# CONTRACT DOCUMENTS AND SPECIFICATIONS

**Schedule I**

**Helicopter Parking Area**

**AIP Project No. 3-06-0012-021-2022**

# Auburn Municipal Airport

# Auburn, California

**Sponsored By:**

**City of Auburn**

**Federal Aviation Administration**

Jacobs

**Issued for Bid**

**February 24, 2022**


**3257 East Guasti Road, Suite 120**
**Ontario, California 91761**

**Phone** **909-974-2700**
**Fax** **909-974-2759**

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**A.I.P. 3-06-0012-021-2022**
**IN THE CITY OF AUBURN, CALIFORNIA**

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**SECTION A**
**SCHEDULE I – HELICOPTER PARKING AREA**
**A.I.P. 3-06-0012-021-2022**
**IN THE CITY OF AUBURN, CALIFORNIA**

# NOTICE INVITING SEALED BIDS

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**NOTICE INVITING SEALED BIDS**
**SCHEDULE I – HELICOPTER PARKING AREA**
**A.I.P. 3-06-0012-021-2022**
**IN THE CITY OF AUBURN, CALIFORNIA**

PUBLIC NOTICE IS HEREBY GIVEN that the City of Auburn as AGENCY, invites sealed bids for the above stated project and will receive such bids in the office of the City Clerk, 1225 Lincoln Way, Room 8, Auburn, CA 95603 up to the hour of 1:30 p.m. on the **March 30, 2022**. The bids will be publicly opened and read at 1:30 p.m. on the **March 30, 2022**, in Room 8.

The recent growth in helicopter air traffic at the Auburn Municipal Airport illustrates need to provide an adequate helicopter parking area with improved operational safety and efficiency. Completion of this project will meet the Airport's forecasted helicopter demand by increasing the parking area capacity from two to four helicopter parking spots. This helicopter parking area site provides a compatible location that will minimize interactions with fixed-wing aircraft once the existing section of Taxiway D south of Taxiway A is removed (separate project) at a later time.

**The Work to be performed shall be completed within 90 calendar days from the date of the Notice to Proceed.**

Contract documents are available for downloading free of charge through the Virtual Project Manager services of CIPlist.com. You must sign up to use this service which will automatically inform you of updates and amendments. Plans and specifications are available for download at http://www.ciplist.com/plans/. Sign up or sign in to download the project documents including bidder's list etc. Hard copies are not available from the City. In accordance with the provisions of California Public Contract Code § 3300, and Business and Professions Code § 7028.15(e), the Agency has determined that the contractor shall posses a valid Class A contractor's license or Class C-10 contractor's license at the time that the contract is awarded. Failure to possess the specified license shall render a bidder's bid as non-responsive and shall bar award of the contract to any bidder not possessing the specified license at the time of the award.

**CONTRACTORS ARE REQUIRED BY LAW TO BE LICENSED AND REGULATED BY THE CONTRACTORS' STATE LICENSE BOARD. ANY QUESTIONS CONCERNING A CONTRACTOR MAY BE REFERRED TO THE REGISTRAR, CONTRACTORS' STATE LICENSE BOARD, P.O. BOX 2600, SACRAMENTO, CALIFORNIA 95826.** At the time the contract is awarded, the contractor shall be properly licensed in accordance with the laws of this state. The first payment for work or material shall not be made unless and until the Registrar of Contractors verifies to the Agency that the records of the Contractors' State License Board indicate that the contractor was properly licensed at the time the contract was awarded. Any bidder or contractor not so licensed shall be subject to all legal penalties imposed by law including, but not limited to, any appropriate disciplinary action by the Contractors' State Board. Failure of the bidder to obtain proper and adequate licensing for an award of a contract shall constitute a failure to execute the contract and shall result in the forfeiture of the security of the bidder. (Public Contract Code § 20103.5)

Bids must be prepared on the approved bid forms in conformance with INSTRUCTIONS TO BIDDERS and submitted in the envelopes provided, sealed and plainly marked on the outside:

"SEALED BID FOR HELICOPTER PARKING AREA",
A.I.P. 3-06-0012-021-2022
DO NOT OPEN WITH REGULAR MAIL"

The bid must be accompanied by a bid guarantee in the amount of 10% of the total bid by 1:30 p.m. ON THE DATE ADVERTISED FOR THE OPENING OF BIDS. More specifically, pursuant to Public Contract Code §§ 20170 and 20171, all bids for the project shall be presented, under sealed cover and shall be accompanied by one of the following forms of bidder's security in the amount of ten percent (10%) of the bid: (a) cash; (b) a cashier's check made payable to the City of Auburn; (c) a certified check made payable to the City of Auburn; or (d) a bidder's bond executed by an admitted surety insurer made payable to the City of Auburn. Such security shall be forfeited should the successful bidder to whom the contract is awarded fails to timely execute the contract and to deliver the necessary bonds and insurance certificates as specified in the contract documents.

To the extent applicable, at any time during the term of the Agreement for the proposed project, the successful bidder may, at its own expense, substitute securities equivalent to the amount withheld as retention (or the retained percentage) in accordance with Public Contract Code § 22300.

Pursuant to California Civil Code § 3247, a payment bond is required to be submitted for all projects estimated in excess of $25,000.00

The Agency has determined that the proposed project is a public work subject to the provisions of Labor Code § 1720 thereby requiring the Contractor to pay the prevailing wage rates for all work performed under the Contract. Accordingly, the proposed project is subject to compliance monitoring and enforcement by the California Department of Industrial Relations.

The Agency reserves the right to reject any and all bids.

A Site Pre-Bid Conference will be held on **March 15, 2022** at 2:00pm. The City will not accept written or verbal questions beyond **March 22, 2022** at 5:00 p.m.

If you have any questions, please contact Alan Mitchell, P.E. City Engineer amitchell@auburn.ca.gov.

BY ORDER OF the City Council of the City of Auburn, California.

**SECTION B**
**SCHEDULE I – HELICOPTER PARKING AREA**
**A.I.P. 3-06-0012-021-2022**
**IN THE CITY OF AUBURN, CALIFORNIA**

# INSTRUCTIONS TO BIDDERS

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**INSTRUCTIONS TO BIDDERS**
**SCHEDULE I – HELICOPTER PARKRING AREA**
**A.I.P. 3-06-0012-021-2022**
**IN THE CITY OF AUBURN, CALIFORNIA**

## B1.01 INSPECTION OF SITE OF WORK

Bidders are required to inspect the site of the work in order to satisfy themselves, by personal examination or by such other means as they may prefer, of the location of the proposed work and as to the actual conditions of and at the site of work. If, during the course of his/her examination, a bidder finds facts or conditions which appear to him/her to conflict with the letter or spirit of the contract documents, or with any other data furnished him/her, he/she may apply to the Agency in writing in accordance with **B1. 04 INTERPRETATION OF CONTRACT DOCUMENTS** for additional information and explanation before submitting his/her bid.

The submission of a proposal by the bidder shall constitute the acknowledgment that, if awarded the contract, he/she has relied and is relying on his/her own examination of (a) the site of the work, (b) the access to the site, and (c) all other data, matters, and things requisite to the fulfillment of the work and on his/her own knowledge of existing services and utilities on and in the vicinity of the site of the work to be constructed under the contract, and not on any representation or warranty of the Agency. No claim for additional compensation will be allowed which is based upon a lack of knowledge of these items.

## B1.02 EXAMINATION OF CONTRACT DOCUMENTS

Each bidder shall thoroughly examine and be familiar with legal and procedural documents, general conditions, specifications, drawings and addenda (if any). The submission of a proposal shall constitute an acknowledgment upon which the Agency may rely that the bidder has thoroughly examined and is familiar with the contract documents. The bidders' attention is directed to the need, if any, for special invoicing for this project. The failure or neglect of a bidder to receive or examine any of the contract documents shall in no way relieve him/her from any obligations with respect to his/her proposal or to the contract. No claim for additional compensation will be allowed which is based upon a lack of knowledge of any contract document.

## B1.03 CONTRACT PERIOD/CONSTRUCTION COMPLETION DATE

Bidder's attention is called to the provisions set forth in **SECTION E, STANDARD SPECIFICATIONS**, particularly those pertaining to the contract period and liquidated damages for avoidable delays.

The Contractor shall begin work within fifteen (15) calendar days after the date of the Notice to Proceed, and shall diligently prosecute said work to completion before the expiration **10 WORKING DAYS.** The Contractor shall pay to the Agency the sum of **$500.00** per day, for each and every calendar days delay in finishing the work in excess of the number of working days prescribed above.

## B1.04 INTERPRETATION OF CONTRACT DOCUMENTS

No oral interpretations will be made to any bidder as to the meaning of the contract documents. Requests for an interpretation shall be made in writing and delivered to the Agency at least seven (7) days before the time announced for opening the proposals. Interpretations by the Agency will be in the form of addenda to the contract documents and, when issued, will be sent as promptly as is practical to all parties to whom the contract documents have been issued. Agency makes no guarantee that all bidders will

receive all addenda. Copies of addenda will be made available for inspection at the office where contract documents are on file for inspection as indicated on the Invitation for Bids. All such addenda shall become part of the contract. All questions shall be addressed to Alan Mitchell, P.E. City Engineer amitchell@auburn.ca.gov.

## B1.05 SOIL INFORMATION

Soil reports has been prepared by a geotechnical engineer for this project.

## B1.06 PROPOSAL

Proposals shall be made on the forms enclosed in **SECTION C** of these specifications with or without removal from the bound contract documents. All proposals shall give the prices proposed, both in words and in numbers, shall give all other information requested herein, and shall be signed by the bidder or his/her authorized representative, with his/her address. If the proposal is made by an individual, his/her name, signature and mailing address must be shown; if made by firm or partnership, the name and mailing address of the firm or partnership and the signature of at least one of the general partners must be shown; if made by a corporation, the proposal shall show the name of the state under the laws of which the corporation is chartered, the name and mailing address of the corporation, and the name and title of the person who signs on behalf of the corporation. If the proposal is made by a corporation, a certified copy of the bylaws or resolution of the board of directors of the corporation shall be furnished demonstrating the authority of the officer signing the proposal to execute contracts on behalf of the corporation.

Each proposal shall be enclosed in a sealed envelope, labeled as specified in **SECTION A - NOTICE INVITING SEALED BIDS**. Bidders are warned against making erasures or alterations of any kind, and proposals which contain omissions, erasures or irregularities of any kind may be rejected. No oral, telegraphic or telephonic proposals or modifications will be considered.

In conformance with the Business and Profession Code, § 7028.15, the Contractor must state clearly his/her license number and expiration date. In addition, he/she shall sign a statement that these representations were made under the penalty of perjury. This statement shall be made on the **EXPERIENCE STATEMENT** in **SECTION C**.

The contractor will be required to pay prevailing wage pursuant to California Law, including California Labor Code §§ 1770 et seq. Copies of the prevailing rate of per diem wages are on file at the offices of the Agency.

## B1.07 ADDENDA

Each proposal shall include specific acknowledgment in the space provided on **SECTION C - BID PROPOSAL** of receipt of all addenda issued during the bidding period. Failure to so acknowledge may result in the proposal being rejected as not responsive.

## B1.08 BID PRICES

Bid prices shall include everything necessary for the completion of construction and fulfillment of the contract including, but not limited to, furnishing all materials, equipment, tools, plant and other facilities and all management, superintendence, labor and services, except as may be provided otherwise in the contract documents. In the event of a difference between a price quoted in words and a price quoted in numbers for the same quotation, the words shall be the amount bid.

In preparing bid prices, bidder represents that he/she has carefully examined the Contract Documents and the site where the work is to be performed and that he/she has familiarized himself with all local conditions and federal, state and local laws, ordinances, rules, and regulations that may affect the performance of the work in any manner. The bidder further represents that he/she has studied all surveys and investigation reports about subsurface and physical conditions pertaining to the job site, that he/she has performed such additional surveys and investigations as he/she deems necessary to complete the work at his/her bid price, and that he/she has correlated the results of all such data with the requirements of the Contract Documents. The submittal of a bid shall be conclusive evidence that the bidder has investigated and is satisfied as to the conditions to be encountered, including locality, uncertainty of weather and all other contingencies, and as to the character, quality, quantities, and scope of the work.

The plans and specifications for the work show subsurface conditions or otherwise hidden conditions as the Design Engineer supposes or believes them to exist, but is not intended or to be inferred that the conditions as shown thereon constitute a representation that such conditions are actually existent. Except as otherwise specifically provided in the Contract Documents, the Agency, the Design Engineer and their consultants or agents shall not be liable for any loss sustained by the Contractor as a result of any variance of such conditions as shown on the plans and the actual conditions revealed during the progress of the work or otherwise.

The Contractor shall perform an independent take-off of the plans and bid accordingly. Quantities listed in the **BID SCHEDULE** in **SECTION C** are intended only as a guide for the Contractor as to the anticipated order of magnitude of work. Contractor shall be responsible for verifying all estimated quantities. Contractor will be reimbursed for the quantity of items actually installed as required by the Contract Documents and shown on the plans to neat line and grade.

The Contractor will not be reimbursed for unauthorized work performed outside of that required by the Contract Documents.

## B1.09 TAXES

No mention shall be made in the proposal of sales tax, use tax, or any other tax, as all amounts bid will be deemed and held to include any such taxes which may be applicable.

## B1.10 RECOGNITION OF BONDING COMPANIES

All bonding companies used by the Contractor in this contract must be recognized by the Federal Government within Circular 570. All proposals or contracts received that include bonds posted by bonding companies not recognized in Circular 570 will result in the disqualification of the bid proposal and forfeiture of the bid bond.

## B1.11 QUALIFICATION OF BIDDERS

Each bidder shall be skilled and regularly engaged in the general class or type of work called for under the contract. A statement setting forth his/her experience shall be submitted by each bidder on the **EXPERIENCE STATEMENT** form provided in **SECTION C**.

Each bidder shall possess a valid Contractor's License issued by the Contractor's State License Board at the time his/her bid is submitted. The class of license shall be applicable to the work specified in the contract. Each bidder shall also have no less than five (5) years experience in the magnitude and character of the work bid.

It is the intention of the Agency to award a contract to a bidder who furnished satisfactory evidence that he/she has the requisite experience and ability, and that he/she has sufficient capital, facilities, and plant to enable him/her to prosecute the work successfully and properly, and to complete it within the time stated in the contract.

To determine the degree of responsibility to be credited to the bidder, the Agency will weigh any evidence that the bidder has performed satisfactorily other contracts of like nature, magnitude and comparable difficulty and comparable rates of progress. If in the opinion of the Agency, a bidder is determined to be insufficiently qualified, then that bidder will not be considered for award of the contract.

## B1.12 DESIGNATION OF SUPPLIERS AND SUBCONTRACTORS

Each proposal shall have listed on the **DESIGNATION OF SUPPLIERS AND SUBCONTRACTORS** form provided in **SECTION C** the name and address of each subcontractor to whom the bidder proposes to sublet portions of the work in excess of one-half percent of the total amount of his/her bid. For the purpose of this paragraph, a subcontractor is defined as one who contracts with the Contractor to furnish materials and labor, or labor only for the performance of work at the site of the work or who will specially fabricate a portion of the work off the site pursuant to detailed drawings in the contract documents.

Public Contract Code § 4104 requires all bidders to list subcontractors who will perform work in excess of ½% of the total bid, or in the case of streets and highways, ½% or $10,000, whichever is greater.

Public Contract Code § 6109 prohibits a contractor from performing work with a subcontractor who is debarred pursuant to Labor Code §§ 1777.1 or 1777.7.

## B1.13 PROPOSAL GUARANTEE

The proposal shall be accompanied by a proposal guarantee bond duly completed on the form provided herewith by a guarantee company authorized to carry on business in the State of California for payments to the Agency in the sum of at least 10% of the total amount of the bid proposal, or alternatively by a certified or cashier's check payable to the Agency, or cash, in the sum of at least 10% of the total amount of the bid proposal. The amount payable to the Agency under the proposal guarantee shall be forfeited to the Agency in case of failure or neglect of the bidder to furnish, execute and deliver to the Agency the required bonds, evidence of insurance and to enter into, execute and deliver to the Agency the agreement on the form provided herewith, within ten (10) days after being notified in writing by the Agency that the award has been made and the agreement is ready for execution.

## B1.14 MODIFICATION OF PROPOSAL

A modification of a bid proposal already received will be considered only if the modification is received before the time announced for the opening of bids. All modifications shall be made in writing, executed and submitted in the same form and manner as the original bid proposal.

## B1.15 WITHDRAWAL OF PROPOSAL

A proposal may be withdrawn by a written request signed by the bidder. Such requests must be delivered to the Agency's designated official prior to the bid opening hour stipulated in **SECTION A – NOTICE INVITING SEALED BIDS**. Proposals may not be withdrawn after that time without forfeiture of the proposal guarantee. The withdrawal of a proposal will not prejudice the right of the bidder to submit a new proposal, providing there is time to do so.

## B1.16 POSTPONEMENT OF BID OPENING

The Agency reserves the right to postpone the date and time for opening of bids at any time prior to the date and time announced in **SECTION A–NOTICE INVITING SEALED BIDS**.

## B1.17 DISQUALIFICATION OF BIDDERS

If there is reason to believe that collusion exists among the bidders, none of the bids of the participants in such collusion will be considered. In the event that any bidder acting as a prime Contractor has an interest in more than one proposal, all such proposals will be rejected, and the bidder will be disqualified. This restriction does not apply to subcontractors or suppliers who may submit quotations to more than one bidder, and while doing so, may also submit a formal proposal as a prime Contractor.

## B1.18 REJECTION OF PROPOSALS

The Agency reserves the right to reject any and all proposals, to waive any irregularity, and to reject any proposals which are incomplete, obscure or irregular; any proposals which omit a bid on any one or more items on which bids are required; which omit unit prices if unit prices are required; in which unit prices are unbalanced in the opinion of the Agency; which are accompanied by insufficient or irregular bid security; or which are from bidders who have previously failed to perform properly or to timely complete contracts of any nature.

## B1.19 AWARD OF CONTRACT

The Contract will be awarded, if at all, to the lowest responsible and responsive bidder, whose bid proposal is not rejected for cause by the Agency. However, until an award is made, the Agency reserves right will be reserved to reject any or all bids, and to waive technical errors or discrepancies, if to do so is deemed to best serve the interests of the Agency. In no event will an award be made until all necessary investigations are made as to the responsibility and qualifications of the bidder to whom it is proposed to make such an award.

Each bidder's attention is directed to the possibility that the award of the project may be delayed for various reasons. The Agency reserves the right to delay the award of the project for 45 calendar days. After 45 calendar days, the low bidder may at any time request release from its bid without penalty.

The acceptance of a proposal will be evidenced by a Notice of Award of Contract in writing, delivered by mail to the bidder whose proposal is accepted. No other act of the Agency shall constitute acceptance of a proposal. The award of contract shall obligate the bidder whose proposal is accepted to furnish a performance bond, payment bond and maintenance bond, as well as evidence of insurance and to execute the contract set forth herein.

## B1.20 RETURN OF PROPOSAL GUARANTEES

Within ten (10) calendar days after the bids are opened, the Agency will release the proposal guarantees accompanying the proposals which are not to be considered in making the award. Proposal guarantees for the two lowest bidders will be held until the contract has been fully executed, after which they will be returned to the respective bidders.

## B2.21 EXECUTION OF CONTRACT

The contract agreement shall be executed in duplicate by the successful bidder and returned, together with the contract bonds and evidence of insurance, within ten (10) calendar days after the notification of the contract award by the Agency in writing. In case of failure of the successful bidder to execute the contract agreement within ten (10) calendar days after such notice, or any subsequent extension approved by Agency, the Agency at its option may consider the bidder in default, in which case the bid bond or proposal guarantee accompanying the bid shall become the property of the Agency. After execution by the Agency, one original contract shall be returned to the Contractor.

## B1.22 FLEXIBILITY OF BID SCHEDULE

It is the intent of the Agency to award a contract to the lowest responsible and responsive bidder and the flexibility shown in the bid schedule is necessary to ensure a project within the Agency's budget limits and constraints.

**SECTION C**
**SCHEDULE I – HELICOPTER PARKING AREA**
**A.I.P. 3-06-0012-021-2022**
**IN THE CITY OF AUBURN, CALIFORNIA**

## PROPOSAL INFORMATION AND DOCUMENTS

**BID PROPOSAL**
**BID SCHEDULE**
**BID BOND**
**BID GUARANTEE**
**BIDDER INFORMATION**
**EXPERIENCE STATEMENT**
**DESIGNATION OF SUPPLIERS AND SUBCONTRACTORS**
**NON-COLLUSION AFFIDAVIT**
**DISADVANTAGED BUSINESS UTILIZATION COMMITMENT**
**CERTIFICATION OF NONSEGREGATED FACILITIES**
**EQUAL EMPLOYMENT OPPORTUNITY REPORT STATEMENT**
**BUY AMERICAN - STEEL AND MANUFACTURED PRODUCTS**
**DEBARMENT AND SUSPENSION CERTIFICATION**
**NONLOBBYING CERTIFICATION FOR FEDERAL-AID CONTRACTS**

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**BID PROPOSAL**
**SCHEDULE I – HELICOPTER PARKING AREA**
**A.I.P. 3-06-0012-021-2022**
**IN THE CITY OF AUBURN, CALIFORNIA**

The undersigned, as bidder, declares that he/she has examined all of the contract documents and specifications contained in this project manual for the above referenced project, and that he/she will contract with the Agency on the form of contract provided herewith to do everything necessary for the fulfillment of this contract at the price, and on the terms and conditions therein contained.

The following are included and are to be considered as forming a part of this proposal: **BID PROPOSAL**, **BID SCHEDULE**, **BID BOND, NONCOLLUSION AFFIDAVIT TO ACCOMPANY PROPOSAL, BID GUARANTEE** (if submitted in lieu of Bid Bond), **BIDDER INFORMATION**, **EXPERIENCE STATEMENT**, **DESIGNATION OF SUPPLIERS & SUBCONTRACTORS**, **BIDDER'S STATEMENT REGARDING INSURANCE COVERAGE**, and **STATEMENT REGARDING CONTRACTOR'S LICENSING LAWS**.

Contractor acknowledges receipt and inclusion of addenda _____ to _____ into this bid proposal and the contract documents.

Attached is a Bid Bond duly completed by a guarantee company authorized to carry on business in the State of California in the amount of at least 10% of the total amount of this proposal, or alternatively, there is attached a certified or cashier's check payable to the Agency or evidence of a cash payment to the Agency, in the amount of at least 10% of the total amount of our proposal.

If this proposal is accepted, we agree to sign the contract form and to furnish the Performance Bond and the Payment Bond (each to be 100% of the bid amount), the Maintenance Bond (to be 50% of the bid amount), and the required evidences of insurance within ten (10) calendar days after receiving written Notice of Award of Contract.

We further agree if our proposal is accepted and a contract for the performance of the work is entered into with the Agency, to so plan the work and to prosecute it with such diligence that all of the work shall be completed within the time stipulated in **SECTION E - TIME OF COMPLETION**.

NAME OF BIDDER:

MAILING ADDRESS:

STATE OF INCORPORATION:

AUTHORIZED SIGNATURE:

TITLE:

DATE:

(If Company is a Corporation, provide corporate resolution per **B 1.06 PROPOSAL.**)

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**BID SCHEDULE**
**SCHEDULE I – HELICOPTER PARKING AREA**
**A.I.P. 3-06-0012-021-2022**
**IN THE CITY OF AUBURN, CALIFORNIA**

The cost of all labor, services, material, equipment and installation necessary for the completion of the work itemized under this schedule, even though not shown or specified, shall be included in the unit price for the various items shown herein. For a description of the work associated with each bid item, see plan drawings and **SECTION J–TECHNICAL SPECIFICATIONS**. The Agency reserves the right to increase or decrease the quantity of any item or omit items as may be necessary, and the same shall in no way affect or void the contract, except that appropriate additions or deductions from the contract total price will be made at the stipulated unit price in accordance with these Contract Documents.

The Agency reserves the right to reject any and all bids, to waive any informality in a bid, and to make awards in the interest of the Agency.

The Contractor shall perform an independent take-off of the plans and bid accordingly. Quantities listed in this Bid Schedule are intended only as a guide for the Contractor as to the anticipated order of magnitude of work. The Contractor shall be responsible for verifying all estimated quantities. The Contractor will be reimbursed for the quantity of items actually installed as required by the Contract Documents, including addenda, and shown on the plans to neat line and grade.

The Contractor will not be reimbursed for work performed for his convenience, or as required to adapt to field conditions, or for unauthorized work performed outside of that required by the Contract Documents.

The Contractor shall be responsible for calculating and providing totals for the bid schedule. The proposal schedule shall include all costs for labor, services, material, equipment, and installation associated with completing the work in place per the plans, specifications and details.

NAME OF BIDDER:_____
CONTRACTOR'S LICENSE NO.:_____
AUTHORIZED SIGNATURE:_____
TITLE:_____
DATE:_____

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## SCHEDULE I – HELICOPTER PARKING AREA
## A.I.P. 3-06-0012-021-2022
## IN THE CITY OF AUBURN, CALIFORNIA

| ITEM NO. | DESIGNATION | Unit | QTY | Cost | |
|---|---|---|---|---|---|
| | | | | Unit Cost | Total |
| C-100-14.1 | Contractor Quality Control Program (CQCP) | LS | 1 | | |
| C-102-5.1 | Erosion Control | LS | 1 | | |
| C-105-6.1 | Mobilization | LS | 1 | | |
| P-101-5.1 | Concrete Pavement Removal | SY | 50 | | |
| P-101-5.2 | Asphalt Pavement Removal (Complete) | SY | 1297 | | |
| P-101-5.3 | Asphalt Pavement Removal (Partial) | SY | 280 | | |
| P-101-5.4 | Remove Elevated Light and Foundation in Turf, (Complete) | EA | 2 | | |
| P-101-5.5 | Remove Electrical Duct Bank | LF | 360 | | |
| P-152-4.1 | Unclassified Excavation | CY | 1000 | | |
| P-152-4.2 | Unsuitable Excavation | CY | 165 | | |
| P-152-4.3 | Subgrade Preparation | SY | 2,600 | | |
| P-209-5.1 | Crushed Aggregate Base Coarse | CY | 800 | | |
| P-209-5.2 | Separation Geotextile | SY | 2,600 | | |
| P-401-8.1 | Bituminous Paving Course | TON | 650 | | |
| P-401-8.2 | Modified Bituminous Material (PG64-28) | TON | 50 | | |
| P-501-8.1 | Portland Cement Concrete Pavement (6") | SY | 580 | | |
| P-603-5.1 | Emulsified Asphalt Tack Coat | GAL | 310 | | |
| P-604-6.1 | Compression Joint Seals for Concrete Pavements | LF | 576 | | |
| P-605-5.1 | Joint Seal Between Asphalt and Concrete | LF | 576 | | |
| P-620-5.1 | Permanent Pavement Marking | SF | 8,254 | | |
| P-620-5.2 | Temporary Pavement Marking | SF | 8,254 | | |
| F-162-5.1 | Install Chain-Link Fence with Slats | LF | 173 | | |
| T-901-5.1 | Seeding | AC | 3 | | |
| L-108-5.1 | Install #8 AWG, 5000V, L-824 Type C Cable | LF | 825 | | |
| L-108-5.2 | Install #6 AWG, Bare Copper Counterpoise | LF | 260 | | |
| L-108-5.3 | Install #2 AWG, 600V, XHHW-2 | LF | 783 | | |
| L-108-5.4 | Install #4 AWG, 600V, XHHW-2 | LF | 456 | | |
| L-110-5.1 | Install 1-Way, 2-Inch PVC Conduit in Turf (DEB) | LF | 179 | | |
| L-110-5.2 | Install 1-Way, 2-inch PVC Conduit (CE) | LF | 152 | | |
| L-125-5.1 | Install L-861T (L), LED, Taxiway Edge Light on New Base, Complete | EA | 9 | | |
| L-125-5.2 | Install L-852T (L), LED, In-Pavement Taxiway Edge Light on New Base, Complete | EA | 8 | | |
| L-125-5.3 | Install L-853 Retroreflective Taxiway Edge Marker - Surface Mounted | EA | 24 | | |
| L-125-5.4 | Install Duplex Convenience Receptacle with Weatherproof Cover | EA | 4 | | |
| L-125-5.5 | Install L-858, Size 1, Style 4, Stake Mounted Guidance Sign | EA | 2 | | |

The Contractor shall be responsible for calculating and providing unit prices for the schedule. The proposal schedule shall include all costs for services, labor, materials, equipment, and installation associated with completing the work in place per the plans, specifications and details.

**Bid Schedule I Total: $_____**

**Bid Schedule I Total (in words):_____**

_____

_____

_____

(Company Name of Bidder) (Date)

**BID BOND**
**SCHEDULE I – HELICOPTER PARKING AREA**
**A.I.P. 3-06-0012-021-2022**
**IN THE CITY OF AUBURN, CALIFORNIA**

KNOW ALL MEN BY THESE PRESENTS that Bidder _____, as PRINCIPAL, and _____, as SURETY, are held and firmly bound unto the City of Auburn as AGENCY, in the penal sum of _____ dollars ($_____), which is ten percent (10%) of the total amount bid by PRINCIPAL to AGENCY for the above stated project, for the payment of which sum, PRINCIPAL and SURETY agree to be bound, jointly and severally, firmly by these presents.

The SURETY, for value received, hereby stipulates and agrees that the obligations of said SURETY and its BOND shall be in no way impaired or affected by any extension of the time within which the AGENCY may accept such Bid; and said SURETY does hereby waive notice of any such extension.

THE CONDITIONS OF THIS OBLIGATION ARE SUCH that, whereas PRINCIPAL is about to submit a bid to AGENCY for the above stated project, if said bid is rejected, or if said bid is accepted and a contract is awarded and entered into by PRINCIPAL in the manner and time specified, and PRINCIPAL provides the required payment and performance bonds and insurance coverages to AGENCY, then this obligation shall be null and void, otherwise it shall remain in full force and effect in favor of AGENCY.

IN WITNESS WHEREOF the parties hereto have set their names, titles, hands, and seals this__ day of ....., 2022.

PRINCIPAL* .....

_____

_____

_____

SURETY* _____

_____

_____

*Provide BIDDER and SURETY name, address and telephone number and the name, title, address and telephone number for their authorized representatives. Power of Attorney must be attached.

Subscribed and sworn to this ..... day of..... , 2022.

NOTARY PUBLIC _____ (SEAL)

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**BID GUARANTEE**
**SCHEDULE I – HELICOPTER PARKING AREA**
**A.I.P. 3-06-0012-021-2022**
**IN THE CITY OF AUBURN, CALIFORNIA**

Note: The following statement shall be used if other than a bid surety bond accompanies bid.

"Accompanying this proposal is a certified check, payable to the order of the City of Auburn in the amount of _____ Dollars ($_____) which is at least ten percent (10%) of the total amount of this bid. The proceeds of this bid guarantee shall become the property of the City of Auburn provided this bid is accepted by said City, through action of its legally constituted contracting authorities, and the undersigned fails to execute a contract and furnish the required bonds and insurance within the stipulated time. Otherwise, the proceeds of this bid guarantee shall be returned to the undersigned."

NAME OF BIDDER: .....

MAILING ADDRESS: .....

.....

.....

AUTHORIZED SIGNATURE: .....

TITLE: .....

DATE: .....

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**BIDDER INFORMATION**
**SCHEDULE I – HELICOPTER PARKING AREA**
**A.I.P. 3-06-0012-17**
**IN THE CITY OF AUBURN, CALIFORNIA**

BIDDER certifies that the following information is true and correct:

Name of Bidder:.....

Business Address: .....

Telephone:……..FAX:……

E-mail: .....

Contractor's License No.:……..Date License Issued:.....……..

License Expiration Date: .....

The following are the names, titles, addresses, and phone numbers of all individuals, firm members, partners, joint venturers, and/or corporate officers having a principal interest in this proposal: (Name / Title / Address / Telephone)

.....

.....

.....

.....

Any voluntary or involuntary bankruptcy judgments against any principal having an interest in this proposal are as follows: (Type of Judgment / Date)

.....

.....

.....

.....

All current and prior DBA's, aliases, and/or fictitious business names for any principal having an interest in this proposal are as follows: (Principal / DBA's / Applicable Dates)

.....

.....

.....

Prior Disqualification

Has your firm ever been disqualified from performing work for any City, County, Public or Private Contracting entity? Yes / No _____. If yes, provide the following information. (If more than once, use separate sheets):

Date: .....Entity: .....

Location: .....

Reason: .....

Provide Status and any Supplemental Statement: .....

.....

.....

.....

.....

Has your firm been reinstated by this entity? Yes / No .....

Violations of Federal or State Law

A. Has your firm or its officers been assessed any penalties by any agency for noncompliance, violations of Federal or State labor laws and/or business or licensing regulations within the past five (5) years relating to your construction projects?

Yes / No: ..... Federal / State: .....

If "yes", identify and describe, (including status): .....

.....

.....

.....

.....

Have the penalties been paid? Yes / No:_____

B. Does you firm or its officers have any ongoing investigations by any AGENCY regarding violations of the State Labor Code, California Business and Professions Code or State Licensing laws?

Yes / No:..... Codes / Laws:..... Section / Article:.....

If "yes", identify and describe (including status):.....

.....

.....

I declare under penalty of perjury under the laws of the State of California that all of the representations made in this **BIDDER INFORMATION** are true and correct. Executed this _____ day of _____, 2018, at _____, California.

Authorized Representative Signature and Title_____

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**EXPERIENCE STATEMENT**
**SCHEDULE I – HELICOPTER PARKING AREA**
**A.I.P. 3-06-0012-021-2022**
**IN THE CITY OF AUBURN, CALIFORNIA**

Pursuant to this **BID PROPOSAL** and **QUALIFICATION OF BIDDERS**, the following is a record of the Bidder's experience in construction of a type similar in magnitude and character to that contemplated under this contract. Included in this section should be a complete list of references for similar projects in terms of scope of work, value of work, and time constraints. The Contractor must demonstrate that he/she has experience with this type of project and can manage this project effectively. If necessary, additional numbered pages can be attached to this page. The Contractor must be properly licensed to perform the work in this project as determined by the State Contractor's License Board.

Project Title:_____ Client:_____

Date: _____ Project Value: _____ Contact: _____ Tel #_____

Description: _____

_____

_____

Subject to Federal Labor Standards: Yes No

Project Title:_____ Client:_____

Date: _____ Project Value: _____ Contact: _____ Tel #_____

Description: _____

_____

_____

Subject to Federal Labor Standards: Yes No

**EXPERIENCE STATEMENT** (Continued)
**SCHEDULE I – RUNWAY LIGHTING REHABILITATION (LED INSTALLATION)**
**A.I.P. 3-06-0012-021-2022**
**IN THE CITY OF AUBURN, CALIFORNIA**

Project Title:_____ Client:_____

Date: _____ Project Value: _____ Contact: _____ Tel #_____

Description: _____

_____

_____

Subject to Federal Labor Standards: Yes No

Project Title:_____ Client:_____

Date: _____ Project Value: _____ Contact: _____ Tel #_____

Description: _____

_____

_____

Subject to Federal Labor Standards: Yes No

I declare under penalty of perjury under the laws of the State of California that all of the representations made in this **EXPERIENCE STATEMENT** are true and correct. Executed this _____ day of _____, 2022, at _____, California.

_____
Authorized Representative Signature and Title

**DESIGNATION OF SUPPLIERS AND SUBCONTRACTORS**
**SCHEDULE I – HELICOPTER PARKING AREA**
**A.I.P. 3-06-0012-021-2022**
**IN THE CITY OF AUBURN, CALIFORNIA**

The following is a list of subcontractors and suppliers, as defined in 2-3 SUBCONTRACTS of the Standard Specifications, who will perform work or provide materials of value in excess of one-half percent of the total bid price or $10,000, whichever is greater.

No subcontractor shall perform work in excess of the amount specified in 2-3 SUBCONTRACTS of the Standard Specifications, without the written approval of the Agency.

The Contractor is responsible to ensure that appropriate provisions are to be inserted in all subcontracts to bind subcontractors to the contract requirements as contained herein.

Each subcontractor must agree to comply with all applicable Federal, State, and local requirements.

| Name and Address of Subcontractor | Employer Tax Id # | MBE/ WBE (Y/N) | Work Subcontracted | Portion of Work (% of Contract Price) |
|---|---|---|---|---|
| | | | | |
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| Name and Address of Subcontractor | Employer Tax Id # | MBE/ WBE (Y/N) | Work Subcontracted | Portion of Work (% of Contract Price) |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |

These representations are made under the penalty of perjury under the laws of the State of California. The undersigned hereby certifies that each subcontractor has been notified in writing of its equal opportunity obligations.

NAME OF BIDDER: _____

AUTHORIZED SIGNATURE: _____

Date: _____

**NON-COLLUSION AFFIDAVIT TO ACCOMPANY PROPOSAL**
**SCHEDULE I – HELICOPTER PARKING AREA**
**A.I.P. 3-06-0012-021-2022**
**IN THE CITY OF AUBURN, CALIFORNIA**

The undersigned declares:
I am the _____ of _____, the party making the foregoing bid.

The bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation. The bid is genuine and not collusive or sham. The bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid. The bidder has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or to refrain from bidding. The bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder. All statements contained in the bid are true. The bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof, to effectuate a collusive or sham bid, and has not paid, and will not pay, any person or entity for such purpose.

Any person executing this declaration on behalf of a bidder that is a corporation, partnership, joint venture, limited liability company, limited liability partnership, or any other entity, hereby represents that he or she has full power to execute, and does execute, this declaration on behalf of the bidder.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct and that this declaration is executed on _____[date], at _____[city], _____[state].

_____
Date

_____
Signature

Contractor's License

a. Class: _____

b. Number:_____

c. Expiration Date: _____

_____
Name of Firm

_____
Address

_____

_____
Phone Number

_____
Signature of Responsible Officer

Place of Residence

Subscribed and sworn to before me this _____ day of _____, 2022.
Notary Public in and for the County

Of

State of California.

My Commission Expires _____, 20__.

# DISADVANTAGED BUSINESS UTILIZATION COMMITMENT

There is no Disadvantaged Business Enterprise (DBE) project goal established for this project. At this time the City of Auburn will meet the DBE goal on federally assisted projects through race neutral measures. The City of Auburn supports the use of race neutral measures to facilitate participation by DBE's and other small businesses, and encourages prime contractors to subcontract portions of their work that they might otherwise perform with their own forces.

The bidder agrees to expend at least __6.2__ percent DBE utilization on this project.

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

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

**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

_____
Authorized Agent (print)

_____
Signature of Authorized Agent

# DBE PARTICIPATION FORM

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

.

Name of DBE Firm: _____

DBE Contract Amount: _____% Percent 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: _____% Percent 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: _____% Percent 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: _____% Percent 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)

| | $ Amount | | $DBE Credit Participation | % DBE |
|---|---|---|---|---|
| DBE Prime Contractor | $_____ | | $_____ | _____% |
| DBE Subcontractor | $_____ | | $_____ | _____% |
| DBE Supplier* | $_____ | x0.60= | $_____ | _____% |
| DBE Manufacturer | $_____ | | $_____ | _____% |
| Total Amount DBE | | | $_____ | _____% |
| DBE Goal | | | $_____ | _____% |

**Only 60% credit allowed for a DBE supplier.*

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 Placer County 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 or will execute(d) a binding contract with the bidder for materials or services should be provided to Placer County. 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

_____
Authorized Agent (print)

_____ Signature
of Authorized Agent

# CERTIFICATION OF NONSEGREGATED FACILITIES

The Federally-assisted construction contractor certifies that he will not maintain or provide, for his employees, segregated facilities at any of his establishments and that he will not permit his employees to perform their services at any location under his control where segregated facilities are maintained. The Federally-assisted construction contractor agrees that a breach of this certification is a violation of the Equal Opportunity Clause in his contract.

As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms, and washrooms, 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 which are segregated on a basis of race, color, religion, or national origin because of habit, local custom, or any other reason. The Federally-assisted construction contractor agrees that (except where he has obtained identical certifications from proposed subcontractors for specific time periods) he will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding $10,000 which are not exempt from the provisions of the Equal Opportunity Clause and that he will retain such certifications in his files.

Date: _____

_____Company

_____Authorized
Agent (print)

_____Signature
of Authorized Agent

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# 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 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

_____
Authorized Agent (print)

_____
Signature of Authorized Agent

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# BUY AMERICAN - STEEL AND MANUFACTURED PRODUCTS
(JAN 1991)

**a.** The Aviation Safety and Capacity Expansion Act of 1990 provide that preference be given to steel and manufactured products produced in the United States when funds are expended pursuant to a grant issued under the Airport Improvement Program. The following terms apply:

(1) Steel and Manufactured Products. As used in this clause, steel and manufactured products include (1) steel produced in the United States or (2) a manufactured product produced in the United States, if the cost of its components mined, produced or manufactured in the United States exceeds 60 percent of the cost of all its components and final assembly has taken place in the United States. Components of foreign origin of the same class or kind as the products referred to in subparagraphs (b) (1) or (2) shall be treated as domestic.

(2) Components. As used in this clause, components mean those articles, materials, and supplies incorporated directly into steel and manufactured products.

(3) Cost of Components. This means the costs for production of the components, exclusive of final assembly labor costs.

**b.** The successful bidder will be required to deliver only domestic steel and manufactured products, except those:

(1) that the U.S. Department of Transportation has determined, under the Aviation Safety and Capacity Expansion Act of 1990, are not produced in the United States in sufficient and reasonably available quantities and of a satisfactory quality;

(2) that the U.S. Department of Transportation has determined, under the Aviation Safety and Capacity Expansion Act of 1990, that domestic preference would be inconsistent with the public interest; or

(3) that inclusion of domestic material will increase the cost of the overall project contract by more than 25 percent.

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# BUY AMERICAN CERTIFICATE
(JAN 1991)

By submitting a bid/proposal under this solicitation, except for those items listed by the bidder below or on a separate and clearly identified attachment to this bid/proposal, the bidder certifies that steel and each manufactured product, is produced in the United States (as defined in the clause Buy American - Steel and Manufactured Products or Buy American – Steel and Manufactured Products for Construction Contracts) and that components of unknown origin are considered to have been produced or manufactured outside the United States.

Bidders may obtain from Placer County lists of articles, materials, and supplies accepted from this provision, if applicable.

| PRODUCT | COUNTRY OF ORIGIN |
|---|---|
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

Date: _____

_____Company

_____Authorized Agent (print)

_____
Signature of Authorized Agent

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# DEBARMENT AND SUSPENSION CERTIFICATION

## TITLE 49, CODE OF FEDERAL REGULATIONS, PART 29

The bidder, under penalty of perjury, certifies that, except as noted below, he/she or any other person associated therewith in the capacity of owner, partner, director, officer, and manager:

- Is not currently under suspension, debarment, voluntary exclusion, or determination of ineligibility by any federal agency;

- Has not been suspended, debarred, voluntarily excluded or determined ineligible by any federal agency within the past 3 years;

- Does not have a proposed debarment pending; and

- Has not been indicted, convicted, or had a civil judgment rendered against it by a court of competent jurisdiction in any matter involving fraud or official misconduct within the past 3 years.

If there are any exceptions to this certification, insert the exceptions in the following space.

Exceptions will not necessarily result in denial of award, but will be considered in determining bidder responsibility. For any exception noted above, indicate below to whom it applies, initiating agency, and dates of action.

Notes: Providing false information may result in criminal prosecution or administrative sanctions. The above certification is part of the Proposal. Signing this Proposal on the signature portion thereof shall also constitute signature of this Certification.

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NONLOBBYING CERTIFICATION
FOR FEDERAL-AID CONTRACTS

The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

(I) No federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any federal 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.

(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 federal 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 of Lobbying Activities," in accordance with its instructions.

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.

The prospective participant also agrees by submitting his or her bid or proposal that he or she shall require that the language of this certification be included in all lower tier subcontracts, which exceed $100,000 and that all such subrecipients shall certify and disclose accordingly.

# DISCLOSURE OF LOBBYING ACTIVITIES

COMPLETE THIS FORM TO DISCLOSE LOBBYING ACTIVITIES PURSUANT TO 31 U.S.C. 1352

**1. Type of Federal Action:**

☐ a. contract
b. grant
c. cooperative agreement
d. loan
e. loan guarantee
f. loan insurance

**2. Status of Federal Action:**

☐ a. bid/offer/application
b. initial award
c. post-award

**3. Report Type:**

☐ a. initial
b. material change

**For Material Change Only:**
year ____ quarter _____
date of last report_____

**4. Name and Address of Reporting Entity**

☐ Prime ☐ Subawardee
Tier _____, if known

**Congressional District,** if known

**5. If Reporting Entity in No. 4 is Subawardee, Enter Name and Address of Prime:**

**Congressional District,** if known

**6. Federal Department/Agency:**

**7. Federal Program Name/Description:**

**CFDA Number,** if applicable _____

**8. Federal Action Number,** if known:

**9. Award Amount,** if known:

**10. a. Name and Address of Lobby Entity**
(If individual, last name, first name, MI)

**b. Individuals Performing Services** (including address if different from No. 10a)
(last name, first name, MI)

(attach Continuation Sheet(s) if necessary)

**11. Amount of Payment (check all that apply)**

$_____ ☐ actual planned

**12. Form of Payment (check all that apply):**

☐ a. cash
☐ b. in-kind; specify: nature_____
value _____

**13. Type of Payment (check all that apply)**

☐ a. retainer
☐ b. one-time fee
☐ c. commission
☐ d. contingent fee
☐ e deferred
☐ f. other, specify_____

**14. Brief Description of Services Performed or to be performed and Date(s) of Service, including officer(s), employee(s), or member(s) contacted, for Payment Indicated in Item 11:**

(attach Continuation Sheet(s) if necessary)

**15. Continuation Sheet(s) attached:** **Yes** ☐ **No** ☐

**16.** Information requested through this form is authorized by Title 31 U.S.C. Section 1352. This disclosure of lobbying reliance was placed by the tier above when his transaction was made or entered into. This disclosure is required pursuant to 31 U.S.C. 1352. This information will be reported to Congress semiannually and will be available for public inspection. Any person who fails to file the required disclosure shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

Signature:_____

Print Name: _____

Title: _____

Telephone No.: _____ Date:_____

**SECTION D**

**SCHEDULE I – HELICOPTER PARKING AREA**
**A.I.P. 3-06-0012-021-2022**
**IN THE CITY OF AUBURN, CALIFORNIA**

**CONTRACT INFORMATION AND DOCUMENTS**

**CONSTRUCTION SERVICES AGREEMENT**
**PAYMENT BOND**
**FAITHFUL PERFORMANCE BOND**
**MAINTENANCE BOND**
**WORKER'S COMPENSATION INSURANCE CERTIFICATE**
**INSURANCE ENDORSEMENT**
**STATEMENT RE INSURANCE COVERAGE**
**STATEMENT RE CONTRACTOR'S LICENSING LAWS**

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**CONSTRUCTION SERVICES AGREEMENT**
**Providing Payment of Prevailing Wages**

**(City of Auburn / *[Company or Individual]*)**

## 1. IDENTIFICATION

This CONSTRUCTION SERVICES AGREEMENT ("Agreement") is entered into by and between the City of Auburn, a California municipal corporation ("City"), and _____, a _____ ("Contractor").

## 2. RECITALS

**2.1.** City has determined that it requires the following construction services from a contractor: Runway Lighting Rehabilitation (LED Installation)

**2.2.** Contractor represents that it is fully qualified to perform such professional services by virtue of its experience and the training, education and expertise of its principals and employees. Contractor further represents that it is willing to accept responsibility for performing such services in accordance with the terms and conditions set forth in this Agreement.

NOW, THEREFORE, for and in consideration of the mutual covenants and conditions herein contained, City and Contractor agree as follows:

## 3. DEFINITIONS

**3.1.** "Scope of Services": Such professional services as are set forth in Contractor's **March 30, 2022** proposal to City attached hereto as Exhibit A and incorporated herein by this reference.

**3.2.** "City Reference Specifications": The City's set of Reference Specifications, including the State of California Department of Transportation Standard Specifications, Standard Plans, and Manual of Traffic Controls, latest edition of each, and the Los Angeles County Department of Public Works Standard Plans which are incorporated herein by reference and are hereby accepted as Reference Specifications. These specifications shall provide the technical standards for work as applicable, in the opinion of the Director of Public Works. Copies are available online, or at City Hall.

**3.3.** "Agreement Administrator": The Agreement Administrator for this project is Allen Mitchell, P.E., City Engineer amitchell@auburn.ca.gov. The Agreement Administrator shall be the principal point of contact at the City for this project. All services under this Agreement shall be performed at the request of the Agreement Administrator. The

Agreement Administrator will establish the timetable for completion of services and any interim milestones. City reserves the right to change this designation upon written notice to Contractor

**3.4.** "Maximum Amount": The highest total compensation and costs payable to Contractor by City under this Agreement. The Maximum Amount under this Agreement is _____ Dollars ($_____).

**3.5.** "Commencement Date": [date].

**3.6.** "Termination Date": [date]

## 4. TERM

The term of this Agreement shall commence at 12:00 a.m. on the Commencement Date and shall expire at 11:59 p.m. on the Termination Date unless extended by written agreement of the parties or terminated earlier under Section 18 ("Termination") below. Contractor may request extensions of time to perform the services required hereunder. Such extensions shall be effective if authorized in advance by City in writing and incorporated in written amendments to this agreement.

## 5. CONTRACTOR'S DUTIES

**5.1.** **Services**. Contractor shall perform the services identified in the Scope of Services. City shall have the right to request, in writing, changes in the Scope of Services. Any such changes mutually agreed upon by the parties, and any corresponding increase or decrease in compensation, shall be incorporated by written amendment to this Agreement.

**5.2.** **Coordination with City**. In performing services under this Agreement, Contractor shall coordinate all contact with City through its Agreement Administrator.

**5.3.** **Budgetary Notification**. Contractor shall notify the Agreement Administrator, in writing, when fees and expenses incurred under this Agreement have reached eighty percent (80%) of the Maximum Amount. Contractor shall concurrently inform the Agreement Administrator, in writing, of Contractor's estimate of total expenditures required to complete its current assignments before proceeding, when the remaining work on such assignments would exceed the Maximum Amount.

**5.4.** **Business License.** Contractor shall obtain and maintain in force a City business license for the duration of this Agreement.

**Professional Standards.** Contractor shall perform all work to the highest standards of Contractor's profession and in a manner reasonably satisfactory to City. Contractor shall keep itself fully informed of and in compliance with all local, state, and federal

laws, rules, and regulations in any manner affecting the performance of this Agreement, including all Cal/OSHA requirements, the conflict of interest provisions of Government Code § 1090 and the Political Reform Act (Government Code § 81000 et seq.).

**5.5. Appropriate Personnel.** Contractor has, or will secure at its own expense, all personnel required to perform the services identified in the Scope of Services. All such services shall be performed by Contractor or under its supervision or by subcontractor(s) of Contractor, and all personnel engaged in the work shall be qualified to perform such services. [ _____, Name of Project Manager] shall be Contractor's project administrator and shall have direct responsibility for management of Contractor's performance under this Agreement. No change shall be made in Contractor's project administrator without City's prior written consent.

**5.6. Prevailing Wages.** This Agreement is subject to the prevailing wage law as more fully set forth in Section 8 (Labor Code), for all work performed under this Agreement for which the payment of prevailing wages is required under the US Department of Labor. In particular, Contractor acknowledges that prevailing wage determinations are available for work performed under this Agreement.

**5.7. Unauthorized Delay.** In accordance with Government Code 53069.85, and all other applicable law, the Contractor agrees to forfeit and pay City the amount of Two Hundred Dollars ($200.00) per day for each and every day of unauthorized delay beyond the Termination Date, which shall be deducted from any monies due to Contractor. This payment shall be considered liquidated damages. Contractor agrees that such liquidated damages are reasonable under the circumstances existing at the time of execution of the contract, that such liquidated damages are to compensate City for losses that are difficult to measure, and that such damages are not a penalty.

**5.8. Unforeseeable Delay.** Contractor shall not be deemed in breach of this Agreement and no forfeiture due to delay shall be made because of any delays in the completion of the Scope of Services due to unforeseeable causes beyond the control and without the fault or negligence of Contractor provided Contractor requests from the Agreement Administrator an extension of time in writing. Unforeseeable causes of delay beyond the control of Contractor shall include acts of God, acts of a public enemy, acts of the government, acts of City, or acts of another contractor in the performance of a contract with City, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and weather, or delays of subcontractors due to such causes, or delays caused by failure of the owner of a utility to provide for removal or relocation of existing utility facilities. Delays caused by actions or negligence of Contractor or its agents, servants, employees, officers, subcontractors, directors, or of any party contracting to perform part of all of the Scope of Services or to supply any equipment or materials shall not be unforeseeable delays. Unforeseeable delays (those beyond Contractor's control) shall not entitle Contractor to any additional compensation beyond the Maximum Amount.

The sole recourse of Contractor shall be to seek an extension of time from the Agreement Administrator.

**5.9. Defective Work.** All work which is defective in its construction or deficient in any of the requirements set by City Reference Specifications shall be remedied or replaced by Contractor in an acceptable manner at its own expense. Defective work shall not entitle Contractor to any additional compensation beyond the Maximum Amount.

**5.10. Permits and Approvals.** Contractor shall obtain, at its sole cost and expense, all permits and regulatory approvals necessary for Contractor's performance of this Agreement. This includes, but shall not be limited to, professional licenses, encroachment permits and building and safety permits and inspections.

**5.11. Notification of Organizational Changes.** Contractor shall notify the Agreement Administrator, in writing, of any change in name, ownership or control of Contractor's firm or of any subcontractor. Change of ownership or control of Contractor's firm may require an amendment to this Agreement.

**5.12. Records.** Contractor shall maintain any and all ledgers, books of account, invoices, vouchers, canceled checks, and other records or documents evidencing or relating to charges for services or expenditures and disbursements charged to City under this Agreement for a minimum of three (3) years, or for any longer period required by law, from the date of final payment to Contractor under this Agreement. All such documents shall be made available for inspection, audit, and/or copying at any time during regular business hours, upon oral or written request of City. In addition, pursuant to Government Code Section 8546.7, if the amount of public funds expended under this Agreement exceeds ten thousand dollars, all such documents and this Agreement shall be subject to the examination and audit of the State Auditor, at the request of City or as part of any audit of City, for a period of three (3) years after final payment under this Agreement.

## 6. SUBCONTRACTING AND ASSIGNMENT

**6.1. General Prohibition of Assignment.** This Agreement covers construction services of a specific and unique nature. Except as otherwise provided herein, Contractor shall not assign or transfer its interest in this Agreement or subcontract any services to be performed without amending this Agreement.

**6.2. Contractor Responsible.** Contractor shall be responsible to City for all services to be performed under this Agreement.

**6.3. Subcontracting.** Contractor shall not subcontract any portion of the performance contemplated and provided for herein unless (1) such subcontracting is specifically described in the proposal attached hereto or (2) the City provides prior written approval. In any event, Contractor shall supervise all work subcontracted by Contractor in

performing the Services and shall be responsible for all work performed by a subcontractor as if Contractor itself had performed such work. The subcontracting of any work shall not relieve Contractor from any of its obligations under this Agreement with respect to the Services. Contractor is obligated to ensure that any and all subcontractors performing any Services shall be fully insured in all respects and to the same extent as set forth under Section 13, to City's satisfaction.

**6.4. Compensation for Subcontractors.** Contractor shall be liable and accountable for any and all payments, compensation, and federal and state taxes to all subcontractors performing services under this Agreement. City shall not be liable for any payment, compensation, or federal and state taxes for any subcontractors.

## 7. COMPENSATION

**7.1. General.** City agrees to compensate Contractor for the services provided under this Agreement, and Contractor agrees to accept payment, of the Maximum Amount in full satisfaction for such services. Compensation shall not exceed the Maximum Amount. Contractor shall not be reimbursed for any expenses unless provided for in this Agreement or authorized in writing by City in advance.

**7.2. Retention.** City may retain up to 5% of each payment until project completion. Contractor may at its own expense substitute securities equivalent to the amount withheld as retention (or the retained percentage) in accordance with Public Contract Code 22300. At the request and expense of Contractor, securities equivalent to the amount withheld shall be deposited with City, or with a state or federally chartered bank in this state as the escrow agent, who shall then pay those moneys to City. Upon satisfactory completion of this Agreement, the securities shall be returned to Contractor.

**7.3. Invoices.** Contractor shall submit to City an invoice, on a monthly basis or as otherwise agreed to by the Agreement Administrator, for services performed pursuant to this Agreement. Each invoice shall identify the Maximum Amount, the services rendered during the billing period, the amount due for the invoice, and the total amount previously invoiced. Contractor shall include a copy of each subcontractor invoice, if any, for which reimbursement is sought in the invoice.

**7.4. Taxes.** City shall not withhold applicable taxes or other payroll deductions from payments made to Contractor except as otherwise required by law. Contractor shall be solely responsible for calculating, withholding, and paying all taxes.

**7.5. Disputes.** The parties agree to meet and confer at mutually agreeable times to resolve any disputed amounts contained in an invoice submitted by Contractor.

**7.6. Additional Work.** Contractor shall not be reimbursed for any expenses incurred for work performed outside the Scope of Services unless prior written approval is given by

the City on a time-and-materials basis pursuant to a written change order. Contractor shall not undertake any such work without prior written approval of the City. A written change order may be issued without amendment to this Agreement, so long as such written change order does not cause the Maximum Amount to be exceeded. Contractor shall only be compensated for such additional work at the rates and costs for labor and materials included in the bid or proposal.

**7.7. City-Initiated Changes -** City may propose in writing changes to Contractor's work within the Scope of Services described. If Contractor is of the opinion that any proposed change causes an increase or decrease in the cost, or a change in the schedule for performance, of the services, Contractor shall notify City in writing of that fact within five (5) days after receipt of written proposal for changes.

**7.8. Contractor-Initiated Changes –** Contractor may propose in writing changes to the Scope of Services, upon identifying a condition which may change the Scope of Services as agreed at the time of execution of this Agreement. Contractor must notify the City's Agreement Administrator of any changed conditions upon discovery and before they are disturbed. The Public Works Director shall investigate, and if the Public Works Director determines that the conditions will materially affect costs, will issue a Change Order adjusting the compensation for such portion of the Scope of Services. If the Public Works Director determines that conditions are changed conditions and they will materially affect performance time, the Contractor, upon submitting a written request, will be granted an extension of time. If the Public Works Director determines that the conditions do not justify an adjustment in compensation or time, the Contractor will be notified in writing. This notice will also advise the Contractor of its obligation to notify the Public Works Director in writing if the Contractor disagrees.

When and if City and Contractor reach agreement on any such proposed change and its effect on the cost and time for performance, they shall confirm such agreement in writing as an amendment to this Agreement. Contractor may not cease work or delay progress on the original project pending negotiations over changes, and must continue to diligently complete the project.

Should the Contractor disagree with the decision, it may submit a written notice of potential claim to the Public Works Director before commencing the disputed work. In the event of such a dispute, the Contractor shall not be excused from any scheduled completion date provided by the Contract and shall proceed with all work to be performed under the Contract. However, the Contractor shall retain any and all rights provided by either Contract or law which pertain to the resolution of disputes and protests between the contracting parties.

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.

## 8. LABOR CODE

**8.1. Prevailing Wage Law.** This Agreement is subject to the requirements of the prevailing wage laws, including, but not limited to, United States Department of Labor Code, as well as Davis-Bacon and Related Acts, which require payment of prevailing wage rates and the performance of other requirements on certain "public works" and "maintenance" projects. Contractor shall defend, indemnify, and hold harmless City, and its officers, employees, agents, and volunteers free and harmless from any claim or liability arising out of failure or alleged failure of Contractor to comply with such prevailing wage laws.

**8.2. Payment of Prevailing Wages.** Contractor shall pay the prevailing wage rates for all work performed under this Agreement. When any craft or classification is omitted from the general prevailing wage determinations, the Contractor shall pay the wage rate of the craft or classification most closely related to the omitted classification.

**8.3. Forfeiture.** Contractor shall forfeit as a penalty to City Two Hundred Dollars ($200.00), or any greater penalty provided in the Labor Code, for each calendar day, or portion thereof, for each worker paid less than the prevailing wage rates for any work done under this Agreement employed in the performance of the Scope of Services by Contractor or by any subcontractor of Contractor in violation of the provisions of the Labor Code. In addition, the difference between such prevailing wage rates and the amount paid to each worker for each calendar day, or portion thereof, for which each worker was paid less than the prevailing wage rate shall be paid to each worker by Contractor.

**8.4. Apprentices.** Contractor shall comply with the provisions of Labor Code 1777.5 concerning the employment of apprentices on public works projects. Contractor shall be responsible for ensuring compliance by its subcontractors with Labor Code 1777.5.

**8.5. Payroll Records.** Pursuant to Labor Code 1776, Contractor and any subcontractor(s) shall keep accurate payroll records, showing the name, address, social security number, work classification, straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed by Contractor in connection with this Agreement. Each payroll record shall contain or be verified by a written declaration that it is made under penalty of perjury, stating both of the following: (1) The information contained in the payroll record is true and correct; and (2) The employer has complied with the requirements of Labor Code 1811 and Labor Code 1815 for any work performed by his or her employees on the public works project. The payroll records shall be certified and shall be available for inspection at all reasonable hours as required by Labor Code 1776.

**8.6. 8-Hour Work Day.** This Agreement is subject to 8-hour work day and wage and hour penalty laws, including, but not limited to, Labor Code 1810 and Labor Code 1813. Contractor and any subcontractor(s) of Contractor shall strictly adhere to the provisions

of the Labor Code regarding 8-hour work day and 40-hour work week requirements, and overtime, Saturday, Sunday, and holiday work. Pursuant to the Labor Code, eight hours' labor shall constitute a legal day's work. Work performed by Contractor's employees in excess of eight hours per day, and 40 hours during any one week, must include compensation for all hours worked in excess of eight hours per day, or 40 hours during any one week, at not less than one and one-half times the basic rate of pay. Contractor shall forfeit as a penalty to City $25.00, or any greater penalty set forth in the Labor Code, for each worker employed in the execution of the work by Contractor or by any subcontractor(s) of Contractor, for each calendar day during which such worker is required or permitted to the work more than eight hours in one calendar day or more than 40 hours in any one calendar week in violation of the Labor Code.

**8.7. Registration with DIR.** Contractor and any subcontractor(s) of Contractor shall comply with the provisions of Labor Code 1771 and Labor Code 1725.5 requiring registration with the Department of Industrial Relations (DIR).

## 9. PUBLIC CONTRACT CODE.

**9.1. Prompt Payment.** This Agreement is subject to the provisions of Article 1.7 (commencing at § 20104.50) of Division 2, Part 3 of the Public Contract Code regarding prompt payment of contractors by local governments. Article 1.7 mandates certain procedures for the payment of undisputed and properly submitted payment requests within 30 days after receipt, for the review of payment requests, for notice to the contractor of improper payment requests, and provides for the payment of interest on progress payment requests which are not timely made in accordance with this Article. This Agreement hereby incorporates the provisions of Article 1.7 as though fully set forth herein.

**9.2. Public Works Claims Less Than $375,000.** To the extent applicable, this Agreement is further subject to the provisions of Article 1.5 (commencing at Section 20104) of Division 2, Part 3 of the Public Contract Code regarding the resolution of public works claims of less than $375,000. Article 1.5 mandates certain procedures for the filing of claims and supporting documentation by the contractor, for the response to such claims by the contracting public agency, for a mandatory meet and confer conference upon the request of the contractor, for mandatory nonbinding mediation in the event litigation is commenced, and for mandatory judicial arbitration if the parties fail to resolve the dispute through mediation. This Agreement hereby incorporates the provisions of Article 1.5 as though fully set forth herein.

**9.3. Ineligible Subcontractor(s).** This Agreement is further subject to the provisions of Public Contracts Code 6109 which prohibits Contractor from performing work on this project with a subcontractor who is ineligible to perform work on the project pursuant to Labor Code 1777.1 or Labor Code 1777.7.

**9.4. Assignment of Actions.** Contractor and any and all subcontractors shall offer and agree to assign to City all rights, title, and interest in and to all causes of action it/they may have under Section 4 of the Clayton Act (15 U.S.C. Sec. 4) 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 this Agreement. This assignment shall be made and become effective at the time City tenders final payment to Contractor, without further acknowledgment by the parties.

## 10. OWNERSHIP OF WRITTEN PRODUCTS

All reports, documents or other written material, and all electronic files, including computer-aided design files, developed by Consultant in the performance of this Agreement (such written material and electronic files are collectively known as "written products") shall be and remain the property of City without restriction or limitation upon its use or dissemination by City except as provided by law. Consultant may take and retain copies of such written products as desired, but no such written products shall be the subject of a copyright application by Consultant.

## 11. RELATIONSHIP OF PARTIES

**11.1. General.** Contractor is, and shall at all times remain as to City, a wholly independent contractor.

**11.2. No Agent Authority.** Contractor shall have no power to incur any debt, obligation, or liability on behalf of City or otherwise to act on behalf of City as an agent. Neither City nor any of its agents shall have control over the conduct of Contractor or any of Contractor's employees, except as set forth in this Agreement. Contractor shall not represent that it is, or that any of its agents or employees are, in any manner employees of City.

**11.3. Independent Contractor Status.** Under no circumstances shall Contractor or its employees look to the City as an employer. Contractor shall not be entitled to any benefits. City makes no representation as to the effect of this independent contractor relationship on Contractor's previously earned California Public Employees Retirement System ("CalPERS") retirement benefits, if any, and Contractor specifically assumes the responsibility for making such a determination. Contractor shall be responsible for all reports and obligations including, but not limited to: social security taxes, income tax withholding, unemployment insurance, disability insurance, and workers' compensation, and other applicable federal and state taxes.

**11.4. Indemnification of CalPERS Determination.** In the event that Contractor or any employee, agent, or subcontractor of Contractor providing services under this Agreement claims or is determined by a court of competent jurisdiction or CalPERS to be eligible for enrollment in CalPERS as an employee of the City, Contractor shall

indemnify, defend, and hold harmless City for the payment of any employee and/or employer contributions for CalPERS benefits on behalf of Contractor or its employees, agents, or subcontractors, as well as for the payment of any penalties and interest on such contributions, which would otherwise be the responsibility of City.

## 12. INDEMNIFICATION

**12.1. Definitions.** For purposes of this Section 12, "Contractor" shall include Contractor, its officers, employees, servants, agents, or subcontractors, or anyone directly or indirectly employed by either Contractor or its subcontractors, in the performance of this Agreement. "City" shall include City, its officers, agents, employees and volunteers.

**12.2. Contractor to Indemnify City.** To the fullest extent permitted by law, Contractor shall indemnify, hold harmless, and defend City from and against any and all claims, losses, costs or expenses for any personal injury or property damage arising out of or in connection with Contractor's alleged negligence, recklessness or willful misconduct or other wrongful acts, errors or omissions of Contractor or failure to comply with any provision in this Agreement.

**12.3. Scope of Indemnity.** Personal injury shall include injury or damage due to death or injury to any person, whether physical, emotional, consequential, or otherwise, Property damage shall include injury to any personal or real property. Contractor shall not be required to indemnify City for such loss or damage as is caused by the sole active negligence or willful misconduct of the City.

**12.4. Attorneys Fees.** Such costs and expenses shall include reasonable attorneys' fees for counsel of City's choice, expert fees and all other costs and fees of litigation. Contractor shall not be entitled to any refund of attorneys' fees, defense costs or expenses in the event that it is adjudicated to have been non-negligent.

**12.5. Defense Deposit.** The City may request a deposit for defense costs from Contractor with respect to a claim. If the City requests a defense deposit, Contractor shall provide it within 15 days of the request.

**12.6. Waiver of Statutory Immunity.** The obligations of Contractor under this Section 12 are not limited by the provisions of any workers' compensation act or similar act. Contractor expressly waives its statutory immunity under such statutes or laws as to City.

**12.7. Indemnification by Subcontractors.** Contractor agrees to obtain executed indemnity agreements with provisions identical to those set forth here in this Section 12 from each and every subcontractor or any other person or entity involved in the performance of this Agreement on Contractor's behalf.

**12.8. Insurance Not a Substitute.** City does not waive any indemnity rights by accepting any insurance policy or certificate required pursuant to this Agreement. Contractor's indemnification obligations apply regardless of whether or not any insurance policies are determined to be applicable to the claim, demand, damage, liability, loss, cost or expense.

## 13. INSURANCE

**13.1. Insurance Required.** Contractor shall maintain insurance as described in this section and shall require all of its subcontractors, Contractors, and other agents to do the same. Approval of the insurance by the City shall not relieve or decrease any liability of Contractor. Any requirement for insurance to be maintained after completion of the work shall survive this Agreement.

**13.2. Documentation of Insurance.** City will not execute this agreement until it has received a complete set of all required documentation of insurance coverage. However, failure to obtain the required documents prior to the work beginning shall not waive the Contractor's obligation to provide them. Contractor shall file with City:

- Certificate of Insurance, indicating companies acceptable to City, with a Best's Rating of no less than A:VII showing. The Certificate of Insurance must include the following reference: **HELICOPTER PARKING AREA, A.I.P. 3-06-0012-021-2022**
  - Documentation of Best's rating acceptable to the City.
  - Original endorsements effecting coverage for all policies required by this Agreement.
  - Complete, certified copies of all required insurance policies, including endorsements affecting the coverage.

**13.3. Coverage Amounts.** Insurance coverage shall be at least in the following minimum amounts:

| | |
|---|---|
| • Professional Liability Insurance: | $1,000,000 per occurrence,<br>$2,000,000 aggregate |
| • General Liability: | |
| • General Aggregate: | $2,000,000 |
| • Products Comp/Op Aggregate | $2,000,000 |
| • Personal & Advertising Injury | $1,000,000 |
| • Each Occurrence | $1,000,000 |
| • Fire Damage (any one fire) | $ 50,000 |
| • Medical Expense (any 1 person) | $ 5,000 |
| • Workers' Compensation: | |
| • Workers' Compensation | Statutory Limits |

- EL Each Accident $1,000,000
- EL Disease - Policy Limit $1,000,000
- EL Disease - Each Employee $1,000,000

- Automobile Liability
  - Any vehicle, combined single limit $1,000,000

Any available insurance proceeds broader than or in excess of the specified minimum insurance coverage requirements or limits shall be available to the additional insured. Furthermore, the requirements for coverage and limits shall be the greater of (1) the minimum coverage and limits specified in this Agreement, or (2) the broader coverage and maximum limits of coverage of any insurance policy or proceeds available to the named insured

**13.4. General Liability Insurance.** Commercial General Liability Insurance shall be no less broad than ISO form CG 00 01. Coverage must be on a standard Occurrence form. Claims-Made, modified, limited or restricted Occurrence forms are not acceptable.

**13.5. Worker's Compensation Insurance.** Contractor is aware of the provisions of Section 3700 of the Labor Code which requires every employer to carry Workers' Compensation (or to undertake equivalent self-insurance), and Contractor will comply with such provisions before commencing the performance of the work of this Agreement. If such insurance is underwritten by any agency other than the State Compensation Fund, such agency shall be a company authorized to do business in the State of California.

**13.6. Automobile Liability Insurance.** Covered vehicles shall include owned if any, non-owned, and hired automobiles and, trucks.

**13.7. Claims-Made Policies.** If any of the required policies provide coverage on a claims-made basis the Retroactive Date must be shown and must be before the date of the contract or the beginning of contract work. Claims-Made Insurance must be maintained and evidence of insurance must be provided for at least five (5) years after completion of the contract of work. If coverage is canceled or non-renewed, and not replaced with another claims-made policy form with a Retroactive Date prior to the contract effective date, the Contractor must purchase "extended reporting" coverage for a minimum of five (5) years after completion of contract work.

**13.8. Additional Insured Endorsements.** The City, its City Council, Commissions, officers, and employees of Auburn must be endorsed as an additional insured for each policy required herein, for liability arising out of ongoing and completed operations by or on behalf of the Contractor. Contractor's insurance policies shall be primary as respects any claims related to or as the result of the Contractor's work. Any insurance, pooled coverage or self-insurance maintained by the City, its elected or appointed officials, directors, officers, agents, employees, volunteers, or Contractors shall be non-

contributory. All endorsements shall be signed by a person authorized by the insurer to bind coverage on its behalf. General liability coverage can be provided using an endorsement to the Contractor's insurance at least as broad as ISO Form CG 20 10 11 85 or both CG 20 10 and CG 20 37.

**13.9. Failure to Maintain Coverage.** In the event any policy is canceled prior to the completion of the project and the Contractor does not furnish a new certificate of insurance prior to cancellation, City has the right, but not the duty, to obtain the required insurance and deduct the premium(s) from any amounts due the Contractor under this Agreement. Failure of the Contractor to maintain the insurance required by this Agreement, or to comply with any of the requirements of this section, shall constitute a material breach of this Agreement.

**13.10. Notices.** Contractor shall provide immediate written notice if (1) any of the required insurance policies is terminated; (2) the limits of any of the required policies are reduced; (3) or the deductible or self-insured retention is increased. Contractor shall provide no less than 30 days' notice of any cancellation or material change to policies required by this Agreement. Contractor shall provide proof that cancelled or expired policies of insurance have been renewed or replaced with other policies providing at least the same coverage. Such proof will be furnished at least two weeks prior to the expiration of the coverages. The name and address for Additional Insured Endorsements, Certificates of Insurance and Notices of Cancellation is: City of Auburn, Attn: Alan Mitchell, P.E. City Engineer amitchell@auburn.ca.gov, 1225 Lincoln Way, Auburn, CA 95603.

**13.11. Contractor's Insurance Primary.** The insurance provided by Contractor, including all endorsements, shall be primary to any coverage available to City. Any insurance or self-insurance maintained by City and/or its officers, employees, agents or volunteers, shall be in excess of Contractor's insurance and shall not contribute with it.

**13.12. Waiver of Subrogation.** Contractor hereby waives all rights of subrogation against the City. Contractor shall additionally waive such rights either by endorsement to each policy or provide proof of such waiver in the policy itself.

**13.13. Report of Claims to City.** Contractor shall report to the City, in addition to the Contractor's insurer, any and all insurance claims submitted to Contractor's insurer in connection with the services under this Agreement.

**13.14. Premium Payments and Deductibles.** Contractor must disclose all deductibles and self-insured retention amounts to the City. The City may require the Contractor to provide proof of ability to pay losses and related investigations, claim administration,

and defense expenses within retention amounts. Ultimately, City must approve all such amounts prior to execution of this Agreement.

City has no obligation to pay any premiums, assessments, or deductibles under any policy required in this Agreement. Contractor shall be responsible for all premiums and deductibles in all of Contractor's insurance policies. The amount of deductibles for insurance coverage required herein are subject to City's approval.

**13.15. Duty to Defend and Indemnify.** Contractor's duties to defend and indemnify City under this Agreement shall not be limited by the foregoing insurance requirements and shall survive the expiration of this Agreement.

## 14. MUTUAL COOPERATION

**14.1. City Cooperation in Performance.** City shall provide Contractor with all pertinent data, documents and other requested information as is reasonably available for the proper performance of Contractor's services under this Agreement.

**14.2. Contractor Cooperation in Defense of Claims.** If any claim or action is brought against City relating to Contractor's performance in connection with this Agreement, Contractor shall render any reasonable assistance that City may require in the defense of that claim or action.

## 15. NOTICES

Any notices, bills, invoices, or reports required by this Agreement shall be deemed received on: (i) the day of delivery if delivered by hand, facsimile or overnight courier service during Contractor's and City's regular business hours; or (ii) on the third business day following deposit in the United States mail if delivered by mail, postage prepaid, to the addresses listed below (or to such other addresses as the parties may, from time to time, designate in writing).

If to City:

[Name]
City of Auburn
[Department/Division]
1225 Lincoln Way
Auburn, CA 95603
Telephone: (530) 823-4211
Facsimile: (530) 823-4209

If to Contractor:

[Name]
[Address]
[Address]
Telephone:
Facsimile:

With courtesy copy to:

Gary B. Bell
Auburn City Attorney
Colantuono, Highsmith & Whatley, PC
333 University Avenue, Suite 200
Sacramento, CA 95825
Telephone 916-898-0049
Fax 530-432-7356

## 16. SURVIVING COVENANTS

The parties agree that the covenants contained in paragraph 5.12 (Records), paragraph 11.4 (Indemnification of CalPERS Determination), Section 12 (Indemnity), paragraph 13.8 (Claims-Made Policies), paragraph 14.2 (Contractor Cooperation in Defense of Claims), and paragraph 19.1 (Confidentiality) of this Agreement shall survive the expiration or termination of this Agreement, subject to the provisions and limitations of this Agreement and all otherwise applicable statutes of limitations and repose.

## 17. TERMINATION

**17.1. City Termination.** City may terminate this Agreement for any reason on five calendar days' written notice to Contractor. Contractor agrees to cease all work under this Agreement on or before the effective date of any notice of termination. All City data, documents, objects, materials or other tangible things shall be returned to City upon the termination or expiration of this Agreement.

**17.2. Contractor Termination.** Contractor may terminate this Agreement for a material breach of this Agreement upon 30 days' notice.

**17.3. Compensation Following Termination.** Upon termination, Contractor shall be paid based on the work satisfactorily performed at the time of termination. In no event shall Contractor be entitled to receive more than the amount that would be paid to Contractor for the full performance of the services required by this Agreement. The City shall have the benefit of such work as may have been completed up to the time of such termination.

**17.4. Remedies.** City retains any and all available legal and equitable remedies for Contractor's breach of this Agreement.

## 18. INTERPRETATION OF AGREEMENT

**18.1. Governing Law.** This Agreement shall be governed and construed in accordance with the laws of the State of California.

**18.2. Integration of Exhibits.** All documents referenced as exhibits in this Agreement are hereby incorporated into this Agreement. In the event of any material discrepancy between the express provisions of this Agreement and the provisions of any document incorporated herein by reference, the provisions of this Agreement shall prevail. This instrument contains the entire Agreement between City and Contractor with respect to the transactions contemplated herein. No other prior oral or written agreements are binding upon the parties. Amendments hereto or deviations herefrom shall be effective and binding only if made in writing and executed on by City and Contractor.

**18.3. Headings.** The headings and captions appearing at the commencement of the sections hereof, and in any paragraph thereof, are descriptive only and for convenience in reference to this Agreement. Should there be any conflict between such heading, and the section or paragraph thereof at the head of which it appears, the language of the section or paragraph shall control and govern in the construction of this Agreement.

**18.4. Pronouns.** Masculine or feminine pronouns shall be substituted for the neuter form and vice versa, and the plural shall be substituted for the singular form and vice versa, in any place or places herein in which the context requires such substitution(s).

**18.5. Severability.** If any term or provision of this Agreement or the application thereof to any person or circumstance shall, to any extent, be invalid or unenforceable, then such term or provision shall be amended to, and solely to the extent necessary to, cure such invalidity or unenforceability, and shall be enforceable in its amended form. In such event, the remainder of this Agreement, or the application of such term or provision to persons or circumstances other than those as to which it is held invalid or unenforceable, shall not be affected, and each term and provision of this Agreement shall be valid and be enforced to the fullest extent permitted by law.

**18.6. No Presumption Against Drafter.** Each party had an opportunity to consult with an attorney in reviewing and drafting this agreement. Any uncertainty or ambiguity shall not be construed for or against any party based on attribution of drafting to any party.

## 19. GENERAL PROVISIONS

**19.1. Confidentiality.** All data, documents, discussion, or other information developed or received by Contractor for performance of this Agreement are deemed confidential and Contractor shall not disclose it without prior written consent by City. City shall grant such consent if disclosure is legally required. All City data shall be returned to City upon the termination or expiration of this Agreement.

**19.2. Conflicts of Interest.** Contractor maintains and warrants that it has not employed nor retained any company or person, other than a bona fide employee working solely for Contractor, to solicit or secure this Agreement. Further, Contractor warrants that it has not paid nor has it agreed to pay any company or person, other than a bona fide employee working solely for Contractor, any fee, commission, percentage, brokerage fee, gift or other consideration contingent upon or resulting from the award or making of this Agreement. Contractor further agrees to file, or shall cause its employees or subcontractor to file, a Statement of Economic Interest with the City's Filing Officer if required under state law in the performance of the services. For breach or violation of this warranty, City shall have the right to rescind this Agreement without liability. For the term of this Agreement, no member, officer, or employee of City, during the term of his or her service with City, shall have any direct interest in this Agreement, or obtain any present or anticipated material benefit arising therefrom.

**19.3. Non-assignment.** Contractor shall not delegate, transfer, subcontract or assign its duties or rights hereunder, either in whole or in part, without City's prior written consent, and any attempt to do so shall be void and of no effect. City shall not be obligated or liable under this Agreement to any party other than Contractor.

**19.4. Binding on Successors.** This Agreement shall be binding on the successors and assigns of the parties.

**19.5. No Third-Party Beneficiaries.** Except as expressly stated herein, there is no intended third-party beneficiary of any right or obligation assumed by the parties.

**19.6. Time of the Essence.** Time is of the essence for each and every provision of this Agreement.

**19.7. Non-Discrimination.** Contractor shall not discriminate against any employee or applicant for employment because of race, sex (including pregnancy, childbirth, or related medical condition), creed, national origin, color, disability as defined by law, disabled veteran status, Vietnam veteran status, religion, age (40 and above), medical condition (cancer-related), marital status, ancestry, or sexual orientation. Employment actions to which this provision applies 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; or in terms, conditions or privileges of employment, and selection for training. Contractor agrees to post in conspicuous places, available to employees and applicants for employment, the provisions of this nondiscrimination clause.

**19.8. Waiver.** No provision, covenant, or condition of this Agreement shall be deemed to have been waived by City or Contractor unless in writing signed by one authorized to bind the party asserted to have consented to the waiver. The waiver by City or Contractor of any breach of any provision, covenant, or condition of this Agreement

shall not be deemed to be a waiver of any subsequent breach of the same or any other provision, covenant, or condition.

**19.9. Excused Failure to Perform.** Contractor shall not be liable for any failure to perform if Contractor presents acceptable evidence, in City's sole judgment that such failure was due to causes beyond the control and without the fault or negligence of Contractor.

**19.10. Remedies Non-Exclusive.** Each right, power and remedy provided for herein or now or hereafter existing at law, in equity, by statute, or otherwise shall be cumulative and shall be in addition to every other right, power, or remedy provided for herein or now or hereafter existing at law, in equity, by statute, or otherwise. The exercise, the commencement of the exercise, or the forbearance from the exercise by any party of any one or more of such rights, powers or remedies shall not preclude the simultaneous or later exercise by such party of any or all of such other rights, powers or remedies.

**19.11. Attorneys' Fees.** If legal action shall be necessary to enforce any term, covenant or condition contained in this Agreement, each party shall pay its own costs, including any accountants' and attorneys' fees expended in the action.

**19.12. Venue.** The venue for any litigation shall be Placer County, California and Contractor hereby consents to jurisdiction in Placer County for purposes of resolving any dispute or enforcing any obligation arising under this Agreement.

**TO EFFECTUATE THIS AGREEMENT,** the parties have caused their duly authorized representatives to execute this Agreement on the dates set forth below.

| | |
|---|---|
| "City"<br>City of Auburn | "Contractor"<br>[Name of Company or Individual] |
| By:_____<br>*Signature* | By:_____<br>*Signature* |
| Printed:_____ | Printed:_____ |
| Title:_____ | Title:_____ |
| Date:_____ | Date:_____ |

**Attest:**

By:_____
Amy Lind, City Clerk

Date:_____

**Approved as to form:**

By:_____
Gary B. Bell, City Attorney

Date:_____

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**PAYMENT BOND**

**SCHEDULE I – HELICOPTER PARKING AREA**
**A.I.P. 3-06-0012-17**
**IN THE CITY OF AUBURN, CALIFORNIA**

WHEREAS, the City of Auburn, as AGENCY has awarded to _____, as CONTRACTOR, a contract for the above-stated project;

AND WHEREAS, CONTRACTOR is required to furnish a bond in connection with the contract, to secure the payment of claims of laborers, mechanics, material persons, and other persons as provided by law;

NOW THEREFORE, we, the undersigned CONTRACTOR and SURETY, are held and firmly bound unto AGENCY in the sum of _____ Dollars ($_____) which is one hundred percent (100%) of the total contract amount for the above-stated project, for which payment well and truly to be made we bind ourselves, our heirs, executors and administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITIONS OF THIS OBLIGATION IS SUCH that if CONTRACTOR, its heirs, executors, administrators, successors, assigns or subcontractors, shall fail to pay any of the persons named in Civil Code Section 3181, or amounts due under the Unemployment Insurance Code with respect to work or labor withheld, and to pay over to the Employment Development Department from the wages of employees of the CONTRACTOR and its subcontractors pursuant to Section 13020 of the Unemployment Insurance Code, with respect to such work and labor, that the surety or sureties herein will pay for the same in an amount not exceeding the sum specified in this bond, otherwise the above obligation shall be void. In case suit is brought upon this bond, SURETY will pay reasonable attorneys' fees to the plaintiffs and AGENCY in an amount to be fixed by the court.

This bond shall inure to the benefit to any of the persons named in Civil Code Section 3181 as to give a right of action to such persons or their assigns in any suit brought upon this bond.

The SURETY hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or the specifications accompanying it shall in any manner affect SURETY's obligations on this bond. The SURETY hereby waives notice of any such change, extension, alteration or addition and hereby waives the requirements of Section 2845 of the Civil Code as a condition precedent to any remedies AGENCY may have.

IN WITNESS WHEREOF the parties hereto have set their names, titles, hands, and seals this day of _____, 2022.

Contractor* Contractor's Signer's Name, Title
Contractor's Business Name
Mailing Street Address
City, State, Zip Code
Telephone #

Surety* _____
_____
_____
_____

*Provide CONTRACTOR and SURETY name, address and telephone number and the name, title, address and telephone number for the respective authorized representatives. Power of Attorney must be attached.

Subscribed and sworn to this___ day of _____, 2022.

NOTARY PUBLIC..... (SEAL)

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**FAITHFUL PERFORMANCE BOND**

**SCHEDULE I – HELICOPTER PARKING AREA**
**A.I.P. 3-06-0012-021-2022**
**IN THE CITY OF AUBURN, CALIFORNIA**

KNOW ALL PERSONS BY THESE PRESENTS That _____, hereinafter referred to as "CONTRACTOR" as PRINCIPAL, and _____ , a corporation duly organized and doing business under and by virtue of the laws of the State of California and duly licensed for the purpose of making, guaranteeing, or becoming sole surety upon bonds or undertakings as Surety, are held and firmly bound unto the CITY OF AUBURN, CALIFORNIA, hereinafter referred to as the "AGENCY" in the sum of _____Dollars ($_____); which is one hundred percent (100%) of the total contract amount for the above stated project; lawful money of the United States of America for the payment of which sum, well and truly to be made, we bind ourselves, our heirs, executors, administrators, assigns and successors, jointly and severally, firmly by these presents.

THE CONDITIONS OF THIS OBLIGATION ARE SUCH, that whereas CONTRACTOR has been awarded and is about to enter into a Contract with AGENCY to perform all work required pursuant to the contract documents for the project entitled: **SCHEDULE I – HELICOPTER PARKING AREA, A.I.P. 3-06-0012-021-2022** which Contract is by this reference incorporated herein, and is required by AGENCY to give this Bond in connection with the execution of the Contract;

NOW, THEREFORE, if CONTRACTOR and his or her Subcontractors shall well and truly do and perform all the covenants and obligations of the Contract on his or her part to be done and performed at the times and in the manner specified herein including compliance with all Contract specifications and quality requirements, then this obligation shall be null and void, otherwise it shall be and remain in full force and effect;

PROVIDED, that any alterations in the work to be done, or in the material to be furnished, which may be made pursuant to the terms of the Contract, shall not in any way release CONTRACTOR or the Surety thereunder, nor shall any extensions of time granted under the provisions of the Contract release either CONTRACTOR or said Surety, and notice of such alterations of extensions of the Contract is hereby waived by said Surety.

In the event suit is brought upon this Bond by AGENCY and judgment is recovered, said Surety shall pay all costs incurred by AGENCY in such suit, including a reasonable attorney's fee to be fixed by the Court.

IN WITNESS WHEREOF the parties hereto have set their names, titles, hands, and seals this ___ day of, 2020.

Contractor* SURETY*…….

……

……

……

……

*Provide CONTRACTOR and SURETY name, address and telephone number and the name, title, address and telephone number for their respective authorized representatives. Power of Attorney must be attached.

Subscribed and sworn to this___ day of _____ , 2022.

NOTARY PUBLIC ..... (SEAL)

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**MAINTENANCE BOND**

**SCHEDULE I – HELICOPTER PARKING AREA**
**A.I.P. 3-06-0012-021-2022**
**IN THE CITY OF AUBURN, CALIFORNIA**

KNOW ALL PERSONS BY THESE PRESENTS THAT WHEREAS, the City of Auburn, as AGENCY has awarded to_____, as CONTRACTOR, a contract for the above-stated project.
AND WHEREAS, CONTRACTOR is required to furnish a bond in connection with the contract guaranteeing maintenance thereof;
NOW, THEREFORE, we, the undersigned CONTRACTOR and SURETY, are held firmly bound unto AGENCY in the sum of _____Dollars ($_____ ), which is fifty percent (50%) of the total contract amount for the above-stated project to be paid to AGENCY, its successors and assigns, for which payment well and truly to be made, we bind ourselves, our heirs, executors and administrators, successors and assigns, jointly and severally, firmly by these presents.
THE CONDITIONS OF THIS OBLIGATION ARE SUCH that if CONTRACTOR shall remedy without cost to AGENCY any defects which may develop during a period of one (1) year from the date of recordation of the Notice of Completion of the work performed under the contract, provided such defects are caused by defective or inferior materials or work, then this obligation shall be void; otherwise it shall be and remain in full force and effect. In case suit is brought upon this bond, SURETY will pay reasonable attorneys' fees to the AGENCY in an amount to be fixed by the court.
IN WITNESS WHEREOF the parties hereto have set their names, titles, hands, and seals this____ day of ....., 2022.
Contractor*

SURETY* _____
_____
_____
_____

*Provide CONTRACTOR and SURETY name, address and telephone number and the name, title, address and telephone number for their respective authorized representatives. Powers of Attorney must be attached.
Subscribed and sworn to this ..... day of..... , 2022.
NOTARY PUBLIC ..... (SEAL)

(EXECUTE IN DUPLICATE)

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## WORKERS' COMPENSATION INSURANCE CERTIFICATE

The Contractor shall execute the following form as required by the California Labor Code, Sections 1860 and 1861:

> 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.

DATE: _____ _____

Contractor's Business Name

(Contractor)_____

By:

(Signature)_____

(Title)_____

Attest:
By: _____
(Signature)

_____
(Title)

Note: See Section 7 Responsibility of the Contractor, Paragraph 7-3 of the Standard Specifications for insurance carrier rating requirements.

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## ENDORSEMENTS TO INSURANCE POLICY

**Name of Insurance Company:**

**Policy Number:**

**Effective Date:**

The following endorsements are hereby incorporated by reference into the attached Certificate of Insurance as though fully set forth thereon:

1. The naming of an additional insured as herein provided shall not affect any recovery to which such additional insured would be entitled under this policy if not named as such additional insured, and
2. The additional insured named herein shall not be held liable for any premium or expense of any nature on this policy or any extensions thereof, and
3. The additional insured named herein shall not by reason of being so named be considered a member of any mutual insurance company for any purpose whatsoever, and
4. The provisions of the policy will not be changed, suspended, canceled or otherwise terminated as to the interest of the additional insured named herein without first giving such additional insured twenty (20) days' written notice.
5. Any other insurance held by the additional insured shall not be required to contribute anything toward any loss or expense covered by the insurance, which is referred to by this certificate.
6. **The company provided insurance for this certificate is a company licensed to do business in the State of California with a Best's rating of A+ VII or greater.**

**It is agreed that the City of Auburn, its officers and employees, are included as Additional Insureds under the contracts of insurance for which the Certificate of Insurance is given.**

_____

**Authorized Insurance Agent**

**Date:** _____

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**STATEMENT REGARDING INSURANCE COVERAGE**
**SCHEDULE I – HELICOPTER PARKING AREA**
**A.I.P. 3-06-0012-021-2022**
**IN THE CITY OF AUBURN, CALIFORNIA**

The undersigned representative of Bidder hereby certifies that he/she has reviewed the insurance coverage requirements specified in **7-3 LIABILITY INSURANCE** of Section E, Standard Specifications. Should Bidder be awarded the contract for the work, the undersigned further certifies that Bidder can meet all of these specification requirements for insurance including insurance coverage of his/her subcontractors.

NAME OF BIDDER: .....

MAILING ADDRESS: .....

.....

.....

AUTHORIZED SIGNATURE: .....

TITLE: .....

DATE: .....

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## STATEMENT REGARDING CONTRACTOR'S LICENSING LAWS

## SCHEDULE I – HELICOPTER PARKING AREA
## A.I.P. 3-06-0012-021-2022
## IN THE CITY OF AUBURN, CALIFORNIA

[Business & Professions Code § 7028.15]
[Public Contract Code § 20103.5]

I, the undersigned, certify that I am aware of the following provisions of California law and that I, or the entity on whose behalf this certification is given, hold a currently valid California contractor's license as set forth below:

*Business & Professions Code § 7028.15*:

a) **It is a misdemeanor for any person to submit a bid to a public agency to engage in the business or act in the capacity of a contractor within this state without having a license therefor,** except in any of the following cases:

(1)The person is particularly exempted from this chapter.

(2)The bid is submitted on a state project governed by Section 10164 of the Public Contract Code or on any local agency project governed by Section 20104 [now § 20103.5] of the Public Contract Code.

b) If a person has been previously convicted of the offense described in this section, the court shall impose a fine of 20 percent of the price of the contract under which the unlicensed person performed contracting work, or four thousand five hundred dollars ($4,500), whichever is greater, or imprisonment in the county jail for not less than 10 days nor more than six months, or both.

In the event the person performing the contracting work has agreed to furnish materials and labor on an hourly basis, "the price of the contract" for the purposes of this subdivision means the aggregate sum of the cost of materials and labor furnished and the cost of completing the work to be performed.

c) This section shall not apply to a joint venture license, as required by Section 7029.1. However, at the time of making a bid as a joint venture, each person submitting the bid shall be subject to this section with respect to his/her individual licenser.

d) This section shall not affect the right or ability of a licensed architect, land surveyor, or registered professional engineer to form joint ventures with licensed contractors to render services within the scope of their respective practices.

e) Unless one of the foregoing exceptions applies, a bid submitted to a public agency by a contractor who is not licensed in accordance with this chapter shall be considered nonresponsive and shall be rejected by the public agency. Unless one of the foregoing exceptions applies, a local public agency shall, before awarding a contract or issuing a purchase order, verify that the contractor was properly licensed when the contractor submitted the bid. Notwithstanding any other provision of law, unless one of the foregoing exceptions applies, the registrar may issue a citation to any public officer or employee of a public entity who knowingly awards a contract or issues a purchase order to a contractor who is not licensed pursuant to this chapter. The amount of civil penalties, appeal, and finality of such citations shall be subject to Sections 7028.7 to 7028.13, inclusive. **Any**

**contract awarded to, or any purchase order issued to, as contractor who is not licensed pursuant to this chapter is void.**

f) Any compliance or noncompliance with subdivision (e) of this section, as added by Chapter 863 of the Statutes of 1989, shall not invalidate any contract or bid awarded by a public agency during which time that subdivision was in effect.

g) A public employee or officer shall not be subject to a citation pursuant to this section if the public employee, officer, or employing agency made an inquiry to the board for the purposes of verifying the license status of any person or contractor and the board failed to respond to the inquiry within three business days. For purposes of this section, a telephone response by the board shall be deemed sufficient.

*Public Contract Code § 20103.5:*

In all contracts subject to this part where federal funds are involved, no bid submitted shall be invalidated by the failure of the bidder to be licensed in accordance with the laws of this state. However, at the time the contract is awarded, the contractor shall be properly licensed in accordance with the laws of this state. The first payment for work or material under any contract shall not be made unless and until the Registrar of Contractors verifies to the agency that the records of the Contractors' State License Board indicate that the contractor was properly licensed at the time the contract was awarded. Any bidder or contractor not so licensed shall be subject to all legal penalties imposed by law, including, but not limited to, any appropriate disciplinary action by the Contractors' State License Board. The agency shall include a statement to that effect in the standard form of pre-qualification questionnaire and financial statement. **Failure of the bidder to obtain proper and adequate licensing for an award of a contract shall constitute a failure to execute the contract and shall result in the forfeiture of the security of the bidder.**

Contractors License Number: _____

License Expiration Date: _____

Authorized Signature: _____

Date: _____

**SECTION E**
**SCHEDULE I – HELICOPTER PARKING AREA**
**A.I.P. 3-06-0012-021-2022**
**IN THE CITY OF AUBURN, CALIFORNIA**

# E-STANDARD SPECIFICATION

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**STANDARD SPECIFICATIONS**
**SCHEDULE I – HELICOPTER PARKING AREA**
**A.I.P. 3-06-0012-021-2022**
**IN THE CITY OF AUBURN, CALIFORNIA**

## 0-1 STANDARD SPECIFICATIONS

Except as noted in section 0-3 below, the provisions of the 2010 Edition of the Caltrans Standard Specifications, with the latest supplements, updates, and amendments, prepared and promulgated by the California Department of Transportation, are adopted as the "Standard Specifications" for the Agency.

## 0-2 NUMBERING OF SECTIONS

The Special Provisions stated below will be numbered as Sections 700 through 799. Subsections of architectural work may be numbered according to the Construction Specifications Institute ("CSI") format.

## 0-3 AMENDMENTS AND MODIFICATIONS

Division I "General Provisions" of the Caltrans Standard Specifications is deleted in its entirety and replaced with the following provisions. The remaining provisions of the 2010 Caltrans Standard Specifications, and any updates, supplements or amendments to those remaining provisions will remain in effect unless they conflict with other provisions set forth in this Agreement. In the event of any inconsistencies between the following Standard Specifications and those set forth in the Caltrans Standard Specifications, the following provisions shall control.

**1-1 TERMS**. 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 DEFINITIONS

**Acceptance** – The AGENCY's formal written acceptance of a project that 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 City of Auburn.

**Agent** – Shall include persons and companies, other than the CONTRACTOR, retained by the City to perform design and construction services in relation to the Work.

**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. The City Council.

**Bond** – Bid, performance, and payment bond or other instrument of security.

**Cash Contract** – A Contract financed by means other than special assessments.

**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.

**City** – The City of Auburn, California, as the AGENCY and Owner.

**City Council** – City Council of the City of Auburn, California.

**Code** – The terms *Government Code, Labor Code*, etc., refer to codes of the State of California.

**Construction Manager** – Persons and/or company retained by the City to perform construction management services.

**Contract** – The written agreement between the AGENCY and the CONTRACTOR covering the Work.

**Contract Documents** – Including, but not limited to: the Contract, any Addendum (which pertain to the contract documents), Notice Inviting Bids, Instructions 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, the general conditions, permits from other agencies, the Special Provisions, the Plans, Standard Plans, Standard Specifications, Reference Specifications, and all Modifications issued after the execution of the Contract.

**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 issues 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 stated 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's days unless otherwise specified.

**Design Engineer** – Persons and/or company retained by the City to perform engineering design services.

**Due Notice** – A written notification, provided in due time, of a proposed action, where the contract requires such notification within a specified time (usually 48 hours or two working days) prior to the commencement of the contemplated action.

**Electrolier** – Street light assembly complete, including foundation, standard, luminaire arm, luminaire, etc.

**Engineer** – The City Engineer of the City of Auburn, or his/her authorized representative.

**Geotechnical Engineer** – Person licensed to practice Soils Engineering or Geotechnical Engineering pursuant to the laws of the State of California and retained by the AGENCY during construction.

**Geotextile** – Synthetic fiber used in civil engineering applications, serving the primary functions 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 mainline 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 assembles (and ballast if so specified).

**Luminaire Arm** – The structural member, bracket, or mast arm, which, mounted on the 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.

**Person** – Any individual, firm, association, partnership, corporation, trust, joint venture, or other legal entity.

**Plans** – The drawings, profiles, cross sections, working 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 test, 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** – Service connections are all or any portion of the conduit, cable, or duct, including meter, between a utility distribution line and an individual consumer.

**Sewer** – Any conduit intended for the reception and transfer of sewage and fluid industrial waste.

**Special Provisions** – Additions and revisions to the Standard Specifications setting for the conditions and requirements peculiar to the Work.

**Specifications** – Standard Specifications, Reference Specifications, Special Provisions, and specifications in 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** – "Standard Plans for Public Works Construction" or "SSPWC" – Latest edition of the Southern California Chapter of the American Public Works Association.

**State Standard Specifications ("SSS")** – Standard Specifications prepared by the State of California, Business and Transportation Agency, Department of Transportation.

**State Standard Plans ("SSP")** – Standard Plans prepared by State of California, Business and Transportation Agency, Department of Transportation.

**State** – State of California.

**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 materials 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 materials 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** – Any individual, firm, or corporation, bound with and for the CONTRACTOR for the acceptable performance, execution, and completion of the Work, and for the satisfaction of all obligations incurred.

**Tonne** – Also referred to as "metric ton" — Represents a unit of measure in the International System of Units equal to 1,000 kilograms.

**Utility** – Tracks, overhead or underground wires, pipeline, 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 Days** – Any days, except: (1) Saturdays, Sundays, legal holidays on which Auburn City Hall is closed for business; (2) days when work is suspended by the Engineer for reasons unrelated to the performance of the CONTRACTOR, and provided in Subsections 6-3 and 6-3.1; and (3) days determined to be non-working in accordance with Section 6-7 "Time of Completion"

## 1-3 ABBREVIATIONS

**1-3.1 Common Usage Terms.** These Standard Specifications incorporate by reference the list of common usage terms in the edition of the "Standard Plans for Public Works Construction" with the following additions:

ARAM Asphalt Rubber Aggregate Membrane

ARHM Asphalt Rubber Hot Mix

**1-3.3 Institutions.** These Standard Specifications incorporate by reference the list of commonly used institution terms in the edition of the "Standard Plans for Public Works Construction" (aka the Greenbook) with the following additions:

| | |
|---|---|
| ACI | American Concrete Institute |
| AGCA | Associated General CONTRACTORs of America |
| APWA | American Public Works Association |
| ASME | American Society of Mechanical Engineers |
| CRSI | Concrete Reinforcing Steel Institute |
| CSI | Construction Specifications Institute |
| IEEE | Institute of Electric and Electronic Engineers |
| NFPA | National Fire Protection Association |
| SSS | State of California Standard Specifications, latest edition, Department of Transportation |
| SSP | State of California Standard Plans, latest edition, Department of Transportation. |
| SSPWC | Standard Specifications for Public Works Construction |
| NEMA | National Electrical Manufacturers Association |

## 1-4 UNITS OF MEASURE

**1-4.1 General.** U.S. Standard Measures, also called U.S. Customary System, are the principal measurement system in these specifications and shall be used for construction, unless otherwise stated in the Contract Documents. The International System of Units, also referred to as SI or the metric system, may be included in parenthesis. SI units and U.S. Standard Measures in parenthesis may or may not be exactly equivalent. Certain materials specifications and test requirements contained herein use SI units specifically and conversions to U.S. Standard Measures have not been included in these circumstances.

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.

**1-4.2 Units of Measure and Their Abbreviations.**

| U.S. Customary Unit (Abbreviations) | Equal To | SI Unit (Abbreviations) |
|---|---|---|
| 1 mil (= 0.0001 in) | ..... | 25.4 micrometer (μm) |
| 1 inch (in) | ..... | 25.4 millimeter (mm) |
| 1 inch (in) | ..... | 2.54 centimeter (cm) |
| 1 foot (ft) | ..... | 0.3048 meter (m) |
| 1 yard (yd) | ..... | 0.9144 meter (m) |
| 1 mile (mi) | ..... | 1.6093 kilometer (km) |
| 1 square foot ($ft^2$) | ..... | 0.0929 square meter ($m^2$) |
| 1 square yard ($yd^2$) | ..... | 0.8361 square meter ($m^2$) |
| 1 cubic foot ($ft^3$) | ..... | 0.0283 cubic meter ($m^3$) |
| 1 cubic yard ($yd^3$) | ..... | 0.7646 cubic meter ($m^3$) |
| 1 acre | ..... | 0.4047 hectare (ha) |
| 1 U.S. gallon (gal) | ..... | 3.7854 Liter (L) |
| 1 fluid ounce (fl. oz.) | ..... | 29.5735 milliliter (mL) |
| 1 pound mass (lb) (avoirdupois) | ..... | 0.4536 kilogram (kg) |
| 1 ounce mass (oz) | ..... | 0.02835 kilogram (kg) |
| 1 Ton (= 2000 lb avoirdupois) | ..... | .09072 Tonne (= 907 kg) |
| 1 Poise | ..... | 0.1 pascal˙second (Pa˙s) |
| 1 centistoke (cs) | ..... | 1 square millimeters per second ($mm^2/s$) |
| 1 pound force (lbf) | ..... | 4.4482 Newton (N) |
| 1 pounds per square inch (psi) | ..... | 6.8948 Kilopascal (kPa) |
| 1 pound force per foot (lbf/ft) | ..... | 1.4594 Newton per meter (N/m) |
| 1 foot-pound force (ft-lbf) | ..... | 1.3558 Joules (J) |
| 1 foot-pound force per second ([ft-lbf]/s) | ..... | 1.3558 Watt (W) |
| 1 part per million (ppm) | | 1 milligram /liter (mg/L) |

**Temperature Units and Abbreviations**

Degree Fahrenheit (˚F):
˚F = (1.8 x ˚C) + 32

Degree Celsius (˚C):
˚C = (˚F – 32) / 1.8

**SI Units (abbreviation) Commonly Used in Both Systems**

1 Ampere (A)

1 Volt (V)

1 Candela (cd)

1 Lumen (lm)

1 second (s)

**Common Metric Prefixes**

| | |
|---|---|
| kilo (k) ..... | $10^{3}$ |
| centi (c) ..... | $10^{-2}$ |
| milli (m) ..... | $10^{-3}$ |
| micro (μ) ..... | $10^{-6}$ |
| nano (n) ..... | $10^{-9}$ |
| pico (p) ..... | $10^{-12}$ |

**1-5 SYMBOLS**

| | |
|---|---|
| Δ | Delta, the central angle or angle between tangents |
| ∠ | Angle |
| % | Percent |
| ′ | Feet or minutes |
| ″ | Inches or seconds |
| # | Number |
| / | per or (between words) |
| ° | Degree |
| PL | Property line |
| CL | Centerline |
| SL | Survey line or station line |

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## SECTION 2 – SCOPE AND CONTROL OF WORK

**2-1 AWARD AND EXECUTION OF CONTRACT**. Award and execution of Contract will be as provided for in the Specifications, Instructions to Bidders, or Notice Advertising for Bids. The City reserves the right to reject any or all proposals.

**2-1.1 Investigation of Site Conditions.** Prior to submittal of the bid, Bidders must visit the site of work and complete their own investigations to satisfy themselves as to the existing conditions affecting the work to be done under these specifications. If the bidder chooses not to visit the site or conduct investigations, he will, nevertheless, be charged with the knowledge of conditions which reasonable inspection and investigation would have disclosed.

After the project is awarded the CONTRACTOR shall carefully study and compare the Contract Documents with each other and with information available to the CONTRACTOR and furnished by the Owner and shall immediately notify the Engineer of errors, inconsistencies or omissions discovered. If the CONTRACTOR performs any construction activity knowing it involves a recognized error, inconsistency or omission in the Contract Documents without such notice to the Engineer, the CONTRACTOR shall assume appropriate responsibility for such performance and may assume responsibility for the full costs for correction.

The CONTRACTOR shall make field measurements and verify field conditions and shall carefully compare such field measurements and conditions and other information known to the CONTRACTOR with the Contract Documents before commencing activities. Errors, inconsistencies or omissions discovered shall be reported to the Engineer immediately.

When existing conditions are encountered which, in the opinion of the Engineer, require temporary suspension of work for design modifications or for other determinations to be made, the CONTRACTOR shall move to other areas of work until such determinations are made at no cost to the City. No additional compensation will be allowed by reason of such temporary suspension of work, or modifications to work, except as noted in Section 3 of these Standard Specifications ("Changes in Work") for specific items of work not included in the bid. Appropriate extension of item for completion may be allowed where justification in the opinion of the Engineer.

**2-1.2 Award of Contract.** The Contract will be awarded, if at all, to the lowest responsible and responsive 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. Refusal or failure to deliver the executed contract, bonds, or insurance in the form provided in the Contract and approved by the AGENCY's attorney within the time provided herein shall be cause, at the AGENCY's option, for the annulment of the award and forfeiture of the bid security. In such event, the AGENCY may successively award the Contract to the next lowest responsible and responsive Bidder until a properly executed Contract, bonds, and insurance is obtained, or it may at any time reject all remaining bids and proceed as provided by law. The refusal or failure of a successive lowest responsible and responsive Bidder to execute the Contract may, at the AGENCY's option, result in an annulment of the award to that Bidder and the forfeiture of that Bidder's bid security. The periods of time specified above within which the award of the Contract may be made shall be subject to extension for such further period as may be agreed upon in writing between the AGENCY and the concerned Bidder.

The AGENCY reserves the right to waive any irregularities.

Within ten (10) calendar days after the date of the Notice of Award, the CONTRACTOR shall execute and return the following contract documents to the AGENCY:

Contract Agreement (in duplicate)
Faithful Performance Bond (in duplicate)
Maintenance Bond (in duplicate)
Payment Bond (in duplicate)
Public Liability and Property Damage Insurance Certificate (two original)
Additionally Insured Endorsement
Workers' Compensation Insurance Certificate (two original)

A corporation to which an award is made may be required, before the Contract agreement is executed by the AGENCY, to furnish evidence of its corporate existence, of its right to enter into contracts in the State of California, and that the officers signing the contract and bonds for the corporation have the authority to do so.

**2-2 ASSIGNMENT.** No Contract or portion thereof may be assigned without consent of the City Council, 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 City Council to the Extent permitted by law. Any assignment of money shall be subject to all property 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 Public Contract Code including Sections 4100 through 4113. The following excerpts or summaries of some of the requirements of this Chapter are included below for information:

The Bidder shall set forth in the Bid, as provided in 4104:

"(a) The name and location of the place of business 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."

"(b) The portion of the work which will be done by each such subcontractor under this act. The prime CONTRACTOR shall list only one subcontractor for each such portion as is defined by the prime CONTRACTOR in his bid."

Subcontracting of more than one-half of one percent of the work for which no Subcontractor was designated in the original Bid will be allowed only in cases of public emergency or necessity and only after the Engineer makes a written finding of circumstances constituting public emergency or necessity.

The CONTRACTOR must obtain written consent of the City Council to substitute a Subcontractor designated in the original Bid, to permit any subcontract to be assigned or transferred, or to otherwise allow a subcontract to be performed by anyone other than the originally designated Subcontractor.

A violation of any of the above provisions will be considered a violation of the Contract, and the City may cancel the Contract and collect appropriate damages or assess the CONTRACTOR a penalty of not more than ten (10) percent of the subcontract involved.

If subcontracted work is not being performed in a satisfactory manner, the City will notify the CONTRACTOR of the need to take corrective action and the Engineer may report the facts to the City Council. Upon order by City Council and the CONTRACTOR's receipt of written instructions from the Engineer, the Subcontractor shall immediately be removed from the Work and may not again be employed on the Work.

**2-3.2 Additional Responsibility.** The CONTRACTOR shall give personal attention to the fulfillment of the Contract and shall keep the Work under its control.

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. Where an entire item is subcontracted, the value of work subcontracted will be based on the Contract Unit Price. When a portion of an item is subcontracted, the value of work subcontracted will be based on the estimated percentage of 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 and business of each Subcontractor and description and value of each portion of the work to be so subcontracted.

**2-3.3 Status of Subcontractors.** All persons engaged in the Work, including Subcontractors and their employees, will be considered employees of the CONTRACTOR. The CONTRACTOR will be held responsible for their work. The AGENCY will deal directly and solely with the CONTRACTOR and make all payments to the CONTRACTOR.

**2-4 CONTRACT BONDS.** Before execution of the Contract, the Bidder shall file surety bonds with the AGENCY to be approved by the City Council in the amounts and for the purposes noted below. Bond 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" (Materials and Labor Bond) shall be for not less than 100 percent of the Contract Price, to satisfy claims of materials 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 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 all warranty periods set forth in the Contract.

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 City Council, 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 City Council.

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.

The PAYMENT BOND shall remain in force until thirty-five (35) calendar days after the date of recordation of the Notice of Completion. The FAITHFUL PERFORMANCE BOND shall remain in force until the date of recordation of the Notice of Completion. The MAINTENANCE BOND shall remain in force until one (1) year after the date of recordation of the Notice of Completion.

All bonds must be accompanied by a Power of Attorney.

**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 on or specified in both.

The Plans shall be supplemented by such working drawings and shop drawings are necessary to adequately control the Work.

The CONTRACTOR shall ascertain the existence of any conditions affecting the cost of the Work through a 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.

All final locations determined in the field, and any deviations from the Plans and Specification, shall be marked in red on the documents to show the as-built conditions. CONTRACTOR shall maintain a complete and accurate record of all changes of construction from that shown in these plans and specifications for the purpose of providing a basis for construction record drawings. No changes shall be made without prior written approval of the Engineer. Upon completion of the Project, CONTRACTOR shall deliver this record of all construction changes to the Engineer along with a letter which declares that other than these noted changes “the Project was constructed in conformance with the Contract Documents.” Final payment will not be made until this requirement is met.

As the figured dimensions shown on the drawings and in the specifications of the Contract may not in every case agree with scaled dimensions, the figured dimensions shall be followed in preference to the scaled dimensions, and drawings to a large scale shall be followed in preference to the drawings to a small scale. Should it appear that the work to be performed, or any related matter, are not sufficiently detailed or explained in the Contract documents, the CONTRACTOR shall apply to the Engineer for such further explanations as necessary, and shall conform to such further explanations provided by the Engineer as part of the Contract to the extent that it is consistent with the terms of the Contract.

Caution: The engineer preparing these plans will not be responsible or liable for unauthorized changes to or uses of these plans. All changes to the plans must be approved in writing by the Engineer.

**2-5.1.1 Record of Construction Changes/As-Builts.** CONTRACTOR shall maintain a complete and accurate record of all changes of construction from that shown in these Plans and Specifications for the purpose of providing a basis for construction record drawings. No changes shall be made without prior written approval of the City Engineer.

Upon completion of the Project, CONTRACTOR shall deliver this record of all construction changes to the Engineer along with a letter which declares that other than these noted changes that Project was constructed in conformance with the Contract Documents.

Caution: The engineer preparing these Plans will not be responsible for, or liable for, unauthorized changes to or uses of these Plans. All changes to the Plans must be approved in writing by City Engineer.

**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) Permits issued by jurisdictional regulatory agencies.
2) Change Orders and/or Supplemental Agreements; whichever occurs last.
3) FAA General Provisions
4) Contract/Agreement
5) Addenda.
6) Bid/Proposal.
7) Special Provisions.
8) Plans.
9) Standard Plans.
10) Standard Specifications.
11) Reference Specifications.

Detail drawings take precedence over general drawings.

**2-5.3 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 are drawings showing details not shown on the Plans which are required to be designed by the CONTRACTOR. 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, three of the copies will e 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 two of the copies to the CONTRACTOR and retain the remaining copies and the reproducible.

Working drawings are required in the following subsections:

SHEET INDEX:

| SHEET | DWG. NO | SHEET TITLE |
|---|---|---|
| 01 | G001 | COVER SHEET |
| 02 | G002 | INDEX OF DRAWINGS, SUMMARY OF APPROXIMATE QUANTITIES AND GENERAL NOTES |
| 03 | G003 | CONSTRUCTION OPERATION AND SAFETY PLAN |
| 04 | G004 | BORING LOG |
| 05 | G005 | CONSTRUCTION STAGING AND PHASING PLAN |
| 06 | C101 | EROSION CONTROL PLAN |
| 07 | C102 | EROSION CONTROL DETAILS |
| 08 | C201 | DEMOLITION PLAN |
| 09 | C301 | GEOMETRIC PLAN |
| 10 | C302 | GEOMETRIC PLAN - TAXIWAY D |
| 11 | C401 | GRADING AND DRAINAGE PLAN |
| 12 | C501 | PAVEMENT JOINT LAYOUT PLAN |
| 13 | C502 | PAVEMENT JOINT DETAILS |
| 14 | C503 | PAVEMENT SECTIONS |
| 15 | C504 | PAINT MARKINGS PLAN |
| 16 | C505 | GUIDANCE SIGN DETAILS |
| 17 | C506 | FENCE DETAILS |
| 18 | E101 | AIRFIELD LIGHTING PLAN |
| 19 | E102 | LIGHTING DETAILS |
| 20 | E103 | LIGHTING DETAILS |
| 21 | E103 | LIGHTING DETAILS |

Working drawings shall be prepared by a Civil or Electrical 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 verifications 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) Certifications per 4-1.5.

4) Construction Schedule per 6-1.

5) Confined Space Entry Program per 7-10.4.4.

6) Concrete mix designs per 201-1.1

7) Asphalt concrete mix designs per 203-6.1.

8) 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.

**2-6 WORK TO BE DONE.** The CONTRACTOR shall perform all work necessary to complete the Contract in a satisfactory manner. Unless otherwise provided, the CONTRACTOR shall furnish all materials, equipment, tools, labor, and incidentals necessary to complete the Work.

Any plan or method of work suggested by the AGENCY or the Engineer to the CONTRACTOR but not specified or required, if adopted or followed by the CONTRACTOR in whole or in part, shall be used at the risk and responsibility of the CONTRACTOR; and the AGENCY and the Engineer shall assume no responsibility therefore and in no way be held liable for any defects in the work which may result from or be caused by use of such plan or method of work.

**2-7 SUBSURFACE DATA.** All soil and test hole data, water table elevations, and soil analyses shown on the drawings or included in the Specifications apply only at the location of the test holes and to the depths indicated. Soil test reports for test holes which have been drilled are available for inspection at the office of the Engineer. Any additional subsurface exploration shall be done by Bidder or the CONTRACTOR at their own expenses.

**2-8 RIGHT-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.

When the CONTRACTOR arranges for additional work areas and facilities temporarily required by him/her, he/she shall provide the AGENCY with proof that the additional work areas and/or facilities have been left in a condition satisfactory to the owner(s) of said work areas and/or facilities prior to acceptance of the work.

**2-9 SURVEYING.** The CONTRACTOR will provide all necessary construction surveying, staking or markings for locating the limits of construction and shall comply with the provisions of 2-9 of these Standard Specifications. The CONTRACTOR shall bear all costs for restaking or marking.

Construction surveys shall be done only under the direction of the Engineer by a Registered (licensed) Land Surveyor or a Registered Civil Engineer authorized to practice land surveying within the state. The AGENCY will provide available record map information. The CONTRACTOR is responsible for obtaining all necessary record maps, centerline ties and survey notes from Los Angeles County.

The CONTRACTOR and his surveyor shall provide the Engineer with a copy of the constructing staking field notes used to construct the improvements. In addition, the CONTRACTOR shall also prove a plot of the improvements to be constructed based on the surveyor's construction staking and markings prior to the installation of the improvements. The plot shall be the same scale as the improvement plans.

**2-9.1 Permanent Survey Markers.** The CONTRACTOR shall notify the Engineer, or the owner on a Private Contract, at least 7 days before starting work to allow for the preservation of survey monuments, lot stakes (tagged), and bench marks.

The CONTRACTOR shall protect existing survey monuments, if any exist within the work limits, during the entire project. Asphalt overlaying of existing survey monuments in the roadway will not be permitted. In the event a surveyed monument lies within an area to be cold planed, removed or reconstructed, the CONTRACTOR shall immediately notify the AGENCY's representative and protect said monument until the monument is relocated.

The CONTRACTOR shall reestablish destroyed survey monuments at the CONTRACTOR's expense.

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 Registered (licensed) 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 oversee surveying adequate for construction. The CONTRACTOR shall preserve construction survey stakes and marks for the duration of their usefulness. If any construction survey stakes are lost or disturbed and need to be replaced, such replacement shall be by the CONTRACTOR at his expense.

The CONTRACTOR shall notify the Engineer in writing at least 2 working days before survey services take place for the laying out of any portion of the Work. The CONTRACTOR shall dig all holes necessary for line and grade stakes.

Unless otherwise specified, stakes will be set and stationed by the CONTRACTOR for curbs, headers, sewers, storm drains, structures, and rough grade. A corresponding cut or fill to finished grade (or flowline) will be indicated on a grade sheet.

**2-9.3 Line and Grade.** The CONTRACTOR shall be responsible for all survey and layout of work.

The line and grades for construction will be parallel to and offset from the position of the work. From the established lines and grades, the CONTRACTOR shall extend the necessary lines and grades for construction of the work and shall be responsible for the correctness of same.

All work shall conform to the lines, elevations, and grades shown on the Plans.

Three consecutive points set on the same slope shall be used together so that any variation from a straight grade can be detected. Any such variation shall be reported to the Engineer. In the absence of such report, the CONTRACTOR shall be responsible for any error in the grade of the finished work.

Grades for underground conduits will be set at the surface of the ground. The CONTRACTOR shall transfer them to the bottom of the trench.

**2-10 AUTHORITY OF COUNCIL AND ENGINEER.** The City Council 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 an authorized representative.

The decision of the Engineer is final and binding on all questions relating to: quantities; acceptability of materials, equipment, or work; execution, progress or sequence of work; and interpretation of the Plans, Specifications, or other drawings. This shall be precedent to any payment under the Contract, unless otherwise ordered by the City Council.

**2-11 INSPECTION.** The Work is subject to inspection and approval by 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 project 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.

The AGENCY shall inspect for compliance with requirements for 8-hour days and 40-hour weeks on normal working days. The CONTRACTOR shall reimburse the AGENCY, at rates established by the AGENCY, for any additional inspection, including inspection on legal holidays.

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## SECTION 3 – CHANGES IN WORK

### 3-1 CHANGES REQUESTED BY THE CONTRACTOR.

**3-1.1 General.** 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 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 no additional cost to the AGENCY.

### 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 the method of payment, any adjustment in the Contract time of completion, and when negotiated prices are involved, shall provide for the CONTRACTOR's signature indicating acceptance.

**3-2.2 Contract Unit Prices.**

**3-2.2.1 General.** If a change is ordered in an item of work covered by a Contract Unit Price, and such change does not involve substantial change in character of the work from that shown on the Plans or specified in the Specifications, then an adjustment in payment will be made. This adjustment will be based upon the increase or decrease in quantity and the Contract Unit Price.

If the actual quantity of an item of work covered by Contract Unit Price and constructed in conformance with the Plans and Specifications varies from the Bid quantity by 25 percent or less, payment will be made at the Contract Unit Price. If the actual quantity of said item of work varies from the Bid quantity by more than 25 percent, payment will be made per 3-2.2.2 or 3-2.2.3 as appropriate.

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 specified in the Specifications, an adjustment in payment will be made per 3-2.4.

**3-2.2.2 Increases of More than 25 Percent.** Should the actual quantity of an item of work covered by a Contract Unit Price and constructed in conformance with the Plans and Specifications, exceed the Bid quantity by more than 25 percent, payment for the quantity in excess of 125 percent of the Bid quantity will be made on the basis of an adjustment in the Contract Unit Price mutually agreed to by the CONTRACTOR and the AGENCY, or at the option of the Engineer, on the basis of Extra Work per 3.3.

The Extra Work per 3-3, basis of payment, shall not include fixed costs. Fixed costs shall be deemed to have been recovered by the CONTRACTOR through payment for 125 percent of the Bid quantity at the Contract Unit Price.

**3-2.2.3 Decreases of More Than 25 Percent.** Should the actual quantity of an item of work covered by a Contract Unit Price, and constructed in conformance with the Plans and Specifications, be less than 75 percent of the Bid quantity, an adjustment in payment will not be made unless so requested in writing by the CONTRACTOR. If the CONTRACTOR so requests, payment will be made on the basis of an adjustment in the Contract Unit Price mutually agreed to

by the CONTRACTOR and the AGENCY, or at the option of the Engineer, on the basis of Extra Work per 3.3; however, in no case will payment be less than would be made for the actual quantity at the Contract Unit Price nor more than would be made for 75 percent of the Bid quantity at the Contract Unit Price.

**3-2.3 Stipulated Unit Prices.** Stipulated Unit Prices are unit prices established by the AGENCY in the Contract Documents. Stipulated Unit Prices may be used for the adjustment of Contract changes when so specified in the Special Provisions.

**3-2.4 Agreed Prices.** Agreed Prices are prices for new or unforeseen work, or adjustments in Contract Unit Prices per 3-2.2, established by mutual agreement between the CONTRACTOR and the AGENCY. If mutual agreement cannot be reached, the Engineer may direct the CONTRACTOR to proceed on the basis of Extra Work in accordance per 3-3, except as otherwise specified in 3-2.2.2 and 3-2.2.3.

**3-2.5 Eliminated Items.** Should any Bid item be eliminated in its entirety, payment will be made to the CONTRACTOR for its actual costs incurred in connection with the eliminated item prior to notification in writing from the Engineer so stating its elimination.

If material conforming to the Plans and Specifications is ordered by the CONTRACTOR for use in the eliminated item prior to the date of notification of elimination by the Engineer, and if the order for the material cannot be canceled, payment will be made to the CONTRACTOR for the actual cost of the materials. In this case, the material shall become the property of the AGENCY. Payment will be made to the CONTRACTOR for its actual costs for any further handling. If the material is returnable, the materials shall be returned and payment will be made to the CONTRACTOR for the actual cost of charges made by the supplier for returning the material and for handling by the CONTRACTOR.

Actual costs, as used herein, shall be computed on the basis of Extra Work per 3-3.

## 3-3 EXTRA WORK.

**3-3.1 General.** New or unforeseen work will be classified as "extra work" when the Engineer determines that it is not covered by the 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 costs of labor will be the actual costs for wages of workers performing the extra work at the time the extra work is done, plus employer payments of payroll taxes, workers compensation insurance, liability insurance, health and welfare, pension, vacation, apprenticeship funds, and other direct costs, resulting from Federal, State, or local laws, as well as assessments or benefits required by lawful collection bargaining agreements.

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 equipment rental. The labor costs for foremen shall be proportioned to all of their assigned work and only that applicable to extra work will be paid.

Nondirect labor costs, including superintendence, shall be considered part of the markup of 3-3.2.3(a).

**(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 job 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 materials 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 in determining equipment rental costs shall not exceed listed rates prevailing locally at equipment rental agencies, or distributors, at the time the work is performed.

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 included.

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 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 time for equipment already at the Work site shall be the duration of its use on the extra work. This time begins when equipment is first put into actual operation on the extra work, plus the time required to move it from its previous site and back, or to a closer site.

**(d) Other Items.** The AGENCY may authorize other items which may be required on the extra work, including labor, services, materials, and equipment. These items must be different in their nature from those required for the Work, and be of a type not ordinarily available from the CONTRACTOR of Subcontractors.

Invoices covering all such items in detail shall be submitted with the request for payment.

**(e) Invoices.** Vendors' invoices for materials, 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.** Unless otherwise provided in the Special Provisions, a reasonable allowance for overhead and profit shall be added to the CONTRACTOR's costs as determined under 3-3.2.2 and shall constitute the markup for all overhead and profit on work by the CONTRACTOR. The CONTRACTOR shall also be compensated for the actual increase in the CONTRACTOR's bond premium caused by the extra work.

**(b) Work by Subcontractor.** When any of the extra work is performed by a Subcontractor, the markup established in 303.2.3(a) shall be applied to the Subcontractor's costs as determined under 3-3.2.2. Unless otherwise provided in the Special Provisions, a reasonable

allowance for the CONTRACTOR's overhead and profit shall be added to the sum of the Subcontractor's costs and markup and shall constitute the markup for all overhead and profit for the CONTRACTOR on work by the Subcontractor.

**3-3.3 Daily Reports by CONTRACTOR.** When the price for the extra work cannot be agreed upon, the CONTRACTOR shall submit a daily report to the Engineer on forms approved by the AGENCY. Included are applicable delivery tickets, listing all labor, materials, and equipment involved for that day, and other services and expenditures when authorized. Failure to submit the daily report by the close of the next working day may waive any rights for that day. An attempt shall be made to reconcile the 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 report. Reports by Subcontractors or others shall be submitted through the CONTRACTOR.

The 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 operations, including loading and transportation, if applicable.
4. Describe other services and expenditures in such detail as the AGENCY may require.

**3-4 CHANGED CONDITIONS.** The CONTRACTOR shall promptly notify the Engineer of the following Work site conditions (hereinafter called changed conditions), in writing, 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 will materially affect costs, 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 they will materially affect 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 do not justify an adjustment in compensation, the CONTRACTOR will be 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 the decision, it may submit a written notice of potential claim to the Engineer before commencing the disputed work. In the event of such a dispute, the CONTRACTOR shall not be excused from any scheduled completion date provided by the Contract and shall proceed with all work to be performed under the Contract. However, the CONTRACTOR shall

retain any and all rights provided by either Contract or 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 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.

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## 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. Materials 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 materials 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.

The CONTRACTOR and all subcontractors, suppliers, and vendors, shall guarantee that the entire Work will meet all requirements of this Contract as to the quality of materials, equipment, and workmanship. The CONTRACTOR, at no cost to the AGENCY, shall make any repairs or replacements made necessary by defects in materials, equipment, or workmanship that become evident within one year after the date of recordation of the Notice of Completion. Within this one year period, the CONTRACTOR shall also restore to full compliance with the requirements of this Contract any portion of the Work which is found not to meet those requirements. The CONTRACTOR shall defend, indemnify, and hold the AGENCY, its officers, agents, and employees harmless from claims of any kind due to injuries or damages arising, directly or indirectly, from said defects or noncompliance.

The CONTRACTOR shall make all repairs, replacements, and restorations within thirty-five (35) days after the date of the Engineer's written notice.

If, in the opinion of the Engineer, the defective work is not of sufficient magnitude or importance to make the work dangerous or undesirable, or if, in the opinion of the Engineer, the removal of such work is impractical or will create conditions which are dangerous or undesirable, the AGENCY shall have the right and authority to retain such work instead of requiring it to be removed and reconstructed, but will make such deductions thereof in the payments due or to become due to the CONTRACTOR as the AGENCY may deem just and reasonable.

**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 such typical materials and fabricated items as bituminous paving 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) and 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 job 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 judge the materials by the requirements of 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. For private contracts, all costs of inspection at the source, including salaries and mileage costs, shall be paid by the permittee.

**4-1.4 Test 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 tis expense, shall deliver the materials for testing to the place and at the time designated by the Engineer. Except as elsewhere specified, the AGENCY will bear the cost of testing material and/or workmanship which meet or exceed the requirements indicated in the Standard Specifications and the Special Provisions. The CONTRACTOR shall bear the cost of all other tests, including the retesting of material or workmanship that fails to pass the first test.

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 renotify the Engineer when samples which are representative may be obtained.

There will be inspection of this project to ensure strict adherence to these specifications. During the course of work, CONTRACTOR shall be responsible for calling the Project Engineer for testing and inspection (48) hours in advance. Work not properly tested and inspected will be subject to rejection.

Any work done in unauthorized areas or in a manner unacceptable to the inspector may not be accepted and/or paid for.

**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. Approval of equipment and materials offered as equivalents to those specified must be obtained prior to the opening of bids as set forth in the Instructions to Bidders.

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.

Along with information supplied by the CONTRACTOR regarding equivalency of the proposed item, the CONTRACTOR shall clearly identify all deviations from the specified item. Deviations discovered by the Engineer after acceptance of an "or equal" item which were not identified by the CONTRACTOR with his/her submittal shall be cause for rejection of the "or equal" item. CONTRACTOR shall be due no additional compensation in time or money for acceptance or rejection of a proposed "or equal" item and subsequent replacement with the item specified. CONTRACTOR shall pay cost to AGENCY for items requiring more than two submittals and analysis of any shop drawing which requires more than a general review of an "or equal" item.

**4-1.7 Weighing and Metering Equipment.** All scales and metering equipment 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.

**4-1.9 Construction Materials Dispute Resolution (Soils, Rock Materials, Concrete, Mortar and Related Materials, Masonry Materials, Bituminous Materials, Rock Products, and Modified Asphalts).** In the interest of safety and public value, whenever credible evidence arises to contradict the test values of materials, the AGENCY and the CONTRACTOR will initiate an immediate and cooperative investigation. Test values of materials are results of the materials' tests, as defined by these Specifications or by the special provisions, required to accept the Work. Credible evidence is process observations or test values gathered using industry accepted practices. A contradiction exists whenever work acceptance or performance becomes suspect. The investigation shall allow access to all test results, procedures, and facilities relevant to the disputed work and consider all available information and, when necessary, gather new and additional information in an attempt to determine the validity, the cause, and if necessary, the remedy to the contradiction. If the cooperative investigation reaches any resolution mechanism acceptable to both the AGENCY and the CONTRACTOR, the contradiction shall be considered resolved and the cooperative investigation concluded.

Whenever the cooperative investigation is unable to reach resolution, the investigation may then either conclude without resolution or continue by written notification of one party to the other requesting the implementation of a resolution process by committee. The continuance of the investigation shall be contingent upon recipient's agreement and acknowledged in writing within 3 calendar days after receiving a request. Without acknowledgement, the investigation shall conclude without resolution. The committee shall consist of three State of California Registered Civil Engineers. Within 7 calendar days after the written request notification, the AGENCY and the CONTRACTOR will each select one engineer. Within 14 calendar days of the written request notification, the two selected engineers will select a third engineer. The goal in selection of the third member is to complement the professional experience of the first two engineers. Should the two engineers fail to select the third engineer, the AGENCY and the CONTRACTOR shall each propose 2 engineers to be the third member within 21 calendar days after the written request notification. The first two engineers previously selected shall then select one of the court proposed engineers in a blind draw.

The committee shall be a continuance of the cooperative investigation and will re-consider all available information and if necessary gather new and additional information to determine the validity, the cause, and if necessary, the remedy to the contradiction. The committee will focus upon the performance adequacy of the material(s) using standard engineering principles and practices and to ensure public value, the committee may provide engineering recommendations as necessary. Unless otherwise agreed, the committee will have 30 calendar days from its formation to complete their review and submit their findings. The final resolution of the committee shall be by majority opinion, in writing, stamped and signed. Should the final resolution not be unanimous, the dissenter may attach a written, stamped, and signed minority opinion.

Once started, the resolution process by committee shall continue to full conclusion unless:

1. Within 7 days of the formation of the committee, the AGENCY and the CONTRACTOR reach an acceptable resolution mechanism; or
2. Within 14 days of the formation of the committee, the initiating party withdraws its written notification and agrees to bear all investigative related costs thus far incurred; or
3. At any point by the mutual agreement of the AGENCY and the CONTRACTOR.

Unless otherwise agreed, the CONTRACTOR shall bear and maintain a record for all the investigative costs until resolution. Should the investigation discover assignable causes for the contradiction, the assignable party, the AGENCY or the CONTRACTOR, shall bear all costs associated with the investigation. Should assignable causes for the contradiction extended to both parties, the investigation will assign costs cooperatively with each party or when necessary, equally. Should the investigation substantiate a contradiction without assignable cause, the investigation will assign costs cooperatively with each party or when necessary, equally. Should the investigation be unable to substantiate a contradiction, the initiator of the investigation shall bear all investigative costs. All claim notification requirements of the contract pertaining to the contradiction shall be suspended until the investigation is concluded.

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## SECTION 5 – UTILITIES

**5-1 LOCATION.** The Permittee (in the case of Private Contracts) and the AGENCY, 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 Northern 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 is 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.

**5-1.1 Mandatory Notification Prior To Excavation.** The Contractor's attention is directed to Section 4215.5 through 4217 of the Government Code of the State of California. This requires that two (2) working days prior to commencing any excavation "Underground Service Alert of Northern California" (USA) shall be notified by phone, toll free 1-800-227-2600, for the assignment of an Inquiry Identification Number.

Construction CONTRACTOR shall contact all utility companies at least five (5) working days prior to commencing work and shall verify the location of any known utilities and determine whether or not a representative of each company will be present during excavation.

The known public utilities contacts are:

City of Auburn – sewer and storm drain

1-251-931-3038

Placer County Water Agency (PCWA) – water

1-530-823-4850 or 1-800-464-0030

P.O. Box 6570

144 Ferguson Road

Auburn, CA 95604

PG&E – gas and electric

1-800-743-5000

P.O. Box 997300

Sacramento, CA 95899-7300

AT&T – telephone and fiber optic

1-800-331-0500

WAVE Broadband – cable and fiber optic

1-866-928-3123

1015 Lincoln Way

Auburn, CA 95603

The CONTRACTOR shall coordinate construction with public utility relocation activities.

The existing subsurface utilities shown have been indicated, based on the best available record information. However, to avoid or resolve any interference problems between these existing utilities and the proposed work, the CONTRACTOR shall field verify the vertical and horizontal locations of all utilities, such as water lines and water services, electronic conduits, telephone and television cable, storm drain facilities, and all other facilities and obstructions prior to beginning any excavations. If conflicts exist, revised grades and/or alignments may be established, if required. **Such field verification shall require exposing these utilities prior to the start of construction**.

Special reference is hereby made to Section 5-2, "Protection," of these Standard Specifications with respect to the protection, repair, and replacement of existing subsurface utilities.

Additionally, the CONTRACTOR shall also notify the following local entities of his/her schedule fourteen (14) days prior to commencing work, including local refuse collectors, street sweepers, the Post Office, Public Schools, and Bus Companies:

City of Auburn Police

1-253-931-3080

340 East Main Street, Ste. 201,

Auburn, WA 98002

City of Auburn Fire Department

1-530-823-4211, ext. 2

1225 Lincoln Way, Room 7

Auburn, CA 95603

City of Auburn Public Works Department

1-530-823-4211, ext 0

1225 Lincoln Way, Room 3

Auburn, CA 95603

CalFire

1-530-224-2489

6105 Airport Road

Redding, CA 96002

Auburn Union School District

1-530-885-7242

255 Epperle Ln.

Auburn, CA 95603

Placer Union School District

1-530-886-4400

13000 New Airport Rd.

Auburn, CA 95603

Placer County Transit

1-530-885-BUSS or 1-916-784-6177

11432 F Ave.

Auburn, CA 95603

**No excavation shall commence unless the CONTRACTOR has obtained the USA Inquiry Identification Number.**

**5-1.2 Accuracy of Utilities Information.** The locations of known existing major utilities, whether above ground or underground, are indicated on the plans. Information and data reflected in the Contract Documents with respect to underground and above ground utilities at or contiguous to the site is based upon information and data furnished to the City and the Engineer by the owners of such utilities, and the City does not assume responsibility for the accuracy or completeness thereof. The CONTRACTOR shall take all possible precautions for the protection of unforeseen utility lines to provide for uninterrupted service and to provide such special protection as may be necessary.

The CONTRACTOR shall be responsible for determining the location and depth of all underground facilities, including service connections, which may affect or be affected by his/her operations and he/she shall include the cost to pothole all utilities within the limits of work in his/her bid. If an existing utility line, which has been marked by Underground Service Alert or is shown on the plans, is damaged by the CONTRACTOR, the CONTRACTOR shall repair the line and bear the cost thereof.

CONTRACTOR shall be aware that electrical conduits between street and traffic lights may exist beneath pavement and/or sidewalk in areas where such lights are in place and that said conduits are not shown on these plans.

In the event that the CONTRACTOR damages any existing utility lines that are not shown, shown incorrectly or the locations of which are not made known to the CONTRACTOR prior to excavation, a telephone call and written report shall be made immediately to the Utility owner, the Engineer, and to the City. If directed by the City, the CONTRACTOR shall make repairs under the provisions for changes and extra work contained in **SECTION 3 - CHANGES IN WORK** of these Standard Specifications.

**5-2 PROTECTION.**

Excavation, trenching, bedding and backfill construction shall be in accordance with the Contract Documents, applicable City requirements, the Standard Specifications, and the project drawings. All trenching including that for water, sewer, storm drain and utility conduits and all service connections and

meter boxes (not permitted in driveways) shall be completed and inspected and approved by the agency having jurisdiction, and the structural backfill inspected and tested for compaction and approved before aggregate base, paving, and other permanent surface construction may commence.

Bedding and backfill material shall be tested by the CONTRACTOR to establish a procedure and to control his operations. Compliance testing will be performed by the Soil Engineer.

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 sown 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.

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 of 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 not otherwise required by the plans and specifications

and 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 the meter and limits of construction. 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 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.

**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.

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## SECTION 6 – PROSECUTION, PROGRESS, AND ACCEPTANCE OF THE WORK

### 6-1 CONSTRUCTION SCHEDULE AND COMMENCEMENT OF WORK.

**6-1.1 Pre-Construction Meeting And Submittal.** A pre-construction meeting will be conducted by the City prior to commencement of construction at a time and place designated by the City. Those attending the meeting shall include, but not be limited to, the following:

a. The CONTRACTORs representative(s)

b. Sub-CONTRACTORs representative(s), if needed

c. City of Auburn Director of Public Works

d. City of Auburn Project Manager

e. The Design Engineers

f. The Construction Engineers

g. The affected utility companies representatives

h. City of Auburn Public Works Inspectors

i. Caltrans' inspector and/or representative(s) if applicable

**One week prior to this meeting the CONTRACTOR shall submit the following:**

1. Construction Schedule
2. Traffic Control Plan
3. Emergency Contact List
4. List of Subcontractors
5. Storm Water Pollution Prevention Plan (SWPPP)

**6-1.2 CONSTRUCTION SCHEDULE.** After notification of award and prior to start of any work, the CONTRACTOR shall submit its proposed construction schedule to the Engineer for approval. The construction schedule shall be in the form of a tabulation, chart, or graph and shall be in sufficient detail to show chronological relationship of all activities of the project. These include, but are 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 construction schedule shall recognize the requirements of 5-5 and reflect completion of all work under the Contract within the specified time and in accordance with the Specifications.

Unless otherwise provided, the Contract time shall commence upon the date of issuance of a notice to proceed. The Work shall start within 15 days thereafter, and be diligently prosecuted to completion within the time provided in the Specifications.

If the CONTRACTOR desires to make a major change in the method of operations after commencing construction, or if the schedule fails to reflect the actual progress, the CONTRACTOR shall submit to the Engineer a revised construction schedule in advance of beginning revised operations.

The Engineer may waive these requirements for work constructed under permit.

Prior to issuing the Notice to Proceed, the Engineer will schedule and conduct a pre-construction meeting with the CONTRACTOR to review the proposed construction schedule and delivery dates, arrange utility coordination, discuss construction methods, and clarify inspection procedures.

**6-1.3 Emergency Contact List.** The CONTRACTOR shall provide the following information in writing and submit it with the signed contract, contract bonds and certificates of insurance. Failure to comply may result in delays in the processing of the contract documents.

1. Name of authorized representative at the job site.
2. Address and telephone number where the above person can be reached 24 hours a day.
3. Address of the nearest office of the CONTRACTOR, if any, and the name and telephone number of a person at that office who is familiar with the project.
4. Address and telephone number of the CONTRACTOR's main office and the name and telephone number of the person at that office familiar with the project.

**6-2 PROSECUTION OF WORK.** To minimize public inconvenience and possible hazard and to restore street and other work areas to their original condition and state of usefulness as soon as practicable, the CONTRACTOR shall diligently prosecute the Work to completion. If the Engineer determines that the CONTRACTOR is failing to prosecute the Work to the proper extent, the CONTRACTOR shall, upon orders from the Engineer, immediately take steps to remedy the situation. All costs of prosecuting the Work as described herein shall be included 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 AGENCY may suspend the work in whole or in part, until the CONTRACTOR takes said steps at no cost to the AGENCY.

As soon as possible under the provisions of the 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 actions will not relieve the CONTRACTOR from liability.

The CONTRACTOR shall submit monthly progress reports to the Engineer by the tenth day of each month. The report shall include an updated construction schedule. Any deviations from the original schedule shall be explained. Progress payments will be withheld pending receipt of any outstanding reports.

**6-3 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.

**6-4 DEFAULT BY CONTRACTOR.** If the CONTRACTOR fails to begin delivery of material and equipment, to commence the Work within the time specified, to maintain the rate of delivery of material, to execute the Work in the manner and at such locations as specified, or fails to maintain the Work schedule which will insure the AGENCY's interest, or, if the CONTRACTOR is not carrying out the intent of the Contract, the AGENCY may serve written notice upon the CONTRACTOR and the Surety on its Faithful Performance Bond demanding satisfactory compliance with the Contract.

The Contract may be canceled by the City Council without liability for damage, when in the City Council's opinion the CONTRACTOR is not complying in good faith, has become insolvent, or has assigned or subcontracted any part of the Work without the City Council's consent. In the event of such cancellation, the CONTRACTOR will be paid the actual amount due based on Contract Unit Prices or lump sums bid and the quantity of the Work completed at the time of cancellation, less damages caused to the AGENCY by acts of the CONTRACTOR. The CONTRACTOR, in having tendered a Bid, shall be deemed to have waived any and all claims for damages because of cancellation of Contract for any such reason. If the AGENCY declares the Contract canceled for any of the above reasons, written notice to that effect shall be served upon the Surety. The Surety shall, within 5 days, assume control and perform the Work as successor to the CONTRACTOR.

If the Surety assumes any part of the Work, it shall take the CONTRACTOR's place in all respects for that part, and shall be paid by the AGENCY for all work performed by it in accordance with the Contract. If the Surety assumes the entire Contract, all money due the CONTRACTOR at the time of its default shall be payable to the Surety as the Work progresses, subject to the terms of the Contract.

If the Surety does not assume control and perform the Work within 5 days after receiving a notice of cancellation, or fails to continue to comply, the AGENCY may exclude the Surety from the premises. The AGENCY may then take possession of all material and equipment and complete the Work by AGENCY forces, by letting the unfinished Work to another CONTRACTOR, or by a combination of such methods. In any event, the cost of completing the Work shall be charged against the CONTRACTOR and its Surety and may be deducted from any money due or becoming due from the AGENCY. If the sums due under the Contract are insufficient for completion, the CONTRACTOR or Surety shall pay to the AGENCY within 5 days after the completion, all costs in excess of the sums due.

The provisions of this subsection shall be in addition to all other rights and remedies available to the AGENCY under law.

**6-5 TERMINATION OF THE CONTRACT.** The City Council 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, o9r by official action of a public authority.

**6-6 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 or elements necessitating cessation of work, inability to obtain materials, labor or equipment, 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. The proof must be provided 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, the Engineer may deem an extension of time to be in the best interests of the AGENCY. 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.

**6-6.1.1 Notice of Delays.** Whenever the CONTRACTOR foresees any delay in the prosecution of the work, and in any event immediately upon the occurrence of any delay which the CONTRACTOR regards as unavoidable, he/she shall notify the Engineer in writing of the probability of the occurrence of such delay and its cause so that the Engineer may take immediate steps to prevent, if possible, the occurrence or continuance of the delay, or, if prevention is not possible, may determine whether the delay is to be considered avoidable or unavoidable, how long it continues, and to what extent it will delay the prosecution and completion of the work. It will be concluded that any and all delays which have occurred in the prosecution and completion of the work have been avoidable delays, except such delays as shall have been called to the attention of the Engineer at the time of their occurrence and found by him/her to have been unavoidable. The CONTRACTOR shall make no claims for any delay not called to the attention of the Engineer at the time of its occurrence as an unavoidable delay.

**6-6.1.2 Avoidable Delays.** Avoidable delays in the prosecution or completion of the work shall include all delays which in the opinion of the Engineer would have been avoided by the exercise of care, prudence, foresight, and diligence on the part of the CONTRACTOR of his/her subcontractors. The following shall be considered avoidable delays within the meaning of the contract: 1) Delays in the prosecution of parts of the work which may in themselves be unavoidable but do not necessarily prevent or delay the prosecution of other parts of the work or the completion of the whole work within the time herein specified; 2) Reasonable loss of time resulting from the necessity of submitting samples of materials and drawings to the Engineer for approval and from performing tests of materials, measurements, and inspections; 3) Reasonable interference of other CONTRACTORs employed by the AGENCY and/or other CONTRACTORs working in the area which do not necessarily prevent the completion of the whole work within the time agreed upon; 4) Delays resulting from inaccurate or incomplete shop drawing submittals; and 5) Interference of other CONTRACTORs performing concurrent work.

**6-6.1.3 Extension of Time.** In case the work is not completed in the time specified, including such extensions of time as may have been granted for unavoidable delays, the CONTRACTOR will be assessed damages for delay in accordance with Paragraph 6-9.1. The AGENCY, however, shall have the right to grant an extension of time for avoidable delay if it is deemed in his/her best interest to do so. During such extension of time, the CONTRACTOR will be charged for engineering and inspection services and other costs as provided in Paragraph 6-6.2.1 but will not be assessed damages pursuant to Paragraph 6-9.

**6-6.2 Extensions of Time.** Extensions of time, when granted, will be based upon the effect of delays to the Work, They will not be granted for noncontrolling delays to minor portions of the Work unless it can be shown that such delays did or will delay the progress of the Work.

**6-6.2.1 Compensation to AGENCY for Extension of Time.** Compensation for extension of time for avoidable delay granted pursuant to Paragraph 6-6.1.3 shall be the actual cost to the AGENCY for engineering, inspection, general supervision, and overhead expenses which are directly chargeable to the work and which accrue during the period of such extension, except that the cost of final inspection and preparation of the final estimate shall not be included.

**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. Such actual costs will be determined by the Engineer. The AGENCY will not be liable for damages which the CONTRACTOR could have avoided by any reasonable means, such as judicious handling of forces or equipment. The determination of what damages the CONTRACTOR could have avoided will be made by the Engineer.

Requests for an extension of time must be delivered to the AGENCY within ten (10) consecutive calendar days following the date of the occurrence that caused the delay. The request must be submitted in writing and must state the cause of the delay, the date of the occurrence causing the delay, and the amount of additional time requested. This shall be included as part of a revised construction schedule required in Section 6-1. Requests for extensions of time shall be supported by all evidence reasonably available or known to the CONTRACTOR, which would support the extension of time requested. Requests for extensions of time, which are not received within the time specified above, shall result in the forfeiture of the CONTRACTOR's right to receive any extension of time requested.

If the CONTRACTOR is requesting an extension of time because of weather, he/she shall supply daily written reports to the AGENCY's representative describing such weather, and the work that could not be performed that day because of such weather or conditions resulting therefrom and that he/she otherwise would have performed.

## 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 days.

**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 for completion, or upon field acceptance by the Engineer for 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 with at least 60 percent of the normal work force for cause as defined in 6-6.1.

The CONTRACTOR's activities involving work which requires street closure, detours, and barricades shall be confined to the hours between 7:30 a.m. and 4:00 p.m. Monday through Friday. In addition, the CONTRACTOR shall not perform any Work on Saturday, Sunday, or on AGENCY-designated holidays. AGENCY-designated holidays are listed in **TABLE 1 – AGENCY-DESIGNATED HOLIDAYS** below. Deviation from these hours will be permitted upon approval of the Engineer, except in emergencies involving immediate hazard to persons or property.

Deviations from these hours will not be permitted without the prior consent of the Engineer, except in emergencies involving immediate hazard to persons or property. In the event of either a requested or emergency deviation, inspection service fees will be charged against the CONTRACTOR. Service fees will be calculated at overtime rates including benefits, overhead, and travel time; and will be deducted from the amounts due the CONTRACTOR.

Failure of the CONTRACTOR to adhere to working day requirements will result in damages being sustained by the City. Such damages are, and will continue to be, impracticable and extremely difficult to determine. For each OCCURRENCE of a working day or hours violation, as provided herein, the CONTRACTOR shall pay to the AGENCY, or have withheld from monies due to it, the sum of $1,000.00.

**TABLE 1 – AGENCY-DESIGNATED HOLIDAYS**

New Year's Day

Martin Luther King, Jr. Day

Lincoln's Birthday

President's Day

Memorial Day

Independence Day

Labor Day

Veteran's Day

Thanksgiving Day

Day after Thanksgiving

Christmas Eve

Christmas Day

New Year's Eve

EXECUTION OF THE CONTRACT SHALL CONSTITUTE AGREEMENT BY THE AGENCY AND CONTRACTOR THAT $1,000 PER VIOLATION IS THE MINIMUM VALUE OF THE COST AND ACTUAL DAMAGED CAUSED BY FAILURE OF THE CONTRACTOR TO LIMIT PERFORMANCE OF THE WORK BETWEEN THE ALLOTTED TIMES, THAT SUCH SUM SHALL NOT BE CONSTRUED AS A PENALTY, AND THAT SUCH SUM MAY BE DEDUCTED FROM PAYMENTS DUE THE CONTRACTOR IF SUCH DELAY OCCURS.

**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 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, it shall 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.

**6-8 COMPLETION, ACCEPTANCE, AND WARRANTY.** The Work will be inspected by the Engineer for acceptance 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 and is ready for acceptance, it will so certify to the City Council, which may accept the completed Work. The Engineer will, in its certification to the City Council, give the date when the Work was completed. This will be the date when the CONTRACTOR is relieved from responsibility to protect the Work.

All work shall be warranted by the CONTRACTOR against defective workmanship and materials for a period of 1 year from the date the Work was completed. The CONTRACTOR shall replace or repair any such defective work in a manner satisfactory to the Engineer, after notice to do so from the Engineer, and within the time specified in the notice. If the CONTRACTOR fails to make such replacement or repairs within the time specified in the notice, the AGENCY may perform this work and the CONTRACTOR's sureties shall be liable for the cost thereof.

**6-8.1 General Guaranty.** The CONTRACTOR shall remedy any defects in the Work and pay for any damage to other work resulting therefrom, which shall appear within a period of one year from the date of final acceptance of the Work unless a longer period is specified. The AGENCY will give notice of observed defects with reasonable promptness.

**6-9 FORFEITURE DUE TO DELAY**. The CONTRACTOR shall complete all or any designated portion of the Work called for under the Contract within the time set forth in Section C (Proposal) of these Specifications.

In accordance with Government Code 53069.85, and all other applicable law, the CONTRACTOR agrees to forfeit and pay the AGENCY the amount of Five Hundred Dollars ($500.00) per day for each and every day of unauthorized delay beyond the completion date, which shall be deducted from any monies due the CONTRACTOR. This payment shall be considered liquidated damages. CONTRACTOR agrees that such liquidated damages are reasonable under the circumstances existing at the time of execution of the contract, that such liquidated damages are to compensate AGENCY for losses that are difficult to measure and that such damages are not a penalty.

Failure of the CONTRACTOR to perform any covenant or condition contained in the Contract Documents within the time period specified shall constitute a material breach of this Contract entitling the AGENCY to terminate the Contract unless the CONTRACTOR applies for, and receives, an extension of time in accordance with the procedures set forth in Section 5-5.

Failure of the AGENCY to insist upon the performance of any covenant or conditions within the time period specified in the Contract Documents shall not constitute a waiver of the CONTRACTOR's duty to complete performance within the designated periods unless the AGENCY has executed a waiver in writing.

The AGENCY's agreement to waive a specific time provision or to extend the time for performance shall not constitute a waiver of any other time provision contained in the Contract Documents.

Failure of the CONTRACTOR to complete performance promptly within the additional time authorized in a waiver or extension of time agreement shall constitute a material breach of this Contract entitling the AGENCY to terminate this agreement.

The CONTRACTOR shall not be deemed in breach of this Contract and no forfeiture due to delay shall be made because of any delays in the completion of the Work due to unforeseeable causes beyond the control and without the fault or negligence of the CONTRACTOR provided the CONTRACTOR requests an extension of time in accordance with the procedures set forth in Section 5-5. Unforeseeable causes of delay beyond the control of the CONTRACTOR shall include acts of God, acts of a public enemy, acts of the government, acts of the AGENCY, or acts of another CONTRACTOR in the performance of a contract with the AGENCY, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and weather, or delays of subcontractors due to such causes, or delays caused by failure of the owner of a utility to provide for removal or relocation of existing utility facilities. Delays caused by actions or neglect of CONTRACTOR or his/her agents, servants, employees, officers, subcontractors, directors, or of any party contracting to perform part of all of the Work or to supply any equipment or materials shall not be excusable delays. Excusable delays (those beyond the CONTRACTOR's control) shall not entitle the CONTRACTOR to any additional compensation. The sole recourse of the CONTRACTOR shall be to seek an extension of time.

**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 CONTRACTOR operations or negligence. The CONTRACTOR will not be required to reclean such portions of the improvement before field acceptance, 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 will assume the responsibility and liability for injury to persons or property resulting from the utilization of the facility or appurtenance so placed into service, except for any such injury to persons or property caused by any willful or negligent act or omission by the CONTRACTOR, Subcontractor, their officers, employees, or agents.

**6-11 GUARANTEE.** The CONTRACTOR shall warrant and guarantee the entire Work and all parts thereof, including that performed and constructed by subcontractors, and others employed directly or indirectly on the Work, against faulty or defective materials, equipment or workmanship for the maximum period provided by law. In addition thereto, for a period of one (1) year commencing on the date of acceptance of the Work, the CONTRACTOR shall, upon the receipt of notice in writing from the AGENCY, promptly make all repairs arising out of defective materials, workmanship or equipment and bear the cost thereof. The AGENCY is hereby authorized to make such repairs and the CONTRACTOR and Surety shall bear the cost thereof if, ten (10) days after the giving of such notice to the CONTRACTOR, the CONTRACTOR has failed to make or undertake with due diligence the repairs; provided, however, that, in the case of an emergency where, in the opinion of the AGENCY, delay could cause serious loss or damage, repairs may be made without notice being sent to the CONTRACTOR or Surety, and all expense in connection therewith shall be charged to the CONTRACTOR and Surety.

For the purpose of this article "Acceptance of the Work" shall mean the acceptance of the Work by the AGENCY in accordance with Subsection 6-8 but not for the purpose of extinguishing any covenant or agreement or agreement on the part of the CONTRACTOR to be performed or fulfilled under this Contract, which has not in fact been performed or fulfilled at the time of such acceptance all of such covenants and agreements, shall continue to be binding on the CONTRACTOR until they have been fulfilled.

The effective date of Acceptance of the Work and commencement of the Guarantee shall be the date of acceptance of the Notice of Completion by the City Council.

## 6-12 DISPUTES AND CLAIMS

**6-12.1 General.** Any and all decisions made on appeal pursuant to this Subsection 6-12 shall be in writing. Any "decision" purportedly made pursuant to this Subsection 6-12 that is not in writing shall not be binding upon the AGENCY and should not be relied upon by the CONTRACTOR.

Nothing in this subsection shall be considered as relieving the CONTRACTOR from his/her duty to file the notice required under Subsection 6-13 or other duties required by the Contract Documents.

**6-12.2 Administrative Review**. Request for review made to the Construction Inspector or Project Engineer may be either oral or written. Request for review made to the City Engineer shall be made in writing with supporting evidence attached.

The CONTRACTOR shall submit each request for review within twenty-one (21) calendar days of receipt of the decision that he/she is requesting.

Prior to demand for arbitration, the CONTRACTOR shall exhaust his/her administrative remedies by attempting to resolve his/her dispute or claim with AGENCY`s staff in the following sequence:

1. Project Engineer
2. City Engineer

Should the Project Engineer fail to address the CONTRACTOR's request for review of a disputed decision within fourteen (14) calendar days after receiving such request, the CONTRACTOR may proceed directly to the City Engineer. At the option of the AGENCY, the person to whom the request for review is directed may elect to take such request to a higher level and the CONTRACTOR's request shall be deemed to be properly submitted to such higher level.

The City Engineer shall address disputes or claims within twenty-eight (28) calendar days after receiving such request and all necessary supporting data. The City Engineer's decision on the dispute or claim shall be the AGENCY's final decision.

**6-12.3 Arbitration**. Claims and disputes arising under or related to the performance of the contract, except for claims that have been released by execution of the "Release on Contract" as provided in Subsection 9-4, shall be resolved in 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 court of competent jurisdiction. Arbitration shall be conducted, to the extent feasible, pursuant to Chapter 3 (Sections 301-393, inclusive) of Division 2 of Title 1 of the California Code of Regulations except that references therein to the "State Contract Act" shall be construed to mean "applicable law" and "Public Agency", or "Department" shall be construed to mean "AGENCY" as defined in Subsection 1.2. 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 Demand for Arbitration. The CONTRACTOR shall request a Demand for Arbitration not later than ninety (90) calendar days after the date of the final written decision of the AGENCY on the claim or dispute.

All contracts valued at more than $15,000 between the CONTRACTOR and his/her 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 these arbitration provisions.

**6-13 NOTICE OF POTENTIAL CLAIM.** The CONTRACTOR shall not be entitled to the payment of any additional compensation for any cause, including any act, or failure to act, by the Engineer, or the happening of any event, thing or occurrence, unless the CONTRACTOR shall have given the Engineer due notice in writing, of the potential claim as hereinafter specified, provided, however, that compliance with this Subsection 6-12 shall not be a prerequisite as to any claim that is based on differences in measurements or errors of computation as to the Contract quantities.

Additionally, this Subsection 6-13 shall not supersede the specific notice and protest requirements of Subsection 3-4 “Changed Conditions” and Subsection 6-7.3 “Contract Time Accounting” respectively.

A written notice of potential claim shall set forth the reasons the CONTRACTOR believes additional compensation will or may be due, the nature of the costs involved, and, insofar as possible, the amount of the potential claim. A notice as above required must have been given to the Engineer prior to the time that the CONTRACTOR shall have performed the Work giving rise to the potential claim for additional compensation, if based on an act or failure to act by the Engineer, or in all other cases within fifteen (15) days after the happening of the event, thing or occurrence giving rise to the potential claim.

It is the intention of this Subsection 6-13 that differences between the parties arising under and by the 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 promptly taken. The CONTRACTOR hereby agrees that he/she shall have no right to additional compensation for any claim that may be based on any such act, failure to act, event, thing or occurrence for which no written notice of potential claim as herein required was filed.

## SECTION 7 – RESPONSBILITIES OF THE CONTRACTOR

**7-1 CONTRACTOR'S EQUIPMENT AND FACILITIES.** The CONTRACTOR shall furnish and maintain in good condition all equipment and facilities as required for the proper execution and inspection of the Work. Such equipment and facilities shall meet all requirements of applicable ordinances and laws.

A noise level limit of 85 dba at a distance of fifty (50) feet shall apply to all construction equipment on or related to the job, whether owned by the CONTRACTOR or not. The use of excessively loud warning signals shall be avoided except in those cases where required for the protection of personnel.

The CONTRACTOR shall arrange and maintain a secure storage site for all equipment and materials. All equipment and unused materials shall be returned to this site at the end of each work day.

**7-2 LABOR.**

**7-2.1 General.** Only competent workers shall be employed on the Work. Any person employed who is found to be incompetent, intemperate, troublesome, disorderly, or otherwise objectionable, or who fails or refuses to perform work property and acceptably, shall be immediately removed from the Work by the CONTRACTOR and not be reemployed on the Work.

**7-2.2 Laws.** 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.

The CONTRACTOR shall strictly adhere to the provisions of the Labor Code regarding minimum wages; the 8-hour day and 40-hour week; overtime; Saturday, Sunday, and holiday work; and nondiscrimination because of race, color, national origin, sex, or religion. Failure to file any report due under said orders will result in suspension of periodic progress payments.

In accordance with the Labor Code, the City Council has on file and will publish a schedule of prevailing wage rates for the types of work to be done under the Contract. The CONTRACTOR shall not pay less than these rates.

Each worker shall be paid subsistence and travel as required by the collective bargaining agreements on file with the State of California Department of Industrial Relations.

The CONTRACTOR's attention is directed to Section 1776 of the Labor Code which imposes responsibility upon the CONTRACTOR for the maintenance, certification, and availability for inspection of such records for all persons employed by the CONTRACTOR of Subcontractor in connection with the project. The CONTRACTOR shall agree through the Contract to comply with this Section and the remaining provisions of the Labor Code.

The CONTRACTOR shall ensure unlimited access to the job site for all Equal Opportunity Compliance officers.

Every CONTRACTOR and Subcontractor shall keep an accurate record showing the name, occupation, and the actual per diem wages paid to each worker employed by him/her in connection with the public work. The record shall be kept open at all reasonable hours to the inspection of the body awarding the Contract and to the Division of Labor Law Enforcement.

**7-2.2.1 Overtime and Shift Work.** The CONTRACTOR may establish overtime and shift work as a regular procedure only with the written permission of the Engineer. Such permission may be revoked at any time. No work other than overtime and shift work established as a regular procedure shall be done outside the hours described in Section 6-7.2, nor on Saturdays, Sundays or legal holidays, except such work as is necessary for the proper care and protection of the work already performed or except in case of an emergency.

All costs for overtime inspection, except those occurring as a result of overtime and shift work established as a regular procedure, shall be paid by the CONTRACTOR. Overtime inspection shall include inspection required during holidays observed by the AGC and Trade Unions, Saturdays, Sundays, and any weekday outside the hours described in Section 6-7.2. Such costs will include but will not necessarily be limited to engineering, inspection, general supervision and other overhead expenses that are directly chargeable to the overtime work. The AGENCY shall deduct all such charges from payments due the CONTRACTOR.

## 7-3 LIABILITY INSURANCE.

**7-3.1 General**. CONTRACTOR and AGENCY agree that AGENCY, its employees, agents and officials should, to the extent permitted by law, be fully protected from any loss, injury, damage, claim, lawsuit, cost, expense, attorneys fees, litigation costs, defense costs, court costs or any other cost arising out of or in any way related to the performance of this Agreement. Accordingly, the provisions of this indemnity provision are intended by the parties to be interpreted and construed to provide the fullest protection possible under the law to the AGENCY. CONTRACTOR acknowledges that AGENCY would not have entered into this Agreement in the absence of the commitment of CONTRACTOR to indemnify and protect AGENCY as set forth here.

**7-3.2** To the full extent permitted by law, CONTRACTOR shall defend, indemnify and hold harmless AGENCY, its employees, agents and officials, from any liability, claims, suits, actions, arbitration proceedings, administrative proceedings, regulatory proceedings, losses, expenses or costs of any kind, whether actual, alleged, or threatened, actual attorneys fees incurred by AGENCY, court costs, interest, defense costs including expert witness fees and any other costs or expenses of any kind whatsoever without restriction or limitation incurred in relation to, as a consequence of, arising out of or in any way attributable actually, allegedly or impliedly, in whole or in part to the performance of this Agreement. All obligations under this provision are to be paid by CONTRACTOR as they are incurred by the AGENCY.

**7-3.3** Without affecting the rights of AGENCY under any provision of this agreement or this section, CONTRACTOR shall not be required to indemnify and hold harmless AGENCY as set forth above for liability attributable to the sole fault of AGENCY, provided such sole fault is determined by agreement between the parties or the findings of a court of competent jurisdiction.

This exception will apply only in instances where the AGENCY is shown to have been solely at fault and not in instances where CONTRACTOR is solely or partially at fault or in instances where AGENCY's fault accounts for only a percentage of the liability involved. In those instances, the obligation of CONTRACTOR will be all-inclusive and AGENCY will be indemnified for all liability incurred, even though a percentage of the liability is attributable to the conduct of the AGENCY.

**7-3.4** CONTRACTOR acknowledges that its obligation pursuant to this section extends to liability attributable to AGENCY, if that liability is less than the sole fault of AGENCY. CONTRACTOR has no obligation under this Agreement for liability proven in a court of competent jurisdiction or by written agreement between the parties to be the sole fault of AGENCY.

**7-3.5** The obligations of CONTRACTOR under this or any other provision of this Agreement will not be limited by the provisions of any workers compensation act or similar act. CONTRACTOR expressly waives its statutory immunity under such statutes or laws as to AGENCY, its employees, agents and officials.

**7-3.6** CONTRACTOR agrees to obtain executed indemnity agreements with provisions identical to those as set forth here in this section from each and every subcontractor, sub-tier CONTRACTOR or any other person or entity involved by, for, with or on behalf of CONTRACTOR in the performance or subject matter of this Agreement. In the event CONTRACTOR fails to obtain such indemnity

obligations from others as required here, CONTRACTOR agrees to be fully responsible according to the terms of this section.

**7-3.7** Failure of AGENCY to monitor compliance with these requirements imposes no additional obligations on AGENCY and will in no way act as a waiver of any rights hereunder. This obligation to indemnify and defend AGENCY as set forth herein is binding on the successors, assigns or heirs of CONTRACTOR and shall survive the termination of this Agreement or this section.

**7-3.8** CONTRACTOR agrees to provide insurance in accordance with the requirements as set forth here. If CONTRACTOR uses existing coverage to comply with these requirements and that coverage does not meet the requirements set forth herein, CONTRACTOR agrees to amend, supplement or endorse the existing coverage to do so. The following coverages will be provided by CONTRACTOR and maintained on behalf of AGENCY and in accordance with the requirements set forth herein.

**7-3.9** Commercial General Liability/Umbrella Insurance. Primary insurance shall be provided on ISO-CGL form No. CG 00 01 11 85 or 88. Total limits shall be not less than two million dollars ($2,000,000.00) per occurrence for all coverages and two million dollars ($2,000,000.00) general aggregate. AGENCY and its officers, agents and employees shall be named as additional insureds using ISO additional insureds endorsement form CG 20 10 11 85 (in no event will AGENCY accept an endorsement form with an edition date later than 1990). Coverage shall apply on a primary non-contributing basis in relation to any other insurance or self-insurance, primary or excess, available to AGENCY or any employee or agent of AGENCY. Coverage shall not be limited to the vicarious liability or supervisory role of any additional insured. Umbrella Liability Insurance (over primary) shall apply to bodily injury/property damage, personal injury/advertising injury, at a minimum, and shall include a "drop down" provision providing primary coverage above a maximum of $25,000.00 self-insured retention for liability not covered by primary policies but covered by the umbrella policy. Coverage shall be following form to any underlying coverage. Coverage shall be provided on a "pay on behalf" basis, with defense costs payable in addition to policy limits. There shall be no cross-liability exclusion. Policies shall have concurrent starting and ending dates.

Each policy of insurance shall contain a clause prohibiting cancellation, modification or lapse without thirty (30) days prior written notice having been given to the City. All insurance policies shall be subject to approval by the City Attorney and certificates evidencing such policies shall be provided to the City concurrently with the filing of all required bonds.

**7-3.10** Business Auto/Umbrella Liability Insurance. Primary coverage shall be written on ISO Business Auto Coverage form CA 00 01 06 92 including symbol 1 (Any Auto). Limits shall be no less than two million dollars ($2,000,000.00) per accident. Starting and ending dates shall be concurrent. If CONTRACTOR owns no autos, a non-owned auto endorsement to the General Liability policy drafted above is acceptable.

## 7-4 WORKERS' COMPENSATION INSURANCE.

**7-4.1** Workers' Compensation/Employers' Liability shall be written on a policy form providing workers' compensation statutory benefits as required by law. Employers' liability limits shall be no less than one million dollars per accident or disease. Employers' liability coverage shall be scheduled under any umbrella policy described above. Unless otherwise agreed, this policy shall be endorsed to waive any right of subrogation as respects the AGENCY, its officers, agents or employees.

**7-4.2** CONTRACTOR and AGENCY further agree as follows:

**7-4.2.1** This Section supersedes all other sections and provisions of this Agreement to the extent that any other section or provision conflicts with or impairs the provisions of this Section.

**7-4.2.2** Nothing contained in this Section is to be construed as affecting or altering the legal status of the parties to this Agreement. The insurance requirements set forth in this Section are intended to be separate and distinct from any other provision in this Agreement and shall be interpreted as such.

**7-4.2.3** All insurance coverage and limits provided pursuant to this Agreement shall apply to the full extent of the policies involved, available, or applicable. Nothing contained in this Agreement or any other agreement relating to the AGENCY or its operations limits the application of each insurance coverage.

**7-4.2.4** Requirements of specific coverage features or limits contained in this Section are not intended as a limitation on coverage, limits or other requirements, or a waiver of any coverage normally provided by any insurance. Specific reference to a given coverage feature is for purposes of clarification only and is not intended by any party to be all-inclusive, or to the exclusion of other coverage, or a waiver of any type.

**7-4.2.5** For purposes of insurance coverage only, this Agreement shall be deemed to have been executed immediately upon any party hereto taking any steps that can be deemed to be in furtherance of or towards performance of this Agreement.

**7-4.2.6** All general or auto liability insurance coverage provided pursuant to this Agreement, or any other agreements pertaining to the performance of this Agreement, shall not prohibit CONTRACTOR, and CONTRACTOR's agents, officers or employees from waiving the right of subrogation prior to a loss. CONTRACTOR hereby waives all rights of subrogation against AGENCY.

**7-4.2.7** Unless otherwise approved by AGENCY, CONTRACTOR's insurance shall be written by insurers authorized to do business in the State of California and with a minimum "Best's" Insurance Guide rating of "A:VII." Self-insurance will not be considered to comply with these insurance specifications.

**7-4.2.8** In the event any policy of insurance required by this Agreement does not comply with these requirements or is canceled and not replaced, AGENCY has the right but not the duty to obtain the insurance it deems necessary and any premium paid by AGENCY will be promptly reimbursed by CONTRACTOR. Upon CONTRACTOR's failure to make such reimbursement within 30 days of written demand, AGENCY may deduct that sum from any monies due CONTRACTOR hereunder or otherwise.

**7-4.2.9** CONTRACTOR agrees to provide evidence of the insurance required herein, satisfactory to AGENCY, consisting of certificate(s) of insurance evidencing all of the coverages required and an additional insured endorsement to CONTRACTOR's general liability and umbrella liability policy (if any) using ISO form CG 20 10 11 85. Certificate(s) are to reflect that the insurer will provide 30 days' notice of any cancellation of coverage. CONTRACTOR agrees to require its insurer to modify such certificates to delete any exculpatory wording stating that failure of insurer to mail written notice of cancellation imposes no obligation, and to delete the word "endeavor" with regard to any notice provisions. CONTRACTOR agrees to provide complete copies of policies to AGENCY upon request.

**7-4.2.10** CONTRACTOR shall provide proof that policies of insurance required herein expiring during the term of this Agreement have been renewed or replaced with other policies providing at least the same coverage. Such proof shall be furnished within 72 hours of the expiration of the coverages.

**7-4.2.11** Any actual or alleged failure on the part of AGENCY or any other additional insured under these requirements to obtain proof of insurance required under this Agreement in no way waives any right or remedy of AGENCY or any additional insured, in this or any other regard.

**7-4.2.12** CONTRACTOR agrees to require all subcontractors or other parties hired for this project to provide general liability insurance naming as additional insureds all parties to this Agreement. CONTRACTOR agrees to obtain certificates evidencing such coverage and make reasonable efforts to ensure that such coverage is provided as required here. CONTRACTOR agrees to require that no contract used by any subcontractor, or contracts CONTRACTOR enters into on behalf of AGENCY, will reserve the right to charge back to AGENCY the cost of insurance required by this Agreement. CONTRACTOR agrees that upon request, all agreements with subcontractors or others with whom CONTRACTOR contracts on behalf of AGENCY will be submitted to AGENCY for review. Failure of AGENCY to request copies of such agreement will not impose any liability on AGENCY, its officers, agents, or employees.

**7-4.2.13** If CONTRACTOR is a Limited Liability Company, general liability coverage must be amended so that the Limited Liability Company and its Managers, Affiliates, employees, agents and other persons necessary or incidental to its operations are insureds.

**7-4.2.14** CONTRACTOR agrees to provide immediate notice to AGENCY of any claim or loss against CONTRACTOR that includes AGENCY as a defendant. AGENCY assumes no obligation or liability by such notice, but has the right (but not the duty) to monitor the handling of any such claim or claims.

**7-5 PERMITS.** Prior to the start of any work, the CONTRACTOR shall apply for and receive any applicable City, County, State, and Federal permits.

The CONTRACTOR shall pay all business taxes or license fees that are required for the work.

All costs associated with these permits are responsibility of CONTRACTOR. If applicable, CONTRACTOR is required to obtain a no fee City Encroachment permit for this project and comply with all permit conditions.

**7-6 THE CONTRACTOR'S REPRESENTATIVE.** Before staring 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.

**7-7 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 this project, and any extension of time.

CONTRACTOR shall coordinate his/her work so as to minimize disruption to ongoing or scheduled private development projects in the project area.

## 7-8 PROJECT SITE MAINTENANCE.

**7-8.1 Cleanup and Dust Control.** Throughout all phases of construction, including suspension of work, and until the final acceptance, the CONTRACTOR shall keep the site clean and free from rubbish and debris. The CONTRACTOR shall also abate dust nuisance by cleaning, sweeping and sprinkling with water, or other means as necessary. The use of water resulting in mud on public streets will not be permitted as a substitute for sweeping or other methods.

When required by the Plans or Specifications, the CONTRACTOR shall furnish and operate a self-loading motor sweeper with spray nozzles at least once each working day for the purpose of keeping paved areas acceptably clean wherever construction, including restoration, is incomplete.

Materials and equipment shall be removed from the site as soon as they are no longer necessary. Before the final inspection, the site shall be cleared of equipment, unused materials, and rubbish so as to present a satisfactory clean and neat appearance. All cleanup costs shall be included in the CONTRACTOR's Bid.

Care shall be taken to prevent spillage on haul routes. Any such spillage shall be removed immediately and the area cleaned.

Excess excavated material from catch basics or similar structures shall be removed from the site immediately. Sufficient material may remain for use as backfill if permitted by the Specifications. Forms and form lumber shall be removed from the site as soon as practicable after stripping.

Failure of the CONTRACTOR to comply with the Engineer's cleanup orders may result in an order to suspend work until the condition is corrected. No additional compensation will be allowed as a result of such suspension.

### 7-8.1.2 Work Area Appearance

The CONTRACTOR shall maintain a neat appearance to the Work at all times.

All unsuitable construction materials and rubbish and debris shall be regularly removed from the job site, be transported to a suitable location, and be disposed of in a proper and legal manner. Materials which are to be disposed of shall not be stored at the project sites but shall be removed before the end of the each working day.

In any area visible to the public, the following shall apply:

1. Broken concrete and debris developed during clearing and grubbing shall be disposed of weekly.
2. The CONTRACTOR shall furnish trash bins for all debris from structure construction. All debris shall be placed in trash bins daily.

3. Forms or false work that are to be re-used shall be neatly stacked concurrent with their removal.

4. Forms and false work that are not to be re-used shall be disposed of with their removal.

5. Wash down from concrete trucks shall be at one location. Concrete from wash down procedures shall be removed from the site weekly.

**7-8.2 Air Pollution Control.** The CONTRACTOR shall not discharge smoke, dust, or any other air contaminants into the atmosphere in such quantity as will violate the regulations of any legally constituted authority.

**7-8.3 Vermin Control.** At the time of acceptance, structures entirely constructed under the Contract shall be free of rodents, insects, vermin, and pests. Necessary extermination work shall be arranged and paid for by the CONTRACTOR as part of the Work within the Contract time, and shall be performed by a licensed exterminator in accordance with requirements of governing authorities. The CONTRACTOR shall be liable for injury to persons or property and responsible for the elimination of offensive odors resulting from extermination operations.

**7-8.4 Sanitation.** 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. They shall also comply with all applicable laws, ordinances, and regulations pertaining to public health and sanitation of dwellings and camps.

Wastewater shall not be interrupted. Should the CONTRACTOR disrupt existing sewer facilities, sewage shall be conveyed in closed conduits and disposed of in a sanitary sewer system. Sewage shall not be permitted to flow in trenches or be covered by backfill.

**7-8.5 Temporary Light, Power, and Water.** The CONTRACTOR shall furnish, install, maintain, and remove all temporary light, power, and water at its own expense. These include piping, wiring, lamps, and other equipment necessary for the Work. The CONTRACTOR shall not draw water from any fire hydrant (except to extinguish a fire), without obtaining permission from the water agency concerned.

**7-8.6 Water Pollution Control.** The CONTRACTOR shall exercise every reasonable precaution to protect channels, storm drains, and bodies of water from pollution. It shall conduct and schedule operations so as to minimize or avoid muddying and silting of said channels, drains, and waters. Water pollution control work shall consist of constructing those facilities which may be required to provide prevention, control, and abatement of water pollution.

**7-8.6.1 General.** This item shall consist of preparation, implementation and compliance with a storm water pollution prevention plan (SWPPP) for the project, if applicable.

**7-8.6.2 Storm Water Pollution Prevention Plan (SWPPP) Preparation.** CONTRACTOR shall submit to the engineer a completed and signed SWPPP at the preconstruction conference. The plan may utilize the practices recommended in the latest edition of the *California Storm Water Best Management Practices Handbook*, available from California Stormwater Quality Association (CSQA), and online at http://www.cabmphandbooks.net/ . The plan shall be consistent with the construction General Permit, issued by the State Water Resources, Control City Council, through submittal of the Notice of Intent (NOI).

If construction will occur between October 15 and April 15 (considered as the rainy season per City Ordinance), a wet weather erosion control plan must be submitted. Additionally, Best

Management Practices (BMPs) implemented during the AGENCY's rainy season shall include but not be limited to those appropriate for wet weather conditions.

**7-8.6.3 Storm Water Pollution Prevention Measures.** All storm water pollution prevention measures shall be in accordance with the submitted SWPPP. In the event circumstances during the course of construction require changes to the original SWPPP, a revised plan shall be promptly submitted to the AGENCY's representative in each instance. No responsibility shall accrue to the AGENCY as a result of the plan or as a result of knowledge of the plan. All work installed by the CONTRACTOR in connection with the SWPPP but not specified to become a permanent part of the project shall be removed and the site restored in so far as practical to its original condition prior to completion of construction or when directed by the AGENCY's representative.

**7-8.6.4 Storm Water Pollution Prevention – Measurement And Payment.** Unless otherwise indicated in the Special Provisions, measurement and payment for Storm Water Pollution Prevention Measures, as described herein, shall be included in the items of Work requiring storm water pollution prevention measures as indicated in the project Special Provisions. Such payment shall be considered full compensation for all labor, materials, tools, and equipment for completion, and implementation and compliance with the SWPPP.

**7-8.7 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. Such dams shall be removed from the site as soon as their use is no longer necessary.

**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 relocate, repair, replace or reestablish all existing improvements within the project limits (e.g., curbs, sidewalks, catch basins, catch basin screens, driveways, fences, walls, sprinkler systems, signs, utility installations, traffic loops, pavements, structures, survey monuments, landscaping, etc.) that are damaged or removed as a result of the CONTRACTOR's operations or as required by the plans and specifications.

All existing improvements, either within the right-of-way or not, including irrigation lines that are damaged by actions of the CONTRACTOR, shall be restored by the CONTRACTOR to their original or better condition at the CONTRACTOR's expense.

The CONTRACTOR shall mark, as approved by the Engineer, all survey monuments, manholes, valves, substructures, or other items that are visible on the surface and will be covered by his operations. This shall be completed prior to the start of that operation and approved by the Engineer.

Existing traffic striping, pavement markings, centerline reflective markers, and curb markings shall also be considered as existing improvements and the CONTRACTOR shall repaint or replace, at the CONTRACTOR's expense, such striping or markings (except for traffic striping and pavement markings within the limits of the Work) if damaged or if their reflectivity is reduced due to construction operations.

All restoration of existing improvements must occur within the construction completion date, unless directed otherwise by the City Engineer.

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 to be removed shall be protected from damage or injury. If damaged or removed due to 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, within the right-of-way which are designated for removal and would be destroyed because of the Work.

All costs to the CONTRACTOR for protecting, removing, restoring, relocating, repairing, replacing, or reestablishing existing improvements shall be the responsibility of the CONTRACTOR.

**7-10 PUBLIC CONVENIENCE AND SAFETY.** One week prior to pre-construction meeting, the CONTRACTOR shall submit his/her complete construction schedule to the Engineer for approval. The CONTRACTOR shall submit requests for changes in the schedule to the Engineer for approval at least forty eight (48) hours prior to the scheduled Work.

**7-10.1 Traffic and Access.** The CONTRACTOR's operations shall cause no unnecessary inconvenience. The access rights of the public shall be considered at all times. Unless otherwise authorized, traffic shall be permitted to pass through the Work, or an approved detour shall be provided.

Safe and adequate pedestrian and vehicular access shall be provided and maintained to: fire hydrants; commercial and industrial establishments; churches, schools and parking lots; service stations and motels; hospitals; police and fire stations; and establishments of similar nature. Access to these facilities shall be continuous and unobstructed unless otherwise approved by the Engineer.

Safe and adequate pedestrian zones and public transportation stops, as well as pedestrian crossings of the Work at intervals not exceeding 90 m (300 fee), shall be maintained unless otherwise approved by the Engineer.

Vehicular access to residential driveways shall be maintained to the property line except when necessary construction precludes such access for reasonable periods of time. 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.

The CONTRACTOR shall cooperate with the various parties involved in the delivery of mail and the collection and removal of trash and garbage to maintain existing schedules for these services.

Grading operations, roadway excavation and fill construction shall be conducted by the CONTRACTOR in a manner to provide a reasonably satisfactory surface for traffic. When rough grading is completed, the roadbed surface shall be brought to a smooth, even condition satisfactory for traffic.

Unless otherwise authorized, work shall be performed in only one-half of the roadway at one time. One half shall be kept open and unobstructed until the opposite side is ready for use. If one-half a street only is being improved, the other half shall be conditioned and maintained as a detour.

The CONTRACTOR will be required to maintain at least one lane of traffic in each direction through the project area at all times in a manner satisfactory to the Engineer in the form of an engineered traffic control plan. The engineered traffic control plans must be signed by a California registered civil and/or traffic engineer. The plan is a required submittal for review one week prior to the pre-construction meeting.

If traffic control on the project shall be implemented by a sub-contractor, such subcontractor must specialize in Traffic Control and be approved by the City Engineer.

The CONTRACTOR shall include in its Bid all costs for the above requirements.

**7-10.1.1 General.** One week prior to pre-construction meeting, the CONTRACTOR shall submit his/her complete construction schedule to the Engineer for approval. The CONTRACTOR shall submit requests for changes in the schedule to the Engineer for approval at least forty eight (48) hours prior to the scheduled Work.

**7-10.1.2 Parking Restrictions and Posting for Tow Away.** No Parking signs, posted by the Contractor, shall be of heavy card stock and not less than 1.75 square feet of surface area on the face. Background color shall be white and letters shall be printed in red water resistant ink except day, date, and time of restriction may be printed in black water resistant ink. The signs shall be printed with the words "Tow Away" and "No Parking" with a character height of not less than 2.75 inches and a stroke width of not less than 0.5 inches. The day, dated, and time of the particular restriction shall be printed or attached below the above mentioned wording in characters of not less than 2.0 inches in height and 0.4 inches in stroke width. The day of the week shall be written out or properly abbreviated with three to four letters; date or dates or restriction shall be listed completely; the beginning and ending times shall be clearly listed on the sign.

Signs shall be mounted such that the wording "No Parking" are at an elevation at least three feet above the adjacent flowline. Signs may be tied with string to trees and power poles, taped to existing sign poles, or mounted to stakes or barricades as provided by the Contractor. The signs shall be placed as needed to control the parking of cars within the construction zone; signs shall be placed at intervals of 75 feet or less along each side of the roadway.

Signs shall be posted and maintained by the Contractor for a period of 72 hours prior to the restrictions becoming effective. The Contractor may only post parking restrictions that are effective for the duration of the Work. Upon completion of the Work, the Contractor shall promptly and completely remove and dispose all signs, stakes, and barricades. The Contractor shall promptly reset or replace all damaged or defective signs.

The Contractor shall be fully responsible for the adequate removal of all parked cars. The Contractor shall coordinate the removal of all vehicles with the City of Auburn Police Department. The Contractor shall notify the City of Auburn Police Department upon posting of the parking restrictions for a particular street. For removal of parked vehicles, the Contractor shall notify the City of Auburn Police Department not less than two hours prior to the needed removal, stating the address nearest the parked vehicle, make, model, color and license number. The City shall not be responsible for any delay or additional costs associated with the removal of parked cars that obstruct the construction operation.

If a vehicle owner successfully contests a towing citation in court, and their citation is dismissed for causes related to the Contractor's failure to perform the requirements of this section, the Contractor shall reimburse the City for the cost of any claims associated with the towing citation.

DEVIATIONS FROM THE REQUIREMENTS OF THIS SUBSECTION WILL BE PERMITTED ONLY ON PRIOR CONSENT OF THE ENGINEER. FAILURE OF THE CONTRACTOR TO ADHERE TO THE REQUIREMENTS OF THIS SUBSECTION, OR FAILURE OF THE CONTRACTOR TO COMPLETE HIS DAILY SCHEDULE ONCE "TEMPORARY NO PARKING" SIGNS HAVE BEEN POSTED, WILL RESULT IN DAMAGES BEING SUSTAINED BY THE CITY. SUCH DAMAGES ARE, AND WILL CONTINUE TO BE, IMPRACTICABLE AND EXTREMELY DIFFICULT TO DETERMINE. FOR EACH OCCURRENCE OF A VIOLATION, AS PROVIDED HEREIN, THE

CONTRACTOR SHALL PAY TO THE AGENCY, OR HAVE WITHHELD FROM MONIES DUE TO IT, THE SUM OF $1,000.00.

EXECUTION OF THE CONTRACT SHALL CONSTITUTE AGREEMENT BY THE AGENCY AND CONTRACTOR THAT $1,000.00 PER VIOLATION IS THE MINIMUM VALUE OF THE COST AND ACTUAL DAMAGE CAUSED, THAT SUCH SUM SHALL NOT BE CONSTRUED AS A PENALTY, AND THAT SUCH SUM MAY BE DEDUCTED FROM PAYMENTS DUE THE CONTRACTOR.

**7-10.1.3 Notification to the Public Agencies.** The CONTRACTOR shall notify the following Agencies 48 hours prior to working in the area within the City of Auburn unless otherwise noted:

Not Applicable – associated agencies are listed above.

**7-10.2 Storage of Equipment and Materials in Public Streets.** Construction materials shall not be stored in streets, roads, or highways for more than 5 days after unloading. All materials or equipment not installed or used in construction within 5 days after unloading shall be stored elsewhere by the CONTRACTOR at its expense unless authorized additional storage time.

Construction equipment shall not be stored at the Work site before its actual use on the Work nor for more than 5 days after it is no longer needed. Time necessary for repair or assembly of equipment may be authorized 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 permitted. After placing backfill, all excess material shall be removed immediately from the site.

**7-10.3 Street Closures, Detours, Barricades.** The CONTRACTOR shall comply with all applicable State, County and City requirements for closure of streets. The CONTRACTOR shall provide barriers, guards, lights, signs, temporary bridges, flagpersons, and watchpersons. The CONTRACTOR shall be responsible for compliance with additional public safety requirements which may arise. The CONTRACTOR shall furnish and install signs and warning devices and promptly remove them upon completion of the Work.

At least 48 hours in advance of closing, partially closing or reopening, any street, alley, or other public thoroughfare, the CONTRACTOR shall notify the Police, Fire, an Public Works Departments, and comply with their requirements. Deviations must first be approved in writing by the Engineer.

The CONTRACTOR shall secure approval, in advance, from authorities concerned for the use of any bridges proposed by it for public use. Temporary bridges shall be clearly posted as to load limit, with signs and posting conforming to current requirements covering "signs" as set forth in the Traffic Manual published by the California Department of Transportation. This manual shall also apply to the street closures, barricades, detours, lights, and other safety devices required.

All traffic control barricades, signs and devices used by the CONTRACTOR shall, as a minimum, conform to the latest edition of the "California Manual on Uniform Traffic Controls Devices" ("MUTCD"). Channelization devices shall be spaced no greater than fifty (50) feet apart. The CONTRACTOR shall take additional precautions as he/she may find necessary under the circumstances.

Should the CONTRACTOR fail to provide adequate traffic control or safety barricades, and in the event a responsible individual cannot be located or refuses to perform, the AGENCY will at its option place needed devices or engage a private firm to place and maintain said barricades, which will be charged to the CONTRACTOR directly.

Full street closures will not be allowed without City Council approval.

All costs involved shall be included in the Bid.

**7-10.4 Safety.**

**7-10.4.1. Safety Orders.** The CONTRACTOR shall have at the Work site, copies of suitable extracts of: Construction Safety Orders, Tunnel Safety Orders and General Industry Safety Orders issues by the State Division of Industrial Safety. The CONTRACTOR shall comply with provisions of these and all other applicable laws, ordinances, and regulations.

Before excavating any trench 1.5 m (5 feet) or more in depth, the CONTRACTOR shall submit a detailed plan to the AGENCY showing the design of shoring, bracing, sloping, or other provisions to be made for the workers' protection from the hazard of caving ground during the excavation of such trench. If the plan varies from the shoring system standards, the plan shall be prepared by a registered Civil Engineer. No excavation shall start until the Engineer has accepted the 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.

Payment for performing all work necessary to provide safety measures shall be included in the prices bid for other items of work except where separate bid items for excavation safety are provided, or required by law.

**7-10.4.2 Use of Explosives.** Explosive may be used only when authorized in writing by the Engineer, or as otherwise stated in the Specifications. Explosives shall be handled, used, and stored in accordance with all applicable regulations.

The Engineer's approval of the use of explosives shall not relieve the CONTRACTOR from liability for claims caused by blasting operations.

**7-10.4.3 Special Hazardous Substances and Processes.** Materials that contain hazardous substances or mixtures may be required on the Work. A Material Safety Data Sheet as described in Section 5194 of the California Code of Regulations shall be requested by the CONTRACTOR from the manufacturer of any hazardous products used.

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 Material Safety Data Sheet and on the product container label.

The CONTRACTOR shall notify the Engineer if a specified product cannot be used under safe conditions.

**7-10.4.4 Confined Spaces.**

**(a)** Confined Space Entry Program. The CONTRACTOR shall be responsible for implementing, administering and maintaining a confined space entry program (CSEP) in accordance with Sections 5156, 5157 and 5158, Title 8, CCR.

Prior to starting the Work, the CONTRACTOR shall prepare and submit its comprehensive CSEP to the Engineer. The CSEP shall address all potential physical and environmental hazards and contain procedures for safe entry into confined spaces, including, but not limited to the following:

1. Training of personnel
2. Purging and cleaning of materials and residue
3. Potential isolation and control of energy and material inflow
4. Controlled access to the space.

5. Atmospheric testing of the space
6. Ventilation of the space
7. Special hazards consideration
8. Personal protective equipment
9. Rescue plan provisions

The CONTRACTOR's submittal shall include the names of its personnel, including subcontractor personnel, assigned to the project who will have CSEP responsibilities, their CSEP training, and their specific assignment and responsibility in carrying out the CSEP.

**(b)** Permit-Required Confined Spaces. Entry into permit-required confined spaces as defined in Section 5157, Title 8, CCR may be required as a part of the Work. All 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 space program 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 CONTRACTOR and AGENCY personnel at the Work site.

**(c)** Payment. Payment for implementing, administering, and providing all equipment and personnel to perform the CSEP shall be included in the bid items for which the CSEP is required.

**7-11 PATENT FEES OR ROYALTIES.** The CONTRACTOR shall absorb in its Bid the patent fees or royalties on any patented article or process 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, addresses and specialties of CONTRACTORs, Subcontractors, architects, or engineers may be displayed on removable signs. The size and location shall be subject to the Engineer's approval.

Commercial advertising matter shall not be attached to 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. The CONTRACTOR shall at all times observe and comply with such laws, ordinances, and regulations.

**7-14 ANTITRUST CLAIMS.** Section 7103.5 of the Public Contract Code provides:

> "In entering into a public works CONTRACTOR 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 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. The assignment shall be made and become effective at the time the awarding body tenders final payment to the CONTRACTOR, without further acknowledgment by the parties."

**7-15 DAILY REPORT.** The CONTRACTOR shall complete a Daily Report indicating manpower, work performed, major equipment used and on standby (itemized separately), subcontractors, and similar items involved in the performance of the Work. The Daily Report shall be completed on forms prepared by the CONTRACTOR and acceptable to the Engineer, and shall be submitted to the City Inspector weekly.

The CONTRACTOR shall submit as requested Certified Payroll Statements for each employee involved with the Work including subcontractors. Submission of certified payroll does not relieve the CONTRACTOR of his responsibility to pay prevailing wage.

## SECTION 8 – FACILITIES FOR AGENCY PERSONNEL

**8-1 GENERAL.** All facilities provided for AGENCY personal shall be at suitable locations approved by the Engineer. Such facilities must in a room, building, or trailer provided for this purposes with an acceptable means for locking.

A Class "A" Field Office in accordance with 8-2.1 shall be provided at any offsite plan facility furnishing pipe subject to AGENCY inspection during manufacture. A Field Laboratory in accordance with 8-3.1 shall be provided at any offsite or project site plant facility furnishing portland cement concrete or asphalt paving material. Any other facilities for AGENCY personnel shall be provided only when required by the Specifications.

Offices and laboratories at plants may be used concurrently by inspection personnel of other agencies provided such use does not seriously conflict with AGENCY use. When facilities are shared in this manner, at least one locker provided with a hasp for a padlock must be available for the exclusive use of AGENCY inspectors. Otherwise any facilities furnished are for the exclusive use of AGENCY personnel.

All facilities shall conform to the applicable codes, ordinances, and regulations of the local jurisdiction and of the State of California, and shall conform to current practice. The interior shall be paneled or suitably lined to provide a facility of good appearance.

The CONTRACTOR shall provide janitorial and other maintenance services in all types of facilities provided. Such services shall include the supply of the appropriate paper products and dispensers. Trash receptacles shall be provided and emptied by the CONTRACTOR at weekly intervals or sooner as required. The trash shall be removed from the project site.

All costs to furnish, maintain, service, and remove the specified facilities at the project site shall be included in the price bid for such facilities. If no bid item is provided in the proposal, costs shall be included in other items for which bids are entered.

The first progress payment will not be approved until all facilities are in place and fully comply with the Specifications.

**8-2 FIELD OFFICE FACILITIES.**

**8-2.1 Class "A" Field Office.** This office shall have a minimum floor space of 16 $m^2$ (175 $ft^2$), at least one door, and window area of not less than 2 $m^2$ (22 $ft^2$). All doors and windows shall be provided with screens.

Furniture shall be provided as follows: one plan table, one standard 1.5 m (5 feet) long double-pedestal desk with a drawer suitable for holding files, two chairs, one drafting stool, and one plan rack.

Electric power shall be provided to include a minimum of four duplex convenience outlets. The office shall be illuminated at the tables and desk. An outdoor lighting fixture with a 300-watt bulb shall be installed.

Heating and air conditioning of sufficient capacity shall be provided at no expense to the AGENCY. The CONTRACTOR shall provide drinking water within the office and integral sanitary facilities directly adjoining. Sanitary facilities shall include a toilet and wash basin with hot and cold running water.

Extended area, non-coin-operated telephone service shall be provided within the office area. The installation shall include sufficient extension code to serve the plan table and desk.

**8-2.2 Class "B" Field Office.** This office shall be the same as class "A" except that integrated sanitary facilities and air conditioning are not required. A chemical toilet facility shall be provided adjacent to the office.

**8-2.3 Class "C" Field Office**. The office shall be of suitable proportions with 11 $m^2$ (120 $ft^2$) of floor area. It shall be equipped with one 0.9 by 1.5 m (3 by 5 foot) table, four chairs and one plan rack. It shall be adequately heated, ventilated, and lighted and two duplex convenience outlets shall be provided. Air conditioning, telephones, and sanitary facilities are not required.

**8-3 FIELD LABORATORIES.**

**8-3.1 Offsite at Manufacturing Plant.** Field laboratories shall conform to the requirements for a Class "C" Field Office specified in 8-2.3 except for the following:

1) Telephone service per 8-2.1.
2) Chair.
3) Work table, 1.2 by 3.0 m (4 by 10 feet), 0.9 m (3 feet) high.
4) Sieves per 203-6.
5) Scales and weights.
6) Burner plate for heating samples.
7) Thermometer, with 90 to 260°C (200 to 400°F) degree range (Asphalt Plants only).
8) Air meter for all concrete in accordance with ASTM C 231 of the type that indicates percentage of air directly (Precast Concrete Plants only)

All sampling and testing equipment shall be maintained in satisfactory operating condition by CONTRACTOR or plant owner. Laboratories shall be located immediately adjacent to and with full view of batching and loading operations.

**8-3.2 At Project Site.** Field laboratories shall be in accordance with 8-3.1, except that sieves, scales, weights, burner plates, sampling devices, pans, and thermometers will be furnished by the AGENCY at no expense to the CONTRACTOR. If air entraining agents are being used in the Concrete on the project, an air meter of the type described in 8-3.1 shall be furnished by the CONTRACTOR.

**8-4 BATHHOUSE FACILITIES.** When the Plans or Specifications require bathhouse facilities, the following shall be provided.

1) One lavatory with hot and cold water.
2) One toilet in a stall.
3) One 1 m (3 feet) trough-type urinal.
4) One enclosed shower at least 1 by 1 m (3 by 3 feet) with hot and cold water.
5) One bench, 2 m (6 feet) long.
6) Soap dispensers.
7) Toilet paper holders.
8) Paper towel cabinet.
9) Wastepaper receptacle.

These facilities shall be serviced and provided with necessary sanitary supplies.

These facilities shall be for the exclusive use of AGENCY personnel. However, a separate building need not be provided for this purpose if such facilities are located in a separate room in a building which includes other facilities.

**8-5 REMOVAL OF FACILITIES.** Field offices, laboratories, and bathhouse facilities at the project site shall be removed upon completion of the Work. Buildings and equipment furnished by the CONTRACTOR at the project site under the provisions of this section are the property of the CONTRACTOR.

**8-6 BASIS OF PAYMENT.** All costs incurred in furnishing, maintaining, servicing, and removing field officers, laboratories, or bathhouse facilities required at the project site shall be included in the bid item for furnishing such facilities. If such facilities are required by the Plans or Specifications and no bid item is provided in the proposal, the costs shall in included in other items for which bids are entered. Such costs incurred in connection with offices and laboratories at plants shall be borne by the plant owners.

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## 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 basis of measurement shall be measured in accordance with 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 certificates 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 WORK.** Items for which quantities are indicated "Lump Sum", "L.S.", or "Job", shall be paid for at the price indicated in the Bid. 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 designated lump sum bid item. This schedule shall equal the lump sum bid and shall be such form and sufficiently detailed as to satisfy the Engineer that it correctly represents a reasonable apportionment of the lump sum.

### 9-3 PAYMENT

**9-3.1 General.** The quantities listed in the Bid schedule will not govern final payment. Payment to the CONTRACTOR will be made only for 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 the Bid schedule, the Contract Unit Prices will prevail subject to the provisions of 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 will not be made for materials wasted or disposed of in a manner not called for under the Contract. This includes rejected materials not unloaded from vehicles, material rejected after it has been place, 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 costs 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.

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 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 acceptance of the Work, 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 direction of the AGENCY. In the event such items are not placed into service prior to partial or final acceptance of the project, warranty periods will commence on the date of such acceptance.

If, within the time fixed by law, a property 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 calendar days from the date of acceptance of the Work by the City Council, 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 purposes 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.

From each progress estimate, 5 percent will be deducted and retained by the AGENCY, and the remainder less the amount of all previous payments will be paid. After 50 percent of the Work has been completed and if progress on the Work is satisfactory, the deduction to be made from remaining progress estimates and from the final estimate may be limited to $500 or 5 percent of the first half of total Contract amount, whichever is greater.

No progress payment made to the CONTRACTOR or its sureties will constitute a waiver of the liquidated damages under 6-9.

On not later than the fifth day of every month, the Contractor shall present to the Director of Public Works and invoice covering the total quantities under each item of work that have been completed, from the start of the job up to and including the last day of the preceding month, and the value of the work so completed determined in accordance with the schedule of unit prices for such items together

with such supporting evidence as may be required by the Director of Public Works. This invoice shall also include an allowance for the cost of such material required in the permanent work as has been delivered to the site but not as yet incorporated in the work.

On not later than the thirtieth of the month, the City shall, after deducting previous payments made, pay to the Contractor ninety (90) percent of the amount of the invoice. No such estimate or payment shall be required to be made, when, in the judgment of the Director of Public Works, the work is not proceeding in accordance with the provisions of the contract, or when in his or her judgment the total value of the work done since the last estimate amounts to less than three hundred dollars ($300). However, payments will be withheld pending receipt of any outstanding reports required by the Contract Documents. In addition, the final progress payment will not be released until the Contractor returns the control set of plans and specifications showing the as-built conditions.

However, payments will be withheld pending receipt of any outstanding reports required by the Contract Documents. In addition, the final progress payment will not be released until the CONTRACTOR returns the control set of plans and specifications showing the as-built conditions.

The full five (5) percent retention will be deducted from all payments. The final retention will be authorized for payment thirty five (35) days after the date of recordation of the Notice of Completion.

The CONTRACTOR may substitute securities for any monies withheld by the AGENCY to ensure performance under the Contract as provided in Public Contract Code Sections 10263 and 22300.

When provided for in the Specifications, and subject to the limitation and conditions therein, the cost of materials and equipment delivered but not incorporated into the Work will be included in the progress estimate.

**9-3.3 Delivered Materials.** Materials and equipment delivered but not incorporated into the Work shall not be submitted for payment and shall not be included in the estimate for progress payment

**9-3.4 Mobilization.** When a bid item is include in the Proposal form for mobilization and subject to the conditions and limitations in the Specifications, the costs of work in advance of construction operations and not directly attributable to any specific bid item will be included in the progress estimate. When no such bid item is provided, payment for such costs will be considered to be included in the other items of work.

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**SECTION F**

**SCHEDULE I – HELICOPTER PARKING AREA**
**A.I.P. 3-06-0012-021-2022**
**IN THE CITY OF AUBURN, CALIFORNIA**

**SPECIAL PROVISIONS**

**PART A – CITY PROVISIONS**
**PART B – FAA PROVISIONS**

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**SPECIAL PROVISIONS**

**SCHEDULE I – HELICOPTER PARKING AREA**
**A.I.P. 3-06-0012-17**
**IN THE CITY OF AUBURN, CALIFORNIA**

## PART A – CITY PROVISIONS

### 700-1 EMERGENCY INFORMATION

The Contractor shall provide the following information in writing and submit it with the signed contract, contract bonds and certificates of insurance. Failure to comply may result in delays in the processing of the contract documents.

1. Name of authorized representative at the job site.
2. Address and telephone number where the above person can be reached 24 hours a day.
3. Address of the nearest office of the Contractor, if any, and the name and telephone number of a person at that office who is familiar with the project.
4. Address and telephone number of the Contractor's main office and the name and telephone number of the person at that office familiar with the project.

### 700-2 CONSTRUCTION SURVEYING

The Contractor will provide all necessary construction surveying, staking or markings for locating the limits of construction and shall comply with the provisions of E2-9. The Contractor shall bear all costs for restaking or marking.

Construction surveys shall be done only under the direction of the Engineer by a Registered (licensed) Land Surveyor or a Registered Civil Engineer authorized to practice land surveying within the state. The Agency will provide available record map information. The Contractor is responsible for obtaining all necessary record maps, centerline ties and survey notes from Placer County.

The Contractor and his surveyor shall provide the Engineer with a copy of the constructing staking field notes used to construct the improvements. In addition the Contractor shall also prove a plot of the improvements to be constructed based on the surveyor's construction staking and markings prior to the installation of the improvements. The plot shall be the same scale as the improvement plans.

### 700-3 PROTECTION OF SURVEY MONUMENTS

The Contractor shall protect existing survey monuments, if any exist within the work limits, during the entire project. Asphalt overlaying of existing survey monuments in the roadway will not be permitted. In the event a surveyed monument lies within an area to be cold planed, removed or reconstructed, the Contractor shall immediately notify the Agency's representative and protect said monument until the monument can be relocated by the Agency.
The Contractor shall reestablish destroyed survey monuments at the Contractor's expense.

## **700-4** REMOVAL OF MATERIALS

Materials which are to be disposed of shall not be stored at the project sites but shall be removed before the end of the working day.

## **700-5** INVESTIGATION OF SITE CONDITIONS

Bidders are urged to visit the site of work and by their own investigations satisfy themselves as to the existing conditions affecting the work to be done under these specifications. If the bidder chooses not to visit the site or conduct investigations, he will, nevertheless, be charged with the knowledge of conditions which reasonable inspection and investigation would have disclosed.

## **700-6** UTILITIES

The Contractor shall coordinate construction with public utility relocation activities. Additional utility/service providers are mentioned in Section E5-1, Location.

The existing subsurface utilities shown have been indicated, based on the best available record information. However, to avoid or resolve any interference problems between these existing utilities and the proposed work, the Contractor shall field verify the vertical and horizontal locations of all utilities, such as water lines and water services, electronic conduits, telephone and television cable, storm drain facilities, and all other facilities and obstructions prior to beginning any excavations. If conflicts exist, revised grades and/or alignments may be established, if required. **Such field verification shall require exposing these utilities prior to the start of construction**.

Special reference is hereby made to Section E5-2, “Protection,” of the SSPWC with respect to the protection, repair, and replacement of existing subsurface utilities.

The Contractor shall telephone Underground Service Alert (USA) at 1-800-422-4133 a minimum of three (3) working days prior to the start of construction. No excavation shall commence unless the Contractor has obtained the USA Inquiry Identification Number. For best response, provide as much notice as possible, up to ten (10) working days.

## PART B – FEDERAL PROVISIONS

General Proposal Requirements and Conditions

### GENERAL

The bidder's attention is directed to the provisions in Section 20, "Proposal Requirements and Conditions," of the Standard FAA General Provisions and these special provisions for the requirements and conditions which the bidder must observe in the preparation of the proposal form and the submission of the bid.

In addition to the subcontractors required to be listed in conformance with the "Designation of Subcontractors" each proposal shall have listed therein the portion of work that will be done by each subcontractor listed. A sheet for listing the subcontractors is included in the Proposal.

The form of "Bidder's Bond to Accompany Proposal" will be found in the Proposal.

In conformance with Public Contract Code Section 7106, a Noncollusion Affidavit is included in the Proposal.

The contractor, sub recipient 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 DOT 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 recipient deems appropriate. Each subcontract signed by the bidder must include this assurance.

PROMPT PROGRESS PAYMENT TO SUBCONTRACTORS

A prime contractor or subcontractor shall pay to any subcontractor, not later than 10-days of receipt of each progress payment, in accordance with the provision in Section 7108.5 of the California Business and Professions Code concerning prompt payment to subcontractors. The 10-days are applicable unless a longer period is agreed to in writing. Any delay or postponement of payment over 30-days may take place only for good cause and with the agency's prior written approval. Any violation of Section 7108.5 shall subject the violating contractor or subcontractor to the penalties, sanctions, and other remedies of that Section. This requirement shall not be construed to limit or impair any contractual, administrative, or judicial remedies, otherwise available to the contractor or subcontractor in the event of a dispute involving late payment or nonpayment by the contractor, deficient subcontractor performance, and/or noncompliance by a subcontractor. This clause applies to both DBE and non-DBE subcontractors.

## PROMPT PAYMENT OF WITHHELD FUNDS TO SUBCONTRACTORS

Federal regulation (49 CFR 26.29) requires the following method be used in federal-aid contracts to ensure prompt and full payment of any retainage kept by the prime contractor or subcontractor to a subcontractor.

The agency shall hold retainage from the prime contractor and shall make prompt and regular incremental acceptances of portions, as determined by the agency of the contract work and pay retainage to the prime contractor based on these acceptances. The prime contractor or subcontractor shall return all monies withheld in retention from all subcontractors within 30 days after receiving payment for work satisfactorily completed and accepted including incremental acceptances of portions of the contract work by the agency. Any delay or postponement of payment may take place only for good cause and with the agency's prior written approval. Any violation of these provisions shall subject the violating prime contractor to the penalties, sanctions, and other remedies specified in Section 7108.5 of the California Business Professions Code. This requirement shall not be construed to limit or impair any contractual, administrative, or judicial remedies otherwise available to the contractor or subcontractor in the event of: a dispute involving late payment or nonpayment by the contractor; deficient subcontractor performance and/or noncompliance by a subcontractor. This clause applies to both DBE and non-DBE subcontractors.

## INSTRUCTIONS FOR COMPLETION OF SF-LLL, DISCLOSURE OF LOBBYING ACTIVITIES

This disclosure form shall be completed by the reporting entity, whether subawardee or prime federal recipient, at the initiation or receipt of covered federal action or a material change to previous filing pursuant to title 31 U.S.C. Section 1352. The filing of a form is required for such payment or agreement to make payment to lobbying entity 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 a covered federal action. Attach a continuation sheet for additional information if the space on the form is inadequate. Complete all items that apply for both the initial filing and material change report. Refer to the implementing guidance published by the Office of Management and Budget for additional information.

1. Identify the type of covered federal action for which lobbying activity is and/or has been secured to influence, the outcome of a covered federal action.
2. Identify the status of the covered federal action.
3. Identify the appropriate classification of this report. If this is a follow-up report caused by a material change to the information previously reported, enter the year and quarter in which the change occurred. Enter the date of the last, previously submitted report by this reporting entity for this covered federal action.
4. Enter the full name, address, city, State and zip code of the reporting entity. Include Congressional District if known. Check the appropriate classification of the reporting entity that designates if it is or expects to be a prime or subaward recipient. Identify

the tier of the subawardee, e.g., the first subawardee of the prime is the first tier. Subawards include but are not limited to subcontracts, subgrants and contract awards under grants.

5. If the organization filing the report in Item 4 checks "Subawardee" then enter the full name, address, city, State and zip code of the prime federal recipient. Include Congressional District, if known.
6. Enter the name of the federal agency making the award or loan commitment. Include at least one organization level below agency name, if known. For example, Department of Transportation, United States Coast Guard.
7. Enter the federal program name or description for the covered federal action (item 1). If known, enter the full Catalog of Federal Domestic Assistance (CFDA) number for grants, cooperative agreements, loans and loan commitments.
8. Enter the most appropriate federal identifying number available for the federal action identification in item 1 (e.g., Request for Proposal (RFP) number, Invitation for Bid (IFB) number, grant announcement number, the contract grant. or loan award number, the application/proposal control number assigned by the federal agency). Include prefixes, e.g., "RFP-DE-90-001."
9. For a covered federal action where there has been an award or loan commitment by the Federal agency, enter the federal amount of the award/loan commitments for the prime entity identified in item 4 or 5.
10. (a) Enter the full name, address, city, State and zip code of the lobbying entity engaged by the reporting entity identified in item 4 to influenced the covered federal action.
    (b) Enter the full names of the individual(s) performing services and include full address if different from 10 (a). Enter Last Name, First Name and Middle Initial (MI).
11. Enter the amount of compensation paid or reasonably expected to be paid by the reporting entity (item 4) to the lobbying entity (item 10). Indicate whether the payment has been made (actual) or will be made (planned). Check all boxes that apply. If this is a material change report, enter the cumulative amount of payment made or planned to be made.
12. Check the appropriate box(es). Check all boxes that apply. If payment is made through an in-kind contribution, specify the nature and value of the in-kind payment.
13. Check the appropriate box(es). Check all boxes that apply. If other, specify nature.
14. Provide a specific and detailed description of the services that the lobbyist has performed or will be expected to perform and the date(s) of any services rendered. Include all preparatory and related activity not just time spent in actual contact with federal officials. Identify the federal officer(s) or employee(s) contacted or the officer(s) employee(s) or Member(s) of Congress that were contacted.
15. Check whether or not a continuation sheet(s) is attached.
16. The certifying official shall sign and date the form, print his/her name title and telephone number.

Public reporting burden for this collection of information is estimated to average 30 minutes per response, including time for reviewing instruction, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this

collection of information, including suggestions for reducing this burden, to the Office of Management and Budget, Paperwork Reduction Project (0348-0046), Washington, D.C. 20503.
SF-LLL-Instructions Rev. 06-04-90«ENDIF»

FEDERAL LOBBYING RESTRICTIONS

Section 1352, Title 1352, Title 31, United States Code prohibits Federal funds from being expended by the recipient or any lower tier subrecipient of a Federal-aid contract to pay for any person for influencing or attempting to influence a federal agency or Congress in connection with the awarding of any federal-aid contract, the making of any federal grant or loan, or the entering into of any cooperative agreement.

If any funds other than federal funds have been paid for the same purposes in connection with this federal-aid contract, the recipient shall submit an executed certification and, if required, submit a completed disclosure form as part of the bid documents.

A certification for federal-aid contracts regarding payment of funds to lobby Congress or a federal agency is included in the Proposal. Standard Form - LLL, "Disclosure of Lobbying Activities," with instructions for completion of the Standard Form is also included in the Proposal. Signing the Proposal shall constitute signature of the Certification.

The above referenced certification and disclosure of lobbying activities shall be included in each subcontract and any lower-tier contracts exceeding $100,000. All disclosure forms, but not certifications, shall be forwarded from tier to tier until received by the Engineer.

The Contractor, subcontractors and any lower-tier contractors shall file a disclosure form at the end of each calendar quarter in which there occurs any event that requires disclosure or that materially affects the accuracy of the information contained in any disclosure form previously filed by the Contractor, subcontractors and any lower-tier contractors. An event that materially affects the accuracy of the information reported includes:

(1) A cumulative increase if $25,000 or more in the amount paid or expected to be paid for influencing or attempting to influence a covered federal action; or

(2) A change in the person(s) or individual(s) influencing or attempting to influence a covered federal action; or

(3) A change in the officer(s), employees(s), or Member(s) contacted to influence or attempt to influence a covered Federal Action.

DISADVANTAGED BUSINESS ENTERPRISE (DBE)

This contract is subject to Part 26, Title 49, Code of Federal Regulations entitled "Participation by Disadvantaged Business Enterprises in Department of Transportation Financial Assistance Programs." The Regulations in their entirety are incorporated herein by this reference. Disadvantaged business enterprises (DBEs), as defined in 49 CFR Part 26 are encouraged to participate in the performance of contracts financed in whole or in part with Federal Funds. The contractor should insure that DBEs have the opportunity to participate in the performance of this contract and shall take all necessary and reasonable steps for this assurance. The Contractor shall not discriminate on the basis of race, color, national origin, or sex in the award and performance of subcontracts.

Bidders shall be fully informed with respect to the requirements of the DBE Regulations. The DBE Regulations in their entirety are incorporated herein by this reference. Attention is directed to the following matters:

A. A DBE must be a small business concern as defined pursuant to Section 3 of U.S. Small Business Act and relevant regulations promulgated pursuant thereto;
B. A DBE may participate as a prime contractor, subcontractor, joint venture partner with a prime or subcontractor, vendor of material or supplies, or as a trucking company;
C. A. DBE joint venture partner must be responsible for specific contract items of work, or clearly defined portions thereof. Responsibility means actually performing, managing and supervising the work with its own forces. The DBE joint venture partner must share in the capital contribution, control, management, risks and profits of the joint venture commensurate with its ownership interest;
D. A DBE must perform a commercially useful function, i.e., must be responsible for the execution of a distinct element of the work and must carry out its responsibility by actually performing, managing and supervising the work;
E. DBEs must be certified by California Unified Certification Program (CUCP). Listings of DBEs certified by the CUCP are available from the following sources:

    1. The Caltrans "Civil Rights" website at:
       http://www.dot.ca.gov/hq/bep.

    2. The Caltrans DBE Directory. This Directory may be obtained from the Department of Transportation, Material Operations Branch, Publication Distribution Unit, 1900 Royal Oaks Drive, Sacramento, California 95815, Telephone: (916) 445-3520;

F. When reporting DBE participation, bidders may count the cost of materials or supplies purchased from DBEs as follows:

    1. If the materials or supplies are obtained from a DBE manufacturer, 100 percent of the cost of the materials or supplies. A DBE manufacturer is a firm that operates or maintains a factory of establishment that produces, on the premises, the materials, supplies, articles, or equipment required under the contract and of the general character described by the specifications.

    2. If the materials or supplies are purchased from a DBE regular dealer, count 60 percent of the cost of the materials or supplies. A DBE regular dealer is a firm that owns, operates or maintains a store, warehouse, or other establishment in which the materials, supplies, articles or equipment of the general character described by the specifications and required under the contract are bought, kept in stock, and regularly sold or leased to the public in the usual course of business. To be a DBE regular dealer, the firm must be an established, regular business that engages, as its principal business and under its own name, in the purchase and

sale or lease of the products in question. A person may be a DBE regular dealer in such bulk items as petroleum products, steel, cement, gravel, stone, or asphalt without owning, operating, or maintaining a place of business as provided in this paragraph F.2., if the person both owns and operates distribution equipment for the products. Any supplementing of regular dealer's own distribution equipment shall be by a long-term lease agreement and not on an ad on or contract-by-contract basis. Packagers, brokers, manufacturers' representatives, or other persons who arrange or expedite transactions are not DBE regular dealers within the meaning of the paragraph F.2.

3. If the DBE is neither a manufacturer nor a regular dealer, count only the entire amount of fees or commissions charged for assistance in the procurement of the materials and supplies, of fees or transportation charges for the delivery of materials or supplies required on a job site, provided the fees are reasonable and not excessive as compared with fees charged for similar services.

G. When reporting DBE participation, bidders may count the participation of DBE trucking companies as follows:

1. The DBE must be responsible for the management and supervision of the entire trucking operation for which it is responsible on a particular contract.

2. The DBE must itself own and operate at least one fully licensed, insured, and operational truck used on the contract.
3. The DBE receives credit for the total value of the transportation services it provides on the contract using trucks it owns, insures, and operates using drivers it employs.
4. The DBE may lease trucks from another DBE firm including an owner-operator, who is certified as a DBE. The DBE who leases trucks from another DBE receives credit for the total value of the transportation services the lessee DBE provides on the contract.
5. The DBE may also lease trucks from a non-DBE firm including from an owner-operator. The DBE who leases trucks from a non-DBE is entitled to credit only for the fee or commission it receives as a result of the lease arrangement. The DBE does not receive credit for the total value of the transportation services provided by the lessee, since these services are not provided by a DBE;
6. For the purposes of this paragraph G, a lease must indicate that the DBE has exclusive use of and control over the truck. This does not preclude the leased truck from working for others during the term of the lease with the consent of the DBBE, so long as the lease gives the DBE absolute priority for use of the leased truck. Leased tucks must display the name and identification number of the DBE.

H. Bidders are encouraged to use services offered by financial institutions owned and controlled by DBEs.

DBE AVAILABILITY ADVISORY

As required by federal law, Caltrans has established a statewide overall DBE goal. In order to ascertain whether that statewide overall DBE goal is being achieved, Caltrans is tracking DBE participation on all Federal-aid contracts administered by cities/counties and other local agencies.

To assist bidders in ascertaining DBE availability for specific items of work, the Agency advises that it has determined that DBEs could reasonably be expected to compete for subcontracting opportunities on this project, and their likely availability for work on this project is 10 percent. The Agency also advises that participation of DBEs in the specified percentage is not a condition of award.

AWARD AND EXECUTION OF CONTRACT

The bidder's attention is directed to the provisions in Section 30, "Award and Execution of Contract," of the Standard FAA General Provisions and these special provisions for the requirements and conditions concerning award and execution of contract.

A "LOCAL AGENCY BIDDER – DBE INFORMATION" form will be provided by the Agency in the contract documents to be executed by the successful bidder. The purpose of the form is to collect data required under 49 CFR Part 26. Even if no DBE participation will be reported, the successful bidder must execute and return the form.

The successful bidder's "LOCAL AGENCY BIDDER – DBE INFORMATION" form should include the names, addresses and phone numbers of DBE firms that will participate, with a complete description of work or supplies to be provided by each, and the dollar value of each DBE transaction. When 100 percent of a contract item of work is not to be performed or furnished by a DBE, a description of the exact portion of that work to be performed or furnished by that DBE should be included in the DBE information, including the planned location of that work. A successful bidder certified as a DBE should describe the work it has committed to performing with its own forces as well as any other work that it has committed to be performed by DBE subcontractors, suppliers and trucking companies.

The successful bidder is encouraged to provide written confirmation from each DBE that the DBE is participating in the contract. A copy of a DBE's quote will serve as written confirmation that the DBE is participating in the contract. If a DBE is participating as a joint venture partner, the successful bidder is encouraged to submit a copy of the joint venture agreement.

The "LOCAL AGENT'S BIDDER – DBE INFORMATION" form should be completed and returned to the Agency by the successful bidder with the executed contract and contract bonds.

SUBCONTRACTOR AND DBE RECORDS

The Contactor shall maintain records showing the name and business address of each first-tier subcontractor. The records shall also show the name and business address of every DBE subcontractor, DBE vendor of materials and DBE trucking company, regardless of tier. The records shall show the date of payment and the total dollar figure paid to all of these firms. DBE prime contractors shall also show the date of work performed by their own forces along with the corresponding dollar value of the work.

Upon completion of the contract, a summary of these records shall be prepared on "Final Report – Utilization of Disadvantaged Business Enterprises (DBE) – First-Tier Subcontractors" (Exhibit 17 – F/Form CEM-2402) and certified correct by the Contractor or his authorized representative, and shall be furnished to the Engineer. The form shall be furnished to the Engineer within 90 days from the date of contract acceptance. The amount of $10,000 will be withheld from payment until a satisfactory form is submitted.

Prior to the fifteenth of each month, the Contractor shall submit documentation to the Engineer showing the amount paid to DBE trucking companies. The Contractor shall also obtain and submit documentation to the Engineer showing the amount paid by DBE trucking companies to all firms, including owner-operators, for the leasing of trucks. If the DBE leases trucks from a non-DBE, the Contractor may count only the fee or commission the DBE receives as a result of the lease arrangement.

The Contractor shall also obtain and submit documentation to the Engineer showing the truck number, owner's name, California Highway Patrol CA number, and if applicable, the DBE certification number of the owner of the truck for all trucks used during that month. This documentation shall be submitted on "Monthly DBE Trucking Verification" Form CEM-2404(F).

PERFORMANCE OF SUBCONTRACTORS

The subcontractors listed by the Contractor in conformance with Section 2-1.054, "Required Listing of Proposed Subcontractors," of the Standard Specifications, shall perform the work an supply the materials for which they are listed unless the Contractor has received prior written authorization to perform the work with other forces or to obtain the materials from other sources.

The Contractor should notify the Engineer in writing of any changes to its anticipated DBE participation. This notice should be provided prior to the commencement of that portion of the work.

SUBCONTRACTING

Attention is directed to the provisions in Section 8-1.01, "Subcontracting," and these special provisions. Pursuant to the provisions in Section 1777.1 of the Labor Code, the Labor Commissioner publishes and distributes a list of contractors ineligible to perform work as a subcontractor on a public works project. This list of debarred contractors is available from the Department of Industrial Relations website at:

http://www.dir.ca.gov/DLSE/Debar.html

The provisions in the third paragraph of Section 8-1.01, "Subcontracting," of the Standard Specifications, that the Contractor shall perform with the Contractor's own organization contract work amounting to not less than 50 percent of the original contract price, *(is or is not)* changed by the Federal Aid requirement specified under "Required Contract Provisions Federal-Aid Construction Contracts" in Section 17 of these special provisions that the Contractor perform not less than 30 percent of the original contract work with the Contractor's own organization.

Each subcontract and any lower tier subcontract that may in turn be made shall include the "Required Contract Provisions Federal-Aid Construction Contracts" in Section 14 of these special provisions. Noncompliance shall be corrected. Payment for subcontracted work involved will be withheld from progress payments due, or to become due, until correction is made. Failure to comply may result in termination of the contract.

BUY AMERICA REQUIREMENTS

Attention is directed to the "Buy America" requirements of the Surface Transportation Assistance Act of 1982 (Section 165) and the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) Sections 1041(a) and 1048(a), and the regulations adopted pursuant thereto. In accordance with said law and regulations, all manufacturing processes for steel and iron materials furnished for incorporation into the work on this project shall occur in the United States; with the exception that pig iron and processed, pelletized and reduced iron ore manufactured outside of the United States may be used in the domestic manufacturing process for such steel and iron materials. The application of coatings, such as epoxy coating, galvanizing, painting, and any other coating that protects or enhances the value of such steel or iron materials shall be considered a manufacturing process subject to the "Buy America" requirements.

A Certificate of Compliance, conforming to the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications, shall be furnished for steel and iron materials. The certificates, in addition to certifying that the materials comply with the specifications, shall also specifically certify that all manufacturing processes for the materials occurred in the United States, except for the exceptions allowed herein.

The requirements imposed by said law and regulations do not prevent a minimal use of foreign steel and iron materials if the total combined cost of such materials used does not exceed one-tenth of one percent (0.1%) of the total contract cost or $2,500, whichever is greater. The Contractor shall furnish the Engineer acceptable documentation of the quantity and value of any foreign steel and iron prior to incorporating such materials into the work.

PAYMENT OF PREDETERMINED MINIMUM WAGES

The payment of predetermined minimum wages applies to all federal-aid construction contracts exceeding $2,000 and all related subcontracts. The minimum wage rates are

established by the U.S. Secretary of Labor (Federal Wage Rates). All labor on this PROJECT shall be paid neither less than the greater of the minimum wage rates established by the U.S. Secretary of Labor (Federal Wage Rates), or by the State of California's Director of the Department of Industrial Relations (State Wage Rates), in accordance with the provisions of these specifications. The minimum Federal wage rates applicable to this PROJECT are included in Exhibit Federal Wage Rates.

**SECTION G**

**SCHEDULE I – HELICOPTER PARKING AREA**
**A.I.P. 3-06-0012-021-2022**
**IN THE CITY OF AUBURN, CALIFORNIA**

FAA GENERAL PROVISIONS

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## SECTION 10
## DEFINITION OF TERMS

Whenever 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 interpreted as follows:

**10-1.** AASHTO. The American Association of State Highway and Transportation Officials, the successor association to AASHO.

**10-2.** ACCESS ROAD. The right-of-way, the roadway and all improvements constructed thereon connecting the airport to a public highway.

**10-3.** ADVERTISEMENT. A public announcement, as required by local law, inviting bids for work to be performed and materials to be furnished.

**10-4.** AIP. The Airport Improvement Program, a grant-in-aid program, administered by the Federal Aviation Administration.

**10-5.** AIR OPERATIONS AREA. For the purpose of these specifications, the term air operations area 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.

**10-6.** 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; and airport buildings and facilities located in any of these areas, and includes a heliport.

**10-7.** ASTM. The American Society for Testing and Materials.

**10-8.** AWARD. The acceptance, by the Owner, of the successful bidder's proposal.

**10-9.** BIDDER. Any individual, partnership, firm, or corporation, acting directly or through a duly authorized representative, who submits a proposal for the work contemplated..

**10-10.** 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.

**10-11.** CALENDAR DAY. Every day shown on the calendar.

**10-12.** 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 the work affected by such changes. The work, covered by a change order, shall be within the scope of the contract.

**10-13.** CONTRACT. The written agreement covering the work to be performed. The awarded contract shall include, but is not limited to: The Advertisement; The Contract Form; The Proposal; The Performance Bond; The Payment Bond; any required insurance certificates; The Specifications; The Plans, and any addenda issued to bidders.

**10-14.** CONTRACT ITEM (PAY ITEM). A specific unit of work for which a price is provided in the contract.

**10-15.** 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.

**10-16.** 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.

**10-17.** DRAINAGE SYSTEM. The system of pipes, ditches, and structures by which surface or subsurface waters are collected and conducted from the airport area.

**10-18.** ENGINEER. The individual, partnership, firm, or corporation duly authorized by the Owner to be responsible for engineering inspection of the contract work and acting directly or through an authorized representative.

**10-19.** EQUIPMENT. All machinery, together with the necessary supplies for upkeep and maintenance, and also all tools and apparatus necessary for the proper construction and acceptable completion of the work.

**10-20.** 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 Engineer to be necessary to complete the work within the intended scope of the contract as previously modified.

**10-21.** FAA. The Federal Aviation Administration of the U.S. Department of Transportation. When used to designate a person, FAA shall mean the Administrator or his/her duly authorized representative.

**10-22.** FEDERAL SPECIFICATIONS. The Federal Specifications and Standards, Commercial Item Descriptions, and supplements, amendments, and indices thereto are prepared and issued by the General Services Administration of the Federal Government.

**10-23.** FORCE ACCOUNT. Force account construction work is construction that is accomplished through the use of material, equipment, labor, and supervision provided by the Owner or by another public agency pursuant to an agreement with the Owner.

**10-24.** INSPECTOR. An authorized representative of the Engineer assigned to make all necessary inspections and/or tests of the work performed or being performed, or of the materials furnished or being furnished by the Contractor.

**10-25.** 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 is intended; and similarly, the words "approved," "acceptable," "satisfactory," or words of like import, shall mean approved by, or acceptable to, or satisfactory to the Engineer, 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.

**10-26.** LABORATORY. The official testing laboratories of the Owner or such other laboratories as may be designated by the Engineer.

**10-27.** 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.

**10-28.** 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 percent of the total amount of the award contract. All other items shall be considered minor contract items.

**10-29.** MATERIALS. Any substance specified for use in the construction of the contract work.

**10-30.** NOTICE TO PROCEED. 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.

**10-31.** OWNER. The term "Owner" shall mean the party of the first part or the contracting agency signatory to the contract. For AIP contracts, the term "sponsor" shall have the same meaning as the term "Owner." Where the term "Owner" is capitalized in this document, it shall mean airport owner or sponsor only.

**10-32.** PAVEMENT. The combined surface course, base course, and subbase course, if any, considered as a single unit.

**10-33.** PAYMENT BOND. The approved form of security furnished by the Contractor and his/her surety as a guaranty that he will pay in full all bills and accounts for materials and labor used in the construction of the work.

**10-34.** PERFORMANCE BOND. The approved form of security furnished by the Contractor and his/her surety as a guaranty that the Contractor will complete the work in accordance with the terms of the contract.

**10-35.** 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.

**10-36.** PROJECT. The agreed scope of work for accomplishing specific airport development with respect to a particular airport.

**10-37.** PROPOSAL. 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.

**10-38.** PROPOSAL GUARANTY. The security furnished with a proposal to guarantee that the bidder will enter into a contract if his/her proposal is accepted by the Owner.

**10-39.** RUNWAY. The area on the airport prepared for the landing and takeoff of aircraft.

**10-40.** 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.

**10-41.** SPONSOR. See definition above of "Owner".

**10-42.** 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; flexible and rigid pavements; navigational aids; buildings; vaults; and, other manmade features of the airport that may be encountered in the work and not otherwise classified herein.

**10-43.** SUBGRADE. The soil that forms the pavement foundation.

**10-44.** SUPERINTENDENT. The Contractor's executive representative who is present on the work during progress, authorized to receive and fulfill instructions from the Engineer, and who shall supervise and direct the construction.

**10-45.** SUPPLEMENTAL AGREEMENT. A written agreement between the Contractor and the Owner covering (1) work that would increase or decrease the total amount of the awarded contract, or any major contract item, by more than 25 percent, such increased or decreased work being within the scope of the originally awarded contract; or (2) work that is not within the scope of the originally awarded contract.

**10-46.** SURETY. The corporation, partnership, or individual, other than the Contractor, executing payment or performance bonds that are furnished to the Owner by the Contractor.

**10-47.** TAXIWAY. For the purpose of this document, the term taxiway means 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 or aircraft parking areas.

**10-48.** 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.

**10-49.** 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 6 hours toward completion of the contract. When work is suspended for causes beyond the Contractor's control, Saturdays, Sundays and holidays on which the Contractor's forces engage in regular work, requiring the presence of an inspector, will be considered as working days.

END OF SECTION 10

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SECTION 20
PROPOSAL REQUIREMENTS AND CONDITIONS

20-1. ADVERTISEMENT (Notice to Bidders).

Auburn Journal – TBD (First Publish)
Auburn Journal – TBD (Second Publishing)

20-2. PREQUALIFICATION OF BIDDERS. Each bidder shall furnish the owner satisfactory evidence of his/her competency to perform the proposed work. Such evidence of competency, unless otherwise specified, shall consist of statements covering the bidder's past experience on similar work, a list of equipment that would be available for the work, and a list of key personnel that would be available. In addition, each bidder shall furnish the owner satisfactory evidence of his/her financial responsibility. Such 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 Contractor'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 his/her 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 his/her (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 he 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 hereinbefore specified.

Each bidder shall submit "evidence of competency" and "evidence of financial responsibility" to the Owner at the time of bid opening.

20-3. CONTENTS OF PROPOSAL FORMS. The Owner shall furnish bidders with proposal forms. All papers bound with or attached to the proposal forms are necessary parts and must not be detached.

The plans specifications, and other documents designated in the proposal form shall be considered a part of the proposal whether attached or not.

20-4. ISSUANCE OF PROPOSAL FORMS. The Owner reserves the right to refuse to issue a proposal form to a prospective bidder should such bidder be in default for any of the following reasons.

**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.** Contractor default under previous contracts with the Owner.

**d.** Unsatisfactory work on previous contracts with the Owner.

20-5. 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 hereinafter provided in the subsection titled ALTERATION OF WORK AND QUANTITIES of Section 40 without in any way invalidating the unit bid prices.

20-6. 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. He shall satisfy himself as to the character, quality, and quantities of work to be performed, materials to be furnished, and as 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 as to the conditions to be encountered in performing the work and as to 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 he may make or obtain from his/her examination of the boring logs and other records of subsurface investigations and tests that are furnished by the Owner.

20-7. PREPARATION OF PROPOSAL. The bidder shall submit his/her proposal on the forms furnished by the Owner. All blank spaces in the proposal forms 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 for which he proposes to do 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 sign his/her proposal correctly and in ink. If the proposal is made by an individual, his/her 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 under the laws of which 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 his/her authority to do so and that the signature is binding upon the firm or corporation.

20-8. 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.

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.

20-9. BID GUARANTEE. Each separate proposal shall be accompanied by a certified check, or other specified acceptable collateral, in the amount specified in the proposal form. Such check, or collateral, shall be made payable to the Owner.

20-10.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 before the time specified for opening all bids. Proposals received after the bid opening time shall be returned to the bidder unopened.

20-11.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 in writing or by telegram 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. No proposal may be withdrawn for a period of sixty-five (65) days after the date set for the opening thereof.

20-12.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.

20-13.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 the subsection titled ISSUANCE OF PROPOSAL FORMS of this section.

END OF SECTION 20

## SECTION 30
## AWARD AND EXECUTION OF CONTRACT

30-1. 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 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 the subsection titled IRREGULAR PROPOSALS of Section 20.

**b.** If the bidder is disqualified for any of the reasons specified in the subsection titled DISQUALIFICATION OF BIDDERS of Section 20.

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.

30-2. AWARD OF CONTRACT. The award of a contract, if it is to be awarded, shall be made within 45 calendar days of the date specified for publicly opening proposals, unless otherwise specified herein.

Award of the contract shall be made by the Owner to the lowest, qualified bidder whose proposal conforms to the cited requirements of the Owner.

30-3. 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 the subsection titled APPROVAL OF CONTRACT of this section.

30-4. 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 hereinbefore specified in the subsection titled CONSIDERATION OF PROPOSALS of this section. 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 within ten (10) days. The successful bidder's proposal guaranty will be returned as soon as the Owner receives the contracts bonds as specified in the subsection titled REQUIREMENTS OF CONTRACT BONDS of this section.

30-5. 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 and the form of the bond or bonds shall be acceptable to the Owner. Unless otherwise specified in this subsection or in the City of Auburn Instructions to Bidders, the surety bond or bonds shall be in a sum equal to the full amount of the contract.

30-6. EXECUTION OF CONTRACT. The successful bidder shall sign (execute) the necessary agreements for entering into the contract and return such signed contract to the owner, along with the fully executed surety bond or bonds specified in the subsection titled REQUIREMENTS OF CONTRACT BONDS of this section, within 10 calendar days from the date mailed or otherwise delivered to the successful bidder. If the contract is mailed, special handling is recommended.

30-7. 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.

30-8. FAILURE TO EXECUTE CONTRACT. Failure of the successful bidder to execute the contract and furnish an acceptable surety bond or bonds within the 10 calendar day period specified in the subsection titled REQUIREMENTS OF CONTRACT BONDS of this section shall be just cause for cancellation of the award and forfeiture of the proposal guaranty, not as a penalty, but as liquidation of damages to the Owner.

END OF SECTION 30

SECTION 40
SCOPE OF WORK

40-1. 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.

40-2. ALTERATION OF WORK AND QUANTITIES. The owner reserves and shall have the right to make such alterations in the work as may be necessary or desirable to complete the work originally intended in an acceptable manner. Unless otherwise specified herein, the Engineer shall be and is hereby authorized to make such alterations in the work as may increase or decrease the originally awarded contract quantities, provided that the aggregate of such alterations does not change the total contract cost or the total cost of any major contract item by more than 25 percent (total cost being based on the unit prices and estimated quantities in the awarded contract). Alterations that do not exceed the 25 percent limitation shall not invalidate the contract nor release the surety, and the Contractor agrees to accept payment for such alterations as if the altered work had been a part of the original contract. These alterations that are for work within the general scope of the contract shall be covered by ``Change Orders'' issued by the Engineer. Change orders for altered work shall include extensions of contract time where, in the Engineer's opinion, such extensions are commensurate with the amount and difficulty of added work.

Should the aggregate amount of altered work exceed the 25 percent limitation hereinbefore specified, such excess altered work shall be covered by supplemental agreement. 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.

40-3. OMITTED ITEMS. The Engineer may, in the Owner's best interest, omit from the work any contract item, except major contract items. 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 nonperformed, 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 the subsection titled PAYMENT FOR OMITTED ITEMS of Section 90.

40-4. EXTRA WORK. Should acceptable completion of the contract require the Contractor to perform an item of work for which no basis of payment has been provided in the original contract or previously issued change orders or supplemental agreements, the same shall be called “Extra Work.” Extra Work that is within the general scope of the contract shall be covered by written change order. Change orders for such 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 Engineer's opinion, is necessary for completion of such Extra Work.

When determined by the Engineer to be in the Owner's best interest, he may order the Contractor to proceed with Extra Work by force account as provided in the subsection titled PAYMENT FOR EXTRA AND FORCE ACCOUNT WORK of Section 90.

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 hereinbefore defined in the subsection titled SUPPLEMENTAL AGREEMENT of Section 10.

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.

40-5. 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. It is understood and agreed that the Contractor shall provide for the free and unobstructed movement of aircraft in the air operations areas of the airport with respect to his/her own operations and the operations of all his/her subcontractors as specified in the subsection titled LIMITATION OF OPERATIONS of Section 80. 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 the subsection titled CONTRACTOR'S RESPONSIBILITY FOR UTILITY SERVICE AND FACILITIES OF OTHERS in Section 70.

With respect to his/her own operations and the operations of all his/her 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.

When the contract requires the maintenance of vehicular traffic on 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 such road, street, or highway open to all traffic and shall provide such maintenance as may be required to accommodate traffic. The Contractor shall furnish erect, and maintain barricades, warning signs, flag person, and other traffic control devices in reasonable conformity with the manual of Uniform Traffic Control Devices for Streets and Highways (published by the United States Government Printing Office), unless otherwise specified herein. 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. Unless otherwise specified herein, the Contractor will not be required to furnish snow removal for such existing road, street, or highway.

The Contractor shall make his/her own estimate of all labor, materials, equipment, and incidentals necessary for providing the maintenance of aircraft and vehicular traffic as specified in this subsection.

The cost of maintaining the aircraft and vehicular traffic specified in this subsection shall not be measured or paid for directly, but shall be included in the various contract items.

40-6. 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 Engineer shall be notified prior to disturbing such structure. The disposition of existing structures so encountered shall be immediately determined by the Engineer in accordance with the provisions of the contract.

Except as provided in the subsection titled RIGHTS IN AND USE OF MATERIALS FOUND IN THE WORK of this section, 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 utilized in the work as otherwise provided for in the contract and shall remain the property of the Owner when so utilized in the work.

40-7. 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 either embankment or waste, he may at his/her option either.

**a.** Use such material in another contract item, providing such use is approved by the Engineer 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 Engineer; or

**c.** Use such material for his/her 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., he shall request the Engineer's approval in advance of such use.

Should the Engineer 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 his/her own 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 his/her use of such material so used in the work or removed from the site.

Should the Engineer 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 his/her 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.

40-8. FINAL CLEANING UP. 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. He 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 such property owner.

END OF SECTION 40

## SECTION 50
## CONTROL OF WORK

50-1. AUTHORITY OF THE ENGINEER. The Engineer shall decide any and all questions which may arise as to the quality and acceptability of materials furnished, work performed, and as to the manner of performance and rate of progress of the work. The Engineer shall decide all questions that may arise as to the interpretation of the specifications or plans relating to the work. The Engineer shall determine the amount and quality of the several kinds of work performed and materials furnished which are to be paid for the under contract.

The Engineer does not have the authority to accept pavements that do not conform to FAA specification requirements.

50-2. 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 Engineer 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 his/her opinion, result in a finished product having a level of safety, economy, durability, and workmanship acceptable to the Owner, he will advise the Owner of his/her determination that the affected work be accepted and remain in place. In this event, the Engineer will document his/her 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. The Engineer's determination and recommended contract price adjustments will be based on good engineering judgment and such tests or retests of the affected work as are, in his/her opinion, needed. Changes in the contract price shall be covered by contract modifications (change order or supplemental agreement) as applicable.

If the Engineer 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 Engineer's written orders.

For the purpose of this subsection, 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 Engineer's responsibility to insist on strict compliance with the requirements of the contract, plans, and specifications during the Contractor's prosecution of the work, when, in the Engineer's opinion, such compliance is essential to provide an acceptable finished portion of the work.

For the purpose of this subsection, the term “reasonably close conformity”' is also intended to provide the Engineer with the authority, after consultation with the FAA, to use good engineering judgment in his/her determinations as to acceptance of work that is not in strict conformity but will provide a finished product equal to or better than that intended by the requirements of the contract, plans and specifications.

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

50-3. COORDINATION OF CONTRACT, PLANS, AND SPECIFICATIONS. The contract, plans, specifications, and all referenced standards cited are essential parts of the contract requirements. 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 dimensions; contract technical specifications shall govern over contract general provisions, plans, cited standards for materials or testing, and cited FAA advisory circulars; contract general provisions shall govern over plans, cited standards for materials or testing, and cited FAA advisory circulars; plans shall govern over cited standards for materials or testing and cited FAA advisory circulars. If any paragraphs contained in the Special Provisions conflict with General Provisions or Technical Specifications, the Special Provisions shall govern.

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, he shall immediately call upon the Engineer for his/her interpretation and decision, and such decision shall be final.

50-4. COOPERATION OF CONTRACTOR. The Contractor will be supplied with five copies each of the plans and specifications. He shall have available on the work at all times one copy each of the plans and specifications. Additional 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 he shall cooperate with the Engineer and his/her 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 his/her 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 Engineer or his/her authorized representative.

50-5. 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 his/her work so as 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 his/her contract and shall protect and save harmless the Owner from any and all damages or claims that may arise because of inconvenience, delays, or loss experienced by him because of the presence and operations of other Contractors working within the limits of the same project.

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

50-6. CONSTRUCTION LAYOUT AND STAKES. The Engineer shall establish horizontal and vertical control only. The Contractor must establish all layout required for the construction of the work. Such stakes and markings as the Engineer may set for either his/her own or the Contractor's guidance shall be preserved by the Contractor. In case of negligence on the part of the Contractor, or his/her employees, resulting in the destruction of such stakes or markings, an amount equal to the cost of replacing the same may be deducted from subsequent estimates due the Contractor at the discretion of the Engineer.

The Contractor will be required to furnish all lines, grades and measurements from the control points necessary for the proper prosecution and control of the work contracted for under these specifications.

The Contractor must give weekly copies of the survey notes to the Engineer so that the Engineer may check them as to accuracy and method of staking. All areas that are staked by the Contractor must be checked by the Engineer prior to beginning any work in the area. The Engineer will make periodic checks of the grades and alignment set by the Contractor. In case of error on the part of the Contractor, or his/her employees, resulting in establishing grades and/or alignment that are not in accordance with the plans or established by the Engineer, all construction not in accordance with the established grades and/or alignment shall be replaced without additional cost to the Owner.

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

Construction Staking and Layout includes but is not limited to:

- Clearing and Grubbing perimeter staking.
- Rough Grade slope stakes at 100-foot stations.
- Drainage Swales slope stakes and flow line blue tops at 50-foot stations.
- Subgrade blue tops at 25 foot stations and 25 foot offset distance (max.) for the following section locations:
  - **a.** Runway – minimum 5 per station.
  - **b.** Taxiways – minimum 3 per station.
  - **c.** Holding apron areas – minimum 3 per station.
  - **d.** Roadways – minimum 3 per station.
- Base Course blue tops at 25 foot stations and 25 foot offset distance (max.) for the following section locations:
  - **a.** Runway– minimum 5 per station.
  - **b.** Taxiways – minimum 3 per station.
  - **c.** Holding apron areas – minimum 3 per station.
- Pavement areas:
  - **a.** Edge of Pavement hubs and tacks (for stringline by Contractor) at 100 foot stations.
  - **b.** Between Lifts at 25 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.

**d.** Shoulder and safety area blue tops at 50 foot stations and at all break points with maximum of 50 foot offsets.

- Fence lines at 100 foot stations.

- Electrical and Communications System locations, lines and grades including but not limited to duct runs, connections, fixtures, signs, lights, VASI's, PAPI's, REIL's, Wind Cones, Distance Markers (signs), pull boxes and manholes.

- Drain lines, cut stakes and alignment on 25-foot stations, inlet and manholes.

- Painting and Striping layout (pinned with 1.5 inch PK nails) marked for paint Contractor. (All nails shall be removed after painting).

- 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. paving lane).

NOTE: 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.

50-7. AUTOMATICALLY CONTROLLED EQUIPMENT. Whenever batching or mixing plant equipment is required to be operated automatically under the contract and a breakdown or malfunction of the automatic controls occurs, the equipment may be operated manually or by other methods for a period 48 hours following the breakdown or malfunction, provided this method of operations will produce results which conform to all other requirements of the contract.

50-8. AUTHORITY AND DUTIES OF INSPECTORS. Inspectors employed by the Owner shall be authorized to inspect all work done and all material furnished. Such inspection may extend to all or any part of the work and to the preparation, fabrication, or manufacture of the materials to be used. Inspectors are not authorized to revoke, alter, or waive any provision of the contract. Inspectors are not authorized to issue instructions contrary to the plans and specifications or to act as foreman for the Contractor.

Inspectors employed by the Owner are authorized to notify the Contractor or his/her 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 Engineer for his/her decision.

50-9. INSPECTION OF THE WORK. All materials and each part or detail of the work shall be subject to inspection by the Engineer. The Engineer 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 Engineer 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.

Any work done or materials used without supervision or inspection by an authorized representative of the Owner may be ordered removed and replaced at the Contractor's expense unless the Owner's representative failed to inspect after having been given reasonable notice in writing that the work was to be performed.

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 Engineer as provided in the subsection titled CONFORMITY WITH PLANS AND SPECIFICATIONS of this section.

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 the subsection titled CONTRACTOR'S RESPONSIBILITY FOR WORK of Section 70.

No removal work made under provision of this subsection shall be done without lines and grades having been given by the Engineer. Work done contrary to the instructions of the Engineer, work done beyond the lines shown on the plans or as given, 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 forthwith with any order of the Engineer made under the provisions of this subsection, the Engineer will have authority to cause unacceptable work to be remedied or removed and replaced and unauthorized work to be removed and to deduct the costs (incurred by the Owner) from any monies due or to become due 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 shall be responsible for all damage done by his/her hauling equipment and shall correct such damage at his/her own expense

50-12. MAINTENANCE DURING CONSTRUCTION. The Contractor shall maintain the work during construction and until the work is accepted. This maintenance shall constitute continuous and 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 the subsection titled MAINTENANCE DURING CONSTRUCTION of this section, the Engineer 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 Engineer'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 deducted from monies due or to become due the Contractor.

50-14. PARTIAL ACCEPTANCE. If at any time during the prosecution of the project the Contractor substantially completes a usable unit or portion of the work, the occupancy of which will benefit the Owner, he may request the Engineer to make final inspection of that unit. If the Engineer finds upon inspection that the unit has been satisfactorily completed in compliance with the contract, he may accept it as being completed, 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 Engineer and Owner will make an inspection. If all construction provided for and contemplated by the contract is found to be completed in accordance with the contract, plans, and specifications, such inspection shall constitute the final inspection. The Engineer 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 Engineer will give the Contractor the necessary instructions for correction of same and the Contractor shall immediately comply with and execute such instructions. 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 Engineer 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 him for work or materials not clearly provided for in the contract, plans, or specifications or previously authorized as extra work, he shall notify the Engineer in writing of his/her intention to claim such additional compensation before he begins the work on which he bases the claim. If such notification is not given or the Engineer 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 Engineer 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 claim for additional compensation is based has been completed, the Contractor shall, within l0 calendar days, submit his/her written claim to the Engineer 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.

50-17. COST REDUCTION INCENTIVE. The provisions of this subsection will apply only to contracts awarded to the lowest bidder pursuant to competitive bidding.

On projects with original contract amounts in excess of $100,000, the Contractor may submit to the Engineer, in writing, proposals for modifying the plans, specifications or other requirements of the contract for the sole purpose of reducing the cost of construction. The cost reduction proposal shall not impair, in any manner, the essential functions or characteristics of the project, including but not limited to service life, economy of operation, ease of maintenance, desired appearance, design and safety standards. This provision shall not apply unless the proposal submitted is specifically identified by the Contractor as being presented for consideration as a value engineering proposal.

Not eligible for cost reduction proposals are changes in the basic design of a pavement type, runway and taxiway lighting, visual aids, hydraulic capacity of drainage facilities, or changes in grade or alignment that reduce the geometric standards of the project.

As a minimum, the following information shall be submitted by the Contractor with each proposal:

**a.** A description of both existing contract requirements for performing the work and the proposed changes, with a discussion of the comparative advantages and disadvantages of each;

**b.** An itemization of the contract requirements that must be changed if the proposal is adopted;

**c.** A detailed estimate of the cost of performing the work under the existing contract and under the proposed changes;

**d.** A statement of the time by which a change order adopting the proposal must be issued;

**e.** A statement of the effect adoption of the proposal will have on the time for completion of the contract; and

**f.** The contract items of work affected by the proposed changes, including any quantity variation attributable to them.

The Contractor may withdraw, in whole or in part, any cost reduction proposal not accepted by the Engineer, within the period specified in the proposal. The provisions of this subsection shall not be construed to require the Engineer to consider any cost reduction proposal that may be submitted.

The Contractor shall continue to perform the work in accordance with the requirements of the contract until a change order incorporating the cost reduction proposal has been issued. If a change order has not been issued by the date upon which the Contractor's cost reduction proposal specifies that a decision should be made, or such other date as the Contractor may subsequently have requested in writing, such cost reduction proposal shall be deemed rejected.

The Engineer shall be the sole judge of the acceptability of a cost reduction proposal and of the estimated net savings from the adoption of all or any part of such proposal. In determining the estimated net savings, the Engineer may disregard the contract bid prices if, in the Engineer's judgment such prices do not represent a fair measure of the value of the work to be performed or deleted.

The Owner may require the Contractor to share in the Owner's costs of investigating a cost reduction proposal submitted by the Contractor as a condition of considering such proposal. Where such a condition is imposed, the Contractor shall acknowledge acceptance of it in writing. Such acceptance shall constitute full authority for the Owner to deduct the cost of investigating a cost reduction proposal from amounts payable to the Contractor under the contract.

If the Contractor's cost reduction proposal is accepted in whole or in part, such acceptance will be by a contract change order that shall specifically state that it is executed pursuant to this subsection. Such change order shall incorporate the changes in the plans and specifications which are necessary to permit the cost reduction proposal or such part of it as has been accepted and shall include any conditions upon which the Engineer's approval is based. The change order shall also set forth the estimated net savings attributable to the cost reduction proposal. The net savings shall be determined as the difference in costs between the original contract costs for the involved work items and the costs occurring as a result of the proposed change. The change order shall also establish the net savings agreed upon and shall provide for adjustment in the contract price that will divide the net savings equally between the Contractor and the Owner.

The Contractor's 50 percent share of the net savings shall constitute full compensation to the Contractor for the cost reduction proposal and the performance of the work.

Acceptance of the cost-reduction proposal and performance of the cost-reduction work shall not extend the time of completion of the contract unless specifically provided for in the contract change order.

END OF SECTION 50

## SECTION 60
## CONTROL OF MATERIALS

60-1. SOURCE OF SUPPLY AND QUALITY REQUIREMENTS. The materials used on 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 complete statements to the Engineer as to the origin, composition, and manufacture of all materials to be used in the work. Such statements shall be furnished promptly after execution of the contract but, in all cases, prior to delivery of such materials.

At the Engineer's option, materials may be approved at the source of supply before delivery is stated. 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 conforms to the requirements of cited materials specifications. In addition, where an FAA specification for airport lighting equipment is cited in the plans or specifications, the Contractor shall furnish such equipment that is:

**a.** Listed in FAA Advisory Circular (AC) 150/5345-53, Airport Lighting Equipment Certification Program, that is in effect on the date of advertisement; and;

**b.** Produced by the manufacturer qualified (by FAA) to produce such specified and listed equipment.

The following airport lighting equipment is required for this contract and is to be furnished by the Contractor in accordance with the requirements of this subsection:

60-2. SAMPLES, TESTS, AND CITED SPECIFICATIONS. Unless otherwise designated, all materials used in the work shall be inspected, tested, and approved by the Engineer before incorporation in the work. Any work in which untested materials are used without approval or written permission of the Engineer 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 Engineer, shall be removed at the Contractor's expense. Unless otherwise designated, tests in accordance with the cited standard methods of ASTM, AASHTO, Federal Specifications, Commercial Item Descriptions, and all other cited methods, which are current on the date of advertisement for bids, will be made by and at the expense of the Engineer. The testing organizations performing on site field tests shall have copies of all referenced standards on the construction site for use by all technicians and other personnel, including the Contractor's representative at his/her request. Unless otherwise

designated, samples will be taken by a qualified representative of the Engineer. 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 his/her request.

The Contractor shall employ a testing organization to perform all Contractor required tests. The Contractor shall submit to the Engineer resumes on all testing organizations and individual persons who will be performing the tests. The Engineer will determine if such persons are qualified. All the test data shall be reported to the Engineer after the results are known. A legible, handwritten copy of all test data shall be given to the Engineer daily, along with printed reports, in an approved format, on a weekly basis. After completion of the project, and prior to final payment, the Contractor shall submit a final report to the Engineer showing all test data reports, plus an analysis of all results showing ranges, averages, and corrective action taken on all failing tests.

60-3. CERTIFICATION OF COMPLIANCE. The Engineer may permit the use, prior to sampling and testing, of certain materials or assemblies when accompanied by manufacturer's certificates of compliance 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.

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 Engineer.

When a material or assembly is specified by ``brand name or equal'' and the Contractor elects to furnish the specified ``brand name,'' 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.

Should the Contractor propose to furnish an ``or equal'' material or assembly, he shall furnish the manufacturer's certificates of compliance as hereinbefore described for the specified brand name material or assembly. However, the Engineer shall be the sole judge as to whether the proposed ``or equal'' is suitable for use in the work.

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

60-4. PLANT INSPECTION. The Engineer or his/her 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 his/her acceptance of the material or assembly.

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

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

**b.** The Engineer 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 Engineer, the Contractor shall arrange for adequate office or working space that may be reasonably needed for conducting plant inspections. Office or working space should be conveniently located 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 Engineer shall have the right to reject only material which, when retested, does not meet the requirements of the contract, plans, or specifications.

60-5. ENGINEER'S FIELD OFFICE. An Engineer’s field office is not required for this project.

60-6. STORAGE OF MATERIALS. Materials shall be so stored as 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 so as to facilitate their prompt inspection. The Contractor shall coordinate the storage of all materials with the Engineer. 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, the storage of materials and the location of the Contractor's plant and parked equipment or vehicles shall be as directed by the Engineer. 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 Engineer 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 his/her entire expense, except as otherwise agreed to (in writing) by the owner or lessee of the property

60-7. 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 Engineer.

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 Engineer has approved its used in the work.

60-8. OWNER FURNISHED MATERIALS. The Contractor shall furnish all materials required to complete the work, except those specified herein (if any) to be furnished by the Owner. Owner-furnished materials shall be made available to the Contractor at the location specified herein.

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

70-1. 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. He 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 his/her 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 himself or his/her employees.

70-2. 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 prosecution of the work.

70-3. 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, he shall provide for such use by suitable legal agreement with the patentee or owner. The Contractor and the surety shall indemnify and save 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 prosecution or after the completion of the work.

70-4. 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) is indicated as follows.

(NOT ANTICIPATED ON THIS PROJECT)

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 Engineer.

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 so as 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 Engineer, 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.

70-5. FEDERAL AID PARTICIPATION. For AIP contracts, the United States Government has agreed to reimburse the Owner for some portion of the contract costs. Such reimbursement is made from time to time upon the Owner's request to the FAA. In consideration of the United States Government's (FAA's) agreement with the Owner, the Owner has included provisions in this contract pursuant to the requirements of Title 49 of the United States Code (USC) and the Rules and Regulations of the FAA that pertain to the work.

As required by the USC, the contract work is subject to the inspection and approval of duly authorized representatives of the Administrator, FAA, and is further subject to those provisions of the rules and regulations that are cited in the contract, plans, or specifications.

No requirement of the USC, the rules and regulations implementing the USC, or this contract shall be construed as making the Federal Government a party to the contract nor will any such requirement interfere, in any way, with the rights of either party to the contract.

70-6. SANITARY, HEALTH, AND SAFETY PROVISIONS. The Contractor shall provide and maintain in a neat, sanitary condition such accommodations for the use of his/her employees as may be necessary to comply with the requirements of the state and local Board of Health, or of other bodies or tribunals having jurisdiction.

Attention is directed to Federal, state, and local laws, rules and regulations concerning construction safety and health standards. The Contractor shall not require any worker to work in surroundings or under conditions that are unsanitary, hazardous, or dangerous to his/her health or safety.

70-7. PUBLIC CONVENIENCE AND SAFETY. The Contractor shall control his/her operations and those of his/her 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 his/her own operations and those of his/her subcontractors and all suppliers in accordance with the subsection titled MAINTENANCE OF TRAFFIC of Section 40 hereinbefore specified and shall limit such operations for the convenience and safety of the traveling public as specified in the subsection titled LIMITATION OF OPERATIONS of Section 80 hereinafter.

70-8. BARRICADES, WARNING SIGNS, AND HAZARD MARKINGS. The Contractor shall furnish, erect, and maintain all barricades, warning signs, and markings for hazards

necessary to protect the public and the work. When used during periods of darkness, such barricades, warning signs, and hazard markings shall be suitably illuminated. Unless otherwise specified, barricades, warning signs, and markings for hazards that are in the air operations area shall be a maximum of 18 inches high. Unless otherwise specified, barricades shall be spaced not more than 25 feet apart. Barricades, warning signs, and markings shall be paid for under Section 40-05.

For vehicular and pedestrian traffic, the Contractor shall furnish, erect, and maintain barricades, warning signs, lights and other traffic control devices in reasonable conformity with the Manual of Uniform Traffic Control Devices for Streets and Highways (published by the United States Government Printing Office).

When the work requires closing an air operations area of the airport or portion of such area, the Contractor shall furnish, erect, and maintain temporary markings and associated lighting conforming to the requirements of AC 150/5340-1, Standards for Airport Markings.

The Contractor shall furnish, erect, and maintain markings and associated lighting of open trenches, excavations, temporary stock piles, and his/her parked construction equipment that may be hazardous to the operation of emergency fire-rescue or maintenance vehicles on the airport in reasonable conformance to AC 150/5370-2, Operational Safety on Airports During Construction.

The Contractor shall identify each motorized vehicle or piece of construction equipment in reasonable conformance to AC 150/5370-2.

The Contractor shall furnish and erect all barricades, warning signs, and markings for hazards prior to commencing work that requires such erection and shall maintain the barricades, warning signs, and markings for hazards until their dismantling is directed by the Engineer.

Open-flame type lights shall not be permitted within the air operations areas of the airport.

70-9. USE OF EXPLOSIVES. When the use of explosives is necessary for the prosecution of the work, the Contractor shall exercise the utmost care not to endanger life or property, including new work. The Contractor shall be responsible for all damage resulting from the use of explosives.

All explosives shall be stored in a secure manner in compliance with all laws and ordinances, and all such storage places shall be clearly marked. Where no local laws or ordinances apply, storage shall be provided satisfactory to the Engineer and, in general, not closer than 1,000 feet (300 m) from the work or from any building, road, or other place of human occupancy.

The Contractor shall notify each property owner and public utility company having structures or facilities in proximity to the site of the work of his/her intention to use

explosives. Such notice shall be given sufficiently in advance to enable them to take such steps as they may deem necessary to protect their property from injury.

The use of electrical blasting caps shall not be permitted on or within 1,000 feet (300 m) of the airport property.

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 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 prosecution of the work, resulting from any act, omission, neglect, or misconduct in his/her manner or method of executing the work, or at any time due to defective work or materials, and said responsibility will not be released until the project shall have 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 nonexecution thereof by the Contractor, he shall restore, at his/her own 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 he shall make good such damage or injury in an acceptable manner.

70-11. RESPONSIBILITY FOR DAMAGE CLAIMS. The Contractor shall indemnify and save harmless the Engineer and the Owner and their officers, and employees from all suits 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 his/her contract as may be considered necessary by the Owner for such purpose may be retained for the use of the Owner or, in case no money is due, his/her surety may be held until such suit(s), action(s), or claim(s) for injuries or damages as aforesaid 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 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 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. Should it be 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 shall be specified herein and indicated on the plans. When so specified, the Contractor shall complete such portions of the work on or before the date specified or as otherwise specified. The Contractor shall make his/her own estimate of the difficulties involved in arranging his/her work to permit such beneficial occupancy by the Owner as described below.

Refer to Sheet G003, Construction Phasing Layout Plan.

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

No portion of the work may be opened by the Contractor for public use until ordered by the Engineer in writing. Should it become necessary to open a portion of the work to public traffic on a temporary or intermittent basis, such openings shall be made when, in the opinion of the Engineer, 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 his/her expense.

The Contractor shall make his/her 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.

Contractor shall be required to conform to safety standards contained AC 150/5370-2, Operational Safety on Airports During Construction (See Special Provisions.)

Contractor shall refer to the approved safety plan to identify barricade requirements and other safety requirements prior to opening up sections of work to traffic.

70-14. CONTRACTOR'S RESPONSIBILITY FOR WORK. Until the Engineer's final written acceptance of the entire completed work, excepting only those portions of the work accepted in accordance with the subsection titled PARTIAL ACCEPTANCE of Section 50, 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 his/her 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, seedings, and soddings furnished under his/her 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 the subsection titled RESTORATION OF SURFACES DISTURBED BY OTHERS of this section, 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 his/her 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 the owners are indicated as follows:

City of Auburn – Alan Mitchell, P.E. City Engineer
1225 Lincoln Way, Room 3, Auburn, CA 95603
(530) 823-4211 (None Anticipated)
Pacific Gas and Electric – Susie Smith
333 Sacramento Street, Auburn, CA 95603
Customer Service 1(800) 743-5000 (None Anticipated)
Placer County Water Agency – Leslie Gault
P.O. Box 6570, Auburn, CA 9503
(530) 823-4850 (None Anticipated)
AT&T – Carol Prince
12824 Earhart Avenue, Auburn, CA 95603
(530) 885-7702 (None Anticipated)
WAVE Broadband – Kirk Ellingson
P.O. Box 3520, Rocklin, CA 95677
1 (866) 928-3123
Recology Auburn Placer – Cust. Service (530) 885-3735 (None Anticipated)

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 his/her 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 his/her plan of operations. Such notification shall be in writing addressed to THE PERSON TO CONTACT as provided hereinbefore in this subsection and the subsection titled RESTORATION OF SURFACES DISTURBED BY OTHERS of this section. A copy of each notification shall be given to the Engineer.

In addition to the general written notification hereinbefore provided, it shall be the responsibility of the Contractor to keep such individual owners advised of changes in his/her plan of operations that would affect such owners.

Prior to commencing the work in the general vicinity of an existing utility service or facility, the Contractor shall again notify each such owner of his/her 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 Engineer.

The Contractor's failure to give the two day's notice hereinabove provided 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 excavation methods acceptable to the Engineer within 3 feet (90 cm) 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, he shall immediately notify the proper authority and the Engineer 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 Engineer 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 his/her operations whether or not 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 his/her 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 prosecution 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 notify the above named FAA Airway Facilities Point-of-Contact 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 prosecution of the project work requires a facility outage, the Contractor shall contact the above named FAA Point-of-Contact a minimum of 48 hours prior to the time of the required outage.

**d.** If prosecution of the project work results in damages to existing FAA equipment or cables, the Contractor shall repair the damaged item in conformance with FAA Airway Facilities' standards to the satisfaction of the above named FAA Point-of-Contact.

**e.** If the project work requires the cutting or splicing of FAA owned cables, the above named FAA Point-of-Contact shall be contacted a minimum of 48 hours prior to the time the cable work commences. The FAA reserves the right to have a FAA Airway Facilities 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 Airway Facilities' specifications and require approval by the above named FAA Point-of-Contact as a condition of acceptance by the Owner. The Contractor is hereby advised that FAA Airway Facilities restricts the location of where splices may be installed. If a cable splice is required in a location that is not permitted by FAA Airway Facilities, 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 to him by this contract, there shall be no liability upon the Engineer, his/her 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 his/her surety, or both, such overpayment as may be sustained, or by failure on the part of the Contractor to fulfill his/her 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. He shall take necessary precautions to prevent pollution of streams, lakes, ponds, and reservoirs with fuels, oils, bitumens, 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.

**120** Should the Contractor encounter, during his/her operations, any building, part of a building, structure, or object that is incongruous with its surroundings, he shall immediately cease operations in that location and notify the Engineer. The Engineer will immediately investigate the Contractor's finding and the Owner will direct the Contractor to either resume his/her operations or to suspend operations as directed.

**121** 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 modification (change order or supplemental agreement) as provided in the subsection titled EXTRA WORK of Section 40 and the subsection titled PAYMENT FOR EXTRA WORK AND FORCE ACCOUNT WORK of Section 90. If appropriate, the contract modification shall include an extension of contract time in accordance with the subsection titled DETERMINATION AND EXTENSION OF CONTRACT TIME of Section 80.

END OF SECTION 70

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## SECTION 80
## PROSECUTION AND PROGRESS

80-1. 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 Engineer.

Should the Contractor elect to assign his/her 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. In case of approval, the Contractor shall file copies of all subcontracts with the Engineer.

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

80-2. NOTICE TO PROCEED. The notice to proceed shall state the date on which it is expected the Contractor will begin the construction and from which date contract time will be charged. The Contractor shall begin the work to be performed under the contract within 10 days of the date set by the Engineer in the written notice to proceed, but in any event, the Contractor shall notify the Engineer at least 24 hours in advance of the time actual construction operations will begin.

80-3. PROSECUTION AND PROGRESS. Unless otherwise specified, the Contractor shall submit his/her progress schedule for the Engineer's approval a minimum of 10 days prior to the scheduled pre-construction meeting. The Contractor's progress schedule, when approved by the Engineer, may be used to establish major construction operations and to check on the progress of the work. The 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 Engineer's request, submit a revised schedule for completion of the work within the contract time and modify his/her operations to provide such additional materials, equipment, and labor necessary to meet the revised schedule. Should the prosecution of the work be discontinued for any reason, the Contractor shall notify the Engineer at least 24 hours in advance of resuming operations.

For AIP contracts, the Contractor shall not commence any actual construction prior to the date on which the notice to proceed is issued by the Owner.

80-4. LIMITATION OF OPERATIONS. The Contractor shall control his/her operations and the operations of his/her subcontractors and all suppliers so as to provide for the free and unobstructed movement of aircraft in the AIR OPERATIONS AREAS of the airport.

When the work requires the Contractor to conduct his/her operations within an AIR OPERATIONS AREA of the airport, the work shall be coordinated with airport operations (through the Engineer) at least 48 hours prior to commencement of such work. The Contractor shall not close an AIR OPERATIONS AREA until so authorized by the Engineer and until the necessary temporary marking and associated lighting is in place as provided in the subsection titled BARRICADES, WARNING SIGNS, AND HAZARD MARKINGS of Section 70.

When the contract work requires the Contractor to work within an AIR OPERATIONS AREA (AOA) of the airport on an intermittent basis (intermittent opening and closing of the AIR OPERATIONS AREA), the Contractor shall maintain constant communications as hereinafter specified; immediately obey all instructions to vacate the AIR OPERATIONS AREA; immediately obey all instructions to resume work in such AIR OPERATIONS AREA. Failure to maintain the specified communications or to obey instructions shall be cause for suspension of the Contractor's operations in the AIR OPERATIONS AREA until the satisfactory conditions are provided. The following AIR OPERATIONS AREA 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:

Refer to Sheet G002, Construction Phasing Layout Plan.

Contractor shall be required to conform to safety standards contained in AC 150/5370-2, Operational Safety on Airports During Construction (See Section H).

**80-04.1.** OPERATIONAL SAFETY ON AIRPORT DURING CONSTRUCTION. All Contractors' operations shall be conducted in accordance with the project safety plan and the provisions set forth within the current version of Advisory Circular 150/5370-2. The safety plan included within the contract documents conveys minimum requirements for operational safety on the airport during construction activities. The Contractor shall prepare and submit a plan that details how it proposes to comply with the requirements presented within the safety plan.

The Contractor shall implement all necessary safety plan measures prior to commencement of any work activity. The Contractor shall conduct routine checks of the safety plan measures 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 safety plan and that they implement and maintain all necessary measures.

No deviation or modifications may be made to the approved safety plan unless approved in writing by the Owner or Engineer

80-5. 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 and, in the opinion of the Engineer, does not perform his work in a proper and skillful manner or is intemperate or disorderly shall, at the written request of the Engineer, be removed forthwith by the Contractor or subcontractor employing such person, and shall not be employed again in any portion of the work without approval of the Engineer.

Should the Contractor fail to remove such persons or person, or fail to furnish suitable and sufficient personnel for the proper prosecution of the work, the Engineer 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 met requirements of the work and to produce a satisfactory quality of work. Equipment used on any portion of the work shall be such that no injury to previously completed work, adjacent property, or existing airport facilities will result from 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 others are authorized by the Engineer. If the Contractor desires to use a method or type of equipment other than specified in the contract, he may request authority from the Engineer 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 Engineer 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 Engineer 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 subsection.

80-6. TEMPORARY SUSPENSION OF THE WORK. The Owner shall have the authority to suspend the work wholly, or in part, for such period or periods as he may deem necessary, due to unsuitable weather, or such other conditions as are considered unfavorable for the prosecution of the work, or for such time as is 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 Engineer's order to suspend work to the effective date of the Engineer's order to resume the work. Claims for such compensation shall be filed with the Engineer within the time period stated in the Engineer's order to resume work. The Contractor shall submit with his/her claim information substantiating the amount shown on the claim. The Engineer 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, for suspensions made at the request of the Owner, or for any other delay provided for in the contract, plans, or specifications.

If it should become 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. He 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.

80-7. DETERMINATION AND EXTENSION OF CONTRACT TIME. The number of calendar or working days allowed for completion of the work shall be stated in the proposal and contract and shall be known as the CONTRACT TIME.

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

**a.** CONTRACT TIME based on WORKING DAYS shall be calculated weekly by the Engineer. The Engineer will furnish the Contractor a copy of his/her weekly statement of the number of working days charged against the contract time during the week and the number of working days currently specified for completion of the contract (the original contract time plus the number of working days, if any, that have been included in approved CHANGE ORDERS or SUPPLEMENTAL AGREEMENTS covering EXTRA WORK).

The Engineer shall base his/her weekly statement of contract time charged on the following considerations:

(1) No time shall be charged for days on which the Contractor is unable to proceed with the principal item of work under construction at the time for at least 6 hours with the normal work force employed on such principal item. Should the normal work force be on a double-shift, 12 hours shall be used. Should the normal work force be on a triple-shift, 18 hours shall apply. Conditions beyond the Contractor's control such as strikes, lockouts, unusual delays in transportation, temporary suspension of the principal item of work under construction or temporary suspension of the entire work which have been ordered by the Owner for reasons not the fault of the Contractor, shall not be charged against the contract time.

(2) The Engineer will not make charges against the contract time prior to the effective date of the notice to proceed.

(3) The Engineer will begin charges against the contract time on the first working day after the effective date of the notice to proceed.

(4) The Engineer will not make charges against the contract time after the date of final acceptance as defined in the subsection titled FINAL ACCEPTANCE of Section 50.

(5) The Contractor will be allowed 1 week in which to file a written protest setting forth his/her objections to the Engineer's weekly statement. If no objection is filed within such specified time, the weekly statement shall be considered as acceptable to the Contractor.

The contract time (stated in the proposal) is based on the originally estimated quantities as described in the subsection titled INTERPRETATION OF ESTIMATED PROPOSAL QUANTITIES of Section 20. Should the satisfactory completion of the contract require performance of work in greater quantities than those estimated in the proposal, 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 proposal. Such increase in contract time shall not consider either the cost of work or the extension of contract time that has been covered by change order or supplemental agreement and shall be made at the time of final payment.

**b.** 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 nonwork 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 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.

**c.** When the contract time is a specified completion date, it shall be the date on which all contract work shall be substantially completed.

If the Contractor finds it impossible for reasons beyond his/her control to complete the work within the contract time as specified, or as extended in accordance with the provisions of this subsection, he may, at any time prior to the expiration of the contract time as extended, make a written request to the Engineer for an extension of time setting forth the reasons which he believes will justify the granting of his/her request. Requests for extension of time on calendar day projects, caused by inclement weather, shall be supported with National Weather Bureau data showing the actual amount of inclement weather exceeded which could normally be expected during the contract period. The Contractor's plea that insufficient time was specified is not a valid reason for extension of time. If the Engineer finds that the work was delayed because of conditions beyond the control and without the fault of the Contractor, he may extend the time for completion in such amount as the conditions justify. The extended time for completion shall then be in full force and effect, the same as though it were the original time for completion.

80-8. 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 the subsection titled DETERMINATION AND EXTENSION OF CONTRACT TIME of this Section) the sum specified in the contract and proposal as liquidated damages will be deducted from any money due or to become due the Contractor or his/her 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 his/her contract.

| Schedule of Work | Liquidated Damages Cost | Allowed Construction Time |
|---|---|---|
| I | $500 per Working Day | 90 Working 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 wavier on the part of the Owner of any of its rights under the contract.

80-9. DEFAULT AND TERMINATION OF CONTRACT. The Contractor shall be considered in default of his/her 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 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 prosecution 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 him 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 Engineer consider the Contractor in default of the contract for any reason hereinbefore, he 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 Engineer 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 prosecution 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 Engineer 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 prosecution of war or in the interest of national defense.

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 Engineer.

Termination of the contract or a portion thereof shall neither relieve the Contractor of his/her responsibilities for the completed work nor shall it relieve his/her 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 Engineer 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 his/her work in such a manner as to insure safety and a minimum of hindrance to flight operations. All Contractor equipment and material stockpiles shall be stored a minimum of 150 feet from the centerline of an active runway. No equipment will be allowed to park within the approach area of an active runway at any time. No equipment shall be within 100 feet of an active runway at any time.

END OF SECTION 80

# SECTION 90
# MEASUREMENT AND PAYMENT

90-1. MEASUREMENT OF QUANTITIES. All work completed under the contract will be measured by the Engineer, or his/her authorized representatives, using United States Customary Units of Measurement or the International System of Units.

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 meter) 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 Engineer.

Structures will be measured according to neat lines shown on the plans or as altered to fit field conditions.

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.

In computing volumes of excavation the average end area method or other acceptable methods will be used.

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 inches.

The term “ton” will mean the short ton consisting of 2,000 pounds (907 kilograms) avoirdupois. All materials that are measured or proportioned by weights shall be weighed on accurate, approved scales by competent, qualified personnel at locations designed by the Engineer. 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 Engineer directs, and each truck shall bear a plainly legible identification mark.

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 to the Engineer, provided that the body is of such shape that the actual contents may be readily 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.

When requested by the Contractor and approved by the Engineer 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 Engineer and shall be agreed to by the Contractor before such method of measurement of pay quantities is used.

Bituminous materials will be measured by the gallon (liter) or ton (kilogram). When measured by volume, such volumes will be measured at 60 F (15 C) or will be corrected to the volume at 60 F (15 C) using ASTM D 1250 for asphalts or ASTM D 633 for tars.

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 bituminous material has been lost from the car or the distributor, wasted, or otherwise not incorporated in the work.

When bituminous materials are shipped by truck or transport, net certified weights by volume, subject to correction for loss or foaming, may be used for computing quantities.

Cement will be measured by the ton (kilogram) or hundredweight (kilogram).

Timber will be measured by the thousand feet board measure (M.F.B.M.) actually incorporated in the structure. Measurement will be based on nominal widths and thicknesses and the extreme length of each piece.

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.

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 by the Engineer in connection with force account work will be measured as agreed in the change order or supplemental agreement authorizing such force account work as provided in the subsection titled PAYMENT FOR EXTRA AND FORCE ACCOUNT WORK of this section.

When standard manufactured items are specified such as fence, wire, plates, rolled shapes, pipe conduit, etc., and these items are identified by gage, 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 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.

Scales shall be accurate within one-half percent of the correct weight throughout the range of use. The Contractor shall have the scales checked under the observation of the inspector 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 one-tenth of 1 percent of the nominal rated capacity of the scale, but not less than 1 pound (454 grams). The use of spring balances will not be permitted.

Beams, dials, platforms, and other scale equipment shall be so arranged that the operator and the inspector can safely and conveniently view them.

Scale installations shall have available ten standard 50-pound (2.3 kilogram) weights for testing the weighing equipment or suitable weights and devices for other approved equipment.

Scales must be tested for accuracy and serviced before use at a new site. Platform scales shall be installed and maintained with the platform level and rigid bulkheads at each end.

Scales "overweighing" (indicating more than correct weight) will not be permitted to operate, and all materials received subsequent to the last previous correct weighting-accuracy test will be reduced by the percentage of error in excess of one-half of 1 percent.

In the event inspection reveals the scales have been "underweighing" (indicating less than correct weight), they shall be adjusted, and no additional payment to the Contractor will be allowed for materials previously weighed and recorded.

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.

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 Engineer. 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.

90-2. 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 prosecution thereof, subject to the provisions of the subsection titled NO WAIVER OF LEGAL RIGHTS of Section 70.

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.

90-3. 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 the subsection titled ALTERATION OF WORK AND QUANTITIES of Section 40 will be made for any increased expense, loss of expected reimbursement, or loss of anticipated profits suffered or claimed by the Contractor which results directly from such alterations or indirectly from his/her unbalanced allocation of overhead and profit among the contract items, or from any other cause.

90-4. PAYMENT FOR OMITTED ITEMS. As specified in the subsection titled OMITTED ITEMS of Section 40, the Engineer 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 Engineer 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 Engineer's order to omit or nonperform such contract item.

Acceptable materials ordered by the Contractor or delivered on the work prior to the date of the Engineer'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 Engineer'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.

90-5. PAYMENT FOR EXTRA AND FORCE ACCOUNT WORK. Extra work, performed in accordance with the subsection titled EXTRA WORK of Section 40, will be paid for at the contract prices or agreed prices specified in the change order or supplemental agreement authorizing the extra work. When the change order or supplemental agreement authorizing the extra work requires that it be done by force account, such force account shall be

measured and paid for based on expended labor, equipment, and materials plus a negotiated and agreed upon allowance for overhead and profit.

**a.** Miscellaneous: No additional allowance will be made for general superintendence, the use of small tools, or other costs for which no specific allowance is herein provided.

**b.** Comparison of Record: The Contractor and the Engineer shall compare records of the cost of force account work at the end of each day. Agreement shall be indicated by signature of the Contractor and the Engineer or their duly authorized representatives.

**c.** Statement: No payment will be made for work performed on a force account basis until the Contractor has furnished the Engineer with duplicate itemized statements of the cost of such force account work detailed as follows.

(1) Name, classification, date, daily hours, total hours, rate and extension for each laborer and foreman.

(2) Designation, dates, daily hours, total hours, rental rate, and extension for each unit of machinery and equipment.

(3) Quantities of materials, prices, and extensions.

(4) Transportation of materials.

(5) Cost of property damage, liability and workman's compensation insurance premiums, unemployment insurance contributions, and social security tax.

Statements shall be accompanied and supported by a receipted invoice for all materials used and transportation charges. However, if materials used on the force account work are not specifically purchased for such work but are taken from the Contractor's stock, then in lieu of the invoices the Contractor shall furnish an affidavit certifying that such materials were taken from his/her stock, that the quantity claimed was actually used, and that the price and transportation claimed represent the actual cost to the Contractor.

90-6. PARTIAL PAYMENTS. Partial payments will be made at least once each month as the work progresses. Said payments will be based upon estimates prepared by the Engineer of the value of the work performed and materials complete 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 the subsection titled PAYMENT FOR MATERIALS ON HAND of this section.

No partial payment will be made when the amount due the Contractor since the last estimate amounts to less than five hundred dollars.

From the total of the amount determined to be payable on a partial payment, 10 percent of such total amount will be deducted and retained by the Owner until the final payment is made, except as may be provided (at the Contractor's option) in the subsection titled

PAYMENT OF WITHHELD FUNDS of this section. The balance (90 percent) of the amount payable, less all previous payments, shall be certified for payment. Should the Contractor exercise his/her option, as provided in the subsection titled PAYMENT OF WITHHELD FUNDS of this section, no such 10 percent retainage shall be deducted.

When not less than 95 percent of the work has been completed, the Engineer may, at the Owner's discretion and with the consent of the surety, prepare an estimate from which will be retained 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 Engineer 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 the subsection titled ACCEPTANCE AND FINAL PAYMENT of this section.

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 retained percentage or 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.

90-7. 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 Engineer at or on an approved site.

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

**c.** The Contractor has furnished the Engineer 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 so stored or stockpiled.

**e.** The Contractor has furnished the Owner evidence that the material so 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 his/her 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 subsection.

90-8. PAYMENT OF WITHHELD FUNDS. At the Contractor's option, he/she may request that the Owner accept (in lieu of the 10 percent retainage on partial payments described in the subsection titled PARTIAL PAYMENTS of this section) the Contractor's deposits in escrow under 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 10 percent 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.

90-9. ACCEPTANCE AND FINAL PAYMENT. When the contract work has been accepted in accordance with the requirements of the subsection titled FINAL ACCEPTANCE of Section 50, the Engineer will prepare the final estimate of the items of work actually performed. The Contractor shall approve the Engineer's final estimate or advise the Engineer of his/her 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 Engineer 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 Engineer's final estimate. If, after such 30-day period, a dispute still exists, the Contractor may approve the Engineer'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 the subsection titled CLAIMS FOR ADJUSTMENT AND DISPUTES of Section 50.

After the Contractor has approved, or approved under protest, the Engineer's final estimate, 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 the subsection titled CLAIMS FOR ADJUSTMENTS AND DISPUTES of Section 50 or under the provisions of this subsection, 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.

END OF SECTION 90

# SECTION H

## SCHEDULE I – HELICOPTER PARKING AREA
## A.I.P. 3-06-0012-021-2022
## IN THE CITY OF AUBURN, CALIFORNIA

## OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION

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U.S. Department
of Transportation
**Federal Aviation**
**Administration**

# Advisory Circular

| **Subject:** Operational Safety on Airports During Construction | **Date:** 12/13/2017<br>**Initiated By:** AAS-100 | **AC No:** 150/5370-2G<br>**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.

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.*

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.

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.

## 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.

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:

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.

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.

# 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.

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.

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.

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.

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.

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.)

## 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.

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.

**Figure 2-1. Temporary Partially Closed Runway**

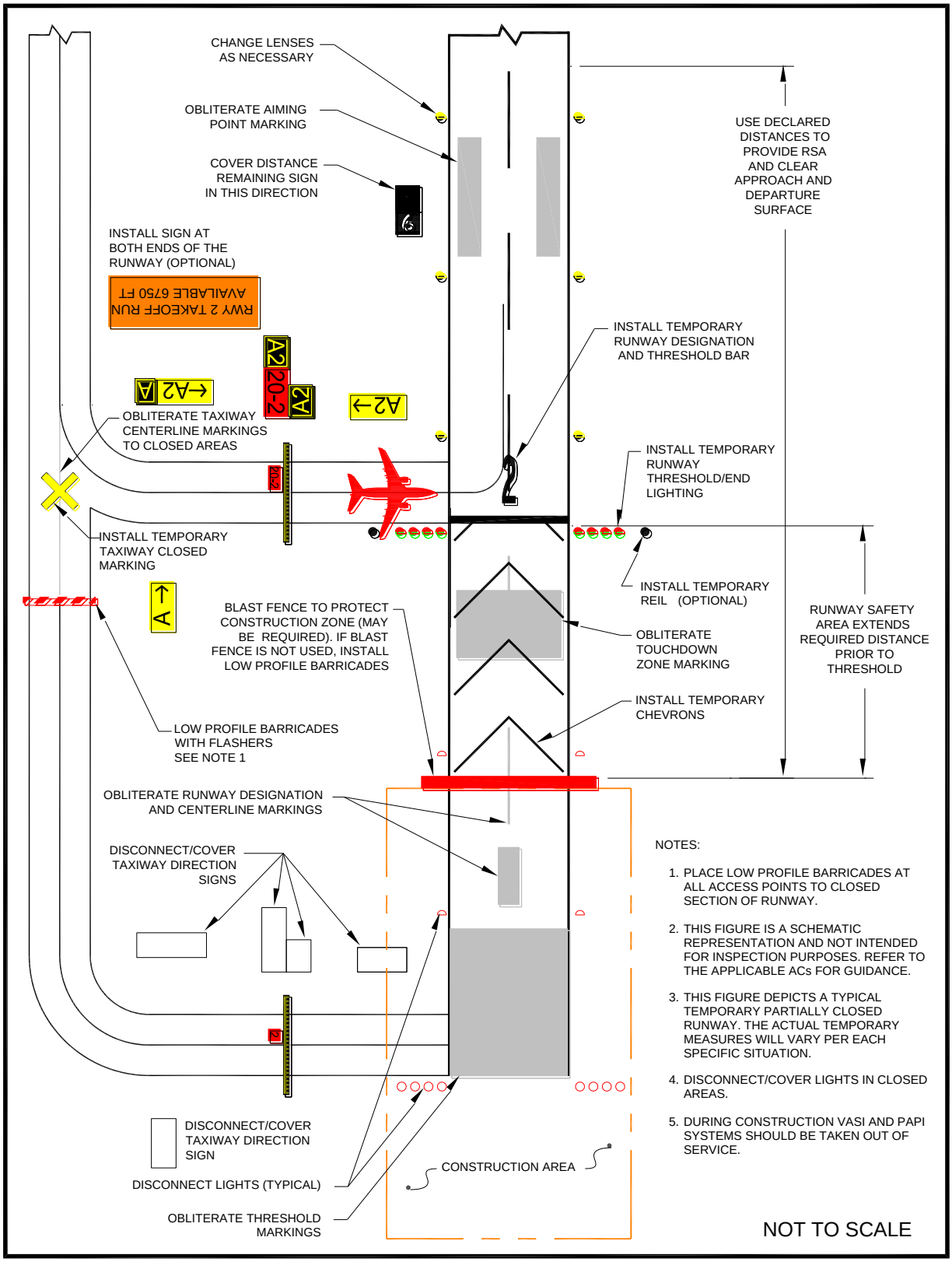
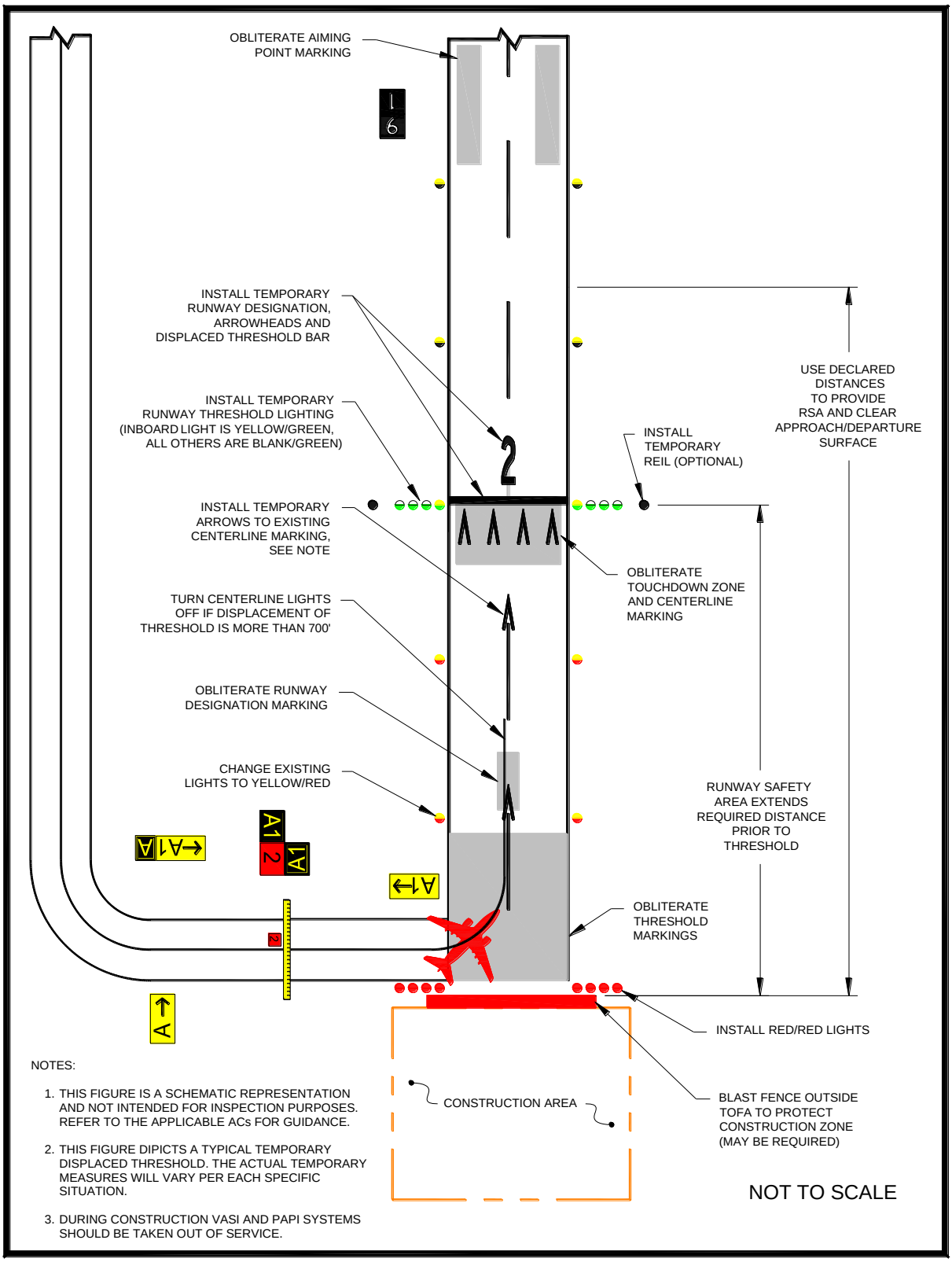


**Figure 2-2. Temporary Displaced Threshold**




**Note:** See paragraph 2.18.2.5.

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

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

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

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-

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.

## 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*.

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.

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

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**

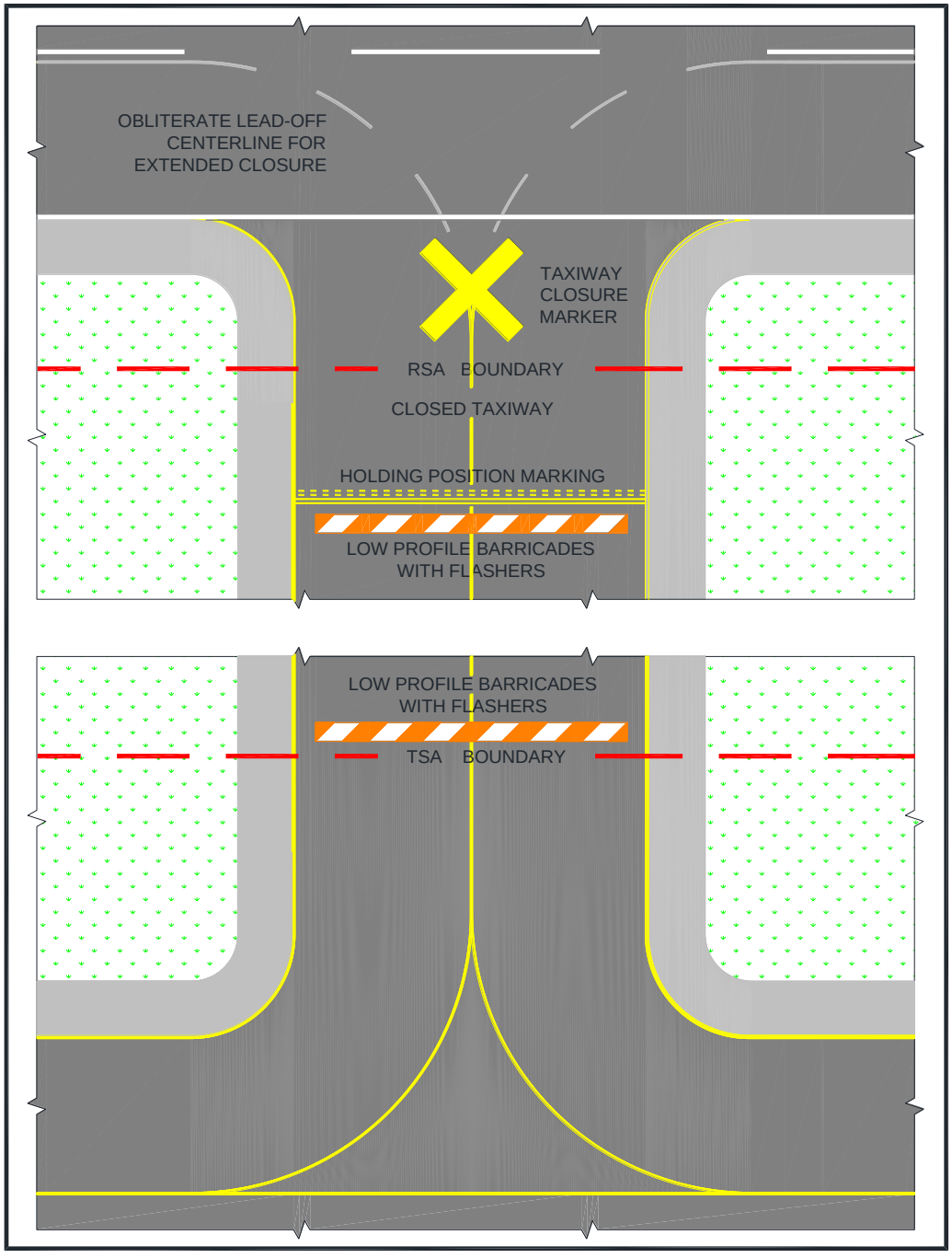
1. **Partially Closed Runways.** Pavement markings for temporary closed portions of the runway consist of a runway threshold bar, runway designation, and yellow chevrons to identify pavement areas that are unsuitable for takeoff or landing (see AC 150/5340-1). Obliterate or cover markings prior to the 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.

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**



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.

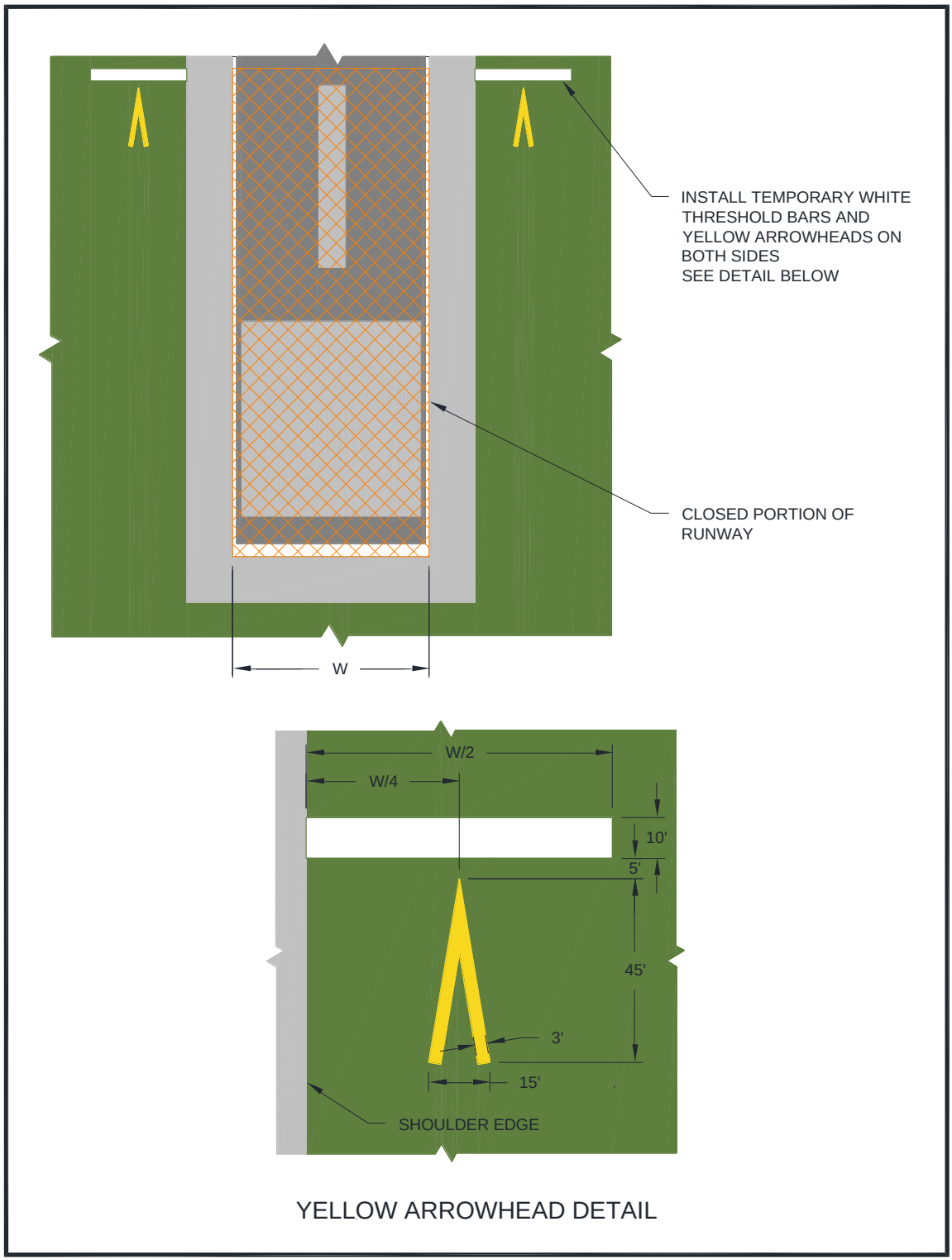
2.18.2.3 It may be necessary to remove or cover runway markings, including but not limited to, runway designation markings, threshold markings, centerline markings, edge stripes, touchdown zone markings and aiming point markings, depending on the length of construction and type of activity at the airport. 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

150/5340-1, *Standards for Airport Markings*, has additional guidance on temporary markings.

**Figure 2-5. Temporary Outboard White Threshold Bars and Yellow Arrowheads**



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.

**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

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

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.

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.

## 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.

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**

**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

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.

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.

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.

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.

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:

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.

# 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.

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

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

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.

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*<br>Guidance for using the NOTAM System in airport reporting. |
| AC 150/5200-30 | *Airport Field Condition Assessments and Winter Operations Safety*<br>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*<br>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*<br>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*<br>Guidance to airport operators on developing ground vehicle operation training programs. |
| AC 150/5300-13 | *Airport Design*<br>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*<br>Guidance for developing and managing an airport foreign object debris (FOD) program |

| Number | Title and Description |
|---|---|
| AC 150/5320-15 | *Management of Airport Industrial Waste*<br>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*<br>FAA standards for the siting and installation of signs on airport runways and taxiways. |
| AC 150/5340-18 | *Standards for Airport Sign Systems*<br>FAA standards for the siting and installation of signs on airport runways and taxiways. |
| AC 150/5345-28 | *Precision Approach Path Indicator (PAPI) Systems*<br>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*<br>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*<br>FAA specifications for unlighted and lighted signs for taxiways and runways. |
| AC 150/5345-53 | *Airport Lighting Equipment Certification Program*<br>Details on the Airport Lighting Equipment Certification Program (ALECP). |
| AC 150/5345-50 | *Specification for Portable Runway and Taxiway Lights*<br>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* |

| Number | Title and Description |
|---|---|
| AC 150/5370-10 | *Standards for Specifying Construction of Airports*<br>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)<br>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*<br>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 |

| 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. |

| 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 |

| 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<br>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 |

## 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 | | | | |

| 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 | | | | |

| 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 | | |

| 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. | | |

| 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). | | |

| 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. | | |

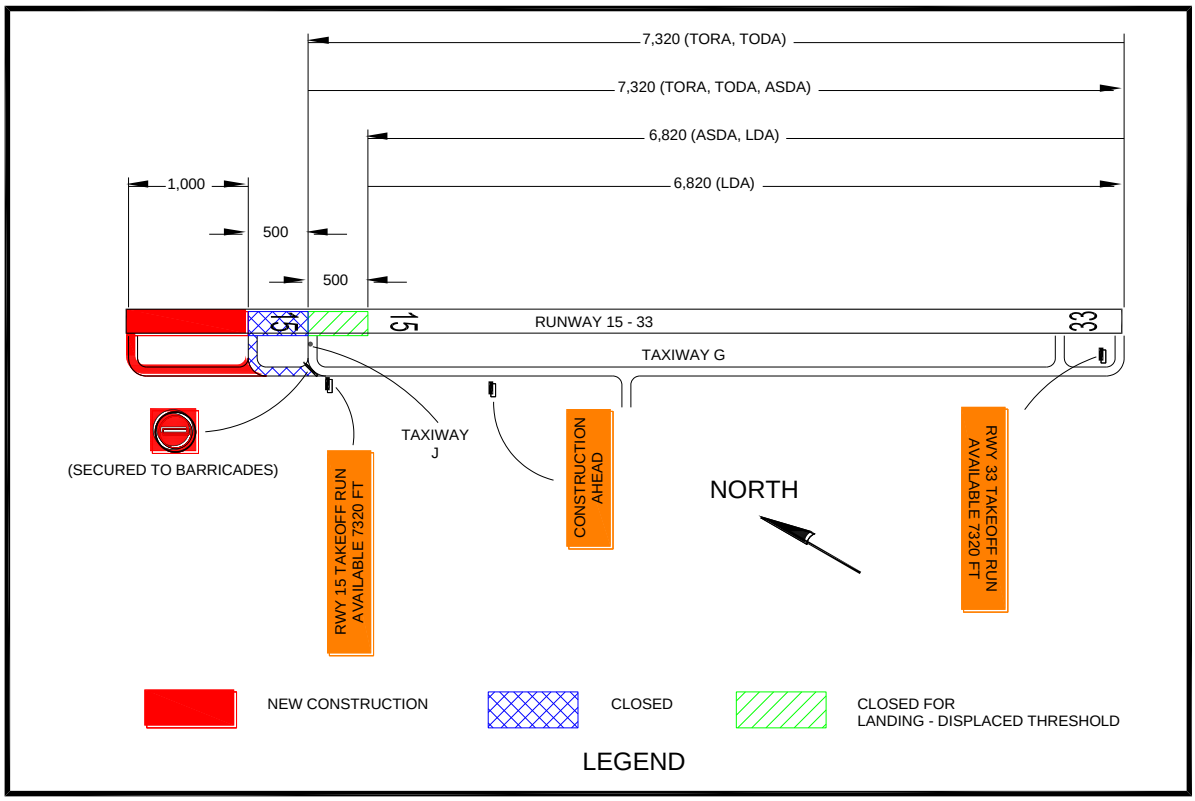
# APPENDIX E. SAMPLE OPERATIONAL EFFECTS TABLE

## 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**

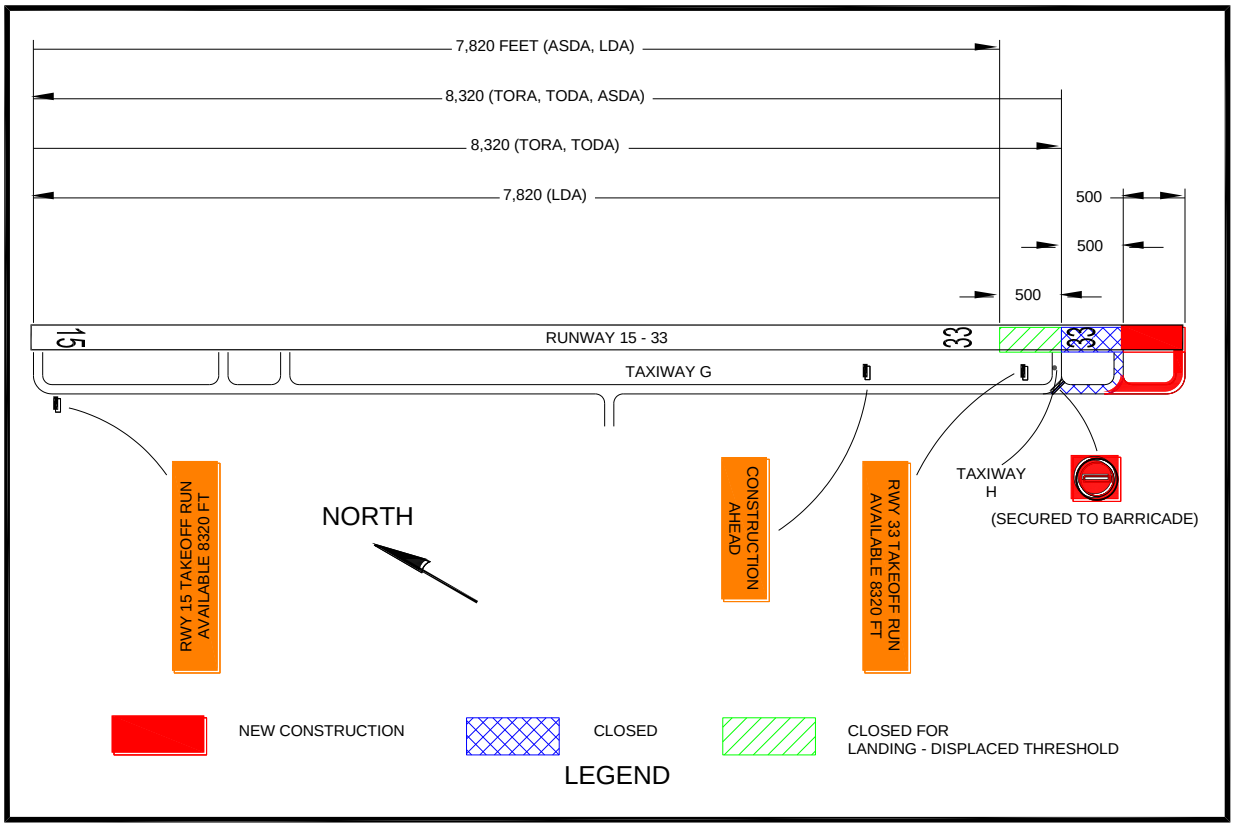



**Note 1:** Where hold signs are installed on both sides of a taxiway, install the TORA sign on the left side of the taxiway before the final turn to the runway intersection.

**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).

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).

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**

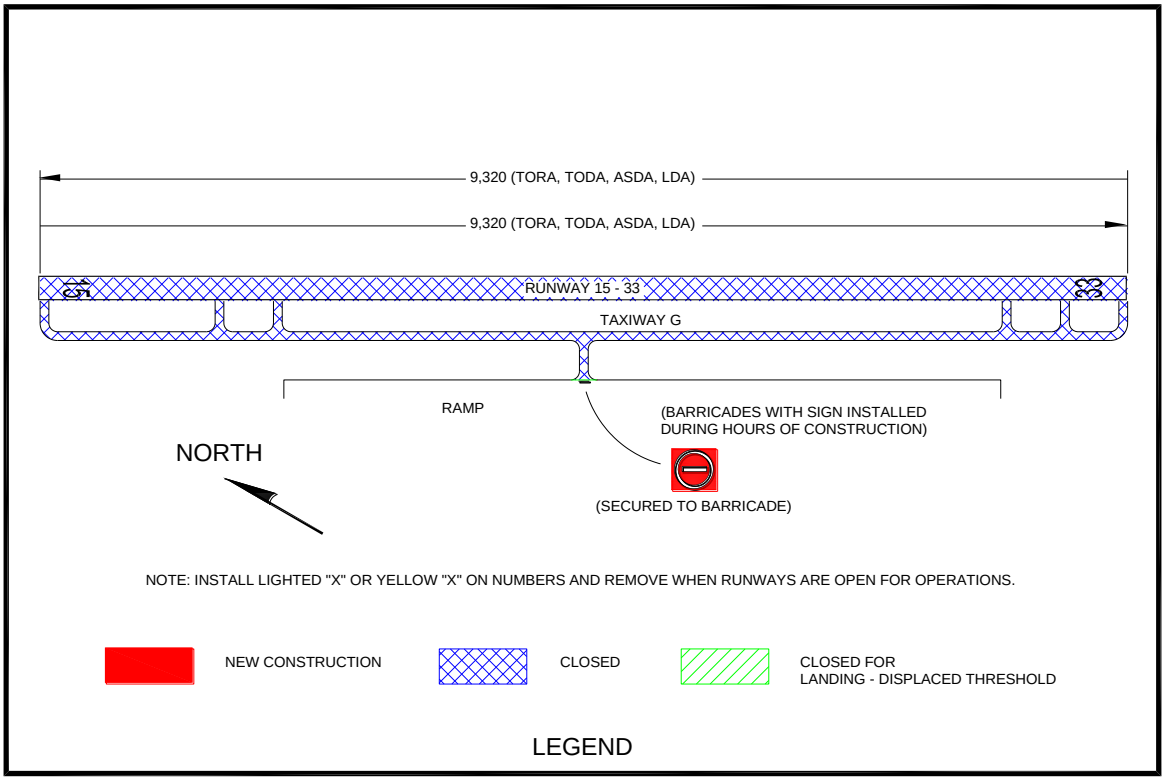


**Table E-1. Operational Effects Table**

| **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<br>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<br>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<br>GA: 26 /day<br>Military: 11 /day | Carrier: 40 /day<br>GA: 26 /day<br>Military: 0 /day | Carrier: 45 /day<br>GA: 26 /day<br>Military: 5 /day | Carrier: 45 / day<br>GA: 20 / day<br>Military: 0 /day |
| **Runway 33 Average Aircraft Operations** | Carrier: 40 /day<br>GA: 18 /day<br>Military: 10 /day | Carrier: 30 /day<br>GA: 18 /day<br>Military: 0 /day | Carrier: 25 /day<br>GA: 18 /day<br>Military: 5 /day | Carrier: 20 /day<br>GA: 5 /day<br>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.

| 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 |

| 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.<br>Taxiway G limited to 118 ft wingspan | Refer above for applicable declared distances. | Refer above for applicable declared distances.<br>Airport closed 2000 – 0500.<br>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*<br>A, B, C, or D | Airplane Design Group*<br>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.

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.

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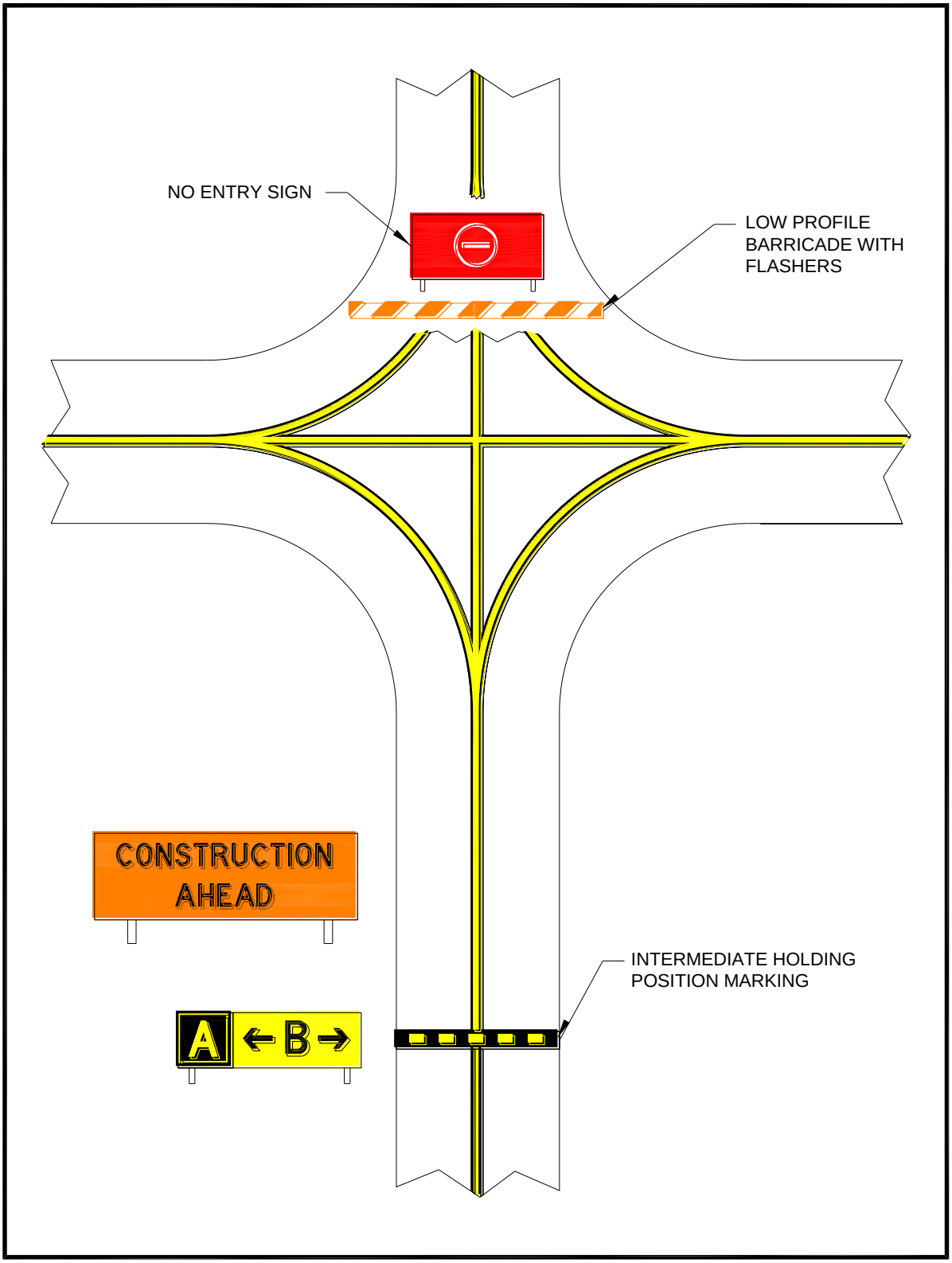
## APPENDIX F. ORANGE CONSTRUCTION SIGNS

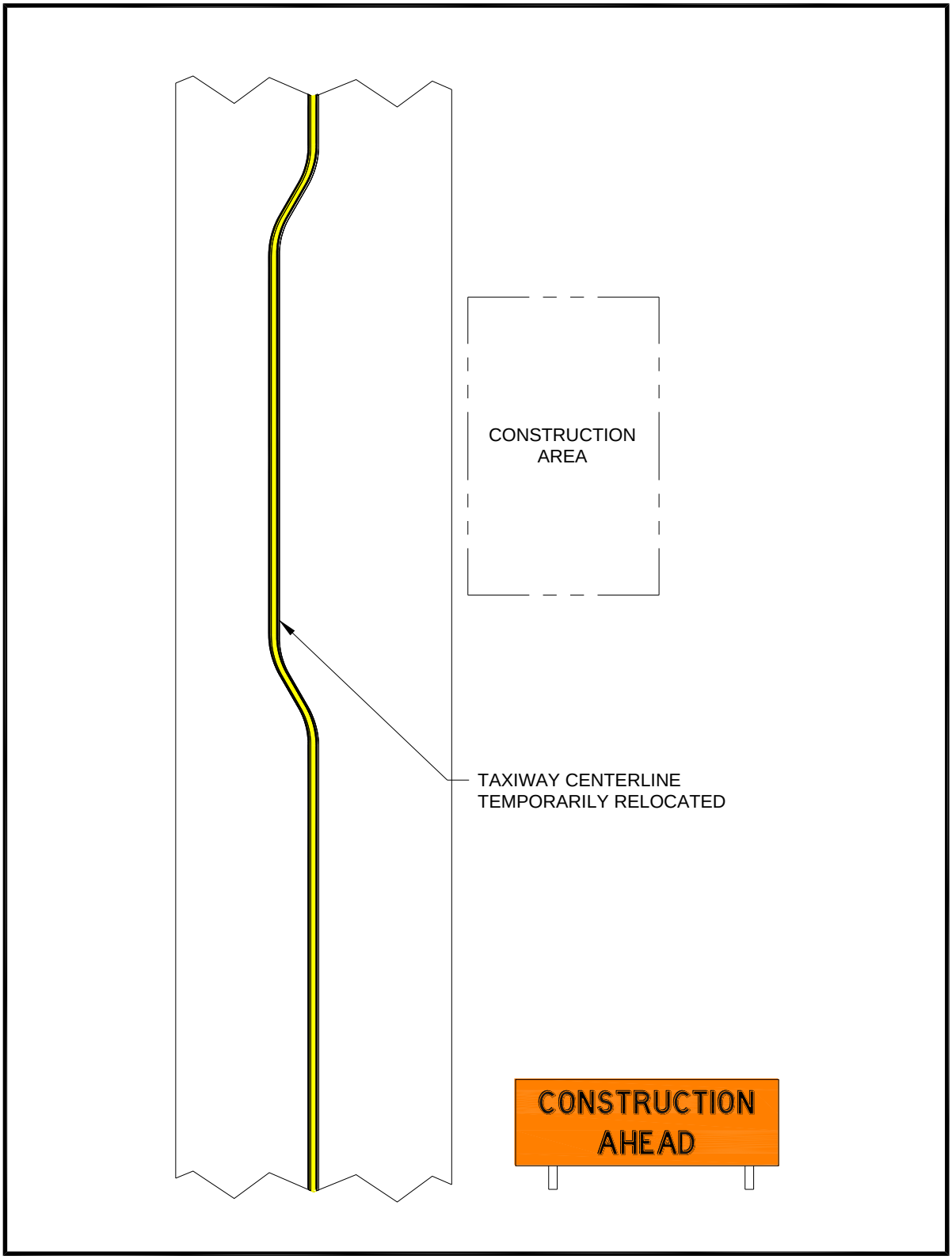
**Figure F-1. Approved Sign Legends**

**Figure F-2. Orange Construction Sign Example 1**




**Note:** For proper placement of signs, refer to EB 93.

**Figure F-3. Orange Construction Sign Example 2**




**Note:** For proper placement of signs, refer to EB 93.

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**Advisory Circular Feedback**

If you find an error in this AC, have recommendations for improving it, or have suggestions for new items/subjects to be added, you may let us know by (1) mailing this form to Manager, Airport Engineering Division, Federal Aviation Administration ATTN: AAS-100, 800 Independence Avenue SW, Washington DC 20591 or (2) faxing it to the attention of the Office of Airport Safety and Standards at (202) 267-5383.

Subject: AC 150/5370-2G Date: _____

*Please check all appropriate line items:*

☐ An error (procedural or typographical) has been noted in paragraph _____ on page _____.

☐ Recommend paragraph _____ on page _____ be changed as follows:

_____
_____
_____

☐ In a future change to this AC, please cover the following subject:
*(Briefly describe what you want added.)*

_____
_____
_____

☐ Other comments:

_____
_____
_____

☐ I would like to discuss the above. Please contact me at (phone number, email address).

_____

Submitted by: _____ Date: _____

**SECTION I**

**SCHEDULE I – HELICOPTER PARKING AREA**
**A.I.P. 3-06-0012-021-2022**
**IN THE CITY OF AUBURN, CALIFORNIA**

**WAGE RATES**

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"General Decision Number: CA20220007 02/18/2022

Superseded General Decision Number: CA20210007

State: California

Construction Types: Building, Heavy (Heavy and Dredging) and Highway

Counties: Alpine, Amador, Butte, Colusa, El Dorado, Glenn, Lassen, Marin, Modoc, Napa, Nevada, Placer, Plumas, Sacramento, Shasta, Sierra, Siskiyou, Solano, Sonoma, Sutter, Tehama, Trinity, Yolo and Yuba Counties in California.

BUILDING CONSTRUCTION PROJECTS (excluding Amador County only); DREDGING CONSTRUCTION PROJECTS (does not include hopper dredge work); HEAVY CONSTRUCTION PROJECTS (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 aresubject 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 $15.00 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 2022.

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 $11.25 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 2022.

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 www.dol.gov/whd/govcontracts.

| Modification Number | Publication Date |
|---|---|
| 0 | 01/07/2022 |
| 1 | 01/14/2022 |
| 2 | 01/21/2022 |
| 3 | 01/28/2022 |
| 4 | 02/04/2022 |
| 5 | 02/18/2022 |

ASBE0016-001 01/01/2021

AREA 1: MARIN, NAPA, SAN BENITO, SAN FRANCISCO, SOLANO, & SONOMA COUNTIES

AREA 2: ALPINE, AMADOR, BUTTE, COLUSA, EL DORADO, GLENN, MODOC, NEVADA, PLACER, PLUMAS, SACRAMENTO, SHASTA, SIERRA, SISKIYOU, SUTTER, TEHEMA, TRINITY, YOLO, & YUBA COUNTIES

| | Rates | Fringes |
|---|---|---|
| Asbestos Workers/Insulator (Includes the application of all insulating materials, Protective Coverings, Coatings, and Finishes to all types of mechanical systems) | | |
| Area 1 | $ 74.16 | 23.58 |
| Area 2 | $ 46.81 | 33.50 |

---

ASBE0016-007 01/01/2021

AREA 1 : ALPINE, AMADOR, BUTTE, COLUSA, EL DORADO, GLENN, LASSEN, MODOC, NEVADA, PLACER, PLUMAS, SACRAMENTO, SHASTA, SIERRA, SISKIYOU, SOLANO, SONOMA, SUTTER, TEHAMA, TRINITY, YOLO & YUBA COUNTIES

AREA 2: MARIN & NAPA COUNTIES

| | 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)
AREA 1.....$ 30.45 10.60
AREA 2.....$ 36.53 9.27

---

BOIL0549-002 01/01/2021

| | Rates | Fringes |
|---|---|---|
| BOILERMAKER | | |
| (1) Marin & Solano Counties | $ 49.62 | 41.27 |
| (2) Remaining Counties | $ 45.60 | 38.99 |

---

BRCA0003-001 08/01/2021

| | Rates | Fringes |
|---|---|---|
| MARBLE FINISHER | $ 37.72 | 17.64 |

---

BRCA0003-004 05/01/2021

AREA 1: ALPINE, AMADOR, BUTTE, COLUSA, EL DORADO, GLENN, LASSEN, MODOC, NEVADA, PLACER, PLUMAS, SACRAMENTO, SHASTA, SIERRA, SUTTER, TEHAMA, YOLO AND YUBA COUNTIES

AREA 2: MARIN, NAPA, SISKIYOU, SOLANO, SONOMA AND TRINITY COUNTIES

| | Rates | Fringes |
|---|---|---|
| BRICKLAYER | | |
| AREA 1 | $ 47.24 | 22.13 |
| AREA 2 | $ 49.78 | 27.34 |

SPECIALTY PAY:
(A) Underground work such as tunnel work, sewer work, manholes, catch basins, sewer pipes and telephone conduit shall be paid $1.25 per hour above the regular rate. Work in direct contact with raw sewage shall receive $1.25 per hour in addition to the above.
(B) Operating a saw or grinder shall receive $1.25 per hour above the regular rate.

(C) Gunite nozzle person shall receive $1.25 per hour above the regular rate.

---

BRCA0003-008 07/01/2021

| | Rates | Fringes |
|---|---|---|
| TERRAZZO FINISHER | $ 39.95 | 18.46 |
| TERRAZZO WORKER/SETTER | $ 53.03 | 28.34 |

---

BRCA0003-010 04/01/2019

| | Rates | Fringes |
|---|---|---|
| TILE FINISHER | | |
| Area 1 | $ 27.31 | 14.75 |
| Area 2 | $ 27.10 | 16.50 |
| Area 3 | $ 29.94 | 16.38 |
| Area 4 | $ 28.06 | 15.82 |
| Tile Layer | | |
| Area 1 | $ 45.51 | 17.64 |
| Area 2 | $ 45.15 | 19.06 |
| Area 3 | $ 49.90 | 19.16 |
| Area 4 | $ 46.77 | 19.08 |

AREA 1: Butte, Colusa, El Dorado, Glenn, Lassen, Modoc, Nevada, Placer, Plumas, Sacramento, Shasta, Sierra, Sutter, Tehema, Yolo, Yuba
AREA 2: Alpine, Amador
AREA 3: Marin, Napa, Solano, Siskiyou
AREA 4: Sonoma

---

BRCA0003-014 08/01/2021

| | Rates | Fringes |
|---|---|---|
| MARBLE MASON | $ 53.17 | 29.10 |

---

CARP0034-001 07/01/2021

| | Rates | Fringes |
|---|---|---|
| Diver | | |
| Assistant Tender, ROV | | |
| Tender/Technician | $ 54.10 | 34.69 |
| Diver standby | $ 60.51 | 34.69 |
| Diver Tender | $ 59.51 | 34.69 |
| Diver wet | $ 103.62 | 34.69 |

| | | |
|---|---|---|
| Manifold Operator (mixed gas) | $ 64.51 | 34.69 |
| Manifold Operator (Standby) | $ 59.51 | 34.69 |

DEPTH PAY (Surface Diving):
050 to 100 ft $2.00 per foot
101 to 150 ft $3.00 per foot
151 to 220 ft $4.00 per foot
221 ft.-deeper $5.00 per foot

SATURATION DIVING:
The standby rate shall apply until saturation starts. The saturation diving rate applies when divers are under pressure continuously until work task and decompression are complete. The diver rate shall be paid for all saturation hours.

DIVING IN ENCLOSURES:
Where it is necessary for Divers to enter pipes or tunnels, or other enclosures where there is no vertical ascent, the following premium shall be paid: Distance traveled from entrance 26 feet to 300 feet: $1.00 per foot. When it is necessary for a diver to enter any pipe, tunnel or other enclosure less than 48"" in height, the premium will be $1.00 per foot.

WORK IN COMBINATION OF CLASSIFICATIONS:
Employees working in any combination of classifications within the diving crew (except dive supervisor) in a shift are paid in the classification with the highest rate for that shift.

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CARP0034-003 07/01/2021

| | Rates | Fringes |
|---|---|---|
| Piledriver | $ 54.10 | 34.69 |

---

CARP0035-001 08/01/2020

AREA 1: MARIN, NAPA, SOLANO & SONOMA

AREA 3: SACRAMENTO, WESTERN EL DORADO (Territory west of an including highway 49 and the territory inside the city limits of Placerville), WESTERN PLACER (Territory west of and including highway 49), & YOLO

AREA 4: ALPINE, BUTTE, COLUSA, EASTERN EL DORADO, GLENN, LASSEN, MODOC, NEVADA, EASTERN PLACER, PLUMAS, SHASTA, SIERRA,

SISKIYOU, SUTTER, TEHAMA, TRINITY,  & YUBA

| | Rates | Fringes |
|---|---|---|
| Drywall Installers/Lathers: | | |
| Area 1 | $ 52.65 | 31.26 |
| Area 3 | $ 47.27 | 31.26 |
| Area 4 | $ 45.92 | 31.26 |
| Drywall Stocker/Scrapper | | |
| Area 1 | $ 26.33 | 18.22 |
| Area 3 | $ 23.64 | 18.22 |
| Area 4 | $ 22.97 | 18.22 |

---

CARP0035-009 07/01/2020

Marin County

| | Rates | Fringes |
|---|---|---|
| CARPENTER | | |
| Bridge Builder/Highway Carpenter | $ 52.65 | 30.82 |
| Hardwood Floorlayer, Shingler, Power Saw Operator, Steel Scaffold & Steel Shoring Erector, Saw Filer | $ 52.80 | 30.82 |
| Journeyman Carpenter | $ 52.65 | 30.82 |
| Millwright | $ 52.75 | 32.41 |

---

CARP0035-010 07/01/2020

AREA 1: Marin, Napa, Solano & Sonoma  Counties

AREA 2: Monterey, San Benito and Santa Cruz

AREA 3: Alpine, Butte, Colusa, El Dorado, Glenn, Lassen, Modoc, Nevada, Placer, Plumas, Sacramento, Shasta, Sierra, Siskiyou, Sutter, Tehama, Trinity, Yolo & Yuba counties

| | Rates | Fringes |
|---|---|---|
| Modular Furniture Installer | | |
| Area 1 | | |
| Installer | $ 28.76 | 22.53 |
| Lead Installer | $ 32.21 | 23.03 |
| Master Installer | $ 36.43 | 23.03 |
| Area 2 | | |

| | | |
|---|---|---|
| Installer | $ 26.11 | 22.53 |
| Lead Installer | $ 29.08 | 23.03 |
| Master Installer | $ 32.71 | 23.03 |
| Area 3 | | |
| Installer | $ 25.16 | 22.53 |
| Lead Installer | $ 27.96 | 23.03 |
| Master Installer | $ 31.38 | 23.03 |

---

CARP0046-001 07/01/2021

El Dorado (West), Placer (West), Sacramento and Yolo Counties

| | Rates | Fringes |
|---|---|---|
| Carpenters | | |
| Bridge Builder/Highway Carpenter | $ 54.85 | 31.49 |
| Hardwood Floorlayer, Shingler, Power Saw Operator, Steel Scaffold & Steel Shoring Erector, Saw Filer | $ 49.12 | 31.49 |
| Journeyman Carpenter | $ 48.97 | 31.49 |
| Millwright | $ 51.47 | 33.08 |

Footnote: Placer County (West) includes territory West of and including Highway 49 and El Dorado County (West) includes territory West of and including Highway 49 and territory inside the city limits of Placerville.

---

CARP0046-002 07/01/2021

Alpine, Colusa, El Dorado (East), Nevada, Placer (East), Sierra, Sutter and Yuba Counties

| | Rates | Fringes |
|---|---|---|
| Carpenters | | |
| Bridge Builder/Highway Carpenter | $ 54.85 | 31.49 |
| Hardwood Floorlayer, Shingler, Power Saw Operator, Steel Scaffold & Steel Shoring Erector, Saw Filer | $ 47.77 | 31.49 |
| Journeyman Carpenter | $ 47.62 | 31.49 |
| Millwright | $ 50.12 | 33.08 |

---

CARP0152-003 07/01/2020

Amador County

| | Rates | Fringes |
|---|---|---|
| Carpenters | | |
| Bridge Builder/Highway Carpenter | $ 52.65 | 30.82 |
| Hardwood Floorlayer, Shingler, Power Saw Operator, Steel Scaffold & Steel Shoring Erector, Saw Filer | $ 45.57 | 30.82 |
| Journeyman Carpenter | $ 45.42 | 30.82 |
| Millwright | $ 47.92 | 32.41 |

---

CARP0180-001 07/01/2021

Solano County

| | Rates | Fringes |
|---|---|---|
| Carpenters | | |
| Bridge Builder/Highway Carpenter | $ 54.85 | 31.49 |
| Hardwood Floorlayer, Shingler, Power Saw Operator, Steel Scaffold & Steel Shoring Erector, Saw Filer | $ 55.00 | 31.49 |
| Journeyman Carpenter | $ 54.85 | 31.49 |
| Millwright | $ 54.95 | 33.08 |

---

CARP0751-001 07/01/2021

Napa and Sonoma Counties

| | Rates | Fringes |
|---|---|---|
| Carpenters | | |
| Bridge Builder/Highway Carpenter | $ 54.85 | 31.49 |
| Hardwood Floorlayer, Shingler, Power Saw Operator, Steel Scaffold & Steel Shoring Erector, Saw Filer | $ 55.00 | 31.49 |
| Journeyman Carpenter | $ 54.85 | 31.49 |
| Millwright | $ 54.95 | 33.08 |

---

CARP1599-001 07/01/2020

Butte, Glenn, Lassen, Modoc, Plumas, Shasta, Siskiyou, Tehama and Trinity Counties

| | Rates | Fringes |
|---|---|---|
| Carpenters | | |
| Bridge Builder/Highway Carpenter | $ 52.65 | 30.82 |
| Hardwood Floorlayer, Shingler, Power Saw Operator, Steel Scaffold & Steel Shoring Erector, Saw Filer | $ 45.57 | 30.82 |
| Journeyman Carpenter | $ 45.42 | 30.82 |
| Millwright | $ 47.92 | 32.41 |

---

ELEC0180-001 06/01/2021

NAPA AND SOLANO COUNTIES

| | Rates | Fringes |
|---|---|---|
| CABLE SPLICER | $ 59.69 | 3%+24.38 |
| ELECTRICIAN | $ 53.06 | 3%+24.38 |

---

ELEC0180-003 12/01/2021

NAPA AND SOLANO COUNTIES

| | Rates | Fringes |
|---|---|---|
| Sound & Communications | | |
| Installer | $ 43.71 | 3%+22.65 |
| Technician | $ 50.27 | 3%+22.65 |

SCOPE OF WORK INCLUDES-
SOUND & VOICE TRANSMISSION (Music, Intercom, Nurse Call, Telephone); FIRE ALARM SYSTEMS [excluding fire alarm work when installed in raceways (including wire and cable pulling) and when performed on new or major remodel building projects or jobs], TELEVISION & VIDEO SYSTEMS, SECURITY SYSTEMS, COMMUNICATIONS SYSTEMS that transmit or receive information and/or control systems that are intrinsic to the above.

EXCLUDES-

Excludes all other data systems or multiple systems which include control function or power supply; excludes installation of raceway systems, line voltage work, industrial work, life-safety systems (all buildings having floors located more than 75' above the lowest floor level having building access); excludes energy management systems.

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ELEC0340-002 02/01/2018

ALPINE, AMADOR, BUTTE, COLUSA, EL DORADO, GLENN, LASSEN, NEVADA, PLACER, PLUMAS, SACRAMENTO, TRINITY, YOLO, YUBA COUNTIES

| | Rates | Fringes |
|---|---|---|
| Communications System | | |
| Sound & Communications Installer | $ 29.35 | 3%+15.35 |
| Sound & Communications Technician | $ 33.75 | 3%+15.35 |

SCOPE OF WORK

Includes the installation testing, service and maintenance, of the following systems which utilize the transmission and/or transference of voice, sound, vision and digital for commercial, education, 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 system, radio page, school intercom and sound, burglar alarms, and low voltage master clock systems.

A. SOUND AND VOICE TRANSMISSION/TRANSFERENCE SYSTEMS
Background foreground music Intercom and telephone interconnect systems, Telephone systems, Nurse call systems, Radio page systems, School intercom and sound systems, Burglar alarm systems, Low voltage master clock systems, Multi-media/multiplex systems, Sound and musical entertainment systems, RF systems, Antennas and Wave Guide.

B. FIRE ALARM SYSTEMS
Installation, wire pulling and testing

C. TELEVISION AND VIDEO SYSTEMS Television monitoring and surveillance systems, Video security systems, Video entertainment systems, Video educational systems, Microwave

transmission systems, CATV and CCTV

D. SECURITY SYSTEMS Perimeter security systems Vibration sensor systems Card access systems Access control systems Sonar/infrared monitoring equipment

E. COMMUNICATIONS SYSTEMS THAT TRANSMIT OR RECEIVE INFORMATION AND/OR CONTROL SYSTEMS THAT ARE INTRINSIC TO THE ABOVE LISTED SYSTEMS SCADA (Supervisory Control and Data Acquisition) PCM (Pulse Code Modulation) Inventory Control Systems Digital Data Systems Broadband and Baseband and Carriers Point of Sale Systems VSAT Data Systems Data Communication Systems RF and Remote Control Systems Fiber Optic Data Systems WORK EXCLUDED Raceway systems are not covered (excluding Ladder-Rack for the purpose of the above listed systems). Chases and/or nipples (not to exceed 10 feet) may be installed on open wiring systems. Energy management systems. SCADA (Supervisory Control and Data Acquisition) when not intrinsic to the above listed systems (in the scope). Fire alarm systems when installed in raceways (including wire and cable pulling) shall be performed at the electrician wage rate, when either of the following two (2) conditions apply:
1. The project involves new or major remodel building trades construction.
2. The conductors for the fire alarm system are installed in conduit.

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ELEC0340-003 06/01/2021

ALPINE (West of Sierra Mt. Watershed), AMADOR, BUTTE, COLUSA, EL DORADO (West of Sierra Mt. Watershed), GLENN, LASSEN, NEVADA (West of Sierra Mt. Watershed), PLACER, PLUMAS, SACRAMENTO, SHASTA, SIERRA (West of Sierra Mt. Watershed), SUTTER, TEHAMA, TRINITY, YOLO & YUBA COUNTIES

| | Rates | Fringes |
|---|---|---|
| ELECTRICIAN | | |
| Remaining area | $ 41.56 | 32.49 |
| Sierra Army Depot, Herlong | $ 48.83 | 18.54 |
| Tunnel work | $ 41.01 | 18.54 |

CABLE SPLICER: Receives 110% of the Electrician basic hourly rate.

---

ELEC0401-005 01/01/2022

ALPINE (east of the main watershed divide), EL DORADO (east of the main watershed divide), NEVADA (east of the main watershed), PLACER (east of the main watershed divide) and SIERRA (east of the main watershed divide) COUNTIES:

| | Rates | Fringes |
|---|---|---|
| ELECTRICIAN | $ 42.50 | 20.95 |

ZONE RATE:

70-90 miles - $8.00 per hour
91+ miles - $10.00 per hour

---

ELEC0551-004 06/01/2021

MARIN AND SONOMA COUNTIES

| | Rates | Fringes |
|---|---|---|
| ELECTRICIAN | $ 53.90 | 26.47 |

---

ELEC0551-005 12/01/2021

MARIN & SONOMA COUNTIES

| | Rates | Fringes |
|---|---|---|
| Sound & Communications | | |
| Installer | $ 43.71 | 23.96 |
| Technician | $ 50.27 | 24.16 |

SCOPE OF WORK INCLUDES-
SOUND & VOICE TRANSMISSION (Music, Intercom, Nurse Call, Telephone); FIRE ALARM SYSTEMS [excluding fire alarm work when installed in raceways (including wire and cable pulling) and when performed on new or major remodel building projects or jobs], TELEVISION & VIDEO SYSTEMS, SECURITY SYSTEMS, COMMUNICATIONS SYSTEMS that transmit or receive information and/or control systems that are intrinsic to the above.

EXCLUDES-
Excludes all other data systems or multiple systems which include control function or power supply; excludes installation of raceway systems, line voltage work,

industrial work, life-safety systems (all buildings having floors located more than 75' above the lowest floor level having building access); excludes energy management systems.

---

ELEC0659-006 01/01/2021

DEL NORTE, MODOC and SISKIYOU COUNTIES

| | Rates | Fringes |
|---|---|---|
| ELECTRICIAN | $ 38.49 | 17.74 |

---

ELEC0659-008 02/01/2020

DEL NORTE, MODOC & SISKIYOU COUNTIES

| | Rates | Fringes |
|---|---|---|
| Line Construction | | |
| (1) Cable Splicer | $ 60.28 | 4.5%+19.40 |
| (2) Lineman, Pole Sprayer, Heavy Line Equipment Man | $ 53.82 | 4.5%+19.40 |
| (3) Tree Trimmer | $ 37.84 | 4.5%+14.30 |
| (4) Line Equipment Man | $ 53.82 | 4.5%+19.40 |
| (5) Powdermen, Jackhammermen | $ 40.37 | 4.5%+14.30 |
| (6) Groundman | $ 33.37 | 4.5%+14.30 |

---

ELEC1245-004 01/01/2022

ALL COUNTIES EXCEPT DEL NORTE, MODOC & SISKIYOU

| | Rates | Fringes |
|---|---|---|
| LINE CONSTRUCTION | | |
| (1) Lineman; Cable splicer | $ 60.19 | 22.07 |
| (2) Equipment specialist (operates crawler tractors, commercial motor vehicles, backhoes, trenchers, cranes (50 tons and below), overhead & underground distribution line equipment) | $ 48.08 | 20.86 |
| (3) Groundman | $ 36.76 | 20.46 |
| (4) Powderman | $ 51.87 | 18.79 |

HOLIDAYS: New Year's Day, M.L. King Day, Memorial Day,

Independence Day, Labor Day, Veterans Day, Thanksgiving Day and day after Thanksgiving, Christmas Day

---

ELEV0008-001 01/01/2022

| | Rates | Fringes |
|---|---|---|
| ELEVATOR MECHANIC | $ 74.54 | 36.885+a+b |

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.

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ENGI0003-008 07/20/2020

| | Rates | Fringes |
|---|---|---|
| Dredging: (DREDGING: CLAMSHELL & DIPPER DREDGING; HYDRAULIC SUCTION DREDGING:) | | |
| AREA 1: | | |
| (1) Leverman | $ 49.88 | 34.35 |
| (2) Dredge Dozer; Heavy duty repairman | $ 44.92 | 34.35 |
| (3) Booster Pump Operator; Deck Engineer; Deck mate; Dredge Tender; Winch Operator | $ 43.80 | 34.35 |
| (4) Bargeman; Deckhand; Fireman; Leveehand; Oiler | $ 40.50 | 34.35 |
| AREA 2: | | |
| (1) Leverman | $ 51.88 | 34.35 |
| (2) Dredge Dozer; Heavy duty repairman | $ 46.92 | 34.35 |
| (3) Booster Pump Operator; Deck Engineer; Deck mate; Dredge Tender; Winch Operator | $ 45.80 | 34.35 |
| (4) Bargeman; Deckhand; Fireman; Leveehand; Oiler | $ 42.50 | 34.35 |

AREA DESCRIPTIONS

AREA 1: ALAMEDA,BUTTE, CONTRA COSTA, KINGS, MARIN, MERCED, NAPA, SACRAMENTO, SAN BENITO, SAN FRANCISCO, SAN JOAQUIN, SAN MATEO, SANTA CLARA, SANTA CRUZ, SOLANO, STANISLAUS, SUTTER, YOLO, AND YUBA COUNTIES

AREA 2: MODOC COUNTY

THE REMAINGING COUNTIES ARE SPLIT BETWEEN AREA 1 AND AREA 2 AS NOTED BELOW:

ALPINE COUNTY:
Area 1: Northernmost part
Area 2: Remainder

CALAVERAS COUNTY:
Area 1: Remainder
Area 2: Eastern part

COLUSA COUNTY:
Area 1: Eastern part
Area 2: Remainder

ELDORADO COUNTY:
Area 1: North Central part
Area 2: Remainder

FRESNO COUNTY:
Area 1: Remainder
Area 2: Eastern part

GLENN COUNTY:
Area 1: Eastern part
Area 2: Remainder

LASSEN COUNTY:
Area 1: Western part along the Southern portion of border with Shasta County
Area 2: Remainder

MADERA COUNTY:
Area 1: Except Eastern part
Area 2: Eastern part

MARIPOSA COUNTY
Area 1: Except Eastern part
Area 2: Eastern part

MONTERREY COUNTY
Area 1: Except Southwestern part

Area 2: Southwestern part

NEVADA COUNTY:
  Area 1:  All but the Northern portion along the border of
  Sierra County
Area 2:  Remainder

PLACER COUNTY:
Area 1:  Al but the Central portion
Area 2:  Remainder

PLUMAS COUNTY:
Area 1:  Western portion
Area 2:  Remainder

SHASTA COUNTY:
Area 1:  All but the Northeastern corner
Area 2:  Remainder

SIERRA COUNTY:
Area 1:  Western part
Area 2:  Remainder

SISKIYOU COUNTY:
Area 1:  Central part
Area 2:  Remainder

SONOMA COUNTY:
Area 1:  All but the Northwestern corner
Area 2:  Remainder

TEHAMA COUNTY:
  Area 1:  All but the Western border with Mendocino & Trinity
  Counties
Area 2:  Remainder

TRINITY COUNTY:
  Area 1:  East Central part and the Northeastern border with
  Shasta County
Area 2:  Remainder

TUOLUMNE COUNTY:
Area 1: Except Eastern part
Area 2: Eastern part

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 ENGI0003-019 06/29/2020

SEE AREA DESCRIPTIONS BELOW

| | Rates | Fringes |
|---|---|---|
| OPERATOR: Power Equipment (LANDSCAPE WORK ONLY) | | |
| GROUP 1 | | |
| AREA 1 | $ 39.95 | 30.28 |
| AREA 2 | $ 41.95 | 30.28 |
| GROUP 2 | | |
| AREA 1 | $ 36.35 | 30.28 |
| AREA 2 | $ 38.35 | 30.28 |
| GROUP 3 | | |
| AREA 1 | $ 31.74 | 30.28 |
| AREA 2 | $ 33.74 | 30.28 |

GROUP DESCRIPTIONS:

GROUP 1: Landscape Finish Grade Operator: All finish grade work regardless of equipment used, and all equipment with a rating more than 65 HP.

GROUP 2: Landscape Operator up to 65 HP: All equipment with a manufacturer's rating of 65 HP or less except equipment covered by Group 1 or Group 3. The following equipment shall be included except when used for finish work as long as manufacturer's rating is 65 HP or less: A-Frame and Winch Truck, Backhoe, Forklift, Hydragraphic Seeder Machine, Roller, Rubber-Tired and Track Earthmoving Equipment, Skiploader, Straw Blowers, and Trencher 31 HP up to 65 HP.

GROUP 3: Landscae Utility Operator: Small Rubber-Tired Tractor, Trencher Under 31 HP.

AREA DESCRIPTIONS:

AREA 1: ALAMEDA, BUTTE, CONTRA COSTA, KINGS, MARIN, MERCED, NAPA, SACRAMENTO, SAN BENITO, SAN FRANCISCO, SAN JOAQUIN, SAN MATEO, SANTA CLARA, SANTA CRUZ, SOLANO, STANISLAUS, SUTTER, YOLO, AND YUBA COUNTIES

AREA 2 - MODOC COUNTY

THE REMAINING COUNTIES ARE SPLIT BETWEEN AREA 1 AND AREA 2 AS NOTED BELOW:

ALPINE COUNTY:
Area 1: Northernmost part
Area 2: Remainder

CALAVERAS COUNTY:

Area 1: Except Eastern part
Area 2: Eastern part

COLUSA COUNTY:
Area 1: Eastern part
Area 2: Remainder

DEL NORTE COUNTY:
Area 1: Extreme Southwestern corner
Area 2: Remainder

ELDORADO COUNTY:
Area 1: North Central part
Area 2: Remainder

FRESNO COUNTY
Area 1: Except Eastern part
Area 2: Eastern part

GLENN COUNTY:
Area 1: Eastern part
Area 2: Remainder

HUMBOLDT COUNTY:
Area 1: Except Eastern and Southwestern parts
Area 2: Remainder

LAKE COUNTY:
Area 1: Southern part
Area 2: Remainder

LASSEN COUNTY:
  Area 1: Western part along the Southern portion of border
  with Shasta County
Area 2: Remainder

MADERA COUNTY
Area 1: Remainder
Area 2: Eastern part

MARIPOSA COUNTY
Area 1: Remainder
Area 2: Eastern part

MENDOCINO COUNTY:
Area 1: Central and Southeastern parts
Area 2: Remainder

MONTEREY COUNTY
Area 1: Remainder

Area 2: Southwestern part

NEVADA COUNTY:
  Area 1: All but the Northern portion along the border of
  Sierra County
Area 2: Remainder

PLACER COUNTY:
Area 1: All but the Central portion
Area 2: Remainder

PLUMAS COUNTY:
Area 1: Western portion
Area 2: Remainder

SHASTA COUNTY:
Area 1: All but the Northeastern corner
Area 2: Remainder

SIERRA COUNTY:
Area 1: Western part
Area 2: Remainder

SISKIYOU COUNTY:
Area 1: Central part
Area 2: Remainder

SONOMA COUNTY:
Area 1: All but the Northwestern corner
Area 2: Reaminder

TEHAMA COUNTY:
  Area 1: All but the Western border with mendocino & Trinity
  Counties
Area 2: Remainder

TRINITY COUNTY:
  Area 1: East Central part and the Northeaster border with
  Shasta County
Area 2: Remainder

TULARE COUNTY;
Area 1: Remainder
Area 2: Eastern part

TUOLUMNE COUNTY:
Area 1: Remainder
Area 2: Eastern Part

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ENGI0003-038 06/29/2020

""AREA 1"" WAGE RATES ARE LISTED BELOW

""AREA 2"" RECEIVES AN ADDITIONAL $2.00 PER HOUR ABOVE AREA 1 RATES.

SEE AREA DEFINITIONS BELOW

| | Rates | Fringes |
|---|---|---|
| OPERATOR: Power Equipment (AREA 1:) | | |
| GROUP 1 | $ 51.42 | 31.15 |
| GROUP 2 | $ 49.89 | 31.15 |
| GROUP 3 | $ 48.41 | 31.15 |
| GROUP 4 | $ 47.03 | 31.15 |
| GROUP 5 | $ 45.76 | 31.15 |
| GROUP 6 | $ 44.44 | 31.15 |
| GROUP 7 | $ 43.30 | 31.15 |
| GROUP 8 | $ 42.16 | 31.15 |
| GROUP 8-A | $ 39.95 | 31.15 |
| OPERATOR: Power Equipment (Cranes and Attachments - AREA 1:) | | |
| GROUP 1 | | |
| Cranes | $ 52.30 | 31.15 |
| Oiler | $ 43.79 | 31.15 |
| Truck crane oiler | $ 46.08 | 31.15 |
| GROUP 2 | | |
| Cranes | $ 50.54 | 31.15 |
| Oiler | $ 42.83 | 31.15 |
| Truck crane oiler | $ 45.07 | 31.15 |
| GROUP 3 | | |
| Cranes | $ 48.80 | 31.15 |
| Hydraulic | $ 44.44 | 31.15 |
| Oiler | $ 42.55 | 31.15 |
| Truck crane oiler | $ 44.83 | 31.15 |
| GROUP 4 | | |
| Cranes | $ 45.76 | 31.15 |
| OPERATOR: Power Equipment (Piledriving - AREA 1:) | | |
| GROUP 1 | | |
| Lifting devices | $ 52.64 | 31.15 |
| Oiler | $ 43.38 | 31.15 |
| Truck Crane Oiler | $ 45.66 | 31.15 |
| GROUP 2 | | |
| Lifting devices | $ 50.82 | 31.15 |
| Oiler | $ 43.11 | 31.15 |

| | | |
|---|---|---|
| Truck Crane Oiler | $ 45.41 | 31.15 |
| GROUP 3 | | |
| Lifting devices | $ 49.14 | 31.15 |
| Oiler | $ 42.89 | 31.15 |
| Truck Crane Oiler | $ 45.12 | 31.15 |
| GROUP 4 | | |
| Lifting devices | $ 47.37 | 31.15 |
| GROUP 5 | | |
| Lifting devices | $ 44.73 | 31.15 |
| GROUP 6 | | |
| Lifting devices | $ 42.50 | 31.15 |
| OPERATOR: Power Equipment (Steel Erection - AREA 1:) | | |
| GROUP 1 | | |
| Cranes | $ 53.27 | 31.15 |
| Oiler | $ 43.72 | 31.15 |
| Truck Crane Oiler | $ 45.95 | 31.15 |
| GROUP 2 | | |
| Cranes | $ 51.50 | 31.15 |
| Oiler | $ 43.45 | 31.15 |
| Truck Crane Oiler | $ 45.73 | 31.15 |
| GROUP 3 | | |
| Cranes | $ 50.02 | 31.15 |
| Hydraulic | $ 45.07 | 31.15 |
| Oiler | $ 43.23 | 31.15 |
| Truck Crane Oiler | $ 45.46 | 31.15 |
| GROUP 4 | | |
| Cranes | $ 48.00 | 31.15 |
| GROUP 5 | | |
| Cranes | $ 46.70 | 31.15 |
| OPERATOR: Power Equipment (Tunnel and Underground Work - AREA 1:) | | |
| SHAFTS, STOPES, RAISES: | | |
| GROUP 1 | $ 47.52 | 31.15 |
| GROUP 1-A | $ 49.99 | 31.15 |
| GROUP 2 | $ 46.26 | 31.15 |
| GROUP 3 | $ 44.93 | 31.15 |
| GROUP 4 | $ 43.79 | 31.15 |
| GROUP 5 | $ 42.65 | 31.15 |
| UNDERGROUND: | | |
| GROUP 1 | $ 47.42 | 31.15 |
| GROUP 1-A | $ 49.89 | 31.15 |
| GROUP 2 | $ 46.16 | 31.15 |
| GROUP 3 | $ 44.83 | 31.15 |
| GROUP 4 | $ 43.69 | 31.15 |
| GROUP 5 | $ 42.55 | 31.15 |

FOOTNOTE: Work suspended by ropes or cables, or work on a Yo-Yo Cat: $.60 per hour additional.

POWER EQUIPMENT OPERATOR CLASSIFICATIONS

GROUP 1: Operator of helicopter (when used in erection work); Hydraulic excavator, 7 cu. yds. and over; Power shovels, over 7 cu. yds.

GROUP 2: Highline cableway; Hydraulic excavator, 3-1/2 cu. yds. up to 7 cu. yds.; Licensed construction work boat operator, on site; Power blade operator (finish); Power shovels, over 1 cu. yd. up to and including 7 cu. yds. m.r.c.

GROUP 3: Asphalt milling machine; Cable backhoe; Combination backhoe and loader over 3/4 cu. yds.; Continuous flight tie back machine assistant to engineer or mechanic; Crane mounted continuous flight tie back machine, tonnage to apply; Crane mounted drill attachment, tonnage to apply; Dozer, slope brd; Gradall; Hydraulic excavator, up to 3 1/2 cu. yds.; Loader 4 cu. yds. and over; Long reach excavator; Multiple engine scraper (when used as push pull); Power shovels, up to and including 1 cu. yd.; Pre-stress wire wrapping machine; Side boom cat, 572 or larger; Track loader 4 cu. yds. and over; Wheel excavator (up to and including 750 cu. yds. per hour)

GROUP 4: Asphalt plant engineer/box person; Chicago boom; Combination backhoe and loader up to and including 3/4 cu. yd.; Concrete batch plant (wet or dry); Dozer and/or push cat; Pull- type elevating loader; Gradesetter, grade checker (GPS, mechanical or otherwise); Grooving and grinding machine; Heading shield operator; Heavy-duty drilling equipment, Hughes, LDH, Watson 3000 or similar; Heavy-duty repairperson and/or welder; Lime spreader; Loader under 4 cu. yds.; Lubrication and service engineer (mobile and grease rack); Mechanical finishers or spreader machine (asphalt, Barber-Greene and similar); Miller Formless M-9000 slope paver or similar; Portable crushing and screening plants; Power blade support; Roller operator, asphalt; Rubber-tired scraper, self-loading (paddle-wheels, etc.); Rubber- tired earthmoving equipment (scrapers); Slip form paver (concrete); Small tractor with drag; Soil stabilizer (P & H or equal); Spider plow and spider puller; Tubex pile rig; Unlicensed constuction work boat operator, on site; Timber skidder; Track loader up to 4 yds.; Tractor-drawn scraper; Tractor, compressor drill combination; Welder; Woods-Mixer (and other similar Pugmill equipment)

GROUP 5: Cast-in-place pipe laying machine; Combination slusher and motor operator; Concrete conveyor or concrete pump, truck or equipment mounted; Concrete conveyor, building site; Concrete pump or pumpcrete gun; Drilling equipment, Watson 2000, Texoma 700 or similar; Drilling and boring machinery, horizontal (not to apply to waterliners, wagon drills or jackhammers); Concrete mixer/all; Person and/or material hoist; Mechanical finishers (concrete) (Clary, Johnson, Bidwell Bridge Deck or similar types); Mechanical burm, curb and/or curb and gutter machine, concrete or asphalt); Mine or shaft hoist; Portable crusher; Power jumbo operator (setting slip-forms, etc., in tunnels); Screed (automatic or manual); Self-propelled compactor with dozer; Tractor with boom D6 or smaller; Trenching machine, maximum digging capacity over 5 ft. depth; Vermeer T-600B rock cutter or similar

GROUP 6: Armor-Coater (or similar); Ballast jack tamper; Boom- type backfilling machine; Assistant plant engineer; Bridge and/or gantry crane; Chemical grouting machine, truck-mounted; Chip spreading machine operator; Concrete saw (self-propelled unit on streets, highways, airports and canals); Deck engineer; Drilling equipment Texoma 600, Hughes 200 Series or similar up to and including 30 ft. m.r.c.; Drill doctor; Helicopter radio operator; Hydro-hammer or similar; Line master; Skidsteer loader, Bobcat larger than 743 series or similar (with attachments); Locomotive; Lull hi-lift or similar; Oiler, truck mounted equipment; Pavement breaker, truck-mounted, with compressor combination; Paving fabric installation and/or laying machine; Pipe bending machine (pipelines only); Pipe wrapping machine (tractor propelled and supported); Screed (except asphaltic concrete paving); Self- propelled pipeline wrapping machine; Tractor; Self-loading chipper; Concrete barrier moving machine

GROUP 7: Ballast regulator; Boom truck or dual-purpose A-frame truck, non-rotating - under 15 tons; Cary lift or similar; Combination slurry mixer and/or cleaner; Drilling equipment, 20 ft. and under m.r.c.; Firetender (hot plant); Grouting machine operator; Highline cableway signalperson; Stationary belt loader (Kolman or similar); Lift slab machine (Vagtborg and similar types); Maginnes internal full slab vibrator; Material hoist (1 drum); Mechanical trench shield; Pavement breaker with or without compressor combination); Pipe cleaning machine (tractor propelled and supported); Post driver; Roller (except asphalt); Chip Seal; Self-propelled automatically applied concrete curing mahcine (on streets, highways, airports and canals); Self-propelled compactor (without dozer); Signalperson;

Slip-form pumps (lifting device for concrete forms); Tie spacer; Tower mobile; Trenching machine, maximum digging capacity up to and including 5 ft. depth; Truck- type loader

GROUP 8: Bit sharpener; Boiler tender; Box operator; Brakeperson; Combination mixer and compressor (shotcrete/gunite); Compressor operator; Deckhand; Fire tender; Forklift (under 20 ft.); Generator; Gunite/shotcrete equipment operator; Hydraulic monitor; Ken seal machine (or similar); Mixermobile; Oiler; Pump operator; Refrigeration plant; Reservoir-debris tug (self-propelled floating); Ross Carrier (construction site); Rotomist operator; Self-propelled tape machine; Shuttlecar; Self-propelled power sweeper operator (includes vacuum sweeper); Slusher operator; Surface heater; Switchperson; Tar pot firetender; Tugger hoist, single drum; Vacuum cooling plant; Welding machine (powered other than by electricity)

GROUP 8-A: Elevator operator; Skidsteer loader-Bobcat 743 series or smaller, and similar (without attachments); Mini excavator under 25 H.P. (backhoe-trencher); Tub grinder wood chipper

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ALL CRANES AND ATTACHMENTS

GROUP 1: Clamshell and dragline over 7 cu. yds.; Crane, over 100 tons; Derrick, over 100 tons; Derrick barge pedestal-mounted, over 100 tons; Self-propelled boom-type lifting device, over 100 tons

GROUP 2: Clamshell and dragline over 1 cu. yd. up to and including 7 cu. yds.; Crane, over 45 tons up to and including 100 tons; Derrick barge, 100 tons and under; Self-propelled boom-type lifting device, over 45 tons; Tower crane

GROUP 3: Clamshell and dragline up to and including 1 cu. yd.; Cranes 45 tons and under; Self-propelled boom-type lifting device 45 tons and under;

GROUP 4: Boom Truck or dual purpose A-frame truck, non-rotating over 15 tons; Truck-mounted rotating telescopic boom type lifting device, Manitex or similar (boom truck) over 15 tons; Truck-mounted rotating telescopic boom type lifting device, Manitex or similar (boom truck) - under 15 tons;

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PILEDRIVERS

GROUP 1: Derrick barge pedestal mounted over 100 tons; Clamshell over 7 cu. yds.; Self-propelled boom-type lifting device over 100 tons; Truck crane or crawler, land or barge mounted over 100 tons

GROUP 2: Derrick barge pedestal mounted 45 tons to and including 100 tons; Clamshell up to and including 7 cu. yds.; Self-propelled boom-type lifting device over 45 tons; Truck crane or crawler, land or barge mounted, over 45 tons up to and including 100 tons; Fundex F-12 hydraulic pile rig

GROUP 3: Derrick barge pedestal mounted under 45 tons; Self-propelled boom-type lifting device 45 tons and under; Skid/scow piledriver, any tonnage; Truck crane or crawler, land or barge mounted 45 tons and under

GROUP 4: Assistant operator in lieu of assistant to engineer; Forklift, 10 tons and over; Heavy-duty repairperson/welder

GROUP 5: Deck engineer

GROUP 6: Deckhand; Fire tender

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STEEL ERECTORS

GROUP 1: Crane over 100 tons; Derrick over 100 tons; Self-propelled boom-type lifting device over 100 tons

GROUP 2: Crane over 45 tons to 100 tons; Derrick under 100 tons; Self-propelled boom-type lifting device over 45 tons to 100 tons; Tower crane

GROUP 3: Crane, 45 tons and under; Self-propelled boom-type lifting device, 45 tons and under

GROUP 4: Chicago boom; Forklift, 10 tons and over; Heavy-duty repair person/welder

GROUP 5: Boom cat

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TUNNEL AND UNDERGROUND WORK

GROUP 1-A: Tunnel bore machine operator, 20' diameter or more

GROUP 1: Heading shield operator; Heavy-duty repairperson; Mucking machine (rubber tired, rail or track type); Raised bore operator (tunnels); Tunnel mole bore operator

GROUP 2: Combination slusher and motor operator; Concrete pump or pumpcrete gun; Power jumbo operator

GROUP 3: Drill doctor; Mine or shaft hoist

GROUP 4: Combination slurry mixer cleaner; Grouting Machine operator; Motorman

GROUP 5: Bit Sharpener; Brakeman; Combination mixer and compressor (gunite); Compressor operator; Oiler; Pump operator; Slusher operator

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AREA DESCRIPTIONS:

POWER EQUIPMENT OPERATORS, CRANES AND ATTACHMENTS,TUNNEL AND UNDERGROUND [These areas do not apply to Piledrivers and Steel Erectors]

AREA 1: DEL NORTE, HUMBOLDT, LAKE, MENDOCINO
AREA 2 -NOTED BELOW

THE REMAINING COUNTIES ARE SPLIT BETWEEN AREA 1 AND AREA 2 AS NOTED BELOW:

DEL NORTE COUNTY:
Area 1: Extreme Southwest corner
Area 2: Remainder

HUMBOLDT COUNTY:
Area 1: Except Eastern and Southwestern parts
Area 2: Remainder

LAKE COUNTY:
Area 1: Southern part
Area 2: Remainder

MENDOCINO COUNTY:
Area 1: Central and Southeastern Parts
Area 2: Remainder

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IRON0433-006 07/01/2020

| | Rates | Fringes |
|---|---|---|
| IRONWORKER | | |
| Fence Erector | $ 34.58 | 24.81 |
| Ornamental, Reinforcing and Structural | $ 41.00 | 33.45 |

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

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LABO0067-001 06/28/2021

AREA ""A"" - MARIN COUNTY

AREA ""B""  - ALPINE, AMADOR, BUTTE COLUSA EL DORADO, GLENN, LASSEN, MODOC, NAPA, NEVADA, PLACER, PLUMAS, SACRAMENTO, SHASTA, SIERRA, SISKIYOU, SOLANO, SONOMA, SUTTER, TEHAMA, TRINITY, YOLO, AND YUBA COUNTIES

| | Rates | Fringes |
|---|---|---|
| Asbestos Removal Laborer | $ 26.05 | 12.75 |
| LABORER (Lead Removal) | | |
| Marin County | $ 34.37 | 25.95 |
| Remaining Counties | $ 33.37 | 25.95 |

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LABO0067-005 06/27/2017

AREA ""A"" - ALAMEDA, CONTRA COSTA,  SAN FRANCISCO, SAN MATEO AND SANTA CLARA COUNTIES

AREA ""B""  -  ALPINE, AMADOR, BUTTE, CALAVERAS, COLUSA, DEL NORTE, EL DORADO, FRESNO, GLENN, HUMBOLDT, KINGS, LAKE, LASSEN, MADERA, MARIPOSA, MENDOCINO, MERCED, MODOC, MONTEREY, NEVADA, PLACER, PLUMAS, SANCREMENTO, SAN BENITO, SAN JOAQUIN, SANTA CRUZ, SIERRA, SHASTA, SISKIYOU, STANISLAUS, TEHAMA, TRINITY, TULARE, TUOLUMNE, YOLO AND YOUBA COUNTIES

| | Rates | Fringes |
|---|---|---|
| LABORER (TRAFFIC CONTROL/LANE CLOSURE) | | |
| Escort Driver, Flag Person | | |
| Area A | $ 29.54 | 22.17 |
| Area B | $ 28.54 | 22.17 |
| Traffic Control Person I | | |
| Area A | $ 29.84 | 22.17 |
| Area B | $ 28.84 | 22.17 |
| Traffic Control Person II | | |
| Area A | $ 27.34 | 22.17 |
| Area B | $ 26.34 | 22.17 |

TRAFFIC CONTROL PERSON I: Layout of traffic control, crash cushions, construction area and roadside signage.

TRAFFIC CONTROL PERSON II: Installation and removal of temporary/permanent signs, markers, delineators and crash cushions.

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LABO0185-002 07/01/2021

ALPINE, AMADOR, BUTTE, COLUSA, EL DORADO, GLENN, LASSEN, MODOC, NEVADA, PLACER, PLUMAS, SACRAMENTO, SHASTA, SIERRA, SISKIYOU, SUTTER, TEHAMA, TRINITY, YOLO AND YUBA COUNTIES

| | Rates | Fringes |
|---|---|---|
| LABORER | | |
| Mason Tender-Brick | $ 34.09 | 24.41 |

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LABO0185-005 07/01/2021

ALPINE, AMADOR, BUTTE, COLUSA, EL DORADO, GLENN, LASSEN, MODOC, NEVADA, PLACER, PLUMAS, SACRAMENTO, SHASTA, SIERRA, SISKIYOU,

SUTTER, TEHAMA, TRINITY, YOLO AND YUBA COUNTIES

| | Rates | Fringes |
|---|---|---|
| Tunnel and Shaft Laborers: | | |
| GROUP 1 | $ 42.00 | 25.71 |
| GROUP 2 | $ 41.77 | 25.71 |
| GROUP 3 | $ 41.52 | 25.71 |
| GROUP 4 | $ 41.07 | 25.71 |
| GROUP 5 | $ 40.53 | 25.71 |
| Shotcrete Specialist | $ 42.52 | 25.71 |

TUNNEL AND SHAFT CLASSIFICATIONS

GROUP 1: Diamond driller; Groundmen; Gunite and shotcrete nozzlemen

GROUP 2: Rodmen; Shaft work & raise (below actual or excavated ground level)

GROUP 3: Bit grinder; Blaster, driller, powdermen, heading; Cherry pickermen - where car is lifted; Concrete finisher in tunnel; Concrete screedman; Grout pumpman and potman; Gunite & shotcrete gunman & potman; Headermen; High pressure nozzleman; Miner - tunnel, including top and bottom man on shaft and raise work; Nipper; Nozzleman on slick line; Sandblaster - potman, Robotic Shotcrete Placer, Segment Erector, Tunnel Muck Hauler, Steel Form raiser and setter; Timberman, retimberman (wood or steel or substitute materials therefore); Tugger (for tunnel laborer work); Cable tender; Chuck tender; Powderman - primer house

GROUP 4: Vibrator operator, pavement breaker; Bull gang - muckers, trackmen; Concrete crew - includes rodding and spreading, Dumpmen (any method)

GROUP 5: Grout crew; Reboundman; Swamper/ Brakeman

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LABO0185-006 06/25/2018

ALPINE, AMADOR, BUTTE, COLUSA, EL DORADO, GLENN, LASSEN, MODOC, NEVADA, PLACER, PLUMAS, SACRAMENTO, SHIASTA, SIERRA, SISKIYOU, SUTTER, TEHAMA, TRINITY, YOLO, YUBA COUNTIES

| | Rates | Fringes |
|---|---|---|
| LABORER (CONSTRUCTION CRAFT | | |

LABORERS - AREA B:)

| | | |
|---|---|---|
| Construction Specialist Group | $ 30.49 | 23.20 |
| GROUP 1 | $ 29.79 | 23.20 |
| GROUP 1-a | $ 30.01 | 23.20 |
| GROUP 1-c | $ 30.01 | 23.20 |
| GROUP 1-e | $ 30.34 | 23.20 |
| GROUP 1-f | $ 30.37 | 23.20 |
| GROUP 2 | $ 29.64 | 23.20 |
| GROUP 3 | $ 29.54 | 23.20 |
| GROUP 4 | $ 23.23 | 23.20 |

See groups 1-b and 1-d under laborer classifications.

LABORER (GARDENERS, HORTICULTURAL & LANDSCAPE LABORERS - AREA B:)

| | | |
|---|---|---|
| (1) New Construction | $ 29.54 | 23.20 |
| (2) Establishment Warranty Period | $ 23.23 | 23.20 |

LABORER (GUNITE - AREA B:)

| | | |
|---|---|---|
| GROUP 1 | $ 29.75 | 22.31 |
| GROUP 2 | $ 29.25 | 22.31 |
| GROUP 3 | $ 28.66 | 22.31 |
| GROUP 4 | $ 28.54 | 22.31 |

LABORER (WRECKING - AREA B:)

| | | |
|---|---|---|
| GROUP 1 | $ 29.79 | 23.20 |
| GROUP 2 | $ 29.64 | 23.20 |

FOOTNOTES:

Laborers working off or with or from bos'n chairs, swinging scaffolds, belts shall receive $0.25 per hour above the applicable wage rate. This shall not apply to workers entitled to receive the wage rate set forth in Group 1-a below.

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LABORER CLASSIFICATIONS

CONSTRUCTION SPECIALIST GROUP: Asphalt ironer and raker; Chainsaw; Laser beam in connection with laborers' work; Cast-in- place manhole form setter; Pressure pipelayer; Davis trencher - 300 or similar type (and all small trenchers); Blaster; Diamond driller; Multiple unit drill; Hydraulic drill

GROUP 1: Asphalt spreader boxes (all types); Barko, Wacker and similar type tampers; Buggymobile; Caulker, bander, pipewrapper, conduit layer, plastic pipelayer; Certified hazardous waste worker including Leade Abatement;

Compactors of all types; Concrete and magnesite mixer, 1/2 yd. and under; Concrete pan work; Concrete sander; Concrete saw; Cribber and/or shoring; Cut granite curb setter; Dri-pak-it machine; Faller, logloader and bucker; Form raiser, slip forms; Green cutter; Headerboard, Hubsetter, aligner, by any method; High pressure blow pipe (1-1/2"" or over, 100 lbs. pressure/over); Hydro seeder and similar type; Jackhammer operator; Jacking of pipe over 12 inches; Jackson and similar type compactor; Kettle tender, pot and worker applying asphalt, lay-kold, creosote, lime, caustic and similar type materials (applying means applying, dipping or handling of such materials); Lagging, sheeting, whaling, bracing, trenchjacking, lagging hammer; Magnesite, epoxyresin, fiberglass, mastic worker (wet or dry); No joint pipe and stripping of same, including repair of voids; Pavement breaker and spader, including tool grinder; Perma curb; Pipelayer (including grade checking in connection with pipelaying); Precast-manhole setter; Pressure pipe tester; Post hole digger, air, gas and electric; Power broom sweeper; Power tampers of all types (except as shown in Group 2); Ram set gun and stud gun; Riprap stonepaver and rock-slinger, including placing of sacked concrete and/or sand (wet or dry) and gabions and similar type; Rotary scarifier or multiple head concrete chipping scarifier; Roto and Ditch Witch; Rototiller; Sandblaster, pot, gun, nozzle operators; Signalling and rigging; Tank cleaner; Tree climber; Turbo blaster; Vibrascreed, bull float in connection with laborers' work; Vibrator; Hazardous waste worker (lead removal); Asbestos and mold removal worker

GROUP 1-a: Joy drill model TWM-2A; Gardner-Denver model DH143 and similar type drills; Track driller; Jack leg driller; Wagon driller; Mechanical drillers, all types regardless of type or method of power; Mechanical pipe layers, all types regardless of type or method of power; Blaster and powder; All work of loading, placing and blasting of all powder and explosives of whatever type regardless of method used for such loading and placing; High scalers (including drilling of same); Tree topper; Bit grinder

GROUP 1-b: Sewer cleaners shall receive $4.00 per day above Group 1 wage rates.  ""Sewer cleaner"" means any worker who handles or comes in contact with raw sewage in small diameter sewers.  Those who work inside recently active, large diameter sewers, and all recently active sewer manholes shal receive $5.00 per day above Group 1 wage rates.

GROUP 1-c: Burning and welding in connection with laborers'

work; Synthetic thermoplastics and similar type welding

GROUP 1-d: Maintenance and repair track and road beds. All employees performing work covered herein shall receive $ .25 per hour above their regular rate for all work performed on underground structures not specifically covered herein. This paragraph shall not be construed to apply to work below ground level in open cut. It shall apply to cut and cover work of subway construction after the temporary cover has been placed.

GROUP 1-e: Work on and/or in bell hole footings and shafts thereof, and work on and in deep footings. (A deep footing is a hole 15 feet or more in depth.) In the event the depth of the footing is unknown at the commencement of excavation, and the final depth exceeds 15 feet, the deep footing wage rate would apply to all employees for each and every day worked on or in the excavation of the footing from the date of inception.

GROUP 1-f: Wire winding machine in connection with guniting or shot crete

GROUP 2: Asphalt shoveler; Cement dumper and handling dry cement or gypsum; Choke-setter and rigger (clearing work); Concrete bucket dumper and chute; Concrete chipping and grinding; Concrete laborer (wet or dry); Driller tender, chuck tender, nipper; Guinea chaser (stake), grout crew; High pressure nozzle, adductor; Hydraulic monitor (over 100 lbs. pressure); Loading and unloading, carrying and hauling of all rods and materials for use in reinforcing concrete construction; Pittsburgh chipper and similar type brush shredders; Sloper; Single foot, hand-held, pneumatic tamper; All pneumatic, air, gas and electric tools not listed in Groups 1 through 1-f; Jacking of pipe - under 12 inches

GROUP 3: Construction laborers, including bridge and general laborer; Dump, load spotter; Flag person; Fire watcher; Fence erector; Guardrail erector; Gardener, horticultural and landscape laborer; Jetting; Limber, brush loader and piler; Pavement marker (button setter); Maintenance, repair track and road beds; Streetcar and railroad construction track laborer; Temporary air and water lines, Victaulic or similar; Tool room attendant (jobsite only)

GROUP 4: Final clean-up work of debris, grounds and building including but not limited to: street cleaner; cleaning and washing windows; brick cleaner (jobsite only); material cleaner (jobsite only). The classification ""material

cleaner"" is to be utilized under the following conditions:
A: at demolition site for the salvage of the material.
B: at the conclusion of a job where the material is to be salvaged and stocked to be reused on another job.
C: for the cleaning of salvage material at the jobsite or temporary jobsite yard.

The material cleaner classification should not be used in the performance of ""form stripping, cleaning and oiling and moving to the next point of erection"".

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GUNITE LABORER CLASSIFICATIONS

GROUP 1: Structural Nozzleman

GROUP 2: Nozzleman, Gunman, Potman, Groundman

GROUP 3: Reboundman

GROUP 4: Gunite laborer

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WRECKING WORK LABORER CLASSIFICATIONS

GROUP 1: Skilled wrecker (removing and salvaging of sash, windows and materials)

GROUP 2: Semi-skilled wrecker (salvaging of other building materials)

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LABO0185-008 07/01/2021

| | Rates | Fringes |
|---|---|---|
| Plasterer tender | $ 35.82 | 28.45 |

Work on a swing stage scaffold: $1.00 per hour additional.

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LABO0261-002 06/28/2021

MARIN COUNTY

| | Rates | Fringes |
|---|---|---|
| LABORER (TRAFFIC CONTROL/LANE CLOSURE) | | |

| | | |
|---|---|---|
| Escort Driver, Flag Person.. | $ 34.48 | 26.21 |
| Traffic Control Person I.... | $ 34.78 | 26.21 |
| Traffic Control Person II... | $ 32.28 | 26.21 |

TRAFFIC CONTROL PERSON I: Layout of traffic control, crash cushions, construction area and roadside signage.

TRAFFIC CONTROL PERSON II: Installation and removal of temporary/permanent signs, markers, delineators and crash cushions.

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LABO0261-004 07/01/2021

MARIN COUNTY

| | Rates | Fringes |
|---|---|---|
| Tunnel and Shaft Laborers: | | |
| GROUP 1..... | $ 42.00 | 25.71 |
| GROUP 2..... | $ 41.77 | 25.71 |
| GROUP 3..... | $ 41.52 | 25.71 |
| GROUP 4..... | $ 41.07 | 25.71 |
| GROUP 5..... | $ 40.53 | 25.71 |
| Shotcrete Specialist..... | $ 42.52 | 25.71 |

TUNNEL AND SHAFT CLASSIFICATIONS

GROUP 1: Diamond driller; Groundmen; Gunite and shotcrete nozzlemen

GROUP 2: Rodmen; Shaft work & raise (below actual or excavated ground level)

GROUP 3: Bit grinder; Blaster, driller, powdermen, heading; Cherry pickermen - where car is lifted; Concrete finisher in tunnel; Concrete screedman; Grout pumpman and potman; Gunite & shotcrete gunman & potman; Headermen; High pressure nozzleman; Miner - tunnel, including top and bottom man on shaft and raise work; Nipper; Nozzleman on slick line; Sandblaster - potman, Robotic Shotcrete Placer, Segment Erector, Tunnel Muck Hauler, Steel Form raiser and setter; Timberman, retimberman (wood or steel or substitute materials therefore); Tugger (for tunnel laborer work); Cable tender; Chuck tender; Powderman - primer house

GROUP 4: Vibrator operator, pavement breaker; Bull gang - muckers, trackmen; Concrete crew - includes rodding and spreading, Dumpmen (any method)

GROUP 5: Grout crew; Reboundman; Swamper/ Brakeman

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LABO0261-007 07/01/2018

MARIN AND NAPA COUNTIES

| | Rates | Fringes |
|---|---|---|
| LABORER | | |
| Mason Tender-Brick | $ 32.45 | 22.20 |

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LABO0261-010 06/25/2018

MARIN COUNTY

| | Rates | Fringes |
|---|---|---|
| LABORER (CONSTRUCTION CRAFT LABORERS - AREA A:) | | |
| Construction Specialist Group | $ 31.49 | 23.20 |
| GROUP 1 | $ 30.79 | 23.20 |
| GROUP 1-a | $ 31.01 | 23.20 |
| GROUP 1-c | $ 30.84 | 23.20 |
| GROUP 1-e | $ 31.34 | 23.20 |
| GROUP 1-f | $ 31.37 | 23.20 |
| GROUP 2 | $ 30.64 | 23.20 |
| GROUP 3 | $ 30.54 | 23.20 |
| GROUP 4 | $ 24.23 | 23.20 |
| See groups 1-b and 1-d under laborer classifications. | | |
| LABORER (GARDENERS, HORTICULTURAL & LANDSCAPE LABORERS - AREA A:) | | |
| (1) New Construction | $ 30.54 | 23.20 |
| (2) Establishment Warranty Period | $ 24.23 | 23.20 |
| LABORER (GUNITE - AREA A:) | | |
| GROUP 1 | $ 30.75 | 22.31 |
| GROUP 2 | $ 30.25 | 22.31 |
| GROUP 3 | $ 29.66 | 22.31 |
| GROUP 4 | $ 29.54 | 22.31 |
| LABORER (WRECKING - AREA A:) | | |
| GROUP 1 | $ 30.79 | 23.20 |
| GROUP 2 | $ 30.64 | 23.20 |

FOOTNOTES:

Laborers working off or with or from bos'n chairs, swinging scaffolds, belts shall receive $0.25 per hour above the applicable wage rate. This shall not apply to workers

entitled to receive the wage rate set forth in Group 1-a below.

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LABORER CLASSIFICATIONS

CONSTRUCTION SPECIALIST GROUP: Asphalt ironer and raker; Chainsaw; Laser beam in connection with laborers' work; Cast-in- place manhole form setter; Pressure pipelayer; Davis trencher - 300 or similar type (and all small trenchers); Blaster; Diamond driller; Multiple unit drill; Hydraulic drill

GROUP 1: Asphalt spreader boxes (all types); Barko, Wacker and similar type tampers; Buggymobile; Caulker, bander, pipewrapper, conduit layer, plastic pipelayer; Certified hazardous waste worker including Leade Abatement; Compactors of all types; Concrete and magnesite mixer, 1/2 yd. and under; Concrete pan work; Concrete sander; Concrete saw; Cribber and/or shoring; Cut granite curb setter; Dri-pak-it machine; Faller, logloader and bucker; Form raiser, slip forms; Green cutter; Headerboard, Hubsetter, aligner, by any method; High pressure blow pipe (1-1/2"" or over, 100 lbs. pressure/over); Hydro seeder and similar type; Jackhammer operator; Jacking of pipe over 12 inches; Jackson and similar type compactor; Kettle tender, pot and worker applying asphalt, lay-kold, creosote, lime, caustic and similar type materials (applying means applying, dipping or handling of such materials); Lagging, sheeting, whaling, bracing, trenchjacking, lagging hammer; Magnesite, epoxyresin, fiberglass, mastic worker (wet or dry); No joint pipe and stripping of same, including repair of voids; Pavement breaker and spader, including tool grinder; Perma curb; Pipelayer (including grade checking in connection with pipelaying); Precast-manhole setter; Pressure pipe tester; Post hole digger, air, gas and electric; Power broom sweeper; Power tampers of all types (except as shown in Group 2); Ram set gun and stud gun; Riprap stonepaver and rock-slinger, including placing of sacked concrete and/or sand (wet or dry) and gabions and similar type; Rotary scarifier or multiple head concrete chipping scarifier; Roto and Ditch Witch; Rototiller; Sandblaster, pot, gun, nozzle operators; Signalling and rigging; Tank cleaner; Tree climber; Turbo blaster; Vibrascreed, bull float in connection with laborers' work; Vibrator; Hazardous waste worker (lead removal); Asbestos and mold removal worker

GROUP 1-a: Joy drill model TWM-2A; Gardner-Denver model DH143 and similar type drills; Track driller; Jack leg driller; Wagon driller; Mechanical drillers, all types regardless of type or method of power; Mechanical pipe layers, all types regardless of type or method of power; Blaster and powder; All work of loading, placing and blasting of all powder and explosives of whatever type regardless of method used for such loading and placing; High scalers (including drilling of same); Tree topper; Bit grinder

GROUP 1-b: Sewer cleaners shall receive $4.00 per day above Group 1 wage rates.  ""Sewer cleaner"" means any worker who handles or comes in contact with raw sewage in small diameter sewers.  Those who work inside recently active, large diameter sewers, and all recently active sewer manholes shal receive $5.00 per day above Group 1 wage rates.

GROUP 1-c: Burning and welding in connection with laborers' work; Synthetic thermoplastics and similar type welding

GROUP 1-d: Maintenance and repair track and road beds.  All employees performing work covered herein shall receive $ .25 per hour above their regular rate for all work performed on underground structures not specifically covered herein.  This paragraph shall not be construed to apply to work below ground level in open cut.  It shall apply to cut and cover work of subway construction after the temporary cover has been placed.

GROUP 1-e: Work on and/or in bell hole footings and shafts thereof, and work on and in deep footings.  (A deep footing is a hole 15 feet or more in depth.)  In the event the depth of the footing is unknown at the commencement of excavation, and the final depth exceeds 15 feet, the deep footing wage rate would apply to all employees for each and every day worked on or in the excavation of the footing from the date of inception.

GROUP 1-f: Wire winding machine in connection with guniting or shot crete

GROUP 2: Asphalt shoveler; Cement dumper and handling dry cement or gypsum; Choke-setter and rigger (clearing work); Concrete bucket dumper and chute; Concrete chipping and grinding; Concrete laborer (wet or dry); Driller tender, chuck tender, nipper; Guinea chaser (stake), grout crew; High pressure nozzle, adductor; Hydraulic monitor (over 100 lbs. pressure); Loading and unloading, carrying and hauling of all rods and materials for use in reinforcing concrete

construction; Pittsburgh chipper and similar type brush shredders; Sloper; Single foot, hand-held, pneumatic tamper; All pneumatic, air, gas and electric tools not listed in Groups 1 through 1-f; Jacking of pipe - under 12 inches

GROUP 3: Construction laborers, including bridge and general laborer; Dump, load spotter; Flag person; Fire watcher; Fence erector; Guardrail erector; Gardener, horticultural and landscape laborer; Jetting; Limber, brush loader and piler; Pavement marker (button setter); Maintenance, repair track and road beds; Streetcar and railroad construction track laborer; Temporary air and water lines, Victaulic or similar; Tool room attendant (jobsite only)

GROUP 4: Final clean-up work of debris, grounds and building including but not limited to: street cleaner; cleaning and washing windows; brick cleaner (jobsite only); material cleaner (jobsite only). The classification ""material cleaner"" is to be utilized under the following conditions:
A: at demolition site for the salvage of the material.
B: at the conclusion of a job where the material is to be salvaged and stocked to be reused on another job.
C: for the cleaning of salvage material at the jobsite or temporary jobsite yard.

The material cleaner classification should not be used in the performance of ""form stripping, cleaning and oiling and moving to the next point of erection"".

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GUNITE LABORER CLASSIFICATIONS

GROUP 1: Structural Nozzleman

GROUP 2: Nozzleman, Gunman, Potman, Groundman

GROUP 3: Reboundman

GROUP 4: Gunite laborer

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WRECKING WORK LABORER CLASSIFICATIONS

GROUP 1: Skilled wrecker (removing and salvaging of sash, windows and materials)

GROUP 2: Semi-skilled wrecker (salvaging of other building

materials)

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LABO0261-015 07/01/2021

| | Rates | Fringes |
|---|---|---|
| Plasterer tender | $ 35.82 | 28.45 |

Work on a swing stage scaffold: $1.00 per hour additional.

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LABO0324-004 06/28/2021

NAPA, SOLANO, AND SONOMA, COUNTIES

| | Rates | Fringes |
|---|---|---|
| LABORER (TRAFFIC CONTROL/LANE CLOSURE) | | |
| Escort Driver, Flag Person | $ 33.48 | 26.21 |
| Traffic Control Person I | $ 33.78 | 26.21 |
| Traffic Control Person II | $ 31.28 | 26.21 |

TRAFFIC CONTROL PERSON I: Layout of traffic control, crash cushions, construction area and roadside signage.

TRAFFIC CONTROL PERSON II: Installation and removal of temporary/permanent signs, markers, delineators and crash cushions.

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LABO0324-008 06/25/2018

NAPA, SOLANO, AND SONOMA COUNTIES

| | Rates | Fringes |
|---|---|---|
| Tunnel and Shaft Laborers: | | |
| GROUP 1 | $ 37.82 | 24.11 |
| GROUP 2 | $ 37.59 | 24.11 |
| GROUP 3 | $ 37.34 | 24.11 |
| GROUP 4 | $ 36.89 | 24.11 |
| GROUP 5 | $ 36.35 | 24.11 |
| Shotcrete Specialist | $ 38.34 | 24.11 |

TUNNEL AND SHAFT CLASSIFICATIONS

GROUP 1: Diamond driller; Groundmen; Gunite and shotcrete nozzlemen

GROUP 2: Rodmen; Shaft work & raise (below actual or excavated ground level)

GROUP 3: Bit grinder; Blaster, driller, powdermen, heading; Cherry pickermen - where car is lifted; Concrete finisher in tunnel; Concrete screedman; Grout pumpman and potman; Gunite & shotcrete gunman & potman; Headermen; High pressure nozzleman; Miner - tunnel, including top and bottom man on shaft and raise work; Nipper; Nozzleman on slick line; Sandblaster - potman, Robotic Shotcrete Placer, Segment Erector, Tunnel Muck Hauler, Steel Form raiser and setter; Timberman, retimberman (wood or steel or substitute materials therefore); Tugger (for tunnel laborer work); Cable tender; Chuck tender; Powderman - primer house

GROUP 4: Vibrator operator, pavement breaker; Bull gang - muckers, trackmen; Concrete crew - includes rodding and spreading, Dumpmen (any method)

GROUP 5: Grout crew; Reboundman; Swamper/ Brakeman

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LABO0324-010 07/01/2018

SOLANO AND SONOMA COUNTIES

| | Rates | Fringes |
|---|---|---|
| LABORER | | |
| Mason Tender-Brick | $ 31.45 | 22.20 |

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LABO0324-013 06/25/2018

NAPA, SOLANO, AND SONOMA COUNTIES

| | Rates | Fringes |
|---|---|---|
| LABORER (CONSTRUCTION CRAFT LABORERS - AREA B:) | | |
| Construction Specialist Group | $ 30.49 | 23.20 |
| GROUP 1 | $ 29.79 | 23.20 |
| GROUP 1-a | $ 30.01 | 23.20 |
| GROUP 1-c | $ 29.84 | 23.20 |
| GROUP 1-e | $ 30.34 | 23.20 |
| GROUP 1-f | $ 29.37 | 23.20 |
| GROUP 2 | $ 29.64 | 23.20 |
| GROUP 3 | $ 29.54 | 23.20 |
| GROUP 4 | $ 23.23 | 23.20 |

See groups 1-b and 1-d under laborer classifications.

| | | |
|---|---|---|
| LABORER (GARDENERS, HORTICULTURAL & LANDSCAPE LABORERS - AREA B:) | | |
| (1) New Construction | $ 29.54 | 23.20 |
| (2) Establishment Warranty Period | $ 23.23 | 23.20 |
| LABORER (GUNITE - AREA B:) | | |
| GROUP 1 | $ 29.75 | 22.31 |
| GROUP 2 | $ 29.25 | 22.31 |
| GROUP 3 | $ 28.66 | 22.31 |
| GROUP 4 | $ 28.54 | 22.31 |
| LABORER (WRECKING - AREA B:) | | |
| GROUP 1 | $ 29.79 | 23.20 |
| GROUP 2 | $ 29.64 | 23.20 |

FOOTNOTES:
Laborers working off or with or from bos'n chairs, swinging scaffolds, belts shall receive $0.25 per hour above the applicable wage rate. This shall not apply to workers entitled to receive the wage rate set forth in Group 1-a below.

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LABORER CLASSIFICATIONS

CONSTRUCTION SPECIALIST GROUP: Asphalt ironer and raker; Chainsaw; Laser beam in connection with laborers' work; Cast-in- place manhole form setter; Pressure pipelayer; Davis trencher - 300 or similar type (and all small trenchers); Blaster; Diamond driller; Multiple unit drill; Hydraulic drill

GROUP 1: Asphalt spreader boxes (all types); Barko, Wacker and similar type tampers; Buggymobile; Caulker, bander, pipewrapper, conduit layer, plastic pipelayer; Certified hazardous waste worker including Leade Abatement; Compactors of all types; Concrete and magnesite mixer, 1/2 yd. and under; Concrete pan work; Concrete sander; Concrete saw; Cribber and/or shoring; Cut granite curb setter; Dri-pak-it machine; Faller, logloader and bucker; Form raiser, slip forms; Green cutter; Headerboard, Hubsetter, aligner, by any method; High pressure blow pipe (1-1/2"" or over, 100 lbs. pressure/over); Hydro seeder and similar type; Jackhammer operator; Jacking of pipe over 12 inches; Jackson and similar type compactor; Kettle tender, pot and worker applying asphalt, lay-kold, creosote, lime, caustic and similar type materials (applying means applying, dipping or handling of such materials); Lagging, sheeting,

whaling, bracing, trenchjacking, lagging hammer; Magnesite, epoxyresin, fiberglass, mastic worker (wet or dry); No joint pipe and stripping of same, including repair of voids; Pavement breaker and spader, including tool grinder; Perma curb; Pipelayer (including grade checking in connection with pipelaying); Precast-manhole setter; Pressure pipe tester; Post hole digger, air, gas and electric; Power broom sweeper; Power tampers of all types (except as shown in Group 2); Ram set gun and stud gun; Riprap stonepaver and rock-slinger, including placing of sacked concrete and/or sand (wet or dry) and gabions and similar type; Rotary scarifier or multiple head concrete chipping scarifier; Roto and Ditch Witch; Rototiller; Sandblaster, pot, gun, nozzle operators; Signalling and rigging; Tank cleaner; Tree climber; Turbo blaster; Vibrascreed, bull float in connection with laborers' work; Vibrator; Hazardous waste worker (lead removal); Asbestos and mold removal worker

GROUP 1-a: Joy drill model TWM-2A; Gardner-Denver model DH143 and similar type drills; Track driller; Jack leg driller; Wagon driller; Mechanical drillers, all types regardless of type or method of power; Mechanical pipe layers, all types regardless of type or method of power; Blaster and powder; All work of loading, placing and blasting of all powder and explosives of whatever type regardless of method used for such loading and placing; High scalers (including drilling of same); Tree topper; Bit grinder

GROUP 1-b: Sewer cleaners shall receive $4.00 per day above Group 1 wage rates.  ""Sewer cleaner"" means any worker who handles or comes in contact with raw sewage in small diameter sewers.  Those who work inside recently active, large diameter sewers, and all recently active sewer manholes shal receive $5.00 per day above Group 1 wage rates.

GROUP 1-c: Burning and welding in connection with laborers' work; Synthetic thermoplastics and similar type welding

GROUP 1-d: Maintenance and repair track and road beds.  All employees performing work covered herein shall receive $ .25 per hour above their regular rate for all work performed on underground structures not specifically covered herein.  This paragraph shall not be construed to apply to work below ground level in open cut.  It shall apply to cut and cover work of subway construction after the temporary cover has been placed.

GROUP 1-e: Work on and/or in bell hole footings and shafts

thereof, and work on and in deep footings. (A deep footing is a hole 15 feet or more in depth.) In the event the depth of the footing is unknown at the commencement of excavation, and the final depth exceeds 15 feet, the deep footing wage rate would apply to all employees for each and every day worked on or in the excavation of the footing from the date of inception.

GROUP 1-f: Wire winding machine in connection with guniting or shot crete

GROUP 2: Asphalt shoveler; Cement dumper and handling dry cement or gypsum; Choke-setter and rigger (clearing work); Concrete bucket dumper and chute; Concrete chipping and grinding; Concrete laborer (wet or dry); Driller tender, chuck tender, nipper; Guinea chaser (stake), grout crew; High pressure nozzle, adductor; Hydraulic monitor (over 100 lbs. pressure); Loading and unloading, carrying and hauling of all rods and materials for use in reinforcing concrete construction; Pittsburgh chipper and similar type brush shredders; Sloper; Single foot, hand-held, pneumatic tamper; All pneumatic, air, gas and electric tools not listed in Groups 1 through 1-f; Jacking of pipe - under 12 inches

GROUP 3: Construction laborers, including bridge and general laborer; Dump, load spotter; Flag person; Fire watcher; Fence erector; Guardrail erector; Gardener, horticultural and landscape laborer; Jetting; Limber, brush loader and piler; Pavement marker (button setter); Maintenance, repair track and road beds; Streetcar and railroad construction track laborer; Temporary air and water lines, Victaulic or similar; Tool room attendant (jobsite only)

GROUP 4: Final clean-up work of debris, grounds and building including but not limited to: street cleaner; cleaning and washing windows; brick cleaner (jobsite only); material cleaner (jobsite only). The classification ""material cleaner"" is to be utilized under the following conditions:
A: at demolition site for the salvage of the material.
B: at the conclusion of a job where the material is to be salvaged and stocked to be reused on another job.
C: for the cleaning of salvage material at the jobsite or temporary jobsite yard.

The material cleaner classification should not be used in the performance of ""form stripping, cleaning and oiling and moving to the next point of erection"".

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GUNITE LABORER CLASSIFICATIONS

GROUP 1: Structural Nozzleman

GROUP 2: Nozzleman, Gunman, Potman, Groundman

GROUP 3: Reboundman

GROUP 4: Gunite laborer

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WRECKING WORK LABORER CLASSIFICATIONS

GROUP 1: Skilled wrecker (removing and salvaging of sash, windows and materials)

GROUP 2: Semi-skilled wrecker (salvaging of other building materials)

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LABO0324-019 07/01/2021

| | Rates | Fringes |
|---|---|---|
| Plasterer tender | $ 35.82 | 28.45 |

Work on a swing stage scaffold: $1.00 per hour additional.

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PAIN0016-004 01/01/2021

MARIN, NAPA, SOLANO & SONOMA COUNTIES

| | Rates | Fringes |
|---|---|---|
| Painters: | $ 45.22 | 25.48 |

PREMIUMS:
EXOTIC MATERIALS - $1.25 additional per hour.
SPRAY WORK: - $0.50 additional per hour.
INDUSTRIAL PAINTING - $0.25 additional per hour
[Work on industrial buildings used for the manufacture and processing of goods for sale or service; steel construction (bridges), stacks, towers, tanks, and similar structures]

HIGH WORK:
over 50 feet - $2.00 per hour additional
100 to 180 feet - $4.00 per hour additional
Over 180 feet - $6.00 per houir additional

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PAIN0016-005 07/01/2021

ALPINE, BUTTE, COLUSA, EL DORADO (west of the Sierra Nevada Mountains), GLENN, LASSEN (west of Hwy. 395, excluding Honey Lake); MARIN, MODOC, NAPA, NEVADA (west of the Sierra Nevada Mountains), PLACER (west of the Sierra Nevada Mountains), PLUMAS, SACRAMENTO, SHASTA, SIERRA (west of the Sierra Nevada Mountains), SISKIYOU, SOLANO, SONOMA, SUTTER, TEHAMA, TRINITY, YOLO AND YUBA COUNTIES

| | Rates | Fringes |
|---|---|---|
| DRYWALL FINISHER/TAPER | $ 50.78 | 28.09 |

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PAIN0016-007 01/01/2021

ALPINE, AMADOR, BUTTE, COLUSA. EL DORADO (west of the Sierra Nevada Mountains), GLENN, LASSEN (west of Highway 395, excluding Honey Lake), MODOC, NEVADA (west of the Sierra Nevada Mountains), PLACER (west of the Sierra Nevada Mountains), PLUMAS, SACRAMENTO, SHASTA, SIERRA (west of the Sierra Nevada Mountains), SISKIYOU, SUTTER, TEHAMA, TRINITY, YOLO & YUBA COUNTIES

| | Rates | Fringes |
|---|---|---|
| Painters: | $ 35.88 | 21.16 |

SPRAY/SANDBLAST: $0.50 additional per hour.
EXOTIC MATERIALS: $1.25 additional per hour.
HIGH TIME: Over 50 ft above ground or water level $2.00 additional per hour. 100 to 180 ft above ground or water level $4.00 additional per hour. Over 180 ft above ground or water level $6.00 additional per hour.

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PAIN0016-008 01/01/2019

MARIN, NAPA, SOLANO AND SONOMA COUNTIES

| | Rates | Fringes |
|---|---|---|
| SOFT FLOOR LAYER | $ 48.60 | 27.43 |

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PAIN0169-004 01/01/2021

MARIN , NAPA & SONOMA COUNTIES; SOLANO COUNTY (west of a line defined as follows: Hwy. 80 corridor beginning at the City of Fairfield, including Travis Air Force Base and Suisun City; going north of Manakas Corner Rd., continue north on Suisun Valley Rd. to the Napa County line; Hwy. 80 corridor south on Grizzly Island Rd. to the Grizzly Island Management area)

| | Rates | Fringes |
|---|---|---|
| GLAZIER | $ 53.07 | 31.15 |

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* PAIN0567-001 07/01/2021

EL DORADO COUNTY (east of the Sierra Nevada Mountains); LASSEN COUNTY (east of Highway 395, beginning at Stacey and including Honey Lake); NEVADA COUNTY (east of the Sierra Nevada Mountains); PLACER COUNTY (east of the Sierra Nevada Mountains); AND SIERRA COUNTY (east of the Sierra Nevada Mountains)

| | Rates | Fringes |
|---|---|---|
| Painters: | | |
| Brush and Roller | $ 31.80 | 13.54 |
| Spray Painter & Paperhanger | $ 33.39 | 13.54 |

PREMIUMS:
Special Coatings (Brush), and Sandblasting = $0.50/hr
Special Coatings (Spray), and Steeplejack = $1.00/hr
Special Coating Spray Steel = $1.25/hr
Swing Stage = $2.00/hr

*A special coating is a coating that requires the mixing of 2 or more products.

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PAIN0567-007 07/01/2020

EL DORADO COUNTY (east of the Sierra Nevada Mountains); LASSEN COUNTY (east of Highway 395, beginning at Stacey and including Honey Lake); NEVADA COUNTY (east of the Sierra Nevada Mountains); PLACER COUNTY (east of the Sierra Nevada Mountains) AND SIERRA COUNTY (east of the Sierra Nevada Mountains)

| | Rates | Fringes |
|---|---|---|
| SOFT FLOOR LAYER | $ 31.01 | 15.48 |

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PAIN0567-010 07/01/2020

EL DORADO COUNTY (east of the Sierra Nevada Mountains); LASSEN COUNTY (east of Highway 395, beginning at Stacey and including Honey Lake); NEVADA COUNTY (east of the Sierra Nevada Mountains); PLACER COUNTY (east of the Sierra Nevada Mountains); AND SIERRA COUNTY (east of the Sierra Nevada Mountains)

| | Rates | Fringes |
|---|---|---|
| Drywall | | |
| (1) Taper | $ 35.20 | 14.02 |
| (2) Steeplejack - Taper, over 40 ft with open space below | $ 36.70 | 14.02 |

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PAIN0767-004 01/01/2021

ALPINE, AMADOR, BUTTE, COLUSA, EL DORADO, GLENN, LASSEN, MODOC, NEVADA, PLACER, PLUMAS, SACRAMENTO, SHASTA, SIERRA, SISKIYOU, SOLANO (Remainder), SUTTER, TEHAMA, TRINITY, YOLO, YUBA

| | Rates | Fringes |
|---|---|---|
| GLAZIER | $ 41.51 | 31.36 |

PAID HOLIDAYS: New Year's Day, Martin Luther King, Jr. Day, President's Day, Memorial Day, Independence Day, Labor Day, Veteran's Day, Thanksgiving Day, and Christmas Day.

Employee rquired to wear a body harness shall receive $1.50 per hour above the basic hourly rate at any elevation.

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PAIN1176-001 07/01/2020

HIGHWAY IMPR0VEMENT

| | Rates | Fringes |
|---|---|---|
| Parking Lot Striping/Highway Marking: | | |
| GROUP 1 | $ 38.48 | 16.88 |
| GROUP 2 | $ 32.71 | 16.88 |
| GROUP 3 | $ 33.09 | 16.88 |

CLASSIFICATIONS

GROUP 1: Striper: Layout and application of painted traffic stripes and marking; hot thermo plastic; tape, traffic stripes and markings

GROUP 2: Gamecourt & Playground Installer

GROUP 3: Protective Coating, Pavement Sealing

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PAIN1237-001 01/01/2021

ALPINE; COLUSA; EL DORADO (west of the Sierra Nevada Mountains); GLENN; LASSEN (west of Highway 395, beginning at Stacey and including Honey Lake); MODOC; NEVADA (west of the Sierra Nevada Mountains); PLACER (west of the Sierra Nevada Mountains); PLUMAS; SACRAMENTO; SHASTA; SIERRA (west of the Sierra Nevada Mountains); SISKIYOU; SUTTER; TEHAMA; TRINITY; YOLO AND YUBA COUNTIES

| | Rates | Fringes |
|---|---|---|
| SOFT FLOOR LAYER | $ 41.81 | 23.39 |

---

PLAS0300-003 07/01/2018

| | Rates | Fringes |
|---|---|---|
| PLASTERER | | |
| AREA 295: Alpine, Amador, Butte, Colusa, El Dorado, Glenn, Lassen, Modoc, Nevada, Placer, Plumas, Sacramento, Shasta, Sierra, Siskiyou, Solano, Sutter, Tehema, Trinity, Yolo & Yuba Counties | $ 32.70 | 31.68 |
| AREA 355: Marin | $ 36.73 | 31.68 |
| AREA 355: Napa & Sonoma Counties | $ 32.70 | 31.68 |

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PLAS0300-005 07/01/2016

| | Rates | Fringes |
|---|---|---|
| CEMENT MASON/CONCRETE FINISHER | $ 32.15 | 23.27 |

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PLUM0038-002 07/01/2021

MARIN AND SONOMA COUNTIES

| | Rates | Fringes |
|---|---|---|
| PLUMBER (Plumber, Steamfitter, Refrigeration Fitter) | | |
| (1) Work on wooden frame structures 5 stories or less excluding high-rise buildings and commercial work such as hospitals, prisons, hotels, schools, casinos, wastewater treatment plants, and resarch facilities as well as refrigeration pipefitting, service and repair work - MARKET RECOVERY RATE | $ 67.15 | 44.21 |
| (2) All other work - NEW CONSTRUCTION RATE | $ 79.00 | 46.01 |

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PLUM0038-006 07/01/2021

MARIN & SONOMA COUNTIES

| | Rates | Fringes |
|---|---|---|
| Landscape/Irrigation Fitter (Underground/Utility Fitter) | $ 67.15 | 32.67 |

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* PLUM0228-001 01/01/2022

BUTTE, COLUSA, GLENN, LASSEN, MODOC, PLUMAS, SHASTA, SIERRA, SISKIYOU, SUTTER, TEHAMA, TRINITY & YUBA COUNTIES

| | Rates | Fringes |
|---|---|---|
| PLUMBER | $ 43.00 | 36.44 |

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PLUM0343-001 07/01/2021

NAPA AND SOLANO COUNTIES

| | Rates | Fringes |
|---|---|---|
| PLUMBER/PIPEFITTER | | |

| | | |
|---|---|---|
| Light Commercial | $ 30.85 | 20.40 |
| All Other Work | $ 56.00 | 39.61 |

DEFINITION OF LIGHT COMMERICIAL:
Work shall include strip shopping centers, office buildings, schools and other commercial structures which the total plumbing bid does not exceed Two Hundred and Fifty Thousand ($250,000) and the total heating and cooling does not exceed Two Hundred Fifty Thousand ($250,000); or Any projects bid in phases shall not qualify unless the total project is less than Two Hundred Fifty Thousand ($250,000) for the plumbing bid; and Two Hundred Fifty Thousand ($250,000) for the heating and cooling bid. Excluded are hospitals, jails, institutions and industrial projects, regardless size of the project

FOOTNOTES: While fitting galvanized material: $.75 per hour additional. Work from trusses, temporary staging, unguarded structures 35' from the ground or water: $.75 per hour additional. Work from swinging scaffolds, boatswains chairs or similar devices: $.75 per hour additional.

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PLUM0350-001 08/01/2021

EL DORADO COUNTY (Lake Tahoe area only); NEVADA COUNTY (Lake Tahoe area only); AND PLACER COUNTY (Lake Tahoe area only)

| | Rates | Fringes |
|---|---|---|
| PLUMBER/PIPEFITTER | $ 47.54 | 17.11 |

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PLUM0355-001 07/01/2021

ALPINE, AMADOR, BUTTE, COLUSA, EL DORADO, GLENN, LASSEN, MODOC, NAPA, NEVADA, PLACER, PLUMAS, SACRAMENTO, SHASTA, SIERRA, SISKIYOU, SOLANO, SUTTER, TEHAMA, TRINITY, YOLO, AND YUBA COUNTIES

| | Rates | Fringes |
|---|---|---|
| Underground Utility Worker /Landscape Fitter | $ 30.90 | 16.80 |

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* PLUM0442-003 01/01/2022

AMADOR (South of San Joaquin River) and ALPINE COUNTIES

| | Rates | Fringes |
|---|---|---|
| PLUMBER | $ 48.75 | 33.94 |

PLUM0447-001 07/01/2021

AMADOR (north of San Joaquin River), EL DORADO (excluding Lake Tahoe area), NEVADA (excluding Lake Tahoe area); PLACER (excluding Lake Tahoe area), SACRAMENTO AND YOLO COUNTIES

| | Rates | Fringes |
|---|---|---|
| PLUMBER/PIPEFITTER | | |
| Journeyman | $ 56.37 | 26.75 |
| Light Commercial Work | $ 36.23 | 17.72 |

ROOF0081-006 08/01/2021

MARIN, NAPA, SOLANO AND SONOMA COUNTIES

| | Rates | Fringes |
|---|---|---|
| Roofer | $ 47.17 | 19.86 |

ROOF0081-007 08/01/2021

ALPINE, BUTTE, COLUSA, EL DORADO, GLENN,LASSEN, MODOC, NEVADA, PLACER, PLUMAS, SACRAMENTO, SHASTA, SIERRA, SISKIYOU, SUTTER, TEHAMA, TRINITY, YOLO, AND YUBA COUNTIES

| | Rates | Fringes |
|---|---|---|
| Roofer | $ 41.23 | 19.61 |

SFCA0483-003 01/01/2022

MARIN, NAPA, SOLANO AND SONOMA COUNTIES

| | Rates | Fringes |
|---|---|---|
| SPRINKLER FITTER (Fire Sprinklers) | $ 70.55 | 35.39 |

SFCA0669-003 04/01/2021

ALPINE, BUTTE, COLUSA, EL DORADO, GLENN, LASSEN, MODOC, NEVADA, PLACER, PLUMAS, SACRAMENTO, SHASTA, SIERRA, SISKIYOU, SUTTER, TEHAMA, TRINITY, YOLO AND YUBA COUNTIES

| | Rates | Fringes |
|---|---|---|
| SPRINKLER FITTER | $ 42.34 | 26.29 |

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SHEE0104-006 06/29/2020

MARIN, NAPA, SOLANO  SONOMA & TRINITY COUNTIES

| | Rates | Fringes |
|---|---|---|
| Sheet Metal Worker | | |
| Mechanical Contracts | | |
| $200,000 or less | $ 55.92 | 45.29 |
| All other work | $ 64.06 | 46.83 |

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SHEE0104-009 07/01/2021

AMADOR, COLUSA, EL DORADO, NEVADA, PLACER, SACRAMENTO, SUTTER, YOLO AND YUBA COUNTIES

| | Rates | Fringes |
|---|---|---|
| SHEET METAL WORKER | $ 47.85 | 41.90 |

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SHEE0104-010 07/01/2020

AlPINE COUNTY

| | Rates | Fringes |
|---|---|---|
| SHEET METAL WORKER | $ 43.50 | 37.42 |

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SHEE0104-011 07/01/2020

BUTTE, COLUSA, EL DORADO, GLENN, LASSEN, MODOC, NEVADA, PLACER, PLUMAS, SACRAMENTO, SHASTA, SIERRA, SISKIYOU, SUTTER, TEHAMA, YOLO AND YUBA COUNTIES

| | Rates | Fringes |
|---|---|---|
| Sheet Metal Worker (Metal decking and siding only) | $ 44.45 | 35.55 |

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SHEE0104-014 07/01/2020

MARIN, NAPA, SOLANO, SONOMA AND TRINITY COUNTIES

| | Rates | Fringes |
|---|---|---|
| SHEET METAL WORKER (Metal Decking and Siding only) | $ 44.45 | 35.55 |

SHEE0104-019 07/01/2020

BUTTE, GLENN, LASSEN, MODOC, PLUMAS, SHASTA, SIERRA, SISKIYOU AND TEHAMA COUNTIES

| | Rates | Fringes |
|---|---|---|
| SHEET METAL WORKER | | |
| Mechanical Jobs $200,000 & under | $ 35.16 | 35.88 |
| Mechanical Jobs over $200,000 | $ 46.60 | 40.21 |

TEAM0094-001 07/01/2021

| | Rates | Fringes |
|---|---|---|
| Truck drivers: | | |
| GROUP 1 | $ 35.15 | 31.42 |
| GROUP 2 | $ 35.45 | 31.42 |
| GROUP 3 | $ 35.75 | 31.42 |
| GROUP 4 | $ 36.10 | 31.42 |
| GROUP 5 | $ 36.45 | 31.42 |

FOOTNOTES:

Articulated dump truck; Bulk cement spreader (with or without auger); Dumpcrete truck; Skid truck (debris box); Dry pre-batch concrete mix trucks; Dumpster or similar type; Slurry truck: Use dump truck yardage rate.
Heater planer; Asphalt burner; Scarifier burner; Industrial lift truck (mechanical tailgate); Utility and clean-up truck: Use appropriate rate for the power unit or the equipment utilized.

TRUCK DRIVER CLASSIFICATIONS

GROUP 1: Dump trucks, under 6 yds.; Single unit flat rack (2-axle unit); Nipper truck (when flat rack truck is used appropriate flat rack shall apply); Concrete pump truck (when flat rack truck is used appropriate flat rack shall apply); Concrete pump machine; Fork lift and lift jitneys; Fuel and/or grease truck driver or fuel person; Snow buggy;

Steam cleaning; Bus or personhaul driver; Escort or pilot car driver; Pickup truck; Teamster oiler/greaser and/or serviceperson; Hook tender (including loading and unloading); Team driver; Tool room attendant (refineries)

GROUP 2: Dump trucks, 6 yds. and under 8 yds.; Transit mixers, through 10 yds.; Water trucks, under 7,000 gals.; Jetting trucks, under 7,000 gals.; Single-unit flat rack (3-axle unit); Highbed heavy duty transport; Scissor truck; Rubber-tired muck car (not self-loaded); Rubber-tired truck jumbo; Winch truck and ""A"" frame drivers; Combination winch truck with hoist; Road oil truck or bootperson; Buggymobile; Ross, Hyster and similar straddle carriers; Small rubber-tired tractor

GROUP 3: Dump trucks, 8 yds. and including 24 yds.; Transit mixers, over 10 yds.; Water trucks, 7,000 gals. and over; Jetting trucks, 7,000 gals. and over; Vacuum trucks under 7500 gals. Trucks towing tilt bed or flat bed pull trailers; Lowbed heavy duty transport; Heavy duty transport tiller person; Self- propelled street sweeper with self-contained refuse bin; Boom truck - hydro-lift or Swedish type extension or retracting crane; P.B. or similar type self-loading truck; Tire repairperson; Combination bootperson and road oiler; Dry distribution truck (A bootperson when employed on such equipment, shall receive the rate specified for the classification of road oil trucks or bootperson); Ammonia nitrate distributor, driver and mixer; Snow Go and/or plow

GROUP 4: Dump trucks, over 25 yds. and under 65 yds.; Water pulls - DW 10's, 20's, 21's and other similar equipment when pulling Aqua/pak or water tank trailers; Helicopter pilots (when transporting men and materials); Lowbedk Heavy Duty Transport up to including 7 axles; DW10's, 20's, 21's and other similar Cat type, Terra Cobra, LeTourneau Pulls, Tournorocker, Euclid and similar type equipment when pulling fuel and/or grease tank trailers or other miscellaneous trailers; Vacuum Trucks 7500 gals and over and truck repairman

GROUP 5: Dump trucks, 65 yds. and over; Holland hauler; Low bed Heavy Duty Transport over 7 axles

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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 www.dol.gov/whd/govcontracts.

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)).

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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.

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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

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Division National Office Branch of Wage Surveys. 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 DECISION"

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# TECHINCAL SPECIFICATIONS

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James Mills

Digitally signed by James Mills
DN: CN=James Mills, dnQualifier=A01410D000009E72B1FE500001FB8, O=Colorado, C=US
Date: 2022.02.22 12:05:53-07'00'

FOR CIVIL ONLY

February 24, 2022

FOR ELECTRICAL ONLY

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## Item C-100 Contractor Quality Control Program (CQCP)

**100-1 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.

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

**e.** Establishment of the overall QC culture.

**100-2 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, surface course paving and concrete paving. Some elements that must be addressed include, but is not limited to mix design, aggregate grading, stockpile management, mixing and transporting, placing and finishing, quality control testing and inspection, smoothness, paving 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.

**100-3 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 100-3a and 100-0b. 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 on-site 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.

**100-4 Project Progress Schedule.** Critical QC activities must be shown on the project schedule as required by Section 80, paragraph 80-03, *Execution and Progress*.

**100-5 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

**100-6 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:

**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.

**100-7 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

**100-8 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)

**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.

**100-9 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.

**(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.

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.** Contractor 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%.

## BASIS OF PAYMENT

**100-14 Payment will be made under:**

Item C-100-14.1 Contractor Quality Control Program (CQCP) – per 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

# 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 (including dust) and water, soil erosion, and siltation through the use of silt fences, berms, dikes, dams, sediment basins, fiber mats, gravel, mulches, grasses, slope drains, tracking pads 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.

**102-2.7 Tracking Pads.** Filter fabric and aggregates utilized for a stabilized tracking pad construction exit which is expected to perform by eliminating sediment and debris from migrating on to existing roadways surfaces.

## 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.

**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.

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** Temporary erosion and pollution control work (including dust control) required will be performed as scheduled or directed by the RPR, including erosion control work performed for protection of construction areas outside the construction limits, such as borrow and waste areas, haul roads, equipment and material storage sites, and temporary plant sites. Temporary erosion and pollution control work will be paid as a lump sum. The Contractor shall submit unit prices, anticipated quantities, and costs of necessary permits for temporary erosion and pollution control items to the RPR.

## BASIS OF PAYMENT

**102-5.1** Temporary erosion and pollution control work will be paid for under:

Item C-102-5.1 Erosion Control - per 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.

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)

FAA/USDA Wildlife Hazard Management at Airports, A Manual for Airport Personnel

## END OF ITEM C-102

## Item C-105 Mobilization and Traffic Control

**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, 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" and "Traffic Control" 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-105-6.1 | Mobilization – per 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.

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**

## Item C-110 Method of Estimating Percentage of Material Within Specification Limits (PWL)

**110-1 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.

**110-2 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:

$$\mathbf{X = (x_1 + x_2 + x_3 + \ldots x_n) / n}$$

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:

$$\mathbf{S_n = [(d_1^2 + d_2^2 + d_3^2 + \ldots d_n^2)/(n-1)]^{1/2}}$$

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:

$$\mathbf{Q_L = (X - L) / S_n}$$

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:

$$\mathbf{Q_L = (X - L) / S_n}$$
**and**
$$\mathbf{Q_U = (U - X) / S_n}$$

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:

$$\mathbf{PWL = (P_U + P_L) - 100}$$

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.

$X = (x_1 + x_2 + x_3 + \ldots x_n) / n$
$X = (96.60 + 97.55 + 99.30 + 98.35) / 4$
X = 97.95% density

**3.** Calculate the standard deviation for the lot.

$S_n = \mathbf{[}((96.60 - 97.95)^2 + (97.55 - 97.95)^2 + (99.30 - 97.95)^2 + (98.35 - 97.95)^2)) / (4 - 1)\mathbf{]}^{1/2}$

$S_n = [(1.82 + 0.16 + 1.82 + 0.16) / 3]^{1/2}$

$S_n = 1.15$

**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.

$P_U = 93$

**8.** Calculate Air Voids PWL

$PWL = (P_L + P_U) - 100$

$PWL = (97 + 93) - 100 = 90$

**EXAMPLE OF OUTLIER CALCULATION (REFERENCE ASTM E178)**

**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 × 1.15) = 99.63%

OR

less than (97.95 - 1.463 × 1.15) = 96.27%.

**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 |

| 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 |
| 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 |

## 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 E178 Standard Practice for Dealing with Outlying Observations

**END OF ITEM C-110**

# Item P-101 Preparation/Removal of Existing Pavements

## DESCRIPTION

**101-1** 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** 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.** Full depth saw cuts shall be made perpendicular to the slab surface. The Contractor shall saw through the full depth of the slab including any dowels at the joint, removing the pavement and installing new dowels as shown on the plans and per the specifications. Where the perimeter of the removal limits is not located on the joint and there are no dowels present, the perimeter shall be saw cut the full depth of the pavement. The pavement inside the saw cut shall be removed by methods which will not cause distress in the pavement which is to remain in place. Concrete slabs that are damaged by under breaking shall be repaired or removed and replaced as directed by the RPR.

The edge of existing concrete pavement against which new pavement abuts shall be protected from damage at all times. Spall and underbreak repair shall be in accordance with the plans. Any underlaying material that is to remain in place, shall be recompacted and/or replaced as shown on the plans. Adjacent areas damaged during repair shall be repaired or replaced at the Contractor's expense.

**(1) Off-Site Disposal**. If the material is to be disposed off-site, removed pavement shall be legally disposed of off-site in a timely fashion

**(2) Crushing.** If the material is to be processed on the airport site, it shall be reduced to a maximum size of 2 inches. Removed materials shall be crushed and stockpiled at the locations shown on the plans and as approved by the Airport. Direct surface water away from stockpile site so as to prevent erosion or deterioration of materials. Stockpile materials with stacking conveyors so as to minimize the footprint of each stockpile.

Ensure that all concrete reinforcing, dowel bars, joint sealant, fiber board, and electrical equipment of any nature are segregated from all stockpiles for disposal. All reinforcing metal, or any nature removed from the concrete rubble during crushing operations shall be separated from finished materials for later disposal or recycling by the contractor.

At the completion of crushing and screening operations, grade site surface to prevent freestanding surface water. Remove all steel reinforcing from the site and dispose of it at either a steel recycling facility or at a state permitted landfill. Remove, and dispose offsite of any excess minus 200 sieve material which may have been generated by the crushing and screening work. Remove any materials used for environmental protection, except that silt fences down grade from stockpiles shall be left in place.

Crushed concrete will be tested by an independent testing agency following the first 1,000 tons of material produced. A sieve analysis shall be performed by the Contractor's Independent Testing Agency, and results forwarded to the RPR for approval. Following initial approval, additional sieve analyses shall be performed for each additional 5,000 tons of material produced. Reports of each test shall be forwarded to the RPR.

**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. Asphalt pavement shall be wasted off the airport site.

**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 (25 mm). 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 (6 mm) 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 (3 mm), not to exceed ¼ inch (6 mm). Any excess joint or crack sealer shall be removed from the pavement surface.

Wider cracks (over 1-1/2 inch wide (38 mm)), 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.

**Gradation**

| 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 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 (+0 to -3 mm) 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.** Not used.

**101-3.4 Concrete Spall Repair.**

**a. Repair of Concrete Spalls.** The Contractor shall repair all spalled concrete as shown on the plans or as directed by the RPR. The perimeter of the repair shall be saw cut a minimum of 2 inches (50 mm) outside the affected area and 2 inches (50 mm) deep and per Item P-501. The deteriorated material shall be removed to a depth where the existing material is firm or cannot be easily removed with a geologist pick. The removed area shall be filled per Item P-501.

**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.

**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 (30 cm) 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 (2 m) 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 (+0 mm and -6 mm) 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 off 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 of off Airport property.

**101-3.6. Preparation of Asphalt Pavement Surfaces Prior to Surface Treatment.** Not used.

**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.** 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 joint and does not damage the joint.

**101-3.8.1 Removal of Existing Joint Sealant**. All existing joint sealants will be removed by plowing or use of hand tools. Any remaining sealant and or debris will be removed by use of wire brushes or other

tools as necessary. Resaw joints removing no more than 1/16 inch (2 mm) from each joint face. Immediately after sawing, flush out joint with water and other tools as necessary to completely remove the slurry.

**101-3.8.2 Cleaning Prior to Sealing**. Immediately before sealing, joints shall be cleaned by removing any remaining laitance and other foreign material. Allow sufficient time to dry out joints prior to sealing. Joint surfaces will be surface-dry prior to installation of sealant.

**101-3.8.3 Joint Sealant.** Joint material and installation will be in accordance with Item P-605.

**101-3.9 Preparation of Cracks 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 (2 mm) 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 & Slab Repair.**

**a. Crack Sealant.** Crack sealant material and installation will be in accordance with Item P-605.

**b. Slab Repair.** Slab repair material and installation shall be in accordance with Item P-501, paragraph 501-4.19.a for shrinkage crack repairs.

**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 to 95% of ASTM D1557.

**b. Removal of Inlets/Manholes/Lights and other Buried Structures.** Where indicated on the plans or as directed by the RPR, inlets, manholes, lights, and other buried structures shall be removed and legally disposed of off-site in a timely fashion after removal. Runway lights and associated isolation transformers shall be salvaged for reinstallation. Excavations after removal shall be backfilled with material equal or better in quality than adjacent embankment. When under paved areas must be compacted to 95% of ASTM D1557, when outside of paved areas must be compacted to 95% of ASTM D698.

**101-3.10 Slab Repair.** Slab repairs shall be cleaned and high molecular weight methacrylate (HMWM) applied. Sandblasting of the surface may be required following the application of HMWM to restore skid resistance.

## 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 removal shall be incidental to pavement removal.

Removal of lean concrete under the concrete pavement shall be incidental to pavement removal. Removal of base course and subgrade under the pavement shall be paid for in accordance with Item P-152 for "Unclassified Excavation."

For PCC pavement only, hauling and disposal or crushing of the material to be paid for under separate item.

**101-4.1.a Concrete Pavement Disposal.** The unit of measurement for Concrete pavement disposal shall be the number of square yards. This price shall be full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the item, including material hauling and disposal fees.

**101-4.1b Concrete Pavement Crushing.** The unit of measurement for concrete pavement crushing shall be the number of square yards. This price shall be full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the item, including material hauling, pre-crushing of PCCP, steel removal, and dump fees.

**101-4.2 Joint and Crack Repair.** The unit of measurement for joint and crack repair shall be the linear foot of joint or crack.

**101-4.3 Concrete Spall Repair.** The unit of measure for concrete spall repair shall be the number of square feet. The location and average depth of the patch shall be determined and agreed upon by the RPR and the Contractor.

**101-4.4 Cold Milling.** The unit of measure for cold milling shall be per square yard, by pavement type milled. The location and average depth of the cold milling shall be as shown on the plans. If the initial cut does not correct the condition, the Contractor shall re-mill the area and will be paid for the total depth of milling.

**101-4.5 Removal of Pipe and Electrical Duct Bank.** The unit of measurement for removal of pipe and electrical duct bank will be made at the contract unit price per linear foot . 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.

**101-4.6 Removal of other Buried Structures.** The unit of measurement for removal of cleanouts, storm drainage structures, sanitary sewer structures, 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.

**101-4.7 Removal of Electrical Items.** The unit of measurement for removal of lights, junction boxes, electrical manholes, signs, wind cones and other miscellaneous electrical items will be made at the contract unit price for each completed and accepted item, including foundations. 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.

**101-4.8 Slab Repair.** The unit of measurement for slab repair shall be the number of square feet. This price shall be full compensation for all labor, equipment, tools, and incidentals necessary to complete this item in accordance with paragraph 101-3.9.3.b.

## 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-101-5.1 | Concrete Pavement Removal - per square yard |
| Item P-101-5.2 | Asphalt Pavement Removal, (Complete) - per square yard |
| Item P-101-5.3 | Asphalt Pavement Removal, (Partial) - per square yard |
| Item P-101-5.4 | Remove Elevated Light and Foundation in Turf, (Complete) – per each |
| Item P-101-5.5 | Remove Electrical Duct Bank – 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 150/5380-6 | 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**

# 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 of off-site. 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.**

The suitability of material to be placed in embankments shall be subject to approval by the RPR. All unsuitable material shall be hauled off site.

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 (100 mm), to loosen and pulverize the soil. Stones or rock fragments larger than 4 inches (100 mm) in their greatest dimension will not be permitted in the top 6 inches (150 mm) 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 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 foot (30 mm) of the stated elevations for ground surfaces, or within 0.04 foot (12 mm) 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 offsite.**

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.** 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 (300 mm) 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 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 "Unsuitable 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 (60 cm) 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.** Borrow areas are not required.

**152-2.4 Drainage Excavation.** Not used.

**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 (300 mm) 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 D1557. 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 (150 mm) 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 (300 mm) and compacted as specified for the adjacent fill.

No direct payment shall be made for the work performed under this section.

**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 (300 mm) 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 (150 mm) nor more than 12 inches (300 mm) 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 D1557. A new Proctor shall be developed for each soil type based on visual classification.

Density tests will be taken by the Contractor for every 1,500 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 (19.0 mm) sieve, follow AASHTO T-180 Annex Correction of maximum dry density and optimum moisture for oversized particles.

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 D1557. Under all areas to be paved, the embankments shall be compacted to a depth of 12 inches and to a density of not less than 100 percent of the maximum density as determined by ASTM D1557. 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, the top 4 inches (100 mm) 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 (100 mm) in their greatest dimensions will not be allowed in the top 12 inches (300 mm) 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 (60 cm) 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 (1.2 m) 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.

**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. After compaction is completed, the subgrade area shall be proof rolled with a 20 ton (18.1 metric ton) Tandem axle Dual Wheel Dump Truck loaded to the legal limit with tires inflated to 100 psi (0.689 MPa) in the presence of the RPR. Apply a minimum of 8 coverages, 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 (25 mm) or show permanent deformation greater than 1 inch (25 mm) 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 (300 mm) and to a density of not less than 100 percent of the maximum dry density 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 (300 mm) 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, and if required, procedures in AASHTO T180 Annex for correction of maximum dry density and optimum moisture for oversized particles. Tests for moisture content and compaction will be taken at a minimum of 1,500 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.

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.

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 (75 mm), 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 (12 mm) when tested with a 12-foot (3.7-m) 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 (3.7-m) straightedge for the full length of each line on a 50-foot (15-m) grid.

**b. Grade.** The grade and crown shall be measured on a 50-foot (15-m) grid and shall be within +/- 0.05 feet (15 mm) of the specified grade.

On safety areas, turfed areas and other designated areas within the grading limits where no subbase or base is to be placed, grade shall not vary more than 0.10 feet (30 mm) 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. The end area is that bound by the original ground line established by field cross-sections and the final theoretical pay line established by cross-sections shown on the plans, subject to verification by the RPR.

**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** Unsuitable Excavation shall be paid for on the basis of the number of cubic yards measured and hauled offsite.

**152-3.4** Subgrade Preparation shall be paid for on the basis of the number of square yards.

## BASIS OF PAYMENT

**152-4.1** Unclassified Excavation and Unsuitable 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** Subgrade Preparation payment shall be made at the contract unit price per square yard. This price shall be full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

| | |
|---|---|
| Item P-152-4.1 | Unclassified Excavation - per cubic yard |
| Item P-152-4.2 | Unsuitable Excavation - per cubic yard |
| Item P-152-4.3 | Subgrade Preparation – per square 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 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 |

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**

# 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:<br>12% maximum using Sodium sulfate - or -<br>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).

**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) | 0-5 | | ±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**. Separation geotextile shall be Class 2, 0.02 $sec^{-1}$ minimum permittivity per ASTM D4491, Apparent opening size per ASTM D4751 with 0.60 mm maximum average roll value.

## 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 (300 mm) 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 (100 mm) nor more than 12 inches (300 mm) 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 determined by ASTM D1557. 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 (75 mm), 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 (9 mm) when tested with a 12-foot (3.7-m) 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 (3.7-m) straightedge for the full length of each line on a 50-foot (15-m) grid.

**b. Grade.** The grade verification shall be measured at spot elevations on the grid established in the paving plans and shall be within +0 and -1/2 inch (12 mm) 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 (1000 $m^2$). 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 D1557. The in-place field density shall be determined per ASTM D1556 or 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.** The thickness of the base course shall be within +0 and -1/2 inch (12 mm) of the specified thickness. Where the thickness is deficient by more than 1/2-inch (12 mm), the Contractor shall correct such areas at no additional cost by scarifying to a depth of at least 3 inches (75 mm), adding new material of proper gradation, and the material shall be blended and recompacted to grade. The Contractor shall evaluate for acceptance the completed thickness of base course by survey on the grid established in the paving plans. The survey shall be provided to the RPR in electronic (Excel) format within 48 hours of completion of the lot. The RPR shall verify the thickness by comparison of the provided finished surface survey of the accepted subgrade/subbase.

## 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.

**209-4.2** Separation geotextile shall be measured by the number of square yards of materials placed and accepted by the RPR as complying with the plans and specifications excluding seam overlaps and edge anchoring.

## 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.

**209-5.2** Payment shall be made at the contract unit price per square yard for separation geotextile. The price shall be full compensation for furnishing all labor, equipment, material, anchors, and incidentals necessary.

Payment will be made under:

| | |
|---|---|
| Item P-209-5.1 | Crushed Aggregate Base Course - per cubic yard |
| Item P-209-5.2 | Separation geotextile - per square 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 |
| 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**

# 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 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.

This item shall be used as surface course. It may also be used for asphalt base course, in lieu of P-403 asphalt base course. The Contractor shall select either P-401 or P-403 for the asphalt base course, and only include costs for one in the bid proposal.

## 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:<br>12% maximum using Sodium sulfate - or -<br>18% maximum using magnesium sulfate | ASTM C88 |
| Clay lumps and friable particles | 0.3% maximum | ASTM C142 |
| Percentage of Fractured Particles | For pavements designed for aircraft gross weights of 60,000 pounds (27200 kg) or more:<br>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 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:<br>10% maximum using Sodium sulfate - or -<br>15% maximum using magnesium sulfate | ASTM C88 |
| Clay lumps and friable particles | 0.3% 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) 64-28 for asphalt used as the surface course.

**Asphalt Binder PG Plus Test Requirements**

| Material Test | Requirement | Standard |
|---|---|---|
| Elastic Recovery | 75% minimum | ASTM D6084[1] |

[1] Follow procedure B on RTFO aged binder.

**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.

**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 binder.
- 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.
- Percentage and properties (asphalt content, asphalt binder properties, and aggregate properties) of reclaimed asphalt mix pavement (RAP) in accordance with paragraph 401-3.4.

**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

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.

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 | |
|---|---|---|
| | Base Course Mix | Surface Course or Base Course Mix |
| 1 inch (25.0 mm) | 100 | -- |
| 3/4 inch (19.0 mm) | 90-100 | 100 |
| 1/2 inch (12.5 mm) | 68-88 | 90-100 |
| 3/8 inch (9.5 mm) | 60-82 | 72-88 |
| No. 4 (4.75 mm) | 45-67 | 53-73 |
| No. 8 (2.36 mm) | 32-54 | 38-60 |
| No. 16 (1.18 mm) | 22-44 | 26-48 |
| No. 30 (600 µm) | 15-35 | 18-38 |
| No. 50 (300 µm) | 9-25 | 11-27 |
| No. 100 (150 µm) | 6-18 | 6-18 |
| No. 200 (75 µm) | 3-6 | 3-6 |
| **Minimum Voids in Mineral Aggregate (VMA)[1]** | 14.0 | 15.0 |

| Sieve Size | Percentage by Weight Passing Sieve | |
|---|---|---|
| | **Base Course Mix** | **Surface Course or Base Course Mix** |
| **Asphalt Percent:** | | |
| Stone or gravel | 4.5-7.0 | 5.0-7.5 |
| Slag | 5.0-7.5 | 6.5-9.5 |
| **Recommended Minimum Construction Lift Thickness** | 3 inch | 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 can only be used in the base course. Reclaimed asphalt shall consist of reclaimed asphalt pavement (RAP), coarse aggregate, fine aggregate, mineral filler, and asphalt. The RAP shall be of a consistent gradation and asphalt content and properties. When RAP is fed into the plant, the maximum RAP size shall not exceed one inch (25 mm). The reclaimed asphalt pavement mix shall be designed using procedures contained in the Asphalt Institute MS-2 Mix Design Manual, 7th Edition. The percentage of asphalt in the RAP shall be established for the mixture design according to ASTM D2172 using the appropriate dust correction procedure. The JMF shall meet the requirements of paragraph 401-3.3. RAP shall only be used for shoulder surface course mixes and for any base courses. The amount of RAP shall be limited to 30% **percent. In addition to the requirements of paragraph 401-3.3, the JMF shall indicate the percent of reclaimed asphalt pavement and the percent and grade of new asphalt binder. For the PG graded asphalt binder selected in 401-2.3, adjust as follows:**

**a.** For 0-20% RAP, there is no change in virgin asphalt binder content.

**b.** For >20 to 30% RAP, select asphalt binder one grade softer, i.e., PG 64-22 would soften to PG 58-28.

RAP containing Coal Tar shall not be used. Coal Tar surface treatments must be removed prior to recycling underlying asphalt material.

Recycled asphalt shingles (RAS) 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 (227 metric 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 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 | 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 ins 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.

**c. Truck Scales.** The asphalt mixture shall be weighed on approved scales furnished by the Contractor, or on certified public scales at the Contractor's expense. Scales shall be inspected and sealed as often as the RPR deems necessary to assure their accuracy. Scales shall conform to the requirements of the General Provisions, subsection 90-01.

In lieu of scales, and as approved by the RPR, asphalt mixture weight may be determined by the use of an

electronic weighing system equipped with an automatic printer that weighs the total asphalt mixture production and as often thereafter as requested by the RPR.

**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.

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 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 15 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 (30 cm); 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 (3 m) from transverse joints in the previous course. Transverse joints in adjacent lanes shall be offset a minimum of 10 feet (3 m).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.

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 (3 m) 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.

**401-4.15 Saw-Cut Grooving.** Saw-cut grooves shall be provided as specified in Item P-621. Sawcut grooving is only required on the surface course.

**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 (0.9 m) wide. The saw blades shall be 1/8-inch (3-mm) wide with a sufficient number of blades to create grooves between 0.090 and 0.130 inches (2 and 3.5 mm) wide; and peaks and ridges approximately 1/32 inch (1 mm) 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 an approved surface treatment 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.

**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 (3.7 m) straightedge, a rolling inclinometer meeting the requirements of ASTM E2133 or rolling external reference device that can simulate a 12-foot (3.7m) 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 either the FAA profile program, ProFAA, of 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 (15 m) 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 (6 m); and at the third points of paving lanes when widths of paving lanes are 20 ft (6 m) 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.

Deviations on the final surface course in either the transverse or longitudinal direction that will trap water greater than 1/4 inch (6 mm) 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 an approved surface treatment such as GSB-88 as approved by the RPR. 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 the paving plans. The final surface of the pavement will not vary from the finish grade spot elevations shown on the plans by more than 0.04 feet vertically and 0.1 feet laterally. 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 (12 mm) 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, air voids, 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.

**a. Individual Measurements.** Control charts for individual measurements shall be established to maintain process control within tolerance for aggregate gradation, asphalt content, air voids, 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.

**401-5.6 QC Reports.** The Contractor shall maintain records and shall submit reports of QC activities daily, in accordance with Item C-100.

**401-5.7 Quality Control Testing Summary.** The following table summarizes testing required in this specification. The information included in this table does not waive any requirements listed throughout the specification. All test results shall be provided to the RPR within 48 hours of completion of the tests.

**Table 5. P-401 QC Testing Summary**

| Specification Reference | Test Type | Test Standard | Minimum Testing Frequency | Responsible Party |
|---|---|---|---|---|
| 2.1 a. | Coarse Aggregate – Material Properties and Quality | ASTM C131<br>ASTM C88<br>ASTM C142<br>ASTM D5821<br>ASTM D4791<br>ASTM C29 | For each job mix formula approval | Contractor |
| 2.1 b. | Fine Aggregate – Material Properties and Quality | ASTM D4318<br>ASTM C88<br>ASTM C142<br>ASTM D2419 | For each job mix formula approval | Contractor |
| 2.1 b. | Natural Sand – Material Properties and Quality | ASTM D1073 | For each job mix formula approval (if applicable) | Contractor |
| 2.2 | Mineral Filler - Material Properties and Quality | ASTM D4318<br>ASTM D242 | For each job mix formula approval<br>(if applicable) | Contractor |
| 2.3 | Asphalt Binder | ASTM D6373<br>ASTM D6084 | For each job mix formula, and each load delivered to project | Contractor |
| 3.3 | Job Mix Formula | Various | For each job mix formula approval | Contractor |
| 3.4 | Reclaimed Asphalt Pavement (RAP) | Asphalt Institute MS-2 Mix Design Manual, 7th Edition<br>ASTM D2172 | For each job mix formula approval | Contractor |
| 3.5 | Control Strip | Various | Approved Control Strip prior to start of full-scale production paving | Contractor |
| 5.3 a. | Asphalt Content | ASTM D6307 or ASTM D2172 | Twice per day | Contractor |
| 5.3 b. | Gradation | ASTM D5444<br>ASTM C136<br>ASTM C117 | Twice per day | Contractor |
| 5.3 c. | Moisture Content of Aggregates | ASTM C566 | One per day | Contractor |

**Table 5. P-401 QC Testing Summary**

| Specification Reference | Test Type | Test Standard | Minimum Testing Frequency | Responsible Party |
|---|---|---|---|---|
| 5.3 d. | Moisture Content of Asphalt | AASHTO T329<br>ASTM D1461 | One per day | Contractor |
| 5.3 e. | Temperatures | --- | Four tests per day | Contractor |
| 5.3 f. | In-Place Density Monitoring (mat and joint) | ASTM D2950 | As needed for QC monitoring | Contractor |
| 5.3 g. | Smoothness for Contractor Quality Control | 12-foot straightedge – deviation < 1/4 inch (final surface)<br>or<br>Rolling Inclinometer ASTM E2133 | Daily<br>Transverse – Perpendicular to paving lane CL every 50-feet (min) and joints separately<br>Longitudinal –<br>Widths < 20': Continuously along center of each paving lane<br>Widths ≥ 20': Continuously along center of each paving lane and at the third point of paving lanes | Contractor – In presence of RPR |
| 5.3 h. | Grade | Less than 0.04 feet | At spot elevations shown on the Paving Plans | Contractor |
| 6.1 d. | In-place Asphalt Mat and Joint Density | | One Mat and One Joint Core per Sublot | Contractor<br>Furnish Cores to RPR QA Lab |

## 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 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 (125 mm) 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 (6 mm) less than the thickness indicated for the lift. Average thickness of lift, or combined 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 (30 cm) 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, 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 finish grade spot elevations shown on the plans do not deviate more than 0.04 feet vertically or 0.1 feet laterally**.**

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%.

**e. Profilograph Roughness for QA Acceptance.** Not used.

**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 6.

**Table 6. 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 6 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.**

**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 Quality Assurance Testing Summary.** The following table summarizes the testing required in this specification. The information included in this table does not waive any requirements listed throughout the specification. All test results shall be provided to the RPR within 48 hours of completion of the tests.

**Table 7. P-401 QA Testing Summary**

| Specification Reference | Test Type | Test Standard | Minimum Testing Frequency | Responsible Party |
|---|---|---|---|---|
| 6.1 c. | Asphalt Air Voids | ASTM D3203<br>ASTM D6926 | One per sublot | RPR QA Testing Lab |
| 6.1 d. | Mat Density | ASTM D2726 | One per sublot | RPR QA Testing Lab |
| 6.1 d. | Joint Density | ASTM D2726 | One per sublot | RPR QA Testing Lab |
| 6.1 d. | Thickness | Not less than ¼ inch deficient from indicated lift thickness, average lift thickness or combined lifts not less than indicated thickness (within grade tolerance) | One per sublot (mat density core) | RPR QA Testing Lab |

## 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 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 8. 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%.

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 8. 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.** Not used.

**401-8.1 Payment.**

Payment will be made under:

| | |
|---|---|
| Item P-401-8.1 | Bituminous Paving Course - per ton |
| Item P-401-8.2 | Modified Bituminous Material (PG 64-28) – 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 |
| 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 |
| 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 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**

# Item P-501 Cement Concrete Pavement

## DESCRIPTION

**501-1.1** This work shall consist of pavement composed of cement concrete with reinforcement and without reinforcement constructed on a prepared underlying surface in accordance with these specifications and shall conform to the lines, grades, thickness, and typical cross-sections shown on the plans. The terms cement concrete, hydraulic cement concrete, and concrete are interchangeable in this specification.

## MATERIALS

**501-2.1 Aggregates.**

**a. Reactivity.** Fine and Coarse aggregates to be used in PCC on this project shall be tested and evaluated by the Contractor for alkali-aggregate reactivity in accordance with both ASTM C1260 and ASTM C1567. Tests must be representative of aggregate sources which will be providing material for production. ASTM C1260 and ASTM C1567 tests may be run concurrently.

**(1)** Coarse aggregate and fine aggregate shall be tested separately in accordance with ASTM C1260, however, the length of test shall be extended to 28 days (30 days from casting). Tests must have been completed within 6 months of the date of the concrete mix submittal.

**(2)** The combined coarse and fine aggregate shall be tested in accordance with ASTM C1567, modified for combined aggregates, using the proposed mixture design proportions of aggregates, cementitious materials, and/or specific reactivity reducing chemicals. If the expansion does not exceed 0.10% at 28 days, the proposed combined materials will be accepted. If the expansion is greater than 0.10% at 28 days, the aggregates will not be accepted unless adjustments to the combined materials mixture can reduce the expansion to less than 0.10% at 28 days, or new aggregates shall be evaluated and tested.

**(3)** If lithium nitrate is proposed for use with or without supplementary cementitious materials, the aggregates shall be tested in accordance with Corps of Engineers (COE) Concrete Research Division (CRD) C662 in lieu of ASTM C1567. If lithium nitrate admixture is used, it shall be nominal 30% ±0.5% weight lithium nitrate in water. If the expansion does not exceed 0.10% at 28 days, the proposed combined materials will be accepted. If the expansion is greater than 0.10% at 28 days, the aggregates will not be accepted unless adjustments to the combined materials mixture can reduce the expansion to less than 0.10% at 28 days, or new aggregates shall be evaluated and tested.

**b. Fine Aggregate.** Grading of the fine aggregate, as delivered to the mixer, shall conform to the requirements of ASTM C33 and the parameters identified in the fine aggregate material requirements below. Fine aggregate material requirements and deleterious limits are shown in the table below.

| Fine Aggregate Material Requirements | | |
|---|---|---|
| Soundness of Aggregates by Use of Sodium Sulfate **or** Magnesium Sulfate | Loss after 5 cycles:<br>10% maximum using Sodium sulfate - or -<br>15% maximum using magnesium sulfate | ASTM C88 |
| Sand Equivalent | 45 minimum | ASTM D2419 |
| Fineness Modulus (FM) | $2.50 \leq FM \leq 3.40$ | ASTM C136 |
| **Limits for Deleterious Substances in Fine Aggregate for Concrete** | | |
| Clay lumps and friable particles | 1.0% maximum | ASTM C142 |
| Coal and lignite | 0.5% using a medium with a density of Sp. Gr. of 2.0 | ASTM C123 |
| Total Deleterious Material | 1.0% maximum | |

**c. Coarse aggregate.** The maximum size coarse aggregate shall be 1 ½ inch.

Aggregates delivered to the mixer shall be clean, hard, uncoated aggregates consisting of crushed stone, crushed or uncrushed gravel, air-cooled iron blast furnace slag, crushed recycled concrete pavement, or a combination. The aggregates shall have no known history of detrimental pavement staining. Steel blast furnace slag shall not be permitted. Coarse aggregate material requirements and deleterious limits are shown in the table below; washing may be required to meet aggregate requirements.

**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:<br>12% maximum using Sodium sulfate - or -<br>18% maximum using magnesium sulfate | ASTM C88 |
| Flat, Elongated, or Flat and Elongated Particles | 8% maximum, by weight, of flat, elongated, or flat and elongated particles at 5:1 for any size group coarser than 3/8 (9.5 mm) sieve [1] | ASTM D4791 |
| Bulk density of slag [2] | Weigh not less than 70 pounds per cubic foot (1.12 Mg/cubic meter) | ASTM C29 |
| D-cracking (Freeze-Thaw)[3] | Durability factor ≥ 95 | ASTM C666 |

[1] 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).

[2] Only required if slag is specified.

[3] Coarse aggregate may only be accepted from sources that have a 20-year service history for the same gradation to be supplied with no history of D-Cracking. Aggregates that do not have a 20-year record of service free from major repairs (less than 5% of slabs replaced) in similar conditions without D-cracking shall not be used unless the material currently being produced has a durability factor greater than or equal to 95 per ASTM C666. The Contractor shall submit a current certification and test results to verify the aggregate acceptability. Test results will only be accepted from a State

Department of Transportation (DOT) materials laboratory or an accredited laboratory. Certification and test results which are not dated, or which are over one (1) year old or which are for different gradations will not be accepted.

The amount of deleterious material in the coarse aggregate shall not exceed the following limits:

**Limits for Deleterious Substances in Coarse Aggregate**

| Deleterious Material | ASTM | Percentage by Mass |
|---|---|---|
| Clay Lumps and friable particles | ASTM C142 | 1.0 |
| Material finer than No. 200 sieve (75 µm) | ASTM C117 | 1.0[1] |
| Lightweight particles | ASTM C123 using a medium with a density of Sp. Gr. of 2.0 | 0.5 |
| Chert[2] (less than 2.40 Sp Gr.) | ASTM C123 using a medium with a density of Sp. Gr. of 2.40) | 0.1[3] |

[1] The limit for material finer than 75-µm is allowed to be increased to 1.5% for crushed aggregates consisting of dust of fracture that is essentially free from clay or shale. Test results supporting acceptance of increasing limit to 1.5% with statement indicating material is dust of fracture must be submitted with Concrete mix. Acceptable techniques to characterizing these fines include methylene blue adsorption or X-ray diffraction analysis. The total of all deleterious materials increases up to 3.5%.

[2] Chert and aggregates with less than 2.4 specific gravity.

[3] The limit for chert may be limited to 0.1 percent by mass in areas subject to severe freeze and thaw.

**d. Combined Aggregate Gradation.** This specification is targeted for a combined aggregate gradation developed following the guidance presented in United States Air Force Engineering Technical Letter (ETL) 97-5: Proportioning Concrete Mixtures with Graded Aggregates for Rigid Airfield Pavements. Base the aggregate grading upon a combination of all the aggregates (coarse and fine) to be used for the mixture proportioning. Three aggregate sizes may be required to achieve an optimized combined gradation that will produce a workable concrete mixture for its intended use. Use aggregate gradations that produce concrete mixtures with well-graded or optimized aggregate combinations. The Contractor shall submit complete mixture information necessary to calculate the volumetric components of the mixture. The combined aggregate grading shall meet the following requirements:

**(1)** The materials selected and the proportions used shall be such that when the Coarseness Factor (CF) and the Workability Factor (WF) are plotted on a diagram as described in paragraph 501-2.1d(4) below, the point thus determined shall fall within the parallelogram described therein.

**(2)** The CF shall be determined from the following equation:

CF = (cumulative percent retained on the 3/8 in. (9.5 mm) sieve)(100) / (cumulative percent retained on the No. 8 (2.36 mm) sieve)

**(3)** The WF is defined as the percent passing the No. 8 (2.36 mm) sieve based on the combined gradation. However, WF shall be adjusted, upwards only, by 2.5 percentage points for each 94 pounds (42 kg) of cementitious material per cubic meter yard greater than 564 pounds per cubic yard (335 kg per cubic meter).

**(4)** A diagram shall be plotted using a rectangular scale with WF on the Y-axis with units from 20 (bottom) to 45 (top), and with CF on the X-axis with units from 80 (left side) to 30 (right side). On this diagram a parallelogram shall be plotted with corners at the following coordinates (CF-75, WF-28), (CF-75, WF-40), (CF-45, WF-32.5), and (CF-45, WF-44.5). If the point determined by the intersection of the computed CF and WF does not fall within the above parallelogram, the grading of each size of aggregate

used and the proportions selected shall be changed as necessary. The point determined by the plotting of the CF and WF may be adjusted during production ±3 WF and ±5 CF. Adjustments to gradation may not take the point outside of the parallelogram.

**e. Contractors Combined Aggregate Gradation.** The Contractor shall submit their combined aggregate gradation using the following format:

**Contractor's Combined Aggregate Gradation**

| Sieve Size | Contractor's Concrete mix Gradation (Percent passing by weight) |
|---|---|
| 2 inch (50 mm) | * |
| 1-1/2 inch (37.5 mm) | * |
| 1 inch (25.0 mm) | * |
| 3/4 inch (19.0 mm) | * |
| 1/2 inch (12.5 mm) | * |
| 3/8 inch (9.5 mm) | * |
| No. 4 (4.75 mm) | * |
| No. 8 (2.36 mm) | * |
| No. 16 (1.18 mm) | * |
| No. 30 (600 µm) | * |
| No. 50 (300 µm) | * |
| No. 100 (150 µm) | * |

**501-2.2 Cement.** Cement shall conform to the requirements of ASTM C150 Type I, Low Alkali (less than 0.6 percent total equivalent alkalis.

**501-2.3 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 alkali content less than 3% per ASTM C311. 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 Resident Project Representative (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.

**c. Raw or Calcined Natural Pozzolan.** Natural pozzolan shall be raw or calcined and conform to ASTM C618, Class N, including the optional requirements for uniformity and effectiveness in controlling Alkali-Silica reaction and shall have a loss on ignition not exceeding 6%. Class N pozzolan for use in mitigating Alkali-Silica Reactivity shall have a total available alkali content less than 3%.

**501-2.4 Joint Seal.** The joint seal for the joints in the concrete pavement shall meet the requirements of Item P-604 and Item P-605 and shall be of the type specified in the plans.

**501-2.5 Isolation Joint Filler.** Premolded joint filler for isolation joints shall conform to the requirements of ASTM D1751 or ASTM D1752 and shall be where shown on the plans. The filler for each joint shall be furnished in a single piece for the full depth and width required for the joint, unless otherwise specified by the RPR. When the use of more than one piece is required for a joint, the abutting ends shall be fastened securely and held accurately to shape by stapling or other positive fastening means satisfactory to the RPR.

**501-2.6 Steel Reinforcement.** Reinforcing shall consist of Epoxy-Coated Steel Wire and Welded Wire Reinforcement conforming to the requirements of ASTM A884. Welded wire fabrics shall be furnished in flat sheets only.

**501-2.7 Dowel and Tie Bars.** Dowel bars shall be plain steel bars conforming to ASTM A615 and shall be free from burring or other deformation restricting slippage in the concrete.

**a. Dowel Bars**. Before delivery to the construction site each dowel bar shall be epoxy coated per ASTM A1078, Type 1, with a coating thickness after curing greater than 10 mils. Patched ends are not required for Type 1 coated dowels. The dowels shall be coated with a bond-breaker recommended by the manufacturer. Dowel sleeves or inserts are not permitted. Grout retention rings shall be fully circular metal or plastic devices capable of supporting the dowel until the grout hardens.

**b. Tie Bars.** Tie bars shall be deformed steel bars and conform to the requirements of ASTM A615. Tie bars designated as Grade 60 in ASTM A615 or ASTM A706 shall be used for construction requiring bent bars.

**501-2.8 Water.** Water used in mixing or curing shall be potable. If water is taken from other sources considered non-potable, it shall meet the requirements of ASTM C1602.

**501-2.9 Material for Curing Concrete.** Curing materials shall conform to one of the following specifications:

**a.** Liquid membrane-forming compounds for curing concrete shall conform to the requirements of ASTM C309, Type 2, Class A, or Class B.

**b.** White polyethylene film for curing concrete shall conform to the requirements of ASTM C171.

**c.** White burlap-polyethylene sheeting for curing concrete shall conform to the requirements of ASTM C171.

**d.** Waterproof paper for curing concrete shall conform to the requirements of ASTM C171.

**501-2.10 Admixtures.** Admixtures shall conform to the following specifications:

**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-entraining 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.

**c. Other Admixtures.** The use of set retarding and set-accelerating admixtures shall be approved by the RPR prior to developing the concrete mix. Retarding admixtures shall meet the requirements of ASTM C494, Type A, B, or D and set-accelerating admixtures shall meet the requirements of ASTM C494, Type C. Calcium chloride and admixtures containing calcium chloride shall not be used.

**d. Lithium Nitrate.** The lithium admixture shall be a nominal 30% aqueous solution of Lithium Nitrate, with a density of 10 pounds/gallon (1.2 kg/L), and shall have the approximate chemical form as shown below:

**Lithium Admixture**

| Constituent | Limit (Percent by Mass) |
|---|---|
| LiNO3 (Lithium Nitrate) | 30 ±0.5 |
| SO4 (Sulfate Ion) | 0.1 (max) |
| Cl (Chloride Ion) | 0.2 (max) |
| Na (Sodium Ion) | 0.1 (max) |
| K (Potassium Ion) | 0.1 (max) |

The lithium nitrate admixture dispensing and mixing operations shall be verified and certified by the lithium manufacturer's representative.

**501-2.11 Epoxy-Resin.** All epoxy-resin materials shall be two-component materials conforming to the requirements of ASTM C881, Class as appropriate for each application temperature to be encountered, except that in addition, the materials shall meet the following requirements:

**a.** Material for use for embedding dowels and anchor bolts shall be Type IV, Grade 3.

**b.** Material for use as patching materials for complete filling of spalls and other voids and for use in preparing epoxy resin mortar shall be Type III, Grade as approved.

**c.** Material for use for injecting cracks shall be Type IV, Grade 1.

**d.** Material for bonding freshly mixed Portland cement concrete or mortar or freshly mixed epoxy resin concrete or mortar to hardened concrete shall be Type V, Grade as approved.

**501-2.12 Bond Breaker.** Not required.

## CONCRETE MIX

**501-3.1. General**. No concrete shall be placed until an acceptable concrete mix has been submitted to the RPR for review and the RPR has taken appropriate action. The RPR's review shall not relieve the Contractor of the responsibility to select and proportion the materials to comply with this section.

**501-3.2 Concrete Mix Laboratory.** The laboratory used to develop the concrete mix shall be accredited in accordance with ASTM C1077. The laboratory accreditation must be current and listed on the accrediting authority's website. All test methods required for developing the concrete mix must be included in the lab accreditation. A copy of the laboratory's current accreditation and accredited test methods shall be submitted to the RPR prior to start of construction.

**501-3.3 Concrete Mix Proportions.** Develop the mix using the procedures contained in Portland Cement Association (PCA) publication, "Design and Control of Concrete Mixtures." Concrete shall be proportioned to achieve a 28-day flexural strength that meets or exceeds the acceptance criteria contained in paragraph 501-6.6 for a flexural strength of 650 psi per ASTM C78.

The minimum cementitious material shall be adequate to ensure a workable, durable mix. The minimum cementitious material (cement plus fly ash, or slag cement) shall be 517 pounds per cubic yard (310 kg per cubic meter). The ratio of water to cementitious material, including free surface moisture on the aggregates but not including moisture absorbed by the aggregates shall be between 0.38 – 0.45 by weight.

Flexural strength test specimens shall be prepared in accordance with ASTM C192 and tested in accordance with ASTM C78. At the start of the project, the Contractor shall determine an allowable slump as determined by ASTM C143 not to exceed 2 inches (50 mm) for slip-form placement. For fixed-

form placement, the slump shall not exceed 3 inches (75 mm). For hand placement, the slump shall not exceed 4 inches (100 mm).

The results of the concrete mix shall include a statement giving the maximum nominal coarse aggregate size and the weights and volumes of each ingredient proportioned on a one cubic yard (meter) basis. Aggregate quantities shall be based on the mass in a saturated surface dry condition.

If a change in source(s) is made, or admixtures added or deleted from the mix, a new concrete mix must be submitted to the RPR for approval.

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.

**501-3.4 Concrete Mix Submittal.** The concrete mix shall be submitted to the RPR at least 30 days prior to the start of operations. The submitted concrete mix shall not be more than 180 days old and must use the materials to be used for production for the project. Production shall not begin until the concrete mix is approved in writing by the RPR.

Each of the submitted concrete mixes (i.e, slip form, side form machine finish and side form hand finish) shall be stamped or sealed by the responsible professional Engineer of the laboratory and shall include the following items and quantities as a minimum:

- Certified material test reports for aggregate in accordance with paragraph 501-2.1. Certified reports must include all tests required; reporting each test, test method, test result, and requirement specified (criteria).
- Combined aggregate gradations and analysis; and including plots of the fine aggregate fineness modulus.
- Reactivity Test Results.
- Coarse aggregate quality test results, including deleterious materials.
- Fine aggregate quality test results, including deleterious materials.
- Mill certificates for cement and supplemental cementitious materials.
- Certified test results for all admixtures, including Lithium Nitrate if applicable.
- Specified flexural strength, slump, and air content.
- Recommended proportions/volumes for proposed mixture and trial water-cementitious materials ratio, including actual slump and air content.
- Flexural and compressive strength summaries and plots, including all individual beam and cylinder breaks.
- Correlation ratios for acceptance testing and Contractor QC testing, when applicable.
- Historical record of test results documenting production standard deviation, when applicable.

**501-3.5 Cementitious Materials.**

**a. Fly Ash.** When fly ash is used as a partial replacement for cement, the replacement rate shall be determined from laboratory trial mixes and shall be between 20 and 30% by weight of the total cementitious material. If fly ash is used in conjunction with slag cement the maximum replacement rate shall not exceed 10% by weight of total cementitious material.

**b. Slag Cement (Ground Granulated Blast Furnace (GGBF)).** Slag cement may be used. The slag cement, or slag cement plus fly ash if both are used, may constitute between 25 to 55% of the total cementitious material by weight.

**c. Raw or Calcined Natural Pozzolan.** Natural pozzolan may be used in the concrete mix. When pozzolan is used as a partial replacement for cement, the replacement rate shall be determined from laboratory trial mixes and shall be between 20 and 30% by weight of the total cementitious material. If pozzolan is used in conjunction with slag cement the maximum replacement rate shall not exceed 10% by weight of total cementitious material.

**501-3.6 Admixtures.**

**a. Air-Entraining Admixtures.** Air-entraining admixture are to be added in such a manner that will ensure uniform distribution of the agent throughout the batch. The air content of freshly mixed air-entrained concrete shall be based upon trial mixes with the materials to be used in the work adjusted to produce concrete of the required plasticity and workability. The percentage of air in the mix shall be 5.5%. Air content shall be determined by testing in accordance with ASTM C231 for gravel and stone coarse aggregate and ASTM C173 for slag and other highly porous coarse aggregate.

**b. Water-Reducing Admixtures.** Water-reducing admixtures shall be added to the mix in the manner recommended by the manufacturer and in the amount necessary to comply with the specification requirements. Tests shall be conducted with the materials to be used in the work, in accordance with ASTM C494.

**c. Other Admixtures.** Set controlling, and other approved admixtures shall be added to the mix in the manner recommended by the manufacturer and in the amount necessary to comply with the specification requirements. Tests shall be conducted with the materials to be used in the work, in accordance with ASTM C494.

**d. Lithium Nitrate.** Lithium nitrate shall be added to the mix in the manner recommended by the manufacturer and in the amount necessary to comply with the specification requirements in accordance with paragraph 501-2.10d.

## CONSTRUCTION METHODS

**501-4.1 Control Strip.** The control strip(s) shall be to the next planned joint after the initial 250 feet (75 m) of each type of pavement construction (slip-form pilot lane, slip-form fill-in lane, or fixed form). The Contractor shall demonstrate, in the presence of the RPR, that the materials, concrete mix, equipment, construction processes, and quality control processes meet the requirements of the specifications. The concrete mixture shall be extruded from the paver meeting the edge slump tolerance and with little or no finishing. Pilot, fill-in, and fixed-form control strips will be accepted separately. Minor adjustments to the mix design may be required to place an acceptable control strip. The production mix will be the adjusted mix design used to place the acceptable control strip. Upon acceptance of the control strip by the RPR, the Contractor must use the same equipment, materials, and construction methods for the remainder of concrete paving. Any adjustments to processes or materials must be approved in advance by the RPR. Acceptable control strips will meet edge slump tolerance and surface acceptable with little or no finishing, air content within action limits, strength equal or greater than requirements of P501-3.3. The control strip will be considered one lot for payment (no sublots required for control strip). Payment will only be made for an acceptable control strip in accordance with paragraph 501-8.1 using a lot pay factor equal to 100.

**501-4.2 Equipment.** The Contractor is responsible for the proper operation and maintenance of all equipment necessary for handling materials and performing all parts of the work to meet this specification.

**a. Plant and Equipment.** The plant and mixing equipment shall conform to the requirements of ASTM C94 and/or ASTM C685. Each truck mixer shall have attached in a prominent place a manufacturer's nameplate showing the capacity of the drum in terms of volume of mixed concrete and the speed of rotation of the mixing drum or blades. The truck mixers shall be examined daily for changes in condition due to accumulation of hard concrete or mortar or wear of blades. The pickup and throwover blades shall be replaced when they have worn down 3/4 inch (19 mm) or more. The Contractor shall have a copy of the manufacturer's design on hand showing dimensions and arrangement of blades in reference to original height and depth.

Equipment for transferring and spreading concrete from the transporting equipment to the paving lane in front of the finishing equipment shall be provided. The equipment shall be specially manufactured, self-propelled transfer equipment which will accept the concrete outside the paving lane and will spread it evenly across the paving lane in front of the paver and strike off the surface evenly to a depth which permits the paver to operate efficiently.

**b. Finishing Equipment.**

**(1) Slip-Form.** The standard method of constructing concrete pavements shall be with an approved slip-form paving equipment designed and operated to spread, consolidate, screed, and finish the freshly placed concrete in one complete pass of the machine so that the end result is a dense and homogeneous pavement which is achieved with a minimum of hand finishing. The paver-finisher shall be a heavy duty, self-propelled machine designed specifically for paving and finishing high quality concrete pavements.

**(2) Fixed-Form.** On projects requiring less than 10,000 cubic yards (7650 cubic meters) of concrete pavement or irregular areas at locations inaccessible to slip-form paving equipment, concrete pavement may be placed with equipment specifically designed for placement and finishing using stationary side forms. Methods and equipment shall be reviewed and accepted by the RPR. Hand screeding and float finishing may only be used on small irregular areas as allowed by the RPR.

**c. Vibrators.** Vibrator shall be the internal type. The rate of vibration of each vibrating unit shall be sufficient to consolidate the pavement without segregation or voids. The number, spacing, and frequency shall be as necessary to provide a dense and homogeneous pavement and meet the recommendations of American Concrete Institute (ACI) 309R, Guide for Consolidation of Concrete. Adequate power to operate all vibrators shall be available on the paver. The vibrators shall be automatically controlled so that they shall be stopped as forward motion ceases. The Contractor shall provide an electronic or mechanical means to monitor vibrator status. The checks on vibrator status shall occur a minimum of two times per day or when requested by the RPR.

Hand held vibrators may only be used in irregular areas and shall meet the recommendations of ACI 309R, Guide for Consolidation of Concrete.

**d. Concrete Saws.** The Contractor shall provide sawing equipment adequate in number of units and power to complete the sawing to the required dimensions. The Contractor shall provide at least one standby saw in good working order and a supply of saw blades at the site of the work at all times during sawing operations.

**e. Fixed Forms.** Straight side fixed forms shall be made of steel and shall be furnished in sections not less than 10 feet (3 m) in length. Forms shall be provided with adequate devices for secure settings so that when in place they will withstand, without visible spring or settlement, the impact and vibration of the consolidating and finishing equipment. Forms with battered top surfaces and bent, twisted or broken forms shall not be used. Built-up forms shall not be used, except as approved by the RPR. The top face of the form shall not vary from a true plane more than 1/8 inch (3 mm) in 10 feet (3 m), and the upstanding leg shall not vary more than 1/4 inch (6 mm). The forms shall contain provisions for locking the ends of

abutting sections together tightly for secure setting. Wood forms may be used under special conditions, when approved by the RPR. The forms shall extend the full depth of the pavement section.

**501-4.3 Form Setting.** Forms shall be set to line and grade as shown on the plans, sufficiently in advance of the concrete placement, to ensure continuous paving operation. Forms shall be set to withstand, without visible spring or settlement, the impact and vibration of the consolidating and finishing equipment. Forms shall be cleaned and oiled prior to the concrete placement.

**501-4.4 Base Surface Preparation Prior to Placement.** Any damage to the prepared base, subbase, and subgrade shall be corrected full depth by the Contractor prior to concrete placement. The underlying surface shall be entirely free of frost when concrete is placed. The prepared grade shall be moistened with water, without saturating, immediately ahead of concrete placement to prevent rapid loss of moisture from concrete.

**501-4.5 Handling, Measuring, and Batching Material.** Aggregate stockpiles shall be constructed and managed in such a manner that prevents segregation and intermixing of deleterious materials. Aggregates from different sources shall be stockpiled, weighed and batched separately at the concrete batch plant. Aggregates that have become segregated or mixed with earth or foreign material shall not be used. All aggregates produced or handled by hydraulic methods, and washed aggregates, shall be stockpiled or binned for draining at least 12 hours before being batched. Store and maintain all aggregates at a uniform moisture content prior to use. A continuous supply of materials shall be provided to the work to ensure continuous placement.

**501-4.6 Mixing Concrete.** The concrete may be mixed at the work site, in a central mix plant or in truck mixers. The mixer shall be of an approved type and capacity. Mixing time shall be measured from the time all materials are placed into the drum until the drum is emptied into the truck. All concrete shall be mixed and delivered to the site in accordance with the requirements of ASTM C94 or ASTM C685.

Mixed concrete from the central mixing plant shall be transported in truck mixers, truck agitators, or non-agitating trucks. The elapsed time from the addition of cementitious material to the mix until the concrete is discharged from the truck should not exceed 30 minutes when the concrete is hauled in non-agitating trucks, nor 90 minutes when the concrete is hauled in truck mixers or truck agitators. In no case shall the temperature of the concrete when placed exceed 90°F (32°C). Retempering concrete by adding water or by other means will not be permitted. With transit mixers additional water may be added to the batch materials and additional mixing performed to increase the slump to meet the specified requirements provided the addition of water is performed within 45 minutes after the initial mixing operations and provided the water/cementitious ratio specified is not exceeded.

**501-4.7 Weather Limitations on Mixing and Placing.** No concrete shall be mixed, placed, or finished when the natural light is insufficient, unless an adequate and approved artificial lighting system is operated.

**a. Cold Weather.** Unless authorized in writing by the RPR, mixing and concreting operations shall be discontinued when a descending air temperature in the shade and away from artificial heat reaches 40°F (4°C) and shall not be resumed until an ascending air temperature in the shade and away from artificial heat reaches 35°F (2°C).

The aggregate shall be free of ice, snow, and frozen lumps before entering the mixer. The temperature of the mixed concrete shall not be less than 50°F (10°C) at the time of placement. Concrete shall not be placed on frozen material nor shall frozen aggregates be used in the concrete.

When concreting is authorized during cold weather, water and/or the aggregates may be heated to not more than 150°F (66°C). The apparatus used shall heat the mass uniformly and shall be arranged to preclude the possible occurrence of overheated areas which might be detrimental to the materials.

Curing during cold weather shall be in accordance with paragraph 501-4.13d.

**b. Hot Weather.** During periods of hot weather when the maximum daily air temperature exceeds 85°F (30°C), the following precautions shall be taken.

The forms and/or the underlying surface shall be sprinkled with water immediately before placing the concrete. The concrete shall be placed at the coolest temperature practicable, and in no case shall the temperature of the concrete when placed exceed 90°F (32°C). The aggregates and/or mixing water shall be cooled as necessary to maintain the concrete temperature at or not more than the specified maximum.

The concrete placement shall be protected from exceeding an evaporation rate of 0.2 psf (0.98 kg/m$^2$ per hour) per hour. When conditions are such that problems with plastic cracking can be expected, and particularly if any plastic cracking begins to occur, the Contractor shall immediately take such additional measures as necessary to protect the concrete surface. If the Contractor's measures are not effective in preventing plastic cracking, paving operations shall be immediately stopped.

Curing during hot weather shall be in accordance with paragraph 501-4.13e.

**c. Temperature Management Program.** Prior to the start of paving operation for each day of paving, the Contractor shall provide the RPR with a Temperature Management Program for the concrete to be placed to assure that uncontrolled cracking is avoided. (Federal Highway Administration HIPERPAV 3 is one example of a temperature management program.) As a minimum, the program shall address the following items:

**(1)** Anticipated tensile strains in the fresh concrete as related to heating and cooling of the concrete material.

**(2)** Anticipated weather conditions such as ambient temperatures, wind velocity, and relative humidity; and anticipated evaporation rate using Figure 19-9, PCA, Design and Control of Concrete Mixtures.

**(3)** Anticipated timing of initial sawing of joint.

**(4)** Anticipated number and type of saws to be used.

**d. Rain.** The Contractor shall have available materials for the protection of the concrete during inclement weather. Such protective materials shall consist of rolled polyethylene sheeting at least 4 mils (0.1 mm) thick of sufficient length and width to cover the plastic concrete slab and any edges. The sheeting may be mounted on either the paver or a separate movable bridge from which it can be unrolled without dragging over the plastic concrete surface. When rain appears imminent, all paving operations shall stop, and all available personnel shall begin covering the surface of the unhardened concrete with the protective covering.

**501-4.8 Concrete Placement.** At any point in concrete conveyance, the free vertical drop of the concrete from one point to another or to the underlying surface shall not exceed 3 feet (1 m). The finished concrete product must be dense and homogeneous, without segregation and conforming to the standards in this specification. Backhoes and grading equipment shall not be used to distribute the concrete in front of the paver. Front end loaders will not be used. All concrete shall be consolidated without voids or segregation, including under and around all load-transfer devices, joint assembly units, and other features embedded in the pavement. Hauling equipment or other mechanical equipment can be permitted on adjoining previously constructed pavement when the concrete strength reaches a flexural strength of 550 psi (3.8 MPa), based on the average of four field cured specimens per 2,000 cubic yards (1,530 cubic meters) of concrete placed. The Contractor must determine that the above minimum strengths are adequate to protect the pavement from overloads due to the construction equipment proposed for the project.

**The Contractor shall have available materials for the protection of the concrete during cold, hot and/or inclement weather in accordance with paragraph 501-4.7.**

**a. Slip-Form Construction.** The concrete shall be distributed uniformly into final position by a self-propelled slip-form paver without delay. The alignment and elevation of the paver shall be regulated from outside reference lines established for this purpose. The paver shall vibrate the concrete for the full width and depth of the strip of pavement being placed and the vibration shall be adequate to provide a consistency of concrete that will stand normal to the surface with sharp well-defined edges. The sliding forms shall be rigidly held together laterally to prevent spreading of the forms. The plastic concrete shall be effectively consolidated by internal vibration with transverse vibrating units for the full width of the pavement and/or a series of equally placed longitudinal vibrating units. The space from the outer edge of the pavement to longitudinal unit shall not exceed 9 inches (23 cm) for slipform and at the end of the dowels for the fill-in lanes. The spacing of internal units shall be uniform and shall not exceed 18 inches (0.5 m).

The term internal vibration means vibrating units located within the specified thickness of pavement section.

The rate of vibration of each vibrating unit shall be sufficient to consolidate the pavement without, segregation, voids, or vibrator trails and the amplitude of vibration shall be sufficient to be perceptible on the surface of the concrete along the entire length of the vibrating unit and for a distance of at least one foot (30 cm). The frequency of vibration or amplitude should be adjusted proportionately with the rate of travel to result in a uniform density and air content. The paving machine shall be equipped with a tachometer or other suitable device for measuring and indicating the actual frequency of vibrations.

The concrete shall be held at a uniform consistency. The slip-form paver shall be operated with as nearly a continuous forward movement as possible and all operations of mixing, delivering, and spreading concrete shall be coordinated to provide uniform progress with stopping and starting of the paver held to a minimum. If for any reason, it is necessary to stop the forward movement of the paver, the vibratory and tamping elements shall also be stopped immediately. No tractive force shall be applied to the machine, except that which is controlled from the machine.

When concrete is being placed adjacent to an existing pavement, that part of the equipment which is supported on the existing pavement shall be equipped with protective pads on crawler tracks or rubber-tired wheels on which the bearing surface is offset to run a sufficient distance from the edge of the pavement to avoid breaking the pavement edge.

Not more than 15% of the total free edge of each 500-foot (150 m) segment of pavement, or fraction thereof, shall have an edge slump exceeding 1/4 inch (6 mm), and none of the free edge of the pavement shall have an edge slump exceeding 3/8 inch (9 mm). (The total free edge of 500 feet (150 m) of pavement will be considered the cumulative total linear measurement of pavement edge originally constructed as nonadjacent to any existing pavement; that is, 500 feet (150 m) of paving lane originally constructed as a separate lane will have 1,000 feet (300 m) of free edge, 500 feet (150 m) of fill-in lane will have no free edge, etc.). The area affected by the downward movement of the concrete along the pavement edge shall be limited to not more than 18 inches (0.5 m) from the edge.

When excessive edge slump cannot be corrected before the concrete has hardened, the area with excessive edge slump will be removed the full width of the slip form lane and replaced at the expense of the Contractor as directed by the RPR.

**b. Fixed-Form Construction.** Forms shall be drilled in advance of being placed to line and grade to accommodate tie bars / dowel bars where these are specified.

Immediately in advance of placing concrete and after all subbase operations are completed, side forms shall be trued and maintained to the required line and grade for a distance sufficient to prevent delay in placing.

Side forms shall remain in place at least 12 hours after the concrete has been placed, and in all cases until the edge of the pavement no longer requires the protection of the forms. Curing compound shall be applied to the concrete immediately after the forms have been removed.

Side forms shall be thoroughly cleaned and coated with a release agent each time they are used and before concrete is placed against them.

Concrete shall be spread, screed, shaped and consolidated by one or more self-propelled machines. These machines shall uniformly distribute and consolidate concrete without segregation so that the completed pavement will conform to the required cross-section with a minimum of handwork.

The number and capacity of machines furnished shall be adequate to perform the work required at a rate equal to that of concrete delivery. The equipment must be specifically designed for placement and finishing using stationary side forms. Methods and equipment shall be reviewed and accepted by the RPR.

Concrete for the full paving width shall be effectively consolidated by internal vibrators. The rate of vibration of each vibrating unit shall be sufficient to consolidate the pavement without segregation, voids, or leaving vibrator trails.

Power to vibrators shall be connected so that vibration ceases when forward or backward motion of the machine is stopped.

**c. Consolidation.** Concrete shall be consolidated with the specified type of lane-spanning, gang-mounted, mechanical, immersion type vibrating equipment mounted in front of the paver, supplemented, in rare instances as specified, by hand-operated vibrators. The vibrators shall be inserted into the concrete to a depth that will provide the best full-depth consolidation but not closer to the underlying material than 2 inches (50 mm). Vibrators shall not be used to transport or spread the concrete. For each paving train, at least one additional vibrator spud, or sufficient parts for rapid replacement and repair of vibrators shall be maintained at the paving site at all times. Any evidence of inadequate consolidation (honeycomb along the edges, large air pockets, or any other evidence) or over-consolidation (vibrator trails, segregation, or any other evidence) shall require the immediate stopping of the paving operation and adjustment of the equipment or procedures as approved by the RPR.

If a lack of consolidation of the hardened concrete is suspected by the RPR, referee testing may be required. Referee testing of hardened concrete will be performed by the RPR by cutting cores from the finished pavement after a minimum of 24 hours curing. The RPR shall visually examine the cores for evidence of lack of consolidation. Density determinations will be made by the RPR based on the water content of the core as taken. ASTM C642 shall be used for the determination of core density in the saturated-surface dry condition. When required, referee cores will be taken at the minimum rate of one for each 500 cubic yards (382 $m^2$) of pavement, or fraction. The Contractor shall be responsible for all referee testing cost if they fail to meet the required density.

The average density of the cores shall be at least 97% of the original concrete mix density, with no cores having a density of less than 96% of the original concrete mix density. Failure to meet the referee tests will be considered evidence that the minimum requirements for vibration are inadequate for the job conditions. Additional vibrating units or other means of increasing the effect of vibration shall be employed so that the density of the hardened concrete conforms to the above requirements.

**501-4.9 Strike-Off of Concrete and Placement of Reinforcement.** Following the placing of the concrete, it shall be struck off to conform to the cross-section shown on the plans and to an elevation that when the concrete is properly consolidated and finished, the surface of the pavement shall be at the elevation shown on the plans. When reinforced concrete pavement is placed in two layers, the bottom layer shall be struck off to such length and depth that the sheet of reinforcing steel fabric or bar mat may be laid full length on the concrete in its final position without further manipulation. The reinforcement

shall then be placed directly upon the concrete, after which the top layer of the concrete shall be placed, struck off, and screed. If any portion of the bottom layer of concrete has been placed more than 30 minutes without being covered with the top layer or if initial set has taken place, it shall be removed and replaced with freshly mixed concrete at the Contractor's expense. When reinforced concrete is placed in one layer, the reinforcement may be positioned in advance of concrete placement or it may be placed in plastic concrete by mechanical or vibratory means after spreading.

Reinforcing steel, at the time concrete is placed, shall be free of mud, oil, or other organic matter that may adversely affect or reduce bond. Reinforcing steel with rust, mill scale or a combination of both will be considered satisfactory, provided the minimum dimensions, weight, and tensile properties of a hand wire-brushed test specimen are not less than the applicable ASTM specification requirements.

**501-4.10 Joints.** Joints shall be constructed as shown on the plans and in accordance with these requirements. All joints shall be constructed with their faces perpendicular to the surface of the pavement and finished or edged as shown on the plans. Joints shall not vary more than 1/2-inch (12 mm) from their designated position and shall be true to line with not more than 1/4-inch (6 mm) variation in 10 feet (3 m). The surface across the joints shall be tested with a 12-foot (3 m) straightedge as the joints are finished and any irregularities in excess of 1/4 inch (6 mm) shall be corrected before the concrete has hardened. All joints shall be so prepared, finished, or cut to provide a groove of uniform width and depth as shown on the plans.

**a. Construction.** Longitudinal construction joints shall be slip-formed or formed against side forms as shown in the plans.

Transverse construction joints shall be installed at the end of each day's placing operations and at any other points within a paving lane when concrete placement is interrupted for more than 30 minutes or it appears that the concrete will obtain its initial set before fresh concrete arrives. The installation of the joint shall be located at a planned contraction or expansion joint. If placing of the concrete is stopped, the Contractor shall remove the excess concrete back to the previous planned joint.

**b. Contraction.** Contraction joints shall be installed at the locations and spacing as shown on the plans. Contraction joints shall be installed to the dimensions required by forming a groove or cleft in the top of the slab while the concrete is still plastic or by sawing a groove into the concrete surface after the concrete has hardened. When the groove is formed in plastic concrete the sides of the grooves shall be finished even and smooth with an edging tool. If an insert material is used, the installation and edge finish shall be according to the manufacturer's instructions. The groove shall be finished or cut clean so that spalling will be avoided at intersections with other joints. Grooving or sawing shall produce a slot at least 1/8 inch (3 mm) wide and to the depth shown on the plans.

**c. Isolation (expansion).** Isolation joints shall be installed as shown on the plans. The pre-molded filler of the thickness as shown on the plans, shall extend for the full depth and width of the slab at the joint. The filler shall be fastened uniformly along the hardened joint face with no buckling or debris between the filler and the concrete interface, including a temporary filler for the sealant reservoir at the top of the slab. The edges of the joint shall be finished and tooled while the concrete is still plastic

**d. Dowels and Tie Bars for Joints**

**(1) Tie Bars.** Tie bars shall consist of deformed bars installed in joints as shown on the plans. Tie bars shall be placed at right angles to the centerline of the concrete slab and shall be spaced at intervals shown on the plans. They shall be held in position parallel to the pavement surface and in the middle of the slab depth and within the tolerances in paragraph 501-4.10(f.). When tie bars extend into an unpaved lane, they may be bent against the form at longitudinal construction joints, unless threaded bolt or other assembled tie bars are specified. Tie bars shall not be painted, greased, or enclosed in sleeves. When slip-form operations call for tie bars, two-piece hook bolts can be installed.

**(2) Dowel Bars.** Dowel bars shall be placed across joints in the proper horizontal and vertical alignment as shown on the plans. The dowels shall be coated with a bond-breaker or other lubricant recommended by the manufacturer and approved by the RPR. Dowels bars at longitudinal construction joints shall be bonded in drilled holes.

**(3) Placing Dowels and Tie Bars.** Horizontal spacing of dowels shall be within a tolerance of ±3/4 inch (19 mm). The vertical location on the face of the slab shall be within a tolerance of ±1/2 inch (12 mm). The method used to install dowels shall ensure that the horizontal and vertical alignment will not be greater than 1/4 inch per feet (6 mm per 0.3 m), except for those across the crown or other grade change joints. Dowels across crowns and other joints at grade changes shall be measured to a level surface. Horizontal alignment shall be checked perpendicular to the joint edge. The portion of each dowel intended to move within the concrete or expansion cap shall be wiped clean and coated with a thin, even film of lubricating oil or light grease before the concrete is placed. Dowels shall be installed as specified in the following subparagraphs.

**(a) Contraction Joints.** Dowels and tie bars in longitudinal and transverse contraction joints within the paving lane shall be held securely in place by means of rigid metal frames or basket assemblies of an approved type. The basket assemblies shall be held securely in the proper location by means of suitable pins or anchors. Do not cut or crimp the dowel basket tie wires.

At the Contractor's option, dowels and tie bars in contraction joints may be installed by insertion into the plastic concrete using approved equipment and procedures per the paver manufacturer's design. Approval of installation methods will be based on the results of the control strip showing that the dowels and tie bars are installed within specified tolerances as verified by cores or non-destructive rebar location devices approved by the RPR.

**(b) Construction Joints**. Install dowels and tie bars by the cast-in- place or the drill-and-dowel method. Installation by removing and replacing in preformed holes will not be permitted. Dowels and tie bars shall be prepared and placed across joints where indicated, correctly aligned, and securely held in the proper horizontal and vertical position during placing and finishing operations, by means of devices fastened to the forms.

**(c) Joints in Hardened Concrete.** Install dowels in hardened concrete by bonding the dowels into holes drilled into the concrete. The concrete shall have cured for seven (7) days or reached a minimum flexural strength of 450 psi (3.1 MPa) before drilling begins. Holes 1/8 inch (3 mm) greater in diameter than the dowels shall be drilled into the hardened concrete using rotary-core drills. Rotary-percussion drills may be used, provided that excessive spalling does not occur. Spalling beyond the limits of the grout retention ring will require modification of the equipment and operation. Depth of dowel hole shall be within a tolerance of ±1/2 inch (12 mm) of the dimension shown on the drawings. On completion of the drilling operation, the dowel hole shall be blown out with oil-free, compressed air. Dowels shall be bonded in the drilled holes using epoxy resin. Epoxy resin shall be injected at the back of the hole before installing the dowel and extruded to the collar during insertion of the dowel so as to completely fill the void around the dowel. Application by buttering the dowel will not be permitted. The dowels shall be held in alignment at the collar of the hole by means of a suitable metal or plastic grout retention ring fitted around the dowel.

**e. Sawing of Joints.** Sawing shall commence, without regard to day or night, as soon as the concrete has hardened sufficiently to permit cutting without chipping, spalling, or tearing and before uncontrolled shrinkage cracking of the pavement occurs and shall continue without interruption until all joints have been sawn. All slurry and debris produced in the sawing of joints shall be removed by vacuuming and washing. Curing compound or system shall be reapplied in the initial saw-cut and maintained for the remaining cure period.

Joints shall be cut in locations as shown on the plans. The initial joint cut shall be a minimum 1/8 inch (3 mm) wide and to the depth shown on the plans. Prior to placement of joint sealant or seals, the top of the joint shall be widened by sawing as shown on the plans.

**501-4.11 Finishing.** Finishing operations shall be a continuing part of placing operations starting immediately behind the strike-off of the paver. Initial finishing shall be provided by the transverse screed or extrusion plate. The sequence of operations shall be transverse finishing, longitudinal machine floating if used, straightedge finishing, edging of joints, and then texturing. Finishing shall be by the machine method. The hand method shall be used only on isolated areas of odd slab widths or shapes and in the event of a breakdown of the mechanical finishing equipment. Supplemental hand finishing for machine finished pavement shall be kept to an absolute minimum. Any machine finishing operation which requires appreciable hand finishing, other than a moderate amount of straightedge finishing, shall be immediately stopped and proper adjustments made, or the equipment replaced. Equipment, mixture, and/or procedures which produce more than 1/4 inch (6 mm) of mortar-rich surface shall be immediately modified as necessary to eliminate this condition or operations shall cease. Compensation shall be made for surging behind the screeds or extrusion plate and settlement during hardening and care shall be taken to ensure that paving and finishing machines are properly adjusted so that the finished surface of the concrete (not just the cutting edges of the screeds) will be at the required line and grade. Finishing equipment and tools shall be maintained clean and in an approved condition. At no time shall water be added to the surface of the slab with the finishing equipment or tools, or in any other way. Fog (mist) sprays or other surface applied finishing aids specified to prevent plastic shrinkage cracking, approved by the RPR, may be used in accordance with the manufacturer's requirements.

**a. Machine Finishing with Slipform Pavers.** The slipform paver shall be operated so that only a very minimum of additional finishing work is required to produce pavement surfaces and edges meeting the specified tolerances. Any equipment or procedure that fails to meet these specified requirements shall immediately be replaced or modified as necessary. A self-propelled non-rotating pipe float may be used while the concrete is still plastic, to remove minor irregularities and score marks. Only one pass of the pipe float shall be allowed. Equipment, mixture, and/or procedures which produce more than 1/4 inch (6 mm) of mortar-rich surface shall be immediately modified as necessary to eliminate this condition or operations shall cease. Remove excessive slurry from the surface with a cutting straightedge and wipe off the edge. Any slurry which does run down the vertical edges shall be immediately removed by hand, using stiff brushes or scrapers. No slurry, concrete or concrete mortar shall be used to build up along the edges of the pavement to compensate for excessive edge slump, either while the concrete is plastic or after it hardens.

**b. Machine Finishing with Fixed Forms.** The machine shall be designed to straddle the forms and shall be operated to screed and consolidate the concrete. Machines that cause displacement of the forms shall be replaced. The machine shall make only one pass over each area of pavement. If the equipment and procedures do not produce a surface of uniform texture, true to grade, in one pass, the operation shall be immediately stopped and the equipment, mixture, and procedures adjusted as necessary.

**c. Other Types of Finishing Equipment.** Clary screeds, other rotating tube floats, or bridge deck finishers are not allowed on mainline paving but may be allowed on irregular or odd-shaped slabs, and near buildings or trench drains, subject to the RPR's approval.

Bridge deck finishers shall have a minimum operating weight of 7500 pounds (3400 kg) and shall have a transversely operating carriage containing a knock-down auger and a minimum of two immersion vibrators. Vibrating screeds or pans shall be used only for isolated slabs where hand finishing is permitted as specified, and only where specifically approved.

**d. Hand Finishing.** Hand finishing methods will not be permitted, except under the following conditions: (1) in the event of breakdown of the mechanical equipment, hand methods may be used to

finish the concrete already deposited on the grade and (2) in areas of narrow widths or of irregular dimensions where operation of the mechanical equipment is impractical.

**e. Straightedge Testing and Surface Correction.** After the pavement has been struck off and while the concrete is still plastic, it shall be tested for trueness with a 12-foot (3.7-m) finishing straightedge swung from handles capable of spanning at least one-half the width of the slab. The straightedge shall be held in contact with the surface in successive positions parallel to the centerline and the whole area gone over from one side of the slab to the other, as necessary. Advancing shall be in successive stages of not more than one-half the length of the straightedge. Any excess water and laitance in excess of 1/8 inch (3 mm) thick shall be removed from the surface of the pavement and wasted. Any depressions shall be immediately filled with freshly mixed concrete, struck off, consolidated, and refinished. High areas shall be cut down and refinished. Special attention shall be given to assure that the surface across joints meets the smoothness requirements. Straightedge testing and surface corrections shall continue until the entire surface is found to be free from observable departures from the straightedge and until the slab conforms to the required grade and cross-section. The use of long-handled wood floats shall be confined to a minimum; they may be used only in emergencies and in areas not accessible to finishing equipment.

**501-4.12 Surface Texture.** The surface of the pavement shall be finished as designated below for all newly constructed concrete pavements. It is important that the texturing equipment not tear or unduly roughen the pavement surface during the operation. The texture shall be uniform in appearance and approximately 1/16 inch (2 mm) in depth. Any imperfections resulting from the texturing operation shall be corrected to the satisfaction of the RPR.

**a. Brush or Broom Finish.** Not used.

**b. Burlap Drag Finish.** Burlap, at least 15 ounces per square yard (555 grams per square meter), will typically produce acceptable texture. To obtain a textured surface, the transverse threads of the burlap shall be removed approximately one foot (30 cm) from the trailing edge. A heavy buildup of grout on the burlap threads produces the desired wide sweeping longitudinal striations on the pavement surface.

**c. Artificial Turf Finish.** Not used.

**501-4.13 Curing.** Immediately after finishing operations are completed and bleed water is gone from the surface, all exposed surfaces of the newly placed concrete shall be cured for a 7-day cure period in accordance with one of the methods below. Failure to provide sufficient cover material of whatever kind the Contractor may elect to use, or lack of water to adequately take care of both curing and other requirements, shall be cause for immediate suspension of concreting operations. The concrete shall not be left exposed for more than 1/2 hour during the curing period.

When a two-saw-cut method is used to construct the contraction joint, the curing compound shall be applied to the saw-cut immediately after the initial cut has been made. The sealant reservoir shall not be sawed until after the curing period has been completed. When the one cut method is used to construct the contraction joint, the joint shall be cured with wet rope, wet rags, or wet blankets. The rags, ropes, or blankets shall be kept moist for the duration of the curing period.

**a. Impervious Membrane Method.** Curing with liquid membrane compounds should not occur until bleed and surface moisture has evaporated. All exposed surfaces of the pavement shall be sprayed uniformly with white pigmented curing compound immediately after the finishing of the surface and before the set of the concrete has taken place. The curing compound shall not be applied during rainfall. Curing compound shall be applied by mechanical sprayers under pressure at the rate of one gallon (4 liters) to not more than 150 square feet (14 sq m). The spraying equipment shall be of the fully atomizing type equipped with a tank agitator. At the time of use, the compound shall be in a thoroughly mixed condition with the pigment uniformly dispersed throughout the vehicle. During application, the compound shall be stirred continuously by mechanical means. Hand spraying of odd widths or shapes and concrete surfaces exposed by the removal of forms will be permitted. When hand spraying is approved by

the RPR, a double application rate shall be used to ensure coverage. Should the film become damaged from any cause, including sawing operations, within the required curing period, the damaged portions shall be repaired immediately with additional compound or other approved means. Upon removal of side forms, the sides of the exposed slabs shall be protected immediately to provide a curing treatment equal to that provided for the surface.

**b. White Burlap-Polyethylene Sheets.** The surface of the pavement shall be entirely covered with the sheeting. The sheeting used shall be such length (or width) that it will extend at least twice the thickness of the pavement beyond the edges of the slab. The sheeting shall be placed so that the entire surface and both edges of the slab are completely covered. The sheeting shall be placed and weighted to remain in contact with the surface covered, and the covering shall be maintained fully saturated and in position for seven (7) days after the concrete has been placed.

**c. Water Method.** The entire area shall be covered with burlap or other water absorbing material. The material shall be of sufficient thickness to retain water for adequate curing without excessive runoff. The material shall be kept wet at all times and maintained for seven (7) days. When the forms are stripped, the vertical walls shall also be kept moist. It shall be the responsibility of the Contractor to prevent ponding of the curing water on the subbase.

**d. Concrete Protection for Cold Weather.** Maintain the concrete at a temperature of at least 50°F (10°C) for a period of 72 hours after placing and at a temperature above freezing for the remainder of the 7-day curing period. The Contractor shall be responsible for the quality and strength of the concrete placed during cold weather; and any concrete damaged shall be removed and replaced at the Contractor's expense.

**e. Concrete Protection for Hot Weather.** Concrete should be continuous moisture cured for the entire curing period and shall commence as soon as the surfaces are finished and continue for at least 24 hours. However, if moisture curing is not practical beyond 24 hours, the concrete surface shall be protected from drying with application of a liquid membrane-forming curing compound while the surfaces are still damp. Other curing methods may be approved by the RPR.

**501-4.14 Removing Forms.** Unless otherwise specified, forms shall not be removed from freshly placed concrete until it has hardened sufficiently to permit removal without chipping, spalling, or tearing. After the forms have been removed, the sides of the slab shall be cured in accordance with paragraph 501-4.13.

If honeycombed areas are evident when the forms are removed, materials, placement, and consolidation methods must be reviewed, and appropriate adjustments made to assure adequate consolidation at the edges of future concrete placements. Honeycombed areas that extend into the slab less than approximately 1 inch (25 mm), shall be repaired with an approved grout, as directed by the RPR. Honeycombed areas that extend into the slab greater than a depth of 1 inch (25 mm) shall be considered as defective work and shall be removed and replaced in accordance with paragraph 501-4.19.

**501-4.15 Saw-Cut Grooving.** If shown on the plans, grooved surfaces shall be provided in accordance with the requirements of Item P-621.

**501-4.16 Sealing Joints.** The joints in the pavement shall be sealed in accordance with Item P-604 and P-605.

**501-4.17 Protection of Pavement.** The Contractor shall protect the pavement and its appurtenances against both public traffic and traffic caused by the Contractor's employees and agents until accepted by the RPR. This shall include watchmen to direct traffic and the erection and maintenance of warning signs, lights, pavement bridges, crossovers, and protection of unsealed joints from intrusion of foreign material, etc. Any damage to the pavement occurring prior to final acceptance shall be repaired or the pavement replaced at the Contractor's expense.

Aggregates, rubble, or other similar construction materials shall not be placed on airfield pavements. Traffic shall be excluded from the new pavement by erecting and maintaining barricades and signs until the concrete is at least seven (7) days old, or for a longer period if directed by the RPR.

In paving intermediate lanes between newly paved pilot lanes, operation of the hauling and paving equipment will be permitted on the new pavement after the pavement has been cured to the requirements of subsection 501-4.18, the joints are protected, the slab edge is protected, and curing material is protected per subsection 501-4.13.

All new and existing pavement carrying construction traffic or equipment shall be kept clean and spillage of concrete and other materials shall be cleaned up immediately.

Damaged pavements shall be removed and replaced at the Contractor's expense. Slabs shall be removed to the full depth, width, and length of the slab.

**501-4.18 Opening to Construction Traffic.** The pavement shall not be opened to traffic until test specimens molded and cured in accordance with ASTM C31 have attained a flexural strength of 450 pounds per square inch (3100 kPa) when tested in accordance with ASTM C78. If such tests are not conducted, the pavement shall not be opened to traffic until 14 days after the concrete was placed. Prior to opening the pavement to construction traffic, all joints shall either be sealed or protected from damage to the joint edge and intrusion of foreign materials into the joint. As a minimum, backer rod or tape may be used to protect the joints from foreign matter intrusion.

**501-4.19 Repair, Removal, or Replacement of Slabs.** New pavement slabs that are broken or contain cracks or are otherwise defective or unacceptable as defined by acceptance criteria in paragraph 501-6.6 shall be removed and replaced or repaired, as directed by the RPR, at the Contractor's expense. Spalls along joints shall be repaired as specified. Removal of partial slabs is not permitted. Removal and replacement shall be full depth, shall be full width of the slab, and the limit of removal shall be normal to the paving lane and to each original transverse joint. The RPR will determine whether cracks extend full depth of the pavement and may require cores to be drilled on the crack to determine depth of cracking. Such cores shall be have a diameter of 2 inches (50 mm) to 4 inches (100 mm), shall be drilled by the Contractor and shall be filled by the Contractor with a well consolidated concrete mixture bonded to the walls of the hole with a bonding agent, using approved procedures. Drilling of cores and refilling holes shall be at no expense to the Owner. Repair of cracks as described in this section shall not be allowed if in the opinion of the RPR the overall condition of the pavement indicates that such repair is unlikely to achieve an acceptable and durable finished pavement. No repair of cracks shall be allowed in any panel that demonstrates segregated aggregate with an absence of coarse aggregate in the upper 1/8 inch (3 mm) of the pavement surface.

**a. Shrinkage Cracks.** Shrinkage cracks which do not exceed one-third of the pavement depth shall be cleaned and either high molecular weight methacrylate (HMWM) applied; or epoxy resin (Type IV, Grade 1) pressure injected using procedures recommended by the manufacturer and approved by the RPR. Sandblasting of the surface may be required following the application of HMWM to restore skid resistance. Care shall be taken to ensure that the crack is not widened during epoxy resin injection. All epoxy resin injection shall take place in the presence of the RPR. Shrinkage cracks which exceed one-third the pavement depth shall be treated as full depth cracks in accordance with paragraphs 501-4.19b and 501-19c.

**b. Slabs with Cracks Through Interior Areas.** Interior area is defined as that area more than 6 inches (150 mm) from either adjacent original transverse joint. The full slab shall be removed and replaced at no cost to the Owner, when there are any full depth cracks, or cracks greater than one-third the pavement depth, that extend into the interior area.

**c. Cracks Close to and Parallel to Joints.** All full-depth cracks within 6 inches (150 mm) either side of the joint and essentially parallel to the original joints, shall be treated as follows.

**(1) Full depth cracks and original joint not cracked.** The full-depth crack shall be treated as the new joint and the original joint filled with an epoxy resin.

**i. Full-Depth Crack.** The joint sealant reservoir for the crack shall be formed by sawing to a depth of 3/4 inches (19 mm), ±1/16 inch (2 mm), and to a width of 5/8 inch (16 mm), ±1/8 inch (3 mm). The crack shall be sawed with equipment specially designed to follow random cracks. Any equipment or procedure which causes raveling or spalling along the crack shall be modified or replaced to prevent raveling or spalling. The joint shall be sealed with sealant in accordance with P-605 or as directed by the RPR.

**ii. Original Joint.** If the original joint sealant reservoir has been sawed out, the reservoir and as much of the lower saw cut as possible shall be filled with epoxy resin, Type IV, Grade 2, thoroughly tooled into the void using approved procedures.

If only the original narrow saw cut has been made, it shall be cleaned and pressure injected with epoxy resin, Type IV, Grade 1, using approved procedures.

Where a parallel crack goes part way across paving lane and then intersects and follows the original joint which is cracked only for the remained of the width, it shall be treated as specified above for a parallel crack, and the cracked original joint shall be prepared and sealed as originally designed.

**(2) Full Depth Cracks and Original Joint Cracked.** If there is any place in the lane width where a parallel crack and a cracked portion of the original joint overlap, the entire slab containing the crack shall be removed and replaced.

**d. Removal and Replacement of Full Slabs.** Make a full depth cut perpendicular to the slab surface along all edges of the slab with a concrete saw cutting any dowels or tie-bars. Remove damaged slab protecting adjacent pavement from damage. Damage to adjacent slabs may result in removal of additional slabs as directed by the RPR at the Contractor's expense.

The underlying material shall be repaired, re-compacted and shaped to grade.

Dowels of the size and spacing specified for other joints in similar pavement on the project shall be installed along all four (4) edges of the new slab in accordance with paragraph 501-4.10d.

Placement of concrete shall be as specified for original construction. The joints around the new slab shall be prepared and sealed as specified for original construction.

**e. Spalls Along Joints.**

**(1)** Spalls less than one inch wide and less than the depth of the joint sealant reservoir, shall be filled with joint sealant material.

**(2)** Spalls larger than one inch and/or deeper than the joint reservoir, but less than ½ the slab depth, and less than 25% of the length of the adjacent joint shall be repaired as follows:

**i**. Make a vertical saw cut at least two inches (50 mm) outside the spalled area and to a depth of at least 2 inches (50 mm). Saw cuts shall be straight lines forming rectangular areas surrounding the spalled area.

**ii.** Remove unsound concrete and at least 1/2 inch (12 mm) of visually sound concrete between the saw cut and the joint or crack with a light chipping hammer.

**iii.** Clean cavity with high-pressure water jets supplemented with compressed air as needed to remove all loose material.

**iv.** Apply a prime coat of epoxy resin, Type III, Grade I, to the dry, cleaned surface of all sides and bottom of the cavity, except any joint face.

**v.** Fill the cavity with low slump concrete or mortar or with epoxy resin concrete or mortar.

**vi.** An insert or other bond-breaking medium shall be used to prevent bond at all joint faces.

**vii.** A reservoir for the joint sealant shall be sawed to the dimensions required for other joints, or as required to be routed for cracks. The reservoir shall be thoroughly cleaned and sealed with the sealer specified for the joints.

**(3)** Spalls deeper than 1/2 of the slab depth or spalls longer than 25% of the adjacent joint require replacement of the entire slab.

**f. Diamond Grinding of Concrete Surfaces.** Diamond grinding shall be completed prior to pavement grooving. Diamond grinding of the hardened concrete should not be performed until the concrete is at least 14 days old and has achieved full minimum strength. Equipment that causes ravels, aggregate fractures, spalls or disturbance to the joints will not be permitted. The depth of diamond grinding shall not exceed 1/2 inch (13 mm) and all areas in which diamond grinding has been performed will be subject to the final pavement thickness tolerances specified.

Diamond grinding shall be performed with a machine specifically designed for diamond grinding capable of cutting a path at least 3 feet (0.9 m) wide. The saw blades shall be 1/8-inch (3-mm) wide with sufficient number of flush cut blades that create grooves between 0.090 and 0.130 inches (2 and 3.5 mm) wide; and peaks and ridges approximately 1/32 inch (1 mm) higher than the bottom of the grinding cut. The Contractor shall determine the number and type of blades based on the hardness of the aggregate. 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. All grinding shall be at the expense of the Contractor.

## CONTRACTOR QUALITY CONTROL (CQC)

**501-5.1 Quality Control Program.** The Contractor shall develop a Quality Control Program in accordance with Item C-100. No partial payment will be made for materials that are subject to specific quality control requirements without an approved quality control program.

**501-5.2 Contractor Quality Control (CQC).** 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.

**501-5.3 Contractor QC Testing.** The Contractor shall perform all QC tests necessary to control the production and construction processes applicable to this specification and as set forth in the CQCP. The testing program shall include, but not necessarily be limited to, tests for aggregate gradation, aggregate moisture content, slump, and air content. A QC Testing Plan shall be developed and approved by the RPR as part of the CQCP.

The RPR may at any time, notwithstanding previous plant acceptance, reject and require the Contractor to dispose of any batch of concrete mixture which is rendered unfit for use due to contamination, segregation, or improper slump. Such rejection may be based on only visual inspection. 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**.**

**a. Fine Aggregate.**

**(1) Gradation.** A sieve analysis shall be made at least twice daily in accordance with ASTM C136 from randomly sampled material taken from the discharge gate of storage bins or from the conveyor belt.

**(2) Moisture Content.** If an electric moisture meter is used, at least two direct measurements of moisture content shall be made per week to check the calibration. If direct measurements are made in lieu of using an electric meter, two tests shall be made per day. Tests shall be made in accordance with ASTM C70 or ASTM C566.

**(3) Deleterious Substances.** Fine aggregate as delivered to the mixer shall be tested for deleterious substances in fine aggregate for concrete as specified in paragraph 501-2.1b, prior to production of the control strip, and a minimum of every 30-days during production or more frequently as necessary to control deleterious substances.

**b. Coarse Aggregate.**

**(1) Gradation.** A sieve analysis shall be made at least twice daily for each size of aggregate. Tests shall be made in accordance with ASTM C136 from randomly sampled material taken from the discharge gate of storage bins or from the conveyor belt.

**(2) Moisture Content.** If an electric moisture meter is used, at least two direct measurements of moisture content shall be made per week to check the calibration. If direct measurements are made in lieu of using an electric meter, two tests shall be made per day. Tests shall be made in accordance with ASTM C566.

**(3) Deleterious Substances.** Coarse aggregate as delivered to the mixer shall be tested for deleterious substances in coarse aggregate for concrete as specified in paragraph 501-2.1c, prior to production of the control strip, and a minimum of every 30-days during production or more frequently as necessary to control deleterious substances.

**c. Slump.** One test shall be made for each sublot. Slump tests shall be performed in accordance with ASTM C143 from material randomly sampled from material discharged from trucks at the paving site. Material samples shall be taken in accordance with ASTM C172.

**d. Air Content.** One test shall be made for each sublot. Air content tests shall be performed in accordance with ASTM C231 for gravel and stone coarse aggregate and ASTM C173 for slag or other porous coarse aggregate, from material randomly sampled from trucks at the paving site. Material samples shall be taken in accordance with ASTM C172.

**e. Unit Weight and Yield.** One test shall be made for each sublot. Unit weight and yield tests shall be in accordance with ASTM C138. The samples shall be taken in accordance with ASTM C172 and at the same time as the air content tests.

**f. Temperatures.** Temperatures shall be checked at least four times per lot at the job site in accordance with ASTM C1064.

**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 (3.7 m) straightedge, a rolling inclinometer meeting the requirements of ASTM E2133 or rolling external reference device that can simulate a 12-foot (3.7m) 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 either the FAA profile program, ProFAA, or FHWA profile program 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 (15 m) 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 (6 m); and at the third points of paving lanes when widths of paving lanes are 20 ft (6 m) 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.

Deviations on the final surface course in either the transverse or longitudinal direction that will trap water greater than 1/4 inch (6 mm) shall be corrected with diamond grinding per paragraph 501-4.19f 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 501-6.6.

Control charts shall be kept showing the 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 will be evaluated prior to and after placement of the concrete surface.

Measurements will be taken at appropriate gradelines (as a minimum at center and edges of paving lane) and longitudinal spacing as shown on paving plans. The final surface of the pavement will not vary from the finish grade spot elevations shown on the plans by more than 0.04 feet vertically and 0.1 feet laterally. The documentation will be provided by the Contractor to the RPR within 24 hours.

Areas with humps or depression that that exceed grade or smoothness and that retain water on the surface must be ground off provided the course thickness after grinding is not more than 1/2 inch (12 mm) less than the thickness specified on the plans. If these areas cannot be corrected with grinding, then the slabs that are retaining water must be removed and replaced in accordance with paragraph 501-4.19d. Grinding shall be in accordance with paragraph 501-4.19f. All corrections will be at the Contractors expense.

**501-5.4 Control Charts.** The Contractor shall maintain linear control charts for fine and coarse aggregate gradation, slump, and air content. The Contractor shall also maintain a control chart plotting the coarseness factor/workability factor from the combined gradations in accordance with paragraph 501-2.1d.

Control charts shall be posted in a location satisfactory to the RPR and shall be kept up to date at all times. 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, or Specification 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 potential problem and the Contractor is not taking satisfactory corrective action, the RPR may halt production or acceptance of the material.

**a. Fine and Coarse Aggregate Gradation.** The Contractor shall record the running average of the last five gradation tests for each control sieve on linear control charts. Superimposed on the control charts shall be the action and suspension limits. Gradation tests shall be performed by the Contractor per ASTM C136. The Contractor shall take at least two samples per lot to check the final gradation. Sampling shall be per ASTM D75 from the flowing aggregate stream or conveyor belt.

**b. Slump and Air Content.** The Contractor shall maintain linear control charts both for individual measurements and range (that is, difference between highest and lowest measurements) for slump and air content in accordance with the following Action and Suspension Limits.

**c. Combined Gradation.** The Contractor shall maintain a control chart plotting the coarseness factor and workability factor on a chart in accordance with paragraph 501-2.1d.

**Control Chart Limits[1]**

| Control Parameter | Individual Measurements | |
|---|---|---|
| | Action Limit | Suspension Limit |
| Gradation[2] | *[3] | *[3] |
| Coarseness Factor (CF) | ±3.5 | ±5 |
| Workability Factor (WF) | ±2 | ±3 |
| Slump | +0.5 to -1 inch (+13 to -25 mm) | +1 to -1.5 inch (+25 to -38 mm) |
| Air Content | ±1.5% | ±2.0% |

[1] Control charts shall be developed and maintained for each control parameter indicated.

[2] Control charts shall be developed and maintained for each sieve size.

[3] Action and suspension limits shall be determined by the Contractor.

**501-5.5 Corrective Action at Suspension Limit.** The CQCP shall indicate that appropriate action shall be taken when the process is believed to be out of control. The CQCP shall detail what action will be taken to bring the process into control and shall contain sets of rules to gauge when a process is out of control. As a minimum, a process shall be deemed out of control and corrective action taken if any one of the following conditions exists.

**a. Fine and Coarse Aggregate Gradation.** When two consecutive averages of five tests are outside of the suspension limits, immediate steps, including a halt to production, shall be taken to correct the grading.

**b. Coarseness and Workability Factor.** When the CF or WF reaches the applicable suspension limits, the Contractor, immediate steps, including a halt to production, shall be taken to correct the CF and WF.

**c. Fine and Coarse Aggregate Moisture Content.** Whenever the moisture content of the fine or coarse aggregate changes by more than 0.5%, the scale settings for the aggregate batcher and water batcher shall be adjusted.

**d. Slump.** The Contractor shall halt production and make appropriate adjustments whenever:

**(1)** one point falls outside the Suspension Limit line for individual measurements

OR

**(2)** two points in a row fall outside the Action Limit line for individual measurements.

**d. Air content.** The Contractor shall halt production and adjust the amount of air-entraining admixture whenever:

**(1)** one point falls outside the Suspension Limit line for individual measurements

OR

**(2)** two points in a row fall outside the Action Limit line for individual measurements.

**501-5.6 Quality Control Testing Summary.** Unless stated otherwise, all testing is conducted by the Contractor. All necessary field and laboratory testing shall be considered incidental to the work and no additional payment will be made.

The following table summarizes the testing required in this specification. The information included in this table does not waive any requirements listed throughout the specification. All test results shall be provided to the RPR within 48 hours of completion of the tests.

**Table 1. P-501 QC Testing Summary**

| Specification Reference | Test Type | Test Standard | Minimum Testing Frequency | Responsible Party |
|---|---|---|---|---|
| 2.1 a. | Aggregates - Reactivity | ASTM C1260, ASTM C1567 | For each source of material | Contractor |
| 2.1 b. | Fine Aggregate | ASTM C33, ASTM C88 ASTM C2419, ASTM C136 ASTM C142, ASTM C123 | For each source of material | Contractor |
| 2.1 c. | Coarse Aggregate | ASTM C131, ASTM C88 ASTM D4791, ASTM C29, ASTM C666, ASTM C142, ASTM C117 ASTM C123 | For each source of material | Contractor |
| 3.3 | Concrete Mix Proportions | ASTM C78, ASTM C192 ASTM C143 | For each mix design or change in source of materials | Contractor |
| 4.1 | Control Strip (250 feet for each type of pavement) | As outlined in 4.1 | Approved prior to full scale plant production | Contractor |

| | | | | |
|---|---|---|---|---|
| 4.7 c. | Temperature Management Program | HIPERPAV3 or other approved program | Prior to start of paving | Contractor |
| 5.3 a. (1) and b. (1) | Gradation | ASTM C136 | Twice daily | Contractor |
| 5.3 a. (2) and b. (2) | Moisture Content | ASTM C70, ASTM C566 | Twice per week if electric moisture meter is used, or<br>Twice per day if direct measurement is made | Contractor |
| 5.3 a. (3) and b. (3) | Deleterious Substances | ASTM C142, ASTM C117<br>ASTM C123 | Prior to production of control strip and minimum of every 30 days during production | Contractor |
| 5.3 c. | Slump | ASTM C143 | One per sublot | Contractor |
| 5.3 d. | Air Content | ASTM C231, ASTM C173 | One per sublot | Contractor |
| 5.3 e. | Unit Weight | ASTM C138 | One per sublot | Contractor |
| 5.3 f. | Temperatures | ASTM C1064 | Four times per lot | Contractor |
| 5.3 g.<br>(1) and (2) | Smoothness | 12 foot straight edge or rolling inclinometer (ASTM E2133)<br>Deviation <1/4 inch | Longitudinally –<br>Widths < 20': Center of each paving lane, continuously while advancing half the length of straight edge, including across the joints<br>Widths $\geq$ 20': Continuously along center of each paving lane and at the third point of paving lanes<br>Transvers – Perpendicular to paving lane centerline and across joint | Contractor |

| | | | | |
|---|---|---|---|---|
| | | | between paving lanes | |
| 5.3 h. | Grade | +/- 0.04 feet by survey per spot elevations furnished on plans | Prior to and after placement, with survey furnished to RPR within 48 hrs. | Contractor |
| 5.4 | Control Charts<br>a. Gradations<br>b. Slump and Air Content<br>c. Combined Gradations | | Daily during production paving | Contractor |

## MATERIAL ACCEPTANCE

**501-6.1 Quality Assurance (QA) Acceptance Sampling and Testing.** All acceptance sampling and testing necessary to determine conformance with the requirements specified in this section, with the exception of coring for thickness determination, will be performed by the RPR. The Contractor shall provide adequate facilities for the initial curing of beams. The Contractor shall bear the cost of providing initial curing facilities and coring and filling operations, per paragraph 501-6.5b(1).

The samples will be transported while in the molds. The curing, except for the initial cure period, will be accomplished using the immersion in saturated lime water method. During the 24 hours after molding, the temperature immediately adjacent to the specimens must be maintained in the range of 60° to 80°F (16° to 27°C), and loss of moisture from the specimens must be prevented. The specimens may be stored in tightly constructed wooden boxes, damp sand pits, temporary buildings at construction sites, under wet burlap in favorable weather, or in heavyweight closed plastic bags, or using other suitable methods, provided the temperature and moisture loss requirements are met.

**501-6.2 Quality Assurance (QA) Testing Laboratory**. Quality assurance testing organizations performing these acceptance tests will be accredited in accordance with ASTM C1077. The quality assurance laboratory accreditation must be current and listed on the accrediting authority's website. All test methods required for acceptance sampling and testing must be listed on the lab accreditation. A copy of the laboratory's current accreditation and accredited test methods will be submitted to the RPR prior to start of construction.

**501-6.3 Lot Size.** Concrete will be accepted for strength and thickness on a lot basis. A lot will consist of a day's production not to exceed 6,000 square yards. Each lot will be divided into approximately equal sublots with individual sublots between 1,100 to 1,600 square yards. Where three sublots are produced, they will constitute a lot. Where one or two sublots are produced, they will be incorporated into the previous or next lot. Where more than one plant is simultaneously producing concrete for the job, the lot sizes will apply separately for each plant.

**501-6.4 Partial Lots.** When operational conditions cause a lot to be terminated before the specified number of tests have been made for the lot or for overages or minor placements to be considered as partial lots, the following procedure will be used to adjust the lot size and the number of tests for the lot.

Where three sublots have been produced, they will constitute a lot. Where one or two sublots have been produced, they will be incorporated into the next lot or the previous lot and the total number of sublots will be used in the acceptance criteria calculation, that is, n=5 or n=6.

**501-6.5 Acceptance Sampling and Testing.**

**a. Strength.**

**(1) Sampling.** One sample will be taken for each sublot from the concrete delivered to the job site. Sampling locations will be determined by the RPR in accordance with random sampling procedures contained in ASTM D3665. The concrete will be sampled in accordance with ASTM C172.

**(2) Test Specimens.** The RPR will be responsible for the casting, initial curing, transportation, and curing of specimens in accordance with ASTM C31. Two (2) specimens will be made from each sample and slump, air content, unit weight, and temperature tests will be conducted for each set of strength specimens. Within 24 to 48 hours, the samples will be transported from the field to the laboratory while in the molds. Samples will be cured in saturated lime water.

The strength of each specimen will be determined in accordance with ASTM C78. The strength for each sublot will be computed by averaging the results of the two test specimens representing that sublot.

**(3) Acceptance.** Acceptance of pavement for strength will be determined by the RPR in accordance with paragraph 501-6.6b(1). All individual strength tests within a lot will be checked for outliers in accordance with ASTM E178, at a significance level of 5%. Outliers will be discarded, and the remaining test values will be used to determine acceptance in accordance with paragraph 501-6.5b.

**b. Pavement Thickness.**

**(1) Sampling.** One core will be taken by the Contractor for each sublot in the presence of the RPR. Sampling locations will be determined by the RPR in accordance with random sampling procedures contained in ASTM D3665. Areas, such as thickened edges, with planned variable thickness, will be excluded from sample locations.

Cores shall be a minimum 4 inch (100 mm) in diameter neatly cut with a core drill. The Contractor will furnish all tools, labor, and materials for cutting samples and filling the cored hole. Core holes will be filled by the Contractor with a non-shrink grout approved by the RPR within one day after sampling.

**(2) Testing.** The thickness of the cores will be determined by the RPR by the average caliper measurement in accordance with ASTM C174. Each core shall be photographed, and the photograph included with the test report.

**(3) Acceptance.** Acceptance of pavement for thickness will be determined by the RPR in accordance with paragraph 501-6.6.

**501-6.6 Acceptance criteria.**

**a. General.** Acceptance will be based on the following characteristics of the completed pavement discussed in paragraph 501-6.5b:

**(1)** Strength

**(2)** Thickness

**(3)** Grade

**(4)** Profilograph smoothness

**(5)** Adjustments for repairs

Acceptance for strength, thickness, and grade, will be based on the criteria contained in accordance with paragraph 501-6.6b(1), 501-6.6b(2), and 501-6.6b(3), respectively. Acceptance for profilograph smoothness will be based on the criteria contained in paragraph 501-6.6b(4).

Production quality must achieve 90 PWL or higher to receive full pavement.

Strength and thickness will be evaluated for acceptance on a lot basis using the method of estimating PWL. Production quality must achieve 90 PWL or higher to receive full pavement. The PWL will be determined in accordance with procedures specified in Item C-110.

The lower specification tolerance limit (L) for strength and thickness will be:

**Lower Specification Tolerance Limit (L)**

| | |
|---|---|
| **Strength** | 0.93 × strength specified in paragraph 501-3.3 |
| **Thickness** | Lot Plan Thickness in inches, - 0.50 in |

**b. Acceptance criteria.**

**(1) Strength.** If the PWL of the lot equals or exceeds 90%, the lot will be acceptable. Acceptance and payment for the lot will be determined in accordance with paragraph 501-8.1.

(**2) Thickness.** If the PWL of the lot equals or exceeds 90%, the lot will be acceptable. Acceptance and payment for the lot will be determined in accordance with paragraph 501-8.1.

**(3) Grade.** The final finished surface of the pavement of the completed project will not vary from the finish grade spot elevations shown on the plans by more than 0.04 feet vertically or 0.1 feet laterally. The documentation stamped and signed by a licensed surveyor shall be in accordance with paragraph 501-5.3h. Payment for sublots that do not meet grade for over 25% of the sublot shall be reduced by 5% and not be more than 95%.

**(4) 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 501-4.19f 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.

**(5) Adjustments for repair.** Sublots with spall repairs, crack repairs, or partial panel replacement, will be limited to no more than 95% payment.

**(6) Adjustment for grinding**. For sublots with grinding over 25% of a sublot, payment will be reduced 5%.

**501-6.7 Quality Assurance Testing Summary.** The following table summarizes the testing required in this specification. The information included in this table does not waive any requirements listed throughout the specification. All test results shall be provided to the RPR within 48 hours of completion of the tests.

**Table 1. P-501 QA Testing Summary**

| Specification Reference | Test Type | Test Standard | Minimum Testing Frequency | Responsible Party |
|---|---|---|---|---|
| 6.5 a. | Strength | ASTM C172, ASTM C31, ASTM C78 | 1 sample per sublot 2 specimens per sample and slump, air content, unit weight, and temperature | RPR QA Testing Lab |
| 6.5 b. | Pavement Thickness Testing | ASTM C174 | One core per sublot<br>Thickness Measurements | RPR QA Testing Lab<br>Contractor to Furnish Cores |
| 6.6 b. (3) | Grade | +/- 0.04 feet by survey per spot elevations furnished on plans | Prior to and after placement, with survey furnished to RPR within 48 hrs. | Contractor |
| 6.6 b. (4) | Profilograph Smoothness | Profile Index <15" per mile per 1/10 mile<br>ASTM E1274, ASTM E950 | Profilograph<br>Data furnished within 48 hrs. | Contractor<br>In presence of RPR |

## METHOD OF MEASUREMENT

**501-7.1** Concrete pavement shall be measured by the number square yards of pavement as specified in-place, completed and accepted.

## BASIS OF PAYMENT

**501-8.1 Payment.** Payment for concrete pavement meeting all acceptance criteria as specified in paragraph 501-6.6. Acceptance Criteria shall be based on results of strength , smoothness, and thickness tests. Payment for acceptable lots of concrete pavement shall be adjusted in accordance with paragraph 501-8.1a for strength and thickness; 501-8.1b for repairs; 501-8.1c for grinding; and 501-8.1d for smoothness, subject to the limitation that:

The total project payment for concrete pavement shall not exceed 100 percent of the product of the contract unit price and the total number of square yards of concrete pavement used in the accepted work (See Note 1 under the Price Adjustment Schedule table below).

Payment shall be full compensation for all labor, materials (including reinforcement), tools, equipment, and incidentals required to complete the work as specified herein and on the drawings.

**a. Basis of adjusted payment.** The pay factor for each individual lot shall be calculated in accordance with the Price Adjustment Schedule table below. A pay factor shall be calculated for both strength and thickness. The lot pay factor shall be the higher of the two values when calculations for both strength and thickness are 100% or higher. The lot pay factor shall be the product of the two values when only one of the calculations for either strength or thickness is 100% or higher. The lot pay factor shall be the lower of the two values when calculations for both strength and thickness are less than 100%.

**Price Adjustment Schedule[1]**

| Percentage of Materials Within Specification Limits (PWL) | Lot Pay Factor (Percent of Contract Unit Price) |
|---|---|
| 96 – 100 | 106 |
| 90 – 95 | PWL + 10 |
| 75 – 90 | 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 in excess of 100% shall be subject to the total project payment limitation specified in paragraph 501-8.1.

[2] The lot shall be removed and replaced unless, after receipt of FAA concurrence, the Owner and Contractor agree in writing that the lot will remain; the lot paid at 50% of the contract unit price; and the total project payment limitation reduced by the amount withheld for that lot.

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 501-8.1. Payment in excess of 100% for accepted lots of concrete pavement shall be used to offset payment for accepted lots of concrete pavement that achieve a lot pay factor less than 100%; except for rejected lots which remain in place and/or sublots with adjustments for repairs.

**b. Adjusted payment for repairs.** The PWL lot pay factor shall be reduced by 5% and be no higher than 95% for sublots which contain repairs in accordance with paragraph 501-4.19 on more than 20% of the slabs within the sublot. Payment factors greater than 100 percent for the strength and thickness cannot be used to offset adjustments for repairs.

**c. Adjusted payment for grinding.** The PWL lot pay factor shall be reduced by 5% and be no higher than 95% for sublots with grinding over 25% of a sublot.

**d. Profilograph Roughness.** The Contractor will receive full payment when the profilograph average profile index is in accordance with paragraph 501-6.6b(4). 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.

**e. Payment.** Payment shall be made under:

Item P-501-8.1 Portland Cement Concrete Pavement (6”) - per square 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 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 A996 | Standard Specification for Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement |
| ASTM A1035 | Standard Specification for Deformed and Plain, Low-Carbon, Chromium, Steel Bars for Concrete Reinforcement |
| ASTM A1064 | Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete |
| ASTM A1078 | Standard Specification for Epoxy-Coated Steel Dowels for Concrete Pavement |
| ASTM C29 | Standard Test Method for Bulk Density (“Unit Weight”) and Voids in Aggregate |
| 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 C70 | Standard Test Method for Surface Moisture in Fine Aggregate |
| ASTM C78 | Standard Test Method for Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading) |
| ASTM C88 | Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate |
| ASTM C94 | Standard Specification for Ready-Mixed Concrete |
| ASTM C114 | Standard Test Methods for Chemical Analysis of Hydraulic Cement |

| | |
|---|---|
| ASTM C117 | Standard Test Method for Materials Finer than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing |
| ASTM C123 | Standard Test Method for Lightweight Particles in Aggregate |
| ASTM C136 | Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates |
| 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 C138 | Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete |
| ASTM C142 | Standard Test Method for Clay Lumps and Friable Particles in 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 C173 | Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method |
| ASTM C174 | Standard Test Method for Measuring Thickness of Concrete Elements Using Drilled Concrete Cores |
| ASTM C227 | Standard Test Method for Potential Alkali Reactivity of Cement-Aggregate Combinations (Mortar-Bar Method) |
| 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 C295 | Standard Guide for Petrographic Examination of Aggregates 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 C566 | Standard Test Method for Total Evaporable Moisture Content of Aggregates by Drying |
| ASTM C595 | Standard Specification for Blended Hydraulic Cements |
| ASTM C618 | Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete |
| ASTM C642 | Standard Test Method for Density, Absorption, and Voids in Hardened 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 C881 | Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete |
| 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 |
| ASTM C1064 | Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete |
| 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 C1567 | Standard Test Method for Determining the Potential Alkali-Silica Reactivity of Combinations of Cementitious Materials and Aggregate (Accelerated Mortar-Bar Method) |
| ASTM C1602 | Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete |
| ASTM D75 | Standard Practice for Sampling Aggregates |
| ASTM D1751 | Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types) |
| ASTM D1752 | Standard Specification for Preformed Sponge Rubber and Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction |
| ASTM D2419 | Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate |
| ASTM D3665 | Standard Practice for Random Sampling of Construction Materials |
| ASTM D4791 | Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate |
| ASTM E178 | Standard Practice for Dealing with Outlying Observations |
| ASTM E1274 | Standard Test Method for Measuring Pavement Roughness Using a Profilograph |

| | |
|---|---|
| ASTM E2133 | Standard Test Method for Using a Rolling Inclinometer to Measure Longitudinal and Transverse Profiles of a Traveled Surface |

American Concrete Institute (ACI)

| | |
|---|---|
| ACI 305R | Guide to Hot Weather Concreting |
| ACI 306R | Guide to Cold Weather Concreting |
| ACI 309R | Guide for Consolidation of Concrete |

Advisory Circulars (AC)

| | |
|---|---|
| AC 150/5320-6 | Airport Pavement Design and Evaluation |

Federal Highway Administration (FHWA)

HIPERPAV 3, version 3.2

Portland Concrete Association (PCA)

| | |
|---|---|
| PCA | Design and Control of Concrete Mixtures, 16th Edition |

U.S. Army Corps of Engineers (USACE) Concrete Research Division (CRD)

| | |
|---|---|
| CRD C662 | Determining the Potential Alkali-Silica Reactivity of Combinations of Cementitious Materials, Lithium Nitrate Admixture and Aggregate (Accelerated Mortar-Bar Method) |

United States Air Force Engineering Technical Letter (ETL)

| | |
|---|---|
| ETL 97-5 | Proportioning Concrete Mixtures with Graded Aggregates for Rigid Airfield Pavements |

**END ITEM P-501**

# 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 (13 km per hour) or seven (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 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 (3.7-m) 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.

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** The emulsified asphalt material for tack coat shall be measured by the gallon (liter). Volume shall be corrected to the volume at 60°F (16°C) in accordance with ASTM D1250. The emulsified asphalt material paid for will be the measured quantities used in the accepted work, provided that the measured quantities are not 10% over the specified application rate. Any amount of emulsified asphalt material more than 10% over the specified application rate for each application will be deducted from the measured quantities, except for irregular areas where hand spraying of the emulsified asphalt material is necessary. Water added to emulsified asphalt will not be measured for payment.

## BASIS OF PAYMENT

**603.5-1** Payment shall be made at the contract unit price per gallon of emulsified asphalt material. This price shall be full compensation for furnishing all materials, for all preparation, delivery, 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-603-5.1 | Emulsified Asphalt Tack Coat - per gallon |

## 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 |
| 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

# Item P-604 Compression Joint Seals for Concrete Pavements

## DESCRIPTION

**604-1.1** This item shall consist of preformed polychloroprene compression seals used for sealing joints of rigid pavements.

## MATERIALS

**604-2.1 Compression Seals.** Compression joint seal materials shall be a vulcanized elastomeric compound using polychloroprene as the only base polymer. The material and the manufactured seal shall conform to ASTM D2628 and Corps of Engineers Concrete Research Division (CRD) C548**.**

The joint seal shall be a labyrinth type seal. The uncompressed depth of the face of the compression seal (that is to be bonded to the joint wall) shall be greater than the uncompressed width of the seal, except that for seals one inch (25 mm) or greater in width, the depth need be only one inch (25 mm) or greater. The actual width of the uncompressed seal shall be as recommended by the joint seal manufacturer for the type and width of joints as shown on the plans. The tolerance on the seal shall be +1/8 inch or -1/16 inch **(**+3 mm or -2 mm)**,** below the top of the pavement surface or bottom of groove for grooved pavement.

The Contractor shall provide a copy of the manufacturer's Certificate of Analysis (COA) for the joint seal material delivered to the project. The COA shall be provided to and approved by the RPR before the material is installed. The furnishing of the vendor's certified test report 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.

Materials delivered to the job site shall be inspected for defects, unloaded, and stored with a minimum of handling to avoid damage. Storage facilities shall be provided at the job site to protect materials from weather and maintain materials at temperatures recommended by the manufacturer.

Representative sample of joint seal material will be sampled and retained by the RPR for possible testing.

**604-2.2 Lubricant/Adhesive.** Lubricant/adhesive used for the compression elastomeric joint seal shall be a one-component compound conforming to ASTM D2835.

## CONSTRUCTION METHODS

**604-3.1 Equipment.** Machines, tools, and equipment used in the performance of the work required by this section shall be approved by the RPR before the work starts and shall be maintained by the Contractor in satisfactory condition at all times.

**a. Joint Cleaning Equipment.**

(**1) Concrete Saw.** A self-propelled power saw with water-cooled diamond saw blades shall be provided for cutting joints to the depths and widths specified and for removing filler, existing old joint seal or other material embedded in the joints or adhered to the joint faces.

**(2) Waterblasting Equipment.** Waterblasting equipment shall include a trailer-mounted water tank, pumps, high-pressure hose, a wand with safety release cutoff controls, nozzle, and auxiliary water resupply equipment. The water tank and auxiliary water resupply equipment shall be of sufficient

capacity to permit continuous operations. The pumps, hoses, wand, and nozzle shall be of sufficient capacity to permit the cleaning of both walls of the joint and the pavement surface for a width of at least 1/2 inch (12 mm) on either side of the joint. The pump shall be capable of supplying a pressure of at least 3,000 psi (20.7 MPa). A pressure gauge mounted at the pump shall show at all times the pressure in pounds per square inch (psi) (kPa) at which the equipment is operating.

(**3) Sandblasting Equipment.** Sandblasting equipment shall include an air compressor, hose, and a long-wearing venturi-type nozzle of proper size, shape, and opening. The maximum nozzle opening should not exceed 1/4 inch (6 mm). The air compressor shall be portable and shall be capable of furnishing not less than 150 cubic feet (4200 liters) per minute and maintaining a line pressure of not less than 90 psi (620 kPa) at the nozzle while in use. The compressor shall be equipped with traps that will maintain the compressed air free of oil and water. The nozzle shall have an adjustable guide that will hold the nozzle aligned with the joint about one inch (25 mm) above the pavement surface and will direct the blast to clean the joint walls. The height, angle of inclination, and the size of the nozzle shall be adjusted as necessary to ensure satisfactory results.

**b. Sealing Equipment.** Equipment used to install the compression seal shall place the compression seal to the prescribed depths within the specified tolerances without cutting, nicking, twisting, or otherwise damaging the seal. The equipment shall not stretch or compress the seal more than 2.0% longitudinally during installation. The machine shall be an automatic self-propelled joint seal application equipment and shall be engine powered. The machine shall include a reservoir for the lubricant/adhesive, a device for conveying the lubricant/adhesive in the proper quantities to the sides the preformed seal or the sidewalls of the joint, a reel capable of holding one full spool of compression seal, and a power-driven apparatus for feeding the joint seal through a compression device and inserting the seal into the joint. The equipment shall also include a guide to maintain the proper course along the joint being sealed. The machine shall at all times be operated by an experienced operator.

Hand operated joint seal application equipment may be used for localized areas and for projects less than 500 square yards (450 square meters). The equipment shall be a two-axle, four-wheel machine that includes means for compressing and inserting the compression seal into the joint and a reel capable of holding one full spool of compression seal material.

## CONSTRUCTION METHODS

**604-4.1 Environmental Conditions**. The ambient temperature and the pavement temperature within the joint wall shall be at least 35°F (2°C) and rising at the time of installation of the materials. Sealant application will not be permitted if moisture or any foreign material is observed in the joint.

**604-4.2 Trial Joint Seal and Lubricant/Adhesive Installation.** Prior to the cleaning and sealing of the joints for the entire project, a control strip at least 200 feet (69 meters) long shall be prepared at a location designated by the RPR using the specified materials and the approved equipment, to demonstrate the materials and construction processes for joint preparation and sealing of all types of joints included in the project. No other joints shall be sealed until the test installation has been approved by the RPR.

If materials or installation do not meet requirements, the materials shall be removed, and the joints shall be cleaned, and a new trial joint seal installation shall be performed at the Contractor's expense. The RPR approved trial section will be incorporated into the permanent work.

**604-4.3 Preparation of Joints.** Immediately before installation of the compression joint seal, the joints shall be thoroughly cleaned to remove all laitance, filler, existing sealer, foreign material and protrusions of hardened concrete from the sides and upper edges of the joint space to be sealed. Cleaning shall extend along pavement surfaces at least 1/2 inch (12 mm) on either side of the joint. After final cleaning and immediately prior to sealing, the joints shall be blown out with compressed air and left free of debris and

water. Any irregularity in the joint face that would prevent uniform contact between the joint seal and the joint face shall be corrected prior to the installation of the joint seal.

**a. Sawing.** Joints shall be sawed to clean and to open them to the full specified width and depth. Immediately following the sawing operation, the joint faces and opening shall be thoroughly cleaned using a water jet to remove all saw cuttings or debris remaining on the faces or in the joint opening. Compression seal shall be installed within three (3) calendar days of the time the joint cavity is sawed. Depth of the joint cavity shall be in accordance with manufacturer's instructions. Submit printed copies of manufacturers' instructions 60 days prior to use on the project. The saw cut for the joint seal cavity shall at all locations be centered over the joint line. The nominal width of the sawed joint seal cavity shall be as follows; the actual width shall be within a tolerance of ±1/16 inch (2 mm):

(**1)** If a nominal 13/16 inch (21 mm) wide compression seal is furnished, the nominal width of the saw cut shall be 8/16 inches (12 mm) when the pavement temperature at the time of sawing is between 25 and 80 °F (-4 and 27 °C). If the pavement temperature at the time of sawing is above this range, the nominal width of the saw cut shall be decreased 1/16 inch (2 mm). If the pavement temperature at the time of sawing is below this range, the nominal width of the saw cut shall be increased 1/16 inch (2 mm).

(**2)** If a nominal one inch (25 mm) wide compression seal is furnished, the nominal width of the saw cut shall be 9/16 inches (14 mm) when the pavement temperature at the time of sawing is between 25 and 140 °F (-4 and 60 °C). If the pavement temperature at the time of sawing is above this range, the nominal width of the saw cut shall be decreased 1/16 inch (2 mm). If the pavement temperature at the time of sawing is below this range, the nominal width of the saw cut shall be increased 1/16 inch (2 mm).

**(3)** The pavement temperature shall be measured and recorded in the presence of the RPR. Measurement shall be made each day before commencing sawing and at any other time during the day when the temperature appears to be moving out of the allowable sawing range.

**b. Waterblast Cleaning.** The concrete joint faces and pavement surfaces extending at least 1/2 inch (12 mm) from the joint edges shall be waterblasted clean. A multiple pass technique shall be used until the surfaces are free of dust, dirt, curing compound, or any residue that might prevent ready insertion or uniform contact of the seal and bonding of the lubricant/adhesive to the concrete. After final cleaning and immediately prior to sealing, the joints shall be blown out with compressed air and left completely free of debris and water.

**c. Sandblast Cleaning**. The concrete joint faces and pavement surfaces extending at least 1/2 inch (12 mm) from the joint edges shall be sandblasted clean. A multiple pass technique shall be used until the surfaces are free of dust, dirt, curing compound, or any residue that might prevent ready insertion or uniform contact of the seal and bonding of the lubricant/adhesive to the concrete. After final cleaning and immediately prior to sealing, the joints shall be blown out with compressed air and left completely free of debris and water.

**d. Rate of Progress.** Cleaning of the joint faces shall be limited to the linear footage of joint that can be sealed during the same workday.

**604-4.4 Installation of the compression seal.**

**a. Time of Installation.** Joints shall be sealed within 3 calendar days of sawing the joint seal cavity and the final cleaning of the joint walls, or a temporary seal shall be installed to prevent infiltration of foreign material. If rain interrupts the sealing operations, the joints shall be washed, cleaned with air and be dry before proceeding with installing of the lubricant/adhesive and compression seal.

**b. Installation Sequence.** Longitudinal joints shall be sealed first, then seal the transverse joints. Transverse joint seals will be continuous from edge to edge of the pavement. Intersections shall be made monolithic by use of joint seal adhesive and care in fitting the intersection parts together. Seals which do

not reach an intersection shall be removed and replaced with new seal as directed by the RPR at the Contractor's Expense. Seal extender pieces shall not be used at intersections.

**c. Sealing Joints.** The sides of the joint seal or the sides of the joint shall be covered with a coating of lubricant/adhesive and the seal installed as specified. Butt joints and seal intersections shall be coated with liberal applications of lubricant/adhesive. Lubricant/adhesive spilled on the pavement shall be removed immediately to prevent setting on the pavement.

The joint seal shall be placed at a uniform depth within the tolerances specified. The compression joint seal shall be placed to a depth of 3/16 inch (5 mm), ±1/8 inch (3 mm), below the pavement surface or below the depth of the groove unless otherwise directed by the RPR.

The seal shall be installed in the longest practicable lengths in longitudinal joints and shall be cut at the joint intersections to provide continuous installation of the seal in the transverse joints. The joint seal shall be installed in an upright position, free from twisting, distortion, and cuts. If stretch of installed joint seal exceeds 1%, adjustments shall be made to the installation equipment and procedure. Stretch of installed joint seals exceeding 2% stretch shall be removed and replaced.

After installation of the longitudinal joint seals, it shall set for a minimum of one (1) hour prior to cutting the seal at the joint intersections. For all transverse joints, the minimum length of the preformed joint seal shall be the pavement width from edge to edge.

**604-4.5 Clean-Up.** Upon completion of the project, all unused materials shall be removed from the site, all lubricant/adhesive on the pavement surface shall be removed, and the pavement shall be left in clean condition.

**604-4.6 Quality Control and Quality Assurance.**

**a. Quality Control** The application equipment shall be inspected to assure uniform application of lubricant/adhesive to the sides of the compression joint seal or the walls of the joint. Equipment causing cutting, twisting, nicking, excessive stretching or compressing of the compression seal, or improper application of the lubricant/adhesive, shall not be used until causes of the deficiencies are determined and corrected by the Contractor.

The seal shall be inspected by the Contractor a minimum of once per 400 feet (120 m) of seal for compliance to the shrinkage or compression requirements. Measurements shall be made at the same interval to determine conformance with depth and width installation requirements.

**b. Quality Assurance.** Cleaned joints shall be approved by the RPR prior to installation of the lubricant/adhesive and compression joint seal.

Conformance to stretching and compression limitations shall be determined by the RPR using the following procedures:

**(1)** Mark the top surface of the compression seal at one foot (30 cm) intervals in a manner clear and durable to enable length determinations of the seal.

**(2)** After installation, the distance between the marks on the seal shall be measured by the Contractor.

**(3)** If the stretching or compression exceeds the specified limit, the seal shall be removed and replaced with new joint seal at the Contractor's Expense. The seal shall be removed up to the last correct measurement.

**604-4.7 Acceptance.** The joint sealing system (compression seal and lubricant/adhesive) shall be inspected by the RPR for proper rate of cure and bonding to the concrete, cuts, twists, nicks, and other deficiencies. Seals exhibiting any defects prior to final acceptance of the project, shall be removed from the joint, wasted, and replaced with new material in a satisfactory manner, at the Contractor's expense, as determined by the RPR.

## METHOD OF MEASUREMENT

**604-5.1 Measurement.** The quantity of compression joint seals installed and accepted, will be determined by the linear foot.

## BASIS OF PAYMENT

**604-6.1 Payment.** Payment will be made at the contract unit bid prices per linear foot for the compression joint seals. The unit bid prices shall include the cost of all labor, materials, the use of all equipment, and tools required to complete the work.

Item 604-6.1 Compression Joint Seals for Concrete Pavements – 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 D2628 | Standard Specification for Preformed Polychloroprene Elastomeric Joint Seals for Concrete Pavements |
| ASTM D2835 | Standard Specification for Lubricant for Installation of Preformed Compression Seals in Concrete Pavements |

Corps of Engineers

| | |
|---|---|
| CRD C548 | Standard Specification for Jet-Fuel and Heat Resistant Preformed Polychloroprene Elastomeric Joint Seals for Rigid Pavements |

Unified Facilities Criteria (UFC)

| | |
|---|---|
| UFC 3-250-08FA | Standard Practice for Sealing Joints and Cracks in Rigid and Flexible Pavements |

## END ITEM P-604

# 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 the following:

ASTM D6690 – for joints between asphalt and concrete pavements

ASTM D5893 – for joints between concrete and concrete pavements

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.

## 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, 3 days prior to pre-work meeting and 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.** The Contractor must demonstrate sandblasting equipment including the air compressor, 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 Resident Project Representative (RPR), that the method cleans the joint and does not damage the joint.

**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 sandblasting, tractor-mounted routing equipment, concrete saw, or 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 (12 mm) from the joint edge shall be sandblasted clean. Sandblasting shall be accomplished in a minimum of two passes. One pass per joint face with the nozzle held at an angle directly toward the joint face and not more than 3 inches (75 mm) from it. 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.

**c. 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.

**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 (15 m) ahead of the joint sealing operations, perform a final cleaning with compressed air. Fill the joints from the bottom up to 1/4 inch (6 mm) ±1/16 inch (2 mm) 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** Joint sealing material shall be measured by the linear foot of sealant in place, completed, and accepted.

## BASIS OF PAYMENT

**605-5.1** Payment for joint sealing material shall be made at the contract unit price per linear foot. The price shall be full compensation 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.

Payment will be made under:

| | |
|---|---|
| Item P-605-5.1 | Seal Joint Between Asphalt and Concrete - 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 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 |
| 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-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 the expansion is greater than 0.20% the aggregates shall not be used, and test results for other aggregates must be submitted for evaluation.

**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 |

**610-2.2.1 Coarse Aggregate Susceptibility to Durability (D) Cracking.** Coarse aggregate may only be accepted from sources that have a 20-year service history for the same gradation to be supplied with no history of D-Cracking. Aggregates that do not have a 20-year record of service free from major repairs (less than 5% of slabs replaced) in similar conditions without D-cracking shall not be used unless the material currently being produced has a durability factor greater than or equal to 95 per ASTM C666. The Contractor shall submit a current certification and test results to verify the aggregate acceptability. Test results will only be accepted from a State Department of Transportation (DOT) materials laboratory or an accredited laboratory. Certification and test results which are not dated or which are over one (1) year old or which are for different gradations will not be accepted.

Crushed granite, calcite cemented sandstone, quartzite, basalt, diabase, rhyolite or trap rock are considered to meet the D-cracking test requirements but must meet all other quality tests specified in Item P-501.

**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 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.

**610-2.10 Steel Reinforcement.** Reinforcing shall consist of wire fabric conforming to the requirements of ASTM A1064**.**

**610-2.11 Materials for Curing Concrete.** Curing materials shall conform to 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 (280 kg per cubic meter). 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 (100 mm) 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.

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 (1.5 m). 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.

## 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; test air content in accordance with ASTM C231; 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. This price shall be full compensation for furnishing all materials including reinforcement and embedded items and for all preparation, delivery, installation, and curing of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

## 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 |

| | |
|---|---|
| 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 |
| 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**

# 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** | **Fed Std. 595 Number** | **Application Rate Maximum** | **Type** | **Application Rate Minimum** |
| I or II | White | 37925 | 115ft$^2$/gal | Type I, Gradation A | 7 lb/gal |
| I or II | Red | 31136 | 115ft$^2$/ga | Type I, Gradation A | 5 lb/gal |
| I or II | Yellow | 33655 | 115ft$^2$/gal | Type I, Gradation A | 7 lb/gal |
| I or II | Black | 37038 | 115ft$^2$/gal | NONE | NONE |

**[1] See paragraph 620-2.2a**

**[2] See paragraph 620-2.2b**

**a. Paint**. Paint shall be waterborne in accordance with the requirements of this paragraph. Paint colors shall comply with Federal Standard No. 595. **Waterborne.** Paint shall meet the requirements of Federal Specification TT-P-1952F, Type I or 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, yellow and red paint shall meet the requirements for Federal Specification TT-B-1325D Type I, Gradation A .

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.

Glass beads shall not be used in black 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 surface preparation test section shall be constructed to review the proposed method and to ensure that no excessive stripping of fines from the pavement surface results from the procedure. Test section shall be approved by the RPR prior to commencing with work.

**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 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 (12 mm) in 50 feet (15 m), and marking dimensions and spacing shall be within the following tolerances:

**Marking Dimensions and Spacing Tolerance**

| Dimension and Spacing | Tolerance |
|---|---|
| 36 inch (910 mm) or less | ±1/2 inch (12 mm) |
| greater than 36 inch to 6 feet (910 mm to 1.85 m) | ±1 inch (25 mm) |
| greater than 6 feet to 60 feet (1.85 m to 18.3 m) | ±2 inch (50 mm) |
| greater than 60 feet (18.3 m) | ±3 inch (76 mm) |

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.

**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/m$^2$/lux | | |
|---|---|---|---|
| | White | Yellow | Red |
| Initial Type I | 300 | 175 | 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** The quantity of pavement marking removal shall be measured by the number of square feet.

**620-4.1b** The quantity of markings shall be paid for shall be measured by the number of square feet of painting, including reflective media (if required)**.**

## 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** Payment for pavement marking removal shall be made at the contract price for the number of square feet.

**620-5.2b** Payment for markings shall be made at the contract price for by the number of square feet of painting.

Payment will be made under:

| | |
|---|---|
| Item P-620-5.1 | Permanent Pavement Marking - per square foot |
| Item P-620-5.2 | Temporary Pavement Marking - per square 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 E1710 Standard Test Method for Measurement of Retroreflective Pavement Marking Materials with CEN-Prescribed Geometry Using a Portable Retroreflectometer

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 |

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**

# Item F-162 Chain-Link Fence

## DESCRIPTION

**162-1.1** This item shall consist of furnishing and erecting a chain-link fence in accordance with these specifications, the details shown on the plans, and in conformity with the lines and grades shown on the plans or established by the RPR.

## MATERIALS

**162-2.1 Fabric.** The fabric shall be woven with a 9-gauge galvanized steel wire in a 2-inch (50 mm) mesh and shall meet the requirements of ASTM A392, Class 2.

**162-2.2 Barbed wire.** Not Used

**162-2.3 Posts, rails, and braces.** Line posts, rails, and braces shall conform to the requirements of ASTM F1043 or ASTM F1083 as follows:

- Galvanized tubular steel pipe shall conform to the requirements of Group IA, (Schedule 40) coatings conforming to Type A, or Group IC (High Strength Pipe), External coating Type B, and internal coating Type B or D.
- Roll Formed Steel Shapes (C-Sections) shall conform to the requirements of Group IIA, and be galvanized in accordance with the requirements of ASTM F1043, Type A.
- Hot-Rolled Shapes (H Beams) shall meet the requirements of Group III, and be galvanized in accordance with the requirements of ASTM F1043, Type A.
- Aluminum Pipe shall conform to the requirements of Group IB.
- Aluminum Shapes shall conform to the requirements of Group IIB.
- Vinyl or polyester coated steel shall conform to the requirements of ASTM F1043, Paragraph 7.3, Optional Supplemental Color Coating.
- Composite posts shall conform to the strength requirements of ASTM F1043 or ASTM F1083. The strength loss of composite posts shall not exceed 10% when subjected to 3,600 hours of exposure to light and water in accordance with ASTM G152, ASTM G153, ASTM G154, and ASTM G155.
- Posts, rails, and braces furnished for use in conjunction with aluminum alloy fabric shall be aluminum alloy or composite.

Posts, rails, and braces, with the exception of galvanized steel conforming to ASTM F1043 or ASTM F1083, Group 1A, Type A, or aluminum alloy, shall demonstrate the ability to withstand testing in salt spray in accordance with ASTM B117 as follows:

- External: 1,000 hours with a maximum of 5% red rust.
- Internal: 650 hours with a maximum of 5% red rust.

The dimensions of the posts, rails, and braces shall be in accordance with Tables I through VI of Federal Specification RR-F-191/3.

**162-2.4 Gates.** Gate frames shall consist of galvanized steel and shall conform to the specifications for the same material under paragraph 162-2.3. The fabric shall be of the same type material as used in the fence.

**162-2.5 Wire ties and tension wires.** Wire ties for use in conjunction with a given type of fabric shall be of the same material and coating weight identified with the fabric type. Tension wire shall be 7-gauge marcelled steel wire with the same coating as the fabric type and shall conform to ASTM A824.

All material shall conform to Federal Specification RR-F-191/4.

**162-2.6 Miscellaneous fittings and hardware.** Miscellaneous steel fittings and hardware for use with zinc-coated steel fabric shall be of commercial grade steel or better quality, wrought or cast as appropriate to the article, and sufficient in strength to provide a balanced design when used in conjunction with fabric posts, and wires of the quality specified herein. All steel fittings and hardware shall be protected with a zinc coating applied in conformance with ASTM A153. Barbed wire support arms shall withstand a load of 250 pounds (113 kg) applied vertically to the outermost end of the arm.

**162-2.7 Concrete.** Concrete shall have a minimum 28-day compressive strength meeting requirement of P-610.

**162-2.8 Marking.** Each roll of fabric shall carry a tag showing the kind of base metal (steel, aluminum, or aluminum alloy number), kind of coating, the gauge of the wire, the length of fencing in the roll, and the name of the manufacturer. Posts, wire, and other fittings shall be identified as to manufacturer, kind of base metal (steel, aluminum, or aluminum alloy number), and kind of coating.

## CONSTRUCTION METHODS

**162-3.1 General.** The fence shall be constructed in accordance with the details on the plans and as specified here using new materials. All work shall be performed in a workmanlike manner satisfactory to the RPR. The Contractor shall layout the fence line based on the plans. The Contractor shall span the opening below the fence with barbed wire at all locations where it is not practical to conform the fence to the general contour of the ground surface because of natural or manmade features such as drainage ditches. The new fence shall be permanently tied to the terminals of existing fences as shown on the plans. The Contractor shall stake down the woven wire fence at several points between posts as shown on the plans.

The Contractor shall arrange the work so that construction of the new fence will immediately follow the removal of existing fences. The length of unfenced section at any time shall not exceed 300 feet (90 m). The work shall progress in this manner and at the close of the working day the newly constructed fence shall be tied to the existing fence.

**162-3.2 Clearing fence line.** Clearing shall consist of the removal of all stumps, brush, rocks, trees, or other obstructions that will interfere with proper construction of the fence. Stumps within the cleared area of the fence shall be grubbed or excavated. The bottom of the fence shall be placed a uniform distance above ground, as specified in the plans. When shown on the plans or as directed by the RPR, the existing fences which interfere with the new fence location shall be removed by the Contractor as a part of the construction work unless such removal is listed as a separate item in the bid schedule. All holes remaining after post and stump removal shall be refilled with suitable soil, gravel, or other suitable material and compacted with tampers.

The cost of removing and disposing of the material shall not constitute a pay item and shall be considered incidental to fence construction.

**162-3.3 Installing posts.** All posts shall be set in concrete at the required dimension and depth and at the spacing shown on the plans.

The concrete shall be thoroughly compacted around the posts by tamping or vibrating and shall have a smooth finish slightly higher than the ground and sloped to drain away from the posts. All posts shall be set plumb and to the required grade and alignment. No materials shall be installed on the posts, nor shall the posts be disturbed in any manner within seven (7) days after the individual post footing is completed.

Should rock be encountered at a depth less than the planned footing depth, a hole 2 inches (50 mm) larger than the greatest dimension of the posts shall be drilled to a depth of 12 inches (300 mm). After the posts are set, the remainder of the drilled hole shall be filled with grout, composed of one part Portland cement and two parts mortar sand. Any remaining space above the rock shall be filled with concrete in the manner described above.

In lieu of drilling, the rock may be excavated to the required footing depth. No extra compensation shall be made for rock excavation.

**162-3.4 Installing top rails.** The top rail shall be continuous and shall pass through the post tops. The coupling used to join the top rail lengths shall allow for expansion.

**162-3.5 Installing braces.** Horizontal brace rails, with diagonal truss rods and turnbuckles, shall be installed at all terminal posts.

**162-3.6 Installing fabric.** The wire fabric shall be firmly attached to the posts and braced as shown on the plans. All wire shall be stretched taut and shall be installed to the required elevations. The fence shall generally follow the contour of the ground, with the bottom of the fence fabric no less than one inch (25 mm) or more than 4 inches (100 mm) from the ground surface. Grading shall be performed where necessary to provide a neat appearance.

At locations of small natural swales or drainage ditches and where it is not practical to have the fence conform to the general contour of the ground surface, longer posts may be used and multiple strands of barbed wire stretched to span the opening below the fence. The vertical clearance between strands of barbed wire shall be 6 inches (150 mm) or less.

**162-3.7 Electrical grounds.** Electrical grounds shall be constructed where a power line passes over the fence and at 500 feet (150 m) intervals. The ground shall be installed directly below the point of crossing. The ground shall be accomplished with a copper clad rod 8 feet (2.4 m) long and a minimum of 5/8 inches (16 mm) in diameter driven vertically until the top is 6 inches (150 mm) below the ground surface. A No. 6 solid copper conductor shall be clamped to the rod and to the fence in such a manner that each element of the fence is grounded. Installation of ground rods shall not constitute a pay item and shall be considered incidental to fence construction. The Contractor shall comply with FAA-STD-019, Lightning and Surge Protection, Grounding, Bonding and Shielding Requirements for Facilities and Electronic Equipment, paragraph 4.2.3.8, Lightning Protection for Fences and Gates, when fencing is adjacent to FAA facilities.

**162-3.8 Cleaning up.** The Contractor shall remove from the vicinity of the completed work all tools, buildings, equipment, etc., used during construction. All disturbed areas shall be seeded per T-901.

## METHOD OF MEASUREMENT

**162-4.1** Chain-link fence will be measured for payment by the linear foot (meter). Measurement will be along the top of the fence from center to center of end posts, excluding the length occupied by gate openings.

**162-4.2** Gates will be measured as complete units.

## BASIS OF PAYMENT

**162-5.1** Payment for chain-link fence will be made at the contract unit price per linear foot (meter).

**162-5.2** Payment for vehicle or pedestrian gates will be made at the contract unit price for each gate.

The price shall be full compensation for furnishing all materials, and for all preparation, erection, and installation of these materials, and for all labor equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

| | |
|---|---|
| Item F-162-5.1 | Chain-Link Fence with Slats - 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 A121 | Standard Specification for Metallic-Coated Carbon Steel Barbed Wire |
| ASTM A153 | Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware |
| ASTM A392 | Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric |
| ASTM A491 | Standard Specification for Aluminum-Coated Steel Chain-Link Fence Fabric |
| ASTM A824 | Standard Specification for Metallic-Coated Steel Marcelled Tension Wire for Use with Chain Link Fence |
| ASTM B117 | Standard Practice for Operating Salt Spray (Fog) Apparatus |
| ASTM F668 | Standard Specification for Polyvinyl Chloride (PVC), Polyolefin and other Organic Polymer Coated Steel Chain-Link Fence Fabric |
| ASTM F1043 | Standard Specification for Strength and Protective Coatings on Steel Industrial Fence Framework |
| ASTM F1083 | Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures |
| ASTM F1183 | Standard Specification for Aluminum Alloy Chain Link Fence Fabric |
| ASTM F1345 | Standard Specification for Zinc 5% Aluminum-Mischmetal Alloy Coated Steel Chain-Link Fence Fabric |
| ASTM G152 | Standard Practice for Operating Open Flame Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials |
| ASTM G153 | Standard Practice for Operating Enclosed Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials |
| ASTM G154 | Standard Practice for Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Nonmetallic Materials |
| ASTM G155 | Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Nonmetallic Materials |

Federal Specifications (FED SPEC)

FED SPEC RR-F-191/3 Fencing, Wire and Post, Metal (Chain-Link Fence Posts, Top Rails and Braces)

FED SPEC RR-F-191/4 Fencing, Wire and Post, Metal (Chain-Link Fence Accessories)

FAA Standard

FAA-STD-019 Lightning and Surge Protection, Grounding, Bonding and Shielding Requirements for Facilities and Electronic Equipment

FAA Orders

5300.38 AIP Handbook

**END OF ITEM F-162**

# Item T-901 Seeding

## DESCRIPTION

**901-1.1** This item shall consist of soil preparation and seeding 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. Provide and use seeds in accordance with the Federal Seed Act.

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**

| Seed | Minimum Seed Purity (Percent) | Minimum Germination (Percent) | Rate of Application lb/acre (or lb/1,000 S.F.) |
|---|---|---|---|
| Crested Wheatgrass Fairway | 95 | 85 | 4.91 |
| Blue Grama Bad River | 90 | 90 | 1.53 |
| Smooth Brome | 90 | 90 | 5 |
| Buffalograss/Primed Bowie | 95 | 95 | 10 |

Seeding shall be performed during the Contractor recommended period to provide optimal germination, unless otherwise approved by the RPR.

**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 dry, free-flowing fertilizer suitable for application by a common fertilizer spreader;

b. A finely-ground fertilizer soluble in water, suitable for application by power sprayers; or

c. A granular or pellet form suitable for application by blower equipment.

Fertilizers shall be 13-13-13 commercial fertilizer and shall be spread at the rate of 150 pounds per acre

**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 (50 mm) 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 (125 mm) as a result of grading operations and, if immediately prior to seeding, the top 3 inches (75 mm) 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 (125 mm). Clods shall be broken and the top 3 inches (75 mm) of soil shall be worked into a satisfactory seedbed by disking, or by use of cultipackers, rollers, drags, harrows, or other appropriate means.

**901-3.2 Dry Application Method.**

**a. Liming.** Not required.

**b. Fertilizing.** Following advance preparations and cleanup fertilizer shall be uniformly spread at the rate that will provide not less than the minimum quantity stated in paragraph 901-2.3.

**c. Seeding.** Grass seed shall be sown at the rate specified in paragraph 901-2.1 immediately after fertilizing. The fertilizer and seed shall be raked within the depth range stated in the special provisions. Seeds of legumes, either alone or in mixtures, shall be inoculated before mixing or sowing, in accordance with the instructions of the manufacturer of the inoculant. When seeding is required at other than the seasons shown on the plans or in the special provisions, a cover crop shall be sown by the same methods required for grass and legume seeding.

**d. Rolling.** After the seed has been properly covered, the seedbed shall be immediately compacted by means of an approved lawn roller, weighing 40 to 65 pounds per foot (60 to 97 kg per meter) of width for

clay soil (or any soil having a tendency to pack), and weighing 150 to 200 pounds per foot (223 to 298 kg per meter) of width for sandy or light soils.

**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 (190 liters) 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 (380 liters) per minute at a pressure of 100 lb / sq inches (690 kPa). 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 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 (6 to 30 m). 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 (15 m) in length shall be provided to which the nozzles may be connected.

**c. Mixtures.** Seed and fertilizer shall be mixed together in the relative proportions specified, but not more than a total of 220 pounds (100 kg) of these combined solids shall be added to and mixed with each 100 gallons (380 liters) 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.** Mixtures of seed and fertilizer shall only be sprayed upon previously prepared seedbeds. 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 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 (0.01 sq m) 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-901-5.1 | 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.

ASTM International (ASTM)

| | |
|---|---|
| ASTM C602 | Standard Specification for Agricultural Liming Materials |

Federal Specifications (FED SPEC)

| | |
|---|---|
| FED SPEC | JJJ-S-181, Federal Specification, Seeds, Agricultural |

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-901**

# 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.

This item shall also include removal of existing wire and/or cable when applicable. Any wire or cable, installed in duct or conduit, which is abandoned by this project, shall be completely removed, and the scrap shall be full compensation to the Contractor for removing said excess wire or cable unless a cable removal item is included in the proposal.

## 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 provided 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.

**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 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 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.** Not Used.

**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.** Not Used.

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.** Not Used.

**108-2.7 Flowable backfill.** Not Used.

**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.

**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.** Not Used.

## 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 a minimum of 3 feet of cable slack extended 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 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.** Not Used.

**108-3.4 Cable markers for direct-buried cable.** Not Used.

**108-3.5 Splicing.** The making of a good cable joint depends very much on the quality of the workmanship employed. It is not only necessary for workers to be familiar with cable installation practice and be proficient in the use of the required tools, but they must be depended upon to take precautions to keep the cable ends free of foreign matter and moisture; to join the appropriate conductors and to make a low resistance conductor joint which will remain secure.

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.** Not Used.

**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.** Not Used.

**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 AWG copper 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.** The counterpoise size is as shown on the plans. The equipotential method is applicable to all airfield lighting systems; i.e. runway, taxiway, apron – touchdown zone, centerline, edge, threshold and approach lighting systems. The equipotential method is also successfully applied to provide lightning protection for power, signal and communication systems. The light bases, counterpoise, etc – all components – are bonded together and bonded to the vault power system ground loop/electrode.

Counterpoise wire shall be installed in the same trench for the entire length of buried cable, conduits and duct banks that are installed to contain airfield cables. The counterpoise is centered over the cable/conduit/duct to be protected.

The counterpoise conductor shall be installed no less than 8 inches (200 mm) minimum or 12 inches (300 mm) maximum above the raceway or cable to be protected, except as permitted below:

**(1)** The minimum counterpoise conductor height above the raceway or cable to be protected shall be permitted to be adjusted subject to coordination with the airfield lighting and pavement designs.

**(2)** The counterpoise conductor height above the protected raceway(s) or cable(s) shall be calculated to ensure that the raceway or cable is within a 45-degree area of protection, (45 degrees on each side of vertical creating a 90 degree angle).

The counterpoise conductor shall be bonded to each metallic light base, mounting stake, and metallic airfield lighting component.

All metallic airfield lighting components in the field circuit on the output side of the constant current regulator (CCR) or other power source shall be bonded to the airfield lighting counterpoise system.

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 Equipotential Method of lightning protection.

Reference FAA STD-019E, Lightning and Surge Protection, Grounding Bonding and Shielding Requirements for Facilities and Electronic Equipment, Part 4.1.1.7.

**b. Isolation.** Not Used

**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.

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 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 3M™ Scotchkote™, or approved equivalent, or coated with coal tar Bitumastic® material to prevent surface exposure to corrosive soil or moisture.

**108-3.10 Testing.** Prior to starting any work, the Contractor shall megger the cable(s) of all airfield lighting circuits in the presence of the Engineer. The results of the tests shall be recorded by the Contractor and certified by the Engineer. At completion of the project, all circuits shall be meggered and the results compared to the initial test. If the final megger results are lower than the initial readings, the

Contractor shall verify that the circuits were not affected by construction. Otherwise the Contractor shall replace and/or repair the circuit(s) at no additional cost to the Sponsor. This does not relieve the Contractor from demonstrating that all new work performed meets the requirements stated below.

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:

**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:

**c.** That all affected lighting power and control circuits (existing and new) are continuous and free from short circuits.

**d.** That all affected circuits (existing and new) are free from unspecified grounds.

**e.** That the insulation resistance to ground of all new non-grounded high voltage series circuits or cable segments is not less than 500 megohms when tested at 1,000V dc applied for 1 minute. Verify continuity of all series airfield lighting circuits prior to energization.

**f.** 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 when tested at 1,000V dc applied for 1 minute.

**g.** That all affected circuits (existing and new) are properly connected per applicable wiring diagrams.

**h.** 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.

**i.** 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** Trenching shall be incidental to the installation of counterpoise wire.

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.

**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, 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 include additional quantities required for 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-108-5.1 | Install #8 AWG, 5000V, L-824 Type C Cable – per linear foot |
| Item L-108-5.2 | Install #6 AWG Bare Copper Counterpoise – per linear foot |
| Item L-108-5.3 | Install #2 AWG, 600V, XHHW-2 – per linear foot |
| Item L-108-5.4 | Install #4 AWG, 600V, XHHW-2 – 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 |

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**

# Item L-110 Airport Underground Electrical Duct Banks and Conduits

## DESCRIPTION

**110-1.1** Prior to start of any underground construction, the Contractor is responsible for locating all existing cables, utilities and structures at various crossing points to continue operation. The plans may show the approximate location(s) of the utilities as they are believed to exist, but field investigation, locating equipment and/or hand work shall be utilized to confirm precise locations. Any damage to existing cables, utilities, or structures which are to remain in use shall be promptly repaired by the Contractor to the satisfaction of the RPR, at no additional cost to the Airport.

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. 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.

**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.

**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 Conduit fittings all types, classes 1 thru 3 and 6 thru 10.
- UL 514C covers all types, Class 5 junction box and cover in plastic (PVC).
- UL 651 covers Rigid PVC Conduit, types I and II, Class 4.
- UL 651A covers 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.

**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.

Tape shall be red in color. A warning shall be imprinted continuously along the length which reads similar to "CAUTION – BURIED ELECTRIC LINE BELOW".

**110-2.10 Survey Marker**. The survey marker shall be manufactured from solid brass. A ribbed shank shall be used to prevent turning and loosening. The minimum length of shank shall be 2 inches, with a minimum cross section of 0.4 square inch. The top shall be 1/8-inch thick and 2 inches in diameter.

## 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 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

**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.

**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 the duct shall be marked by a flat survey marker installed directly above the duct in the pavement, one foot from the edge. The top of the marker shall be + 0 inch to - 1/16 inch from pavement finished surface.

When duct is installed in new or existing pavement, the Contractor shall cut or core a hole, 4 inches in diameter, 2 1/2 inches deep minimum. Fill the core hole with a non-shrink grout. Center the survey marker in the grout prior to setting. After the grout has set to full strength, stamp the word "DUCT" as well as number, size of the duct bank and distance of survey marker to end of duct on the survey marker. The text of the stamp shall be 1/4 inch high. Pre-stamped markers may also be used. Furnishing and installation of duct markers is incidental to the respective duct pay item.

**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 topsoiling, seeding, and mulching 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.** Not used.

## METHOD OF MEASUREMENT

**110-4.1** Underground conduits and duct banks shall be measured by the linear feet (meter) 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 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 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-110-5.1 | Install 1-Way, 2-Inch PVC Conduit in Turf (DEB) – per linear foot |
| Item L-110-5.2 | Install 2-Way, 2-Inch PVC Conduit in Turf (DEB) – per linear foot |
| Item L-110-5.3 | Install 1-Way, 2-inch PVC Conduit (CE) – per linear foot |

DEB – Direct Earth Buried

CE – Concrete Encased

**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**

# 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. All LED light fixtures shall be warranted by the manufacturer for a minimum of 4 years after date of installation, including all electronics.

## EQUIPMENT AND MATERIALS

**125-2.1 Conduit/Duct.** Conduit shall conform to Specification Item L-110 Airport Underground Electrical Duct Banks and Conduits.

**125-2.2 Cable and Counterpoise.** Cable and Counterpoise shall conform to Item L-108 Underground Power Cable for Airports.

Two-wire secondary conductors, 600V rated, between the isolation transformers and fixtures shall conform to FAA AC 150/5346-26 (latest edition).

a. Plug. Type II, Class A, Style 1.

b. Receptacle. Type II, Class A, Style 7.

c. Cable. Two conductor, 12 AWG, 600V rated insulation meeting FAA AC 150/5345-7.

**125-2.3 Tape.** Rubber and plastic electrical tapes shall conform to Item L-108 Underground Power Cable for Airports.

**125-2.4 Cable Connections.** Cable Connections shall conform to Item L-108 Installation of Underground Cable for Airports.

**125-2.5 Retroreflective Markers.** Retroreflective markers shall be type L-853 and shall conform to the requirements of AC 150/5345-39.

**125-2.6 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 | Base | Filter | Transformer | Notes |
|---|---|---|---|---|---|---|---|
| L-852T(L) | 2 | 1 | 3 | L-868B | Blue | L-830-17 (20/25W) | |
| L-861T(L) | 2 | 1 | -- | L-867B | Blue | L-830-16 (10/15W) | |

**125-2.7 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-858(L) | 1 | 4 | -- | 2 | |

**125-2.8 Runway End Identifier Light (REIL).** Not Used.

**125-2.9 Precision Approach Path Indicator (PAPI).** Not Used.

**125-2.10 Circuit Selector Cabinet.** Not Used.

**125-2.11 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 and L-868, Class 1A,

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.

**125-2.12 Isolation Transformers**. Isolation Transformers shall be Type L-830, size as required for each installation. Transformer shall conform to AC 150/5345-47.

**125-2.13 Frangible Couplings**. All elevated items shall be installed on frangible couplings in accordance with the respective Federal Aviation Administration Advisory Circular. Frangible couplings shall be metallic and provide an electrical grounding path between the fixture/sign and the base can.

**125-2.14 Colored Filters**. Colored filters, or colored lenses, to be used for Airfield Lighting Fixtures shall conform to the requirements of SAE International, AS 25050A and FAA ACs.

**125-2.15 Bolting Hardware**. All airfield bolting hardware shall be stainless steel and shall meet FAA requirements. All bolts 1/4 inch and larger shall be hex head type. All bolts smaller than 1/4 inch trade size shall be recessed Allen type. All bolted connections shall utilize an anti-rotational locking type device. The base can cover and fixture mounting bolts shall extend through the base can mounting flange a minimum of 0.5 inch. The bolts shall be fully threaded.

**a. Anti-Seize Compound.** The anti-seize compound shall be Ideal "Noalox" or approval equal for threaded connections, including bolts and frangible couplings.

**125-2.16 Concrete**. Concrete shall comply with Item P-610, Concrete for Miscellaneous Structures.

**125-2.17 Reinforcing Steel**. The reinforcing steel shall be ASTM A 615, Grade 60.

## INSTALLATION

**125-3.1 Temporary Wiring**. The Contractor shall provide temporary wiring as required to reconnect existing circuits to provide guidance for aircraft to pass through the construction areas on those taxiways/runways which must remain open. The Contractor shall check all temporary circuits before dusk each day to assure that they are operational. In the event of failure, the Contractor shall immediately take steps to restore operation. The cost of temporary and reconnected lighting shall be absorbed in the various work items.

**125-3.2 Maintain Existing Airport Lighting Systems During Construction**. Protect existing airport lighting systems. Any portion of the existing airport lighting systems damaged or disconnected during installation of the new systems shall be repaired and reconnected and must be fully functional 1 hour prior to dusk each day or during adverse weather conditions, to the satisfaction of the Engineer. In the event of a failure, the Contractor shall take immediate steps to restore operation. This work shall be at no additional cost to the Owner. All lighting systems serving active taxiways or runways shall be completely operational to the satisfaction of the Engineer. Any closure to taxiway or runway shall be approved by the Airport.

**125-3.3 Installation.**

**a. General.** All fixtures, signs, base cans, etc., shall be installed as shown on the Plans or approved shop drawings and in accordance with the applicable FAA Advisory Circulars and manufacturer's recommendations. Survey instruments shall be used to position all items to insure precise location and orientation. Tolerances given in the FAA Advisory Circulars, these Specifications, and the Plans shall not be exceeded. Where no tolerance is given, no deviation is permitted. Items not installed in accordance with the FAA Advisory Circulars, these Specifications and Plans shall be replaced by and at the expense of the Contractor.

In new or existing pavement, all conduits, duct banks, counterpoise, base cans, etc., shall be installed prior to the placement of the final lift of pavement. No additional payment will be made for excavation in paved areas nor for restoration of pavement for lighting equipment installation.

Light bases installed in an existing conduit line shall be aligned vertically and horizontally just as if they were being installed in completely new construction. The Contractor shall supply all materials necessary to attach the new base to the existing conduit. Where lights are being installed in existing pavement, the Contractor shall drill or cleanly saw the pavement to form a new round hole for installation.

All concrete used for this item shall be completely consolidated and contain no voids. All exposed concrete shall be finished smooth with a steel trowel and broom finished. The finished pavement surface shall be protected from foreign substances which could cause staining (for example, oil). The Contractor shall immediately clean all spills and correct/clean any stained surfaces at the Contractor's expense.

Assemble units and connect to the system in accordance with the manufacturer's recommendations and instructions. Light fixtures shall not be installed closer than or within 2 feet of a paving joint without written permission of the Engineer.

Painted and galvanized surfaces that are damaged shall be repaired according to the manufacturer's recommendations, to the satisfaction of the Owner and Engineer. Use LPS-1G cold galvanizing compound or approved equal to repair galvanized surfaces. Obtain paint and primer, of same batch number, from the equipment manufacturer to repair painted surfaces.

Dow Corning Compound III valve lubricant non-curing sealant, or approved equal, shall be used to seal between sections of base cans, spacer rings, adapter rings, and fixtures.

All threaded connections shall be coated with Ideal "Noalox" compound, or approved equal, before being assembled. This is required for all bolts and frangible couplings.

Changes to the concrete joint layout or the location of the light base cans shall be submitted to the RPR for approval prior to construction. Conflicts that may occur, as a result of changes in the joint layout or the location of the lights, shall be the full responsibility of the Contractor.

If a light can is installed incorrectly, or the duct/conduit is plugged/broken, or the concrete joints are installed incorrectly, or the light base can is sawed by a concrete saw, the pavement around the light base can, the base can itself, and the fixture shall be removed and replaced at the Contractor's expense.

Dewatering necessary to construct L-125 items and related erosion and turbidity control in accordance with Federal, state, and local requirements is incidental to its respective pay item as a part of L-125. The cost of all excavation regardless of type of material encountered, shall be included in the unit price bid for the L-125 Item.

No frangible coupling shall extend more than 3" above surrounding grade. If required, the surrounding grade may be adjusted to meet the 3" requirement. Similar material surrounding the fixtures, signs, foundations, etc. shall be placed and compacted to a maximum downward slope of 10H:1V. Refer to Engineering Brief 79A.

**b. Elevated Light Base Can Installation.** The duct trench shall be enlarged at the indicated location of the base can. Depth of the hole shall be sufficient for the base can as well as any aggregate material to be placed below for drainage. Fasten a cover to the can to limit debris from entering the can until the light fixture is installed. The cans are to be set to accommodate the finished grades of soil or surrounding pavement, and fixture orientation. Bedding material shall be worked under any portion of the conduit elevated in the process of leveling the light base, to relieve any strain at the connection which may develop during the backfilling operation. Care shall be taken during backfill around the can so that it is not displaced during the operation. Place native material in 8-inch lifts and compact to match surrounding conditions. Dispose of any unused material as directed by the RPR.

The can hubs shall be fitted with grommet fittings as shown on the Drawings. Unused openings shall be securely sealed. Orient the hubs parallel to the pavement centerline.

For paved areas, base can installation shall be as shown on the Drawings. Before paving may proceed, the Contractor shall demonstrate to the Engineer that the base cans are at the correct elevation, azimuth, and rotation and that the proper clearance exists between the base can and the paving train.

**c. Base Can Installation for Semi-Flush Fixtures.** Elevation of the base with respect to the runway or taxiway pavement surface, azimuth with respect to the centerline marking and mounting ring set level in all directions are three parameters that must be met. It is absolutely necessary that the final elevation of the fixture edge is plus 0 inch to minus 1/16 inch, from the pavement finished surface at the lowest point. This method of installation requires surveying that is precise. Install spacer rings to bring the lighting fixtures up to the correct elevation. The spacer rings and any remedial action required to adjust the base can will be at the Contractor's expense.

A sectional base may be utilized to facilitate construction. Seal between sections with non-curing sealant material, a separate gasket is not required. Installation of the light base and conduit shall be held in place with a jig. The jig shall establish the elevation, level and azimuth of the base and maintain this position until the concrete anchor is placed. Care must be taken while placing the concrete anchor that neither the jig nor the light base alignment is disturbed until the concrete has set. Use a metal spacer ring and the plywood lid on the base to provide the necessary recess for the light fixture. The surface of the pavement around the light base must conform to the surface of the surrounding pavement; dished and mounded areas are not acceptable. Where asphalt pavement is placed, the asphalt around the light shall be compacted to the same requirements as all other portions of the asphalt paving.

**d. Elevated Light Installation.** The elevated light fixtures shall be assembled in accordance with the manufacturer's instructions. The transformer secondary leads shall be connected to the lamp leads by means of a disconnecting plug. Do not tape or apply heat shrink tubing to the joint at the base plate. Install the proper lamp in the fixture.

After making up the primary connector leads as discussed in Item L-110, Airport Underground Electrical Duct Banks and Conduits, place the isolation transformer on a support as shown on the Plans. Mount the light fixture to the light base with stainless steel bolts torqued as recommended by the can manufacturer.

The fixtures shall be oriented and aligned to within 1 degree of plumb and leveled, using appropriate leveling tools. Final adjustment of the Optical System shall be made at night, following manufacturer's instructions, and shall be to the satisfaction of the RPR.

**e. Semi-Flush Fixture Installation.** Semi-flush runway lights shall be assembled in accordance with the manufacturer's instructions. The transformer secondary leads shall be connected to the lamp leads by means of a disconnecting plug and receptacle.

Install the fixtures in accordance with the general requirements and details shown on the Drawings. The fixture base and leveling jig shall not be removed until the concrete has sufficiently set.

After installation of the light fixture, the azimuth of the light beam shall not vary more than plus or minus 1/2-degree from the required orientation. The top of the fixture edge must be plus 0 inch to minus 1/16 inch, from the pavement finished surface at the lowest point.

**f. Lighted Sign Installation.** The taxiway guidance sign shall be installed in accordance with the manufacturer's instructions and details shown on the Drawings.

Signs shall be oriented at 90 degrees to the direction of the taxing path from which it is viewed, unless noted otherwise on the Plans.

For all signs, the concrete pad shall extend to not less than 2 feet out from the sign ends and 18 inches beyond each face. Thickness of the pad shall be a minimum of 6 inches. The concrete pad shall be poured

in place and rest on undisturbed soil. The pad shall be reinforced with steel bars formed and placed as indicated on the Plans. Any dirt required around the sign foundation shall be compacted to match surrounding conditions and the slope shall not exceed 3 percent.

During construction of the pad, the base can shall be set and firmly held in place so that the machined upper surface of the base flange will be level to within 2 degrees and not more than 1/4 inch above the pad surface. All other bearing areas for additional flange supports shall be in the same horizontal plane as the base can flange ring.

Install new legends on existing signs at locations and with designations as indicated on the Contract Drawings. Installation of new sign legends on existing signs shall be done in accordance with construction sequencing as indicated on Contract Documents.

Reinstalled and relocated signs shall be to the same standards as new signs.

All horizontal edges to be chamfered 1 inch at 45 degrees.

The sign and foundation shall be oriented and leveled, using appropriate leveling equipment so that they are within 1 degree of level. Final adjustment of the photometric output shall be made at night, according to manufacturer's instructions, and shall be to the satisfaction of the RPR.

**125-3.4 Testing**. This section describes the testing and demonstrations to be furnished by this Contractor. All items furnished and/or installed by this Contractor shall be tested and demonstrated in accordance with these Specifications. All equipment and labor required for testing and demonstrations shall be furnished by this Contractor.

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.

Up to two walk-throughs may be initiated by the Owner or the RPR during which the airfield lighting units would be required to be in operation. Additional walk-throughs may be necessary depending upon the number of discrepancies found on the previous walk-throughs.

The Contractor is responsible for lamp replacements and necessary maintenance of airfield items during the testing, construction, and walk-through periods.

Test cabling per Item L-108, Underground Power Cable for Airports.

Demonstrate all features and functions of all systems and instruct the Owner's personnel in the proper and safe operation of the systems.

The Contractor shall perform the necessary inspection and tests for some items concurrently with the installation because of subsequent inaccessibility of some components. The RPR shall be notified by the Contractor 48 hours in advance of any testing.

There are no approved "repair" procedures for items that have failed testing other than complete replacement. Any other corrective measures shall be approved in writing by the RPR.

**125-3.5 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.

**125-3.6 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** Reflective markers will be measured by the number installed as completed units in place, ready for operation, and accepted by the RPR. 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. Guidance signs will be measured by the number of each type and size 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.

Precision Approach Path Indicator shall be measured by each system installed as a completed unit, in place, ready for operation, and accepted by the RPR. Abbreviated Precision Approach Path Indicator 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.

Payment will be made under:

Item L-125-5.1 Install L-861T(L), LED, Taxiway Edge Light on New Base, Complete – per each

L-861T LED, omni-directional blue, 24-inch overall height column mounted on a L-867B 24-inch deep base can including flex grommets, base plate, frangible coupling, gasket, bolts, ground rod, internal/external ground lugs, ground jumper, L-830 isolation transformer and all incidentals necessary for a complete installation. Align and level.

Item L-125-5.2 Install L-852T(L), LED, In-Pavement Taxiway Edge Light on New Base, Complete – per each

L-852T LED, omni-directional blue, flush mounted on a L-868B multi-section base can including flex grommets, spacers, Y-flange, o-ring, sealant, bolts, ground rod, internal/external ground lugs, ground jumper, L-830 isolation transformer and all incidentals necessary for a complete installation. Align and level.

Item L-125-5.3 Install L-853 Retroreflective Taxiway Edge Marker – Surface Mount – per each

Item L-125-5.4 Install Duplex Convenience Receptacle With Weatherproof Cover – per each

Item L-125-5.5 Install L-858, Size 1, Style 4, Stake Mounted Guidance Sign – 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 Accessories |
| 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**

# GEOTECHNIAL ENGINEERING REPORT

# AUBURN MUNICIPAL AIRPORT – NEW HELICOPTER PARKING AREA

APN 052-010-028-000

AUBURN, PLACER COUNTY, CALIFORNIA

NOVEMBER 13, 2020

PREPARED FOR:

JACOBS ENGINEERING GROUP INC

707 17TH STREET, SUITE 2400

DENVER, COLORADO 80202

Google Earth Image

NV5

792 SEARLS AVENUE

NEVADA CITY, CA 95959

PROJECT NO. 4455.00.01

Project No. 3783A.00
November 13, 2020

Jacobs Engineering Group Inc
707 17th Street, Suite 2400
Denver, Colorado 80202-5131

Attention: Jesus Moncada, PE, Senior Project Manager

**Reference:** **Auburn Municipal Airport – New Helicopter Parking Area**
APN 052-010-028-000
Auburn, Placer County, California

**Subject:** **Geotechnical Engineering Report**

Dear Mr. Moncada:

This report presents the results of our geotechnical engineering investigation for the proposed helicopter parking area to be constructed at the Auburn Municipal Airport (AUN) in Auburn, California. As proposed, the project is likely to include construction of a new helicopter parking area, comprised of four helipads, and access roadway located southwest of Taxiways "A" and "D."

The findings presented in this report are based on our subsurface investigation, laboratory test results, and our experience with subsurface conditions in the area. Our opinion is that the project can be completed as proposed, provided the recommendations presented in this report are implemented. Our primary concern, from a geotechnical engineering standpoint, includes the presence of shallow potentially expansive soil. Recommendations for mitigating potentially expansive soil are presented in the report.

Please contact us if you have any questions regarding our observations or the recommendations presented in this report.

Sincerely,

**NV5**

Prepared by:

Janina S. Smith
Staff Engineer

Reviewed by:

Chuck R. Kull, GE 2359, CEG 1622
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Sent via U.S. Mail and Email to Jesus.Moncada@jacobs.com

F:\1 Projects\3783 Auburn Airport Helipad\3783A.00\Gtk Report\01 Text\3783A.00_AUN New Helicopter Parking_Geotechnical Report.docx

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## APPENDICES

Appendix A Important Information about Your Geotechnical Engineering Report (included with permission of GBA, Copyright 2016)
Appendix B Exploratory Boring Logs
Appendix C Laboratory Test Data

# 1.0 INTRODUCTION

At the request of Jacobs Engineering Group Inc (Jacobs), NV5 performed a geotechnical investigation of the proposed helicopter parking area to be constructed at the Auburn Municipal Airport (AUN) in Auburn, California. The project area comprises Placer County assessor parcel number (APN) 052-010-028-00. The subject project area is herein referred to as the "project site."

The geotechnical investigation was performed in general accordance with our proposal for the project, dated December 31, 2019. For your review, Appendix A contains a document prepared by Geoprofessional Business Association (GBA) entitled Important Information about Your Geotechnical Engineering Report, which summarizes the general limitations, responsibilities, and use of geotechnical reports.

## 1.1 SITE DESCRIPTION

The project site is located at the Auburn Municipal Airport in Auburn, California, and is located southwest of Taxiways "A" and "D." The project site is accessed by Rickenbacker Way or New Airport Road. The Auburn Municipal Airport is bordered by undeveloped and residential property to the north, east and west, and by commercial properties to the south and southwest. A site location map is presented as Figure 1.

At the time of our field investigation, the Auburn Municipal Airport was active with airplane and helicopter traffic. The proposed helicopter parking area was comprised of existing helicopter parking (two helipads) to the east and a clear area covered with short grasses to the west. In general, the east and west portions of the project site were transected by a northeast to southwest trending moderate grade slope approximately 3 feet in height. Figure 2 shows approximate locations of the existing helicopter parking, hangars, and taxiways, as well as an outline of the proposed helicopter parking area.

## 1.2 PROPOSED IMPROVEMENTS

Based on conversations with Jacobs and review of a preliminary site plan, we understand that the proposed improvements will likely include construction of a new helicopter parking area, comprising four helipads, and access roadway located southwest of taxiways "A" and "D." Appurtenant construction will likely include a drainage swale between taxiway "A" and the proposed helicopter parking area, with a culvert constructed under the proposed access roadway. We anticipate that grading for the project will include fill for raising grade in the western portion of the parking area and access roadway.

## 1.3 PURPOSE

We performed a surface reconnaissance and subsurface geotechnical investigation at the project site, collected soil samples for laboratory testing, and performed engineering calculations to provide grading and pavement recommendations for the proposed improvements.

### 1.4 SCOPE OF SERVICES

To prepare this report, we performed the following scope of services:

- We performed a site investigation, including a literature review and field investigation.
- We collected relatively undisturbed soil samples and bulk soil samples from selected exploratory borings.
- We performed laboratory tests on select soil samples obtained during our field investigation to determine their engineering material properties.
- Based on observations made during our field investigation and the results of laboratory testing, we performed engineering calculations to provide geotechnical engineering recommendations for earthwork and pavement improvements.

Our scope of services did not include a groundwater flow analysis, nor an evaluation of the project site for the presence of hazardous materials, historic mining features, asbestiform minerals, or mold.

## 2.0 SITE INVESTIGATION

We performed a site investigation to characterize the existing surface conditions and shallow subsurface soil/rock conditions. Our site investigation included a literature review and field investigation as described below.

### 2.1 LITERATURE REVIEW

We performed a limited review of geologic literature pertaining to the project site. The following sections summarize our findings.

#### 2.1.1 Soil Survey

As part of our study, we reviewed the Web Soil Survey (United States Department of Agriculture [USDA] Natural Resource Conservation Service [NRCS]; *https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx*). The soil survey indicates that the project site is located in an area containing Auburn-Argonaut complex, 2 to 5 percent slopes. The soil survey describes the Auburn and Argonaut soil types as well drained soils. The Auburn soil is shallow and formed in residuum from vertically tilted basic schist and slate. The Argonaut soil is moderately deep and formed in residuum from metabasic rock.

A typical profile of the Auburn soil type is described as a surface layer of strong brown to yellowish red silt loam to a depth of 20 inches below the ground surface (bgs), underlain by partly weathered basic schist.

A typical profile of the Argonaut soil type is described as a surface layer of strong brown loam to a depth of 4 inches bgs. The loam is typically underlain by yellowish red silt loam to a depth of 9 inches bgs. The silt loam is typically underlain by yellowish red clay loam to a depth of 16 inches bgs. A yellowish brown with patches of yellowish red clay is generally observed below the clay loam, to a depth of 25 inches bgs. Weathered basic schist typically underlies the clay.

### 2.1.2 Geologic Setting

According to the Mineral Land Classification of Placer County, Department of Conservation, Division of Mines and Geology, DMG Open File Report 95-10 (1995), the project site is generally located in an area mapped as Mesozoic and Paleozoic serpentinized ultramafic rock. The Mesozoic and Paleozoic eras span the time from 540 to 65 million years before present (MYBP).

The referenced geologic map indicates that the project site is likely underlain by serpentinized ultramafic rock, often associated with naturally occurring asbestos (NOA). During our site investigation, we encounter serpentinized ultramafic rock in our borings. If ultramafic rock, serpentinite or NOA-containing minerals are encountered during grading activities, site grading would be regulated under Cal/EPA Air Resources Board Regulation 93105, Asbestos Airborne Toxic Control Measure for Construction, Grading, Quarrying, and Surface Mining Operations (ATCM) and Placer County Rule 228, Fugitive Dust. We anticipate that, as a minimum, dust mitigation measures such as limiting site access, restricting onsite construction vehicle speeds, covering stockpiled soil, and liberal use of water during grading will be required during grading to prevent the generation of dust from the project site. We can prepare an asbestos dust mitigation plan (ADMP), if required, for project planning and approval purposes.

We reviewed California Geological Survey Open File Report 96-08, *Probabilistic Seismic Hazard Assessment for the State of California*, and the 2002 update entitled *California Fault Parameters*. The documents indicate the project site is located within the Foothills Fault System. The Foothills Fault System is designated as a Type C fault zone, with low seismicity and a low rate of recurrence. The 1997 edition of California Geological Survey Special Publication 42, Fault Rupture Hazard Zones in California, describes active faults and fault zones (activity within 11,000 years), as part of the Alquist-Priolo Earthquake Fault Zoning Act. The map and document indicate the project site is not located within an Alquist-Priolo active fault zone.

## 2.2 FIELD INVESTIGATION

We performed our field investigation on April 22, 2020. During our field investigation, we observed the local topography and surface conditions and performed a subsurface investigation. The following sections summarize surface and subsurface conditions observed during our field investigation.

Our subsurface investigation included the excavation of 5 exploratory borings across the project site. We excavated to depths ranging between 5.5 and 15.75 feet below the ground surface (bgs) using a CME 75 drill rig equipped with 3.25-inch hollow stem augers and a 140 pound automatic hammer. After sampling, borings B2 through B5 were backfilled with drill cuttings, and boring B1 was backfilled with drill cuttings and covered with an asphalt patch. A staff engineer from our firm logged the soil conditions revealed in the exploratory borings and collected relatively undisturbed and bulk soil samples for laboratory testing. Figure 2 shows the approximate exploratory boring locations, and were determined approximately by pacing their distance from features onsite and should be considered accurate only to the degree implied by the method used.

### 2.2.1 Surface Conditions

At the time of our field investigation, the proposed helicopter parking area consisted of existing helicopter parking (two helipads) to the east and a clear area covered with short grasses to the west. The proposed helicopter parking area was bordered by taxiway "A" to the north, taxiway "D" to the east, hangars to the south, and a clear grassy area to the west. A drainage swale was observed between the existing helicopter parking area and taxiway "A" (to the north). The existing helicopter parking, taxiways, and hanger areas were covered with asphaltic concrete (AC) pavement.

Site topography in the area of the proposed helicopter parking area was generally flat, except for an approximately 3-foot high, moderate slope, transecting the project site from northeast to southwest, and a gentle graded slope located along the southern project site boundary (north of the existing hangers). According to Google Earth, site topography from east to west across the project site generally trends from approximately 1497 to 1490 feet above mean sea level (AMSL).

### 2.2.2 Subsurface Soil Conditions

The following described soil conditions are generalized, based on our interpretation of the subsurface soil, groundwater, and bedrock conditions observations in our 5 exploratory borings.

The relatively consistent soil conditions encountered in our exploratory borings indicate that such conditions are present in the near vicinity of the boring locations. Subsurface conditions may vary at other locations and times. The location of the soil and bedrock boundaries should be considered approximate. The transition between soil and bedrock types may be gradual. More detailed information can be found in the boring logs in Appendix B.

Boring B-1, located at the existing helicopter parking, was advanced through approximately 2 inches of asphalt and 7 inches of aggregate base (AB). The pavement section was underlain by moderately to very strong, completely to moderately weathered, ultramafic rock that excavated as light gray to light yellowish brown sandy silt. Boring B-1 was terminated in weathered rock at 15.5 feet below ground surface (bgs).

Boring B-2 through B-4 were advanced through approximately 0.75 to 1.0 feet of surface soil generally described as reddish brown, stiff to hard, dry, clay with sand. The surface soil was underlain by grayish brown to brown, firm to stiff, dry to damp, fat clay with sand (residual soil) to depths of approximately 1.5 feet bgs. Underlying the residual soil was moderately to very strong, completely to moderately weathered, ultramafic rock that excavated as light gray to light yellowish brown sandy silt. Borings B-2 and B-4 were terminated upon refusal on rock at depths of 5.5 and 2.5 feet bgs, respectively. Boring B-3 was terminated in weathered rock at 15.75 feet bgs.

Boring B5 was advanced through approximately 1.75 feet of surface soil generally described as reddish brown, stiff to hard, dry, clay with sand. The surface soil was underlain by moderately to very strong, completely to moderately weathered ultramafic rock that excavated as light gray to light yellowish brown sandy silt. Borings B-5 was terminated upon refusal on rock at 5.5 feet bgs.

### 2.2.3 Groundwater Conditions

During our field investigation, we did not encounter groundwater seepage in our exploratory borings, nor did we observe onsite springs or seeps emanating from the ground surface. Our observations of groundwater conditions were made in October 2020 following a period of relatively dry weather. Although we did not observe groundwater in our exploratory borings, our experience has shown that seepage may be encountered in excavations which reveal the soil/weathered rock transition, particularly during or after the rainy season.

## 3.0 LABORATORY TESTING

We performed laboratory tests on selected soil samples collected from our subsurface exploratory borings to determine their engineering material properties. These engineering material properties were used to develop geotechnical engineering design recommendations for earthwork and pavement improvements. We performed the following laboratory tests:

- Atterberg Limits (ASTM D4318)
- Resistance Value (D2844)
- Minimum Soil Resistivity (Caltrans Method 643)
- Sulfate and Chloride (Caltrans Method 417 and 422M)

In general, relatively undisturbed soil samples were collected for laboratory testing within the upper 5 feet of the borings. Appendix D presents laboratory test data.

We performed an Atterberg limits determination on a sample collected at approximately 1.0 feet bgs from boring B-4 (B4-L1). The Atterberg limits determination revealed that the portion of the sample passing the No. 40 sieve had a liquid limit of 74 and a plastic limit of 22, resulting in a plasticity index of 52. Based on the Atterberg limits determination, we classified the soil as a clay with high plasticity (CH).

We were unable to performed expansion index testing on sample B4-L1 or additional samples of the same clayey soil due to low sample recovery. Based on the Atterberg limits determination we classified the soil as a fat clay (CH) with high plasticity.

One R-value test was performed on a composite bulk sample obtained from Borings B-1 and B-2 from 1.0 to 5.0 feet bgs. The test indicated that the predominantly fine-grained soil had an R-value of 14, by exudation pressure. Based on our experience in the area and the subsurface conditions revealed during our investigation, we elected to use a design R-value of 12. Selective grading during construction could be performed to place more granular material in the upper 18-24 inches of subgrade to increase durability and reduce baserock sections.

A soil sample was collected from Boring B-3 at 2.0 feet bgs for corrosion testing. Corrosion testing, including pH, minimum resistivity, sulfate content and chloride content, was performed by Sunland Analytical in accordance with CA DOT test methods 643, 417, and 422m. Table 3.0-1 summarizes the test results. Based on the limited tests, the soil is moderately corrosive to buried iron, steel, cast iron, ductile iron, galvanized steel and dielectric coated steel or iron. Test results are discussed further in section 5.1.9, “Soil Corrosion Potential.” The laboratory report is included in Appendix C.

Table 3.0-1: Summary of Corrosion Testing

| Boring/ Sample Number | Sample Depth (feet) | pH | Minimum Resistivity (ohms-cm) | Chloride Content (ppm) | Sulfide Content (ppm) |
|---|---|---|---|---|---|
| B-3 / B3-BK1 | 2.0 | 6.26 | 1,450 | 2.3 | 5.1 |

Notes:
Ohms-cm = ohms centimeter
ppm = parts per million

## 4.0 CONCLUSIONS

The following conclusions are based on our field observations, laboratory test results, and our experience in the area.

1. Our opinion is that the project site is suitable for the proposed improvements, provided that the geotechnical engineering recommendations and design criteria presented in this report are incorporated into the project plans.
2. Based on our site observations, the geology of the region, and our experience in the area, our opinion is that the risk of seismically induced hazards such as slope instability, liquefaction, and surface rupture are remote at the project site.
3. Based on the site geology and our observation of the surface conditions, we anticipate that grading and excavation onsite will reveal variably weathered, fractured, ultramafic rock. Areas of resistant rock may be encountered which may require splitting or hammering to increase the rate of excavation.
4. We did not encounter existing fill in our exploratory borings. If existing fill is encountered during construction, we should be retained to evaluate the condition of the fill, and to make recommendations to mitigate the presence of fill, if necessary. Existing fill, if encountered, should not be relied upon to support proposed improvements without testing and evaluation.
5. Fat Clay was encountered at shallow depths in our exploratory borings. Expansive near-surface soils shrink and swell as they lose and gain moisture throughout the yearly weather cycle. Near the surface, the resulting movements can heave and crack lightly loaded slabs and pavements. Recommendations regarding fine grained, potentially expansive soils are presented in this report.
6. During our site investigation, we did encounter serpentinized ultramafic rock. Furthermore, the referenced geologic map indicates that portions of the project site are likely underlain by serpentinite, a rock often associated with naturally occurring asbestos (NOA). If ultramafic rock, serpentinite or NOA-containing minerals are encountered at the project site, site grading would be regulated under Cal/EPA Air Resources Board Regulation 93105, Asbestos Airborne Toxic Control Measure for Construction, Grading, Quarrying, and Surface Mining Operations (ATCM). We anticipate that, as a minimum, dust mitigation measures such as limiting site access, restricting onsite construction vehicle speeds, covering stockpiled soil, and liberal use of water during grading will be required during grading to prevent the generation of dust from the project site. We can prepare an asbestos dust mitigation plan (ADMP), if required, for project planning and approval purposes.

7. Although we did not observe shallow groundwater or seepage during our field investigation, areas of seepage may be encountered during grading onsite, particularly during the rainy season and/or in excavations which reveal the surface soil/weathered rock contact. Preliminary recommendations regarding construction dewatering are presented in this report.
8. Prior to grading and construction, we should be retained to review the proposed grading plan to confirm our recommendations.

## 5.0 RECOMMENDATIONS

The following geotechnical engineering recommendations are based on our understanding of the project as currently proposed, our field observations, the results of our laboratory testing program, engineering analysis, and our experience in the area.

### 5.1 GRADING

The following sections present our grading recommendations. The grading recommendations address clearing and grubbing, expansive soil, soil preparation for fill placement, engineered fill, fill slope grading, erosion control, surface water and subsurface drainage, soil corrosion potential, plan review, and construction monitoring.

#### 5.1.1 Clearing and Grubbing

Areas proposed for fill placement, roadway, and parking area construction should be cleared and grubbed to remove vegetation, weak and porous soils, and other deleterious materials as described below. We anticipate that clearing and grubbing will be minimal at the project site.

1. Strip and remove debris from clearing operations and the weak and porous soil containing shallow vegetation, roots and other deleterious materials. We anticipate that the depth of grubbing and clearing would be between 1 and 3 inches, but the actual depth of stripping will vary across the project site. The organic topsoil can be stockpiled onsite and used in landscape areas but is not suitable for use as engineered fill. The project geotechnical engineer should approve any proposed use of the spoil generated from stripping prior to placement on the project site.
2. Overexcavate any relatively loose debris and soil that is encountered in our exploratory borings or any other onsite excavations to underlying, competent material. Possible excavations include exploratory trenches excavated by others, mantles or soil test pits, and holes resulting from tree stump or boulder removal.
3. If loose, untested fill is encountered during site development, overexcavate to competent native soil or weathered rock and replace with engineered fill in accordance with Sections 5.1.3, “Soil Preparation for Fill Placement,” and 5.1.4, “Engineered Fill,” of this report.
4. Fat clay was encountered in our exploratory borings between depths of 0.75 and 1.5 feet bgs. Fine grained, potentially expansive soil, as determined by NV5, that is encountered during grading should be overexcavated and stockpiled for removal, mixed as directed by NV5, or used in landscape areas. Recommendations for mitigating potentially expansive soil is presented in Section 5.1.2, “Expansive Soil,” of this report.

5. All rocks greater than 8 inches in greatest dimension (oversized rock) should be removed from the top 12 inches of native soil, if encountered. Oversized rock may be used in landscape areas, rock landscape walls, rock faced slopes, or removed from the project site.
6. Vegetation, deleterious materials, pavement debris, and oversized rocks not used in landscape areas, drainage channels, or other non-structural uses should be removed from the project site.

### 5.1.2 Expansive Soil

Based on the results of our field investigation and laboratory testing, fine-grained potentially expansive soil is present on the project site. Expansive soil is characterized by its ability to undergo significant volume change (shrink/swell) due to fluctuations in moisture content. Changes in soil moisture content can result from rainfall, landscape irrigation, perched groundwater, drought, or other factors and may cause unacceptable settlement or heave of structures, concrete slabs-on-grade, or pavements supported over these materials.

Expansive soil is typically identified by the presence of smaller clay minerals. Soil properties with the potential for swelling include a plasticity index (PI) greater than 15 and an Elastic Index (EI) greater than 20.

Expansive soil, where encountered, should be over-excavated to underlying competent native soil or weathered rock, or a minimum depth of 2 feet below slabs-on-grade and pavement sections. Over-excavations should extend a minimum 2 feet laterally from the edge of hardscapes. Over-excavations should be backfilled with approved non-expansive soil, placed and compacted in accordance with the following grading recommendations. Excavated expansive soil(s) should either be disposed off-site, placed in non-structural areas, or placed within the lower portion of deep fills.

It may be possible to mix potentially expansive soil with granular soil in order to reuse the material as structural fill. The actual mix ratio should be evaluated by NV5 at the time of construction, but a typical mix ratio for this type of application is about 4 parts granular soil to 1 part expansive soil. We recommend that an NV5 representative be present during site grading and earthwork to evaluate the implementation of our recommendations and provide additional or revised recommendations, if needed.

### 5.1.3 Soil Preparation for Fill Placement

Where fill placement is proposed, the surface soil exposed by site clearing and grubbing should be prepared as described below.

1. The surface soil should be scarified to a minimum depth of 12 inches below the existing ground surface, or to resistant rock, whichever is shallower. Following scarification, the soil should be uniformly moisture conditioned to within approximately 3 percentage points of the ASTM D1557 optimum moisture content.
2. The scarified and moisture conditioned soil should then be compacted to achieve a minimum relative compaction of 90 percent based on ASTM D1557 maximum dry density. The moisture content, density, and relative percent compaction should be verified by a representative of NV5. The earthwork contractor should assist our representative by excavating test pads with onsite earth moving equipment.

3. The native soil surface should be graded to minimize ponding of water and to drain surface water away from the proposed helicopter parking area. Where possible, surface water should be collected, conveyed and discharged into natural drainage courses or drainage swells.

### 5.1.4 Engineered Fill

All fill placed beneath pavement and as part of fill slopes should be considered structural engineered fill. Soil fill placement proposed for the project should incorporate the following recommendations:

1. Soil used to construct engineered fills should be non-expansive, free of deleterious, and consist predominantly of materials less than ½-inch in greatest dimension and should not contain rocks greater than 3 inches in greatest dimension (oversized material). Soil should have a plasticity index (PI) of less than or equal to 15, as determined by ASTM D4318 Atterberg Indices testing. If encountered, rock used in fill should be broken into pieces no larger than 3 inches in diameter. Rocks larger than 3 inches are considered oversized material and should be stockpiled for offhaul or later use in landscape areas and drainage channels. The contractor could use a rock rake or screen to remove oversized rocks.
2. Import soil should be predominantly granular, non-expansive and free of deleterious material. In general, the import soil should have a plasticity index less than 15 with 100% passing a 3-inch screen and less than 15% passing a No. 200 sieve. Prior to importation to the project site, the source generator should document that the import fill meets the guidelines set forth by the California Regional Water Quality Control Board and/or California Environmental Protection Agency (CalEPA) Department of Toxic Substances Control (DTSC) “Information Advisory, Clean Imported Fill Material” (2001). This advisory represents the best practice for characterization of soil prior to import for use as engineered fill. The Contractor should understand that they are responsible for importing soil that meets the regulatory guidelines. Import material that is proposed for use onsite should be submitted to NV5 for approval and possible laboratory testing at least 72 hours prior to transport to the site.
3. Engineered soil used to construct fill should be uniformly moisture conditioned to within approximately 3 percentage points of the ASTM D1557 optimum moisture content. Wet soil may need to be air dried or mixed with drier material to facilitate placement and compaction, particularly during or following the wet season.
4. Fill should be constructed by placing uniformly moisture conditioned soil in maximum 8-inch-thick loose, horizontal lifts (layers) prior to compacting.
5. All fill should be compacted to a minimum relative compaction of 90 percent of the ASTM D1557 maximum dry density. The upper 12 inches of fill in paved areas or proposed slabs-on-grade should be compacted to a minimum of 95 percent relative compaction.
6. The earthwork contractor should compact each loose soil lift with a tamping foot compactor such as a Caterpillar (CAT) 815 Compactor or equivalent as approved by NV5’s project engineer or his/her field representative. A smooth steel drum roller compactor should not be used to compact loose soil lifts for construction of engineered fills.

7. The prepared finished grade or finished subgrade soil surface should be proof-rolled with a fully loaded, 4,000-gallon-capacity water truck with the rear of the truck supported on a double-axle, tandem-wheel undercarriage or approved equivalent. The proof-rolled surface should be visually observed by the project engineer or his/her field representative to be firm, competent and relatively unyielding.

### 5.1.5 Fill Slope Grading

Based on our understanding of the project, we anticipate that fill slopes will be created as part of the proposed development. In general, permanent fill slopes should be no steeper than 2:1 (H:V).

The fill must be benched into existing side slopes as fill placement progresses. Benching must extend through loose surface soil into firm material, and at intervals such that no loose surface soil is beneath the fill. As a minimum, a horizontal bench should be excavated every 5 vertical feet or as determined by a representative of NV5.

Fill should be placed in horizontal lifts to the lines and grades shown on project plans. Fill slopes should not be constructed or extended horizontally by placing soil on an existing slope face and/or compacted by track walking.

Slopes should be constructed by overbuilding the slope face and then cutting it back to the design slope gradient and grade.

### 5.1.6 Erosion Controls

Graded portions of the project site should be seeded as soon as possible to allow vegetation to become established prior to and during the rainy season. In addition, grading that results in greater than one acre of soil disturbance or in sensitive areas may require the preparation of a site-specific stormwater pollution prevention plan. As a minimum, the following controls should be installed prior to and during grading to reduce erosion.

1. Prior to commencement of site work, fiber rolls should be installed down slope of the proposed area of disturbance to reduce migration of sediment from the project site. Fiber rolls on slopes are intended to reduce sediment discharge from disturbed areas, reduce the velocity of water flow, and aid in the overall revegetation of slopes. The fiber rolls should remain in place until construction activity is complete and vegetation becomes established.
2. Erosion controls should be installed on all cut and fill slopes to minimize erosion caused by surface water runoff.
3. All soil exposed in permanent slope faces should be hydroseeded or hand seeded/strawed with an appropriate seed mixture compatible with the soil and climate conditions of the project site as recommended by the local Resource Conservation District. Alternatively, an appropriate manufactured erosion control mat may be applied.
4. Install surface water drainage ditches at the top of cut and fill slopes (as necessary) to intercept and redirect concentrated surface water away from cut and fill slope faces. Under no circumstances should concentrated surface water be directed over slope faces. The intercepted water should be discharged into natural drainage courses or into other collection and disposal structures.

5. If grading is performed during wet weather, exposed soil may be susceptible to excessive disturbance. This could create a situation where previously completed earthwork needs to be repaired, possibly leading to project delays. Sediment and erosion control efforts, particularly stormwater mitigation, should be implemented in accordance with local accepted industry standards and best management practices.

### 5.1.7 Surface Water Drainage

Final site grading should be planned so that surface water is directed away from all slopes and hardscapes, including pavements, as described below.

1. Slope final grades so that surface water drains away from the proposed helicopter parking area finished subgrade at a minimum 2 percent slope for a minimum distance of 10 feet. Ponding of surface water should not be allowed on or near the edge of pavements.
2. Direct surface water off the helicopter parking area so that concentrated flow over fill areas does not cause erosion.
3. We anticipate that the existing drainage swale located between the existing helicopter parking area and taxiway "A" will need to be extended across the proposed fill. We also anticipate a culvert will be installed beneath the proposed access road, which is to be constructed across the drainage swell.
4. Drainage gradients should be maintained to carry all surface water to a properly designed infiltration facility.

### 5.1.8 Subsurface Drainage

If grading is performed during or immediately following the rainy season, seepage will likely be encountered. If groundwater or saturated soil conditions are encountered during grading, we anticipate that dewatering may be possible by gravity or by temporary installation of sump pumps in excavations.

Control of subsurface seepage at the base of fill areas can typically be accomplished by placement of an area drain. Underlying, saturated soil is typically removed and replaced with free draining, granular drain rock enveloped in geotextile fabric to an elevation above the encountered groundwater. Fill soil can be placed over the granular rock. NV5 should review proposed drainage improvements with regard to the site conditions prior to construction.

### 5.1.9 Soil Corrosion Potential

The project site soil corrosion potential was evaluated by Sunland Analytical on a soil sample collected at a depth of approximately 2.0 feet bgs from Boring B-2. Based on the limited tests (i.e., pH, resistivity, chloride, sulfate, and sulfide) the soil is moderately corrosive to buried iron, steel, cast iron, ductile iron, galvanized steel and dielectric coated steel or iron. All buried metallic piping should be protected against corrosion in accordance with the pipe manufacture recommendations. The laboratory report is included in Appendix C.

We reviewed the Online Soil Survey prepared by the USDA Soil Conservation Service (*https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx*). Based on review of soil survey information the native soil conditions onsite possess a low corrosion potential for concrete and a low corrosion potential for uncoated steel. To reduce the likelihood of corrosion problems, materials used for structural improvements should be selected based on local experience and practice. If alternative or new construction methods or materials are being proposed, it may be appropriate to have the selected materials evaluated by a corrosion engineer for compatibility with the onsite soil and groundwater conditions.

### 5.1.10 Grading Plan Review and Construction Monitoring

Coordination between the design team and the geotechnical engineer is recommended to assure that the design is compatible with the soil, geologic and groundwater conditions encountered during our study. NV5's experience, and that of the engineering profession, clearly indicates that during the construction phase of a project the risks of costly design, construction and maintenance problems can be significantly reduced by retaining a design geotechnical engineering firm to review the project plans and specifications and to provide geotechnical engineering consultation, observation and CQA testing services during construction. Construction quality assurance includes review of plans and specifications and performing construction monitoring as described below.

1. NV5 should be allowed to review the final earthwork grading improvement plans prior to commencement of construction to determine whether the recommendations have been implemented and, if necessary, to provide additional and/or modified recommendations.
2. Prior to commencing a new phase of construction, a meeting should be held at the site that includes, but is not limited to, the owner or owner's representative, the general contractor, the grading contractor, the foundation contractor, the underground contractor, any specialty contractors, the project civil engineer, other members of the project design team and NV5. This meeting should serve as a time to discuss and answer questions regarding the recommendations presented herein and to establish the coordination procedure between the contractors and NV5
3. Prior to commencement of a new phases of development on the site, NV5 should be retained to observe the soil/rock conditions within and surrounding the proposed improvements to confirm or modify our recommendations. A preconstruction meeting with the contractor and subcontractors involved should be held to discuss and review the applicable recommendations of this report as they apply to the proposed construction.
4. NV5 should be retained to perform construction quality assurance (CQA) monitoring of all earthwork grading performed by the contractor to determine whether our recommendations have been implemented, and if necessary, provide additional and/or modified recommendations. Upon your request we will prepare a CQA geotechnical engineering services proposal that will present a work scope, a tentative schedule and a fee estimate for your consideration and authorization. If NV5 is not retained to provide geotechnical engineering CQA services during the construction phase of the Project, then NV5 will not be responsible for geotechnical engineering CQA services provided by others nor any aspect of the Project that fails to meet your or a third party's expectations in the future.

## 5.2 STRUCTURAL IMPROVEMENT DESIGN CRITERIA

Our opinion is that the proposed helicopter parking area can be constructed of either asphaltic concrete (AC) or Portland cement concrete (PCC). PCC may perform better if the pad will be subjected to fuel trucks or heavy vehicles that may make short radius turns. PCC will be less susceptible to degradation from fuel spills.

### 5.2.1 Concrete Slab-on-Grade

Concrete slab-on-grade components are described below. If loads higher than 350 psf or intermittent live loads are anticipated, then a California-licensed structural engineer should design the necessary concrete slab-on-grade thickness and steel reinforcements.

1. Minimum 6-Inch-Thick Concrete Slab: The concrete slab should be installed with a minimum 3,000 pounds per square inch (psi) compressive strength after 28 days of curing. NV5 recommends that the concrete design have a water/cement ratio no greater than 0.45 and should be placed with minimum and maximum slumps of 3 and 5 inches, respectively. Pozzolans or other additives may be added to increase workability. The concrete mix design is the responsibility of the concrete supplier.
2. Steel Reinforcement: Reinforcement should be used to improve the load-carrying capacity, to reduce cracking caused by shrinkage during curing and from both differential and repeated loadings. It should be understood that it is nearly impossible to prevent all cracks from development in concrete slabs; in other words, it should be expected that some cracking will occur in all concrete slabs no matter how well they are reinforced. Concrete slabs that will be subjected to heavy loads should be designed with steel reinforcements by a California-licensed structural engineer.
3. Rebar: As a minimum, use No. 3 rebar (ASTM A615/A 615M-04 Grade 60), tied and placed with minimum 18-inch centers in both directions (perpendicular) and supported on concrete “dobies” to position the rebar in the center of the slab during concrete pouring. "Hooking and pulling" of steel during concrete placement is not recommended.
4. Minimum 4-Inch-Thick Crushed Rock or Class II Aggregate Base Rock Layer: The slab should be underlain by either crushed rock or Class II AB rock. Crushed rock should be mechanically consolidated under the observation of NV5. AB rock layers should be placed and compacted to a minimum of 95 percent of the ASTM D1557 dry density with a moisture content of ± 3 percentage points of the ASTM D1557 optimum moisture content. The crushed rock should be washed to produce a particle size distribution of 100 percent (by dry weight) passing the ¾ inch sieve and 5 percent passing the No. 4 sieve and 0 to 3 percent passing the No. 200 sieve. An alternative rock material would include AB rock meeting the specification of Caltrans Class II AB. Just prior to pouring the concrete slab, the rock layer should be moistened to a saturated surface dry (SSD) condition. This measure will reduce the potential for water to be withdrawn from the bottom of the concrete slab while it is curing and will help minimize the development of shrinkage cracks.

5. Subgrade Soil Preparation: The subgrade soil should be prepared and compacted consistent with the recommendations of Section 5.1. The top 6 inches of the non-expansive soil should be compacted to a minimum of 95 percent of the ASTM D1557 dry density with relatively uniform moisture content within ± 3 percentage points of the ASTM D1557 optimum moisture content. Prior to placing slab rock, subgrade soil must be moisture conditioned to between 75 and 90 percent saturation to a depth of 24 inches. Moisture conditioning should be performed for a minimum of 24 hours prior to concrete placement. Clayey soil may take up to 72 hours to reach this required degree of saturation. If the soil is not moisture conditioned prior to placing concrete, moisture will be wicked out of the concrete, possibly contributing to shrinkage cracks. Additionally, our opinion is that moisture conditioning the soil prior to placing concrete will reduce the likelihood of soil swell or heave following construction at locations where fine grained, potentially expansive soil is encountered. To facilitate slab-on-grade construction, we recommend that the slab subgrade soil be moisture conditioned following rock placement.
6. Crack Control Grooves: Crack control grooves should be installed during placement or saw cuts should be made in accordance with the ACI and Portland Cement Association (PCA) specifications. Generally, NV5 recommends that crack control grooves or saw cuts are installed on 10-foot-centers in both directions (perpendicular).
7. Concrete slabs should be moisture cured for at least seven days after placement. Excessive curling of the slab may occur if moisture conditioning is not performed. This is especially critical for slabs that are cast during the warm summer months.
8. The subgrade soil around the slabs-on-grade should be sloped away from the proposed slab subgrade a minimum of 2 percent for a distance of 10 feet as discussed in the “Surface Water Drainage” section of this report.
9. Field observations of all concrete slab-on-grade surfaces and installed steel reinforcements should be made by an NV5 construction monitor prior to pouring concrete.

These recommendations do not address vapor intrusion through the slab. We should be notified if conditioned space is proposed for the proposed helicopter parking area.

### 5.2.2 Asphaltic Pavement

The following recommended asphalt concrete flexible pavement sections are based on a design R-value of 12 and traffic indices (TIs) of 5 and 6. This is suitable for occasional fueling trucks, light traffic, and helicopters. Pavement design is presented in Table 5.2.2-1.

Table 5.2.2-1 - Recommended Pavement Sections

| **Traffic Index: 5**<br>**Design R-Value: 12** | **Pavement Section (inches)** |
|---|---|
| Caltrans Section 39, Standard Specifications<br>Asphalt Concrete | 3.0 |
| Caltrans Section 26, Class 2 Baserock<br>95% compaction | 9.5 |
| Subgrade<br>95% compaction | 12.0 |
| **Traffic Index: 6**<br>**Design R-Value: 12** | **Pavement Section (inches)** |
| Caltrans Section 39, Standard Specifications<br>Asphalt Concrete | 3.5 |
| Caltrans Section 26, Class 2 Baserock<br>95% compaction | 12.0 |
| Subgrade<br>95% compaction | 12.0 |

## 6.0 LIMITATIONS

The following limitations apply to the findings, conclusions and recommendations presented in this report:

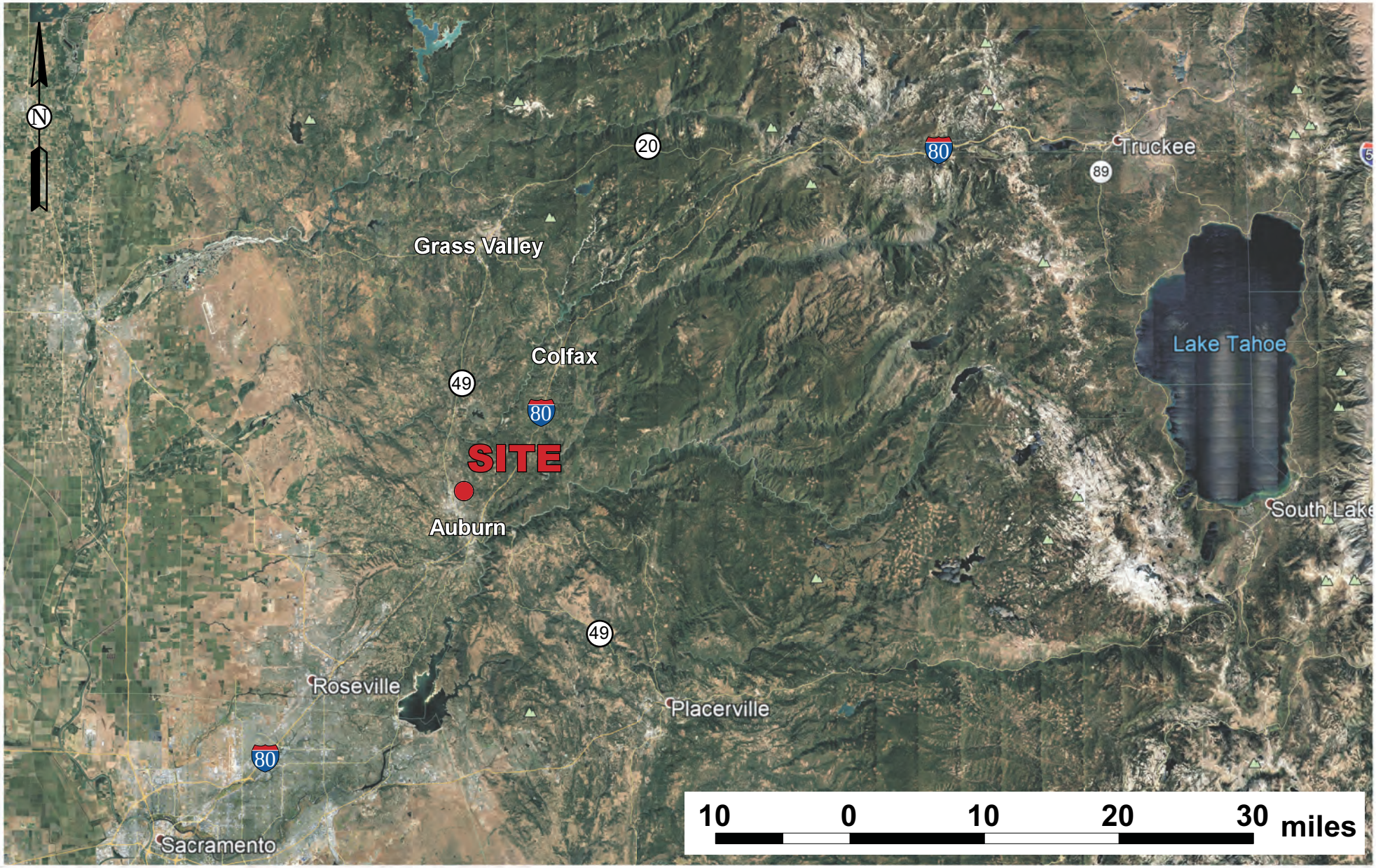
1. Our professional services were performed consistent with the generally accepted geotechnical engineering principles and practices employed in northern California. No warranty is expressed or implied.
2. These services were performed consistent with our agreement with our client. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of our services. We do not warrant the accuracy of information supplied by others, or the use of segregated portions of this report. This report is solely for the use of our client unless noted otherwise. Any reliance on this report by a third party is at the party's sole risk.
3. If changes are made to the nature or design of the project as described in this report, then the conclusions and recommendations presented in this report should be considered invalid. Only our firm can determine the validity of the conclusions and recommendations presented in this report. Therefore, we should be retained to review all project changes and prepare written responses with regards to their impacts on our conclusions and recommendations. However, we may require additional fieldwork and laboratory testing to develop any modifications to our recommendations. Costs to review project changes and perform additional fieldwork and laboratory testing necessary to modify our recommendations are beyond the scope of services presented in this report. Any additional work will be performed only after receipt of an approved scope of services, budget, and written authorization to proceed.

4. The analyses, conclusions and recommendations presented in this report are based on site conditions as they existed at the time we performed our surface and subsurface field investigations. We have assumed that the subsurface soil and groundwater conditions encountered at the location of our exploratory trenches are generally representative of the subsurface conditions throughout the entire project site. However, the actual subsurface conditions at locations between and beyond our exploratory borings may differ. Therefore, if the subsurface conditions encountered during construction are different than those described in this report, then we should be notified immediately so that we can review these differences and, if necessary, modify our recommendations.
5. The elevation or depth to groundwater underlying the project site may differ with time and location.
6. The project site map shows approximate boring locations as determined by pacing distances from identifiable site features. Therefore, the trench locations should not be relied upon as being exact nor located with surveying methods.
7. Our geotechnical investigation scope of services did not include evaluating the project site for the presence of hazardous materials. Although we did not observe hazardous materials within the proposed improvement area at the time of our field investigation, all project personnel should be careful and take the necessary precautions should hazardous materials be encountered during construction.
8. The findings of this report are valid as of the present date. However, changes in the conditions of the property can occur with the passage of time. The changes may be due to natural processes or to the works of man, on the project site or adjacent properties. In addition, changes in applicable or appropriate standards can occur, whether they result from legislation or the broadening of knowledge. Therefore, the recommendations presented in this report should not be relied upon after a period of two years from the issue date without our review.

## FIGURES

FIGURE 1 SITE LOCATION MAP

FIGURE 2 EXPLORATION MAP




Reference: Google Earth, Imagery Date: 12/30/2016, Accessed: 10/12/2020

Scale:1" = 10 miles

NV5
792 Searls Avenue, Nevada City, California, 95959
PHONE: 530-478-1305, FAX: 530-478-1019

# SITE LOCATION MAP

Project Name: AUBRUN AIRPORT HELIPAD

Location: AUBURN, CALIFORNIA

Project No.: 3783A.00

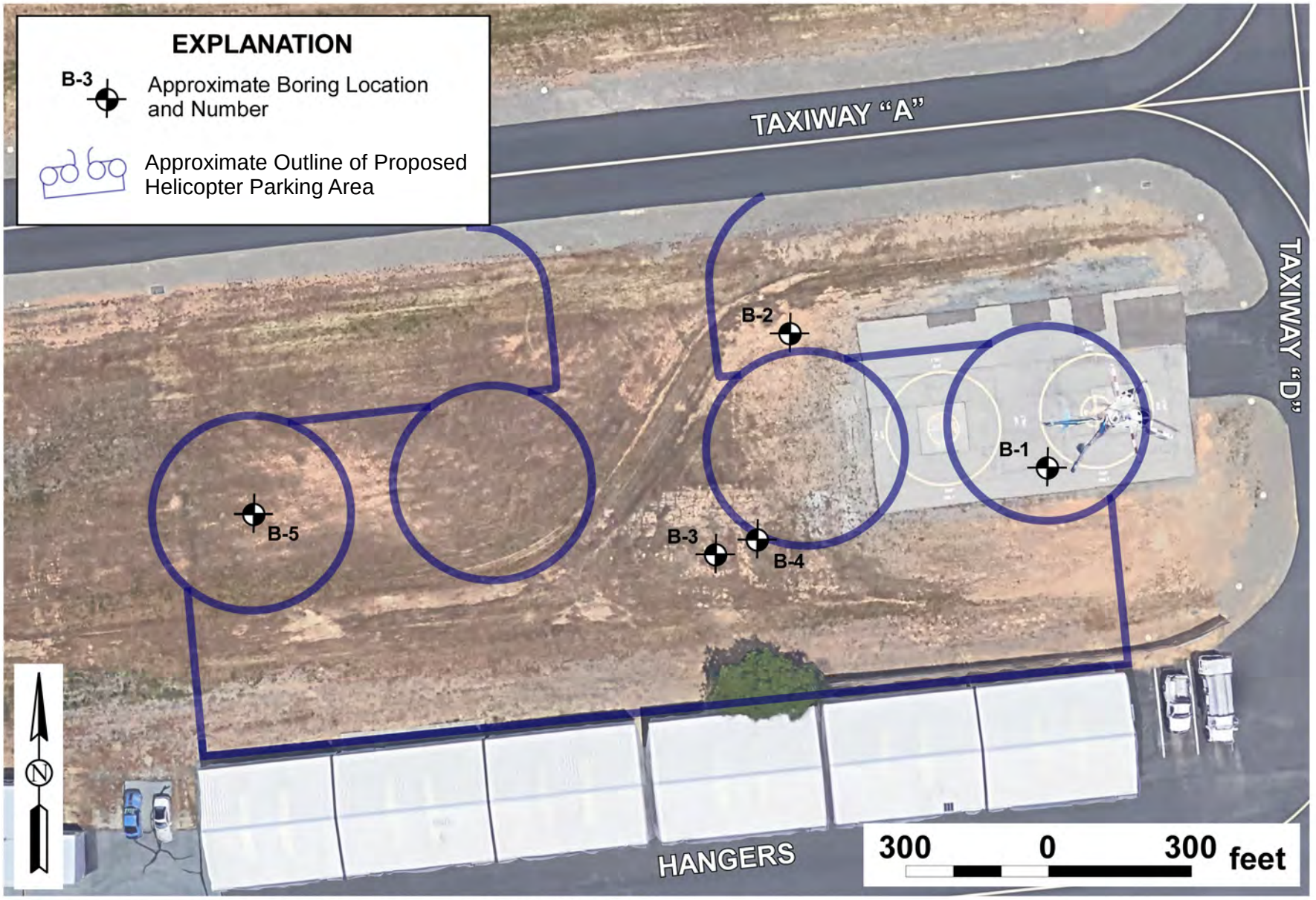
Date: OCTOBER 2020

Drawn By: WAL

Checked By: JSS

FIGURE

1




Reference: Google Earth, Imagery Date: 9/11/2019, Accessed: 10/12/2020

Scale:1" =300'

NV5
792 Searls Avenue, Nevada City, California, 95959
PHONE: 530-478-1305, FAX: 530-478-1019

# EXPLORATION MAP

Project Name: AUBURN AIRPORT HELIPAD

Location: AUBURN, CALIFORNIA

Project No.: 3783A.00

Date: OCTOBER 2020

Drawn By: WAL

Checked By: JSS

FIGURE

2

# APPENDIX A

IMPORTANT INFORMATION ABOUT YOUR
GEOTECHNICAL ENGINEERING REPORT

(Included with Permission of GBA, copyright 2016)

# Important Information about This

# Geotechnical-Engineering Report

**Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.**

**While you cannot eliminate all such risks, you can manage them. The following information is provided to help.**

**The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, clients can benefit from a lowered exposure to the subsurface problems that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed below, contact your GBA-member geotechnical engineer. Active involvement in the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.**

## Geotechnical-Engineering Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. *Those who rely on a geotechnical-engineering report prepared for a different client can be seriously misled*. No one except authorized client representatives should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one – not even you – should apply this report for any purpose or project except the one originally contemplated.*

## Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read it *in its entirety*. Do not rely on an executive summary. Do not read selected elements only. *Read this report in full.*

## You Need to Inform Your Geotechnical Engineer about Change

Your geotechnical engineer considered unique, project-specific factors when designing the study behind this report and developing the confirmation-dependent recommendations the report conveys. A few typical factors include:

- the client's goals, objectives, budget, schedule, and risk-management preferences;
- the general nature of the structure involved, its size, configuration, and performance criteria;
- the structure's location and orientation on the site; and
- other planned or existing site improvements, such as retaining walls, access roads, parking lots, and underground utilities.

Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.*

## This Report May Not Be Reliable

*Do not rely on this report* if your geotechnical engineer prepared it:

- for a different client;
- for a different project;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, that it could be unwise to rely on a geotechnical-engineering report whose reliability may have been affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If your geotechnical engineer has not indicated an "apply-by" date on the report, ask what it should be*, and, in general, *if you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying it. A minor amount of additional testing or analysis – if any is required at all – could prevent major problems.

## Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface through various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing were performed*. The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgment to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team from project start to project finish, so the individual can provide informed guidance quickly, whenever needed.

## This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, *they are not final*, because the geotechnical engineer who developed them relied heavily on judgment and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* revealed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

## This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a full-time member of the design team, to:

- confer with other design-team members,
- help develop specifications,
- review pertinent elements of other design professionals' plans and specifications, and
- be on hand quickly whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction observation.

## Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for informational purposes only*. To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report, but they may rely on the factual data relative to the specific times, locations, and depths/elevations referenced. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

## Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely*. Ask questions. Your geotechnical engineer should respond fully and frankly.

## Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures*. If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. As a general rule, *do not rely on an environmental report prepared for a different client, site, or project, or that is more than six months old.*

## Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, none of the engineer's services were designed, conducted, or intended to prevent uncontrolled migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration.*** Confront the risk of moisture infiltration by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

Telephone: 301/565-2733
e-mail: info@geoprofessional.org www.geoprofessional.org

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# APPENDIX B

EXPLORATORY BORING LOGS

# EXPLORATORY BORING LOG

792 Searls Avenue, Nevada City, California, 95959
PHONE: 530-478-1305, FAX: 530-478-1019

**Boring No.** B1

| | | | |
|---|---|---|---|
| **Project Name:** AUBURN AIRPORT HELIPAD | **Project No.:** 3783A.00 | **Task:** - | **Start:** 10/12/2020 |
| **Location:** AUBURN, CALIFORNIA | **Ground Elev. (Ft. MSL):** 1495 | | **Finish:** 10/12/2020 |

**Sheet:** 1 of 1

| | | |
|---|---|---|
| **Logged By:** J. SMITH | **Drilling Company:** H1 DRILLING | **Drill Rig Type:** TRUCK-MOUNTED MOBILE |
| **Driller:** R. HUMPHREYS | **Drilling Method:** HOLLOW STEM AUGER | **Hammer Type:** 140-LB AUTO-TRIP |
| **Boring Dia. (In.):** 3.25 | **Total Depth (Ft.):** 15.5 | **Backfill or Well Casing:** GROUT WITH ASPHALT PATCH |

**Ground Water Information**

| | | | | |
|---|---|---|---|---|
| **Date** | - | | | |
| **Time** | - | | | |
| **Depth (ft)** | NFWE | | | |

**Soil and/or Rock Descriptions**

(USCS Symbol; USCS Name; Field Estimated Particle Size Gradation (%); Munsel Color; Density/Consistency; Moisture; Fill Material; Dilatancy; Plasticity Toughness; Dry Strength; Structure; Cementation; Organics; Odor; Other)

| Time (H:M) | Pocket Penetrometer (TSF) | SPT Blow Counts (Blows / Foot) | Drilling Method and/or Sampler Type | Sample Recovery (Ft./Ft.) | Sample No. | Depth B.G.S. (Ft.) | Sample Interval And Symbol | Well Construction Detail | Graphic Log | Soil and/or Rock Descriptions |
|---|---|---|---|---|---|---|---|---|---|---|
| 11:41 | | | HSA | | | | | | | 2" ASPHALT |
| | | | | | | 1 | | | | 7" AB |
| | | | | | B1-C1 | | | | × × | (Rx) ULTRAMAFIC ROCKS; SERPENTINIZED, PERIODOTITES AND PYROXENITES W/ ALTERATIONS TO SERPANTINE, TALC, AND CHLORITE, AND OCCASIONAL FURRUGINOUS COATING; COMPLETELY TO MODERATELY WEATHERED; MODERATELY TO VERY STRONG; PALE OLIVE (10Y-5GY 6/4), LIGHT OLIVE (10Y-5GY 5/4), GREENISH GRAY (GLEY 1 5/1), WITH DARK YELLOWISH BROWN (10YR 3/6); GENERALLY EXCAVATES AS (SM) SANDY SILT, LIGHT GRAY TO LIGHT YELLOWISH BROWN. |
| | | | SPT | | B1-BK1 | 2 | | | × × | |
| | | | | | | 3 | | | × × | |
| | | 61 | | | | | | | × × | |
| | | | HSA | | | 4 | | | × × | |
| | | | | | | | | | × × | |
| | | | | | | 5 | | | × × | |
| | | | SPT | | B1-BK2 | | | | × × | |
| | | | | | | 6 | | | × × | |
| | | 57 | | | | | | | × × | |
| | | | HSA | | | 7 | | | × × | |
| | | | | | | | | | × × | |
| | | | | | | 8 | | | × × | |
| | | | | | | | | | × × | |
| | | | | | | 9 | | | × × | |
| | | | | | | | | | × × | |
| | | | | | | 10 | | | × × | |
| | | | SPT | | B1-BK3 | | | | × × | |
| | | | | | | 11 | | | × × | |
| | | 51 | | | | | | | × × | [EXTREMELY OXIDIZED] |
| | | | HSA | | | 12 | | | × × | |
| | | | | | | | | | × × | |
| | | | | | | 13 | | | × × | |
| | | | | | | | | | × × | |
| | | | | | | 14 | | | × × | |
| | | | | | | | | | × × | |
| | | | | | | 15 | | | × × | |
| 12:19 | | 78+ | SPT | | B1-BK4 | | | | | |
| | | | | | | 16 | | BOH | | BOH AT 15.5' |
| | | | | | | 17 | | | | |
| | | | | | | 18 | | | | |
| | | | | | | 19 | | | | |
| | | | | | | 20 | | | | |

NOTES: BOH = BOTTOM OF HOLE; BGS = BELOW GROUND SURFACE; NFWE = NO FREE WATER ENCOUNTERED; HSA = HOLLOW STEM AUGER; MC = MODIFIED CALIFORNIA SAMPLER; SPT = STANDARD PENETRATION TEST SAMPLER

# EXPLORATORY BORING LOG

792 Searls Avenue, Nevada City, California, 95959
PHONE: 530-478-1305, FAX: 530-478-1019

**Boring No.** B2

| | | | | |
|---|---|---|---|---|
| **Project Name:** AUBURN AIRPORT HELIPAD | **Project No.:** 3783A.00 | **Task:** - | **Start:** 10/12/2020 | **Sheet:** 1 of 1 |
| **Location:** AUBURN, CALIFORNIA | **Ground Elev. (Ft. MSL):** 1495 | | **Finish:** 10/12/2020 | |
| **Logged By:** J. SMITH | **Drilling Company:** H1 DRILLING | | **Drill Rig Type:** TRUCK-MOUNTED MOBILE | |
| **Driller:** R. HUMPHREYS | **Drilling Method:** HOLLOW STEM AUGER | | **Hammer Type:** 140-LB AUTO-TRIP | |
| **Boring Dia. (In.):** 3.25 | **Total Depth (Ft.):** 5.5 | **Backfill or Well Casing:** CUTTINGS | | |

**Ground Water Information**

| | | | | |
|---|---|---|---|---|
| **Date** | - | | | |
| **Time** | - | | | |
| **Depth (ft)** | NFWE | | | |

| Time (H:M) | Pocket Penetrometer (TSF) | SPT Blow Counts (Blows / Foot) | Drilling Method and/or Sampler Type | Sample Recovery (Ft./Ft.) | Sample No. | Depth B.G.S. (Ft.) | Sample Interval And Symbol | Well Construction Detail | Graphic Log | Soil and/or Rock Descriptions |
|---|---|---|---|---|---|---|---|---|---|---|
| 10:21 | | | HSA | | | 1 | | | | (CL) CLAY WITH SAND; FIELD ESTIMATE: 80% FINES, 20% SAND; REDDISH BROWN (5YR 4/4); DRY; STIFF TO HARD. |
| | | | SPT | | B2-BK1 | 2 | | | × × | (CH) FAT CLAY WITH SAND; FIELD ESTIMATE: 80-90% FINES, 10-20% SAND; GRAYISH BROWN (2.5Y 5/2) TO (7.5YR 4/3); DAMP TO MOIST; FIRM TO STIFF; RESIDUAL SOIL. |
| | | 78+ | | | B2-C1 | | | | × × | |
| | | | HSA | | | 3 | | | × × | (Rx) ULTRAMAFIC ROCKS; SERPENTINIZED, PERIODOTITES AND PYROXENITES W/ ALTERATIONS TO SERPANTINE, TALC, AND CHLORITE, AND OCCASIONAL FURRUGINOUS COATING; COMPLETELY TO MODERATELY WEATHERED; MODERATELY TO VERY STRONG; PALE OLIVE (10Y-5GY 6/4), LIGHT OLIVE (10Y-5GY 5/4), GREENISH GRAY (GLEY 1 5/1), WITH DARK YELLOWISH BROWN (10YR 3/6); GENERALLY EXCAVATES AS (SM) SANDY SILT, LIGHT GRAY TO LIGHT YELLOWISH BROWN. |
| | | | | | | 4 | | | × × | |
| | | | | | | 5 | | | × × | |
| 10:44 | | 78+ | SPT | | B2-BK2 | 6 | | BOH | | BOH AT 5.5' DUE TO REFUSAL ON ROCK |
| | | | | | | 7 | | | | |
| | | | | | | 8 | | | | |
| | | | | | | 9 | | | | |
| | | | | | | 10 | | | | |
| | | | | | | 11 | | | | |
| | | | | | | 12 | | | | |
| | | | | | | 13 | | | | |
| | | | | | | 14 | | | | |
| | | | | | | 15 | | | | |
| | | | | | | 16 | | | | |
| | | | | | | 17 | | | | |
| | | | | | | 18 | | | | |
| | | | | | | 19 | | | | |
| | | | | | | 20 | | | | |

NOTES: BOH = BOTTOM OF HOLE; BGS = BELOW GROUND SURFACE; NFWE = NO FREE WATER ENCOUNTERED; HSA = HOLLOW STEM AUGER; MC = MODIFIED CALIFORNIA SAMPLER; SPT = STANDARD PENETRATION TEST SAMPLER

# EXPLORATORY BORING LOG

792 Searls Avenue, Nevada City, California, 95959
PHONE: 530-478-1305, FAX: 530-478-1019

**Boring No.** B3

| | | | |
|---|---|---|---|
| **Project Name:** AUBURN AIRPORT HELIPAD | **Project No.:** 3783A.00 | **Task:** - | **Start:** 10/12/2020 |
| **Location:** AUBURN, CALIFORNIA | **Ground Elev. (Ft. MSL):** 1495 | | **Finish:** 10/12/2020 |
| **Logged By:** J. SMITH | **Drilling Company:** H1 DRILLING | | **Drill Rig Type:** TRUCK-MOUNTED MOBILE |
| **Driller:** R. HUMPHREYS | **Drilling Method:** HOLLOW STEM AUGER | | **Hammer Type:** 140-LB AUTO-TRIP |
| **Boring Dia. (In.):** 3.25 | **Total Depth (Ft.):** 15.75 | **Backfill or Well Casing:** CUTTINGS | |

**Sheet:** 1 of 1

**Ground Water Information**

| | | | | |
|---|---|---|---|---|
| **Date** | - | | | |
| **Time** | - | | | |
| **Depth (ft)** | NFWE | | | |

| Time (H:M) | Pocket Penetrometer (TSF) | SPT Blow Counts (Blows / Foot) | Drilling Method and/or Sampler Type | Sample Recovery (Ft./Ft.) | Sample No. | Depth B.G.S. (Ft.) | Sample Interval And Symbol | Well Construction Detail | Graphic Log | Soil and/or Rock Descriptions |
|---|---|---|---|---|---|---|---|---|---|---|
| 10:52 | | | HSA | | | 1 | | | | (CL) CLAY WITH SAND; FIELD ESTIMATE: 80% FINES, 20% SAND; REDDISH BROWN (5YR 4/4); DRY; STIFF TO HARD. |
| | | | | | | 2 | | | | (CH) FAT CLAY WITH SAND; FIELD ESTIMATE: 80-90% FINES, 10-20% SAND; GRAYISH BROWN (2.5Y 5/2) TO (7.5YR 4/3); DAMP TO MOIST; FIRM TO STIFF; RESIDUAL SOIL. |
| | | | SPT | | B3-BK1 | | | | | |
| | | 42 | | | | 3 | | | | (Rx) ULTRAMAFIC ROCKS; SERPENTINIZED, PERIODOTITES AND PYROXENITES W/ ALTERATIONS TO SERPANTINE, TALC, AND CHLORITE, AND OCCASIONAL FURRUGINOUS COATING; COMPLETELY TO MODERATELY WEATHERED; MODERATELY TO VERY STRONG; PALE OLIVE (10Y-5GY 6/4), LIGHT OLIVE (10Y-5GY 5/4), GREENISH GRAY (GLEY 1 5/1), WITH DARK YELLOWISH BROWN (10YR 3/6); GENERALLY EXCAVATES AS (SM) SANDY SILT, LIGHT GRAY TO LIGHT YELLOWISH BROWN. |
| | | | HSA | | | 4 | | | | |
| | | | | | | 5 | | | | |
| | | | SPT | | B3-BK2 | | | | | |
| | | | HSA | | | 6 | | | | |
| | | 62 | | | | 7 | | | | |
| | | | | | | 8 | | | | |
| | | | | | | 9 | | | | |
| | | | | | | 10 | | | | |
| | | | SPT | | B3-BK3 | | | | | |
| | | | | | | 11 | | | | |
| 11:11 | | 78 | | | | 12 | | | | |
| | | | HSA | | | | | | | |
| | | | | | | 13 | | | | |
| | | | | | | 14 | | | | |
| | | | | | | 15 | | | | |
| | | | SPT | | B3-BK4 | | | | | |
| | | 78+ | | | | 16 | | BOH | | BOH AT 15.75' |
| | | | | | | 17 | | | | |
| | | | | | | 18 | | | | |
| | | | | | | 19 | | | | |
| | | | | | | 20 | | | | |

NOTES: BOH = BOTTOM OF HOLE; BGS = BELOW GROUND SURFACE; NFWE = NO FREE WATER ENCOUNTERED; HSA = HOLLOW STEM AUGER; MC = MODIFIED CALIFORNIA SAMPLER; SPT = STANDARD PENETRATION TEST SAMPLER

# EXPLORATORY BORING LOG

792 Searls Avenue, Nevada City, California, 95959
PHONE: 530-478-1305, FAX: 530-478-1019

**Boring No.** B4

| | | | |
|---|---|---|---|
| **Project Name:** AUBURN AIRPORT HELIPAD | **Project No.:** 3783A.00 | **Task:** - | **Start:** 10/12/2020 |
| **Location:** AUBURN, CALIFORNIA | **Ground Elev. (Ft. MSL):** 1495 | | **Finish:** 10/12/2020 |
| **Logged By:** J. SMITH | **Drilling Company:** H1 DRILLING | | **Drill Rig Type:** TRUCK-MOUNTED MOBILE |
| **Driller:** R. HUMPHREYS | **Drilling Method:** HOLLOW STEM AUGER | | **Hammer Type:** 140-LB AUTO-TRIP |
| **Boring Dia. (In.):** 3.25 | **Total Depth (Ft.):** 2.5 | **Backfill or Well Casing:** CUTTINGS | |

**Sheet:** 1 of 1

| Time (H:M) | Pocket Penetrometer (TSF) | SPT Blow Counts (Blows / Foot) | Drilling Method and/or Sampler Type | Sample Recovery (Ft./Ft.) | Sample No. | Depth B.G.S. (Ft.) | Sample Interval And Symbol | Well Construction Detail | Graphic Log |
|---|---|---|---|---|---|---|---|---|---|
| 12:35 | | | HSA | | | 1 | | | |
| | | | MC | 0.5/1.5' | B4-L1 | 2 | | | |
| 12:41 | | 34 | | | | 3 | | BOH | |
| | | | | | | 4 | | | |
| | | | | | | 5 | | | |
| | | | | | | 6 | | | |
| | | | | | | 7 | | | |
| | | | | | | 8 | | | |
| | | | | | | 9 | | | |
| | | | | | | 10 | | | |
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| | | | | | | 12 | | | |
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| | | | | | | 15 | | | |
| | | | | | | 16 | | | |
| | | | | | | 17 | | | |
| | | | | | | 18 | | | |
| | | | | | | 19 | | | |
| | | | | | | 20 | | | |

**Ground Water Information**

| | | | | |
|---|---|---|---|---|
| **Date** | - | | | |
| **Time** | - | | | |
| **Depth (ft)** | NFWE | | | |

**Soil and/or Rock Descriptions**

(USCS Symbol; USCS Name; Field Estimated Particle Size Gradation (%); Munsel Color; Density/Consistency; Moisture; Fill Material; Dilatancy; Plasticity Toughness; Dry Strength; Structure; Cementation; Organics; Odor; Other)

(CL) CLAY WITH SAND; FIELD ESTIMATE: 80% FINES, 20% SAND; REDDISH BROWN (5YR 4/4); DRY; STIFF TO HARD.

(CH) FAT CLAY WITH SAND; FIELD ESTIMATE: 80-90% FINES, 10-20% SAND; GRAYISH BROWN (2.5Y 5/2) TO (7.5YR 4/3); DAMP TO MOIST; FIRM TO STIFF; RESIDUAL SOIL.

(Rx) ULTRAMAFIC ROCKS; SERPENTINIZED, PERIODOTITES AND PYROXENITES W/ ALTERATIONS TO SERPANTINE, TALC, AND CHLORITE, AND OCCASIONAL FURRUGINOUS COATING; COMPLETELY TO MODERATELY WEATHERED; MODERATELY TO VERY STRONG; PALE OLIVE (10Y-5GY 6/4), LIGHT OLIVE (10Y-5GY 5/4), GREENISH GRAY (GLEY 1 5/1), WITH DARK YELLOWISH BROWN (10YR 3/6); GENERALLY EXCAVATES AS (SM) SANDY SILT, LIGHT GRAY TO LIGHT YELLOWISH BROWN.

BOH AT 2.5' DUE TO REFUSAL ON ROCK

NOTES: BOH = BOTTOM OF HOLE; BGS = BELOW GROUND SURFACE; NFWE = NO FREE WATER ENCOUNTERED; HSA = HOLLOW STEM AUGER; MC = MODIFIED CALIFORNIA SAMPLER; SPT = STANDARD PENETRATION TEST SAMPLER

# EXPLORATORY BORING LOG

792 Searls Avenue, Nevada City, California, 95959
PHONE: 530-478-1305, FAX: 530-478-1019

**Boring No.** B5

| | | | |
|---|---|---|---|
| **Project Name:** AUBURN AIRPORT HELIPAD | **Project No.:** 3783A.00 | **Task:** - | **Start:** 10/12/2020 |
| **Location:** AUBURN, CALIFORNIA | **Ground Elev. (Ft. MSL):** 1495 | | **Finish:** 10/12/2020 |
| **Logged By:** J. SMITH | **Drilling Company:** H1 DRILLING | | **Drill Rig Type:** TRUCK-MOUNTED MOBILE |
| **Driller:** R. HUMPHREYS | **Drilling Method:** HOLLOW STEM AUGER | | **Hammer Type:** 140-LB AUTO-TRIP |
| **Boring Dia. (In.):** 3.25 | **Total Depth (Ft.):** 9.25 | **Backfill or Well Casing:** CUTTINGS | |

**Sheet:** 1 of 1

**Ground Water Information**

| | | | | |
|---|---|---|---|---|
| **Date** | - | | | |
| **Time** | - | | | |
| **Depth (ft)** | NFWE | | | |

| Time (H:M) | Pocket Penetrometer (TSF) | SPT Blow Counts (Blows / Foot) | Drilling Method and/or Sampler Type | Sample Recovery (Ft./Ft.) | Sample No. | Depth B.G.S. (Ft.) | Sample Interval And Symbol | Well Construction Detail | Graphic Log | Soil and/or Rock Descriptions |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | (USCS Symbol; USCS Name; Field Estimated Particle Size Gradation (%); Munsel Color; Density/Consistency; Moisture; Fill Material; Dilatancy; Plasticity Toughness; Dry Strength; Structure; Cementation; Organics; Odor; Other) |
| 12:49 | | | HSA | | | 1 | | | | (CL) CLAY WITH SAND; FIELD ESTIMATE: 80% FINES, 20% SAND; REDDISH BROWN (5YR 4/4); DRY; STIFF TO HARD. |
| | | | | | | 2 | | | | |
| | | | MC | 0.5/1.5' | B5-L1 | | | | × × | (Rx) ULTRAMAFIC ROCKS; SERPENTINIZED, PERIODOTITES AND PYROXENITES W/ ALTERATIONS TO SERPANTINE, TALC, AND CHLORITE, AND OCCASIONAL FURRUGINOUS COATING; COMPLETELY TO MODERATELY WEATHERED; MODERATELY TO VERY STRONG; PALE OLIVE (10Y-5GY 6/4), LIGHT OLIVE (10Y-5GY 5/4), GREENISH GRAY (GLEY 1 5/1), WITH DARK YELLOWISH BROWN (10YR 3/6); GENERALLY EXCAVATES AS (SM) SANDY SILT, LIGHT GRAY TO LIGHT YELLOWISH BROWN. |
| | | 78+ | | | | 3 | | | × × | |
| | | | HSA | | | | | | × × | |
| | | | | | | 4 | | | × × | |
| | | | | | | 5 | | | × × | |
| | | | SPT | | | | | | × × | |
| | | 78+ | | | | 6 | | | × × | |
| | | | HSA | | | 7 | | | × × | |
| | | | | | | 8 | | | × × | |
| | | | | | | | | | × × | |
| | | | | | | 9 | | | × × | |
| 13:21 | | 78+ | SPT | | | | | | | |
| | | | | | | 10 | | BOH | | BOH AT 5.5' DUE TO REFUSAL ON ROCK |
| | | | | | | 11 | | | | |
| | | | | | | 12 | | | | |
| | | | | | | 13 | | | | |
| | | | | | | 14 | | | | |
| | | | | | | 15 | | | | |
| | | | | | | 16 | | | | |
| | | | | | | 17 | | | | |
| | | | | | | 18 | | | | |
| | | | | | | 19 | | | | |
| | | | | | | 20 | | | | |

NOTES: BOH = BOTTOM OF HOLE; BGS = BELOW GROUND SURFACE; NFWE = NO FREE WATER ENCOUNTERED; HSA = HOLLOW STEM AUGER; MC = MODIFIED CALIFORNIA SAMPLER; SPT = STANDARD PENETRATION TEST SAMPLER

# APPENDIX C

LABORATORY TEST DATA

# ATTERBERG INDICES

**ASTM D4318**

**DSA File #:**

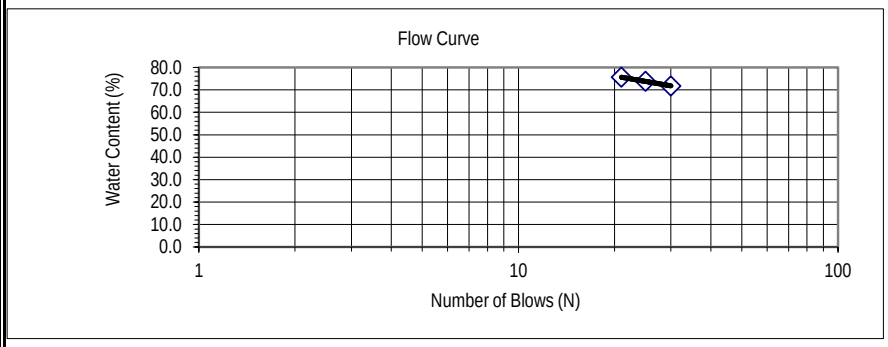
**DSA Appl #:**

| | | | | | |
|---|---|---|---|---|---|
| Project No.: | **3783A.00** | Project Name: | **AUN New Helicopter Parking** | Date: | **10/22/2020** |
| Sample No.: | **B4-L1** | Boring/Trench: **B4** | Depth, (ft.): **-** | Tested By: | **GWO/SLN** |
| Description: | **Brown (7.5YR 4/3) Fat Clay with Sand** | | | Checked By: | **MLH** |
| Sample Location: | | | | Lab. No.: | **15-20-529** |

Estimated % of Sample Retained on No. 40 Sieve: 5 Sample Air Dried: yes

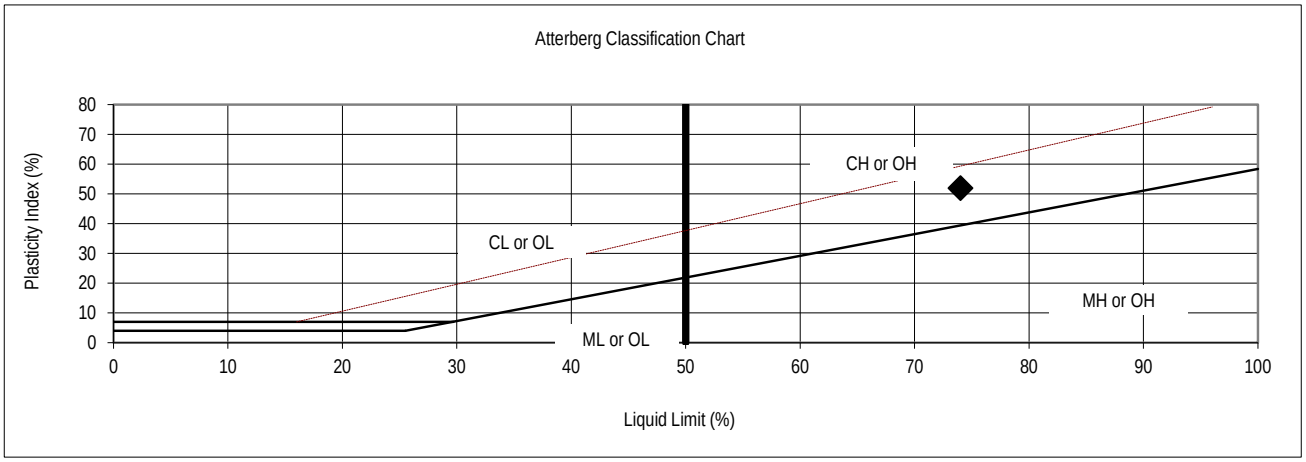
Test Method A or B: A

| LIQUID LIMIT: | | | | | | PLASTIC LIMIT: | | |
|---|---|---|---|---|---|---|---|---|
| Sample No.: | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 |
| Pan ID: | 2 | T | 22 | | | B | PI | |
| Wt. Pan (gr) | 15.29 | 15.04 | 15.32 | | | 15.36 | 15.30 | |
| Wt. Wet Soil + Pan (gr) | 21.32 | 20.15 | 21.01 | | | 21.36 | 21.37 | |
| Wt. Dry Soil + Pan (gr) | 18.80 | 17.98 | 18.56 | | | 20.27 | 20.26 | |
| Wt. Water (gr) | 2.52 | 2.17 | 2.45 | | | 1.09 | 1.11 | |
| Wt. Dry Soil (gr) | 3.51 | 2.94 | 3.24 | | | 4.91 | 4.96 | |
| Water Content (%) | 71.8 | 73.8 | 75.6 | | | 22.2 | 22.4 | |
| Number of Blows, N | 30 | 25 | 21 | | | | | |
| | | | | LIQUID LIMIT = | 74 | | PLASTIC LIMIT = | 22 |




Plasticity Index = 52

Group Symbol = CH




792 Searls Avenue | Nevada City, CA 95959 | www.NV5.com | Office 530.478.1305 | Fax 530.478.1019

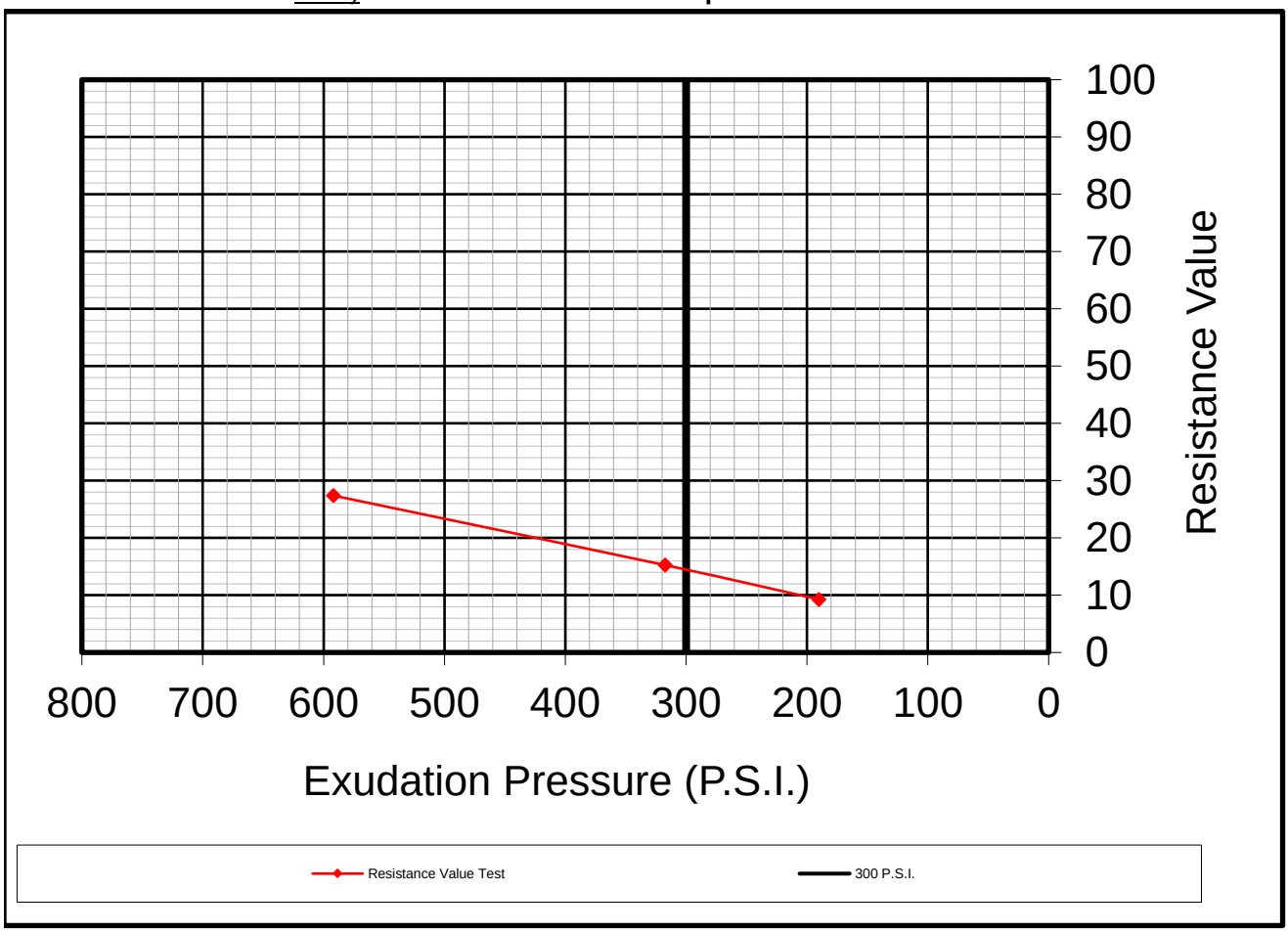
**CQA – INFRASTRUCTURE – ENERGY – PROGRAM MANAGEMENT – ENVIRONMENTAL**

Pavement Engineering Inc.
Redding • Sacramento • San Luis Obispo
Concord • Santa Clarita

# RESISTANCE (R) VALUE TEST

**California Test 301**

| | | | |
|---|---|---|---|
| **PEI Laboratory No.:** | L202791 | **NV5 Project Name:** | AUN New Helicoptor Parking |
| **PEI Client:** | NV5 (Holdrege & Kull) | **NV5 Project No.:** | 3783A.00 |
| **PEI Project Name:** | 2020 Laboratory Testing | **NV5 Date Sampled:** | 10/15/2020 |
| **PEI Project No.:** | 200018-01 | **NV5 Office:** | Nevada City |
| **Report Date:** | October 19, 2020 | **NV5 Engineer:** | John Atkinson |
| **Sample Description:** | Brown Clay (comp of B1 & B2) | **NV5 PO No.:** | 15-20-529 |
| | | **NV5 Sample ID:** | |




| Specimen No. | 7 | 8 | 9 |
|---|---|---|---|
| Moisture Content (%) | 16.0 | 17.2 | 15.5 |
| Dry Density (PCF) | 117.1 | 115.8 | 119.4 |
| Resistance Value (R) | 15 | 9 | 27 |
| Exudation Pressure (PSI) | 317 | 190 | 592 |
| Expansion Pressure | 152 | 91 | 255 |
| As Received Moisture Content (%) | 16.0 | | |

**RESISTANCE VALUE AT 300 P.S.I.** **14**

AAPTO R18

Reviewed By: _____

*Brandon Rodebaugh*
*Materials Engineer*

**Sunland Analytical**
11419 Sunrise Gold Circle, #10
Rancho Cordova, CA 95742
(916) 852-8557

Date Reported 10/21/2020
Date Submitted 10/16/2020

To: Michelle Holub
Holdrege & Kull
792 Searls Ave.
Nevada City, CA 95959

From: Gene Oliphant, Ph.D. \ Randy Horney
General Manager \ Lab Manager

The reported analysis was requested for the following location:
Location : 3783A.000 Site ID : B3-BK1.
Your purchase order number is 1520529.
Thank you for your business.

* For future reference to this analysis please use SUN # 83268-173768.

---

EVALUATION FOR SOIL CORROSION

| | | |
|---|---|---|
| Soil pH | 6.26 | |
| Minimum Resistivity | 1.45 ohm-cm (x1000) | |
| Chloride | 2.3 ppm | 00.00023 % |
| Sulfate | 5.1 ppm | 00.00051 % |

METHODS
pH and Min.Resistivity CA DOT Test #643
Sulfate CA DOT Test #417, Chloride CA DOT Test #422m