY GUTTER AND APRON
- PROPOSED UNDERDRAIN PIPE
- PROPOSED UNDERDRAIN CLEANOUT
- PROPOSED INLET
- PROPOSED STORM MANHOLE
- PROPOSED RCP STORM PIPE

NOTES

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10. CONTRACTOR SHALL PROTECT ALL EXISTING UNDERGROUND UTILITIES IN PLACE, UNLESS OTHERWISE NOTED.

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF
TAXIWAY F

UNDERDRAIN AND STORM SEWER LAYOUT PLAN
STA. 150+00 TO STA. 163+00
RUNWAY 7/25

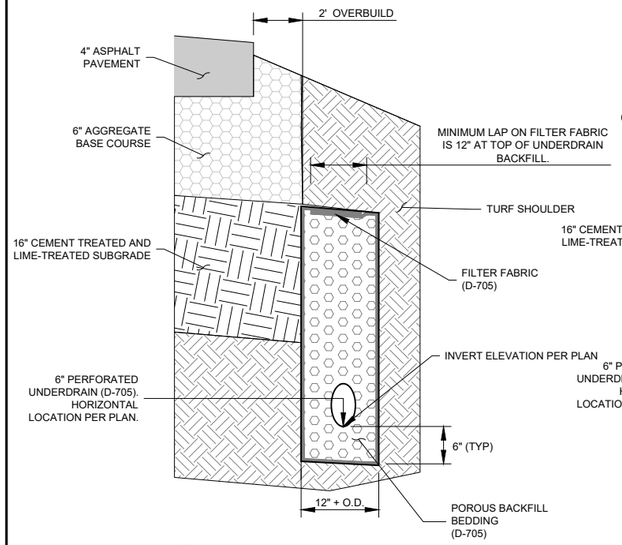
AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME
C604

SHEET NO.
56 of 89

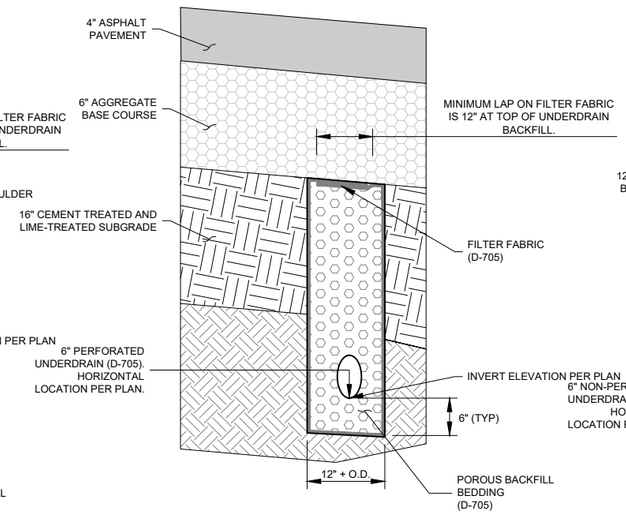
DRAWING NO.
1641-DOA

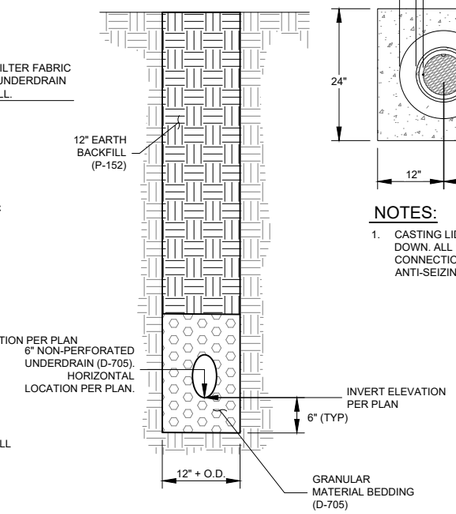
Plotted May 25, 2023 @ 9:45 AM by: Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\060-OXR-043-C600-C604-UNDR-STRM.dwg



1 UNDERDRAIN DETAIL

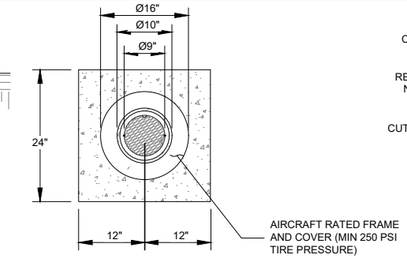
NOT TO SCALE





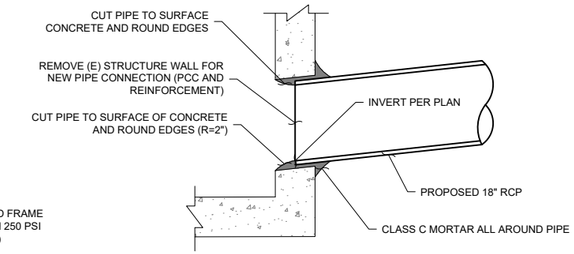
2 UNDERDRAIN TRENCH SECTION (OUTFALL) DETAIL

NOT TO SCALE



NOTES:

1. CASTING LIDS SHALL BE BOLTED DOWN. ALL MACHINE THREADED CONNECTIONS SHALL HAVE ANTI-SEIZING COMPOUND.

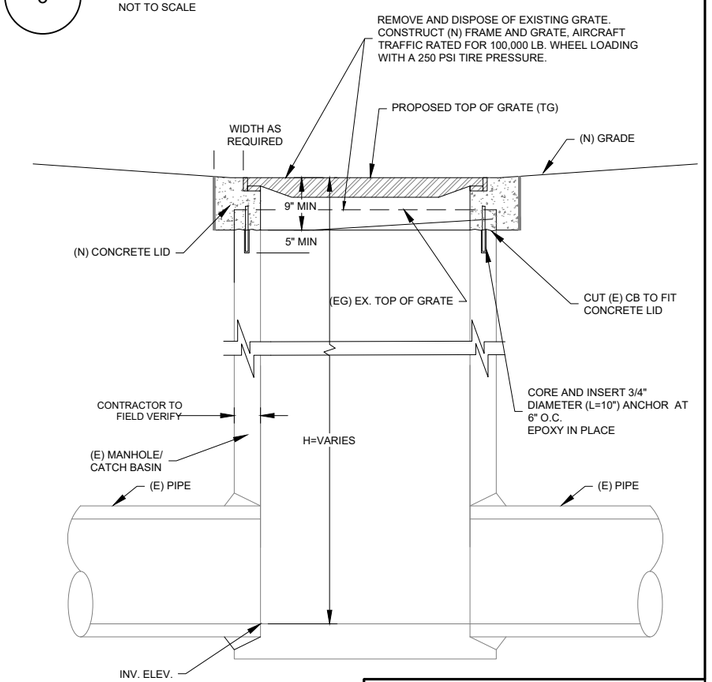


NOTES:

1. THE MINIMUM OPENING INTO THE EXISTING STRUCTURE SHALL BE THE OUTSIDE DIAMETER OF THE CONNECTION PIPE PLUS 1".
2. ANY EXISTING ASPHALT AND BASE COURSE REMOVAL REQUIRED FOR TRENCHING WILL BE PAID FOR UNDER P-401A AND P-209A RESPECTIVELY TO MATCH THE EXISTING PAVEMENT SECTION.

3 PIPE CONNECTION TO EXISTING STORM DRAINS

NOT TO SCALE

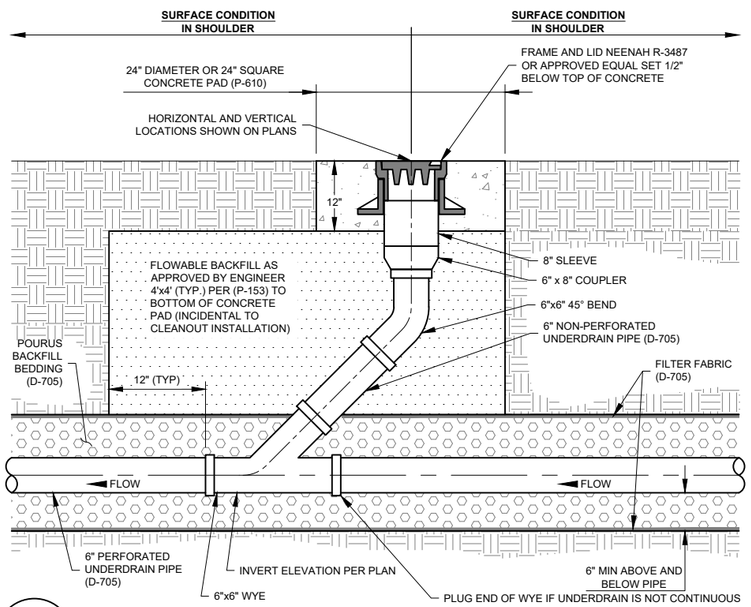


NOTES:

1. CONTRACTOR SHALL FIELD MEASURE EACH CATCH BASIN TO BE ADJUSTED PRIOR TO ORDERING FRAME AND GRATE.

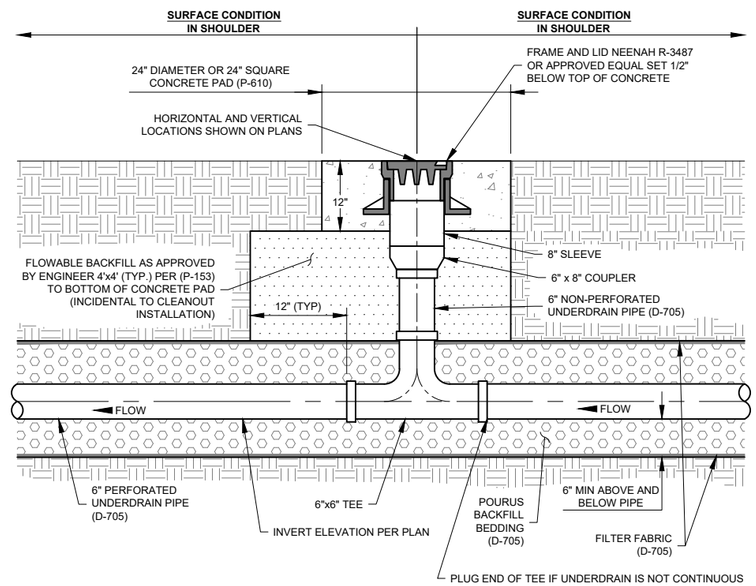
5 INLET ADJUSTMENT

NOT TO SCALE



4A ONE WAY UNDERDRAIN CLEANOUT IN SHOULDER (36" MINIMUM DEPTH) DETAIL

NOT TO SCALE



4B ONE WAY UNDERDRAIN CLEANOUT IN SHOULDER (20" MINIMUM DEPTH) DETAIL

NOT TO SCALE

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER JOHN DUANE INGRAM No. C058505 05/23/2023 CIVIL STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION® A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF TAXIWAY F

UNDERDRAIN AND STORM SEWER DETAILS

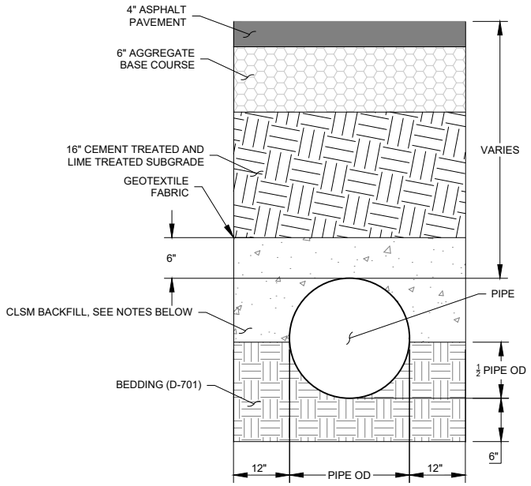
SHEET NAME C650

SHEET NO. 57 of 89

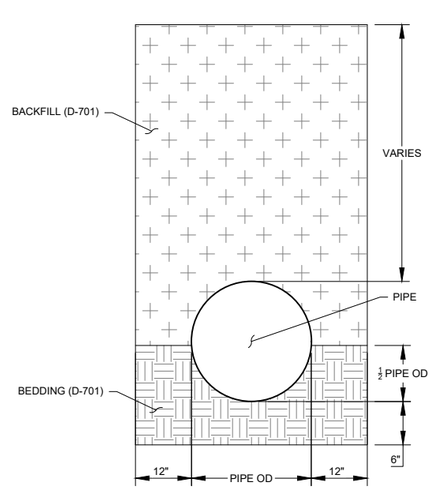
DRAWING NO. 1642-DOA

AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

Plotted May 25, 2023 @ 9:45 AM by Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\060-OXR-043-0550-UNDR-STRM-DETL.dwg



PAVED AREA



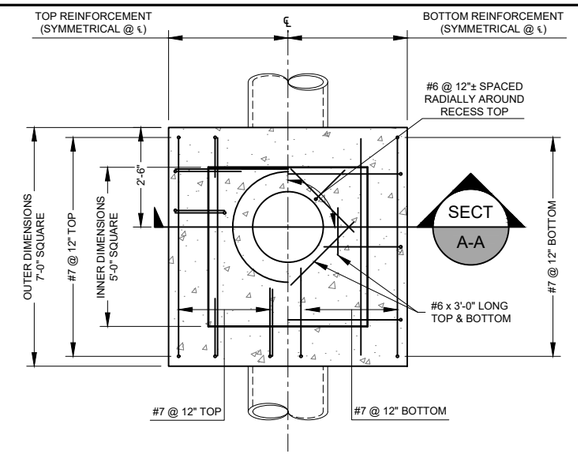
UNPAVED AREA

NOTES:

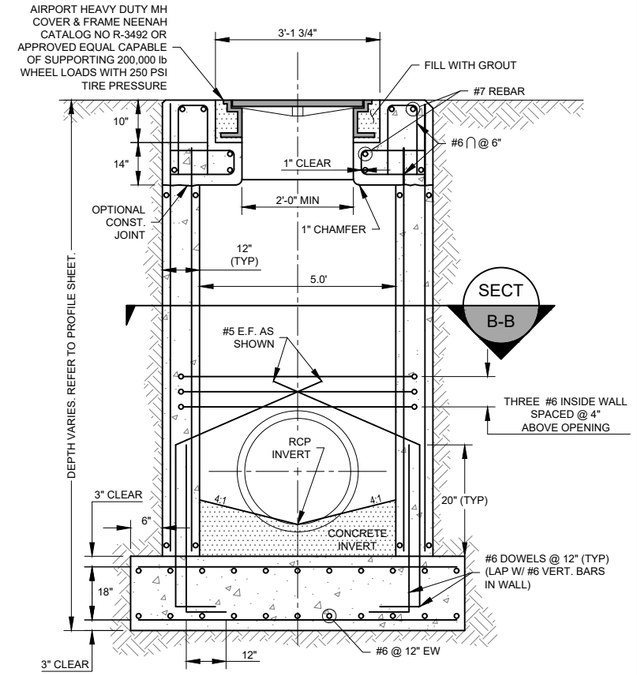
1. CLSM BACKFILL SHALL EXTEND 5FT BEYOND EDGE OF PAVEMENT.
2. DEPENDING ON COVER DEPTH, USE CLSM TO THE TOP OR BOTTOM OF THE LIME TREATED SUBGRADE LAYER (IN NEW PAVEMENT SECTION).
3. ANY EXISTING ASPHALT AND BASE COURSE REMOVAL REQUIRED FOR TRENCHING WILL BE PAID FOR UNDER P-401A AND P-209A RESPECTIVELY TO MATCH THE EXISTING PAVEMENT SECTION.

6 STORM DRAIN BACKFILL

NOT TO SCALE



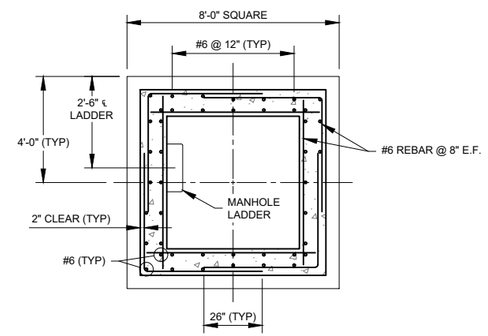
MANHOLE PLAN VIEW



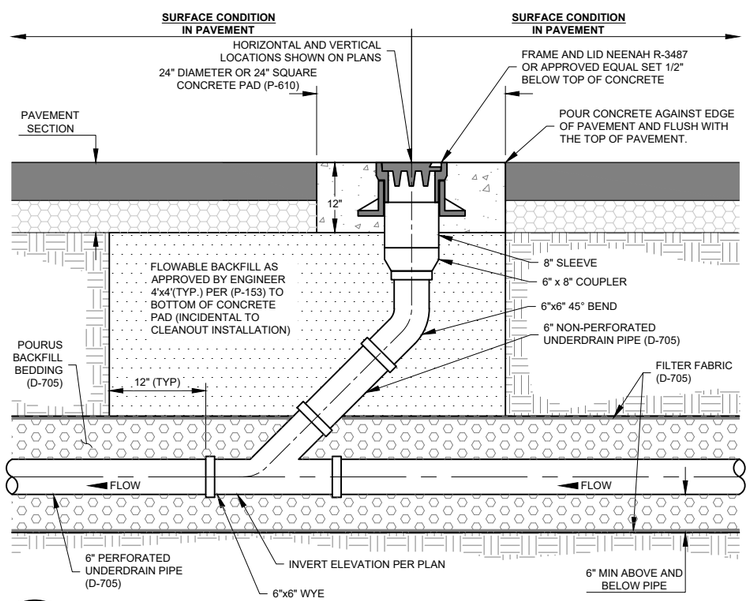
MANHOLE SECTION A-A

7 STORM MANHOLE (AIRCRAFT RATED) DETAIL

NOT TO SCALE

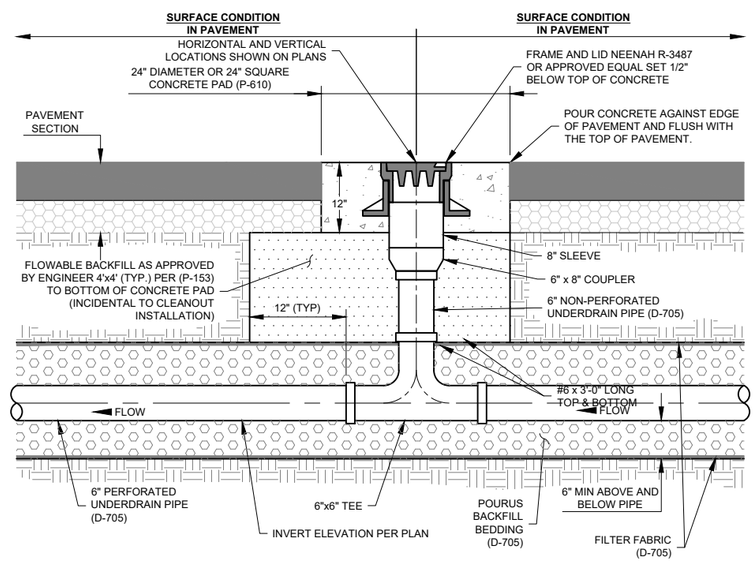


MANHOLE SECTION B-B



4C ONE WAY UNDERDRAIN CLEANOUT IN PAVEMENT (36" MINIMUM DEPTH) DETAIL

NOT TO SCALE



4D ONE WAY UNDERDRAIN CLEANOUT IN PAVEMENT (20" MINIMUM DEPTH) DETAIL

NOT TO SCALE

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER JOHN DUANE INGRAM No. C058505 05/23/2023 CIVIL STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION® A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF TAXIWAY F

UNDERDRAIN AND STORM SEWER DETAILS

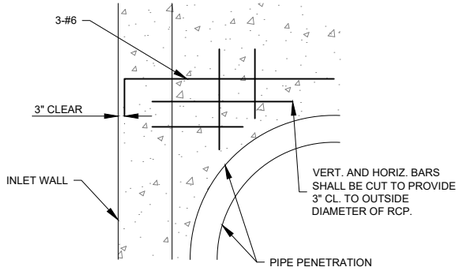
AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME C651

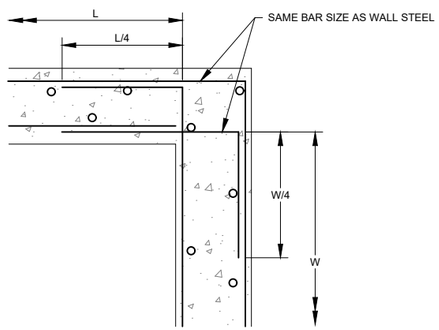
SHEET NO. 58 of 89

DRAWING NO. 1643-DOA

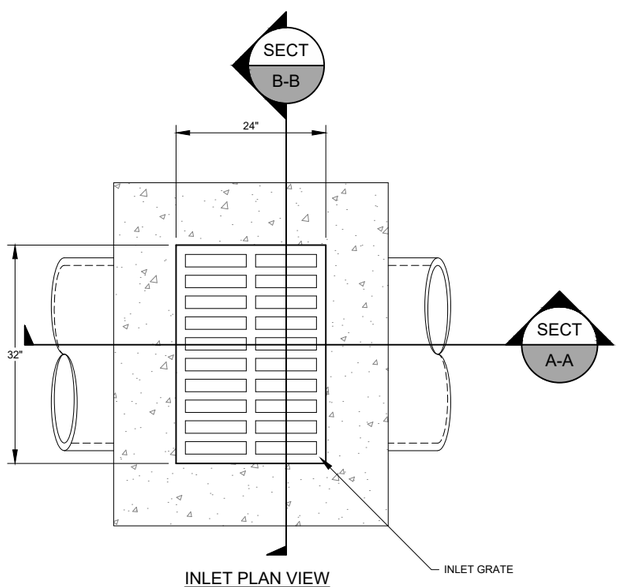
Plotted May 25, 2023 @ 9:45 AM by: Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\060-OXR-043-0550-UNDR-STRM-DETL.dwg



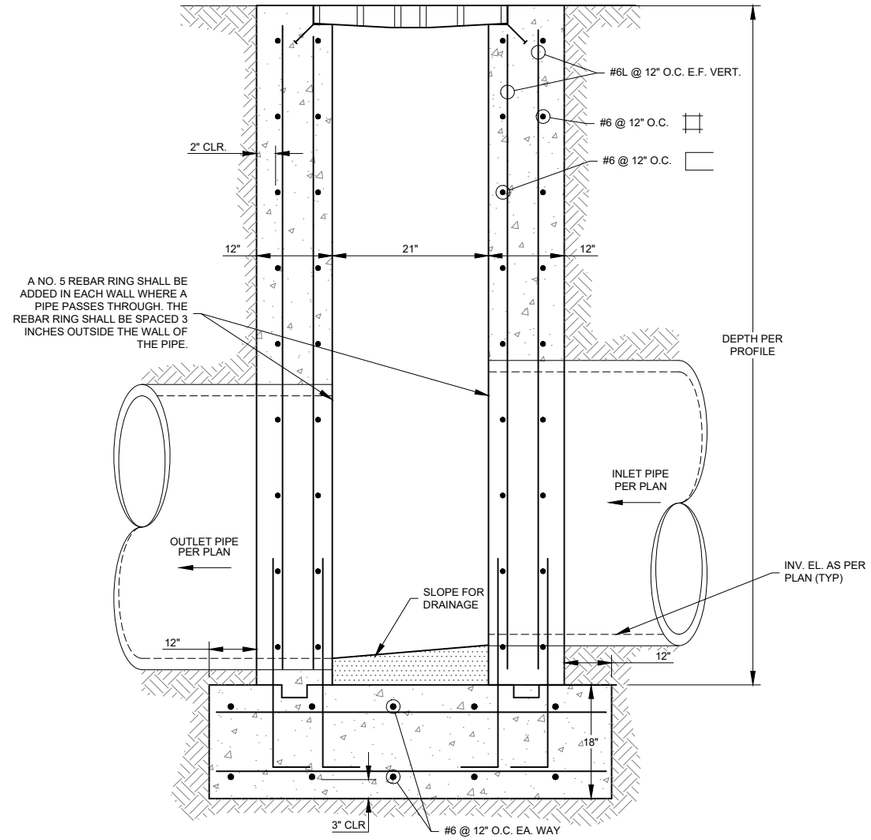
PIPE/INLET PENETRATION REINFORCING DETAIL



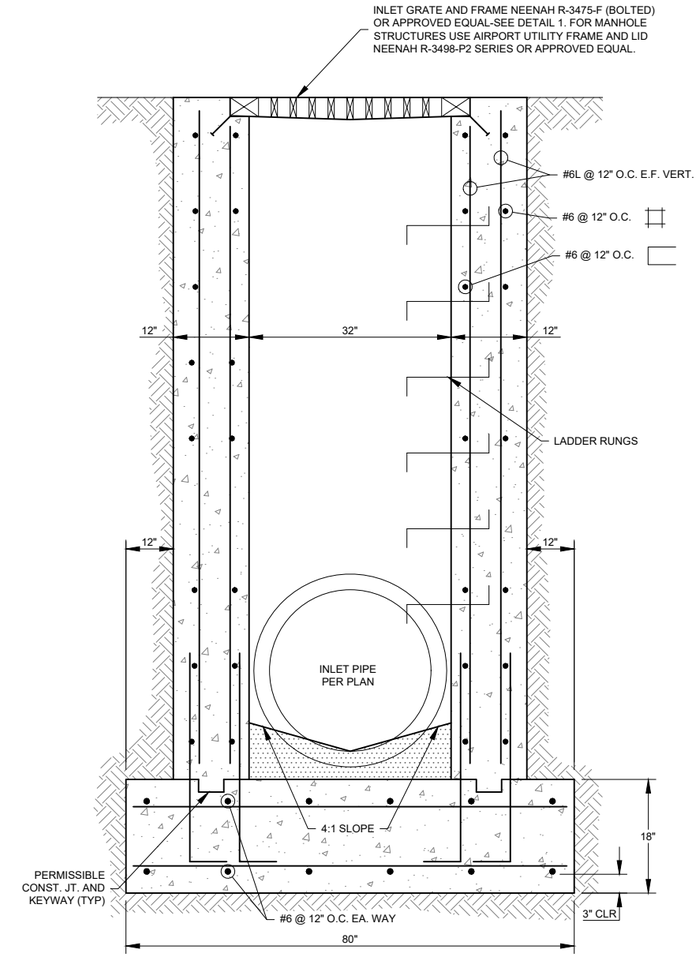
TYPICAL INLET CORNER REINFORCING



INLET PLAN VIEW



INLET SECTION A-A



INLET SECTION B-B

INLET NOTES:

1. FOR PIPE SIZES 24" AND LESS.
2. RING/COVER AND BRICK SHALL BE SET ON FULL BED OF MORTAR.
3. ALL PRECAST MANHOLE SECTIONS, FLAT TOPS, BARRELS, REDUCERS, ETC. SHALL CONFORM TO ASTM C-478, STANDARD SPECIFICATION FOR PRECAST REINFORCED MANHOLE SECTIONS.
4. ALL INTERIOR SEAMS AND PIN HOLES SHALL BE GROUTED.
5. SHAPING FOR SMOOTH MANHOLE INVERTS MUST BE DONE BY FORMING OR SHAPING CONCRETE BASE. MINIMUM DEPTH OF ANY SHAPING CONCRETE TO 2".
6. MANHOLE STEPS SHALL NOT BE INSTALLED OVER THE FLOW CHANNEL. ALL INLETS OVER 3'-6" IN DEPTH TO THE LOWEST INVERT SHALL HAVE STEPS PLACED 12" MINIMUM OR 16" MAXIMUM IN STRAIGHT VERTICAL ALIGNMENT WITH THE BOTTOM STEP 8" ABOVE THE BENCH MINIMUM. STEPS MAYBE NEENAH R 1982 OR APPROVED EQUAL.
7. FLEXIBLE ASPHALTIC SEALANT, (RAMNECK ETC.) IS REQUIRED IN SHIPLAP JOINTS AND IN JOINTS BETWEEN BASE, BARREL SECTIONS, CONE SECTIONS, FLAT TOPS, ETC.
8. GRATE SHALL BE BOLTED TO FRAME DURING CONCRETE PLACEMENT.
9. REINFORCING STEEL SHALL BE GRADE 60.
10. AT THE CONTRACTORS OPTION THE MANHOLE/INLET STRUCTURES MAY BE PRECAST. IF THIS OPTION IS SELECTED, THE MANHOLE/INLET STRUCTURES SHALL BE PERFORMED BY A LICENSED ENGINEER IN THE STATE OF WYOMING AND IN ACCORDANCE WITH THE PRECAST SECTION SHALL BE IN ACCORDANCE WITH SECTION D-751 AND P-610 OF THE TECHNICAL SPECIFICATIONS.
11. FLOW CHANNELS AND INVERTS SHALL BE FORMED BY SHAPING WITH P-610 CONCRETE OR APPROVED GROUT.

8 INLET (AIRCRAFT RATED) DETAIL

NTS

ISSUED FOR BID

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION® A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF TAXIWAY F

UNDERDRAIN AND STORM SEWER DETAILS

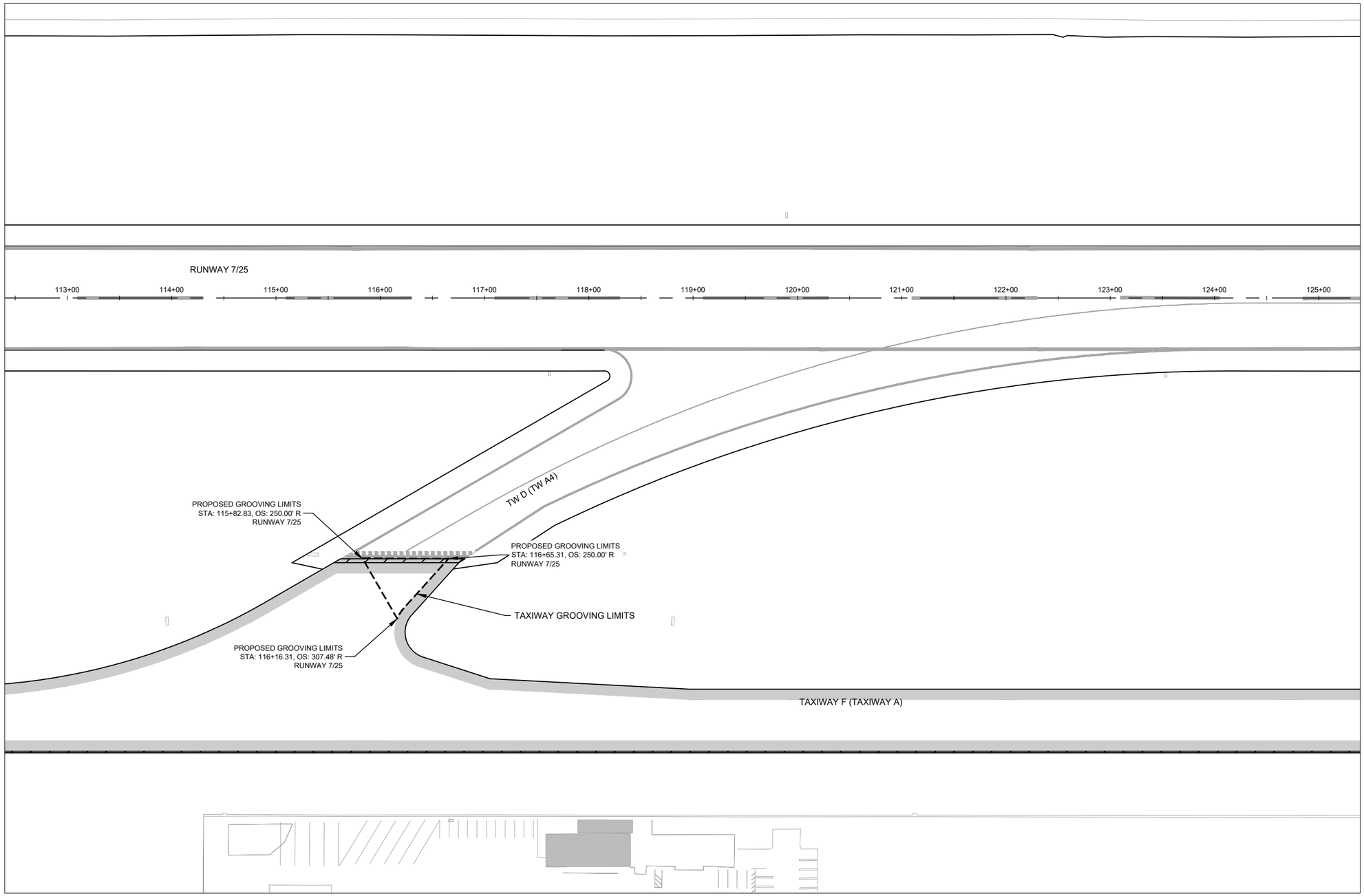
AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

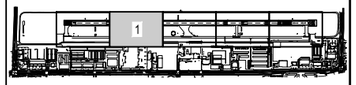
SHEET NAME C652

SHEET NO. 59 of 89

DRAWING NO. 1644-DOA

Plotted May 25, 2023 @ 9:45 AM by: Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\060-OXR-043-C650-UNDR-STRM-DETL.dwg





GROOVING NOTES

1. NEW ASPHALT PAVEMENT SHALL BE ALLOWED TO CURE FOR A PERIOD OF 30 DAYS BEFORE GROOVING OPERATIONS COMMENCE.
2. GROOVES SHALL BE CONTINUOUS FOR THE ENTIRE LENGTH OF THE TAXIWAY GROOVING LIMITS SHOWN AND TRANSVERSE TO THE DIRECTION OF AIRCRAFT LANDING OPERATIONS.
3. THE GROOVES SHALL BE TERMINATED WITHIN 10 FEET OF THE RUNWAY PAVEMENT EDGE.
4. GROOVES SHALL BE SAWED NO CLOSER THAN 6 INCHES AND NO MORE THAN 18 INCHES FROM MONUMENTS OR FIXTURES IN PAVEMENT.
5. GROOVES SHALL BE SAWED NO CLOSER THAN 3 INCHES AND NO MORE THAN 9 INCHES FROM TRANSVERSE PAVING JOINTS.
6. GROOVING TO BE PERFORMED AFTER PAVEMENT IS STRAIGHTEDGE TESTED AND ACCEPTED, AND PRIOR TO APPLICATION OF PERMANENT PAVEMENT MARKINGS.

N

GRAPHIC SCALE
50 0 50 100
(IN FEET)

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF
TAXIWAY F

PAVEMENT GROOVING PLAN

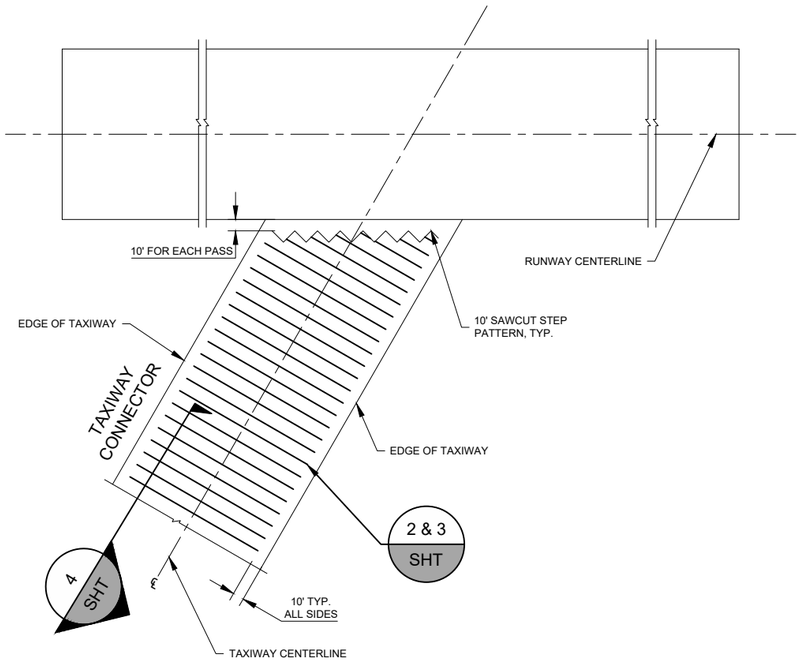
AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME
C700

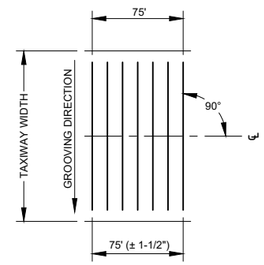
SHEET NO.
60 of 89

DRAWING NO.
1645-DOA

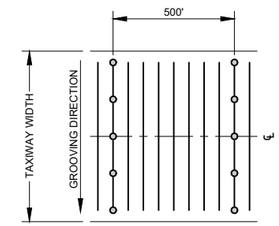
Plotted May 25, 2023 @ 9:46 AM by: Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\070-OXR-043-C700-GROV.dwg



1 STEPPED INTERSECTION GROOVING LAYOUT DETAIL
NOT TO SCALE



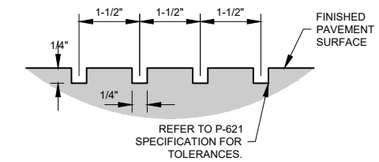
2 GROOVING ALIGNMENT DETAIL
NOT TO SCALE



SURVEY CONTROL NOTES

1. CONTRACTOR SHALL PLACE SURVEY MARKINGS AT A MINIMUM OF EVERY 500' ALONG CENTERLINE AND AT QUARTER AND EDGE POINTS ACROSS TAXIWAY TO CONTROL PERPENDICULAR LANES, AND TO GIVE THE CONTRACTOR AMPLE TIME TO CORRECT ANY DEFICIENCIES.

3 GROOVING SURVEY CONTROL DETAIL
NOT TO SCALE



4 GROOVE SECTION DETAIL
NOT TO SCALE

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

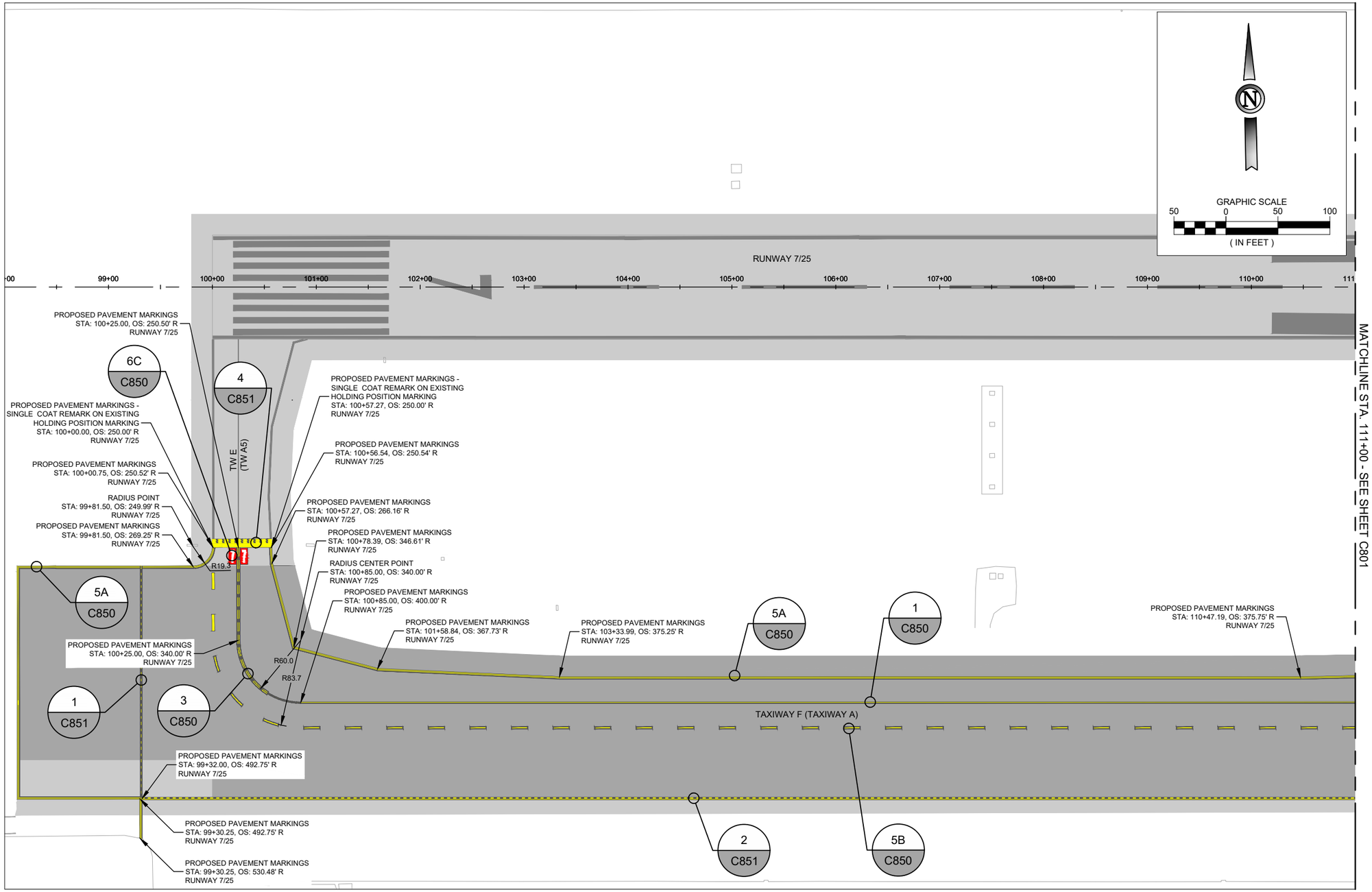
RECONSTRUCTION OF TAXIWAY F

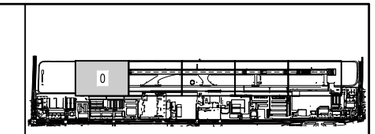
PAVEMENT GROOVING DETAILS

AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME C750
SHEET NO. 61 of 89
DRAWING NO. 1646-DOA

Plotted May 25, 2023 @ 9:46 AM by Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\070-OXR-043-C750-GROV-DETL.dwg





PAVEMENT MARKINGS LEGEND

	ASPHALT	
EXISTING		EXISTING PAINT
		PROPOSED TAXIWAY PAINT
PROPOSED		PROPOSED TAXIWAY PAINT

NOTES:

1. UNLESS OTHERWISE SPECIFIED, ALL TAXIWAY MARKINGS SHALL BE YELLOW IN ACCORDANCE WITH SPECIFICATION P-620.
2. ALL STRIPING WILL HAVE A BLACK BORDER AT THE DIMENSIONS INDICATED ON THE DETAILS UNLESS SHOWN OTHERWISE IN STRIPING DETAILS.
3. CONTRACTOR WILL BE REQUIRED TO REPAINT ANY MARKINGS THAT ARE OUTSIDE THE PROJECT WORK LIMITS WHICH ARE DAMAGED BY THE CONTRACTORS OPERATIONS. REPAINTING OF THESE DAMAGED AREAS WILL BE AT THE CONTRACTORS EXPENSE.
4. PAINT SHOULD BE STORED IN A CLIMATE-CONTROLLED ENVIRONMENT IN ORDER TO MEET MANUFACTURERS RECOMMENDED TEMPERATURES BEFORE IT IS APPLIED. MATERIAL THAT DOES NOT MEET REQUIRED TEMPERATURE REQUIREMENTS WILL BE WARMED TO THE MINIMUM TEMPERATURE FOR 24 HOURS BEFORE IT IS APPLIED OR AS APPROVED BY THE RESIDENT ENGINEER.
5. PERMANENT APPLICATION OF PAINT WILL BE APPLIED 30 DAYS AFTER THE INITIAL TEMPORARY APPLICATION. RATES OF APPLICATION SHALL BE AS SPECIFIED IN SECTION P-620.
6. GLASS BEADS SHALL BE APPLIED TO ALL TEMPORARY AND PERMANENT PAVEMENT MARKINGS. APPLICATION RATES AND GLASS BEAD TYPE SHALL BE AS SPECIFIED IN ITEM P-620. GLASS BEADS SHALL NOT BE APPLIED TO BLACK OR GREEN PAINT. GLASS BEADS SHALL BE INCIDENTAL TO P-620 BID ITEMS.
7. SEE SHEET C851 FOR STRIPING DETAILS AND NOTES.
8. CONTRACTOR SHALL HAVE A COPY OF THE CURRENT FAA ADVISORY CIRCULAR AC 150/5340-1M "STANDARDS FOR AIRPORT MARKINGS" ON SITE AT ALL TIMES. ANY DISCREPANCY BETWEEN INFORMATION SHOWN ON THE PLAN SHEETS AND THE ADVISORY CIRCULAR SHALL BE COORDINATED WITH THE ENGINEER FOR DIRECTION.
9. FINAL PAINT LAYOUT WILL BE CONFIRMED BY THE AIRPORT PRIOR TO CONSTRUCTION.
10. ANY DISCREPANCIES BETWEEN THESE PLANS AND THE ACTUAL STRIPING PRESENT IN THE FIELD SHALL BE BROUGHT TO THE ATTENTION OF RESIDENT ENGINEER.

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF TAXIWAY F

PAVEMENT MARKING PLAN
STA. 98+00 TO STA. 111+00
RUNWAY 7/25

AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME C800
SHEET NO. 62 of 89
DRAWING NO. 1647-DOA

Plotted May 25, 2023 @ 9:46 AM by Bell, Robert
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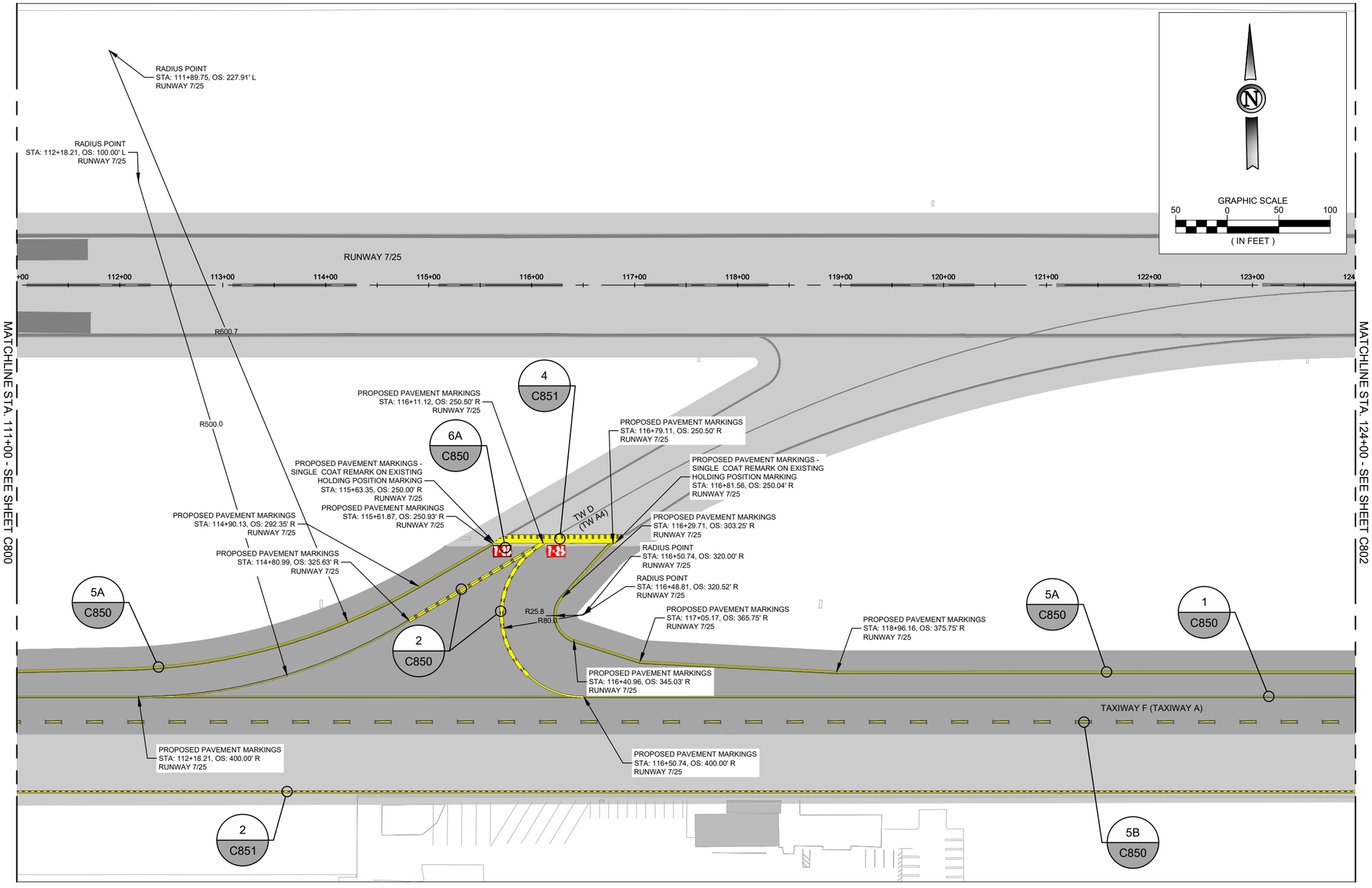
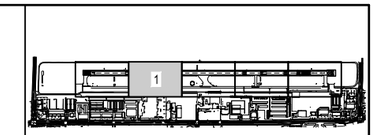




PAVEMENT MARKINGS LEGEND

EXISTING	ASPHALT	EXISTING PAINT
EXISTING	ASPHALT	PROPOSED TAXIWAY PAINT
PROPOSED	ASPHALT	PROPOSED TAXIWAY PAINT

NOTES:

1. UNLESS OTHERWISE SPECIFIED, ALL TAXIWAY MARKINGS SHALL BE YELLOW IN ACCORDANCE WITH SPECIFICATION P-620.
2. ALL STRIPING WILL HAVE A BLACK BORDER AT THE DIMENSIONS INDICATED ON THE DETAILS UNLESS SHOWN OTHERWISE IN STRIPING DETAILS.
3. CONTRACTOR WILL BE REQUIRED TO REPAINT ANY MARKINGS THAT ARE OUTSIDE THE PROJECT WORK LIMITS WHICH ARE DAMAGED BY THE CONTRACTORS OPERATIONS. REPAINTING OF THESE DAMAGED AREAS WILL BE AT THE CONTRACTORS EXPENSE.
4. PAINT SHOULD BE STORED IN A CLIMATE-CONTROLLED ENVIRONMENT IN ORDER TO MEET MANUFACTURERS RECOMMENDED TEMPERATURES BEFORE IT IS APPLIED. MATERIAL THAT DOES NOT MEET REQUIRED TEMPERATURE REQUIREMENTS WILL BE WARMED TO THE MINIMUM TEMPERATURE FOR 24 HOURS BEFORE IT IS APPLIED OR AS APPROVED BY THE RESIDENT ENGINEER.
5. PERMANENT APPLICATION OF PAINT WILL BE APPLIED 30 DAYS AFTER THE INITIAL TEMPORARY APPLICATION. RATES OF APPLICATION SHALL BE AS SPECIFIED IN SECTION P-620.
6. GLASS BEADS SHALL BE APPLIED TO ALL TEMPORARY AND PERMANENT PAVEMENT MARKINGS. APPLICATION RATES AND GLASS BEAD TYPE SHALL BE AS SPECIFIED IN ITEM P-620. GLASS BEADS SHALL NOT BE APPLIED TO BLACK OR GREEN PAINT. GLASS BEADS SHALL BE INCIDENTAL TO P-620 BID ITEMS.
7. SEE SHEET C851 FOR STRIPING DETAILS AND NOTES.
8. CONTRACTOR SHALL HAVE A COPY OF THE CURRENT FAA ADVISORY CIRCULAR AC 150/5340-1M "STANDARDS FOR AIRPORT MARKINGS" ON SITE AT ALL TIMES. ANY DISCREPANCY BETWEEN INFORMATION SHOWN ON THE PLAN SHEETS AND THE ADVISORY CIRCULAR SHALL BE COORDINATED WITH THE ENGINEER FOR DIRECTION.
9. FINAL PAINT LAYOUT WILL BE CONFIRMED BY THE AIRPORT PRIOR TO CONSTRUCTION.
10. ANY DISCREPANCIES BETWEEN THESE PLANS AND THE ACTUAL STRIPING PRESENT IN THE FIELD SHALL BE BROUGHT TO THE ATTENTION OF RESIDENT ENGINEER.

ISSUED FOR BID

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF
TAXIWAY F

PAVEMENT MARKING PLAN
STA. 111+00 TO STA. 124+00
RUNWAY 7/25

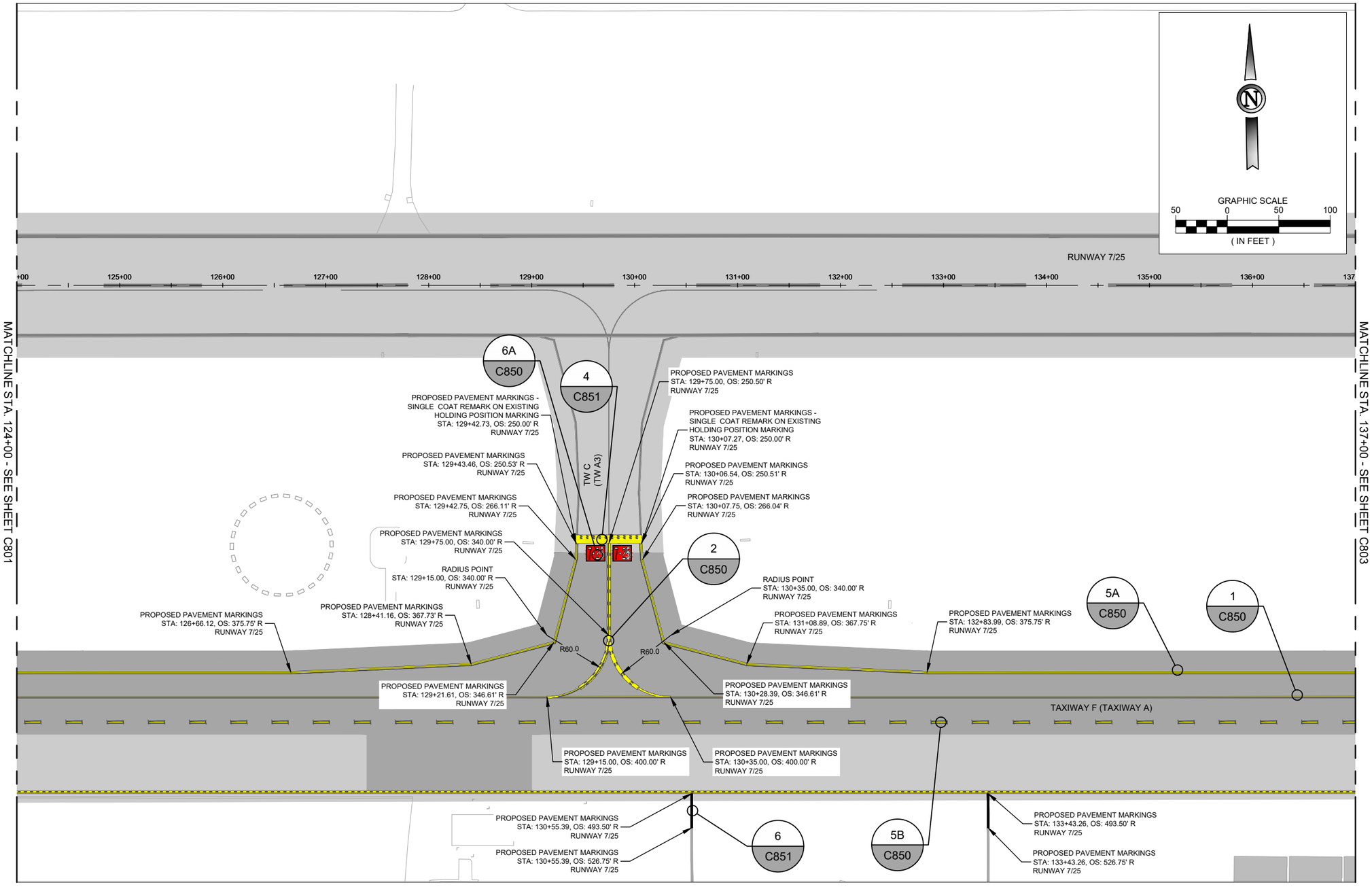
AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

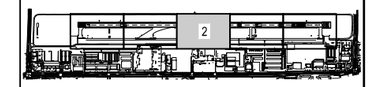
SHEET NAME
C801

SHEET NO.
63 of 89

DRAWING NO.
1648-DOA

Plotted May 25, 2023 @ 9:46 AM by: Ball, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\080-OXR-043-C800-C804-PANT.dwg





PAVEMENT MARKINGS LEGEND

	ASPHALT	
EXISTING		EXISTING PAINT
		PROPOSED TAXIWAY PAINT
PROPOSED		PROPOSED TAXIWAY PAINT

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1. UNLESS OTHERWISE SPECIFIED, ALL TAXIWAY MARKINGS SHALL BE YELLOW IN ACCORDANCE WITH SPECIFICATION P-620.
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7. SEE SHEET C851 FOR STRIPING DETAILS AND NOTES.
8. CONTRACTOR SHALL HAVE A COPY OF THE CURRENT FAA ADVISORY CIRCULAR AC 150/5340-1M "STANDARDS FOR AIRPORT MARKINGS" ON SITE AT ALL TIMES. ANY DISCREPANCY BETWEEN INFORMATION SHOWN ON THE PLAN SHEETS AND THE ADVISORY CIRCULAR SHALL BE COORDINATED WITH THE ENGINEER FOR DIRECTION.
9. FINAL PAINT LAYOUT WILL BE CONFIRMED BY THE AIRPORT PRIOR TO CONSTRUCTION.
10. ANY DISCREPANCIES BETWEEN THESE PLANS AND THE ACTUAL STRIPING PRESENT IN THE FIELD SHALL BE BROUGHT TO THE ATTENTION OF RESIDENT ENGINEER.

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF
TAXIWAY F

PAVEMENT MARKING PLAN
STA. 124+00 TO STA. 137+00
RUNWAY 7/25

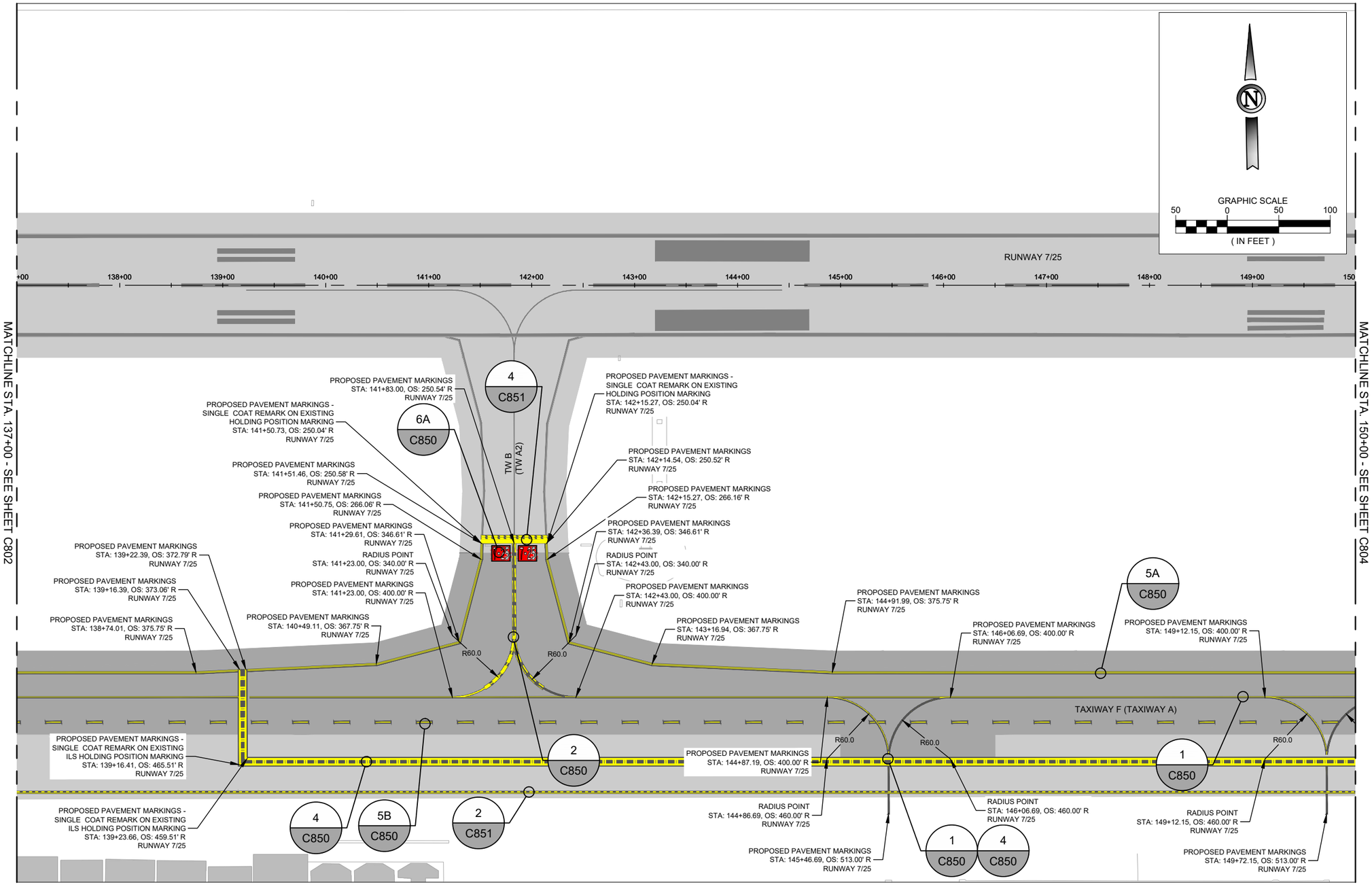
AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

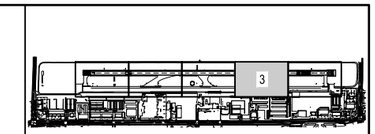
SHEET NAME
C802

SHEET NO.
64 of 89

DRAWING NO.
1649-DOA

Plotted May 25, 2023 @ 9:46 AM by: Ball, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\080-OXR-043-C800-C804-PANT.dwg





PAVEMENT MARKINGS LEGEND

	ASPHALT	
EXISTING		EXISTING PAINT
		PROPOSED TAXIWAY PAINT
PROPOSED		PROPOSED TAXIWAY PAINT

NOTES:

1. UNLESS OTHERWISE SPECIFIED, ALL TAXIWAY MARKINGS SHALL BE YELLOW IN ACCORDANCE WITH SPECIFICATION P-620.
2. ALL STRIPING WILL HAVE A BLACK BORDER AT THE DIMENSIONS INDICATED ON THE DETAILS UNLESS SHOWN OTHERWISE IN STRIPING DETAILS.
3. CONTRACTOR WILL BE REQUIRED TO REPAINT ANY MARKINGS THAT ARE OUTSIDE THE PROJECT WORK LIMITS WHICH ARE DAMAGED BY THE CONTRACTORS OPERATIONS. REPAINTING OF THESE DAMAGED AREAS WILL BE AT THE CONTRACTORS EXPENSE.
4. PAINT SHOULD BE STORED IN A CLIMATE-CONTROLLED ENVIRONMENT IN ORDER TO MEET MANUFACTURERS RECOMMENDED TEMPERATURES BEFORE IT IS APPLIED. MATERIAL THAT DOES NOT MEET REQUIRED TEMPERATURE REQUIREMENTS WILL BE WARMED TO THE MINIMUM TEMPERATURE FOR 24 HOURS BEFORE IT IS APPLIED OR AS APPROVED BY THE RESIDENT ENGINEER.
5. PERMANENT APPLICATION OF PAINT WILL BE APPLIED 30 DAYS AFTER THE INITIAL TEMPORARY APPLICATION. RATES OF APPLICATION SHALL BE AS SPECIFIED IN SECTION P-620.
6. GLASS BEADS SHALL BE APPLIED TO ALL TEMPORARY AND PERMANENT PAVEMENT MARKINGS. APPLICATION RATES AND GLASS BEAD TYPE SHALL BE AS SPECIFIED IN ITEM P-620. GLASS BEADS SHALL NOT BE APPLIED TO BLACK OR GREEN PAINT. GLASS BEADS SHALL BE INCIDENTAL TO P-620 BID ITEMS.
7. SEE SHEET C851 FOR STRIPING DETAILS AND NOTES.
8. CONTRACTOR SHALL HAVE A COPY OF THE CURRENT FAA ADVISORY CIRCULAR AC 150/5340-1M "STANDARDS FOR AIRPORT MARKINGS" ON SITE AT ALL TIMES. ANY DISCREPANCY BETWEEN INFORMATION SHOWN ON THE PLAN SHEETS AND THE ADVISORY CIRCULAR SHALL BE COORDINATED WITH THE ENGINEER FOR DIRECTION.
9. FINAL PAINT LAYOUT WILL BE CONFIRMED BY THE AIRPORT PRIOR TO CONSTRUCTION.
10. ANY DISCREPANCIES BETWEEN THESE PLANS AND THE ACTUAL STRIPING PRESENT IN THE FIELD SHALL BE BROUGHT TO THE ATTENTION OF RESIDENT ENGINEER.

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF
TAXIWAY F

PAVEMENT MARKING PLAN
STA. 137+00 TO STA. 150+00
RUNWAY 7/25

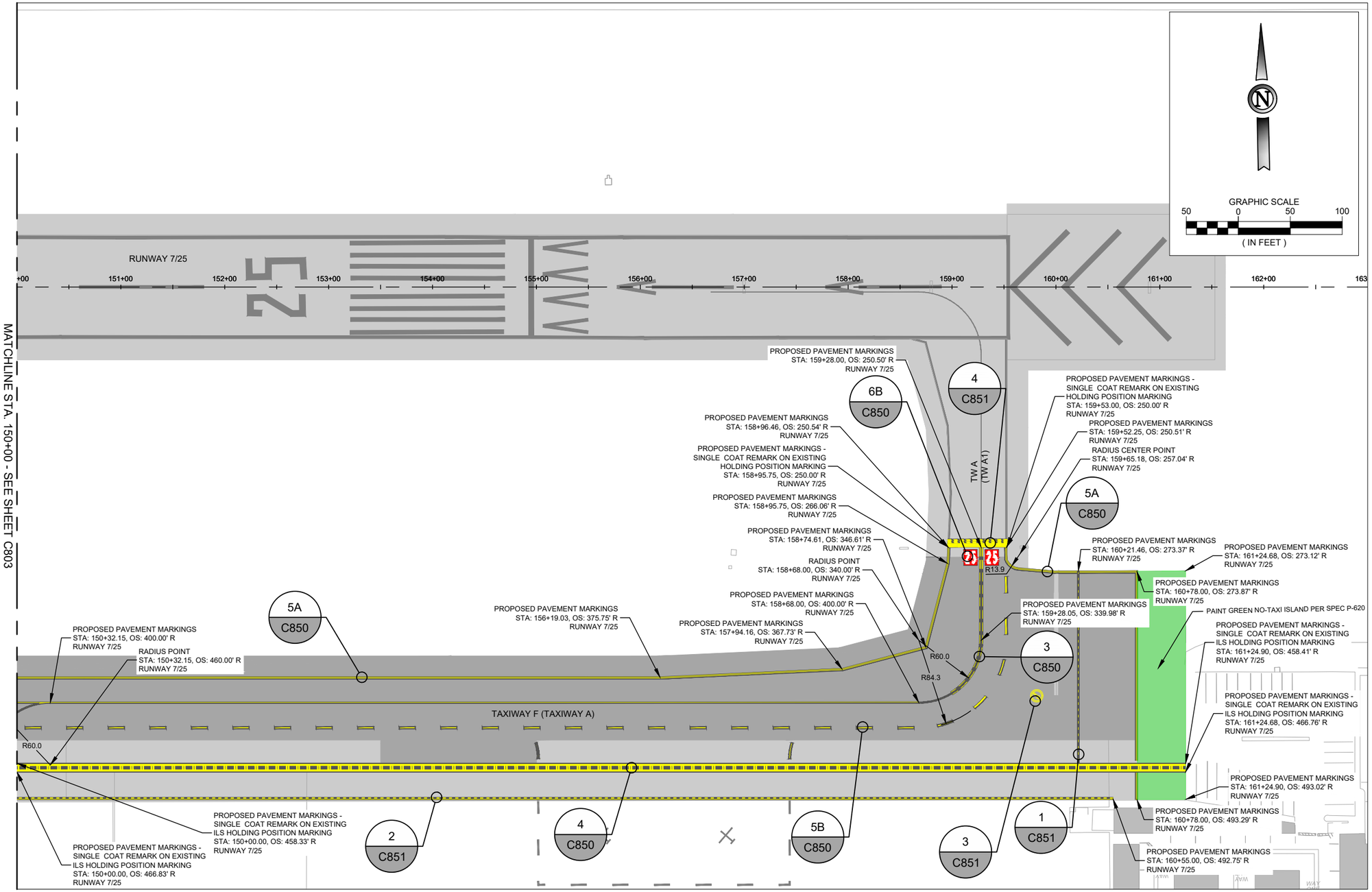
AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

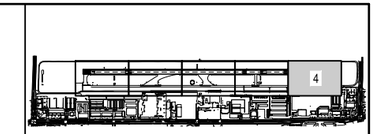
SHEET NAME
C803

SHEET NO.
65 of 89

DRAWING NO.
1650-DOA

Plotted May 25, 2023 @ 9:46 AM by Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\080-OXR-043-C800-C804-PANT.dwg





PAVEMENT MARKINGS LEGEND

	ASPHALT	
EXISTING		EXISTING PAINT
		PROPOSED TAXIWAY PAINT
PROPOSED		PROPOSED TAXIWAY PAINT

NOTES:

1. UNLESS OTHERWISE SPECIFIED, ALL TAXIWAY MARKINGS SHALL BE YELLOW IN ACCORDANCE WITH SPECIFICATION P-620.
2. ALL STRIPING WILL HAVE A BLACK BORDER AT THE DIMENSIONS INDICATED ON THE DETAILS UNLESS SHOWN OTHERWISE IN STRIPING DETAILS.
3. CONTRACTOR WILL BE REQUIRED TO REPAINT ANY MARKINGS THAT ARE OUTSIDE THE PROJECT WORK LIMITS WHICH ARE DAMAGED BY THE CONTRACTORS OPERATIONS. REPAINTING OF THESE DAMAGED AREAS WILL BE AT THE CONTRACTORS EXPENSE.
4. PAINT SHOULD BE STORED IN A CLIMATE-CONTROLLED ENVIRONMENT IN ORDER TO MEET MANUFACTURERS RECOMMENDED TEMPERATURES BEFORE IT IS APPLIED. MATERIAL THAT DOES NOT MEET REQUIRED TEMPERATURE REQUIREMENTS WILL BE WARMED TO THE MINIMUM TEMPERATURE FOR 24 HOURS BEFORE IT IS APPLIED OR AS APPROVED BY THE RESIDENT ENGINEER.
5. PERMANENT APPLICATION OF PAINT WILL BE APPLIED 30 DAYS AFTER THE INITIAL TEMPORARY APPLICATION. RATES OF APPLICATION SHALL BE AS SPECIFIED IN SECTION P-620.
6. GLASS BEADS SHALL BE APPLIED TO ALL TEMPORARY AND PERMANENT PAVEMENT MARKINGS. APPLICATION RATES AND GLASS BEAD TYPE SHALL BE AS SPECIFIED IN ITEM P-620. GLASS BEADS SHALL NOT BE APPLIED TO BLACK OR GREEN PAINT. GLASS BEADS SHALL BE INCIDENTAL TO P-620 BID ITEMS.
7. SEE SHEET C851 FOR STRIPING DETAILS AND NOTES.
8. CONTRACTOR SHALL HAVE A COPY OF THE CURRENT FAA ADVISORY CIRCULAR AC 150/5340-1M "STANDARDS FOR AIRPORT MARKINGS" ON SITE AT ALL TIMES. ANY DISCREPANCY BETWEEN INFORMATION SHOWN ON THE PLAN SHEETS AND THE ADVISORY CIRCULAR SHALL BE COORDINATED WITH THE ENGINEER FOR DIRECTION.
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10. ANY DISCREPANCIES BETWEEN THESE PLANS AND THE ACTUAL STRIPING PRESENT IN THE FIELD SHALL BE BROUGHT TO THE ATTENTION OF RESIDENT ENGINEER.

ISSUED FOR BID

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

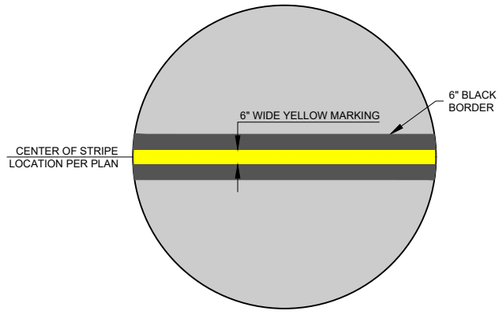
RECONSTRUCTION OF TAXIWAY F

PAVEMENT MARKING PLAN
STA. 150+00 TO STA. 163+00
RUNWAY 7/25

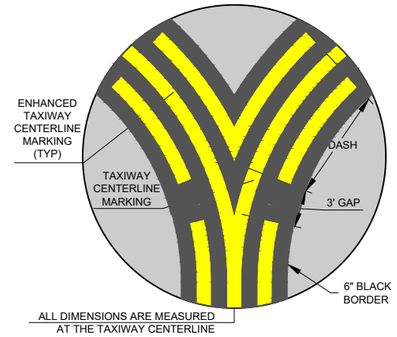
AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME C804
SHEET NO. 66 of 89
DRAWING NO. 1651-DOA

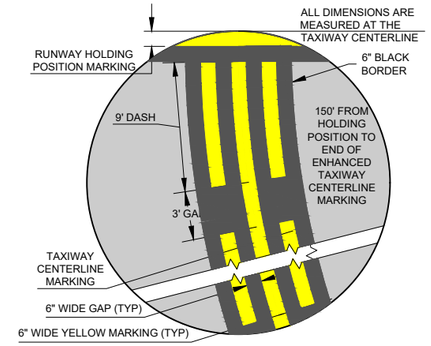
Plotted May 25, 2023 @ 9:47 AM by Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\080-OXR-043-C800-C804-PANT.dwg



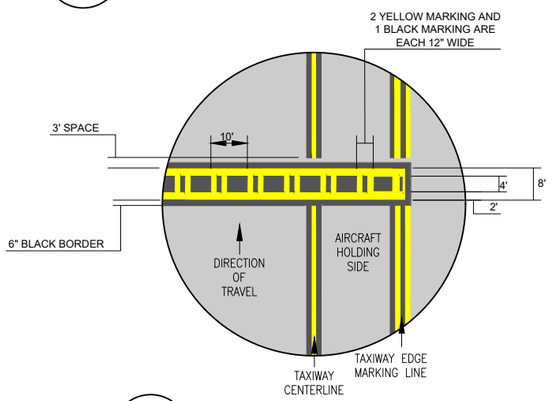
1 TAXIWAY CENTERLINE DETAIL
NOT TO SCALE



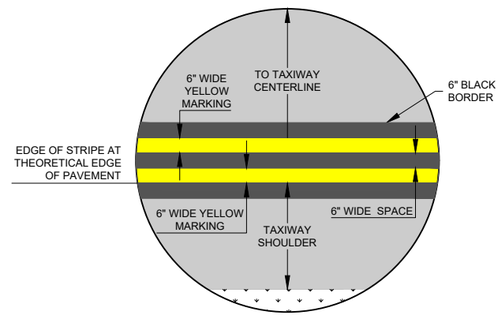
2 CONVERGING ENHANCED TAXIWAY CENTERLINES
NOT TO SCALE



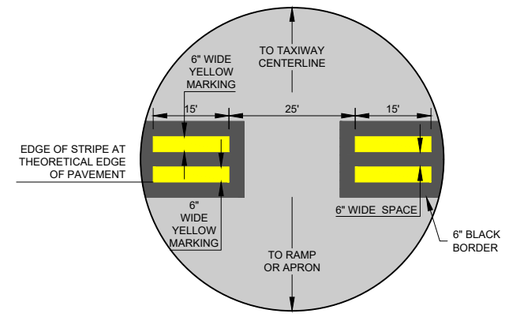
3 ENHANCED TAXIWAY CENTERLINE DETAIL
NOT TO SCALE



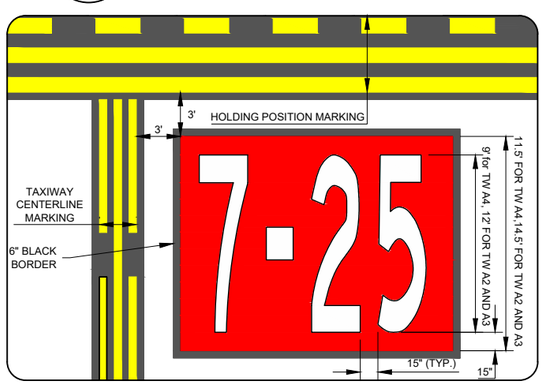
4 ILS HOLDING POSITION MARKING
NOT TO SCALE



5A TAXIWAY SOLID EDGE LINE DETAIL
NOT TO SCALE



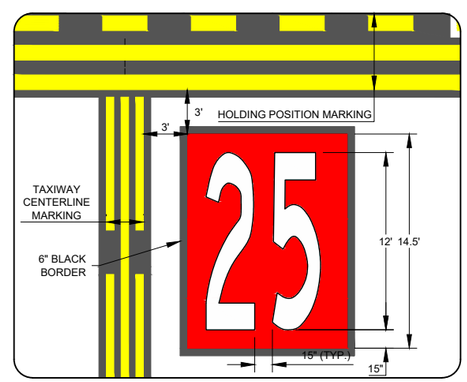
5B TAXIWAY DASHED EDGE LINE DETAIL
NOT TO SCALE



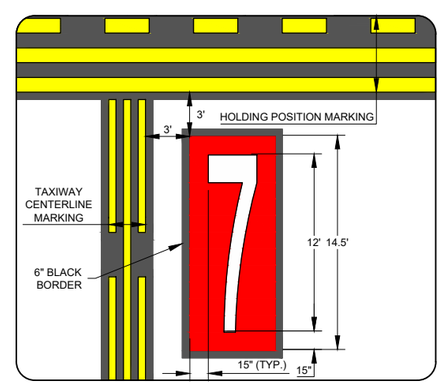
6A RUNWAY 7-25 DOUBLE DESIGNATION HOLDING POSITION SIGN
NOT TO SCALE

HOLDING POSITION NOTES

1. CONTRACTOR SHALL UTILIZE AIRPORT PROVIDED STENCILS, IF AVAILABLE, FOR THE SURFACE PAINTED HOLDING POSITION SIGNS. THE CONTRACTOR SHALL MAINTAIN THE STENCILS THROUGHOUT USE AND WILL BE RESPONSIBLE FOR REPLACEMENT IF ANY DAMAGE OCCURS. IF STENCILS ARE NOT PROVIDED BY THE AIRPORT, THE CONTRACTOR SHALL PROVIDE STENCILS WHICH WILL REMAIN WITH THE AIRPORT AFTER THE PROJECT COMPLETION.
2. DIMENSIONS MAY VARY BASED ON THE SIZES OF STENCILS USED. LARGER WIDTH SIGNS MAY BE NEEDED DEPENDING ON STENCIL WIDTH IN ORDER TO MEET THE INDICATED SPACING REQUIREMENT. COST ADJUSTMENTS WILL NOT BE PERMITTED IF LARGER SIGNS ARE NEEDED DUE TO TO STENCIL WIDTH.
3. TWO PAINT APPLICATIONS WILL BE REQUIRED FOR EACH RUNWAY HOLD POSITION MARKING. THE FIRST APPLICATION SHALL USE THE TEMPORARY PAINT APPLICATION RATE. THE SECOND APPLICATION SHALL USE THE PERMANENT PAINT APPLICATION RATE.



6B RUNWAY 25 SINGLE DESIGNATION HOLDING POSITION SIGN
NOT TO SCALE



6C RUNWAY 7 SINGLE DESIGNATION HOLDING POSITION SIGN
NOT TO SCALE

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER JOHN DUANE INGRAM No. C058505 05/23/2023 CIVIL STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION® A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

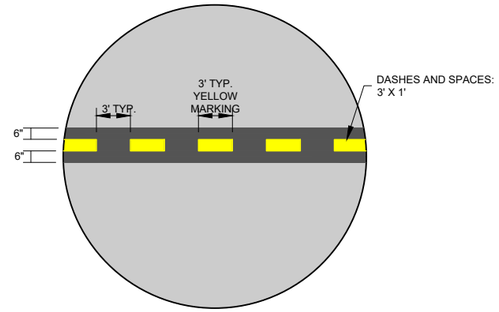
RECONSTRUCTION OF TAXIWAY F

PAVEMENT MARKING DETAILS

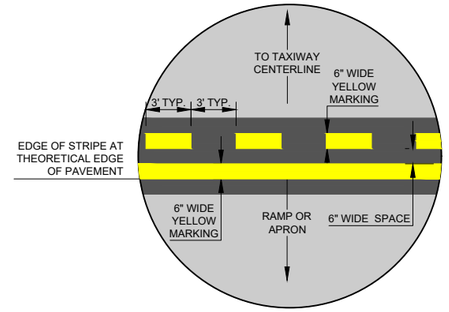
AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME C850
SHEET NO. 67 of 89
DRAWING NO. 1652-DOA

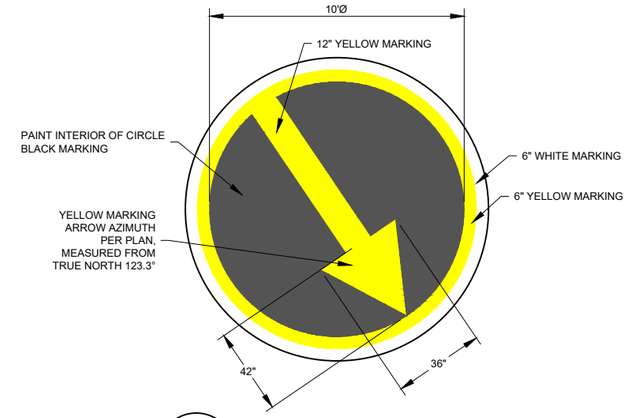
Plotted May 25, 2023 @ 9:47 AM by Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\080-OXR-043-C850-PAINT-DETL.dwg



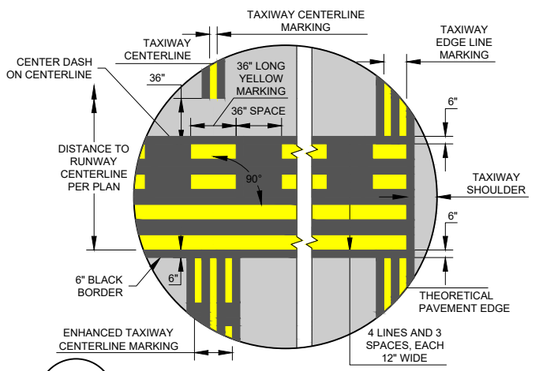
1 INTERMEDIATE HOLDING POSITION MARKING
NOT TO SCALE



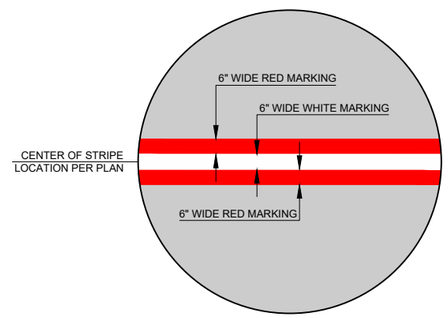
2 NON-MOVEMENT AREA MARKING
NOT TO SCALE



3 VOR CHECKPOINT MARKING
NOT TO SCALE



4 RUNWAY HOLDING POSITION DETAIL
NOT TO SCALE



5 SIDA AREA MARKING DETAIL
NOT TO SCALE

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF
TAXIWAY F

PAVEMENT MARKING DETAILS

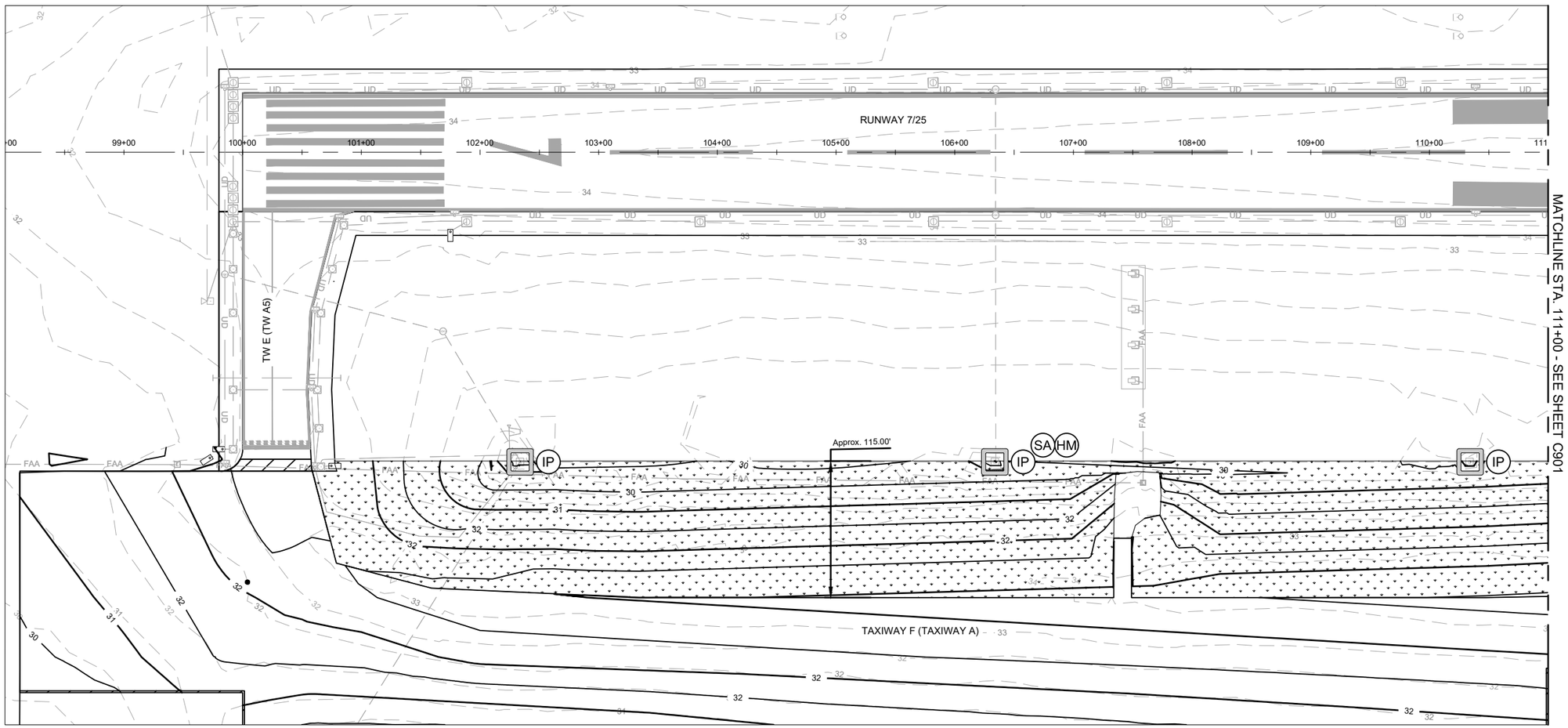
AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

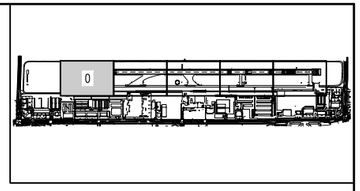
SHEET NAME
C851

SHEET NO.
68 of 89

DRAWING NO.
1653-DOA

Plotted May 25, 2023 @ 9:47 AM by: Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\080-OXR-043-C850-PMT-DETL.dwg





MATCHLINE STA. 111+00 - SEE SHEET C901

GRAPHIC SCALE
50 0 50 100
(IN FEET)

EROSION CONTROL LEGEND

36.0	EXISTING INDEX CONTOUR
38.1	EXISTING INTERMEDIATE CONTOUR
36.0	PROPOSED INDEX CONTOUR
38.1	PROPOSED INTERMEDIATE CONTOUR
SA HM	SEEDING WITH HYDROMULCH
IP	INLET PROTECTION

NOTES:

1. LIMITS OF GRADING ARE APPROXIMATE AND DO NOT CONSTITUTE LIMITS OF DISTURBANCE. CONTRACTOR SHALL BE RESPONSIBLE TO RESTORE ALL ADDITIONAL AREAS DISTURBED BY CONSTRUCTION OPERATIONS AT NO COST TO THE SPONSOR. THIS INCLUDES, BUT IS NOT LIMITED TO, MINOR GRADING, TOPSOILING WITH ONSITE MATERIAL, TEMPORARY AND PERMANENT EROSION CONTROL MEASURES.
2. ALL LIGHTS AND OTHER SURFACE UTILITY INFRASTRUCTURE TO BE PROTECTED DURING HYDRAULIC MULCHING OPERATIONS.
3. IT IS THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN, IMPLEMENT, MAINTAIN AND CLOSEOUT ANY NECESSARY STATE OR LOCAL PERMITS, LICENSES, ETC. RELATED TO THE PROJECT OR THE WORK DESCRIBED HEREIN AND/OR SHOWN ON THE PLANS. THE PREPARATION OF A "STORMWATER MANAGEMENT PLAN(S)" SHALL BE THE CONTRACTOR'S RESPONSIBILITY AS WELL. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLIANCE WITH ALL REQUIREMENTS UNDER ANY SUCH REQUIRED PERMITS AND/OR LICENSES.
4. SEE SHEET C950 FOR INLET PROTECTION DETAIL.
5. ALL BMP'S SHALL COMPLY WITH THE DETAILS HEREIN AND AS SHOWN IN THE CASQA CALIFORNIA STORMWATER BMP HANDBOOK - CONSTRUCTION - (LATEST EDITION). CONTRACTOR SHALL UTILIZE ALL NON-STORMWATER MANAGEMENT TECHNIQUES LISTED HEREIN, IN COMPLIANCE WITH THE SWPPP.

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF
TAXIWAY F

SEEDING AND EROSION CONTROL PLAN
STA. 98+00 TO STA. 111+00
RUNWAY 7/25

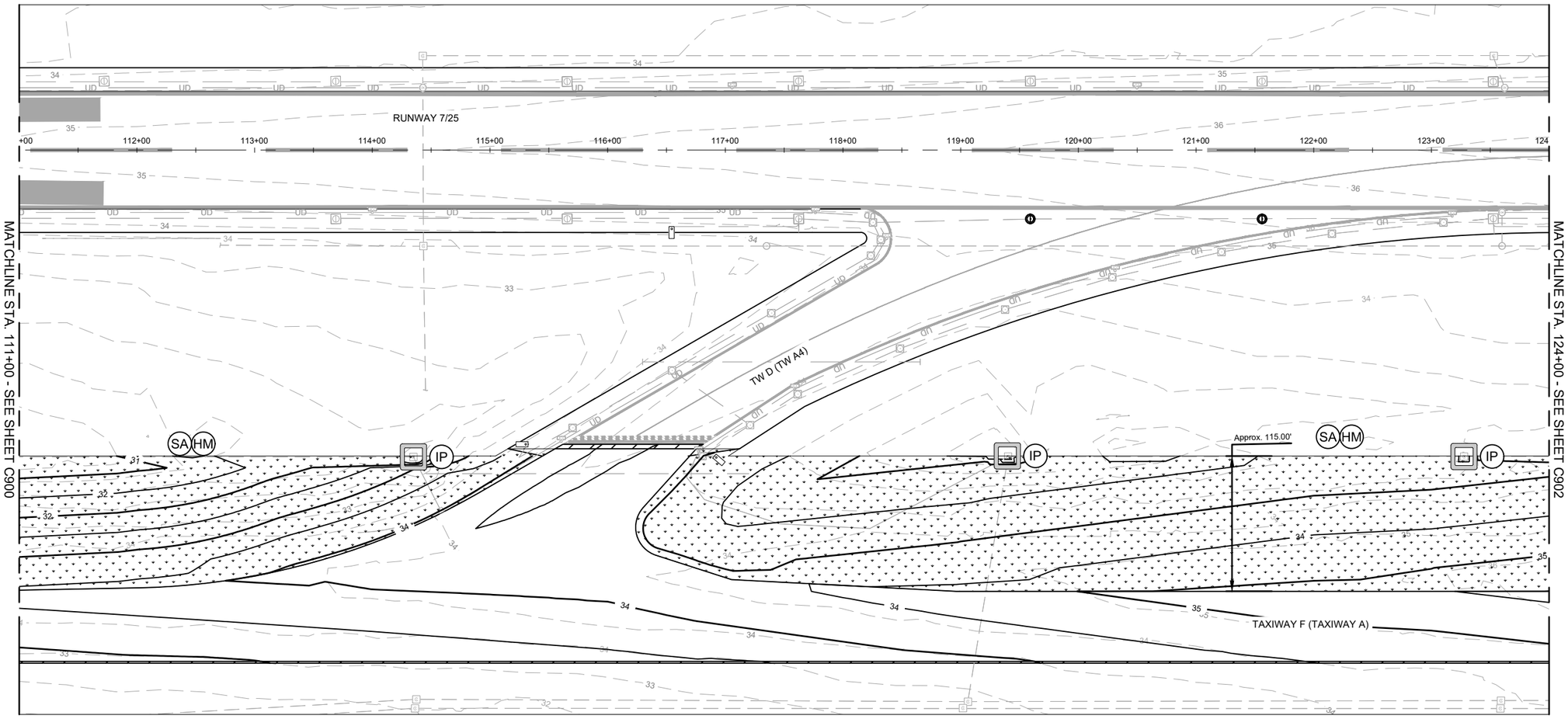
AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

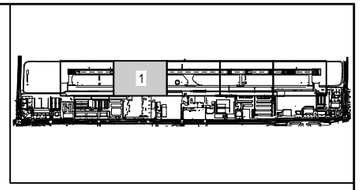
SHEET NAME
C900

SHEET NO.
69 of 89

DRAWING NO.
1654-DOA

Plotted May 25, 2023 @ 9:47 AM by: Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\090-OXR-043-C900-C904-EROS.dwg





GRAPHIC SCALE
50 0 50 100
(IN FEET)

EROSION CONTROL LEGEND

6536.0	EXISTING INDEX CONTOUR
6538.1	EXISTING INTERMEDIATE CONTOUR
6536.0	PROPOSED INDEX CONTOUR
6538.1	PROPOSED INTERMEDIATE CONTOUR
SA HM	SEEDING WITH HYDROMULCH
IP	INLET PROTECTION

NOTES:

1. LIMITS OF GRADING ARE APPROXIMATE AND DO NOT CONSTITUTE LIMITS OF DISTURBANCE. CONTRACTOR SHALL BE RESPONSIBLE TO RESTORE ALL ADDITIONAL AREAS DISTURBED BY CONSTRUCTION OPERATIONS AT NO COST TO THE SPONSOR. THIS INCLUDES, BUT IS NOT LIMITED TO, MINOR GRADING, TOPSOILING WITH ONSITE MATERIAL, TEMPORARY AND PERMANENT EROSION CONTROL MEASURES.
2. ALL LIGHTS AND OTHER SURFACE UTILITY INFRASTRUCTURE TO BE PROTECTED DURING HYDRAULIC MULCHING OPERATIONS.
3. IT IS THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN, IMPLEMENT, MAINTAIN AND CLOSEOUT ANY NECESSARY STATE OR LOCAL PERMITS, LICENSES, ETC. RELATED TO THE PROJECT OR THE WORK DESCRIBED HEREIN AND/OR SHOWN ON THE PLANS. THE PREPARATION OF A "STORMWATER MANAGEMENT PLAN(S)" SHALL BE THE CONTRACTOR'S RESPONSIBILITY AS WELL. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLIANCE WITH ALL REQUIREMENTS UNDER ANY SUCH REQUIRED PERMITS AND/OR LICENSES.
4. SEE SHEET C950 FOR INLET PROTECTION DETAIL.
5. ALL BMP'S SHALL COMPLY WITH THE DETAILS HEREIN AND AS SHOWN IN THE CASQA CALIFORNIA STORMWATER BMP HANDBOOK - CONSTRUCTION - (LATEST EDITION). CONTRACTOR SHALL UTILIZE ALL NON-STORMWATER MANAGEMENT TECHNIQUES LISTED HEREIN, IN COMPLIANCE WITH THE SWPPP.

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF
TAXIWAY F

SEEDING AND EROSION CONTROL PLAN
STA. 111+00 TO STA. 124+00
RUNWAY 7/25

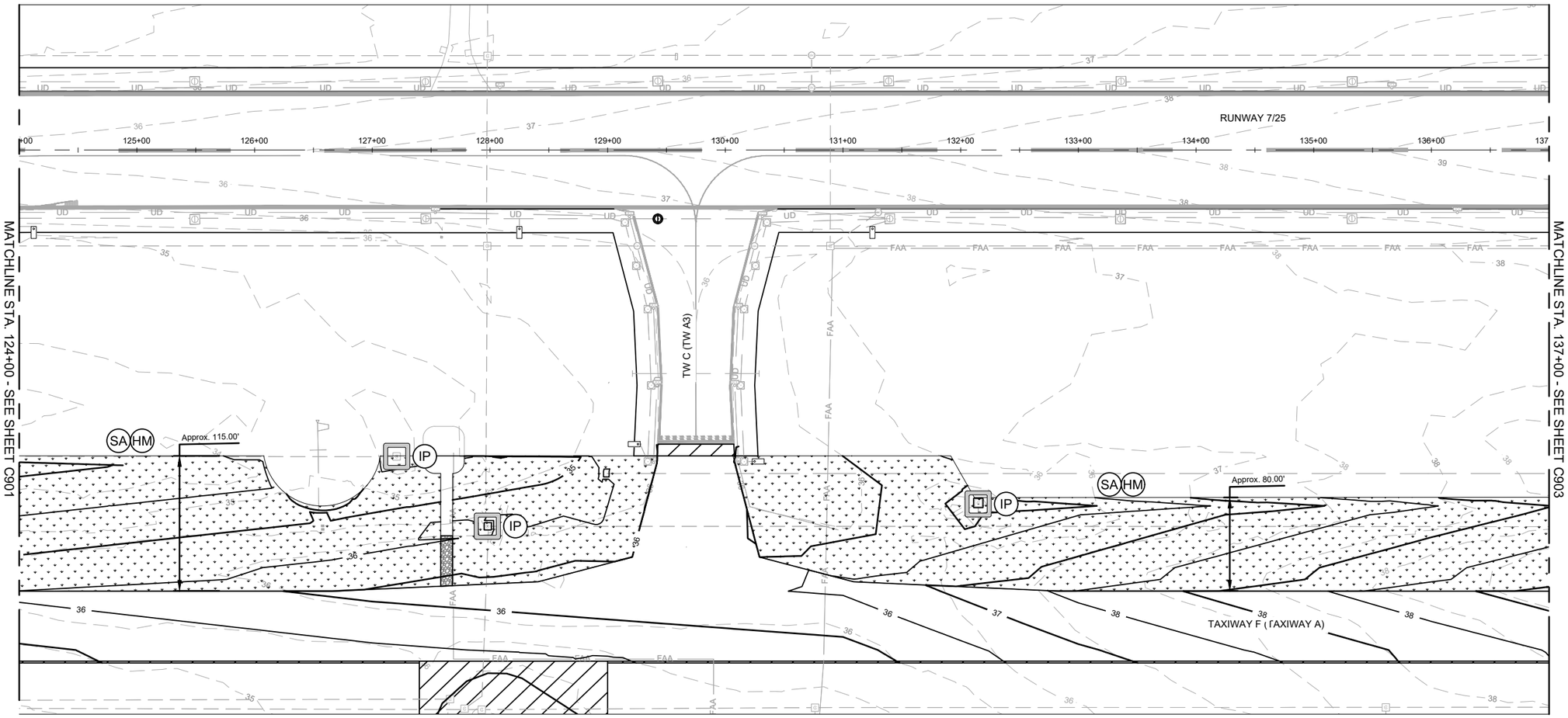
AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

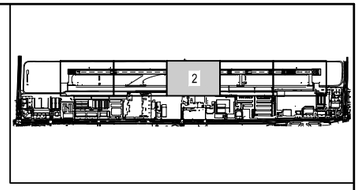
SHEET NAME
C901

SHEET NO.
70 of 89

DRAWING NO.
1655-DOA

Plotted May 25, 2023 @ 9:47 AM by: Ball, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\090-OXR-043-C900-C904-EROS.dwg





GRAPHIC SCALE
50 0 50 100
(IN FEET)

EROSION CONTROL LEGEND

6536.0	EXISTING INDEX CONTOUR
6538.1	EXISTING INTERMEDIATE CONTOUR
6536.0	PROPOSED INDEX CONTOUR
6538.1	PROPOSED INTERMEDIATE CONTOUR
SA HM	SEEDING WITH HYDROMULCH
IP	INLET PROTECTION

NOTES:

1. LIMITS OF GRADING ARE APPROXIMATE AND DO NOT CONSTITUTE LIMITS OF DISTURBANCE. CONTRACTOR SHALL BE RESPONSIBLE TO RESTORE ALL ADDITIONAL AREAS DISTURBED BY CONSTRUCTION OPERATIONS AT NO COST TO THE SPONSOR. THIS INCLUDES, BUT IS NOT LIMITED TO, MINOR GRADING, TOPSOILING WITH ONSITE MATERIAL, TEMPORARY AND PERMANENT EROSION CONTROL MEASURES.
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4. SEE SHEET C950 FOR INLET PROTECTION DETAIL.
5. ALL BMP'S SHALL COMPLY WITH THE DETAILS HEREIN AND AS SHOWN IN THE CASQA CALIFORNIA STORMWATER BMP HANDBOOK - CONSTRUCTION - (LATEST EDITION). CONTRACTOR SHALL UTILIZE ALL NON-STORMWATER MANAGEMENT TECHNIQUES LISTED HEREIN, IN COMPLIANCE WITH THE SWPPP.

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

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OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
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APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF
TAXIWAY F

SEEDING AND EROSION CONTROL PLAN
STA. 124+00 TO STA. 137+00
RUNWAY 7/25

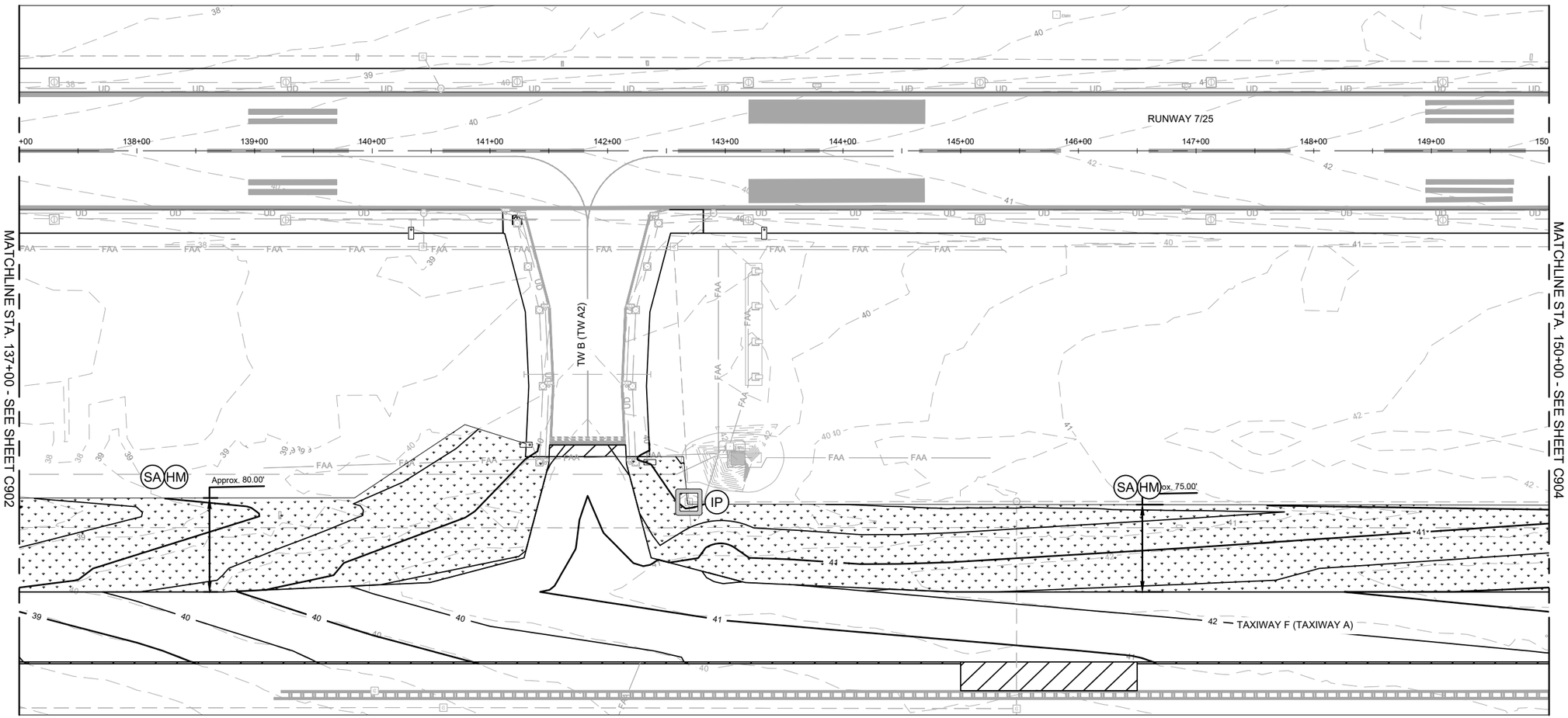
AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

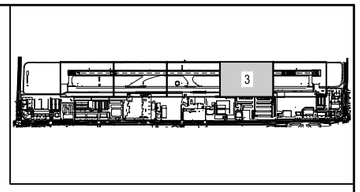
SHEET NAME
C902

SHEET NO.
71 of 89

DRAWING NO.
1656-DOA

Plotted May 25, 2023 @ 9:48 AM by Ball, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\090-OXR-043-C900-C904-EROS.dwg





GRAPHIC SCALE
50 0 50 100
(IN FEET)

EROSION CONTROL LEGEND

6536.0	EXISTING INDEX CONTOUR
6538.1	EXISTING INTERMEDIATE CONTOUR
6536.0	PROPOSED INDEX CONTOUR
6538.1	PROPOSED INTERMEDIATE CONTOUR
SA HM	SEEDING WITH HYDROMULCH
IP	INLET PROTECTION

NOTES:

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ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

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OXNARD AIRPORT
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DES: T.A.R.
DR: R.L.B.
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APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF
TAXIWAY F

SEEDING AND EROSION CONTROL PLAN
STA. 137+00 TO STA. 150+00
RUNWAY 7/25

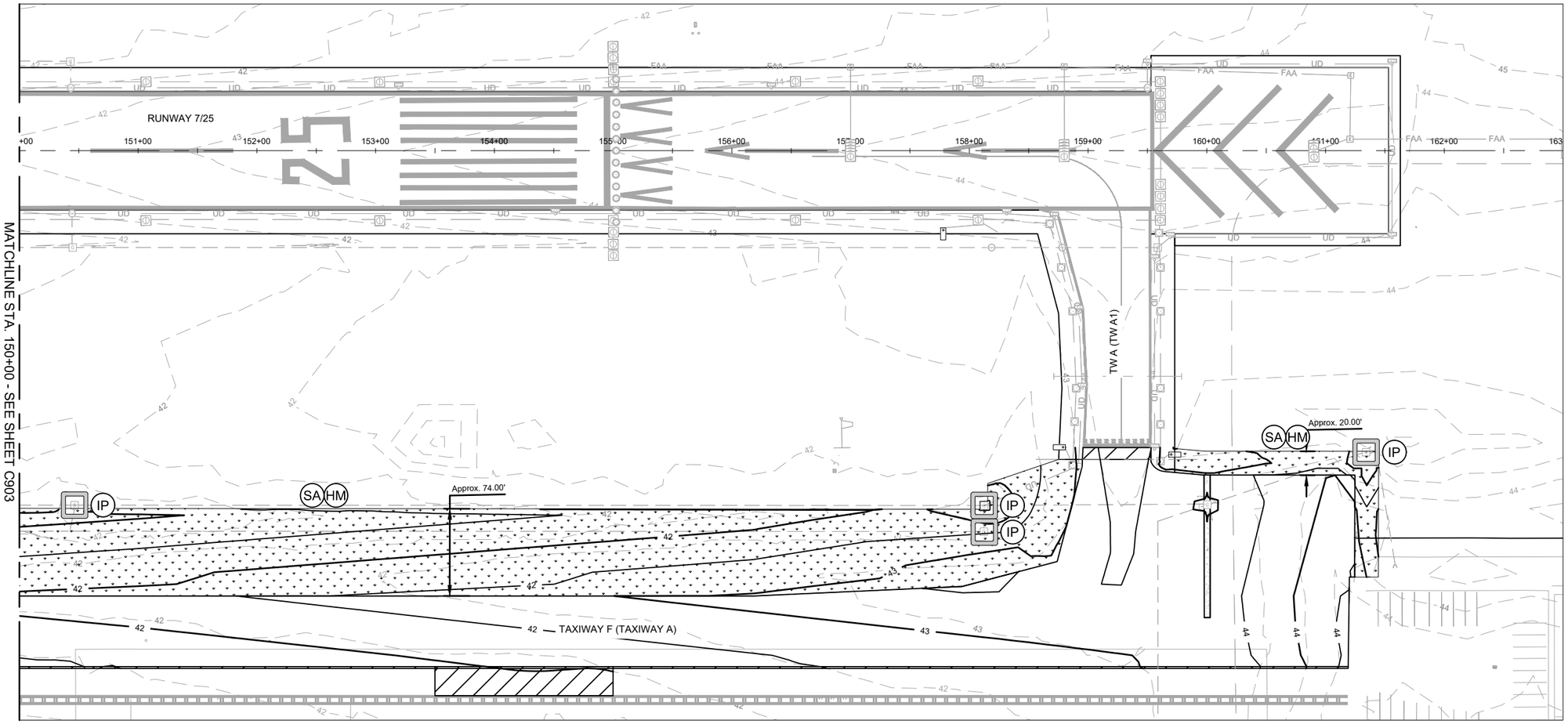
AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

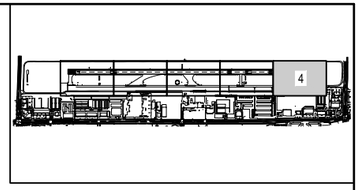
SHEET NAME
C903

SHEET NO.
72 of 89

DRAWING NO.
1657-DOA

Plotted May 25, 2023 @ 9:48 AM by: Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\090-OXR-043-C900-C904-EROS.dwg





MATCHLINE STA. 150+00 - SEE SHEET C903

GRAPHIC SCALE
50 0 50 100
(IN FEET)

EROSION CONTROL LEGEND

6536.0	EXISTING INDEX CONTOUR
6538.1	EXISTING INTERMEDIATE CONTOUR
6536.0	PROPOSED INDEX CONTOUR
6538.1	PROPOSED INTERMEDIATE CONTOUR
SA HM	SEEDING WITH HYDROMULCH
IP	INLET PROTECTION

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ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

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OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF
TAXIWAY F

SEEDING AND EROSION CONTROL PLAN
STA. 150+00 TO STA. 163+00
RUNWAY 7/25

AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME
C904

SHEET NO.
73 of 89

DRAWING NO.
1658-DOA

Plotted May 25, 2023 @ 9:48 AM by: Bell, Robert
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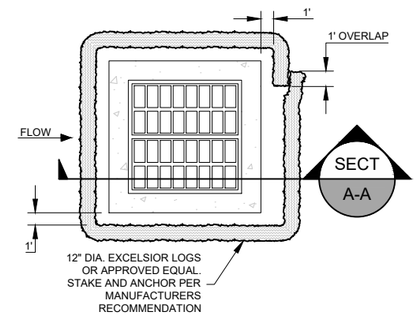
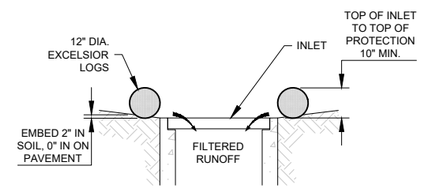


INLET PROTECTION PLAN VIEW



INLET PROTECTION SECTION A-A

INLET PROTECTION INSTALLATION NOTES

1. INLET PROTECTION SHALL BE INSTALLED WITHIN 48 HOURS AFTER INLET CONSTRUCTION OR PAVING IS COMPLETED.
2. THE SWMP MANAGER SHALL INSPECT INLET PROTECTION WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS OR CLEAN OUT AS NECESSARY. INSPECT MORE FREQUENTLY DURING WINTER CONDITIONS DUE TO FREEZE/THAW PROBLEMS. REPAIR AS NECESSARY.
3. SEDIMENT ACCUMULATED UPSTREAM OF INLET PROTECTION SHALL BE REMOVED AT THE END OF EACH DAY DURING CONSTRUCTION OR WHEN THE SEDIMENT DEPTH UPSTREAM OF INLET PROTECTION IS WITHIN 2-1/2 INCHES OF THE CREST.
4. INLET PROTECTION IS TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND GRASS COVER IS APPROVED, UNLESS THE LOCAL JURISDICTION APPROVES EARLIER REMOVAL OF INLET PROTECTION IN STREETS.
5. WHEN INLET PROTECTION AT AREA INLETS IS REMOVED, THE DISTURBED AREA SHALL BE COVERED WITH TOP SOIL, DRILL SEEDED AND CRIMP MULCHED, OR IS OTHERWISE STABILIZED IN A MANNER APPROVED BY THE LOCAL JURISDICTION.

1 INLET PROTECTION DETAIL (IP)
NOT TO SCALE

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
JOHN DUANE INGRAM
No. C058505
05/23/2023
CIVIL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
JOHN DUANE INGRAM	PE - C 058505	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

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OXNARD AIRPORT
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DES: T.A.R.
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APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF
TAXIWAY F

EROSION CONTROL DETAIL

AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME
C950

SHEET NO.
74 of 89

DRAWING NO.
1659-DOA

Plotted May 25, 2023 @ 9:48 AM by Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\090-OXR-043-C950-EROS-DETL.dwg

MASTER ELECTRICAL LEGEND

	EXISTING	NEW	DEMOLITION	ADJUST
L-850C R/W EDGE IN PAVEMENT LIGHT				—
L-862 R/W EDGE ELEVATED LIGHT				—
L-862E R/W END ELEVATED LIGHT				—
L-852G R/W IN-PAVEMENT GUARD LIGHT	—		—	—
L-804 R/W ELEVATED GUARD LIGHT			—	—
R/W MALSR LIGHT				
L-861T T/W EDGE LIGHT			(4)	
L-853 RETRO-REFLECTIVE MARKER				
L-853 RETRO-REFLECTIVE MARKER ON J-BOX	—		—	—
RUNWAY/TAXIWAY SIGN			(5)	—
L-867 JUNCTION BOX (3)				
HAND HOLE	HH	HH	—	HH
ELECTRICAL MANHOLE	EMH	EMH	—	EMH
2" ELECTRICAL CONDUIT (DEB) (1)			—	—
2" ELECTRICAL CONDUIT (CE) (1)			—	—
2" ELECTRICAL CONDUIT (CLSM)	—		—	—
ELECTRICAL DUCT BANK (DEB) (2)			—	—
ELECTRICAL DUCT BANK (CE) (2)			—	—
L-824C CABLE (HASH MARKS INDICATE THE NUMBER OF CONDUCTORS)	(2)	(3)	—	—

ABBREVIATIONS LEGEND (NOT ALL ABBREVIATIONS ARE USED)

A	-	AMP	OHT	-	OVERHEAD TELEPHONE
AFF	-	ABOVE FINISHED FLOOR	P	-	PHASE
AFG	-	ABOVE FINISHED GRADE	PAPI	-	PRECISION APPROACH PATH INDICATOR
ATS	-	AUTOMATIC TRANSFER SWITCH	PT	-	POINT OF TANGENCY
BC	-	BARE COPPER	PVC	-	POLYVINYL CHLORIDE CONDUIT
C	-	CONDUIT	REIL	-	RUNWAY END INDICATOR LIGHT
CCR	-	CONSTANT CURRENT REGULATOR	RGL	-	RUNWAY GUARD LIGHT
CE	-	CONCRETE ENCASED	RGS	-	RIGID GALVANIZED STEEL CONDUIT
CKT.	-	CIRCUIT	RE	-	REFER TO
CLSM	-	CONTROLLED LOW STRENGTH MATERIAL	RW	-	RUNWAY
COMM.	-	COMMUNICATION	S	-	SEWER
CONC.	-	CONCRETE	SCHD.	-	SCHEDULE
DEB	-	DIRECT EARTH BURIED	SHT.	-	SHEET
ELEC.	-	ELECTRIC/ELECTRICAL	STA.	-	STATION
EXIST., EX.	-	EXISTING	TDZ	-	TOUCH DOWN ZONE
FAA	-	FEDERAL AVIATION ADMINISTRATION	TW	-	TAXIWAY
F.O.	-	FIBER OPTIC	TYP	-	TYPICAL
GFI	-	GROUND FAULT INTERRUPTING	UE, UGE	-	UNDERGROUND ELECTRICAL
GND., G	-	GROUND	U.G.	-	UNDERGROUND
HDPE	-	HIGH-DENSITY POLYETHYLENE	UON	-	UNLESS OTHERWISE NOTED
kV	-	KILOVOLTS	UT	-	UNDERGROUND TELEPHONE
kW	-	KILOWATTS	V	-	VOLT
MALSR	-	MEDIUM INTENSITY APPROACH LIGHT SYSTEM WITH RUNWAY ALIGNMENT INDICATOR LIGHTS	VA	-	VOLT AMP
MH.	-	MANHOLE	W	-	WATT, WIRE
N.I.C.	-	NOT IN CONTRACT	W/	-	WITH
NO.	-	NUMBER	WP	-	WEATHERPROOF
OHP	-	OVERHEAD POWER	XFMR	-	TRANSFORMER

CIRCUIT LEGEND

(1) RUNWAY EDGE LIGHTS
(2) TAXIWAY EDGE LIGHTS

R/W LIGHT KEY

C - WHITE
Y - YELLOW
G - GREEN
R - RED

LEGEND NOTES:

(1) ALL ELECTRICAL CONDUITS ARE 1-2" SCH. 40 PVC CONDUIT UNLESS IDENTIFIED OTHERWISE.

(2) SIZE AND NUMBER OF CONDUITS IN A DUCT BANK ARE AS INDICATED ON PLAN SHEETS.

(3) ALL L-867 JUNCTION BOXES ARE SIZE B, 12" DIA. X 24" DEEP WITH 3/8" THICK BLANK COVER, UNLESS OTHERWISE INDICATED.

(4) SEE PROJECT SPECIFIC DEMOLITION NOTE #1.

(5) SEE PROJECT SPECIFIC DEMOLITION NOTE #2.

PROJECT SPECIFIC DEMOLITION NOTES

1. THE CONTRACTOR SHALL REMOVE AND PROPERLY STORE THE RUNWAY/TAXIWAY LIGHTS ACCORDING TO THE ELECTRICAL DEMOLITION PLAN SHEETS E100 SERIES. THE STORAGE OF THE RUNWAY/TAXIWAY EDGE LIGHTS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND IS CONSIDERED INCIDENTAL TO REMOVAL ITEMS. CONTRACTOR SHALL RETURN SALVAGED FIXTURES TO THE SPONSOR. NO SEPARATE PAYMENT WILL BE MADE.
2. ACCORDING TO THE PLANS, L-858 GUIDANCE SIGNS SHALL BE REMOVED BY THE CONTRACTOR. THE GUIDANCE SIGN REMOVAL ITEM SHALL CONSIST OF THE CONTRACTOR REMOVING THE L-858 GUIDANCE SIGN, CONCRETE BASE, AND STORAGE OF THE L-858 GUIDANCE SIGN. THE CONTRACTOR SHALL PROVIDE PROPER STORAGE FOR THE L-858 GUIDANCE SIGN. THE STORAGE OF THE L-858 GUIDANCE SIGN SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND IS CONSIDERED INCIDENTAL TO THE REMOVAL ITEM. NO SEPARATE PAYMENT WILL BE MADE.
3. ALL COMPONENTS OF THE AIRFIELD LIGHTING SYSTEM OUTSIDE OF THE PROJECT AREA AND CLOSED PORTIONS OF THE AIRFIELD SHALL NOT BE DAMAGED BY THE CONTRACTOR. ANY DAMAGE TO THESE COMPONENTS WILL BE REPLACED BY THE CONTRACTOR AT NO EXPENSE TO THE SPONSOR.
4. THE CONTRACTOR SHALL REMOVE ALL WIRES AND CABLES FROM CONDUITS WHICH ARE TO BE ABANDONED. NO ADDITIONAL PAYMENT WILL BE MADE FOR REMOVAL OF ABANDONED WIRES AND CABLES.
5. ALL CONDUIT OR DUCT BANKS, WIRE, OR COUNTERPOISE REMOVED DURING THE PROJECT SHALL BE CONSIDERED INCIDENTAL TO THE VARIOUS CIVIL DEMOLITION ITEMS.
6. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ANY JUMPER CABLES THAT ARE NEEDED TO OPERATE THE AIRFIELD LIGHTING CIRCUITS DURING EACH PHASE OF WORK. THE CONTRACTOR SHALL SUBMIT A PLAN FOR JUMPER LOCATIONS TO THE ENGINEER FOR APPROVAL. THE JUMPER CABLES SHALL BE CONSIDERED INCIDENTAL TO THE VARIOUS PROJECT ITEMS.

ELECTRICAL NOTES

1. THE PROJECT PAY ITEMS PROVIDED ARE TO BE INCLUSIVE OF ALL WORK TO BE PERFORMED AS SHOWN IN THE CONTRACT DOCUMENTS. ALL WORK NOT IDENTIFIED WITH A SPECIFIC PAY ITEM IS TO BE CONSIDERED REQUIRED WORK TO COMPLETE THE PROJECT, AND IS TO BE INCIDENTAL TO THE COST OF PROJECT PAY ITEMS PROVIDED.
2. WHENEVER, IN THE CONTRACT DOCUMENTS, THE WORDS "PROVIDE", "INSTALL", "FURNISH AND INSTALL", OR SIMILAR WORDS ARE USED, IT SHALL BE UNDERSTOOD THAT THE INTENT OF THE CONTRACT DOCUMENT IS TO PROVIDE FOR THE CONSTRUCTION AND COMPLETION IN EVERY DETAIL THE WORK DESCRIBED. IT IS FURTHER INTENDED THAT THE CONTRACTOR SHALL FURNISH ALL LABOR, SUPERVISION, MATERIALS, EQUIPMENT, TOOLS, TRANSPORTATION, SUPPLIES, TESTING, AND INCIDENTALS REQUIRED TO COMPLETE THE WORK IN ACCORDANCE WITH THE DRAWINGS (PLANS), SPECIFICATIONS, AND TERMS OF THE CONTRACT.
3. THE CONTRACTOR SHALL OBTAIN AND PAY FOR ALL REQUIRED PERMITS, LICENSES, ETC., PRIOR TO COMMENCEMENT OF WORK. THE COST OF PERMITS, LICENSES, ETC. SHALL BE INCIDENTAL TO, AND INCLUDED IN THE BID PRICE FOR THE RESPECTIVE PAY ITEMS.
4. ALL DAMAGE TO UTILITIES OR EXISTING STRUCTURES FROM CONSTRUCTION ACTIVITIES SHALL BE IMMEDIATELY REPORTED TO THE RESIDENT ENGINEER. THE RESIDENT ENGINEER SHALL DETERMINE WHETHER REPAIR OR REPLACEMENT IS NECESSARY. ALL REPAIR METHODS SHALL BE SUBMITTED TO THE RESIDENT ENGINEER FOR REVIEW AND APPROVAL PRIOR TO INITIATING THE WORK.
5. IN NEW OR EXISTING PAVEMENT ALL CONDUITS, DUCT BANKS, BASE CANS, COUNTERPOISE, GROUND CONDUCTORS, ETC. SHALL BE INSTALLED PRIOR TO PLACEMENT OF THE FINAL LIFT OF PAVEMENT.
6. AIRFIELD SIGNS PROVIDING DIRECTIONS TO CLOSED AREAS SHALL BE COVERED. ALL AREAS CLOSED TO AIRCRAFT SHALL NOT BE LIGHTED. ADEQUATE LIGHTING, IN THE OPINION OF THE RESIDENT ENGINEER, SHALL BE PROVIDED TO DELINEATE THE ACTIVE AND CLOSED AREAS OF THE AOA. THE ABOVE ITEMS ARE CONSIDERED INCIDENTAL TO THE VARIOUS BID ITEMS.
7. ALL COMPONENTS OF THE AIRFIELD LIGHTING SYSTEM OUTSIDE OF THE PROJECT AREA AND CLOSED PORTIONS OF THE AIRFIELD SHALL BE OPERATIONAL AT THE END OF EACH WORK SHIFT AND FOR EVERY PERIOD OF LOW VISIBILITY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL TEMPORARY JUMPER AND OTHER EQUIPMENT NECESSARY TO MAINTAIN AN OPERATIONAL SYSTEM DURING CONSTRUCTION. TEMPORARY JUMPERS SHALL BE CONSIDERED INCIDENTAL TO THE VARIOUS BID ITEMS. ALL TEMPORARY JUMPERS SHALL BE INSTALLED IN CONDUIT.
8. CONTRACTOR SHALL BE REQUIRED TO PROVE TO THE SATISFACTION OF THE PROJECT ENGINEER THAT THE LIGHTING SYSTEM IS OPERATIONAL BEFORE LEAVING THE WORK SITE AFTER EVERY WORK SHIFT.
9. THE AIRPORT MAINTENANCE DEPARTMENT'S "LOCKOUT/TAGOUT" PROCEDURE AND NFPA 70E SHALL BE COMPLIED WITH BY THIS CONTRACTOR.
10. THE CONTRACTOR SHALL VERIFY EXISTING CONDITIONS PRIOR TO STARTING WORK.
11. EXISTING CONDUIT, DUCT BANK, CIRCUITING, AND UTILITY INFORMATION IS BASED ON "AS-BUILT" AND "RECORD" DRAWINGS AND SITE VISITS BY THE ENGINEER. THE EXISTING UTILITY LOCATIONS SHOWN ON THE PLANS ARE APPROXIMATE AND SHALL NOT BE SCALED FOR EXACT LOCATION. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO CONTACT THE APPROPRIATE UTILITY/AGENCY PRIOR TO STARTING WORK AND STAKE/MARK THE LOCATION OF ALL EXISTING UTILITIES. ANY INTERRUPTION OF AN EXISTING SYSTEM OR UTILITY SERVICE SHALL BE COORDINATED AND APPROVED BY THE AIRPORT AND THE AUTHORITY, AGENCY, OR UTILITY HAVING JURISDICTION PRIOR TO STARTING WORK.
12. ALL REMOVED FIXTURES, BASEPLATES, SPACERS, SIGNS, TRANSFORMERS, ETC. SHALL BE TURNED OVER TO THE AIRPORT'S MAINTENANCE DEPARTMENT. ALL REMOVED CABLES, DUCT, BASECANS, CONCRETE PADS, MANHOLES, ETC. SHALL BE PROPERLY AND LEGALLY DISPOSED OF OFF THE SITE BY THE CONTRACTOR. ALL ITEMS TO BE RELOCATED SHALL BE REMOVED FIRST AND PROPERLY STORED FOR FUTURE INSTALLATION.
13. PROVIDE WORK, EQUIPMENT AND MATERIALS THAT COMPLY WITH FAA REQUIREMENTS, NATIONAL ELECTRICAL CODE, AND ALL LOCAL CODES.
14. PROVIDE PROPER CONSTRUCTION WARNINGS AND BARRICADES PER FAA REQUIREMENTS, AND PRESENT PLANS FOR SAME TO ENGINEER AND AIRPORT OPERATIONS MANAGER FOR APPROVAL PRIOR TO COMMENCING WORK.
15. NOTIFY ENGINEER OF ANY SIGNIFICANT DIFFERENCES BETWEEN DRAWINGS AND FIELD CONDITIONS.
16. DAMAGE TO EXISTING EQUIPMENT NOT ASSOCIATED WITH DEMOLITION FOR THIS PROJECT TO BE REPAIRED AND OPERATIONAL AT CONTRACTOR'S EXPENSE.
17. LOCATION OF EXISTING UTILITIES AND STRUCTURES IS BASED ON THE BEST AVAILABLE INFORMATION AND IS NOT WARRANTED TO BE EXACT, NOR IS IT WARRANTED THAT ALL UTILITIES ARE SHOWN.
18. WHERE NEW DUCT BANKS OR OTHER UTILITIES ARE NEAR EXISTING UTILITIES THE CONTRACTOR SHALL HAND EXCAVATE AROUND THE EXISTING UTILITIES IN ORDER TO PREVENT DAMAGE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR IMMEDIATELY REPAIRING ANY UTILITY DAMAGED DURING CONSTRUCTION.
19. THE CONTRACTOR SHALL REMOVE ALL CONDUIT AND CONDUCTORS MARKED FOR REMOVAL ON DEMOLITION SHEETS. ALL ABANDONED/UNUSED CONDUCTORS SHALL BE REMOVED FROM EXISTING CONDUITS IN WHICH NEW CONDUCTORS ARE INSTALLED. NO ABANDONED CONDUCTORS SHALL BE LEFT IN PLACE AT THE COMPLETION OF THE JOB. NO PAYMENT WILL BE MADE FOR REMOVAL OF EXISTING CONDUCTORS. ALL REMOVED WIRE SHALL BE THE PROPERTY OF THE CONTRACTOR.
20. THE CONTRACTOR SHALL KEEP A SET OF AS-BUILT DRAWINGS THAT SHALL BE SUBMITTED TO THE ENGINEER AT THE COMPLETION OF THE JOB. THE CONTRACTOR SHALL NOTE, AND BRING TO THE ENGINEER'S ATTENTION, ANY DISCREPANCIES BETWEEN THE PLANS AND ACTUAL FIELD CONDITIONS. REDLINES AND SURVEY AUTOCAD AS-BUILTS SHALL BE PROVIDED UPON COMPLETION.
21. THE DIMENSION BETWEEN LIGHTS SHOWN ON A RADIUS IS DEFINED AS THE CHORD LENGTH. LOCATIONS SHOWN ARE TO THE CENTER OF THE LIGHTING FIXTURE.
22. CONTRACTOR TO FIELD VERIFY ALL ELEVATION ADJUSTMENTS PRIOR TO ORDERING EXTENSION RINGS OR EXCAVATING ELECTRICAL STRUCTURES.
23. AT LOCATIONS WHERE NEW RUNWAY LIGHTS, TAXIWAY LIGHTS, SIGNS, OR CONDUIT ARE TO BE INSTALLED IN EXISTING PAVEMENT THE CONTRACTOR SHALL NEATLY SAWCUT, REMOVE, AND PATCH EXISTING PAVEMENT AS NECESSARY TO ALLOW THE INSTALLATION OF THE NEW EQUIPMENT. PAVEMENT REMOVAL AND PATCHING SHALL BE CONSIDERED INCIDENTAL TO INSTALLATION OF THE NEW EQUIPMENT. NO ADDITIONAL PAYMENT WILL BE MADE FOR PAVEMENT REMOVAL AND PATCHING.
24. THE CONTRACTOR SHALL KEEP A SET OF AS-BUILT DRAWINGS THAT SHALL BE SUBMITTED TO THE ENGINEER AT THE COMPLETION OF THE JOB. THE CONTRACTOR SHALL NOTE, AND BRING TO THE ENGINEER'S ATTENTION, ANY DISCREPANCIES BETWEEN THE PLANS AND ACTUAL FIELD CONDITIONS. REDLINES AND SURVEY AUTOCAD AS-BUILTS SHALL BE PROVIDED UPON COMPLETION.
25. THE ELECTRICAL CONTRACTOR SHALL ATTEND THE CONSTRUCTION MEETINGS FOR THE DURATION OF THE PROJECT.
26. ALL ELECTRICAL WORK, INCLUDING CONDUITS, HANDHOLES, GROUNDING, POWER DISTRIBUTION EQUIPMENT, WIRING, JUNCTION BOXES, ETC., PERTAINING TO NAVIGATIONAL AIDS (LOCALIZER, LOCALIZER EQUIPMENT SHELTER, REILS, AND PAPI) SHALL BE CONSTRUCTED IN ACCORDANCE WITH FAA SPECIFICATIONS FAA-C-1217, FAA-C-1391, AND FAA-STD-019 IN ADDITION TO THE SPECIFICATIONS CONTAINED WITHIN THE CONTRACT DOCUMENTS.
27. THE CONTRACTOR SHALL MEASURE THE INSULATION RESISTANCE OF ALL AIRFIELD CIRCUITS PRIOR TO STARTING ANY ELECTRICAL WORK. AT THE COMPLETION OF THE PROJECT, THE CONTRACTOR SHALL PROVIDE A MEGOHMMETER TO THE AIRPORT'S MAINTENANCE DEPARTMENT. THE MEGOHMMETER SHALL BE CAPABLE OF TESTING INSULATION RESISTANCE AT 500V AND 1000V. THE TESTER SHALL BE CAPABLE OF MEASURING RESISTANCE VALUES BETWEEN 0.01MΩ AND 2000MΩ WITH A MINIMUM ACCURACY OF ±1.5%. MEGOHMMETER SHALL BE FLUKE 1503, OR APPROVED EQUAL.
28. THE CONTRACTOR'S OPTION, NEW CONDUIT PROVIDED UNDER EXISTING PAVEMENT MAY BE INSTALLED BY DIRECTIONAL BORING IN LIEU OF CUTTING AN OPEN TRENCH AS DESCRIBED ABOVE. ALL CONDUIT INSTALLED BY DIRECTIONAL BORING SHALL BE SCHEDULE 40 HDPE. HDPE CONDUIT SHALL NOT BE USED OUTSIDE OF DIRECTIONAL BORING APPLICATIONS. ANY DAMAGE TO EXISTING PAVEMENT FROM BORING OPERATIONS (INCLUDING HEAVING) SHALL BE REPAIRED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE SPONSOR, AND TO THE APPROVAL OF THE ENGINEER.
29. CONTRACTOR SHALL NOTIFY ENGINEER 24 HOURS IN ADVANCE AND BE IN RADIO CONTACT WITH THE ATC WHEN OPERATING INSIDE THE AOA.
30. CONDUITS, ELECTRIC LINES, AND DUCT BANKS MARKED FOR REMOVAL ON UTILITY DEMOLITION SHEETS MAY BE ABANDONED IN PLACE IF THEY ARE NOT DISTURBED DURING CONSTRUCTION ACTIVITIES. ANY CONDUIT, ELECTRIC LINES, OR DUCT BANK ENCOUNTERED DURING CONSTRUCTION SHALL BE REMOVED. NO PAYMENT SHALL BE MADE FOR REMOVAL OF CONDUITS, DUCT BANKS, AND ELECTRIC LINES.
31. THE CONTRACTOR SHALL REMOVE ALL ABANDONED/UNUSED CONDUCTORS AND CABLES FROM EXISTING CONDUITS IN WHICH NEW CONDUCTORS OR CABLES ARE INSTALLED. NO ABANDONED CONDUCTORS OR CABLES SHALL BE LEFT IN PLACE AT THE COMPLETION OF THE PROJECT. NO PAYMENT WILL BE MADE FOR REMOVAL OF EXISTING CONDUCTORS OR CABLES. ALL REMOVED CONDUCTORS AND CABLES SHALL BE THE PROPERTY OF THE CONTRACTOR.
32. ALL WIRE INSTALLED DURING THE PROJECT SHALL BE COPPER WIRE ONLY.

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
ZACHARY C. AMBARIANTZ
No. E19382
05/25/2023
ELECTRICAL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
ZACHARY C. AMBARIANTZ	PE - E 19382	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF
TAXIWAY F

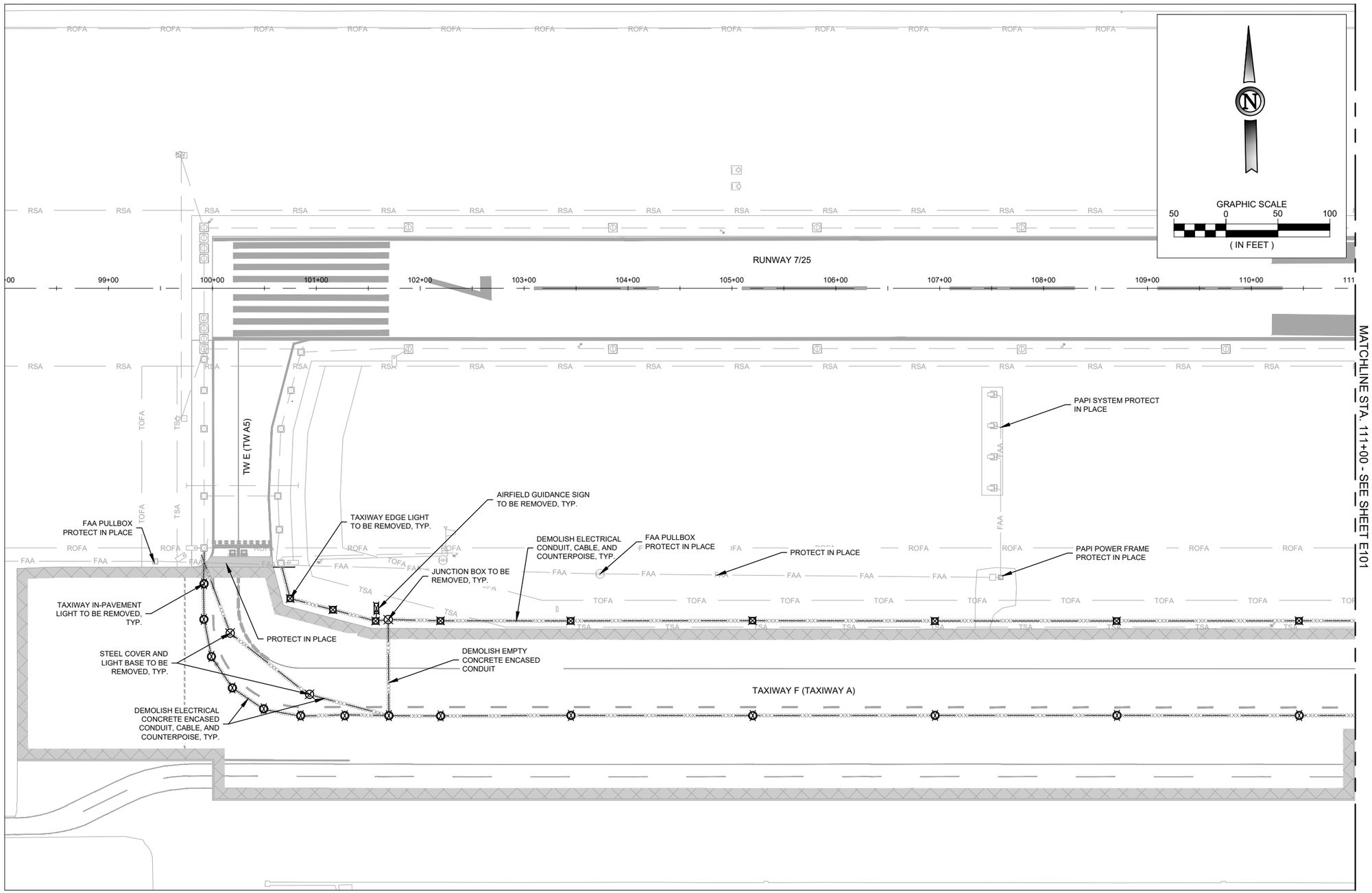
ELECTRICAL LEGEND AND GENERAL NOTES

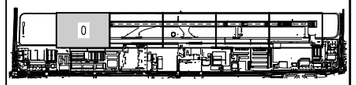
AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME
E001

SHEET NO.
75 of 89

DRAWING NO.
1660-DOA





ELECTRICAL DEMOLITION LEGEND

- EXISTING ELECTRICAL DIRECT EARTH BURIED (DEB)
- EXISTING ELECTRICAL CONCRETE ENCASED (CE)
- REMOVE ELECTRICAL DIRECT EARTH BURIED (DEB)
- REMOVE ELECTRICAL CONCRETE ENCASED (CE)
- REMOVE TW IN-PAVEMENT LIGHT
- REMOVE TW EDGE LIGHT
- REMOVE HANDHOLE/PULLBOX
- REMOVE JUNCTION BOX
- REMOVE GUIDANCE SIGN

NOTES

1. SEE SHEET E001 FOR ELECTRICAL LEGEND AND NOTES.
2. SEE SHEETS E200 THRU E204 FOR ELECTRICAL PLANS.
3. SEE SHEETS E250 THRU E254 FOR ELECTRICAL DETAILS.
4. SEE SHEETS C100 THRU C104 FOR CIVIL DEMOLITION.
5. CONTRACTOR TO USE SURVEY CONTROL POINTS AS SHOWN ON SHEET G005 SURVEY CONTROL LAYOUT.
6. CONTRACTOR SHALL LOCATE AND PROTECT ALL EXISTING UTILITIES.

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
ZACHARY C. AMBARIANTZ
No. E19382
05/25/2023
ELECTRICAL
STATE OF CALIFORNIA

ZACHARY C. AMBARIANTZ	PE - E 19382	5/25/2023
NAME	REG. NO.	DATE

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF TAXIWAY F

ELECTRICAL DEMOLITION PLAN
STA. 98+00 TO STA. 111+00
RUNWAY 7/25

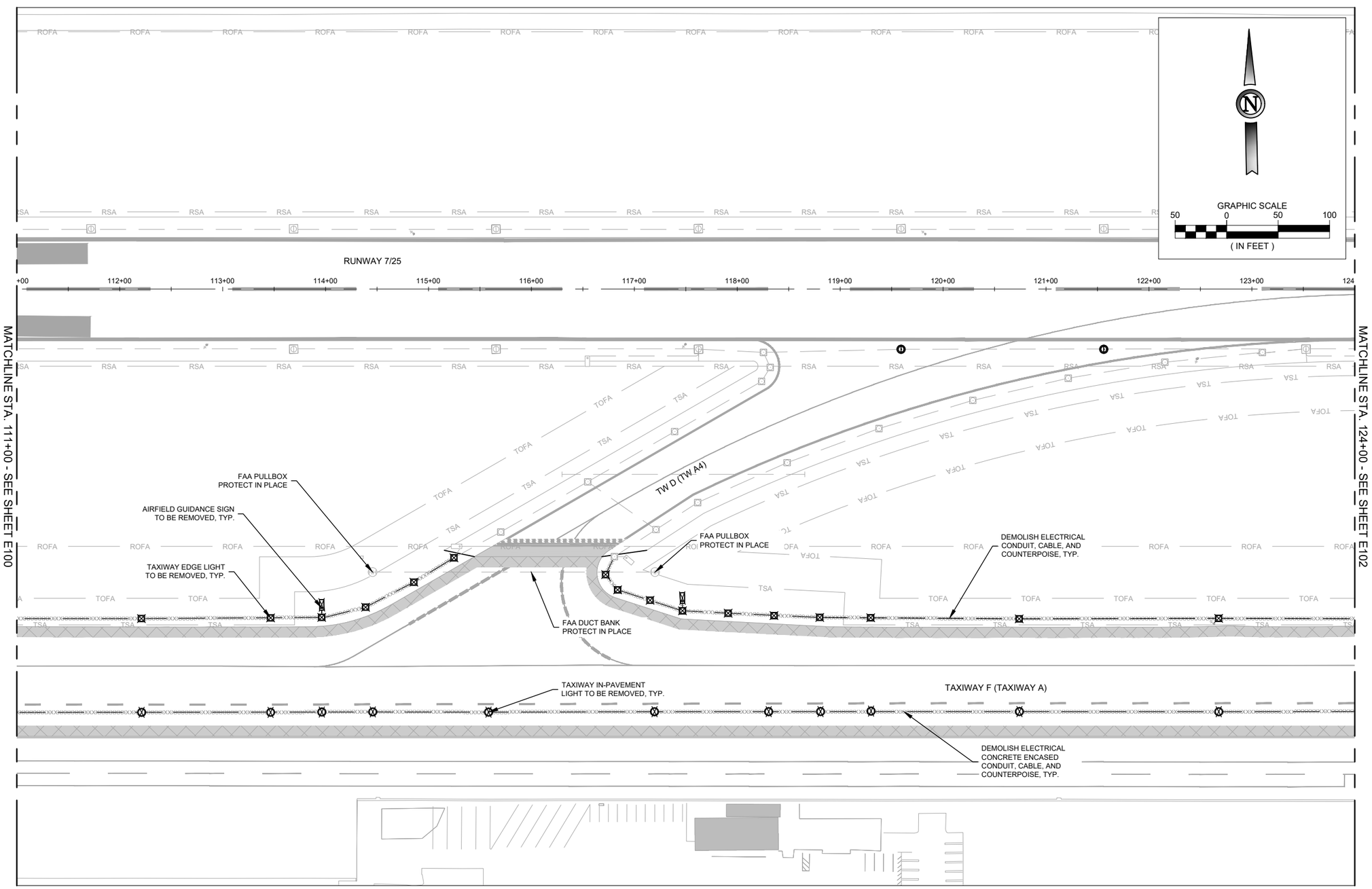
AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

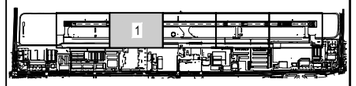
SHEET NAME
E100

SHEET NO.
76 of 89

DRAWING NO.
1661-DOA

Plotted May 25, 2023 @ 9:49 AM by Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\100-OXR-043-E100-E104-ELEC-DEMO.dwg





ELECTRICAL DEMOLITION LEGEND

- EXISTING ELECTRICAL DIRECT EARTH BURIED (DEB)
- EXISTING ELECTRICAL CONCRETE ENCASED (CE)
- REMOVE ELECTRICAL DIRECT EARTH BURIED (DEB)
- REMOVE ELECTRICAL CONCRETE ENCASED (CE)
- REMOVE TW IN-PAVEMENT LIGHT
- REMOVE TW EDGE LIGHT
- REMOVE HANDHOLE/PULLBOX
- REMOVE JUNCTION BOX
- REMOVE GUIDANCE SIGN

NOTES

1. SEE SHEET E001 FOR ELECTRICAL LEGEND AND NOTES.
2. SEE SHEETS E200 THRU E204 FOR ELECTRICAL PLANS.
3. SEE SHEETS E250 THRU E254 FOR ELECTRICAL DETAILS.
4. SEE SHEETS C100 THRU C104 FOR CIVIL DEMOLITION.
5. CONTRACTOR TO USE SURVEY CONTROL POINTS AS SHOWN ON SHEET G005 SURVEY CONTROL LAYOUT.
6. CONTRACTOR SHALL LOCATE AND PROTECT ALL EXISTING UTILITIES.

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER ZACHARY C. AMBARIANTZ No. E19382 05/25/2023 ELECTRICAL STATE OF CALIFORNIA

NAME	REG. NO.	DATE
ZACHARY C. AMBARIANTZ	PE - E 19382	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

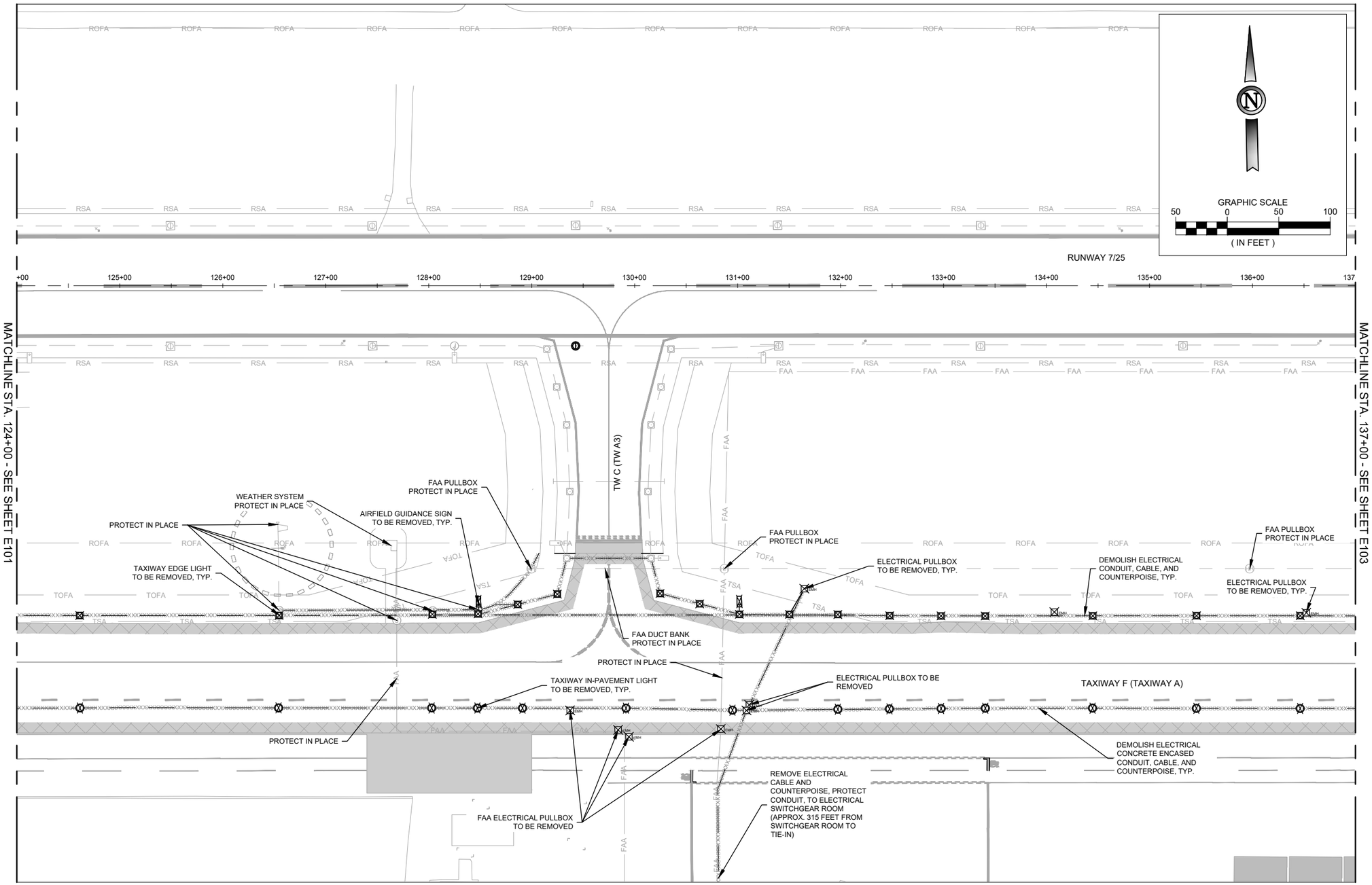
RECONSTRUCTION OF TAXIWAY F

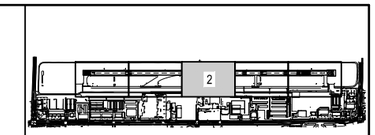
ELECTRICAL DEMOLITION PLAN
STA. 111+00 TO STA. 124+00
RUNWAY 7/25

AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME E101
SHEET NO. 77 of 89
DRAWING NO. 1662-DOA

Plotted May 25, 2023 @ 9:49 AM by: Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\100-OXR-043-E100-E104-ELEC-DEMO.dwg





ELECTRICAL DEMOLITION LEGEND

- EXISTING ELECTRICAL DIRECT EARTH BURIED (DEB)
- EXISTING ELECTRICAL CONCRETE ENCASED (CE)
- REMOVE ELECTRICAL DIRECT EARTH BURIED (DEB)
- REMOVE ELECTRICAL CONCRETE ENCASED (CE)
- REMOVE TW IN-PAVEMENT LIGHT
- REMOVE TW EDGE LIGHT
- REMOVE HANDHOLE/PULLBOX
- REMOVE JUNCTION BOX
- REMOVE GUIDANCE SIGN

NOTES

1. SEE SHEET E001 FOR ELECTRICAL LEGEND AND NOTES.
2. SEE SHEETS E200 THRU E204 FOR ELECTRICAL PLANS.
3. SEE SHEETS E250 THRU E254 FOR ELECTRICAL DETAILS.
4. SEE SHEETS C100 THRU C104 FOR CIVIL DEMOLITION.
5. CONTRACTOR TO USE SURVEY CONTROL POINTS AS SHOWN ON SHEET G005 SURVEY CONTROL LAYOUT.
6. CONTRACTOR SHALL LOCATE AND PROTECT ALL EXISTING UTILITIES.

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
ZACHARY C. AMBARIANTZ
No. E19382
05/25/2023
ELECTRICAL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
ZACHARY C. AMBARIANTZ	PE - E 19382	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF TAXIWAY F

ELECTRICAL DEMOLITION PLAN
STA. 124+00 TO STA. 137+00
RUNWAY 7/25

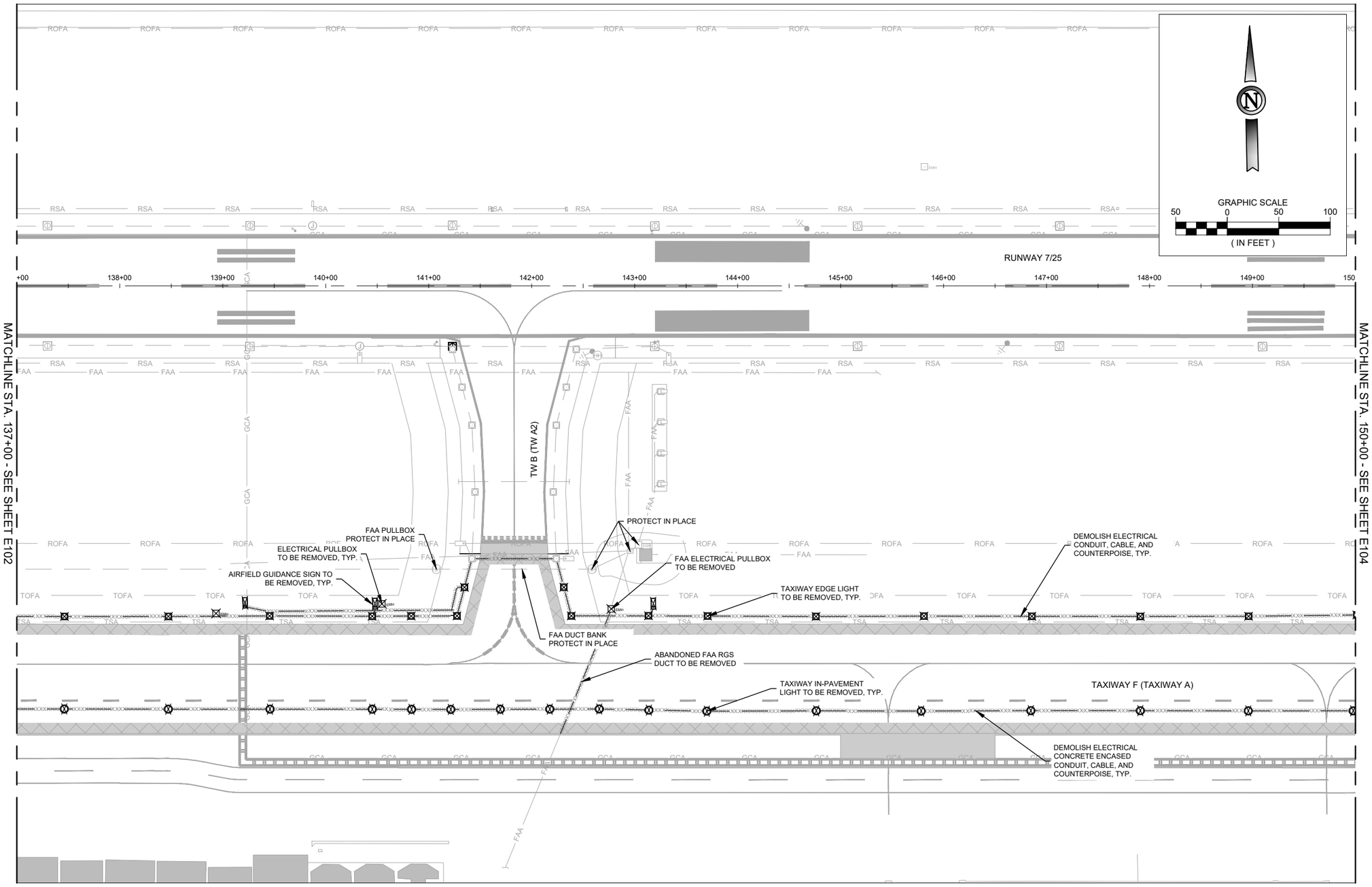
AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

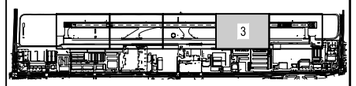
SHEET NAME
E102

SHEET NO.
78 of 89

DRAWING NO.
1663-DOA

Plotted May 25, 2023 @ 9:49 AM by Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\100-OXR-043-E100-E104-ELEC-DEMO.dwg





ELECTRICAL DEMOLITION LEGEND

- EXISTING ELECTRICAL DIRECT EARTH BURIED (DEB)
- EXISTING ELECTRICAL CONCRETE ENCASED (CE)
- REMOVE ELECTRICAL DIRECT EARTH BURIED (DEB)
- REMOVE ELECTRICAL CONCRETE ENCASED (CE)
- REMOVE TW IN-PAVEMENT LIGHT
- REMOVE TW EDGE LIGHT
- REMOVE HANDHOLE/PULLBOX
- REMOVE JUNCTION BOX
- REMOVE GUIDANCE SIGN

NOTES

1. SEE SHEET E001 FOR ELECTRICAL LEGEND AND NOTES.
2. SEE SHEETS E200 THRU E204 FOR ELECTRICAL PLANS.
3. SEE SHEETS E250 THRU E254 FOR ELECTRICAL DETAILS.
4. SEE SHEETS C100 THRU C104 FOR CIVIL DEMOLITION.
5. CONTRACTOR TO USE SURVEY CONTROL POINTS AS SHOWN ON SHEET G005 SURVEY CONTROL LAYOUT.
6. CONTRACTOR SHALL LOCATE AND PROTECT ALL EXISTING UTILITIES.

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER ZACHARY C. AMBARIANTZ No. E19382 05/25/2023 ELECTRICAL STATE OF CALIFORNIA

NAME	REG. NO.	DATE
ZACHARY C. AMBARIANTZ	PE - E 19382	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

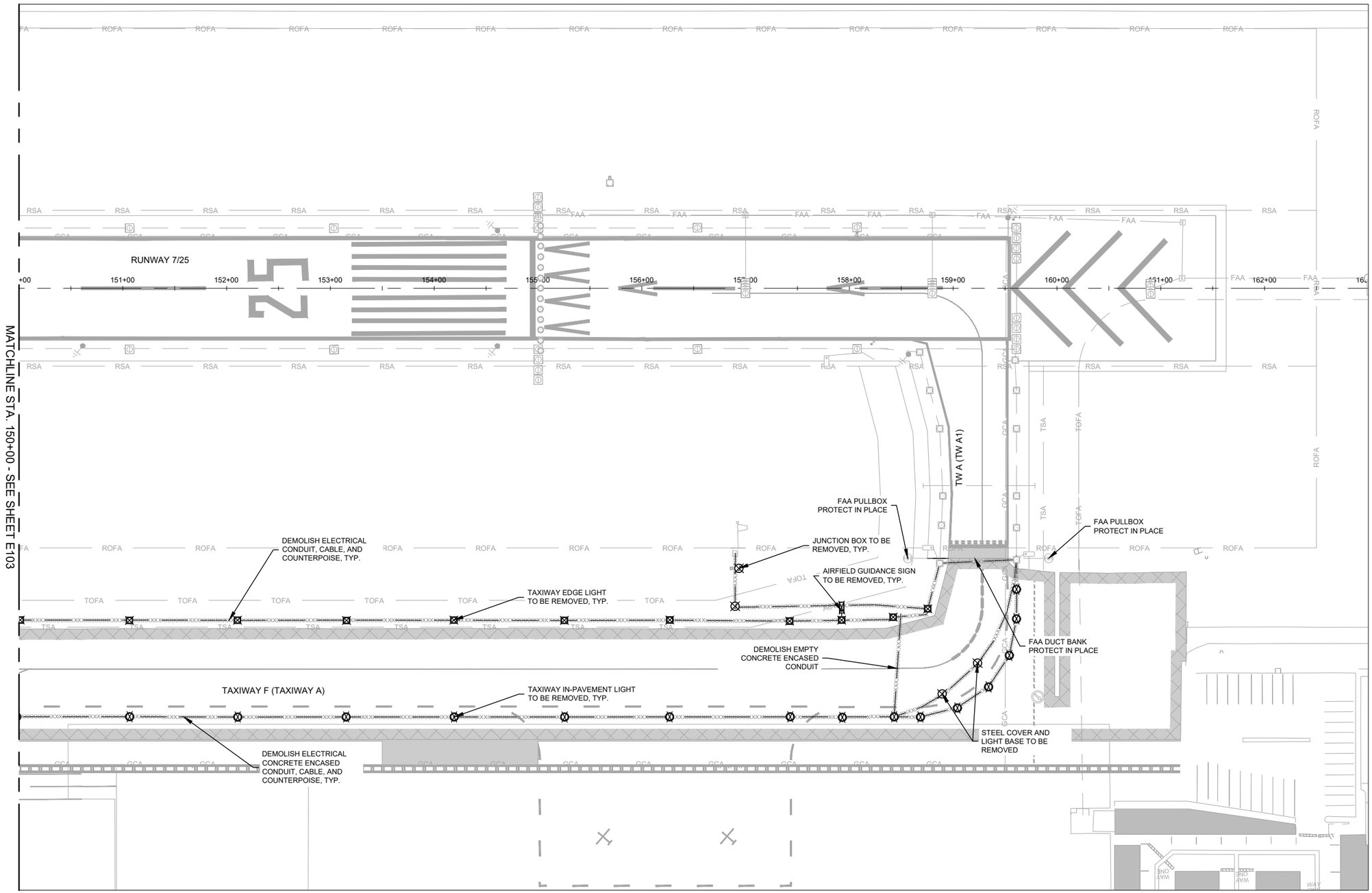
RECONSTRUCTION OF TAXIWAY F

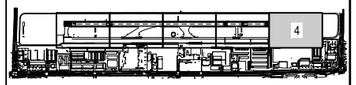
ELECTRICAL DEMOLITION PLAN
STA. 137+00 TO STA. 150+00
RUNWAY 7/25

AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME E103
SHEET NO. 79 of 89
DRAWING NO. 1664-DOA

Plotted May 25, 2023 @ 9:49 AM by Ball, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\190-OXR-043-E100-E104-ELEC-DEMO.dwg





ELECTRICAL DEMOLITION LEGEND

- EXISTING ELECTRICAL DIRECT EARTH BURIED (DEB)
- EXISTING ELECTRICAL CONCRETE ENCASED (CE)
- REMOVE ELECTRICAL DIRECT EARTH BURIED (DEB)
- REMOVE ELECTRICAL CONCRETE ENCASED (CE)
- REMOVE TW IN-PAVEMENT LIGHT
- REMOVE TW EDGE LIGHT
- REMOVE HANDHOLE/PULLBOX
- REMOVE JUNCTION BOX
- REMOVE GUIDANCE SIGN

NOTES

1. SEE SHEET E001 FOR ELECTRICAL LEGEND AND NOTES.
2. SEE SHEETS E200 THRU E204 FOR ELECTRICAL PLANS.
3. SEE SHEETS E250 THRU E254 FOR ELECTRICAL DETAILS.
4. SEE SHEETS C100 THRU C104 FOR CIVIL DEMOLITION.
5. CONTRACTOR TO USE SURVEY CONTROL POINTS AS SHOWN ON SHEET G005 SURVEY CONTROL LAYOUT.
6. CONTRACTOR SHALL LOCATE AND PROTECT ALL EXISTING UTILITIES.

GRAPHIC SCALE
50 0 50 100
(IN FEET)

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
ZACHARY C. AMBARIANTZ
No. E19382
05/25/2023
ELECTRICAL
STATE OF CALIFORNIA

ZACHARY C. AMBARIANTZ	PE - E 19382	5/25/2023
NAME	REG. NO.	DATE

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF TAXIWAY F

ELECTRICAL DEMOLITION PLAN
STA. 150+00 TO STA. 163+00
RUNWAY 7/25

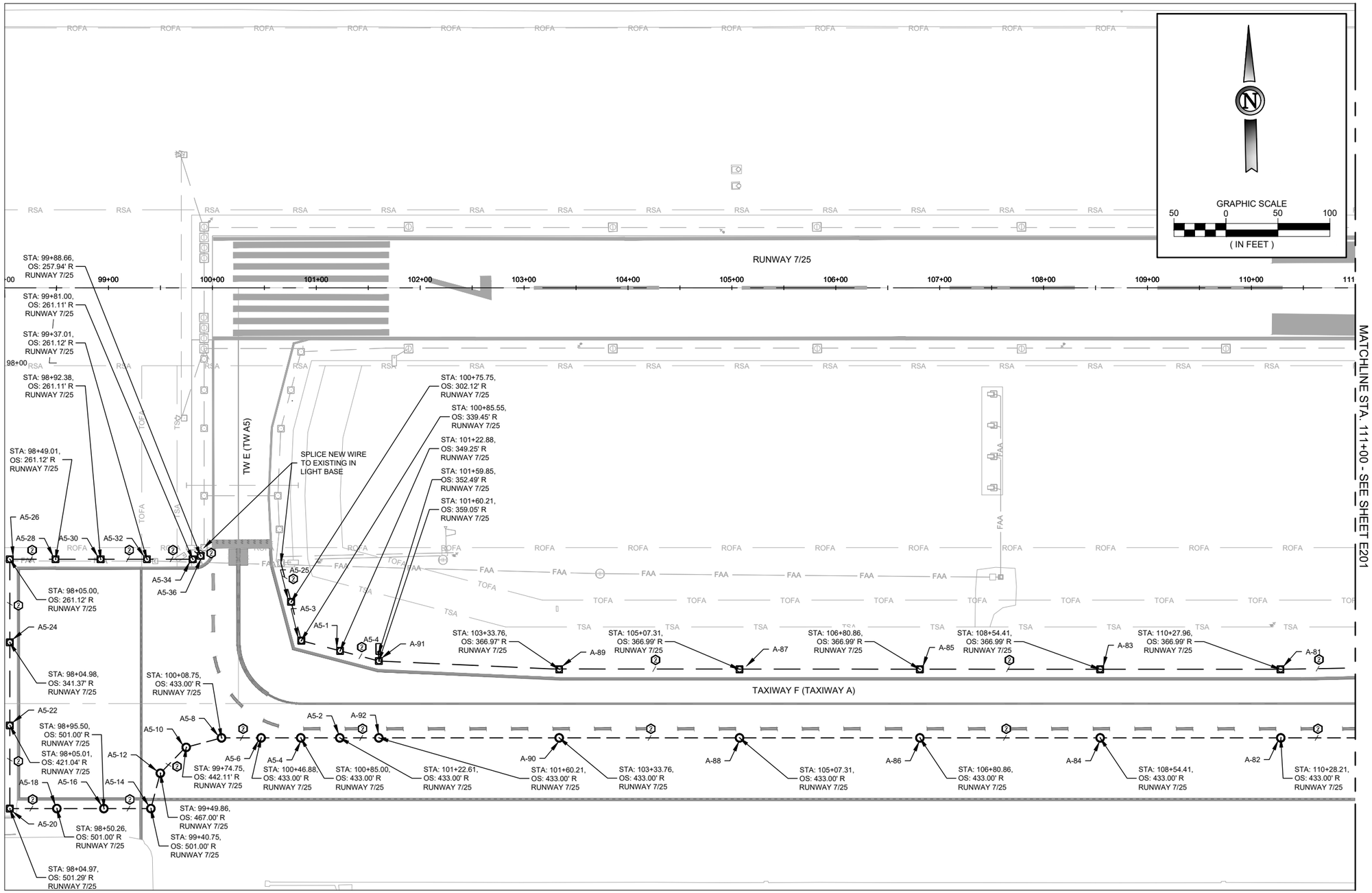
AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME
E104

SHEET NO.
80 of 89

DRAWING NO.
1665-DOA

Plotted May 25, 2023 @ 9:49 AM by Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\100-OXR-043-E100-E104-ELEC-DEMO.dwg



NOTES

1. SEE SHEET E001 FOR ELECTRICAL LEGEND AND GENERAL NOTES.
2. SEE SHEETS E100 THRU E104 FOR ELECTRICAL DEMOLITION.
3. SEE SHEETS E250 THRU E254 FOR ELECTRICAL DETAILS.
4. CONTRACTOR TO USE SURVEY CONTROL POINTS AS SHOWN ON SHEET G005 SURVEY CONTROL LAYOUT.
5. SEE SHEETS G052 THRU G055 FOR CONSTRUCTION PHASING.
6. CONTRACTOR SHALL LOCATE AND PROTECT ALL EXISTING UTILITIES.
7. FAA HANDHOLES SHALL BE JENSEN PRECAST PB4848 WITH TORSION HINGED COVER, OR APPROVED EQUAL. THE 4/0 B.C. GROUND LOOP SHOW IN DETAILS 1 AND 2 ON SHEET E254 SHALL BE CONSIDERED INCIDENTAL TO THE FAA HANDHOLE INSTALLATION.

CIRCUIT LEGEND

1. RUNWAY EDGE LIGHTS
2. TAXIWAY EDGE LIGHTS

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER ZACHARY C. AMBARIANTZ No. E19382 05/25/2023 ELECTRICAL STATE OF CALIFORNIA

NAME	REG. NO.	DATE
ZACHARY C. AMBARIANTZ	PE - E 19382	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION® A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

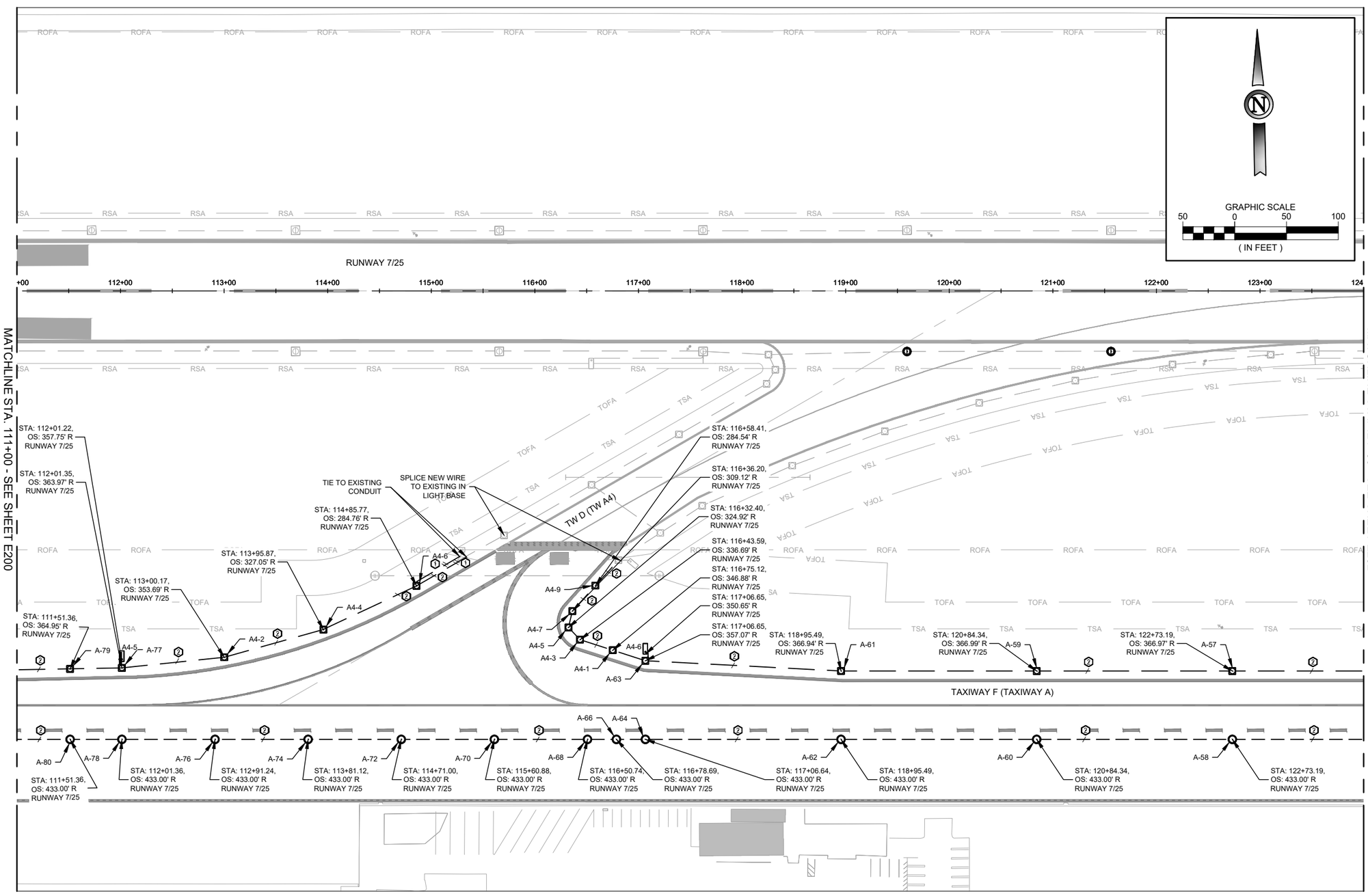
RECONSTRUCTION OF TAXIWAY F

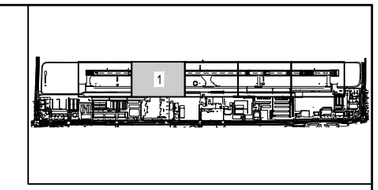
ELECTRICAL LAYOUT PLAN
STA. 98+00 TO STA. 111+00
RUNWAY 7/25

AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME: E200
SHEET NO.: 81 of 89
DRAWING NO.: 1666-DOA

Plotted May 25, 2023 @ 9:50 AM by: Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\100-OXR-043-E200-E204-ELEC-GEOM.dwg





NOTES

1. SEE SHEET E001 FOR ELECTRICAL LEGEND AND GENERAL NOTES.
2. SEE SHEETS E100 THRU E104 FOR ELECTRICAL DEMOLITION.
3. SEE SHEETS E250 THRU E254 FOR ELECTRICAL DETAILS.
4. CONTRACTOR TO USE SURVEY CONTROL POINTS AS SHOWN ON SHEET G005 SURVEY CONTROL LAYOUT.
5. SEE SHEETS G052 THRU G055 FOR CONSTRUCTION PHASING.
6. CONTRACTOR SHALL LOCATE AND PROTECT ALL EXISTING UTILITIES.
7. FAA HANDHOLES SHALL BE JENSEN PRECAST PB4848 WITH TORSION HINGED COVER, OR APPROVED EQUAL. THE 4/0 B.C. GROUND LOOP SHOW IN DETAILS 1 AND 2 ON SHEET E254 SHALL BE CONSIDERED INCIDENTAL TO THE FAA HANDHOLE INSTALLATION.

CIRCUIT LEGEND

1	RUNWAY EDGE LIGHTS
2	TAXIWAY EDGE LIGHTS

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER ZACHARY C. AMBARIANTZ No. E19382 05/25/2023 ELECTRICAL STATE OF CALIFORNIA

NAME	REG. NO.	DATE
ZACHARY C. AMBARIANTZ	PE - E 19382	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
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COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

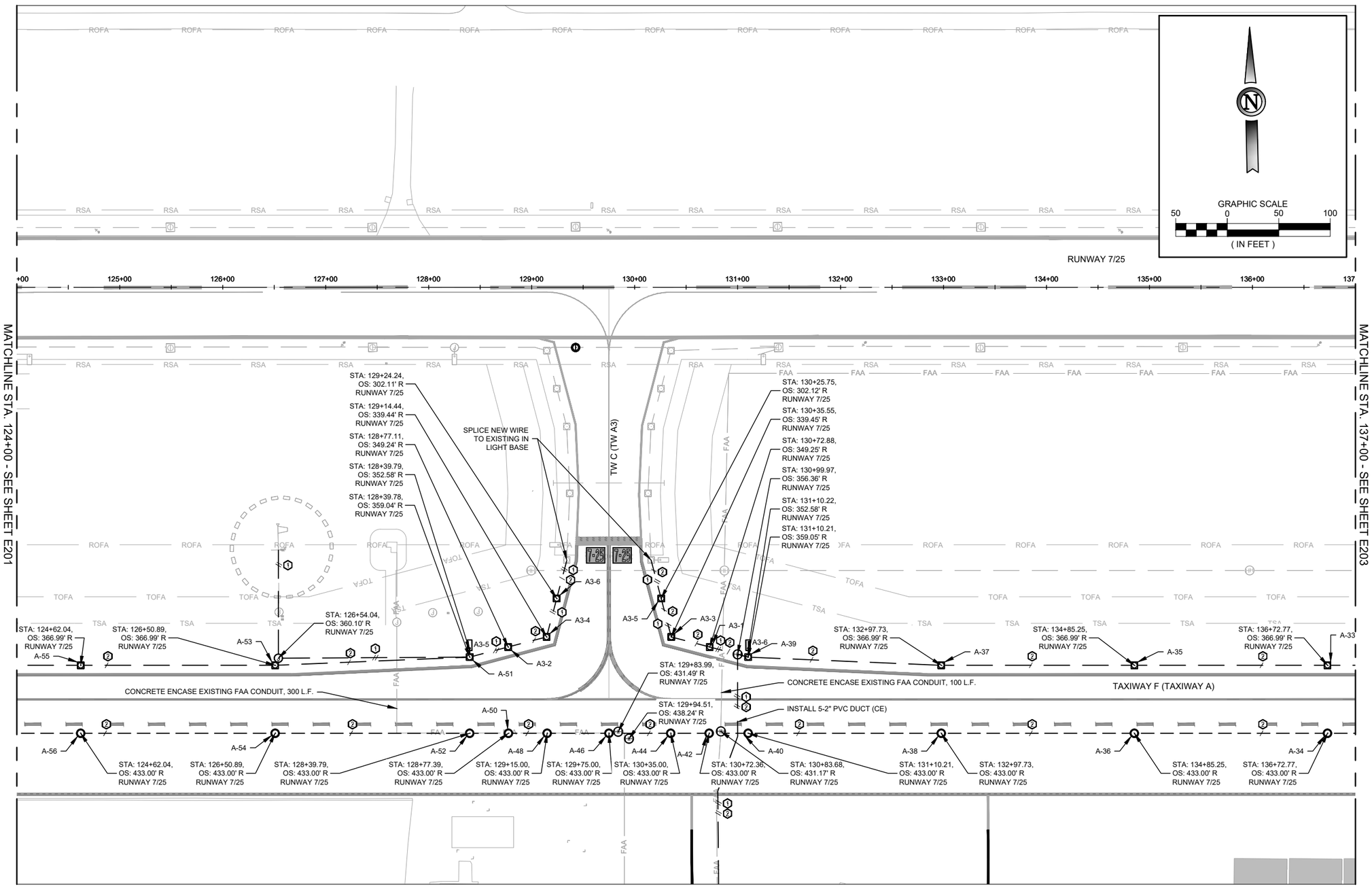
RECONSTRUCTION OF TAXIWAY F

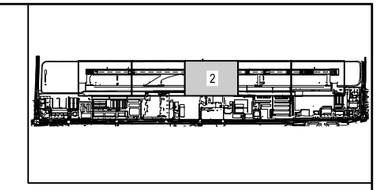
ELECTRICAL LAYOUT PLAN
STA. 111+00 TO STA. 124+00
RUNWAY 7/25

AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME E201
SHEET NO. 82 of 89
DRAWING NO. 1667-DOA

Plotted May 25, 2023 @ 9:50 AM by: Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\100-OXR-043-E200-E204-ELEC-GEOM.dwg





NOTES

1. SEE SHEET E001 FOR ELECTRICAL LEGEND AND GENERAL NOTES.
2. SEE SHEETS E100 THRU E104 FOR ELECTRICAL DEMOLITION.
3. SEE SHEETS E250 THRU E254 FOR ELECTRICAL DETAILS.
4. CONTRACTOR TO USE SURVEY CONTROL POINTS AS SHOWN ON SHEET G005 SURVEY CONTROL LAYOUT.
5. SEE SHEETS G052 THRU G055 FOR CONSTRUCTION PHASING.
6. CONTRACTOR SHALL LOCATE AND PROTECT ALL EXISTING UTILITIES.
7. FAA HANDHOLES SHALL BE JENSEN PRECAST PB4848 WITH TORSION HINGED COVER, OR APPROVED EQUAL. THE 4/0 B.C. GROUND LOOP SHOW IN DETAILS 1 AND 2 ON SHEET E254 SHALL BE CONSIDERED INCIDENTAL TO THE FAA HANDHOLE INSTALLATION.

CIRCUIT LEGEND

1	RUNWAY EDGE LIGHTS
2	TAXIWAY EDGE LIGHTS

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
ZACHARY C. AMBARIANTZ
No. E19382
05/25/2023
ELECTRICAL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
ZACHARY C. AMBARIANTZ	PE - E 19382	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
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OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF TAXIWAY F

ELECTRICAL LAYOUT PLAN
STA. 124+00 TO STA. 137+00
RUNWAY 7/25

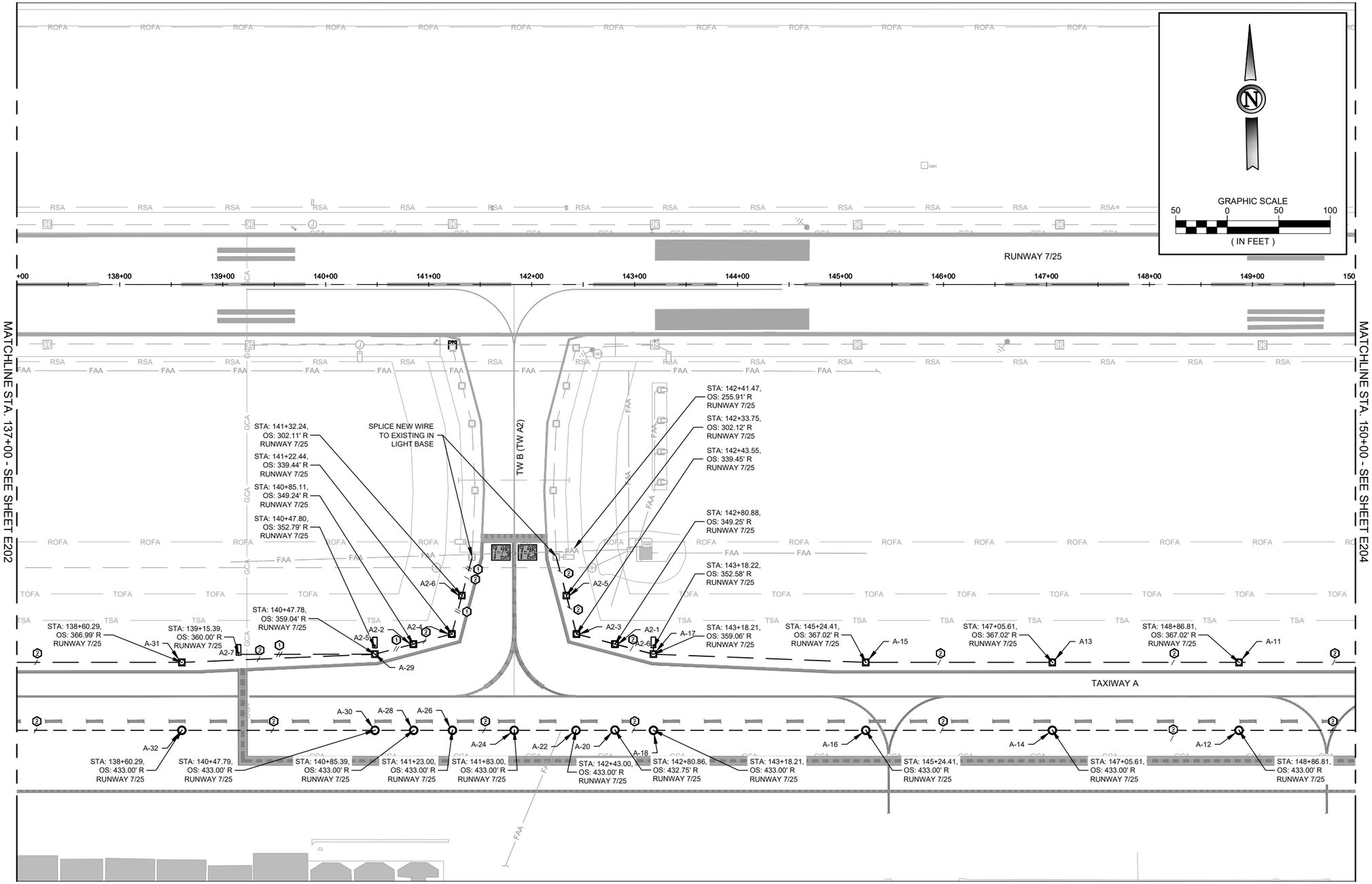
AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

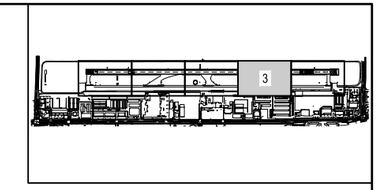
SHEET NAME
E202

SHEET NO.
83 of 89

DRAWING NO.
1668-DOA

Plotted May 25, 2023 @ 9:50 AM by: Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\100-OXR-043-E200-E204-ELEC-GEOM.dwg





NOTES

1. SEE SHEET E001 FOR ELECTRICAL LEGEND AND GENERAL NOTES.
2. SEE SHEETS E100 THRU E104 FOR ELECTRICAL DEMOLITION.
3. SEE SHEETS E250 THRU E254 FOR ELECTRICAL DETAILS.
4. CONTRACTOR TO USE SURVEY CONTROL POINTS AS SHOWN ON SHEET G005 SURVEY CONTROL LAYOUT.
5. SEE SHEETS G052 THRU G055 FOR CONSTRUCTION PHASING.
6. CONTRACTOR SHALL LOCATE AND PROTECT ALL EXISTING UTILITIES.
7. FAA HANDHOLES SHALL BE JENSEN PRECAST PB4848 WITH TORSION HINGED COVER, OR APPROVED EQUAL. THE 4/0 B.C. GROUND LOOP SHOW IN DETAILS 1 AND 2 ON SHEET E254 SHALL BE CONSIDERED INCIDENTAL TO THE FAA HANDHOLE INSTALLATION.

CIRCUIT LEGEND

1	RUNWAY EDGE LIGHTS
2	TAXIWAY EDGE LIGHTS

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER ZACHARY C. AMBARIANTZ No. E19382 05/25/2023 ELECTRICAL STATE OF CALIFORNIA

NAME	REG. NO.	DATE
ZACHARY C. AMBARIANTZ	PE - E 19382	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

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A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

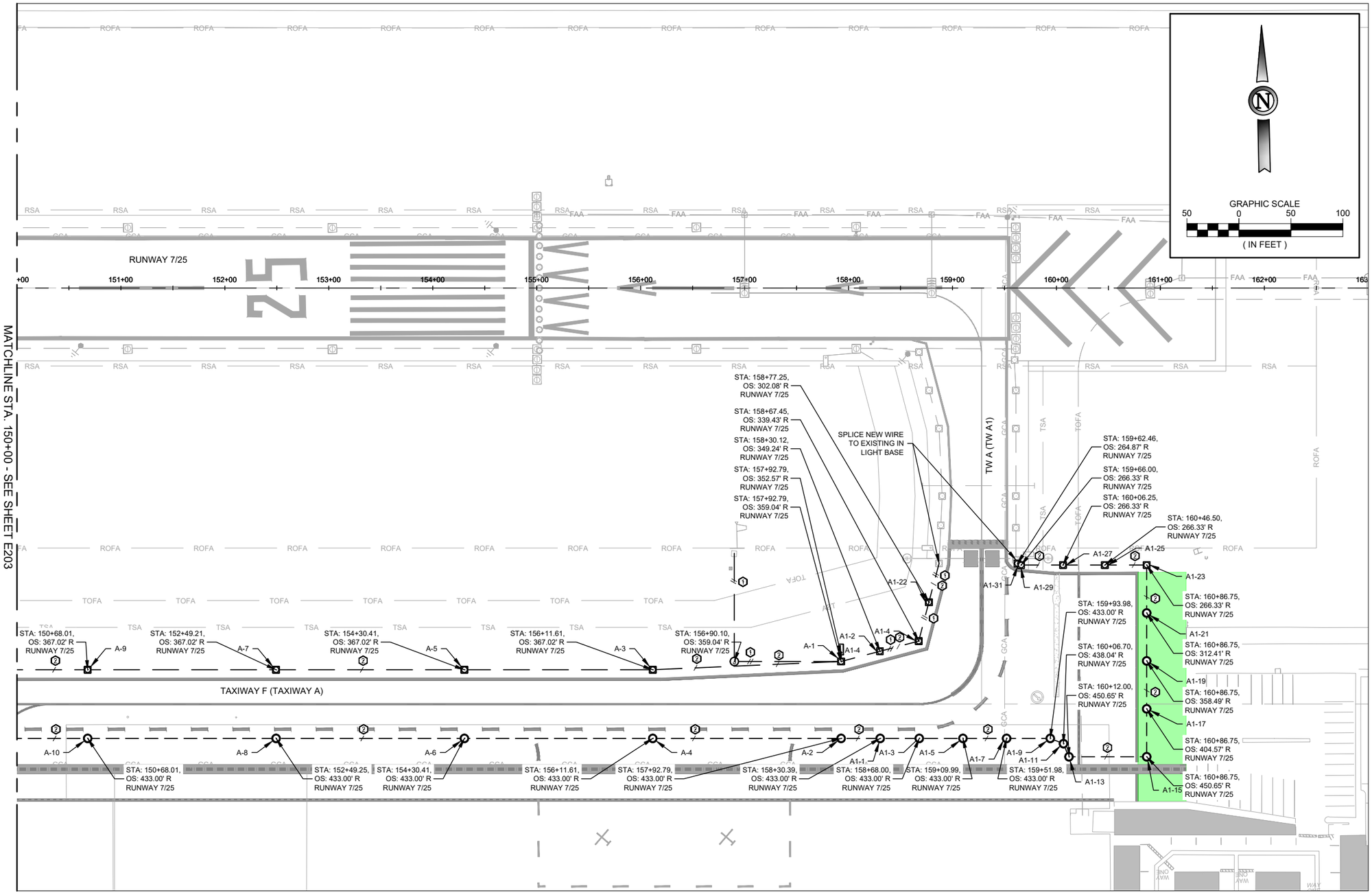
RECONSTRUCTION OF TAXIWAY F

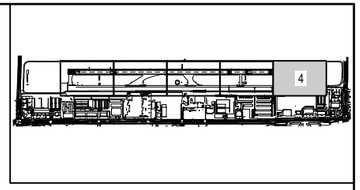
ELECTRICAL LAYOUT PLAN
STA. 137+00 TO STA. 150+00
RUNWAY 7/25

AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME: E203
SHEET NO. 84 of 89
DRAWING NO. 1669-DOA

Plotted May 25, 2023 @ 9:50 AM by Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\100-OXR-043-E200-E204-ELEC-GEOM.dwg





NOTES

1. SEE SHEET E001 FOR ELECTRICAL LEGEND AND GENERAL NOTES.
2. SEE SHEETS E100 THRU E104 FOR ELECTRICAL DEMOLITION.
3. SEE SHEETS E250 THRU E254 FOR ELECTRICAL DETAILS.
4. CONTRACTOR TO USE SURVEY CONTROL POINTS AS SHOWN ON SHEET G005 SURVEY CONTROL LAYOUT.
5. SEE SHEETS G052 THRU G055 FOR CONSTRUCTION PHASING.
6. CONTRACTOR SHALL LOCATE AND PROTECT ALL EXISTING UTILITIES.
7. FAA HANDHOLES SHALL BE JENSEN PRECAST PB4848 WITH TORSION HINGED COVER, OR APPROVED EQUAL. THE 4/0 B.C. GROUND LOOP SHOW IN DETAILS 1 AND 2 ON SHEET E254 SHALL BE CONSIDERED INCIDENTAL TO THE FAA HANDHOLE INSTALLATION.

CIRCUIT LEGEND
1 RUNWAY EDGE LIGHTS
2 TAXIWAY EDGE LIGHTS

GRAPHIC SCALE
50 0 50 100
(IN FEET)

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER
ZACHARY C. AMBARIANTZ
No. E19382
05/25/2023
ELECTRICAL
STATE OF CALIFORNIA

NAME	REG. NO.	DATE
ZACHARY C. AMBARIANTZ	PE - E 19382	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF
TAXIWAY F

ELECTRICAL LAYOUT PLAN
STA. 150+00 TO STA. 163+00
RUNWAY 7/25

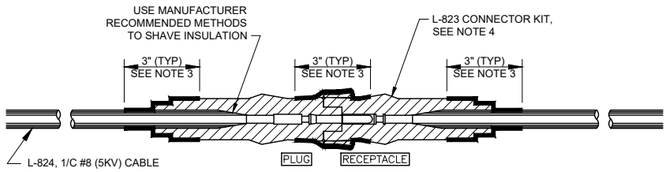
AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME
E204

SHEET NO.
85 of 89

DRAWING NO.
1670-DOA

Plotted May 25, 2023 @ 9:51 AM by Bait Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\100-OXR-043-E200-E204-ELEC-GEOM.dwg

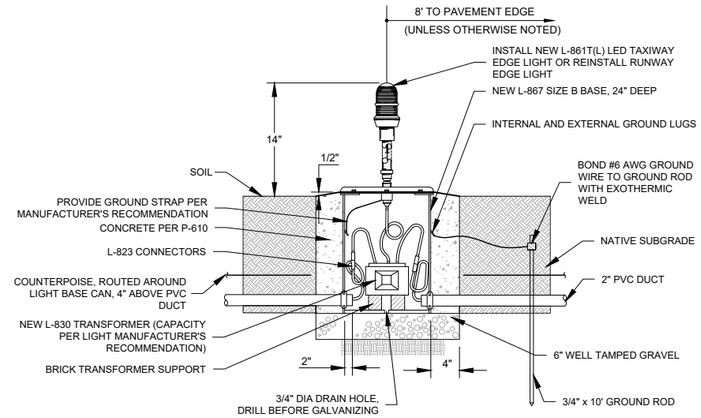


NOTES:

1. THE CABLE SHALL BE THOROUGHLY CLEANED PRIOR TO THE INSTALLATION OF THE L-823 CONNECTOR KIT.
2. INSTALLATION OF THE PIN/RECEPTACLE SHALL BE COMPLETED WITH "CRIMPING" TOOL SUPPLIED OR RECOMMENDED BY THE MANUFACTURER AND DESIGNED FOR THIS SPECIFIC PURPOSE.
3. ALL FIELD MADE JOINTS SHALL BE WRAPPED WITH 3" OF RUBBER TAPE AND HELD IN PLACE WITH VINYL TAPE, 1 1/2" ON EACH SIDE OF JOINT AND HALF LAPPED.
4. PROVIDE CONNECTOR KITS THAT INCLUDE AN INTEGRAL FLAP/BOOT TO SEAL THE JOINT BETWEEN THE PLUG AND RECEPTACLE. WRAP JOINT WITH VINYL TAPE.
5. CONTRACTOR SHALL REMOVE CABLE SPREADER PRIOR TO INSTALLATION OF CABLE TO CONNECTOR.
6. SPLICE THE RETURN CONDUCTOR IF IN SAME CONDUIT WITH THE SUPPLY CONDUCTOR AT EVERY TENTH FIXTURE LOCATION. CONTRACTOR SHALL SPLICE ONLY WHEN REQUIRED. LOCATIONS OF RETURN SPLICE ARE TO BE AS-BUILT. RETURN CONDUCTOR SHALL PASS STRAIGHT THROUGH CANS (WITHOUT SLACK) AT LOCATIONS WHERE RETURN CONDUCTOR IS NOT SPLICED.

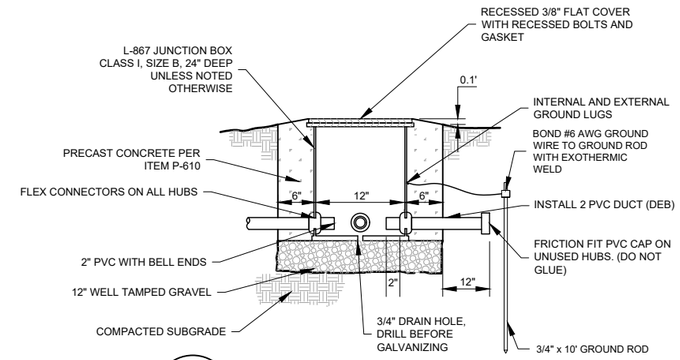
1 TYPICAL L-824 (5KV) CABLE CONNECTOR DETAIL

N.T.S



2 ELEVATED RUNWAY/TAXIWAY EDGE LIGHT DETAIL

N.T.S

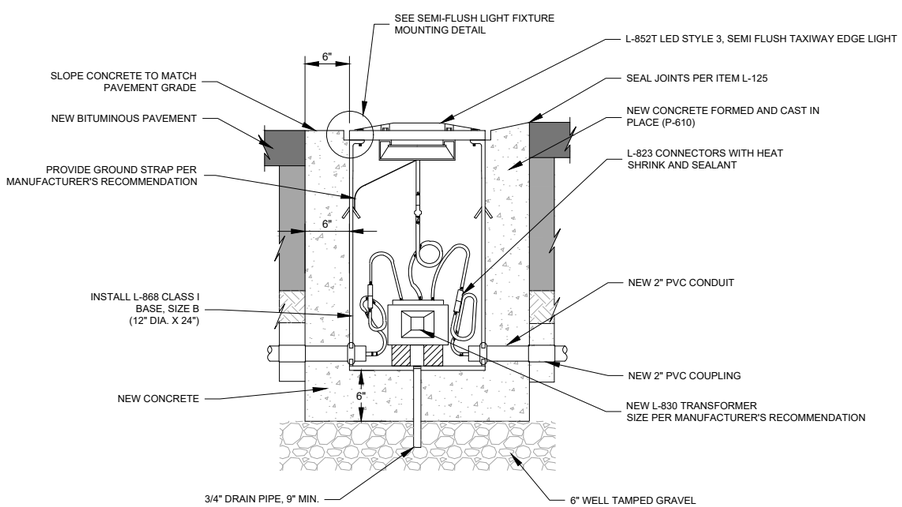


3 JUNCTION BOX DETAIL

N.T.S

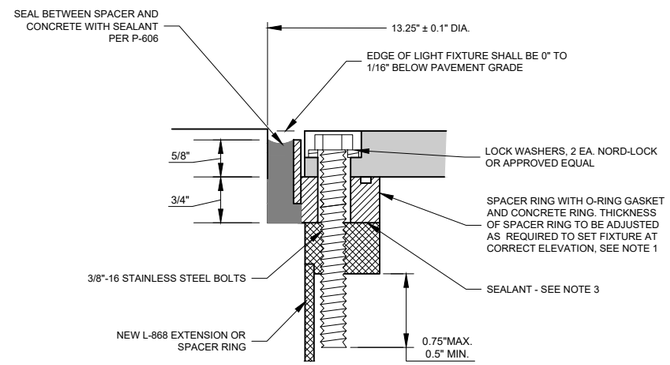
GENERAL NOTES:

1. RUNWAY/TAXIWAY TAGS - AFFIX NON-CORROSIVE NUMBERING TAG TO BASE CAN CONCRETE COLLAR FACING THE RUNWAY OR TAXIWAY WITH SELF DRILLING SCREW AND POLYURETHANE ADHESIVE SEALANT. NUMBERS SHALL BE ENGRAVED FOR PERMANENT READABILITY. SIGNS SHALL BE NUMBERED ACCORDING TO AIRFIELD SIGN LEGEND SCHEDULE. SAMPLE INSTALLATION TO BE APPROVED BY THE ENGINEER. TAG SHALL BE SAME TYPE AS EXISTING TAGS. CONTRACTOR TO CONFIRM NOMENCLATURE WITH SPONSOR AND ENGINEER PRIOR TO ORDERING TAGS.
2. CABLE CIRCUIT IDENTIFICATION MARKINGS - CONTRACTOR SHALL APPLY ELECTRICAL TAPE MARKINGS ON EITHER SIDE OF A SPLICE WITHIN A JUNCTION STRUCTURE AND AT A MINIMUM OF 2 LOCATIONS WITH IN A HANDHOLE. A 6" LENGTH OF HALF LAPPED ELECTRICAL TAPE SHALL BE APPLIED. THE CONTRACTOR SHALL USE BLUE TAPE FOR THE TAXIWAY CIRCUIT AND RED TAPE FOR THE RUNWAY CIRCUIT.



4 INPAVEMENT TAXIWAY LIGHT DETAIL

N.T.S



NOTES:

1. THE SPACER RING IS DESIGNED AS A NOMINAL 0.75" THICKNESS. THE SPACER RING MAY BE REQUIRED TO BE THICKER OR THINNER DEPENDING ON BASE CAN INSTALLATION AND PAVING TECHNIQUES. THE CONTRACTOR SHALL BE RESPONSIBLE TO MEASURE AND DETERMINE THE EXACT REQUIRED THICKNESS OF EACH INDIVIDUAL SPACER RING REQUIRED TO PUT THE AIRFIELD LIGHTING FIXTURE AT THE CORRECT ELEVATION, AZIMUTH, AND ROTATION PER FAA ADVISORY CIRCULAR 150/5340-30, LATEST EDITION. THE CONTRACTOR'S BID PRICE SHALL INCLUDE FURNISHING AND INSTALLING ALL SPACER RINGS.
2. ALL BASE CAN INSTALLATION TECHNIQUES, METHODS, MATERIALS, ETC. SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL PRIOR TO THE START OF WORK.
3. USE ACETATE RESISTANT, CONDUCTIVE SEALANT BETWEEN ADAPTER/SPACER RING(S) AND BASE CAN. INSTALL ENOUGH SEALANT TO CREATE A WATERPROOF SEAL, HOWEVER, THE SEALANT SHALL NOT ACT AS A BARRIER BETWEEN THE SPACER RING(S) AND BASE CAN. METAL TO METAL CONTACT SHALL BE MAINTAINED BETWEEN THE BASE CAN AND SPACER RING(S).
4. THE FIXTURE MOUNTING BOLTS SHALL EXTEND THROUGH THE BASE CAN MOUNTING FLANGE INTO THE BASE CAN A MINIMUM OF 1/2". THE BOLTS SHALL HAVE ENOUGH THREAD SO THEY DO NOT SHOULDER OUT BEFORE THE FIXTURE IS SECURELY TIGHTENED.
5. THE NUMBER OF HUBS FOR A BASE CAN SHALL BE AS SHOWN ON THE PLANS. THE HUBS SHALL BE FACTORY DRILLED PRIOR TO GALVANIZING.
6. ALL BOLTS SHALL BE NEW AND SHALL BE TIGHTENED PER THE MANUFACTURERS TORQUE RECOMMENDATION USING A MANUAL TORQUE WRENCH NOT AN ELECTRIC DRILL DRIVER.

5 INPAVEMENT LIGHT FIXTURE MOUNTING DETAIL

N.T.S

ISSUED FOR BID

NAME	REG. NO.	DATE
ZACHARY C. AMBARIANTZ	PE - E 19382	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF TAXIWAY F

ELECTRICAL DETAILS

AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

SHEET NAME E250

SHEET NO. 86 of 89

DRAWING NO. 1671-DOA

Plotted May 25, 2023 @ 9:51 AM by: Bell, Robert
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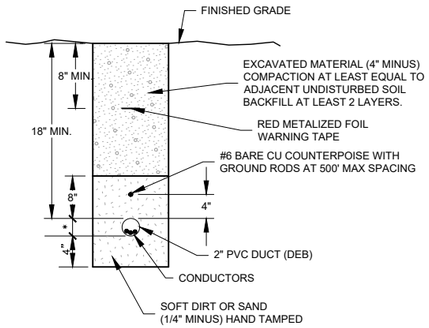
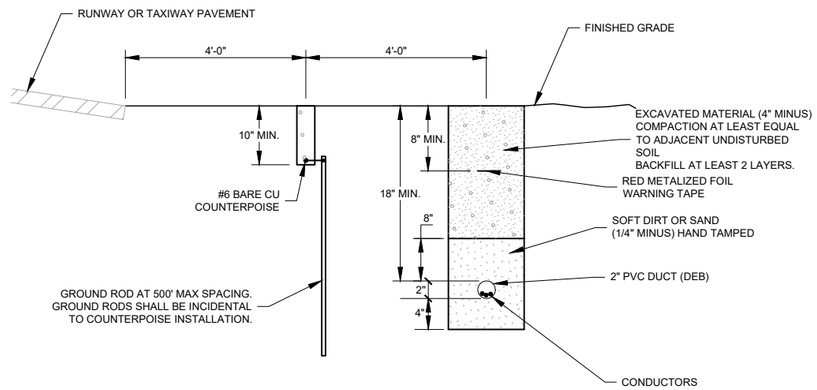


1 DUCT TRENCH (DEB) DETAIL

N.T.S

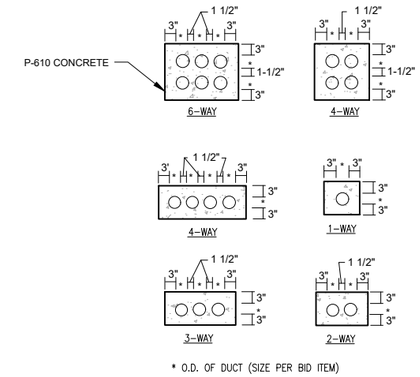
NOTE:
THIS DETAIL SHALL BE USED FOR ALL CONDUIT NOT INSTALLED PARALLEL TO RUNWAY OR TAXIWAY PAVEMENT.



2 DUCT TRENCH (DEB) PARALLEL TO TAXIWAY PAVEMENT DETAIL

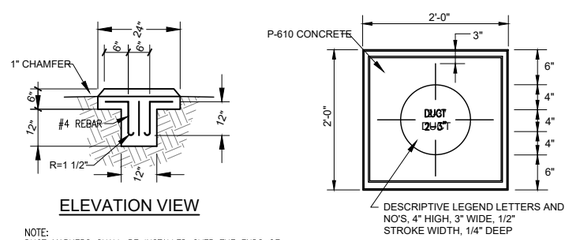
N.T.S

NOTE:
THIS DETAIL SHALL BE USED FOR ALL CONDUIT INSTALLED PARALLEL TO RUNWAY OR TAXIWAY PAVEMENT.



3 DUCT SPACING (CE) DETAIL

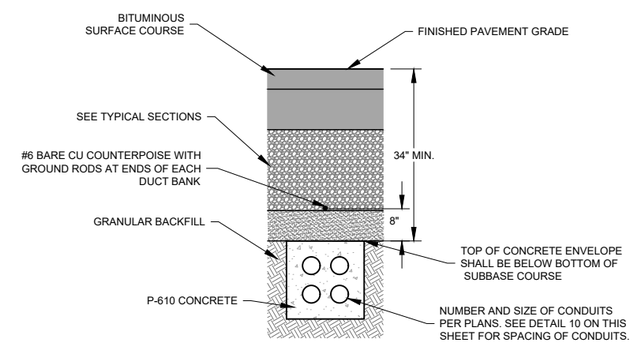
N.T.S



NOTE:
DUCT MARKERS SHALL BE INSTALLED OVER THE ENDS OF ALL SPARE CONDUITS AND AT ALL LOCATIONS WHERE CONDUIT CHANGES DIRECTION.

4 DUCT MARKER DETAIL

N.T.S



5 DUCT TRENCH (CE) DETAIL

N.T.S

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER ZACHARY C. AMBARIANTZ No. E19382 05/25/2023 ELECTRICAL STATE OF CALIFORNIA

NAME	REG. NO.	DATE
ZACHARY C. AMBARIANTZ	PE - E 19382	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION® A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF TAXIWAY F

ELECTRICAL DETAILS

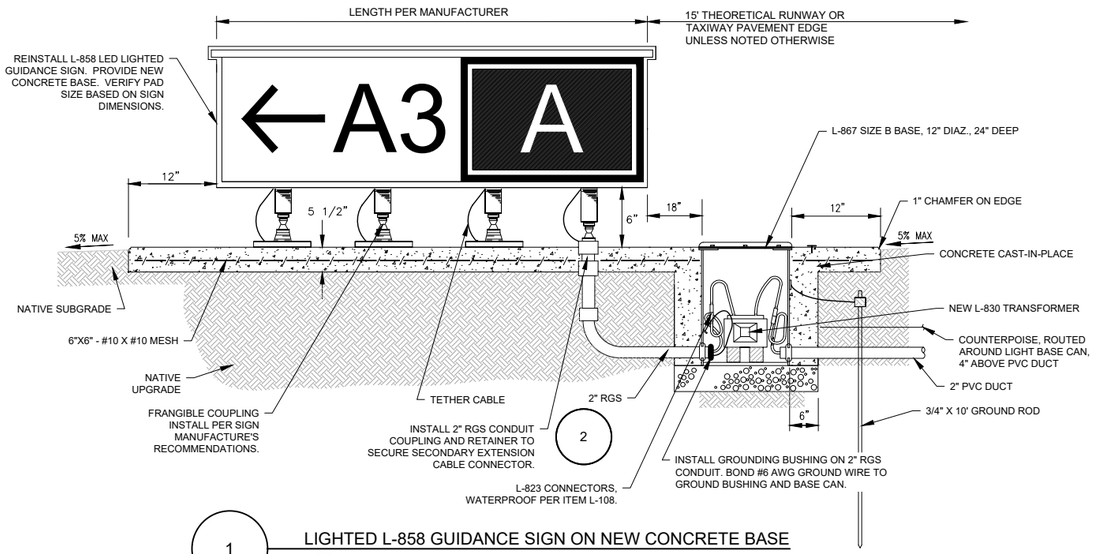
SHEET NAME E251

SHEET NO. 87 of 89

DRAWING NO. 1672-DOA

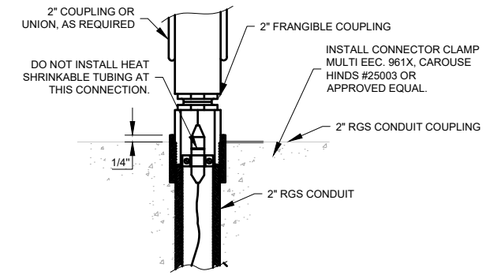
AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

Plotted May 25, 2023 @ 9:51 AM by Ball, Robert
L:\OXR\OXR AIP\043 Taxiway F Reconstruction\CAD\PLANS\100-OXR-043-E250-E253-ELEC-DETL.dwg



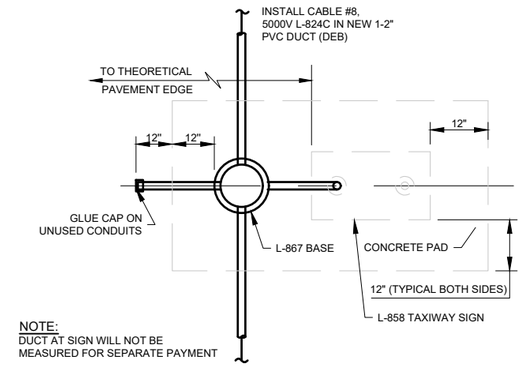
1 LIGHTED L-858 GUIDANCE SIGN ON NEW CONCRETE BASE

N.T.S



2 2" RGS CONDUIT COUPLING AND RETAINER

N.T.S



NOTE:
DUCT AT SIGN WILL NOT BE MEASURED FOR SEPARATE PAYMENT

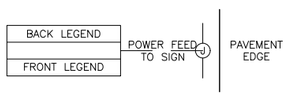
3 CONDUIT LAYOUT TO TAXIWAY SIGN DETAIL

N.T.S

AIRPORT GUIDANCE SIGNS								
SIGN #	SIGN LEGEND		L-858 SIGN TYPE		MODULES	SIZE	CIRCUIT	NOTES
	FRONT	BACK	FRONT	BACK				
A1-4	←A1 A	A	Y/L	L	3	1	2	INSTALL EXISTING SIGN ON NEW CONCRETE FOUNDATION
A2-5	←A2 A	A	Y/L	L	3	1	2	INSTALL EXISTING SIGN ON NEW CONCRETE FOUNDATION
A2-6	A	A A2→	L	L/Y	3	1	2	INSTALL EXISTING SIGN ON NEW CONCRETE FOUNDATION
A2-7	ILS		R	Y	2	1	1	INSTALL NEW SIGN, COMPLETE
A3-5	←A3 A	A	Y/L	L	3	1	2	INSTALL EXISTING SIGN ON NEW CONCRETE FOUNDATION
A3-6	A	A A3→	L	L/Y	3	1	2	INSTALL EXISTING SIGN ON NEW CONCRETE FOUNDATION
A4-5	↖A4 A	A	Y/L	L	3	1	2	INSTALL EXISTING SIGN ON NEW CONCRETE FOUNDATION
A4-6	A	A A4↘	L	L/Y	3	1	2	INSTALL EXISTING SIGN ON NEW CONCRETE FOUNDATION
A5-4	A	A A5→	L	L/Y	3	1	2	INSTALL EXISTING SIGN ON NEW CONCRETE FOUNDATION

SIGN TYPE LEGEND

Y - BLACK LEGEND ON YELLOW BACKGROUND (L-858Y DIRECTIONAL)
R - WHITE LEGEND ON RED BACKGROUND (L-858R-MANDATORY)
L - YELLOW LEGEND ON BLACK BACKGROUND (L-858L-LOCATION)
B - WHITE LEGEND ON BLACK BACKGROUND (L-858B - RDR)



NOTES:

1. ALL SIGNS SHALL BE EQUIPPED WITH LED TYPE LIGHTING WHICH COMPLIES WITH THE REQUIREMENTS OF FAA ENGINEERING BRIEF 67D.
2. ALL NEW SIGNS SHALL CONFORM TO AC 150/5345-44, LIGHTED, SIZE 1, STYLE 2. NUMBER OF SIGN MODULES SHALL BE AS REQUIRED FOR LEGEND.
3. THE DETAILS SHOWN IN THE PLANS PROVIDE THE MINIMUM REQUIREMENTS FOR SIGN INSTALLATIONS. THE CONTRACTOR SHALL USE STANDARDS APPLICABLE FOR THE PARTICULAR SIGN MANUFACTURER. THE BOLTING PATTERN, METHOD OF ANCHORING, ETC., SHALL BE PER THE SIGN MANUFACTURER'S RECOMMENDATIONS AND SHALL BE APPROVED BY THE ENGINEER.
4. ALL SIGNS SHALL BE FURNISHED WITH TETHERS. TETHERS SHALL BE 1/8" STAINLESS STEEL AIRCRAFT CABLE WITH A FORMED EYE ON BOTH ENDS. THE TETHER SHALL BE ATTACHED TO THE SIGN AND BASE BY BEING SANDWICHED BETWEEN TWO STAINLESS STEEL FENDER WASHERS, WITH A 1/2" MINIMUM STAINLESS STEEL BOLT. THE TETHER SHALL BE OF SUFFICIENT LENGTH TO HAVE A MINIMUM OF 6" SLACK WHEN ATTACHED BETWEEN THE SIGN AND THE SIGN BASE. ALL TETHERS SHALL BE THE SAME LENGTH.
5. ALL SIGNS SHALL BE ORIENTED SUCH THAT THE LONGITUDINAL CENTERLINE OF THE SIGN IS PERPENDICULAR TO THE RESPECTIVE TAXIWAY/RUNWAY CENTERLINE, UNLESS OTHERWISE NOTED.
6. THE ACTUAL SIGN DIMENSIONS MAY VARY FROM THOSE SHOWN. THE BASE SIZE SHALL BE ADJUSTED TO MATCH THE SIGN.
7. THE CONCRETE SHALL COMPLY WITH SPECIFICATION P-610.
8. CONCRETE STEEL REINFORCEMENT SHALL BE TYPE ASTM A615 GRADE 60. ALL REINFORCEMENT SHALL HAVE A 2" MINIMUM CONCRETE COVER. REINFORCEMENTS MAY BE ADJUSTED TO MISS INTERFERENCES.
9. ALL ANCHOR BOLTS SHALL BE A-36 STEEL, HOT DIP GALVANIZED WHEN CAST INTEGRALLY WITH THE CONCRETE PAD OR STAINLESS STEEL EXPANSION ANCHORS.
10. THE BONDING CONDUCTOR AND SIGN TETHER SHALL NOT BE ATTACHED AT THE SAME ANCHOR BOLT. AN APPROVED MECHANICAL OR COMPRESSION LUG SHALL BE USED TO CONNECT THE BONDING CONDUCTOR TO THE SIGN FLANGE AND SIGN.
11. LAYOUT OF SIGN LEGENDS BY SIGN MANUFACTURER SHALL BE APPROVED BY THE ENGINEER PRIOR TO FABRICATION.
12. INSTALL SIGNS AND FOUNDATIONS LEVEL, PROVIDE GRADING AS REQUIRED. NO ADDITIONAL PAYMENT WILL BE MADE FOR SIGN GRADING.
13. BID ITEM FOR LIGHTED SIGNS SHALL INCLUDE PVC CONDUIT EXTENDED ONE FOOT BEYOND CONCRETE PAD.
14. LOCATION GIVEN FOR SIGNS DENOTES THE MIDDLE OF THE SIGN EDGE ON THE SIDE CLOSEST TO THE RUNWAY OR TAXIWAY EDGE.

ISSUED FOR BID

NAME	REG. NO.	DATE
ZACHARY C. AMBARIANTZ	PE - E 19382	5/25/2023

FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

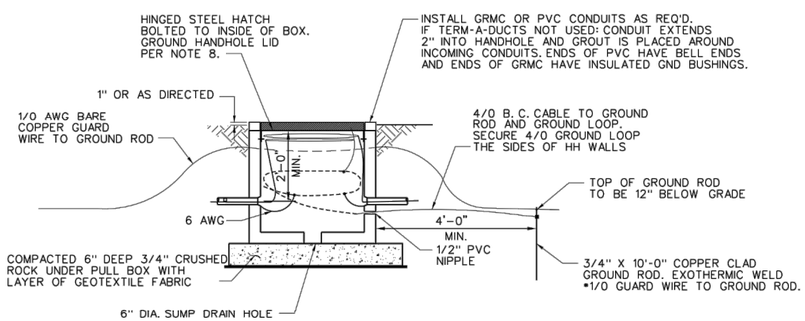
RECONSTRUCTION OF TAXIWAY F

ELECTRICAL DETAILS

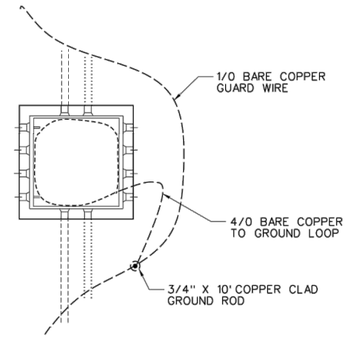
SHEET NAME: E252
SHEET NO.: 88 of 89
DRAWING NO.: 1673-DOA

AIP PROJECT NO.	JVIATION PROJ. NO.	SPEC. NO.	COUNTY PROJ. NO.
3-06-0179-043-2023	2023.OXR.01	DOA 23-03	OXR-150

Plotted May 25, 2023 @ 9:51 AM by Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\100-OXR-043-E250-E253-ELEC-DETL.dwg



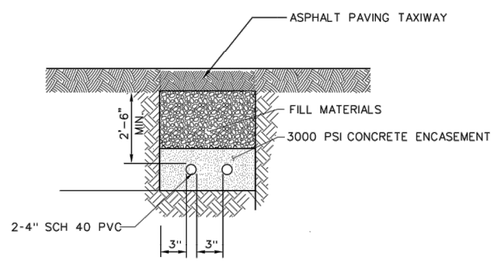
1 HANDHOLE DETAIL
SCALE: N.T.S



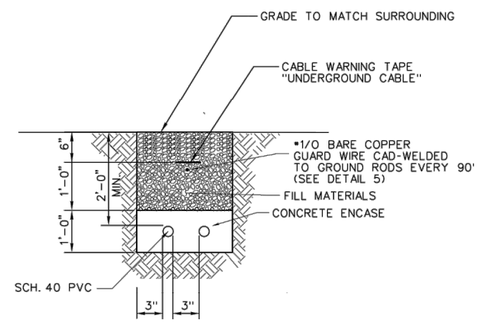
2 TYPICAL HANDHOLE GROUNDING
SCALE: N.T.S

HANDHOLE NOTES:

1. ACTUAL HANDHOLE SIZES ARE PER LAYOUT PLAN.
2. INSTALL 6 INCH COMPACTED GRAVEL PER SPECIFICATION UNDER THE HANDHOLE TO INSURE UNIFORM DISTRIBUTION OF SOIL PRESSURE AND DRAINAGE.
3. CONDUITS ENTERING HANDHOLE SHALL BE FITTED WITH BELL ENDS, NEATLY GROUT AROUND CONDUIT ENTRANCE.
4. PROVIDE CABLE RACKS/HOOKS AND LOOP EACH CABLE NEATLY INSIDE THE HANDHOLE (2 PER SIDE).
5. ALL FASTENERS AND HARDWARE SUCH AS HINGES, SPRINGS, ETC. SHALL BE HOT DIPPED GALVANIZED.
6. ALL CABLES TO BE IDENTIFIED AND TAGGED (WITH BRASS TAGS OR EQUAL) IN EACH HANDHOLE PER FAA-C-1391 LATEST REVISION.
7. APPLY EXPANDABLE FOAM DUCT SEALANT OR EQUIV. AT OPENINGS TO PREVENT WATER AND GAS FROM ENTERING HANDHOLE.
8. HANDHOLE COVERS TO BE MACHINE ENGRAVED, LABEL "FAA POWER"



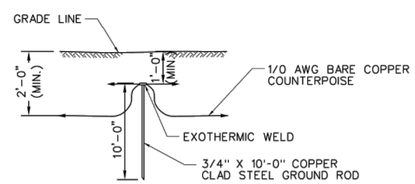
3 TRENCH UNDER TAXIWAY (TYP)
FOR 2-4" SCH 40 PVC



4 TRENCH DETAIL (TYP)
FOR 2-2" PVC SCH. 40

GROUNDING/BONDING NOTES:

1. INSTALL A 4/0 COPPER GROUND LOOP INSIDE HANDHOLE. SECURE WIRES TO THE HANDHOLE WALLS
2. BOND ALL CABLE SHIELDS (OR STEEL INTERLOCKED ARMOR IF USED) TO THE BUS BAR IN ACCORDANCE WITH THE MANUFACTURER'S DIRECTIONS. BOND OTHER METALLIC BODIES TO THE BUS BAR WITH A MINIMUM 6 AWG BARE COPPER CONDUCTOR USING MECHANICAL CONNECTIONS AND TWO-HOLE LUGS.
3. CONNECT AND EXOTHERMICALLY WELD THE 1/0 AWG GUARD WIRES TO THE OUTSIDE GROUND RODS ON EACH SIDE OF THE HANDHOLE, ENSURING 10 FEET DISTANCE FROM THE OUTSIDE OF THE HANDHOLE TO THE GROUND ROD.
4. IF FEASIBLE, ALL CONNECTIONS, SWEEP, OR CURVES IN THE GROUNDING SYSTEM SHALL BE SMOOTH AND SHALL BE OF AT LEAST 8 INCH RADIUS NO MATTER WHAT THE ORIENTATION (VERTICAL OR HORIZONTAL).
5. USE COPPER GROUND LUGS ON COPPER BUS BAR.
6. PVC CONDUIT ENDS DO NOT NEED TO BE GROUNDED.
7. GRSC ENDS SHALL BE GROUNDED WITH GROUND BUSHINGS DAISY CHAINED TO THE BUS BAR USING A #6 GREEN.
8. GROUND LID WITH #6 STRANDED BARE COPPER WIRE USING MECHANICAL CONNECTIONS AND TWO-HOLE LUGS.



5 GROUND ROD DETAIL
SCALE: N.T.S

GUARD WIRE AND GROUND ROD NOTES:

1. THE GUARD WIRE SHOULD BE LOCATED 8 IN BELOW THE FINISHED GRADE, AT MINIMUM HEIGHT OF 10 IN ABOVE THE DUCT, AND SHALL RUN PARALLEL TO THE DUCTBANK PATH THAT IS BEING PROTECTED
2. GUARD WIRES SHALL BE BONDED TO THE EES AT EACH END, AND TO GROUND RODS LOCATED AT APPROXIMATELY 90-FT INTERVALS ALONG THE GUARD WIRE PATH USING EXOTHERMIC WELDS. THE SPACING BETWEEN GROUND RODS MUST VARY BY 10-20 PERCENT TO PREVENT RESONANCE. INSTALL THE GROUND RODS APPROXIMATELY 6 FT ON EITHER SIDE OF THE DUCTBANK TRENCH

REV	APPROVED DATE	DESCRIPTION	JCN	REDLINE DATE	APVD

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

OXNARD CALIFORNIA

REVIEWED BY | SUBMITTED BY | APPROVED BY
DESIGNED | ISSUED BY | DATE | JCN
DRAWN | DRAWING NO | REV
CHECKED

ISSUED FOR BID

REGISTERED PROFESSIONAL ENGINEER ZACHARY C. AMBARIANTZ No. E19382 05/25/2023 ELECTRICAL STATE OF CALIFORNIA

ZACHARY C. AMBARIANTZ PE - E 19382 5/25/2023
NAME REG. NO. DATE
FOR AND ON BEHALF OF JVIATION, A WOOLPERT COMPANY

JVIATION®
A WOOLPERT COMPANY

OXNARD AIRPORT
OXNARD,CA

COUNTY of VENTURA
Department of Airports

DES: T.A.R.
DR: R.L.B.
CH: C.L.G.
APP: J.D.I.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION
1	J.D.I.	5/25/2023	ISSUED FOR BID

Exhibit 1

RECONSTRUCTION OF TAXIWAY F

ELECTRICAL DETAILS

SHEET NAME E253
SHEET NO. 89 of 89
DRAWING NO. 1674-DOA

AIP PROJECT NO. 3-06-0179-043-2023 | JVIATION PROJ. NO. 2023.OXR.01 | SPEC. NO. DOA 23-03 | COUNTY PROJ. NO. OXR-150

Plotted May 25, 2023 @ 9:51 AM by Bell, Robert
L:\OXR\OXR AIP 043 Taxiway F Reconstruction\CAD\PLANS\100-OXR-043-E250-E253-ELEC-DETL.dwg