

**Proposal, Contract Documents And  
Technical Specifications For**

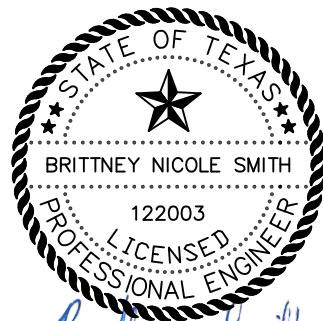
**EAST TEXAS REGIONAL AIRPORT**

**SOUTHWEST GA AREA TAXILANE – PHASE II**

COUNTY BID No. 2019-914  
FAA AIP No. 3-048-0137-47-2019

KSA Project No. GC.113

July, 2019



Prepared by:

*Brittney Nicole Smith*  
07/02/2019

**KSA**

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**TBPE Firm Registration No. F-1356**

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**EAST TEXAS REGIONAL AIRPORT**

**SOUTHWEST GA AREA TAXILANE – PHASE II**

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## NOTICE TO BIDDERS AND/OR PROPOSERS

### PROJECTS, SERVICES & SUPPLIES

SEALED BIDS will be received by Kelli L. Davis, CPPB, Gregg County Purchasing Department, at 101 East Methvin Street, Suite 205, Gregg County Courthouse, Longview, Texas 75601, for the construction of Southwest GA Area Taxilane – Phase II until Tuesday, August 20, 2019 at 2:00 p.m. Upon opening, bids will be publicly read aloud. Any bids received after the above stated time will be returned unopened. All interested persons may attend.

#### Bid

SOUTHWEST GA AREA TAXILANE – PHASE II  
EAST TEXAS REGIONAL AIRPORT  
LONGVIEW, TEXAS

AIP No. 3-048-0137-47-2019  
COUNTY Bid No. 2019-914

THE PROPOSED WORK includes:

Southwest GA Area Taxilane – Phase II

It is the policy of the Department of Transportation (DOT) that disadvantaged business enterprises as defined in 49 CFR Part 26 shall have the maximum opportunity to participate in the performance of contracts financed in whole or in part with Federal funds.

Contract documents including bid proposal forms, plans sheets, and specifications for the Project may be viewed and downloaded free of charge (with the option to purchase hard copies) at [www.civcastusa.com](http://www.civcastusa.com). Scanned plans and specifications (PDF format) are available on CD for a non-refundable price of \$50.00 from KSA Engineers, Inc., 140 E Tyler Street, Longview, Texas, 75601 (903-236-7700). Printed copies of the Contract Documents may be viewed at the Engineer's office. Please submit questions for this project at least 48 hours prior to bid opening through [www.civcastusa.com](http://www.civcastusa.com) in the Q&A portal or to Brittney Smith, P.E. at [bsmith@ksaeng.com](mailto:bsmith@ksaeng.com). All addenda issued for this project will **only** be posted on [www.civcastusa.com](http://www.civcastusa.com). Gregg County reserves the right to accept or reject in whole or in part any bid received and to waive any irregularities or formalities in the best interest of the County.

Advertisement Dates:

Longview News Journal

1<sup>st</sup> Publication: Wednesday, July 24, 2019

2<sup>nd</sup> Publication: Wednesday, July 31, 2019

Specifications may be reviewed at the office of the Airport Director, East Texas Regional Airport, Longview, Texas, Telephone (903) 643-3031. Also, a pre-bid conference for Bid No. 2019-914 will be held on Thursday, August 8, 2019 at 10:00 a.m. in the 2<sup>nd</sup> floor conference room in the terminal building at the East Texas Regional Airport.

Mr. Roy H. Miller, Jr. A.A.E.  
Airport Director, East Texas Regional Airport  
Gregg County, Longview, Texas

## INFORMATION FOR BIDDERS

EAST TEXAS REGIONAL AIRPORT  
GREGG COUNTY, TEXAS  
SOUTHWEST GA AREA TAXILANE – PHASE II  
COUNTY BID NO. 2019-914  
AIP PROJECT NO. 3-048-0137-47-2019

SEALED BIDS will be received by Kelli L. Davis, CPPB, Gregg County Purchasing Agent, at 101 East Methvin Street, Suite 205, Gregg County Courthouse, Longview, Texas 75601, until Tuesday, August 20, 2019 at 2:00 p.m. Upon opening, bids will be publicly read aloud. Any bids received after the above stated time will be returned unopened. All interested persons may attend.

THE PROPOSED WORK includes:

- Southwest GA Area Taxilane – Phase II.

THE ATTENTION OF THE BIDDERS is called to the fact that security of the airport is of prime concern at all times and this Contract is subject to restrictions to this end as set out by the Contract Documents. Some of the work must be accomplished in such a manner as to minimize interference with air carriers and coincident aircraft operations. All other work is subject to safety and other restrictions as outlined in the Contract Documents.

DOCUMENTS ARE ON FILE at the office of the Airport Director, East Texas Regional Airport, Gregg County, Texas, and in the office of KSA Engineers, Inc., 104 E Tyler Street, Suite 600, Longview, Texas, 75601. Contract documents including bid proposal forms, plans sheets, and specifications for the Project may be viewed and downloaded free of charge (with the option to purchase hard copies) at [www.civcastusa.com](http://www.civcastusa.com). Scanned plans and specifications (PDF format) are available on CD for a non-refundable price of \$50.00 from KSA Engineers, Inc., 140 E Tyler Street, Suite 600, Longview, Texas, 75601 (903-236-7700 or [bsmith@ksaeng.com](mailto:bsmith@ksaeng.com)). Please submit questions for this project at least 48 hours prior to bid opening through [www.civcastusa.com](http://www.civcastusa.com) in the Q&A portal or to Brittney Smith, P.E. at [bsmith@ksaeng.com](mailto:bsmith@ksaeng.com). All addenda issued for this project will **only** be posted on [www.civcastusa.com](http://www.civcastusa.com).

BIDDING SECURITY in the form of a Bid Bond or certified Cashier's Check in an amount not less than five percent (5%) of the total Bid shall be furnished by each Bidder as required by the above mentioned documents. Such check, or collateral, shall be made payable to Gregg County.

POLICY - It is the policy of the Department of Transportation (DOT) that disadvantaged business enterprises as defined in 49 CFR Part 26 shall have the maximum opportunity to participate in the performance of contracts financed in whole or in part with Federal funds.

The proposed contract is subject to the Buy American provision under Section 9129 of the Aviation Safety and Capacity Expansion Act of 1990. Details of such requirement are contained in the Specifications.

All bidders and proposers shall make good faith efforts, as defined in Appendix A of 49 CFR Part 26, Regulations of the Office of the Secretary of Transportation, to subcontract twelve point one percent (12.1%) of the dollar value of the prime contract to small business concerns owned and controlled by socially and economically disadvantaged individuals (DBE). In the event that the bidder for this solicitation qualifies as a DBE, the contract goal shall be deemed to have been met. Individuals who are rebuttably presumed to be socially and economically disadvantaged include women, Blacks, Hispanics, Native Americans, Asian-Pacific Americans and Asian-Indian Americans. The apparent successful bidder (proposer) will be required to submit information concerning the DBE's that will participate in this contract (subcontract). The information will include the name and address of each DBE, a description of the work to be performed by each named firm, and the dollar value of the contract (subcontract). If the bidder fails to achieve the contract goal as stated herein, it will be required to provide documentation demonstrating

that it made good faith efforts in attempting to do so. A bid that fails to meet these requirements will be considered nonresponsive.

The proposed contract is under and subject to Executive Order 11246 of September 24, 1965, and to the Equal Opportunity Clause. The Bidder's (Proposer's) attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth in the Specifications.

The Bidder (Proposer) must supply all the information required by the bid or proposal form. The successful bidder will be required to submit a Certification of Nonsegregated Facilities prior to award of the contract, and to notify prospective subcontractors of the requirement for such a Certification where the amount of the subcontract exceeds \$10,000. Samples of the Certification and Notice to Subcontractors appear in the specifications.

Women will be afforded equal opportunity in all areas of employment. However the employment of women shall not diminish the standards or requirements for the employment of minorities.

For contracts over \$50,000 or more, a contractor having 50 or more employees, and his subcontractors having 50 or more employees and who may be awarded a subcontract of \$50,000 or more, will be required to maintain an affirmative action program within 120 days of the commencement of the contract.

COMPLIANCE REPORTS - Within 30 days after award of this contract, the contractor shall file a compliance report (Standard Form 100) if:

- (a) The contractor has not submitted a complete compliance report within 12 months preceding the date of award; and
- (b) The contractor is within the definition of "employer" in Paragraphs 2e(3) of the instructions included in Standard Form 100.

The contractor shall require the subcontractor on all-tier subcontracts, irrespective of dollar amount, to file Standard Form 100 within 30 days after award of the subcontract if the above two conditions apply. Standard Form 100 will be furnished upon request.

The proposed contract is subject to the equal opportunity clause contained in the specifications, which will be furnished to prospective bidders or will be available for examination at the office indicated in the advertisement.

A pre-bid conference for this project will be held on Thursday, August 8, 2019 at 10:00 a.m. in the 2<sup>nd</sup> floor conference room in the terminal building at the East Texas Regional Airport.

Mr. Roy H. Miller, Jr., A.A.E.  
Airport Director, East Texas Regional Airport  
Gregg County, Longview, Texas

Advertisement Dates:

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1<sup>st</sup> Publication: Wednesday, July 24, 2019

2<sup>nd</sup> Publication: Wednesday, July 31, 2019



## INSTRUCTION TO BIDDERS

I-01 NOT USED

I-02 CERTIFICATION OF NON-SEGREGATED FACILITIES:

- a: A certification of Non-Segregated Facilities must be submitted prior to the award of a federally assisted construction contract exceeding \$10,000, which is not exempt from the provisions of the equal opportunity clause.
- b: Contractors receiving federally assisted construction contract awards exceeding \$10,000, which are exempt from the provisions of the equal opportunity clause, will be required to provide for the forwarding of the following notice to prospective subcontractors for supplies and construction contracts where the subcontractors exceed \$10,000 and are not exempt from the provisions of the equal opportunity clause. NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

I-03 NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENTS FOR CERTIFICATION OF NON-SEGREGATED FACILITIES:

- a: A certification of Non-Segregated Facilities must be submitted prior to the award of a subcontract exceeding \$10,000, which is not exempt from the provisions of the equal opportunity clause.
- b: Contractors receiving subcontract awards exceeding \$10,000 which are exempt from the provisions of the equal opportunity clause will be required to provide for the forwarding of this notice to prospective subcontractors for suppliers and construction contracts where the subcontracts exceed \$10,000 and are not exempt from the provisions of the equal opportunity clause. NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

I-04 PROPOSALS

- a: Proposals shall be strictly in accordance with the prescribed forms furnished with the specifications. Any modifications or deviations therefrom may be considered sufficient cause for rejection.
- b: The proposal must be legibly written in ink with all prices given in figures. If the unit price and total amount for any item are not in agreement, the unit price shall govern and the totals will be corrected to conform thereto. Erasures or other changes in the Proposal must be explained or noted over the initials of the Bidder.
- c: Proposals must be submitted for all of the construction included in the schedule for which the bid is submitted. A price shall be bid for each item listed in the unit price schedule. Any bid covering only a part of the work will not be considered.
- d: Proposals must be signed, in writing, by an individual authorized to bind the Bidder.
- e: Proposals must be submitted complete, with all other contract documents in their original bindings as furnished by the Engineer. They must be submitted at the place and on or before the time specified in the Advertisement for Bids.
- f: Proposals must be submitted in sealed envelopes addressed to the Owner, and clearly marked in accordance with paragraph I-09, DELIVERY OF PROPOSAL.

- g: The plans, specifications, and other documents designated in the Proposal form shall be considered a part of the Proposal whether attached or not.

I-05 ISSUANCE OF PROPOSAL FORMS:

- a: 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:
  1. Failure to comply with any pre-qualification regulations of the Owner, if such regulations are cited, or otherwise included, in the Proposal as a requirement for bidding.
  2. 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.
  3. Contractor defaulted under previous contracts with the Owner.
  4. Unsatisfactory work on previous contracts with the Owner.

I-06 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 of comparison for 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 subsection - ALTERATION OF WORK AND QUANTITIES of Section 40 of the General Provisions without in any way invalidating the unit bid prices.

I-07 LOCAL CONDITIONS:

- a: Bidders shall read the specifications, examine the drawings, and make their own estimates of the existing facilities and the difficulties that will attend the execution of the work called for by the proposed Contract, including local conditions, uncertainty of weather, and all other contingencies. Bidders shall satisfy themselves by personal examination of the location of the proposed work and by such means as they may choose as to the actual conditions and requirements. Information derived from the plans and specifications or from the Engineer or his assistants shall not relieve the Bidder of this responsibility.
- b: 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.
- c: Not used.

I-08 PROPOSAL GUARANTY:

- a: Proposals must be accompanied by a certified check drawn on a National Bank, or a bank having membership in the Federal Reserve System, or by a bid bond executed by a

satisfactory Surety Company. The proposal guaranty shall be in an amount not less than five percent (5%) of the total amount of the bid. The proposal guaranty shall be made payable to Gregg County, Texas.

- b: Check or bond of the successful Bidder shall be forfeited in case the Bidder neglects or refuses to enter into a contract and to furnish the required performance bond and payment bonds within fifteen (15) days after the prescribed Contract and bond forms are presented for his signature.
- c: Checks of unsuccessful Bidders will be returned in accordance with paragraph I-20, RETURN OF PROPOSAL GUARANTY.

**I-09 DELIVERY OF PROPOSAL:**

Each Proposal submitted shall be placed in a sealed envelope plainly marked with the project number, contract 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 of bids. Proposals received after the bid opening time shall be returned to the Bidder unopened.

**I-10 WITHDRAWAL OR REVISION OF PROPOSALS:**

- a: A bidder may withdraw or revise (by withdrawal of one proposal and submission of another) a Proposal provided that 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 of bids.
- b: A Bidder may not withdraw a bid for a period of ninety (90) days after the opening thereof as per the terms stated in the Proposal.

**I-11 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.

**I-12 BID BONDS, CONTRACT BONDS, AND INSURANCE:**

Attention of Bidders is called to the fact that all bid bonds, performance and payment bonds, labor bonds, employer's liability insurance, public liability insurance, workmen's compensation insurance, and property damage insurance must be secured through agents who are residents of Texas.

**I-13 CLARIFICATION OF CONTRACT DOCUMENTS:**

If any person contemplating submitting a bid for the proposed Contract is in doubt as to the true meaning of any part of the plans, specifications or other proposed contract documents, he may submit to the Engineer a written request for an interpretation thereof. The person submitting the request will be responsible for its prompt delivery. Any interpretation of the contract documents will be made only by an addendum duly issued; a copy of such addendum will be mailed to each person who has previously secured or subsequently secures a set of contract documents. The

Owner will not be responsible for any other explanation or interpretations of the contract documents.

I-14 IRREGULAR PROPOSALS:

- a: Proposals shall be considered irregular for the following reasons:
  - 1. 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.
  - 2. If there are unauthorized additions, conditional or alternate pay items, or irregularities of any kind, which make the Proposal incomplete, indefinite, or otherwise ambiguous.
  - 3. 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.
  - 4. If the Proposal contains unit prices that are obviously unbalanced.
  - 5. If the Proposal is not accompanied by the Proposal guaranty specified by the Owner.
- b: For AIP Contracts, Proposals shall be considered irregular for any of the reasons stated and, in addition, if the Proposal is "non-responsive" with respect to the requirements of Part 152 of the Federal Aviation Regulations as specified in the Proposal form.
- c: 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.

I-15 DISQUALIFICATION OF BIDDERS:

- a: A Bidder shall be considered disqualified for any of the following reasons:
  - 1. Submitting more than one (1) Proposal from the same partnership, firm, or corporation under the same or different name.
  - 2. Evidence of collusion among Bidders. Bidders participating in collusion shall be disqualified as Bidders for any future work of the Owner until such participating Bidder has been reinstated by the Owner as a qualified Bidder.
  - 3. If the Bidder is considered to be in "default" for any reason specified in paragraph I-05, ISSUANCE OF PROPOSAL FORMS.

I-16 EXECUTION OF CONTRACT DOCUMENTS:

- a: Following notice of award and within fifteen (15) calendar days, as provided in the Proposal, the successful Bidder shall properly execute the Contract in six (6) counterparts.
- b: Failure of the successful Bidder to execute the Contract and furnish an acceptable Surety bond or bonds within fifteen (15) calendar days 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.

I-17 BASIS OF AWARD:

- a: Bids will be considered on the basis of the total amount bid as derived from unit and lump sum prices and estimated quantities as given in the Proposal. Evidence of serious unbalancing of the unit prices may be considered cause for rejection of bids.
- b: The Contract will be awarded to the Bidder submitting the lowest and best bid, considering the Bidder's experience and ability to do the work, and the character and quality of the equipment he proposed to furnish. The Owner reserves the right to select such bid as will in its opinion serve the best interest of the Owner. The award is subject to the approval of the Federal Aviation Administration.
- c: In addition, until the award of the 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 contract; advertise for new Proposals or proceed with the work otherwise. All such actions shall promote the Owner's best interests.
- d: The proposal indicates several bid schedules, with additive alternate bids. The Owner reserves the right to award any Schedule or combination of Schedules. Additive Alternate bid will only be awarded if the corresponding schedule is also awarded. The Owner reserves the right to select such bid as will in its opinion serve the best interests of the Owner.

I-18 AWARD OF CONTRACT

The award of a contract, if it is to be awarded, is contingent upon Gregg County receiving adequate funding from the Federal Aviation Administration.

The award of a contract, if it is to be awarded, shall be made within ninety (90) calendar days of the date specified for publicly opening Proposals, unless otherwise specified herein.

If awarded, the Owner will award only one prime contract. Each bidder must supply a bid on all schedules and alternates as described in the bid proposal.

Award of the Contracts shall be made by the Owner to the lowest, qualified Bidder whose Proposal conforms to the cited requirements of the Owner.

I-19 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 paragraph I-22, APPROVAL OF CONTRACT.

I-20 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 herein before specified in paragraph I-17, BASIS OF AWARD. Proposal guaranties of the two lowest Bidders will be retained by the Owner until such time as an award is made, at which time, the unsuccessful Bidder's proposal guaranty will be returned. The successful Bidder's proposal guaranty will be returned as soon as the Owner receives the contract bonds as specified in paragraph I-21, REQUIREMENTS OF CONTRACT BONDS.

I-21 REQUIREMENTS OF CONTRACT BONDS:

At the time of the execution of the Contract, the successful Bidder shall furnish the Owner separate Surety bond or bonds that have been fully executed by the Bidder and his 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 the bonds shall be acceptable to the Owner. Unless otherwise specified in this subsection, the Surety bond or bonds shall be in a sum equal to the full amount of the Contract.

Performance and Payment Bond each in the amount of 100 percent of the contract amount shall be provided.

I-22 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.

I-23 BUY AMERICAN - STEEL AND MANUFACTURED PRODUCTS FOR CONSTRUCTION CONTRACTS (JAN 1991)

a: The Aviation Safety and Capacity Expansion Act of 1990 provides 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 sixty percent (60%) 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 the subparagraphs (b)(1) or (2) shall be treated as domestic.
2. Components. As used in this clause, components means those articles, materials, and supplies incorporated directly into steel and manufactured products.
3. Cost of Components. This means the cost for production of the components, exclusive of final assembly labor costs.

b: The successful bidder will be required to assure that only domestic steel and manufactured products will be used by the Contractor, subcontractors, material men, and suppliers in the performance of this contract, except those-

1. that the US. 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 satisfactory quality;
2. that the US. 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 twenty-five percent (25%).

I-24 LIQUIDATED DAMAGES:

Gregg County, Texas will suffer financial loss if the project is not completed within the contract time. Each prime contractor or its surety shall be liable for and shall pay to the Gregg County the sum of one thousand dollars (\$1,000.00) per calendar day that the project remains incomplete beyond the expiration of the contract time.

I-25 POLICY:

It is the policy of the Department of Transportation (DOT) that disadvantaged business enterprises as defined in 49 CFR Part 26 shall have the maximum opportunity to participate in the performance of contracts financed in whole or in part with Federal funds.

The proposed contract is subject to the Buy American provision under Section 9129 of the Aviation Safety and Capacity Expansion Act of 1990. Details of such requirement are contained in the Specifications.

All bidders and proposers shall make good faith efforts, as defined in Appendix A of 49 CFR Part 26, Regulations of the Office of the Secretary of Transportation, to subcontract ten point six percent (10.6%) of the dollar value of the prime contract to small business concerns owned and controlled by socially and economically disadvantaged individuals (DBE). In the event that the bidder for this solicitation qualifies as a DBE, the contract goal shall be deemed to have been met. Individuals who are rebuttably presumed to be socially and economically disadvantaged include women, Blacks, Hispanics, Native Americans, Asian-Pacific Americans and Asian-Indian Americans. The apparent successful bidder (proposer) will be required to submit information concerning the DBE's that will participate in this contract (subcontract). The information will include the name and address of each DBE, a description of the work to be performed by each named firm, and the dollar value of the contract (subcontract). If the bidder fails to achieve the contract goal as stated herein, it will be required to provide documentation demonstrating that it made good faith efforts in attempting to do so. A bid that fails to meet these requirements will be considered nonresponsive.

The proposed contract is under and subject to Executive Order 11246 of September 24, 1965, and to the Equal Opportunity Clause. The Bidder's (Proposer's) attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth in the Specifications.

The Bidder (Proposer) must supply all the information required by the bid or proposal form. The successful bidder will be required to submit a Certification of Nonsegregated Facilities prior to award of the contract, and to notify prospective subcontractors of the requirement for such a Certification where the amount of the subcontract exceeds \$10,000. Samples of the Certification and Notice to Subcontractors appear in the specifications.

Women will be afforded equal opportunity in all areas of employment. However the employment of women shall not diminish the standards or requirements for the employment of minorities.

For contracts over \$50,000 or more, a contractor having 50 or more employees, and his subcontractors having 50 or more employees and who may be awarded a subcontract of \$50,000 or more, will be required to maintain an affirmative action program within 120 days of the commencement of the contract.

I-26 COMPLIANCE REPORTS:

Within 30 days after award of this contract, the contractor shall file a compliance report (Standard Form 100) if:

- a: The contractor has not submitted a complete compliance report within 12 months preceding the date of award; and
- b: The contractor is within the definition of "employer" in Paragraphs 2e(3) of the instructions included in Standard Form 100.

The contractor shall require the subcontractor on all-tier subcontracts, irrespective of dollar amount, to file Standard Form 100 within 30 days after award of the subcontract if the above two conditions apply. Standard Form 100 will be furnished upon request.

The proposed contract is subject to the equal opportunity clause contained in the specifications which will be furnished to prospective bidders or will be available for examination at the office indicated in the advertisement.

I-27 PRE-BID CONFERENCE:

A pre-bid conference for this project will be held on Thursday, August 8, 2019 at 10:00 a.m. in the 2nd floor conference room located in the terminal building at the East Texas Regional Airport.



## ***BID INSTRUCTIONS/REQUIREMENTS***

❖ ***SUBMISSION OF BIDS/BIDS***: Two (2) complete sets of all bid documents (original and one (1) copy) shall be sealed and **marked** Bid# 2019-914 East Texas Regional Airport, Southwest GA Area Taxilane – Phase II.

Gregg County Purchasing  
Kelli Davis, CPPB, Purchasing Agent  
101 East Methvin, St. 205  
Longview, Texas 75601

- ❖ Questions concerning this bid/Bid and process **shall** be directed only to Gregg County Purchasing Director by email to [purchasing@co.gregg.tx.us](mailto:purchasing@co.gregg.tx.us); Kelli Davis. Failure to comply with this guideline could result in disqualification from the bid process.
- ❖ **All bids must be sealed** when returned to Gregg County.
- ❖ The bid must be signed and dated by a representative of the vendor's company who is authorized. It should be sealed, and received by Gregg County Purchasing Agent, 101 East Methvin, St. 205, Longview, TX, 75601 by the closing date and time specified. A facsimile transmission is **not** an acceptable response to this Bid.
- ❖ All questions/checklists/blanks must be included in your response on the forms provided. Failure to include any of the requested information within your bid may result in rejection/disqualification.
- ❖ BIDS WILL BE received and publicly acknowledged at the Gregg County Purchasing Department located at the address listed above. Vendors, their representatives and interested persons may be present. All submissions shall be open for public inspection except for trade secrets, financial information, and other confidential information contained in the Bid/bid and identified as such by vendor.
- ❖ **It is the bidders' sole responsibility to print and review all pages of the bid document, attachments, questions and their answers, addenda and special notices. The Bid Signature Form, Certification of eligibility and contract must be signed and returned. Failure to provide signatures on these forms could render bid non-responsive.**
- ❖ **All documents relating to this bid including but not limited to, the bid document, questions and their responses, addenda and special notices will be posted under the Bid number on the Gregg County Purchasing Department website and available for download by bidders and other interested parties. It is the bidders'/respondents' sole responsibility to review this site and retrieve all related documents prior to the Bid due date.**

**PROPOSAL**

Place: Gregg County, Texas

Date: \_\_\_\_\_

Proposal of \_\_\_\_\_

A Corporation organized and existing under the laws of the State of \_\_\_\_\_

OR

Proposal of \_\_\_\_\_

A partnership consisting of \_\_\_\_\_

and \_\_\_\_\_

OR

Proposal of \_\_\_\_\_

An individual trading as \_\_\_\_\_

and \_\_\_\_\_

To: Gregg County Purchasing Agent  
Gregg County Courthouse  
101 E. Methvin  
Longview, Texas 75601

The undersigned Bidder, having visited the site and examined the Plans, Specifications, and other Contract Documents, including the Addenda and being familiar with the conditions relating to the proposed project, hereby proposed to furnish all tools, appliances, equipment, and specified materials and perform all necessary labor for Southwest GA Area Taxilane – Phase II in strict accordance with the Plans, Specifications and other Contract Documents at and for the unit prices proposed herein.

The undersigned Bidder, having read the Advertisement for Bids, understands that sealed Proposals will be received by Kelli L. Davis, CPPB, Gregg County Purchasing Agent, at 101 East Methvin Street, Suite 205, Gregg County Courthouse, Longview, Texas 75601, until Tuesday, August 20, 2019 at 2:00 p.m.

The Undersigned Bidder, in compliance with the Bid Advertisement hereby proposes to do the work called for in said Specifications and other Contract Documents and shown on the Plans for the said work at the following rate and prices:

SPEC NO.	QUAN.	UNIT	DESCRIPTION (with unit price in words)	UNIT PRICE	TOTAL PRICE
<b>BASE BID</b>					
C-102-5.1e	1,500	L.F.	Installation and Removal of Silt Fence at _____ Dollars and _____ Cents per linear foot	\$ _____	\$ _____
C-102-5.1j	1,700	S.Y.	Erosion Control Matting at _____ Dollars and _____ Cents per square yard	\$ _____	\$ _____
C-102-5.1k	1	L.S.	Storm Water Pollution Prevention Plan (SWPPP) at _____ Dollars and _____ Cents per lump sum	\$ XXXXXXXXX	\$ _____
C-105	1	L.S.	Mobilization at _____ Dollars and _____ Cents per lump sum	\$ XXXXXXXXX	\$ _____
P-101-5.1	39	S.Y.	Pavement Removal at _____ Dollars and _____ Cents per square yard	\$ _____	\$ _____
P-101-5.7	850	L.F.	Removal of Pipe and other Buried Structures at _____ Dollars and _____ Cents per linear foot	\$ _____	\$ _____
P-151-4.2	7.6	AC.	Clearing and Grubbing at _____ Dollars and _____ Cents per acre	\$ _____	\$ _____
P-152-4.1	15,622	C.Y.	Unclassified Excavation at _____ Dollars and _____ Cents per cubic yard	\$ _____	\$ _____
P-152-4.2	2,407	C.Y.	Embankment in Place at _____ Dollars and _____ Cents per cubic yard	\$ _____	\$ _____
P-155-8.1	5,702	S.Y.	8" Lime-Treated Subgrade at _____ Dollars and _____ Cents per square yard	\$ _____	\$ _____
P-155-8.2	154	TON	Lime (8%) at _____ Dollars and _____ Cents per ton	\$ _____	\$ _____
P-401-8.1	785	TON	Asphalt Surface Course at _____ Dollars and _____ Cents per ton	\$ _____	\$ _____

SPEC NO.	QUAN.	UNIT	DESCRIPTION (with unit price in words)	UNIT PRICE	TOTAL PRICE
P-403-8.1	1,235	TON	Asphalt Base Course at _____ Dollars and _____ Cents per ton	\$ _____	\$ _____
P-602-5.1	1,711	GAL	Emulsified Asphalt Prime Coat at _____ Dollars and _____ Cents per gallon	\$ _____	\$ _____
P-603-5.1	399	GAL	Emulsified Asphalt Tack Coat at _____ Dollars and _____ Cents per gallon	\$ _____	\$ _____
P-620-5.1	385	S.F.	Taxiway Markings at _____ Dollars and _____ Cents per square foot	\$ _____	\$ _____
F-162.-5.1	2,300	L.F.	Chain Link Fence at _____ Dollars and _____ Cents per linear foot	\$ _____	\$ _____
F-162.-5.2	2	EA.	Vehicle Gates at _____ Dollars and _____ Cents per each	\$ _____	\$ _____
D-701-5.1	60	L.F.	18 Inch ASTM C-76, Class III RCP at _____ Dollars and _____ Cents per linear foot	\$ _____	\$ _____
D-752-5.4	2	EA.	Pre-Cast Safety End Treatments for Culvert Pipe at _____ Dollars and _____ Cents per each	\$ _____	\$ _____
T-901-5.1	6	AC.	Seeding at _____ Dollars and _____ Cents per acre	\$ _____	\$ _____
T-905-5.2	31,339	S.Y.	Topsoiling (Furnished From Off the Site)  at _____ Dollars and _____ Cents per square yard	\$ _____	\$ _____
L-108-5.1	200	L.F.	No. 8 AWG, 5 KV, L-824, Type C Cable, installed in Conduit at _____ Dollars and _____ Cents per linear foot	\$ _____	\$ _____
L-108-5.2	50	L.F.	No. 6 AWG, Solid, Bare Counterpoise Wire, installed in Trench, Including Ground Rods and Ground Connectors  at _____ Dollars and _____ Cents per linear foot	\$ _____	\$ _____

SPEC NO.	QUAN.	UNIT	DESCRIPTION (with unit price in words)	UNIT PRICE	TOTAL PRICE
L-108-5.3	100	L.F.	Remove No. 8 AWG, 5 KV, L-824, Type C Cable at _____ Dollars and _____ Cents per linear foot	\$ _____	\$ _____
L-110-5.1	60	L.F.	Install 2" PVC Schedule 40 Conduit in Trench including Excavation and Backfill at _____ Dollars and _____ Cents per linear foot	\$ _____	\$ _____
L-110-5.2	10	L.F.	Remove Existing 2" Conduit Including Excavation and Backfill at _____ Dollars and _____ Cents per linear foot	\$ _____	\$ _____
L-115-5.1	1	EA.	Install L-867D Electrical Handhole, Including Concrete Encasement, Grounding, and Appurtenances at _____ Dollars and _____ Cents per each	\$ _____	\$ _____
L-125-5.1	1	EA.	Install New Airfield Size 1, 2 Module, Quartz Lamp Lighted Sign, Transformer, Base Can, Concrete Pad and Appurtenances at _____ Dollars and _____ Cents per each	\$ _____	\$ _____
S-E16100-5.1	1	L.S.	Electrical Service and Access Control for Slide Gates at _____ Dollars and _____ Cents per lump sum	\$ XXXXXXXX	\$ _____
KSA-105-3.1	1	L.S.	Barricades and Markings for Pavement Closures at _____ Dollars and _____ Cents per lump sum	\$ XXXXXXXX	\$ _____
KSA-107-5.1	2,906	L.F.	Trench Excavation Safety Protection at _____ Dollars and _____ Cents per linear foot	\$ _____	\$ _____
KSA-108-1.1	5	Mo.	Temporary Movable Construction Fence at _____ Dollars and _____ Cents per month	\$ _____	\$ _____
KSA-701-5.1	40	EA.	Taxiway Centerline Retroreflective Markers (Green) at _____ Dollars and _____ Cents per each	\$ _____	\$ _____

SPEC NO.	QUAN.	UNIT	DESCRIPTION (with unit price in words)	UNIT PRICE	TOTAL PRICE
S-33-5.1	320	L.F.	6" AWWA C900 DR 18 Waterline at _____ Dollars and _____ Cents per linear foot	\$ _____	\$ _____
S-33-5.2	40	L.F.	6" Restrained Joint PVC Waterline at _____ Dollars and _____ Cents per linear foot	\$ _____	\$ _____
S-33-5.3	1,000	L.F.	12" AWWA C900 DR18 Waterline at _____ Dollars and _____ Cents per linear foot	\$ _____	\$ _____
S-33-5.4	3	EA.	Connect to Existing Waterline at _____ Dollars and _____ Cents per each	\$ _____	\$ _____
S-33-5.5	1	L.S.	Water Line Pressure Testing and Sterilization at _____ Dollars and _____ Cents per lump sum	\$ XXXXXXXX	\$ _____
S-33-5.6	1	EA.	Connect to Existing Fire Hydrant at _____ Dollars and _____ Cents per each	\$ _____	\$ _____
S-35-5.1	1	EA.	Furnish and Install 6" Gate Valve at _____ Dollars and _____ Cents per each	\$ _____	\$ _____
S-35-5.2	2	EA.	Furnish and Install 12" Gate Valve at _____ Dollars and _____ Cents per each	\$ _____	\$ _____
S-36-5.1	3	EA.	4' Standard Sanitary Sewer Manhole at _____ Dollars and _____ Cents per each	\$ _____	\$ _____
S-36-5.2	1	EA.	Tie into Existing Sanitary Sewer Manhole at _____ Dollars and _____ Cents per each	\$ _____	\$ _____
S-37-5.1	1,586	L.F.	6" SDR 26 PVC Sanitary Sewer Line at _____ Dollars and _____ Cents per linear foot	\$ _____	\$ _____

SPEC NO.	QUAN.	UNIT	DESCRIPTION (with unit price in words)	UNIT PRICE	TOTAL PRICE
S-37-5.2	2	EA.	Single Stub Cleanout at _____ Dollars and _____ Cents per each	\$ _____	\$ _____
TXDOT 247-5.1	2,244	S.Y.	6" Flexible Base Course at _____ Dollars and _____ Cents per square yard	\$ _____	\$ _____
TXDOT 340	456	TON	Fine Graded Hot-Mix Asphalt (Type D) at _____ Dollars and _____ Cents per ton	\$ _____	\$ _____

**TOTAL AMOUNT - BASE BID:** \$ \_\_\_\_\_

SPEC NO.	QUAN.	UNIT	DESCRIPTION (with unit price in words)	UNIT PRICE	TOTAL PRICE
<b>ADDITIVE ALTERNATE</b>					
P-155-8.1	1,411	S.Y.	8" Lime-Treated Subgrade at _____ Dollars and _____ Cents per square yard	\$ _____	\$ _____
P-155-8.2	38	TON	Lime (8%) at _____ Dollars and _____ Cents per ton	\$ _____	\$ _____
P-401-8.1	315	TON	Asphalt Surface Course at _____ Dollars and _____ Cents per ton	\$ _____	\$ _____
P-403-8.1	489	TON	Asphalt Base Course at _____ Dollars and _____ Cents per ton	\$ _____	\$ _____
P-602-5.1	409	GAL	Emulsified Asphalt Prime Coat at _____ Dollars and _____ Cents per gallon	\$ _____	\$ _____
P-603-5.1	988	GAL	Emulsified Asphalt Tack Coat at _____ Dollars and _____ Cents per gallon	\$ _____	\$ _____
P-620-5.1	117	S.F.	Runway and Taxiway Markings at _____ Dollars and _____ Cents per square foot	\$ _____	\$ _____
KSA-701-5.1	10	EA.	Taxiway Centerline Retroreflective Markers (Green) at _____ Dollars and _____ Cents per each	\$ _____	\$ _____

**TOTAL AMOUNT - ADDITIVE ALTERNATE: \$** \_\_\_\_\_

Notes:

1. The quantities shown above are estimates only. The bidder understands that this is a unit price bid and that payment will be made for those quantities of work constructed and accepted as meeting the Contract requirements.



All extensions of the unit prices will be subject to verification by the Owner. In case of discrepancy between a unit price and its extension, the unit price will be considered to be the bid.

Accompanying this Proposal is a (Certified Check/Bid Bond) in an amount not less than five percent (5%) of the total amount of bid, which it is agreed, shall be retained as liquidated damages by the Gregg County Commissioners Court if the undersigned fails to execute the Contract and furnish bond as specified within ten (10) days after formal notification of award to the undersigned.

The undersigned agrees to begin work within ten (10) days after the work order is issued and complete the work within the following time schedule:

**150 calendar days**

Should the Contractor fail to fully complete the work within the above stated time, he shall pay the Gregg County Commissioners Court, as fixed, agreed and liquidated damages, and not as a penalty, the sum specified in subparagraph LIQUIDATED DAMAGES OF INSTRUCTION TO BIDDERS, for each working day of delay until the work is completed or accepted, and the additional time is only to be allowed for delays as stipulated in the Contract Documents. Liquidated damages shall also be accessed at the same rate as specified above for phased construction as required by the plans.

The undersigned Bidder agrees that this bid may not be withdrawn for a period of ninety (90) days after the opening thereof.

Previous Contracts. Section 60-1.7 (b) of the Regulations of the Secretary of Labor requires each bidder or prospective prime contractor and proposed subcontractor, where appropriate, to state in the bid or at the outset of negotiations for the contract whether it has participated in any previous contract or subcontract subject to the equal opportunity clause; and if so, whether it has filed with the Joint Reporting Committee, the Director, an agency, or the former President's Committee in Equal Employment Opportunity all reports due under the applicable filing requirements. In any case in which a bidder or prospective prime contractor or proposed subcontractor that participated in a previous contract subject to Executive Order 10925, 11114, or 11246 has not filed a report due under the applicable filing documents, no contract or subcontract shall be awarded unless such contractor submits a report covering the delinquent period or such other period specified by the FAA or the Director, OFCCP.

Bid or Proposal Form. To effectuate the foregoing requirements the sponsor is required to include in the bid or proposal form a statement of substantially as follows:

The Bidder (proposer) shall complete the following statement by checking the appropriate space.

The Bidder (proposer) has \_\_\_\_\_ has not \_\_\_\_\_ participated in a previous contract subject to the equal opportunity clause prescribed by Executive Order 10925, or Executive Order 11114, or Executive Order 11246.

The Bidder (proposer) has \_\_\_\_\_ has not \_\_\_\_\_ submitted all compliance reports in connection with any such contract due under the applicable filing requirements; and that representations indicating submission of required compliance reports signed by proposed subcontractors will be obtained prior to award of subcontracts.

If the Bidder (proposer) has participated in a previous contract subject to the equal opportunity clause and has not submitted compliance reports due under applicable filing requirements, the Bidder (proposer) shall submit a compliance report on Standard Form 100, "Employee Information Report EEO-1" prior to the award of contract.

Standard Form 100 is normally furnished to contractors annually, based on a mailing list currently maintained by the Joint Reporting Committee. In the event a contractor has not received the form, he may obtain it by writing to the Joint Reporting Committee, 1800 G Street, Washington, DC 20506.

BUY AMERICAN CERTIFICATE (JAN 1991)

By submitting a bid/proposal under this solicitation, except for those items listed by the offerer below or on a separate and clearly identified attachment to this bid/proposal, the offerer 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.

A list of articles, materials, and supplies excepted from this provision is included in Appendix 3.

\_\_\_\_\_  
Witness

SEAL (If Bidder is a Corporation)

\_\_\_\_\_  
Name of Bidder

By \_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Print Name and Title)

\_\_\_\_\_  
(Address)

\_\_\_\_\_  
(City, State and Zip Code)

\_\_\_\_\_  
(Phone Number)

Submitted on \_\_\_\_\_, 2019.

The Bidder has examined copies of all the Bidding Documents and of the following Addenda (receipt of which is hereby acknowledged):

Date  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Addenda Number  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Note: Sign in ink. Do not detach. All items listed in the Unit Price Schedule must be bid upon.**

***CERTIFICATION OF ELIGIBILITY***

By submitting a bid or Bid in response to this solicitation, the bidder/proposer certifies that at the time of submission, he/she is ***not*** on the Federal Government's list of suspended, ineligible, or debarred contractors.

In the event of placement on the list between the time of bid/Bid submission and time of award, the bidder/proposer will notify the Gregg County Purchasing Agent. Failure to do so may result in terminating this contract for default.

**Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**Printed Name:** \_\_\_\_\_

## ***BID SIGNATURE FORM***

The undersigned agrees this bid becomes the property of Gregg County after the official opening.

The undersigned affirms he has familiarized himself with the local conditions under which the work is to be performed; satisfied himself/herself of the conditions of delivery, handling and storage of equipment and all other matters which may be incidental to the work, before submitting a bid.

The undersigned agrees if this bid is accepted, to furnish any and all items/services upon which prices are offered, at the price(s) and upon the terms and conditions contained in the Specifications. The period for acceptance of this Bid will be ninety (90) calendar days unless a different period is noted by the bidder.

The undersigned affirms that they are duly authorized to execute this contract, that this bid has not been prepared in collusion with any other Bidder, nor any employee of Gregg County, and that the contents of this bid have not been communicated to any other bidder or to any employee of Gregg County prior to the official opening of this bid.

Vendor hereby assigns to purchase any and all claims for overcharges associated with this contract which arise under the antitrust laws of the United States, 15 USCA Section 1 et seq., and which arise under the antitrust laws of the State of Texas, Tex. Bus. & Com. Code, Section 15.01, et seq.

The undersigned affirms that they have read and do understand the specifications and any attachments contained in this bid package. ***Failure to sign and return this form will result in the rejection of the entire bid.***

**Signature** \_\_\_\_\_ **X**

Company Name		
Address		
City/State/Zip Code		
Phone:	Office:	Fax:
	Cell:	Email:
Print Name		
Job Title		

## VENDOR REFERENCES

Please list three (3) references of current customers who can verify the quality of service your company provides. The County prefers customers of similar size and scope of work to this Bid. ***THIS FORM MUST BE RETURNED WITH YOUR BID.***

### **REFERENCE ONE:**

COMPANY NAME:
ADDRESS/CITY/STATE/ZIP:
CONTACT NAME/TITLE:
BUSINESS PHONE/FAX:
CONTRACT PERIOD: SCOPE OF WORK:

### **REFERENCE TWO:**

COMPANY NAME:
ADDRESS/CITY/STATE/ZIP:
CONTACT NAME/TITLE:
BUSINESS PHONE/FAX:
CONTRACT PERIOD: SCOPE OF WORK:

### **REFERENCE THREE:**

COMPANY NAME:
ADDRESS/CITY/STATE/ZIP:
CONTACT NAME/TITLE:
BUSINESS PHONE/FAX:
CONTRACT PERIOD: SCOPE OF WORK:

To: Vendors of Gregg County, Texas  
From: Kelli L. Davis, CPPB, Purchasing Agent  
Re: ***Conflict of Interest Form (CIQ)***

Vendor;

Attached, please find link below to a Conflict of Interest Questionnaire. The questionnaire should reflect the name of the individual, Official, Employee or Department with whom the conflict of interest. If you have any questions regarding compliance with Chapter 176 of the Texas Local Government Code, please consult your legal representative. Compliance is the responsibility of each individual, business, agent or representative who is subject to the law's filing requirements.

<http://www.ethics.state.tx.us/forms/CIQ.pdf>

Original completed forms should be filed with the County Clerk's Office and a copy sent to the Gregg County Purchasing Department either through bid return, fax, or email. Please see contact information below.

**Gregg County Clerk**  
Gregg County Courthouse  
101 East Methvin, St. 200  
Longview, Texas 75601  
Ph; 903-236-8430

**Gregg County Purchasing Department**  
Email: [purchasing@co.gregg.tx.us](mailto:purchasing@co.gregg.tx.us)  
Ph: 903-237-2684  
Fx: 903-237-2682

***Applicable Law***

Chapter 176 of the Texas Local Government Code requires that any vendor or person considering doing business with a local government entity disclose in the Questionnaire Form CIQ, the vendor or person's affiliation or business relationship that might cause a conflict of interest with a local government entity. By law, this questionnaire must be filed with the records administrator of Gregg County (County Clerk) no later than the 7<sup>th</sup> business day after the date the person becomes aware of facts that require the statement to be filed. See Section 176.006, Texas Local Government Code.

**BID BOND**

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned \_\_\_\_\_ as Principal, are hereby held and firmly bound unto The County of Gregg, Texas as OWNER in the penal sum of \_\_\_\_\_ for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, successors and assigns.

Signed, this \_\_\_\_\_ day of \_\_\_\_\_, 2019.

The Condition of the above obligation is such that whereas the Principal has submitted to The County of Gregg, Texas a certain Bid attached hereto and hereby made a part hereof to enter into a contract in writing for the Southwest GA Area Taxilane – Phase II.

NOW THEREFORE

- (a) If said BID shall be rejected, or
- (b) If said BID shall be accepted and the Principal shall execute and deliver a contract in the Form of Contract attached hereto (properly completed in accordance with said BID) and shall furnish a BOND for his faithful performance of said contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said BID,

then this obligation shall be void, otherwise the same shall remain in force and effect: it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event exceed the penal amount of this obligation as herein stated.

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 OWNER may accept such BID; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

\_\_\_\_\_  
Principal (L.S.)

\_\_\_\_\_  
Surety

By: \_\_\_\_\_

IMPORTANT - Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the project is located.

**STATEMENT OF QUALIFICATIONS**

\_\_\_\_\_ Bidder

\_\_\_\_\_ Address

Similar Projects Completed by Bidder:

1. NAME OF PROJECT: \_\_\_\_\_

OWNER: \_\_\_\_\_ ADDRESS \_\_\_\_\_

OWNER TELEPHONE NUMBER \_\_\_\_\_

ENGINEER: \_\_\_\_\_ ADDRESS \_\_\_\_\_

ENGINEER TELEPHONE NUMBER \_\_\_\_\_

DATE STARTED \_\_\_\_\_ DATE COMPLETED: \_\_\_\_\_

APPROX. QUANTITIES OF MAJOR ITEMS: \_\_\_\_\_

\_\_\_\_\_

VALUE OF CONTRACT: \_\_\_\_\_

2. NAME OF PROJECT: \_\_\_\_\_

OWNER: \_\_\_\_\_ ADDRESS \_\_\_\_\_

OWNER TELEPHONE NUMBER \_\_\_\_\_

ENGINEER: \_\_\_\_\_ ADDRESS \_\_\_\_\_

ENGINEER TELEPHONE NUMBER \_\_\_\_\_

DATE STARTED \_\_\_\_\_ DATE COMPLETED: \_\_\_\_\_

APPROX. QUANTITIES OF MAJOR ITEMS: \_\_\_\_\_

\_\_\_\_\_

VALUE OF CONTRACT: \_\_\_\_\_



3. NAME OF PROJECT: \_\_\_\_\_  
OWNER: \_\_\_\_\_ ADDRESS \_\_\_\_\_  
OWNER TELEPHONE NUMBER \_\_\_\_\_  
ENGINEER: \_\_\_\_\_ ADDRESS \_\_\_\_\_  
ENGINEER TELEPHONE NUMBER \_\_\_\_\_  
DATE STARTED \_\_\_\_\_ DATE COMPLETED: \_\_\_\_\_  
APPROX. QUANTITIES OF MAJOR ITEMS: \_\_\_\_\_  
\_\_\_\_\_  
VALUE OF CONTRACT: \_\_\_\_\_

4. NAME OF PROJECT: \_\_\_\_\_  
OWNER: \_\_\_\_\_ ADDRESS \_\_\_\_\_  
OWNER TELEPHONE NUMBER \_\_\_\_\_  
ENGINEER: \_\_\_\_\_ ADDRESS \_\_\_\_\_  
ENGINEER TELEPHONE NUMBER \_\_\_\_\_  
DATE STARTED \_\_\_\_\_ DATE COMPLETED: \_\_\_\_\_  
APPROX. QUANTITIES OF MAJOR ITEMS: \_\_\_\_\_  
\_\_\_\_\_  
VALUE OF CONTRACT: \_\_\_\_\_

5. NAME OF PROJECT: \_\_\_\_\_  
OWNER: \_\_\_\_\_ ADDRESS \_\_\_\_\_  
OWNER TELEPHONE NUMBER \_\_\_\_\_  
ENGINEER: \_\_\_\_\_ ADDRESS \_\_\_\_\_  
ENGINEER TELEPHONE NUMBER \_\_\_\_\_  
DATE STARTED \_\_\_\_\_ DATE COMPLETED: \_\_\_\_\_  
APPROX. QUANTITIES OF MAJOR ITEMS: \_\_\_\_\_  
\_\_\_\_\_  
VALUE OF CONTRACT: \_\_\_\_\_

6. NAME OF PROJECT: \_\_\_\_\_  
OWNER: \_\_\_\_\_ ADDRESS \_\_\_\_\_  
OWNER TELEPHONE NUMBER \_\_\_\_\_  
ENGINEER: \_\_\_\_\_ ADDRESS \_\_\_\_\_  
ENGINEER TELEPHONE NUMBER \_\_\_\_\_  
DATE STARTED \_\_\_\_\_ DATE COMPLETED: \_\_\_\_\_  
APPROX. QUANTITIES OF MAJOR ITEMS: \_\_\_\_\_  
\_\_\_\_\_  
VALUE OF CONTRACT: \_\_\_\_\_

Contractor may attach additional project summaries and/or references for consideration by the Owner.



## ***STANDARD TERMS AND CONDITIONS*** ***Gregg County, Texas***

### **Awarded vendor certifies and agrees to the following:**

1. Non-performance or non-compliance of the Standard Terms & Conditions, or non-performance or non-compliance with the Specifications shall be basis for termination by Gregg County of the bid or final executed contract. Termination in whole, or in part, by the County may be made solely at the County's option and without prejudice to any other remedy to which Gregg County may be entitled by law or in equity, or elsewhere under this Bid or the agreement, by giving thirty (30) days written notice to the vendor with the understanding that all work being performed under this agreement shall cease upon the date specified in such notice. Gregg County shall not pay for work, equipment, services or supplies, which are unsatisfactory. The Respondent may be given reasonable opportunity prior to termination to correct any deficiency. This however shall in no way be construed as negating the basis for termination for non-performance or non-compliance.
2. Respondent shall make all inquiries necessary to be thoroughly informed as to the specifications and all other requirements proposed in the Bid. Any apparent omission or silence of detail in the description concerning any point in the specifications shall be interpreted on the basis of best commercial practices, and best commercial practices shall prevail.
3. Invoices shall be sent to the Gregg County Purchasing Department, 101 East Methvin, St. 205, Longview, TX, 75601. Invoices must detail the materials/equipment/services delivered and **must reference the Gregg County Purchase Order Number.** Payments are processed after the Purchasing Department has verified that the material or equipment and/or services have been delivered in good condition and that no unauthorized substitutions have been made according to specifications. Neither a signed receipt nor payments shall be construed as an acceptance of any defective work, improper materials, or release of any claim for damage.
4. Only the Commissioners Court of Gregg County, Texas acting as a body may enter into any type of agreement or contract on behalf of Gregg County. Department heads, other elected or appointed officials, are not authorized to enter into any type of agreement or contract on behalf of Gregg County, or to agree to any type of supplemental agreements or contracts for goods or services. Contracts are subject to review by the County's attorney prior to signature by the authorized County official.

5. The Respondent shall be considered an independent Contractor and not an agent, servant, employee or representative of the County in the performance of the work. No term or provision, hereof, or act of the Respondent shall be construed as changing that status.
6. The Respondent shall defend, indemnify, and shall save whole and harmless the County and all its officers, agents, employees from and against all suits, actions, or claims of the character, name and description brought for or on account of any injuries or damages (including but not restricted to death) received or sustained by any person(s) or property on account of, arising out of, or in connection with the performance of the work, including without limiting the generality of the foregoing, any negligent act or omission of the Respondent on the execution or performance of the Contract.
7. The Respondent agrees, during the performance of the work, to comply with all applicable codes and ordinances of the City of Longview, Gregg County, or State of Texas as they may apply, as these laws may now read or as they may hereafter be changed or amended.
8. The awarded vendor shall obtain from the appropriate City, Gregg County, or State of Texas the necessary permit(s) required by the ordinances of the City, County, or State, for performance of the work.
9. The awarded contractor shall not sell, assign, transfer or convey the agreement in whole or in part, without the prior written consent of the County.
10. The parties herein agree that the agreement shall be enforceable in Gregg County, Texas, and if legal action is necessary to enforce it, exclusive venue shall lie in Gregg County, Texas.
11. The agreement shall be governed by, and construed in accordance with, the Laws of the State of Texas and all applicable Federal Laws.
12. Funding Clause - Payments required to be made by Gregg County under the terms of the agreement shall be contingent upon and subject to the initial and continuing appropriation of funding for the agreement by and through the Commissioners Court of Gregg County, Texas. In the event appropriations for funding of the agreement are not approved by and through the Commissioners Court, the contract shall terminate. Gregg County shall, submit written notice to Respondent thirty (30) days prior to such termination. Upon notice of termination, as provided in this paragraph, the Respondent may submit a final invoice to the County and coordinate with the Purchasing Agent to remove all property belonging to said Respondent as soon as possible. Payment for final invoice will be subject to verification and approval by the purchasing agent. Thereupon, Gregg County will be released from its obligation to make further payments.
13. Gregg County is exempt from federal excise and sales taxes, ad valorem taxes and personal property taxes; therefore, tax must not be included in proposals tendered. Proposals offered must be complete and all inclusive. Gregg County will not pay additional taxes, surcharges or other fees not included in bid prices.

14. In case any one or more of the provisions contained in the agreement shall for any reason be held to be invalid, illegal, or unenforceable in any respect, such invalidity, illegality, or unenforceability shall not affect any other provision thereof and the agreement shall be considered as if such had never been contained herein.
15. The agreement embodies the complete agreement of the parties hereto, superseding all oral or written previous and contemporary agreements between the parties and relating to matters herein, and except as otherwise provided herein cannot be modified without written agreement of the parties. A contract will be executed after determination of the award.
16. Awarded Respondent must provide a certificate of insurance conforming to the above listed requirements or a statement of Respondent's insurance carrier certifying that the required coverage shall be obtained by Respondent within ten (10) days of formal award of the Contract. In the case where a certification letter from an insurance carrier is attached to the bid in lieu of an insurance certificate, any formal award of a contract shall be contingent upon required coverage being put into force **prior** to any performance required by subject agreement.
17. Gregg County reserves the right to terminate an agreement/contract at any time, without cause, upon thirty (30) days written notice to awarded contractor. Upon termination, Gregg County shall pay Respondent for those costs directly attributable to work done or supplies obtained in preparation for completion or compliance with the Contract, except no payment shall be made for costs recoverable by Respondent in the normal course of doing business or which can be mitigated through the sale of supplies or materials obtained for use under this Contract. It is further agreed by Respondent that Gregg County shall not be liable for loss or reduction in any anticipated profit.
18. Gregg County is wholly committed to developing, establishing, maintaining, and enhancing minority business involvement in the total procurement process. The County, its contractors, their suppliers and sub-contractors, vendors of goods, equipment, services, and professional services, shall not discriminate on the basis of race, color, religion, national origin, age, handicap, or sex in the award and/or performance of contracts. However, competition and quality of work remain the ultimate standards in contractor, sub-contractor, vendor service, professional service, and supplier utilization. All vendors, suppliers, professionals and contractors doing business or anticipating doing business with Gregg County shall support, encourage and implement steps toward our common goal of establishing equal opportunity for all citizens of Gregg County.
19. The awarded contractor agrees that Gregg County assumes no responsibility for any costs associated with any administrative or judicial proceedings resulting from the solicitation process.
20. The awarding Respondent shall maintain adequate records to justify all charges, expenses, and costs incurred in estimating and performing the work for at least two (2) years. County shall have access to all records, documents and information collected and/or maintained by others in the course of the administration of this agreement.

21. Contractor understands and agrees that in returning a response to this proposal/bid that it is neither an "offer" nor an "acceptance" until such time a formal contract is authorized/awarded by the Gregg County Commissioners Court; if any.
22. Gratuities– Gregg County may, by written notice to the Seller, cancel this contract without liability to Seller if it is determined by Gregg County that gratuities, in the form of entertainment, gifts, or otherwise, were offered or given by the Seller, or any agent or representative of the Seller, to any officer or employee of Gregg County with a view toward securing a contract or securing favorable treatment with respect to the awarding or amending, or the making of any determinations with respect to the performing of such a contract. In the event this contract is canceled by Gregg County pursuant to this provision, Gregg County shall be entitled, in addition to any other rights and remedies, to recover or withhold the amount of the cost incurred by Seller in providing such gratuities.
23. Termination - The performance of work under this order may be terminated in whole or in part by the Buyer in accordance with this provision. Termination of work hereunder shall be effected by the delivery to the Seller of a "Notice of Termination" specifying the extent to which performance of work under the order is terminated and the date upon which such termination becomes effective. Such right of termination is in addition to and not in lieu of rights of Buyer.
24. Force Majeure - If, by reason of Force Majeure, either party hereto shall be rendered unable wholly or in part to carry out its obligations under this Agreement then such party shall give notice and full particulars of such Force Majeure in writing to the other party within a reasonable time after occurrence of the event or cause relied upon, and the obligation of the party giving such notice, so far as it is affected by such Force Majeure, shall be suspended during the continuance of the inability then claimed, except as hereinafter provided, but for no longer period, and such party shall endeavor to remove or overcome such inability with all reasonable dispatch. The term Force Majeure as employed herein, shall mean acts of God, strikes, lockouts, or other industrial disturbances, act of public enemies, orders of any kind of government of the United States or the State of Texas or any civil or military authority, insurrections, riots, epidemics, landslides, lightning, earthquake, fires, hurricanes, storms, floods, washouts, droughts, arrests, restraint of government and people, civil disturbances, explosions, breakage or accidents to machinery, pipelines or canals or other causes not reasonably within the control of the party claiming such inability. It is understood and agreed that the settlement of strikes and lockouts shall be entirely within the discretion of the party having the difficulty, and that the above requirement that any Force Majeure shall be remedied with all reasonable dispatch shall not require the settlement of strikes and lockouts by acceding to the demands of the opposing party or parties when such settlement is unfavorable in the judgment of the party having the difficulty.

25. Assignment Delegation - No right or interest in this contract shall be assigned or delegation of any obligation made by Seller without the written permission of the Buyer. Any attempted assignment or delegation by Seller shall be wholly void and totally ineffective for all purposes unless made in conformity with this paragraph.
26. Waivers - No claim or right arising out of a breach of this contract can be discharged in whole or in part by a waiver or renunciation of the claim or right unless the waiver or renunciation is supported by consideration and is in writing signed by the aggrieved party.
27. Modification - Contract can be modified or rescinded only by a written and signed agreement by both of the parties duly authorized agents.
28. Applicable Law - This agreement shall be governed by the Uniform Commercial Code. Wherever the term "Uniform Commercial Code" is used, it shall be construed as meaning the Uniform Commercial Code as adopted in the State of Texas as effective and in force on the date of this agreement.
29. Advertising - Seller shall not advertise or publish, without Buyer's prior consent, the fact that Buyer has entered into this contract, except to the extent necessary to comply with proper requests for information from an authorized representative of the federal, state, or local government.
30. Right to Assurance - Whenever one party to this contract in good faith has reason to question the other party's intent to perform, he may demand that the other party give written assurance of his intent to perform. In the event a demand is made and no assurance is given within five (5) days, the demanding party may treat this failure as an anticipatory repudiation of the contract.
31. Venue - Both parties agree that venue for any litigation arising from this contract shall be in Longview, Gregg County, Texas.
32. No negotiations, decisions, or actions shall be executed by the vendor as a result of any discussions with any public service official, employee and/or consultant. Only those transactions provided in written form may be considered binding.
33. The contents of each vendor's bid, including specifications shall remain valid for a minimum of 60 calendar days from the Bid due date.
34. Subcontracting: The Vendor must function as the single point of responsibility for the Agency. No vendor shall submit a proposal comprised of separate software packages from multiple subcontractors.

35. Conflict of Interest: No public official shall have interest in this contract except in accordance with Vernon's Texas Codes Annotated, Local Government Code Title 5, Subtitle C, Chapter 171. State Law (CHAPTER 176 of the Local Government Code) requires the filing of a CONFLICT OF INTEREST QUESTIONNAIRE by certain individuals and businesses.
36. Design, Strength, Quality of materials and workmanship must conform to the highest standards of manufacturing and engineering practice.
37. All Hardware of any other item offered in this bid must be new and unused, unless otherwise specified, in first-class condition and of current manufacture.
38. Descriptions: Whenever an article or material is defined or used in the BID specifications by describing a proprietary product or by using the name of a manufacturer, model number, or make, the term "or equal" if not inserted, shall be implied. Any reference to specified article or material shall be understood as descriptive, NOT restrictive, and is used to indicate type and quality level desired for comparison purposes unless otherwise noted. Bids must be submitted on units of quantity specified, extended, and totaled. In the event of discrepancies in extension, the unit prices shall govern.
39. Addendum: Any interpretations, corrections or changes to this Bid and Specifications will be made by addendum, unless otherwise stated. Issuing authority of addendum shall be the Commissioners' Court of Gregg County, Texas. Addendum will be mailed, emailed, or faxed to all that are known to have received a copy of the Bid. Vendors shall acknowledge receipt of all addenda and include receipt and response to addenda with submission.
40. Patents/Copyrights: The successful vendor agrees to protect Gregg County from claims involving infringements of patents and/or copyrights.
41. Contract Administrator: The Contract Administrator will serve as sole liaison between the Gregg County Commissioners Court and affected Gregg County Departments and the successful vendor. Unless directly outlined in this specification the vendor shall consider no one but the Contract Administrator authorized to communicate, by any means, information or suggestions regarding or resembling this bid throughout the proposal process. The Contract Administrator has been designated the responsibility to ensure compliance with contract requirements, such as but not limited to, acceptance, inspection and delivery. The County will not pay for work, equipment or supplies, which it deems unsatisfactory. Vendors will be given a reasonable opportunity to correct deficiencies before termination. This however, shall in no way be construed as negating the basis for termination for non-performance.
42. Packing slips or other suitable shipping documents shall accompany each special order shipment and shall include:



- (a) Name and address of successful vendor;
  - (b) Name and address of receiving department and/or location;
  - (c) Gregg County Purchase Order number; and,
  - (d) Descriptive information of the materials shipped or services rendered, including item numbers, serial numbers, quantities, number of containers and package numbers, address/location of services rendered, as applicable.
43. Unless otherwise indicated, items will be new, unused, and in first class condition in containers suitable for damage-free shipment and storage.
44. Invoices must show all information as stated above, and will be issued for each purchase order.
45. Equipment/Good/Services supplied under this contract shall be subject to the County's approval. Item(s) found defective or not meeting specifications shall be picked up and replaced by the successful vendor within one (1) week after notification at no expense to the County. If item(s) is not picked up within one (1) week after notification, the item(s) will become a donation to the County for disposition.
46. Warranty: Successful vendor shall warrant that all equipment/goods/services shall conform to the proposed specifications and/or all warranties stated in the Uniform Commercial Code and be free from all defects in material, workmanship and title.
47. Remedies: The successful vendor and Gregg County agree that both parties have all rights, duties, and remedies available as stated in the Uniform Commercial Code.
48. Silence of Specification: The apparent silence of specifications as to any detail or to the apparent omission from it of a detailed description concerning any point, shall be regarded as meaning that only the best commercial practices are to prevail. All interpretations of these specifications shall be made on the basis of this statement.
49. The Contractor shall procure and maintain at its sole cost and expense for the duration of this Agreement insurance against claims for injuries to persons or damages to property that may arise from or in connection with the performance of the work hereunder by the Contractor, its agents, representatives, volunteers, employees or subcontractors. The Contractor's insurance coverage shall be primary insurance with respect to the County, its officials, employees and volunteers. Any insurance or self-insurance maintained by the County, its officials, employees or volunteers shall be considered in excess of the Contractor's insurance and shall not contribute to it. Further, the Contractor shall include all subcontractors as additional insured under its policies or shall furnish separate certificates and endorsements for each subcontractor. All coverage for subcontractors shall be subject to all of the requirements stated herein. **All Certificates of Insurance and endorsements shall be furnished to the County's Purchasing Agent and approved by the County *before* work commences.**

50. ***Standard Insurance Policies Required:***
- a. Commercial General Liability Policy
  - b. Automobile Liability Policy
  - c. Worker's Compensation Policy

General Requirements applicable to all policies:

- a. Only insurance carriers licensed and admitted to do business in the State of Texas will be accepted.
- b. Deductibles shall be listed on the Certificate of Insurance and are acceptable only on a per occurrence basis for property damage only.
- c. "Claims Made" policies will not be accepted.
- d. Each insurance policy shall be endorsed to state that coverage shall not be suspended, voided, canceled, reduced in coverage or in limits except after thirty (30) days prior written notice by certified mail, return receipt requested, has been given to Gregg County.
- e. All insurance policies shall be furnished to Gregg County upon request.

Commercial General Liability

- a. General Liability insurance shall be written by carrier with an A:VIII or better rating in accordance with the current Best Key Rating guide.
- b. Minimum Combined Single Limit of \$1,000,000.00 per occurrence for bodily injury and property damage with Gregg County named as an additional insured.
- c. No coverage shall be deleted from the standard policy without notification of individual exclusions being attached for review and acceptance.

Automobile Liability

- a. General Liability Insurance shall be written by a carrier with an A:VIII or better rating in accordance with the current Best Key Rating Guide.
- b. Minimum Combined Single Limit of \$600,000.00 per occurrence for bodily injury and property damage.

51. ***Workers Compensation Insurance*** - Pursuant to the requirements set forth in Title 28, Section 110.110 of the Texas compensation insurance policy; either directly through their employer's policy (the Contractor's or subcontractor's policy) or through an executed coverage agreement on an approved TWCC form. Accordingly, if a subcontractor does not have his or her own policy and a coverage agreement is used, Contractors and subcontractors must use that portion of the form whereby the hiring contractor agrees to provide coverage to the employees of the subcontractor. The portion of the form that would otherwise allow them not to provide coverage for the employees of an independent contractor may not be used.

The worker's compensation insurance shall include the following terms:

- a. Employer's Liability limits of \$500,000.00 for each accident is required.

- b. "Texas Waiver of Our Right to Recover from Others Endorsement" shall be included in this policy. (Waiver of Subrogation)

Pursuant to the explicit terms of Title 28, Section 110.110 (c) (7) of the Texas Administrative Code, the Proposal specifications, this Agreement, and all subcontracts on this Project must include the following terms and conditions in the following language, without any additional words or changes, except those required to accommodate the specific document in which they are contained or to impose stricter standards of documentation:

**Definitions:**

**Certificate of coverage ("certificate")** - A copy of a certificate of insurance, a certificate of authority to self-insure issued by the Texas Worker's Compensation Commission, or a coverage agreement (TWCC-81), TWCC-83, or TWCC-84), showing statutory worker's compensation insurance coverage for the person's or entity's employees providing services on a project, for the duration of the project.

**Duration of the project** - includes the time from the beginning of the work on the project until the Contractor's/person's work on the project has been completed and accepted by the governmental entity.

**Persons providing services on the project ("subcontractors" in section 406.096 {of the Texas Labor Code})** - includes all persons or entities performing all or part of the services the Contractor has undertaken to perform on the project, regardless of whether that person has employees. This includes, without limitation, independent Contractors, subcontractors, leasing companies, motor carriers, owner-operators, employees of any such entity or employees of any entity which furnishes persons to provide services on the project. "Services" include, without limitation, providing, hauling, or delivering equipment or materials, or providing labor, transportation, or other service related to a project. "Services" does not include activities unrelated to the project, such as food/beverage respondents, office supply deliveries, and delivery of portable toilets.

- The Contractor shall provide coverage, based on the proper reporting of classification codes and payroll amounts and filing of any coverage agreements, that meets the statutory requirements of Texas Labor Code, Section 401.011 (44) for all employees of the Contractor providing services on the project, for the duration of the project.
- The Contractor must provide a certificate of coverage to the governmental entity prior to being awarded the contract.
- If the coverage period shown on the Contractor's current certificate of coverage ends during the duration of the project, the Contractor must, prior to the end of the coverage period, file a new certificate of coverage with the governmental entity showing that coverage has been extended.
- The Contractor shall obtain from each person providing services on a project, and provide to the governmental entity:

- (1) a certificate of coverage, prior to that person beginning work on the project, so the governmental entity will have on file providing services on the project, and certificates of coverage showing coverage for all person; and
- (2) no later than seven calendar days after receipt by the Contractor, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the project.
- (3) The Contractor shall retain all required certificates of coverage for the duration of the project and for one year thereafter.

The Contractor shall notify the governmental entity in writing by certified mail or personal delivery, within 10 calendar days after the Contractor knew or should have known, or any change that materially affects the provision of coverage of any person providing services on the project.

The Contractor shall post on each project site a notice, in the text, form and manner prescribed by the Texas Workers' Compensation commission, informing all persons providing services on the project that they are required to be covered, and stating how a person may verify coverage and report lack of coverage.

The Contractor shall contractually require each person with whom it contracts to provide services on a project, to:

- (1) provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreement, that meets the statutory requirements of Texas Labor Code, Section 401.011 (44) for all of its employees providing services on the project, for the duration of the project;
- (2) provide to the Contractor, prior to that person beginning work on the project, a certificate of coverage showing that coverage is being provided for all employees of the person providing services on the project, for the duration of the project;
- (3) provide the Contractor, prior to the end of the coverage period, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the project.
- (4) obtain from each other person with whom it contracts, and provide to the Contractor:
  - (a) a certificate of coverage, prior to the other person beginning work on the project; and
  - (b) a new certificate of coverage showing extension of coverage, prior to the end of the coverage period, if the coverage period shown on the current certificate of coverage ends during the duration of the project;
- (5) retain all required certificates of coverage on file for the duration of the project and for one year thereafter;
- (6) notify the governmental entity in writing by certified mail or personal delivery, within 10 calendar days after the person knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the project; and

- (7) Contractually require each person with whom it contracts, to perform as required; with the certificates of coverage to be provided to the person for whom they are providing services.

By signing a contract with Gregg County, or providing, or causing to be provided a certificate of coverage, the Contractor who will provide services on the project will be covered by workers' compensation coverage for the duration of the project, that the coverage will be based on proper reporting of classification codes and payroll amounts, and that all coverage agreements will be filed with the appropriate insurance carrier, or, in the case of a self-insured, with the commission's Division of Self-Insurance regulation. Providing false or misleading information may subject the Contractor to administrative penalties, criminal penalties, civil penalties, or other civil actions.

***CERTIFICATES OF INSURANCE*** shall be prepared and executed by the insurance company or its authorized agent, and shall contain the following provisions and warranties:

- a. The company is licensed and admitted to do business in the State of Texas.
- b. The insurance policies provided by the insurance company are underwritten on forms that have been provided by the Texas State Board of Insurance or ISO.
- c. All endorsements and insurance coverage according to requirements and instructions contained herein.
- d. The form of the notice of cancellation, termination, or change in coverage provisions to Gregg County.
- e. Original endorsements affecting coverage required by the section shall be furnished with the certificates of insurance.

## ***BONDING REQUIREMENTS***

If applicable, a Bid Bond shall be required. Pursuant to the provisions of Section 262.032 (a) of the Texas Local Government Code, if the contract contemplated by this request is a bid for the construction of public works, or will be under a contract exceeding \$100,000.00, Gregg County may require the vendor to execute a good and sufficient bid bond in the amount of five percent (5%) of the total contract price. Said bond shall be executed with a surety company authorized to do business in the State of Texas.

If applicable, a Performance Bond shall be required. Pursuant to the provisions of Section 262.032 (b) of the Texas Local Government Code, within thirty (30) days of the date of the signing of a contract or issuance of a purchase order following the acceptance of a bid by Gregg County Commissioners Court and prior to commencement of the actual work, the successful vendor shall furnish a performance bond to Gregg County for the full amount of the contract if the contract exceeds \$50,000.00. Said bond shall be for the purpose of insuring the faithful performance of the work in accordance with the plans, specifications and contract documents associated with the contract.

If applicable, a Payment Bond shall be required. Pursuant to the provisions of Section 2253.021, Texas Government Code, if the amount of the contract awarded to the successful vendor exceeds \$25,000.00, the successful vendor shall execute a payment bond in the amount of the contract. Said bond is solely for the protection and use of payment bond beneficiaries who have a direct contractual relationship with the prime contractor or a subcontractor to supply public work labor or material. This bond must be issued to the County within ten (10) days of the award of the contract and before vendor begins the work.

If applicable, a Performance Bond shall be required. Pursuant to the provisions of Section 2253.021, Texas Government Code, if the amount of the contract awarded to the successful vendor exceeds \$100,000.00, the successful vendor shall execute a performance bond in the amount of the contract. Said performance bond is solely for the protection of Gregg County and is conditioned on the faithful performance of the work in accordance with the plans, specifications, and contract documents. This bond must be issued to the County within ten (10) days of the award of the contract and before the vendor begins the work.

## ***CRIMINAL BACKGROUND CHECKS***

**Any contracts will require vendors to enter sensitive security areas. These include, but are not limited to, Gregg County Courthouse, Gregg County Sheriff's Department and/or Gregg County Jails.**

**The following will apply to awarded vendor personnel.**

- The successful bidder shall provide information, including, but not limited to, name, date of birth, and driver's license number for each individual who will be performing work on Gregg County property.
- Vendor personnel who perform work on Gregg County property must submit to and pass a Sheriff's Department Criminal Background Check. That status must be maintained by all vendor personnel entering County buildings for the duration of the contract.
- Criminal Background checks conducted by your firm may or may not be acceptable to certain departments depending on their particular requirements. The County reserves the right to conduct additional Criminal Background Checks as it deems necessary.
- Award of a contract could be affected by your firms' refusal to agree to these terms. Award could also be affected if your firm is unable to supply personnel who can pass a Criminal Background Check.

**The Criminal Background Check applies to the individual and not the company.**

## *Special Conditions*

WORK. The CONTRACTOR shall provide and pay for all materials, supplies, machinery, equipment, tools, superintendence, labor, services, insurance, and all water, light, power, fuel, transportation and other facilities necessary for the execution and completion of the work covered by the contract Documents. Unless otherwise specified, all materials shall be new and both workmanship and materials shall be of a good quality. The CONTRACTOR shall if required, furnish satisfactory evidence as to the kind and quality of materials.

RIGHT OF ENTRY. The OWNER reserves the right to enter the property or location on which the work herein is contracted for by such agent or agents as he may elect, for the purpose of inspecting the work, or for the purpose of constructing or installing such collateral work as said OWNER may desire.

EQUIPMENT, MATERIALS AND CONSTRUCTION PLANT. The CONTRACTOR shall be responsible for the care, preservation, conservation, and protection of all materials, supplies, machinery, equipment, tools, apparatus, accessories, facilities, all means of construction, and any and all parts of the work, whether the CONTRACTOR has been paid, partially paid, or not paid for such work, until the entire work is completed and accepted.

CHARACTER OF WORKMEN. The CONTRACTOR agrees to employ only orderly and competent men, skillful in the performance of the type of work required under this contract, to do the work; and agrees that whenever the OWNER shall inform him in writing that any man or men on the work are, in his opinion, incompetent, unfaithful or disorderly, such man or men shall be discharged from the work and shall not again be employed on the work without the OWNER'S written consent.

PROTECTION AGAINST ACCIDENT TO EMPLOYEES AND THE PUBLIC. The CONTRACTOR shall at all times exercise reasonable precautions for the safety of employees and others on or near the work and shall comply with all applicable provisions of Federal, State, and Municipal safety laws and building and construction codes. All machinery and equipment and other physical hazards shall be guarded in accordance with the "Manual of Accident Prevention in Construction" of the Associated General Contractors of America except where incompatible with Federal, State, or Municipal laws or regulations. The CONTRACTOR shall provide such machinery guards, safe walkways, ladders, bridges, gangplanks, and other safety devices if necessary. The safety precautions actually taken and their adequacy shall be the sole responsibility of the CONTRACTOR, acting at his discretion as an independent contractor.

PROTECTION OF ADJOINING PROPERTY. The said CONTRACTOR shall take proper means to protect the adjacent or adjoining property or properties in any way encountered, which might be injured or seriously affected by any process of construction to undertaken under this Agreement, from any damage or injury by reason of said process of construction; and he shall be liable for any and all claims for such damage on account of his failure to fully protect all adjoining property. The CONTRACTOR agrees to indemnify, save and hold harmless the OWNER against any claim or claims for damages due to any injury to any adjacent or adjoining



property, arising or growing out of the performance of the contract; but any such indemnity shall not apply to any claim of any kind arising out of the existence or character of the work.

**PROTECTION AGAINST CLAIMS OF SUB-CONTRACTORS, LABORERS, MATERIALMEN AND FURNISHERS OF MACHINERY, EQUIPMENT AND SUPPLIES.** The CONTRACTOR agrees that he will indemnify and save the OWNER harmless from all claims growing out of the lawful demands of sub-contractors, laborers, workmen, mechanics, material men and furnishers of machinery and parts thereof, equipment, power tools, and all supplies, including commissary, incurred in the furtherance of the performance of this contract. When so desired by the OWNER, the CONTRACTOR shall furnish satisfactory evidence that all obligations of the nature hereinabove designated have been paid, discharged or waived. If the CONTRACTOR fails so to do, then the OWNER may at the option of the CONTRACTOR either pay directly any unpaid bills, of which the OWNER has written notice, or withhold from the CONTRACTOR'S unpaid compensation a sum of money deemed reasonably sufficient to liquidate any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged, whereupon payments to the CONTRACTOR shall be resumed in full, in accordance with the terms of this contract, but in no event shall the provisions of this sentence be construed to impose any obligation upon the OWNER by either the CONTRACTOR or his Surety.

**FINAL COMPLETION AND ACCEPTANCE.** Within ten (10) days after the CONTRACTOR has given the OWNER written notice that the work has been completed, or substantially completed, the OWNER shall inspect the work and within said time, prepare and send a list of deficiencies. If there are not deficiencies found then OWNER will process final payment.

**FINAL PAYMENT.** The OWNER, who shall pay to the CONTRACTOR on or before the 30th day, and before the 35th day, after the date of Project Completion, the balance due the CONTRACTOR under the terms of this Agreement, provided he has fully performed his contractual obligations under the terms of this contract.

**PAYMENTS WITHELD.** The OWNER may, on account of subsequently discovered evidence, withhold payment to such extent as may be necessary to protect himself from loss on account of:

- (a) Defective work not remedied.
- (b) Claims filed or reasonable evidence indicating probable filing of claims.
- (c) Failure of the CONTRACTOR to make payments properly to subcontractors or for material or labor.
- (d) Damage to another contractor.
- (e) Reasonable doubt that the work can be completed for the unpaid balance of the contract amount.
- (f) Reasonable indication that the work will not be completed within the contract time.

**CHANGE ORDERS:** Without invalidating this Agreement, the OWNER may, at any time or from time to time, order deletions or revisions to the work; such changes will be authorized by Change Order to be prepared by the OWNER after formal approval of the Gregg County Commissioners Court. The Change Order shall set forth the basis for any change in contract

price, as hereinafter set forth for Extra Work, and any change in contract time which may result from the change..

**EXAMINATION OF SITE OF PROJECT.** Prospective bidders shall make a careful examination of the site of the project, soil and water conditions to be encountered, improvements to be protected, disposal sites for surplus materials not designated to be salvaged materials, and methods of providing ingress and egress to private properties and of handling traffic during construction of the entire project.

**TRADE NAMES AND MATERIALS.**

Where materials or equipment are specified by a trade or brand name, it is not the intention of the Owner to discriminate against an equal product of another manufacturer, but rather to set a definite standard of quality of performance, and to establish an equal basis for the evaluation of bids. Where the words "equivalent", "proper" or "equal to" are used, they shall be understood to mean the equivalent of, or equal to some other thing, in the opinion or judgment of the Owner. Unless otherwise specified, all materials shall be the best of their respective kinds and shall be in all cases fully equal to approved samples. Notwithstanding that the words "or equal to" or other such expressions may be used in the specifications in connection with a material, manufactured article or process, the materials, article or process specifically designated shall be used, unless a substitute shall be approved in writing by the Owner, and the Owner shall have the right to require the use of such specifically designated material, article or process.

**BARRICADES, LIGHTS, AND WATCHMEN.** Where the work is carried on in or adjacent to any street, alley or public place, the Contractor shall at his own cost and expense furnish and erect such barricades, fences, lights, and danger signals, shall provide such watchmen, and shall provide such other precautionary measures for the protection of persons or property and of the work as are necessary. Barricades shall be painted in a color that will be visible at night. From sunset to sunrise the Contractor shall furnish and maintain at least one light at each barricade and sufficient number of barricades shall be erected to keep vehicles from being driven on or into any work under construction. The Contractor shall furnish watchmen in sufficient numbers to protect the work. The Contractor will be held responsible for all damage to the work due to failure of barricades, signs, lights, and watchmen to protect it, and whenever evidence is found of such damage, the Owner may order the damaged portion immediately removed and replaced by the Contractor at his cost and expense. The Contractor's responsibility for the maintenance of barricades, signs, and lights, and for providing watchmen shall not cease until the project shall have been accepted by the Owner.

**RESTORATION OF SITE & CLEANUP.** Upon completion of the project (or major portions thereof) the Contractor shall restore the site to its original condition or better. Driveways and streets shall be compacted and resurfaced as originally found. All private property disrupted during construction including fences, patios, retaining walls, sidewalks, wooden decks, etc. shall be mended or repaired to their original condition. At the conclusion of the work, all tools, temporary structures and materials belonging to the Contractor shall be promptly removed, and all dirt, rubbish and other foreign substances shall be disposed of. The Contractor shall thoroughly clean all equipment and materials installed by him and shall deliver over such materials and equipment in an undamaged, clean condition.

## SAFETY.

- In accordance with generally accepted construction practices, the Contractor alone will be solely and completely responsible for conditions of the job site, including safety of all persons and property during performance of the work. This requirement will apply continuously and not be limited to normal working hours.
- The duty of the Owner to conduct construction review of the Contractor's performance is not intended to include review of the adequacy of the Contractor's safety measures, in, or on, or near the construction site.

EXISTING UTILITIES AND SERVICE LINES. The Contractor shall be responsible for the protection of all existing utilities or service lines crossed or exposed by his construction operations. Where existing utilities or service lines are cut, broken or damaged, the Contractor shall replace or repair the utilities or service lines with the same type of original material and construction, or better, at his own cost and expense.

PROTECTION OF PROPERTY. The Contractor shall, at no additional expense to the Owner, protect by false work, braces, shoring or other property along his line of work or affected directly by his work, against damage and shall repair the damages or repay the injured Owners if such damage occurs. The Contractor shall exercise care to protect from injury all water pipes, sanitary sewer pipes, gas mains, telephone cables, electric cables, service pipes, and other utilities or fixtures which may be encountered during the progress of the work. All utilities and other service facilities or fixtures if damaged, shall be repaired by the Contractor without additional compensation. Protection is Contractor's responsibility and he must satisfy himself as to the existence and location of all utilities and structures.

CONTRACTS IN DEFAULT. The Owner may declare a contract in default for any one or more of the following reasons:

- Failure to complete the work within the contract period or any extension thereof.
- Failure or refusal to comply with an order of the Owner within a reasonable time.
- Failure or refusal to remove rejected materials.
- Failure or refusal to perform anew any defective or unacceptable work.
- Bankruptcy or insolvency, or the making of an assignment for the benefit of creditors.
- Failure to provide a qualified superintendent, competent workmen or subcontractors to carry on the work in an acceptable manner or failure to prosecute the work according to the agreed schedule of completion.
- Disregard or violation of any other important provisions of the Contract Documents as determined by the Engineer.

**STANDARD FORM OF AGREEMENT**

STATE OF TEXAS §  
COUNTY OF Gregg §

THIS AGREEMENT, made and entered into this \_\_\_\_\_ day of \_\_\_\_\_, 2019 by and between the County of Gregg, Texas, acting through the Honorable Bill Stoudt, County Judge, thereunto duly authorized so to do, Party of the First Part, hereinafter termed OWNER, and \_\_\_\_\_ of the City of \_\_\_\_\_, County of \_\_\_\_\_ and State of \_\_\_\_\_, Party of the Second Part, hereinafter termed CONTRACTOR.

WITNESSETH: That for and in consideration of the payments and agreements hereinafter mentioned, to be made and performed by the Party of the First Part (OWNER), and under the conditions expressed in the bond having even date wherewith, the said Party of the Second Part (CONTRACTOR), hereby agrees with the said party of the First Part (OWNER) to commence and complete the construction of certain improvements described as follows:

County Bid No. 2019-914  
East Texas Regional Airport – South GA Area Taxilane – Phase II.

and all extra work in connection therewith, under the terms as stated in this Standard Form of Agreement: all of the documents attached to this Standard Form of Agreement: all Plans Specifications and drawings for the projects as prepared by the Owner’s engineer KSA Engineers Inc. (herein entitled “Engineer); and all printed or written explanatory materials of said Plans, Specifications and drawings. The Contractor hereby agrees with the OWNER that the CONTRACTOR shall commence and complete all such construction work at the CONTRACTOR’S own proper cost and expense to furnish all the materials, supplies, machinery, equipment, tools, superintendence, labor, insurance and other accessories and services necessary to complete the said construction and work.

This documents that are attached to and for all purposes made part of this Standard Form of Agreement include the Notice to Bidders, Bid Bond, Statement of Qualifications, Contractor’s Bid Proposal, Construction Performance Bond, Construction Payment Bond, Maintenance Bond, Certificate of Insurance, General Provisions, Special Provisions, Mandatory Federal Contract Provisions, Gregg County, Texas Standard Terms and Conditions, and Technical Specifications. This agreement shall also include all Plans, Specifications and drawings for the project, as prepared by the ENGINEER, and all printed or written explanatory materials shall include all Plans, Specifications, Addenda and drawings. This Standard Form of Agreement and the documents listed herein shall collectively evidence and constitute the entire contract between the parties hereto regarding the subject matter hereof.

THE CONTRACTOR hereby agrees to commence work within ten (10) days after the date written notice to do so shall have been given to him, and to substantially complete the same within 90 calendar days after the date of the written notice to commence work, subject to such extensions of time as are provided by the General and Special Provisions.

THE OWNER agrees to pay the Contractor in current funds \_\_\_\_\_ Dollars (\$ \_\_\_\_\_) such payments to be subject to the General and Special Provisions of the contract.

IN WITNESS WHEREOF, the parties to these presents have executed this Agreement in the year and day first above written.

County of Gregg  
OWNER, Party of the First Part

\_\_\_\_\_  
CONTRACTOR, Party of the Second Part

By: \_\_\_\_\_  
County Judge

By: \_\_\_\_\_

STATE OF TEXAS §  
COUNTY OF \_\_\_\_\_ §

BEFORE ME, the undersigned, a Notary Public in and for said County and State, on this day personally appeared \_\_\_\_\_, CONTRACTOR, known to me to be the person and office whose name is subscribed to the foregoing instrument and acknowledged to me that the same was the act of said \_\_\_\_\_ and that executed the same as the act of such \_\_\_\_\_ for the purposes and consideration therein expressed, and in the capacity herein stated.

GIVEN UNDER, my hand and seal of office this the \_\_\_\_\_ day of \_\_\_\_\_, A.D., 2019.

\_\_\_\_\_  
Notary Public in and for

\_\_\_\_\_  
County State

My Commission Expires: \_\_\_\_\_

STATE OF TEXAS §  
COUNTY OF \_\_\_\_\_ §

BEFORE ME, the undersigned, a Notary Public in and for said County and State, on this day personally appeared \_\_\_\_\_, OWNER, known to me to be the person and office whose name is subscribed to the foregoing instrument and acknowledged to me that the same was the act of said \_\_\_\_\_ and that executed the same as the act of such City for the purposes and consideration therein expressed, and in the capacity herein stated.

GIVEN UNDER, my hand and seal of office this the \_\_\_\_\_ day of \_\_\_\_\_, A.D., 2019.

\_\_\_\_\_  
Notary Public in and for

\_\_\_\_\_  
County State

My Commission Expires: \_\_\_\_\_

## **Certificate of Interested Parties (Form 1295)**

In 2015, the Texas Legislature adopted House Bill 1295, which added Section 2252.908 of the Government Code. The law states that a government entity may not enter into certain contracts with a business entity unless the business entity submits a disclosure of interested parties to the government entity. The disclosure of interested parties will be submitted online via Form 1295 and must be submitted to the governmental entity prior to any signed contract and/or vote by the governing authority.

### **The Filing Process:**

1. Prior to award by Commissioners Court, your firm will be required to log in to the Texas Ethics Commission, [https://www.ethics.state.tx.us/whatsnew/elf\\_info\\_form1295.htm](https://www.ethics.state.tx.us/whatsnew/elf_info_form1295.htm) and fill out the Electronic Filing Application.
2. Once submitted, the system will generate an electronic Form 1295 displaying a "Certificate Number." Your firm must print, sign and notarize Form 1295.
3. **Within ten (10) business days** from notification of pending award by the Gregg County Purchasing Agent, the completed Form 1295 **must** be submitted to Gregg County.
4. Your firm will need to repeat this process and obtain a separate Form 1295 each time you enter into a new contract, renew a contract or make modification and/or amendments to a Gregg County contract.

Instructions and information are available at <https://www/ethics.state.tx.us/tec/1295-Info.htm> or you may call the Texas Ethics Commission at (512) 463-5800.

**CONSTRUCTION PERFORMANCE BOND**

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

CONTRACTOR (Name and Address)

SURETY (Name and Principal Place of Business):

OWNER (Name and Address):

**County of Gregg, Texas  
101 E. Methvin  
Longview, Texas 75601**

CONSTRUCTION CONTRACT

Date: \_\_\_\_\_

Amount: \$ \_\_\_\_\_

Description (Name and Location): Southwest GA Area Taxilane – Phase II  
AIP Project No. 3-048-0137-47-2019, County Bid No. 2019-914.  
East Texas Regional Airport, Gregg County, Texas

BOND

Date: \_\_\_\_\_  
(Not earlier than Construction Contract Date)

Amount: \_\_\_\_\_

Modifications to this Bond Form: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

CONTRACTOR AS PRINCIPAL

SURETY

Company: \_\_\_\_\_ (Corp. Seal)

Company: \_\_\_\_\_ (Corp. Seal)

Signature: \_\_\_\_\_  
Name and Title:

Signature: \_\_\_\_\_  
Name and Title:

CONTRACTOR AS PRINCIPAL

SURETY

Company: \_\_\_\_\_ (Corp. Seal)

Company: \_\_\_\_\_ (Corp. Seal)

Signature: \_\_\_\_\_  
Name and Title:

Signature: \_\_\_\_\_  
Name and Title:

1. The Contractor and the Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner to pay for the performance of the Construction Contract, which is incorporated herein by reference.
2. If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except to participate in conferences as provided in Subparagraph 3.1.
3. If there is no Owner Default, the Surety's obligation under this Bond shall arise after:
  - a. The Owner has notified the Contractor and the Surety at its address described in Paragraph 10 below, that the Owner is considering declaring a Contractor Default and has requested and attempted to arrange a conference with the Contractor and the Surety to be held not later than fifteen days after receipt of such notice to discuss methods of performing the Construction Contract. If the Owner, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default; and
  - b. The Owner has declared a Contractor Default and formally terminated the Contractor's right to complete the contract. Such Contractor Default shall not be declared earlier than twenty days after the Contractor and the Surety have received notice as provided in Subparagraph 3.1; and
- 3.3 The Owner has agreed to pay the Balance of the contract Price to the Surety in accordance with the terms of the Construction Contract or to a contractor selected to perform the Construction Contract in accordance with the terms of the contract with the Owner.
4. When the Owner has satisfied the conditions of Paragraph 3, the Surety shall promptly and at the Surety's expense take one of the following actions:
  - a. Arrange for the Contractor, with consent of the Owner, to perform and complete the Construction Contract; or
  - b. Undertake to perform and complete the Construction Contract itself, through its agents or through independent contractors; or
  - c. Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a Contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and the contractor selected with the Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the construction Contract, and pay to the Owner the amount of damages as described in Paragraph 6 in excess of the Balance of the Contract Price incurred by the Owner resulting from the Contractor's default; or
  - d. Waive its right to perform and complete, arrange for completion or obtain a new contractor and with reasonable promptness under the circumstances:
    1. After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, tender payment therefor to the Owner; or
    2. Deny liability in whole or in part and notify the Owner citing reasons therefor.
5. If the Surety does not proceed as provided in Paragraph 4 with reasonable promptness, the Surety shall be deemed to be in default of this Bond fifteen days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Subparagraph 4.4 and the Owner refuses the payment tendered or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.
6. After the Owner has terminated the Contractor's right to complete the Construction Contract, and if the Surety elects to act under Subparagraph 4.1, 4.2, or 4.3 above, then the responsibilities of the Surety to the Owner shall not be greater than those of the Owner under the Construction Contract. To the limit of the amount of this Bond, but subject to commitment by the Owner of the Balance of the Contract Price to mitigation of costs and damages on the Construction Contract, the Surety is obligated without duplication for:
  - 6.1. The responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;
  - 6.2. Additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Paragraph 4; and
  - 6.3. Liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.
7. The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, or successors.
8. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.
9. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after Contractor Default or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.
10. Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the signature page.
11. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory bond and not as a common law bond.
12. Definitions.
  - 12.1. Balance of the Contract Price: The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.
  - 12.2. Construction Contract: The agreement between the Owner and the Contractor identified on the signature page, including all Contract Documents and changes thereto.
  - 12.3. Contractor Default: Failure of the Contractor, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Construction Contract.
  - 12.4. Owner Default: Failure of the Owner, which has neither been remedied nor waived, to pay the Contractor as required by the Construction Contract or to perform and complete or comply with the other terms thereof.

(FOR INFORMATION ONLY - Name, Address and Telephone)

AGENT or BROKER:

OWNER'S REPRESENTATIVE (Architect, Engineer or other party):



**CONSTRUCTION PAYMENT BOND**

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

CONTRACTOR (Name and Address)

SURETY (Name and Principal Place of Business):

OWNER (Name and Address):

**County of Gregg, Texas  
101 E. Methvin  
Longview, Texas 75601**

CONSTRUCTION CONTRACT

Date: \_\_\_\_\_

Amount: \$ \_\_\_\_\_

Description (Name and Location): Southwest GA Area Taxilane – Phase II  
AIP Project No. 3-048-0137-47-2019, County Bid No. 2019-914.  
East Texas Regional Airport, Gregg County, Texas

BOND

Date: \_\_\_\_\_  
(Not earlier than Construction Contract Date)

Amount: \_\_\_\_\_

Modifications to this Bond Form: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

CONTRACTOR AS PRINCIPAL

SURETY

Company: \_\_\_\_\_ (Corp. Seal)

Company: \_\_\_\_\_ (Corp. Seal)

Signature: \_\_\_\_\_  
Name and Title:

Signature: \_\_\_\_\_  
Name and Title:

CONTRACTOR AS PRINCIPAL

SURETY

Company: \_\_\_\_\_ (Corp. Seal)

Company: \_\_\_\_\_ (Corp. Seal)

Signature: \_\_\_\_\_  
Name and Title:

Signature: \_\_\_\_\_  
Name and Title:

Prepared through the joint efforts of The Surety Association of America, Engineers' Joint Contract Documents Committee, The Associated General Contractors of America, American Institute of Architects, American Subcontractors Association, and the American Specialty Contractors.

1. The Contractor and the Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner to pay for labor, materials and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference.
2. With respect to the Owner, this obligation shall be null and void if the Contractor:
  - a. Promptly makes payment, directly or indirectly, for all sums due Claimants, and
  - b. Defends, indemnifies and holds harmless the Owner from all claims, demands, liens or suits by any person or entity who furnished labor, materials or equipment for use in the performance of the Construction Contract, provided the Owner has promptly notified the Contractor and the Surety (at the address described in Paragraph 12) of any claims, demands, liens or suits and tendered defense of such claims, demands, liens or suits to the Contractor and the Surety, and provided there is no Owner Default.
3. With respect to Claimants, this obligation shall be null and void if the Contractor promptly makes payment, directly or indirectly, for all sums due.
4. The Surety shall have no obligation to Claimants under this Bond until:
  - 4.1. Claimants who are employed by or have a direct contract with the Contractor have given notice to the Surety (at the address described in Paragraph 12) and set a copy, or notice thereof, to the Owner, stating that a claim is being made under this Bond and, with substantial accuracy, the amount of the claim.
  - 4.2. Claimants who do not have a direct contract with the Contractor:
    1. Have furnished written notice to the Contractor and sent a copy, or notice thereof, to the Owner, within 90 days after having last performed labor or last furnished materials or equipment included in the claim stating, with substantial accuracy, the amount of the claim and the name of the party to whom the materials were furnished or supplied or for whom the labor was done or performed; and
    2. Have either received a rejection in whole or in part from the Contractor, or not received within 30 days of furnishing the above notice any communication from the Contractor by which the Contractor has indicated the claim will be paid directly or indirectly; and
    3. Not having been paid within the above 30 days, have sent a written notice to the Surety (at the address described in Paragraph 12) and sent a copy, or notice thereof, to the Owner, stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to the Contractor.
5. If a notice required by Paragraph 4 is given by the Owner to the Contractor or to the Surety, that is sufficient compliance.
6. When the Claimant has satisfied the conditions of Paragraph 4, the Surety shall promptly and at the Surety's expense take the following actions:
  - a. Send an answer to the Claimant, with a copy to the Owner, within 45 days after receipt of the claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed.
  - b. Pay or arrange for payment of any undisputed amounts.
7. The Surety's total obligation shall not exceed the amount of this Bond, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.
8. Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any Construction Performance Bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and the Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.
9. The Surety shall not be liable to the Owner, Claimants or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for payment of any costs or expenses of any Claimant under this bond, and shall have under this Bond no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.
10. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.
11. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the location in which the work or part of the work is located or after the expiration of one year from the date (1) on which the Claimant gave the notice required by Subparagraph 4.1 or Clause 4.2 (iii), or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.
12. Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the signature page. Actual receipt of notice by Surety, the Owner or the Contractor, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.
13. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. The intent is, that this Bond shall be construed as a statutory bond and not as a common law bond.
14. Upon request by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor shall promptly furnish a copy of this Bond or shall permit a copy to be made.
15. DEFINITIONS
  - 15.1. Claimant: An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials or equipment were furnished.
  - 15.2. Construction Contract: The agreement between the Owner and the Contractor identified on the signature page, including all Contract Documents and changes thereto.
  - 15.3. Owner Default: Failure of the Owner, which has neither been remedied nor waived, to pay the Contractor as required by the Construction Contract or to perform and complete or comply with the other terms thereof.

(FOR INFORMATION ONLY - Name, Address and Telephone)

AGENT or BROKER:

OWNER'S REPRESENTATIVE (Architect, Engineer or other party):

**MAINTENANCE BOND**

STATE OF TEXAS                    §  
COUNTY OF GREGG               §

KNOW ALL MEN BY THESE PRESENTS: That \_\_\_\_\_  
as Principal, hereinafter called Contractor, and \_\_\_\_\_, as Sureties, are held  
and firmly bound unto the County of Gregg, Texas, as Obligee, hereinafter called Owner, in the amount of  
\_\_\_\_\_ Dollars (\$\_\_\_\_\_), for the payment  
whereof Contractor and Sureties bind themselves, their heirs, executors, administrators, successors and  
assigns, jointly and severally, firmly by these presents.

WHEREAS, the Contractor has completed the construction of Southwest GA Area Taxilane –  
Phase II for the County of Gregg, Texas in accordance with the drawings and specifications submitted to  
the County of Gregg and;

WHEREAS, the contractor hereby covenants and agrees that he will maintain and keep in repair  
such improvements from any defects resulting from improper installation thereof or material defects, for a  
period of one (1) year, commencing on the date of issuance of the Certificate of Completion for  
construction of said project.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the Contractor  
shall promptly and faithfully perform as hereinabove provided, then this obligation shall be null and void,  
otherwise, it shall remain in full force and effect.

WHENEVER the Contractor shall be and declared by the Owner to be in default under aforesaid  
agreement to maintain and keep in repair, the Sureties shall promptly remedy the default or be  
responsible to the Owners for having performed Contractor's obligation thereunder.

IN WITNESS WHEREOF, the said Principal and Surety have signed and sealed this instrument  
this \_\_\_\_\_ day of \_\_\_\_\_, 2019.

\_\_\_\_\_  
  
By \_\_\_\_\_  
Title \_\_\_\_\_  
Address \_\_\_\_\_  
  
\_\_\_\_\_  
  
\_\_\_\_\_

\_\_\_\_\_  
  
By \_\_\_\_\_  
Title \_\_\_\_\_  
Address \_\_\_\_\_  
  
\_\_\_\_\_  
  
\_\_\_\_\_

The name and address of the Resident Agent of Surety is:  
  
\_\_\_\_\_  
  
\_\_\_\_\_

**CERTIFICATE OF INSURANCE**

TO: \_\_\_\_\_ Date \_\_\_\_\_  
 \_\_\_\_\_ Project No. \_\_\_\_\_  
 Owner \_\_\_\_\_ Type of \_\_\_\_\_  
 \_\_\_\_\_ Project \_\_\_\_\_  
 Address \_\_\_\_\_

THIS IS TO CERTIFY THAT \_\_\_\_\_  
 (Name and address of insured)

is, at the date of this certificate, insured by this Company with respect to the business operations hereinafter described, for the types of Insurance and in accordance with the provisions of the standard policies used by this Company, and further hereinafter described. Exceptions to standard policy noted on reverse side hereof.

	Policy No.	Effective	Expires	Limits of Liability
Workmen's Compensation				
Public Liability				1 Person \$ 1 Accident
Contingent Liability				1 Person \$ 1 Accident
Property Damage				
Builder's Risk				
Automobile				
Other				

The foregoing Policies (do) (do not) cover all sub-contractors.

Locations Covered: \_\_\_\_\_

Descriptions of Operations Covered: \_\_\_\_\_

The above policies either in the body thereof or by appropriate endorsement provide that they may not be changed or cancelled by the insurer in less than five days after the insured has received written notice of such change or cancellation.

Where applicable local laws or regulations require more than five days actual notice of change or cancellation to the assured, the above policies contains such special requirements, either in the body thereof or by appropriate endorsement thereto attached.

\_\_\_\_\_  
 (Name of Insurer)

By \_\_\_\_\_

Title \_\_\_\_\_

## SEPARATION OF MATERIALS FORM

The successful Bidder shall prepare an itemized list of materials (including his prices to Owner) which are to be incorporated into the project and/or furnished to the Owner uninstalled. Consumable materials including motor fuel, are excluded from this list.

This is a list of materials which, for sales tax purposes, are considered sold by the Contractor to the owner who is a sales tax exempt entity. Such materials are thus exempt from any sales taxes, either on the Contractor's purchase of the materials for resale or on his resale to the Owner.

The level of detail in this breakdown is at the discretion of the Contractor, with the understanding that the Contractor is responsible for furnishing required documentation to the State Comptroller. Major material purchases should be included to ensure their tax exempt status.

Material quantities in this breakdown should be limited to the amounts reasonably necessary for completion of the project. Excess materials which are used on another project may become subject to sales tax if not properly documented.

The Contractor's material prices to the Owner must be no less than his purchase price and may include transportation and handling costs plus a reasonable profit.

The total material price in the required breakdown must equal the total material price listed below. The breakdown must be mathematically correct before it will be approved by the Engineer and incorporated into the contract documents as sales tax exempt.

The material price breakdown shall be submitted with this form before execution of the contract documents. Otherwise, the Contractor may risk losing his sales tax exemption for this project.

- |    |   |          |
|----|---|----------|
| 1. | TOTAL CONTRACT AMOUNT<br>(As Awarded)   | \$ _____ |
| 2. | SALES TAX EXEMPT MATERIALS<br>(All materials which are (a) furnished by Contractor and incorporated into completed project or (b) furnished uninstalled by Contractor to Owner) | \$ _____ |
| 3. | OTHER COSTS<br>(Including installation and consumable materials)  | \$ _____ |

- NOTES:
1. Line 1 = contract price as awarded.
  2. Line 2 + Line 3 must equal Line 1.
  3. Line 2 must be not less than Contractor's anticipated invoice price for all sales tax exempt materials.

TO OWNER: PROJECT: \_\_\_\_\_

APPLICATION NO: \_\_\_\_\_

Distribution to:

<input type="checkbox"/>	OWNER
<input type="checkbox"/>	ENGINEER
<input type="checkbox"/>	CONTRACTOR
<input type="checkbox"/>	
<input type="checkbox"/>	

FROM CONTRACTOR: VIA ENGINEER: \_\_\_\_\_

PERIOD TO: \_\_\_\_\_

PROJECT NOS: \_\_\_\_\_

CONTRACT FOR: \_\_\_\_\_

CONTRACT DATE: \_\_\_\_\_

**CONTRACTOR'S APPLICATION FOR PAYMENT**

Application is made for payment, as shown below, in connection with the Contract. Continuation Sheet, AIA Document G703, is attached.

The undersigned Contractor certifies that to the best of the Contractor's knowledge, information and belief the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work for which previous Certificates for Payment were issued and payments received from the Owner, and that current payment shown herein is now due.

- ORIGINAL CONTRACT SUM \$ \_\_\_\_\_
- Net change by Change Orders \$ \_\_\_\_\_
- CONTRACT SUM TO DATE (Line 1 ± 2) \$ \_\_\_\_\_
- TOTAL COMPLETED & STORED TO DATE (Column G on G703) \$ \_\_\_\_\_
- RETAINAGE:
  - % of Completed Work \$ \_\_\_\_\_  
(Column D + E on G703)
  - % of Stored Material \$ \_\_\_\_\_  
(Column F on G703)
 Total Retainage (Lines 5a + 5b or Total in Column I of G703) \$ 0.00
- TOTAL EARNED LESS RETAINAGE \$ 0.00  
(Line 4 Less Line 5 Total)
- LESS PREVIOUS CERTIFICATES FOR PAYMENT (Line 6 from prior Certificate) \$ \_\_\_\_\_
- CURRENT PAYMENT DUE \$ 0.00
- BALANCE TO FINISH, INCLUDING RETAINAGE (Line 3 less Line 6) \$ 0.00

**ENGINEER'S CERTIFICATE FOR PAYMENT**

In accordance with the Contract Documents, based on on-site observations and the data comprising the application, the Engineer certifies to the Owner that to the best of the Engineer's knowledge, information and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

AMOUNT CERTIFIED ..... \$ \_\_\_\_\_

(Attach explanation if amount certified differs from the amount applied. Initial all figures on this Application and on the Continuation Sheet that are changed to conform with the amount certified.) ENGINEER: \_\_\_\_\_

By: \_\_\_\_\_ Date: \_\_\_\_\_

This Certificate is not negotiable. The AMOUNT CERTIFIED is payable only to the Contractor named herein. Issuance, payment and acceptance of payment are without prejudice to any rights of the Owner or Contractor under this Contract.

CHANGE ORDER SUMMARY	ADDITIONS	DEDUCTIONS
Total changes approved in previous months by Owner		
Total approved this Month		
<b>TOTALS</b>	\$0.00	\$0.00
<b>NET CHANGES by Change Order</b>	\$0.00	

# CONTINUATION SHEET

AIA DOCUMENT G703

PAGE OF PAGES

AIA Document G702, APPLICATION AND CERTIFICATION FOR PAYMENT, containing

Contractor's signed certification is attached.

In tabulations below, amounts are stated to the nearest dollar.

Use Column I on Contracts where variable retainage for line items may apply.

APPLICATION NO:

APPLICATION DATE:

PERIOD TO:

ENGINEER'S PROJECT NO:

A ITEM NO.	B DESCRIPTION OF WORK	C SCHEDULED VALUE	D WORK COMPLETED		E THIS PERIOD	F MATERIALS PRESENTLY STORED (NOT IN D OR E)	G TOTAL COMPLETED AND STORED TO DATE (D+E+F)	% (G ÷ C)	H BALANCE TO FINISH (C - G)	I RETAINAGE (IF VARIABLE RATE)
			FROM PREVIOUS APPLICATION (D + E)							
<b>GRAND TOTALS</b>										
		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00		\$0.00	

Users may obtain validation of this document by requesting of the license a completed AIA Document D401 - Certification of Document's Authenticity

**AFFIDAVIT AND COMPLETION CERTIFICATE**

STATE OF TEXAS           §  
  §  
COUNTY OF GREGG       §

THAT I, the undersigned, being duly sworn, say that I was the Contractor for the performance of certain work under AIP Grant No. 3-048-0137-47-2019 entered into the \_\_\_\_\_ day of \_\_\_\_\_, 2019, between the Gregg County, Texas (Owner) and \_\_\_\_\_ (Contractor) for construction of the Southwest GA Area Taxilane – Phase II at the East Texas Regional Airport under the Federal Aviation Administration Airport Improvement Program.

KNOW ALL MEN BY THESE PRESENTS:

1. The undersigned further certifies the improvements on the aforementioned project have been fully and satisfactorily completed in conformity with the contract.
2. The undersigned further certifies that there are no claims of laborers or mechanics for unpaid wages arising out of the performance of said contract and that the wage rates paid by Contractor and all Subcontractors were in conformity with the contract provisions relating to said wage rates.
3. The undersigned further certifies that there are no claims of subcontractors or materials suppliers for unpaid bills for labor or materials and supplies furnished in the course of the contract.

CERTIFIED TRUE AND CORRECT

\_\_\_\_\_  
Contractor

STATE OF TEXAS           §  
  §  
COUNTY OF \_\_\_\_\_ §

Before me, the undersigned, a Notary Public in and for said County and State, on this day personally appeared \_\_\_\_\_, known to me to be the person whose name is subscribed to the foregoing instrument and acknowledged to me that he executed the same for the purposes and consideration therein expressed.

Given under my hand and seal of office this \_\_\_\_\_ day of \_\_\_\_\_, AD., 2019.

\_\_\_\_\_  
Notary Public in and for  
\_\_\_\_\_ County, Texas



**CERTIFICATE OF SUBSTANTIAL COMPLETION**

---

PROJECT: East Texas Regional Airport  
Southwest GA Area Taxilane – Phase II  
AIP Project No. 3-048-0137-47-2019  
Gregg County Bid No. 2019-914

DATE OF ISSUANCE: \_\_\_\_\_

---

OWNER: County of Gregg, Texas  
East Texas Regional Airport

PROJECT NO.: GC-113

CONTRACTOR: \_\_\_\_\_ (Contractor)

ENGINEER: KSA Engineers, Inc.

---

This Certificate of Substantial Completion applies to all work in the Bid Proposal and subsequent field and/or change orders.

TO: Gregg County, Texas

And to: \_\_\_\_\_ (Contractor)

---

The Work to which this Certificate applies has been inspected by authorized representatives of the OWNER, CONTRACTOR, and ENGINEER, and that work is hereby declared to be substantially complete in accordance with the Contract Documents on

\_\_\_\_\_  
DATE OF SUBSTANTIAL COMPLETION

A tentative list of items to be completed or corrected is shown below:

- 1.

This list may not be all-inclusive, and the failure to include an item in it does not alter the responsibility of Contractor to complete all the Work in accordance with the Contract Documents. The items in the list shall be completed or corrected by CONTRACTOR within 90 days from the date of Substantial Completion.

---

This certificate does not constitute an acceptance of the Work not in accordance with the Contract Documents nor is it a release of CONTRACTOR's obligation to complete the Work in accordance with the Contract Documents.

---

Executed by ENGINEER on \_\_\_\_\_, 20\_\_\_\_

KSA Engineers, Inc.

By: \_\_\_\_\_  
Authorized Signature

CONTRACTOR accepts this Certificate of Substantial Completion on \_\_\_\_\_, 20\_\_\_\_

(Contractor)

By: \_\_\_\_\_  
Authorized Signature

OWNER accepts this Certificate of Substantial Completion on \_\_\_\_\_, 20\_\_\_\_

Gregg County, Texas  
East Texas Regional Airport

By: \_\_\_\_\_  
Authorized Signature

## DISADVANTAGED BUSINESS ENTERPRISE PROGRAM

The following bid conditions apply to this Department of Transportation (DOT) assisted contract. Submission of a bid/proposal by a prospective Contractor shall constitute full acceptance of these bid conditions.

- (1) DEFINITION - Disadvantaged Business Enterprise (DBE) as Used in this Contract shall have the same meaning as defined in 26.5 of *Subpart A* to 49 CFR Part 26.
- (2) POLICY - It is the policy of DOT that DBE's as defined in 49 CFR Part 26 shall have the *equal* opportunity to participate in the performance of contracts and subcontracts financed in whole or in part with federal funds. Consequently, the DBE requirements of 49 CFR Part 26 apply to this contract.
- (3) DBE OBLIGATION - The Contractor agrees to ensure that disadvantaged business enterprises as defined in 49 CFR Part 26 have the *equal* opportunity to participate in the performance of contracts and subcontracts financed in whole or in part with federal funds. *In this* regard all Contractors shall take all necessary and reasonable steps in accordance with 49 CFR Part 26 to ensure that DBE's have the maximum opportunity to compete for and perform contracts. Contractors shall not discriminate on the basis of race, color, national origin, or sex in the award and performance of DOT assisted contracts.
- (4) COMPLIANCE - All bidders, potential Contractors, or subcontractors for this DOT assisted contract are hereby notified that failure to carry out the DOT policy and the DBE obligation, as set forth above, shall constitute a breach of contract which may result in termination of the contract or such other remedy as deemed appropriate by the Owner.
- (5) SUBCONTRACT CLAUSE - All bidders and potential Contractors hereby assure that they will include the above clauses in all subcontracts which offer further subcontracting opportunities.
- (6) CONTRACT AWARD - Bidders are hereby advised that meeting DBE subcontract goals or making an acceptable good faith effort to meet such goals are conditions of being awarded this DOT assisted contract.

The Owner proposes to award the contract to the lowest responsive and responsible bidder submitting a reasonable bid provided he has met the goals for DBE participation or, if failing to meet the goals, he has made an acceptable good faith effort to meet the established goals for the DBE participation. Bidder is advised that the Owner reserves the right to reject any or all bids submitted.

- (7) DBE PARTICIPATION GOAL. The attainment of goals established for this contract are to be measured as a percentage of the total dollar value of the contract. The goals established for this contract are as follows:
  - a. **The percent to be performed by DBE's is twelve point one percent (12.1%).**
- (8) AVAILABLE CERTIFIED DBE'S - The Owner has developed a DBE Program and DBE Directory as required by 49 CFR Part 26. For this contract, the Owner will accept as certified, *those* DBE firms which are identified by the Small Business Administration (SBA) as 8 (a) firms and those firms which are currently certified by other Department of Transportation (DOT) agencies (such as the *Texas Bureau* of Aeronautics). Firms which desire certification which do not meet the SBA or other DOT agencies previous certification: criteria are required by the Owner to complete the DOT recommended *application documents in their entirety* before they can be certified for this contract. Copies of the *application documents* may be obtained from Owner. The act of simply filling out the *application documents* does not mean automatic

certification by the Owner. The rules and procedures of 49 CFR Part 26 shall govern the certification process of the Owner.

- (9) CONTRACTOR'S REQUIRED SUBMISSION - The owner requires the submission of the following information with the bid. Certain other DBE information may also be required.

**DISADVANTAGED BUSINESS ENTERPRISE SUBCONTRACTS**

<b>DBE Subcontractors Names/Addresses/Identity*</b>	<b>Subcontract Work Item</b>	<b>Dollar Value of Subcontract Work</b>	<b>General range of DBE Subcontractors' Annual Revenue</b>

**WOMEN SUBCONTRACTS**

<b>DBE Subcontractors Names/Addresses/Identity*</b>	<b>Subcontract Work Item</b>	<b>Dollar Value of Subcontract Work</b>	<b>General range of DBE Subcontractors' Annual Revenue</b>

**OTHER DISADVANTAGED SUBCONTRACTORS**

DBE Subcontractors Names/Addresses/Identity*	Subcontract Work Item	Dollar Value of Subcontract Work	General range of DBE Subcontractors' Annual Revenue

\*(Black, Hispanic, Asian American, American Indian, and other economically disadvantaged)

Total Bid (1) \$ \_\_\_\_\_

Total DBE Value (2) \$ \_\_\_\_\_

Total DBE percent (2)/(1) \_\_\_\_\_ %

If the Contractor fails to meet the DBE subcontract goals established in paragraph 7 above, the following information must be submitted prior to contract award to assist the owner in determining whether or not the contractor made acceptable good faith efforts to meet the contract goal. This information (when applicable), as well as the DBE information, should be submitted as specified in Paragraph 9 above.

Suggested guidance for use in determining if good faith efforts were made by a contractor are included in *Appendix A to 49 CFR Part 26, and Subpart 26.53 a-f revised as of February 2, 1999.*

A list of the efforts that a contractor may make and the owner may use in making a determination as to the acceptability of a contractor's efforts to meet the goal as included in Appendix A are as follows:

- a. Whether the contractor attended any pre-solicitation or pre-bid meetings that were scheduled by the *recipient* to inform DBE's of contracting and subcontracting opportunities;
- b. Whether the contractor advertised in general circulation, trade association, and minority-focus media concerning the subcontracting opportunities;
- c. Whether the contractor provided written notice to a reasonable number of specific DBE's that their interest in the contract was being solicited in sufficient time to allow the DBE's to participate effectively;
- d. Whether the contractor followed up initial solicitations of interest by contracting DBE's to determine with certainty whether the DBE's were interested;

- e. Whether the contractor selected portions of work to be performed by DBE's in order to increase the likelihood of meeting the DBE goal (including, where appropriate, breaking down contracts into economically feasible units to facilitate DBE participation);
- f. Whether the contractor provided interested DBE's with adequate information about the plans specifications, and requirements of the contract;
- g. Whether the contractor negotiated in good faith with interested DBE's, not rejecting DBE's as unqualified without sound reasons based on a thorough investigation-of their capabilities;
- h. Whether the contractor made efforts to assist interested DBE's in obtaining bonding, lines of credit, or insurance required by the recipient or contractor; and
- i. Whether the contractor effectively used the services of available minority community organizations; minority contractors' groups; local and state Federal Minority Business Assistance Offices; and other organizations that provide assistance in the recruitment and placement of DBE's.

NOTE: The nine items set forth above are merely suggested criteria and the owner may specify that you submit information on certain other actions a contractor took to secure DBE participation in an effort to meet the goals. A contractor may also submit to the owner other information on efforts to meet the goals.

- (10) CONTRACTOR ASSURANCE. The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR pat 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.
- (11) PROMPT PAYMENT. The prime contractor agrees to pay each subcontractor under this prime contract for satisfactory performance of this contract no later than \_\_\_\_\_ days from the receipt of each payment the prime contractor received from Gregg County. The prime contractor agrees further to return retainage payments to each subcontractor within \_\_\_\_\_ days after the subcontractor's work is satisfactorily completed. Any delay of postponement of payment from the above referenced time frame may occur only for good cause following written approval of the Gregg County. This clause applies to both DBE and non-DBE subcontractors.

The Bidder shall establish and maintain records and submit regular reports, as required, which will identify and assess progress in achieving DBE subcontract goals and other DBE affirmative action efforts.

Name of Bidder: \_\_\_\_\_

IRS Number: \_\_\_\_\_

By: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

**MANDATORY FEDERAL  
CONTRACT PROVISIONS**

## **INSTRUCTIONS REGARDING CONTRACTOR'S INSURANCE**

The following provision or a similar provision shall be included in the Special Provisions and in the Instructions to Bidders for all proposed AIP project bidding documents:

Contractor's Liability Insurance Requirements: The bidder shall provide with the Proposal a listing of both automobile and personal liability insurance coverage currently in force, along with a copy of a Certificate of Insurance as verification of that coverage. In addition, the bidder shall provide a statement of premium cost issued by the agent or insurance carrier for that coverage.

In the event the Owner determines that the low bidder's coverage in force is inadequate, the Owner may require the low bidder to procure additional coverage in amounts specified by the Owner. The cost of premiums for such additional coverage shall be paid by Owner in the form of a reimbursement under the contract.

In the event the low bidder is unable, after diligent effort, to procure such additional coverage as may be required by the Owner, the Owner shall provide such additional coverage, naming the contractor as insured or, at the option of the Owner, reduce the amount of additional coverage required or waive any requirement for additional coverage.

Third Party Coverage: In the event the bidding documents require the contractor to name the consultant and/or the Owner as additional insured, the bidder shall show the premium cost for the additional insured in the Proposal in the item for additional coverage. The amount shown in the bid item for additional premium cost shall be that amount of additional premium above the premium for the coverage shown in the Certificate of Insurance submitted with the bid. In the event additional coverage is required by the Owner, the additional premium cost for third party coverage above the amounts shown in the Certificate of Insurance shall be paid by the Owner in the form of a reimbursement under the contract.



## SPECIAL INSTRUCTION TO BIDDERS REGARDING EEO

### **Notice of Requirement for Affirmative Action to Ensure Equal Employment Opportunity (Executive Order 11246, as amended)**

1. The Offerors or Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth herein.
2. The goals and timetables for minority and female participation, expressed in percentage terms for the contractor's aggregate work force in each trade on all construction work in the covered area, are as follows:

Goals for minority  
participation in  
each trade

12.1%

(Insert Percentage Requirement)

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

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

3. The contractor shall provide written notifications to the Director, OFCCP, within 10 working days of award of any construction subcontract in excess of \$10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address, and telephone number of the subcontractor; employee identification number; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the contract is to be performed.
4. As used in this notice and in the contract resulting from this solicitation, the "covered area" is (insert description of the geographical areas where the contract is to be performed giving the state, county, and city, if any).

**Certification Regarding Debarment, Suspension,  
Ineligibility and Voluntary Exclusion  
(49 CFR PART 29)**

The bidder (offeror) certifies, by submission of this proposal or acceptance of this contract, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency. It further agrees that by submitting this proposal that it will include this clause without modification in all lower tier transactions, solicitations, proposals, contracts, and subcontracts. Where the bidder/offeror/contractor or any lower tier participant is unable to certify to this statement, it shall attach an explanation to this solicitation/proposal.

**Certification Regarding Foreign Trade Restrictions  
(49 CFR PART 30)**

The contractor or subcontractor, by submission of an offer and/or execution of a contract, certifies that it:

- a. is not owned or controlled by one or more citizens or nationals of a foreign country included in the list of countries that discriminate against U.S. firms published by the Office of the United States Trade representative (USTR);
- b. has not knowingly entered into any contract or subcontract for this project with a contractor that is a citizen or national of a foreign country on said list, or is owned or controlled directly or indirectly by one or more citizens or nationals of a foreign country on said list.
- c. has not procured any product nor subcontracted for the supply of any product for use on the project that is produced in a foreign country on said list.

Unless the restrictions of this clause are waived by the Secretary of Transportation in accordance with 49 CFR 30.17, no contract shall be awarded to a contractor or subcontractor who is unable to certify to the above. If the contractor knowingly procures or subcontracts for the supply of any product or service of a foreign country on said list for use on the project, the Federal Aviation Administration may direct, through the sponsor, cancellation of the contract at no cost to the Government.

Further, the contractor agrees that, if awarded a contract resulting from this solicitation, it will incorporate this provision for certification without modification in each contract and in all lower tier subcontracts. The contractor may rely upon the certification of a prospective subcontractor unless it has knowledge that the certification is erroneous. The contractor shall provide immediate written notice to the sponsor if the contractor learns that its certification or that of a subcontractor was erroneous when submitted or has become erroneous by reason of changed circumstances. The subcontractor agrees to provide immediate written notice to the contractor, if at any time it learns that its certification was erroneous by reason of changed circumstances.

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

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

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

**Buy American Certification  
(Aviation Safety and Capacity Expansion Act of 1990)**

By submitting a bid/proposal under this solicitation, except for those items listed by the offeror below or on a separate and clearly identified attachment to this bid/proposal, the offeror certifies that steel and each manufactured product, is produced in the United States (as defined in the clause 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.

Offerors may obtain from Gregg County, Texas (insert sponsor representative) lists of articles, materials, and supplies excepted from this provision.

PRODUCT	COUNTRY OF ORIGIN
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

**CERTIFICATION OF BIDDER REGARDING  
EQUAL EMPLOYMENT OPPORTUNITY**

GENERAL

BIDDER'S NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

INTERNAL REVENUE SERVICE EMPLOYER IDENTIFICATION NO. \_\_\_\_\_

**NONSEGREGATED FACILITIES**

**NOTICE TO PROSPECTIVE FEDERALLY ASSISTED  
CONSTRUCTION CONTRACTORS  
(41 CFR 60-1.8)**

- (1) A Certification of Nonsegregated Facilities must be submitted prior to the award of a federally assisted construction contract exceeding \$10,000 which is not exempt from the provisions of the equal opportunity clause.
- (2) Contractors receiving federally assisted construction contract awards exceeding \$10,000 which are not exempt from the provisions of the equal opportunity clause will be required to provide for the forwarding of the following notice to prospective subcontractors for supplies and construction contracts where the subcontracts exceed \$10,000 and are not exempt from the provisions of the equal opportunity clause.

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

**NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENTS FOR  
CERTIFICATION OF NONSEGREGATED FACILITIES**

- (1) A Certification of Nonsegregated Facilities must be submitted prior to the award of a subcontract exceeding \$10,000 which is not exempt from the provisions of the equal opportunity clause.
- (2) Contractors receiving subcontract awards exceeding \$10,000 which are not exempt from the provisions of the equal opportunity clause will be required to provide for the forwarding of this notice to prospective subcontractors for supplies and construction contracts where the subcontracts exceed \$10,000 and are not exempt from the provisions of the equal opportunity clause.

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

## CERTIFICATION OF NONSEGREGATED FACILITIES

The federally assisted construction contractor certifies that he does not maintain or provide for his employees any segregated facilities at any of his establishments, and that he does not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. The federally assisted construction certifies further that he will not maintain or provide for his employees any 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 this contract. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms and washrooms, restaurants and other eating areas, timeclocks, 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 by explicit directive or are in fact segregated on the basis of race, color, religion, sex, or national origin, because of habit, local custom, or any other reason. The federally assisted construction 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.

### NOTICE TO PROSPECTIVE CONTRACTORS OF REQUIREMENT FOR CERTIFICATION OF NONSEGREGATED FACILITIES

A Certificate of Nonsegregated Facilities must be submitted prior to the award of a contract or subcontract exceeding \$10,000 which is not exempt from the provisions of the Equal Opportunity Clause.

Certification - The information above is true and complete to the best of my knowledge and belief.

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Name and title of Signer (Please Type)

---

Signature

---

Date

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

# **WAGE, LABOR, EEO, SAFETY AND GENERAL REQUIREMENTS**

## **SECTION A**

(Federal Aviation Administration (FAA) Requirements)

### A-1 Airport and Airway Improvement Program Project

The work in each Department of Transportation, Aviation Division contract which is being undertaken and accomplished by East Texas Regional Airport (Sponsor) in accordance with the terms and condition of a grant agreement between the Sponsor and the United States, under the Airport and Airway Improvement Act of 1982 (P.L. 97-248) as amended by the Airport and Airway Safety and Capacity Expansion Act of 1987 (P.L. 100-223) and Part 152 of the Federal Aviation Regulations (14 CFR Part 152), pursuant to which the United States has agreed to pay a certain percentage of the costs under those Acts. The United States is not a party to this contract and no reference in this contract to the FAA or any representative thereof, or the United States, by the Contract, makes the United States a party to this contract.

### A-2 Consent to Assignment

The contractor shall obtain the prior written consent of the Sponsor to any proposed assignment of any interest in or part of this contract.

### A-3 Convict labor.

No convict labor may be employed under this contract.

### A-4 Veterans Preference.

In the employment of labor (except in executive, administrative, and supervisory positions), preference shall be given to veterans of the Vietnam era and disabled veterans as defined in Section 515(c)(1) and (2) of the Act. However, this preference shall apply only where the individuals are available and qualified to perform the work to which the employment relates.

### A-5 Withholding Sponsor from Contractor

Whether or not payments or advance to East Texas Regional Airport (Sponsor) are withheld or suspended by the FAA, the Sponsor may withhold or cause to be withheld from the contractor so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics employed by the contractor or any subcontractor on the work, the full amount of wages required by this contract.

### A-6 Nonpayment of Wages.

If the contractor or subcontractor fails to pay any laborer or mechanic employed or working on the site of the work any of the wages required by this contract, the Sponsor may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment or advance of funds until the violations cease.

### A-7 FAA Inspection and Review

The contractor shall allow any authorized representative or the FAA to inspect and review any work or materials used in the performance of this contract.

A-8 Subcontracts

The contractor shall insert in each of his subcontracts the provisions contained in paragraphs A-1, A-3, A-4, A-5, A-6, and A-7 requiring the subcontractors to include these provisions in any lower tier subcontracts which they may enter into, together with a clause requiring this insertion in any further subcontracts that may in turn be made.

A-9 Contract termination.

Any violation or breach of the terms of this contract on the part of the contractor or subcontractor may result in the suspension or termination of this contract or such other action which may be necessary to enforce the rights of the parties of this agreement. (49 CFR Part 18).

A-10 Inspection of Records

The contractor shall maintain an acceptable cost accounting system. The Sponsor, the FAA, and the Comptroller General of the United States shall have access to any books, documents, paper, and records or the contractor which are directly pertinent to the specific contract for the purposes of making an audit, examination, excerpts, and transcriptions. The contractor shall maintain all required records for three years after the Sponsor makes final payment and all other pending matters are closed. (49 CFR Part 18).

A-11 Rights to Inventions.

All rights to inventions and materials generated under this contract are subject to regulations issued by the FAA and the Sponsor of the Federal grant under which this contract is executed. Information regarding these rights is available from the FAA and the Sponsor. (49 CFR Part 18).

A-12 General Civil Rights Provisions.

The contractor assures that it will comply with pertinent statutes, Executive orders and such rules as are promulgated to assure that no person shall, on the grounds of race, creed, color, national origin, sex, age, or handicap be excluded from participating in any activity conducted with or benefiting from Federal assistance. This provision binds the contractor from the bid solicitation period through the completion of the contract. (Section 520, Airport and Airway Improvement Act of 1982).

## SECTION B

(Federal Aviation Administration (FAA) Requirements)

### DAVIS BACON ACT REQUIREMENTS (29 CFR PART 5)

#### **B-1 Minimum Wages**

(a) All laborers and mechanics employed or working upon the site of the work will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by the Secretary of Labor under the Copeland Act (29 CFR Part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalent thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractor relationship which may be alleged to exist between the contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under section I (b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to laborers or mechanics, subject to the provisions of paragraph (B-1)(d) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR Part 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under (B-1) (b) of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can easily be seen by the workers.

(b) (1) The contracting officer shall require that any class of laborers or mechanics which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met;

- (i) The work to be performed by the classification requested is not performed by a classification in the wage determinations; and
- (ii) The classification is utilized in the area by the construction industry, and
- (iii) The proposed was rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment, Employment Standards Administration, U.S. Department of labor, Washington, D.C. 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB Control Number 1215-0140).

(3) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives and the control officer do not agree on the proposed classification and wage rate



(including the amount designated for fringe benefits where appropriate), the contracting officer shall refer the questions, including the views of all interested and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB Control Number 1215-0140).

(4) The wage rate (including fringe benefits where appropriate) determined pursuant to subparagraphs (B-1) (b) (2) or (3) of this paragraph, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(c) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona ride fringe benefit or an hourly cash equivalent thereof.

(d) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program. (Approved by the Office of Management and Budget under OMB Control Number 1215-0140).

## **B-2 Withholding**

The Federal Aviation Administration or the Sponsor shall upon Its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other Federal-assisted contract subject to David-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, " helper, employed or working on the site of work, all or part of the wages required by the contract, the Federal Aviation Administration may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

## **B-3 Payrolls and basic records**

(a) Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona ride fringe benefits or cash equivalents thereof of the types described in l(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section l(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual costs incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of programs, the registration of the

apprentices and trainees, and the ratios and was rates prescribed in the applicable programs. (29 CFR 5.5(a)(3)(1) (Approved by the Office and Budget under OMB Control Number 215-0149).

(b) (1) The contractor shall submit weekly, for each week in which any contract work is performed, a copy of all payrolls to the applicant, sponsor, or owner, as the case may be, for transmission to the Federal Aviation Administration. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under paragraph 5.5(a)(3)(i) above. This information may be submitted in any form desired. Optional Form WH-347 is available for this purpose and may be purchased from the Superintendent of Documents (Federal Stock Number 029-005-00014-1), U.S. Government Printing Office, Washington, D.C. 20402. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. (Approved by the Office of Management and Budget under OMB Control Number 1215-0149).

(2) Each payroll submitted shall be accompanied by a 'Statement of Compliance,' signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following.

(i) That the payroll for the payroll period contains the information required to be maintained under paragraph B-3 (a) above and that such information is correct and complete;

(ii) That each laborer and mechanic (including each helper, apprentice and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations 29 CFR Part 3;

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract

(3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph B-3 (b)(2) of this section.

(4) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 231 of Title 31 of the United States Code.

(c) The contractor or subcontractor shall make the records required under paragraph B-3 (a) of this section available for inspection, copying or transcription by authorized representatives of the Sponsor, the Federal Aviation Administration or the Department of labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the Federal agency may, after written notice to the contractor, sponsor, applicant or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

#### **B-4 Apprentices and Trainees.**

(a) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State Apprenticeship Agency recognized by the Bureau, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an Apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice rate, who is not registered or otherwise employed as stated above, shall be paid not less than the apprentice wage rate, on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Bureau of Apprenticeship and Training, or a State Apprenticeship Agency recognized by the Bureau, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(b) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employment listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(c) Equal Employment Opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.

#### **B-5 Compliance With Copeland Act Requirements**

The contractor shall comply with the requirements of 29 CFR Part 3, which are incorporated by reference in this contract.

#### **B-6 Subcontracts**

The contractor or subcontractor shall insert in any subcontracts the clauses contained in 29 CFR Part 5.5(a)(1) through (10) and such other clauses as the Federal Aviation Administration may by appropriate instructions require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR Part 5.5.

#### **B-7 Compliance With Davis-Bacon and Related Act Requirements**

All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by reference in this contract.

#### **B-8 Disputes Concerning Labor Standards**

Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR Parts 5, 6 and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

#### **B-9 Certification of Eligibility**

- (a) By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).
- (b) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).
- (c) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

#### **B-10 Contract Termination: Debarment**

A breach of the contract clauses in paragraph B-1 through B-9 of this section and paragraphs C-1 through C-5 of Section C may be grounds for termination of the contract, and for the debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

## SECTION C

(Federal Aviation Administration (FAA) Requirements)

### CONTRACT WORKHOURS AND SAFETY STANDARDS ACT REQUIREMENTS (29 CFR PART 5)

#### **C-1 Overtime Requirements**

No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic, including watchmen and guards, in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

#### **C-2 Violation; Liability for Unpaid Wages; Liquidated Damages**

In the event of any violation of the clause set forth in paragraph C-1 above, the contractor or any subcontractor responsible therefore shall be liable for the unpaid wages. In addition, such contract and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph C-1 above, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph C-1 above.

#### **C-3 Withholding for Unpaid Wages and Liquidated Damages**

The Federal Aviation Administration or the Sponsor shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any monies payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph C-2 above.

#### **C-4 Subcontractors.**

The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraphs C-1 through C-4 and also a clause requiring the subcontractor to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs C-1 through C-4.

#### **C-5 Working Conditions.**

No contractor or subcontractor may require any labor or mechanic employed in the performance of any contract to work in surroundings or under working conditions that are unsanitary, hazardous or dangerous to his health or safety as determined under construction safety and health standards (29 CFR Part 1926) issued by the Department of Labor.

## SECTION D

(Federal Aviation Administration (FAA) Requirements)

### EQUAL EMPLOYMENT OPPORTUNITY (41 CFR PART 60-1.4(b))

During the performance of this contract, the contractor agrees as follows:

- D-1 The contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to the following:
- Employment, upgrading, demotion, or transfer, recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.
- D-2 The contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive considerations for employment without regard to race, color, religion, sex, or national origin.
- D-3 The contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representatives of the contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
- D-4 The contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, as amended, and of the rules, regulations, and relevant orders of the Secretary of Labor.
- D-5 The contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the administering agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.
- D-6 In the event of the contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated or suspended in whole or in part and the contractor may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with procedure authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.
- D-7 The contractor will include the portion of the sentence immediately preceding paragraph D-1 and the provisions of paragraphs D-1 through D-7 in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The contractor will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provision, including sanctions for noncompliance:

Provided, however, that in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency the contractor may request the United States to enter into such litigation to protect the interests of the United States.

## **SECTION E**

(Federal Aviation Administration (FAA) Requirements)

### **CLEAN AIR AND WATER POLLUTION CONTROL REQUIREMENTS**

- E-1 Any other provision herein to the contrary notwithstanding, the contractor in carrying out work under this contract, shall at all times comply with all applicable state and federal air and water quality standards; with all pollution control laws; and with such rules, regulations, and directives as may be lawfully issued by a local, state, or federal agency having within its jurisdiction the protection of the environment in the area surrounding where work under this contractor will be performed. In addition, the contractor shall comply with directives given by the Project Engineer in implementation of the letter and intent of FAA Advisory Circular 150/5370-10, Item P-156, Temporary Air and Water Pollution, Soil Erosion and Siltation Control. Copies of this Advisory Circular can be obtained from Department of Transportation, Distribution Unit, TAD-4843, Washington, D.C. 20590.
- E-2 Contractors and subcontractors agree:
- a. That any facility to be used in the performance of the contract or subcontractor or to benefit from the contract is not listed on the Environmental Protection Agency (EPA) List of Violating Facilities;
  - b. To comply with all the requirements of Section 114 of the Clean Air Act, as amended, 42 U.S.C. 1857 et seq. and Section 308 of the Federal Water Pollution Control Act, as amended, 33 U.S.C. 1251 et seq. relating to inspection, monitoring, entry, reports, and information, as well as all other requirements specified in Section 114 and Section 308 of the Acts, respectively, and all other regulations and guidelines issued thereunder;
  - c. That, as a condition for the award of this contract, the contractor or subcontractor will notify the awarding official of the receipt of any communication from the EPA indicating that a facility to be used for the performance of or benefit from the contract is under consideration to be listed on the EPA List of Violating Facilities;
  - d. To include or cause to be included in any construction contract or subcontract which exceeds \$100,000 the aforementioned criteria and requirements.



## SECTION F

(Federal Aviation Administration (FAA) Requirements)

### **STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY CONSTRUCTION CONTRACT SPECIFICATIONS (41 C.F.R. 60-43)**

1. As used in these specifications:
  - a. "Covered area" means the geographical area described in the "solicitation from which this contract resulted;
  - b. "Director" means Director, Office of Federal Contract Compliance (OFCCP), U.S. Department of Labor, or any person to whom the Director delegates authority;
  - c. "Employer identification number" means the Federal social security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941;
  - d. "Minority" includes:
    - (1) Black (all) persons having origins in any of the Black African racial groups not of Hispanic origin;
    - (2) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin regardless of race);
    - (3) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and
    - (4) American Indian or Alaskan native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).
2. Whenever the contractor, or any subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of \$10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.
3. If the contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the US. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors shall be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each contractor or subcontractor participating in an approved plan is individually required to comply with its obligations under the EEO clause and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other contractors or subcontractors toward a goal in an approved Plan does not excuse any covered contractor's subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.
4. The contractor shall implement the specific affirmative action standards provided in paragraphs 7a through 7p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. Covered construction contractors performing construction work in a geographical area where they do not have a Federal or federally assisted construction contract shall apply the minority and female goals established for the geographical

area where the work is being performed. Goals are published periodically in the Federal Register in notice form, and such notices may be obtained from any Office of Federal Contract Compliance Programs office or from Federal procurement contracting officers. The contractor is expected to make substantially uniform progress in meeting its goals in each craft during the period specified.

5. Neither the provisions of any collective bargaining agreement nor the failure by a union with whom the contractor has a collective bargaining agreement to refer either minorities or women shall excuse the contractor's obligations under these specifications, Executive Order 11246 or the regulations promulgated pursuant thereto.

6. In order for the nonworking training hours of apprentices and to be counted in meeting the goals, such apprentices and trainees shall be employed by the contractor during the training period and the contractor shall have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees shall be trained pursuant to training programs approved by the U.S. Department of Labor.

7. The contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The contractor shall document these efforts fully and shall implement affirmative action steps at least as extensive as the following.

a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the contractor's employees are assigned to work. The contractor, where possible, will assign two or more women to each construction project. The contractor shall specifically ensure that all foremen, superintendents, and other onsite supervisory personnel are aware of and carry out the contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.

b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.

c. Maintain a current file of the names, addresses, and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source, or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the contractor by the union or, if referred, not employed by the contractor, this shall be documented in the file with the reason therefore along with whatever additional actions the contractor may have taken.

d. Provide immediate written notification to the Director when the union or unions with which the contractor has a collective bargaining agreement has not referred to the contractor a minority person or female sent by the contractor, or when the contractor has other information that the union referral process has impeded the contractor's efforts to meet its obligations.

e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the contractor's employment needs, especially those programs funded or approved by the Department of Labor. The contractor shall provide notice of these programs to the sources compiled under 7b above.

f. Disseminate the contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc. by specific review of the policy with all management personnel and with all

minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location when construction work is performed.

g. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination, or other employment decisions including specific of these Items with onsite supervisory personnel such as superintendents, general foremen, etc, prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

h. Disseminate the contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the contractor's EEO policy with other contractors and subcontractors with whom the contractor does or anticipates doing business.

i. Direct its recruitment efforts, both oral and written, to minority, female, and community organizations, to schools with minority and female students; and to minority and female recruitment and training organizations serving the contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the contractor shall send written notification to organizations, such as the above, describing the openings, screening procedures, and tests to be used in the selection process.

j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable provide after school, summer, and vacation employment to minority and female youth both on the site and in other areas of a contractor's workforce.

k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.

l. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel, for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.

m. Ensure that seniority practices, job classifications, work assignments, and other personnel practices do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the contractor's obligations under these specifications are being carried out.

n. Ensure that all facilities and company activities are nonsegregated except that separate or single user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.

o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.

p. Conduct a review, at least annually, of all supervisor's adherence to and performance under the contractor's EEO policies and affirmative action obligations.

8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (7a through p). The efforts of a contractor association, joint contractor union, contractor community, or other similar groups of which the contractor is a member and participant, may be asserted as fulfilling anyone or more of its obligations under 7a through p of these specifications provided that the contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected

in the contractor's minority and female workforce participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the contractor. The obligation to comply, however, is the contractor's and failure of such a group to fulfill an obligation shall not be a defense for the contractor's noncompliance.

9. A single goal for minorities and a separate single goal for women have been established. The contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and nonminority. Consequently, if the particular group is employed in a substantially disparate manner (for example, even though the contractor has achieved its goals for women generally,) the contractor may be in violation of the Executive Order if a specific minority group of women is underutilized.

10. The contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.

11. The contractor shall not enter into any subcontract with any person or firm debarred from Government contract pursuant to Executive Order 11246.

12. The contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination, and cancellation of existing subcontract as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs. Any contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.

13. The contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.

14. The contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government, and to keep records. Records shall at least include for each employee, the name, address, telephone number, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.

15. Nothing herein provided shall be construct as a limitation upon the application of other laws which establish different standards of compliance or upon the applications of requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

## **SECTION G**

(Federal Aviation Administration (FAA) Requirement)

### **CONTRACTUAL REQUIREMENTS TO PURSUANT TO CIVIL RIGHTS ACT OF 1964, TITLE VI (49 CFR PART 21)**

During the performance of this contract, the contractor, for itself, its assignees and successors in interest (hereinafter referred to as the "contractor") agrees as follows:

1. **Compliance with Regulations.** The contractor shall comply with the Regulations relative to nondiscrimination in federally assisted programs of the Department of Transportation (hereinafter, "DOT") Title 49, Code of Federal Regulations, Part 21, as they may be amended from time to time (hereinafter referred to as the Regulations), which are herein incorporated by reference and made a part of this contract.
2. **Nondiscrimination.** The contractor, with regard to the work performed by it during the contract, shall not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor shall not participate either directly or in indirectly in the discrimination prohibited by section 21.5 of the Regulations, including employment practices when the contract covers a program set forth in Appendix B of the Regulations.
3. **Solicitations for Subcontracts, Including Procurements of Materials and Equipment.** In all solicitations either by competitive bidding or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials or leases of equipment, each potential subcontractor or supplier shall be notified by the contractor of the contractor's obligations under this contract and the Regulations relative to nondiscrimination on the grounds of race, color, or national origin.
4. **Information and Reports.** The contractor shall provide all information and reports required by the Regulations or directives issued pursuant thereto and shall permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Sponsor or the Federal Aviation Administration (FAA) to be pertinent to ascertain compliance with such Regulations, orders, and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish this information, the contractor shall so certify to the sponsor or the FAA, as appropriate, and shall set forth what efforts it has made to obtain the information.
5. **Sanctions for Noncompliance.** In the event of the contractor's noncompliance with the nondiscrimination provisions of this contract, the sponsor shall impose such contract sanctions as it or the FAA may determine to be appropriate, including, but not limited to:
  - a. Withholding of payments to the contractor under the contract until the contractor complies, and/or
  - b. Cancellation, termination, or suspension of the contact in whole or in part.
6. **Incorporation of Provisions.** The contractor shall include the provisions of paragraphs 1 through 5 in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Regulations or directives issued pursuant thereto. The contractor shall take such action with respect to any subcontract or procurement as the sponsor or the FAA may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, however, that in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or supplier as a result of such direction,

the contractor may request the Sponsor to enter into such litigation to protect the interest of the sponsor and, in addition, the contractor may request the United States to enter into such litigation to protect the interest of the United States.

## **SECTION H**

(Federal Aviation Administration (FAA) Requirements)

### **TERMINATION OF CONTRACT (49 CFR PART 18)**

1. The Sponsor may, by written notice, terminate this contract in whole or in part at any time, either for the Sponsor's convenience or because of failure to fulfill the contract obligations. Upon receipt of such notice services shall be immediately discontinued (unless the notice directs otherwise) and all materials as may have been accumulated in performing this contract, whether completed or in progress, delivered to the Sponsor.
2. If the termination is for the convenience of the Sponsor, an equitable adjustment in the contract price shall be made, but no amount shall be allowed for anticipated profit on unperformed services.
3. If the termination is due to failure to fulfill the contractor's obligations, the Sponsor may take over the work and prosecute the same to completion by contract or otherwise. In such case, the contractor shall be liable to the Sponsor for any additional cost occasioned to the Sponsor thereby.
4. If, after notice of termination for failure to fulfill contract obligations, it is determined that the contractor had not so failed, the termination shall be deemed to have been effected for the convenience of the Sponsor. In such event, adjustment in the contract price shall be made as provided in paragraph 2 of this clause.
5. The rights and remedies of the sponsor provided in this clause are in addition to any other rights and remedies provided by law or under this contract.

## **SECTION I**

(Federal Aviation Administration (FAA) Requirements)

### **BUY AMERICAN - STEEL AND MANUFACTURED PRODUCTS FOR CONSTRUCTION CONTRACTS (Aviation Safety and Capacity Expansion Act of 1990)**

- (a) The Contractor agrees that only domestic steel and manufactured products will be used by the Contractor, subcontractors, materialmen, and suppliers in the performance of this contract, as defined in (b) below.
- (b) The following terms apply to this clause:
1. Steel and manufactured products. As used in this clause, steel and manufactured products include (1) those 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.
  2. Components. As used in this clause, components means those articles, materials, and supplies incorporated directly into steel and manufactured products.
  3. Cost of Components. This means the cost for production of the components, exclusive of final assembly labor costs.



## **DISADVANTAGED BUSINESS ENTERPRISE IN FEDERAL FUNDED CONSTRUCTION - Aviation**

The purpose of this Special Provision is to carry out the U. S. Department of Transportation's (DOT) policy of ensuring nondiscrimination in the award and administration of DOT assisted contracts and creating a level playing field on which firms owned and controlled by minority or socially and economically disadvantaged individuals can compete fairly for DOT assisted contracts. If the Disadvantaged Business Enterprise (DBE) goal is greater than zero, Article A, "Disadvantaged Business Enterprise in Federal-Aid Construction," of this special provision shall apply to this contract. If there is no DBE goal, Article B "Race Neutral DBE Participation," of this Special Provision shall apply to this contract.

### ARTICLE A: Disadvantaged Business Enterprise in Federal-Aid Construction

#### 1. POLICY.

It is the policy of the DOT and **Gregg County, Texas** (henceforth the "Sponsor") that DBEs, as defined in 49 CFR Part 26, Subpart A and the Sponsor's DBE Program, shall have the opportunity to participate in the performance of contracts financed in whole or in part with Federal funds. Consequently, the DBE requirements of 49 CFR Part 26, and the Sponsor's DBE Program, apply to this contract as follows.

- A. The Contractor will offer DBEs, as defined in 49 CFR Part 26, Subpart A and the Sponsor's DBE Program, the opportunity to compete fairly for contracts and subcontracts financed in whole or in part with Federal funds. In this regard, the Contractor shall make a good faith effort to meet the DBE goal for this contract.
- B. The Contractor and any subcontractors 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.
- C. The requirements of this Provision shall be physically included in any subcontract.
- D. After a conditional award is made to the low bidder, the Sponsor will determine the adequacy of a Contractor's efforts to meet the contract goal, within 10 working days from receipt of information required under Section 4, "Contractor's Responsibilities." If the requirements of Section 4 are met, the conditional situation will be removed and the contract will be forwarded to the Contractor for execution.

The Contractor's performance, during the construction period of the contract, in meeting his approved goal will be monitored by the Sponsor.

#### 2. DEFINITIONS.

- A. "Sponsor" means **Gregg County, Texas**.
- B. "Federal-Aid Contract" is any contract between Sponsor and a Contractor which is paid for in whole or in part with DOT financial assistance.
- C. "DBE Joint Venture" means an association of a DBE firm and one (1) or more other firm(s) to carry out a single business enterprise for profit for which purpose they combine their property, capital, efforts, skills and knowledge, and in which the DBE is responsible for a distinct clearly defined portion of the work of the contract and whose share in the capital contribution,

control, management, risks and profits of the joint venture are commensurate with its ownership interest.

D. "Disadvantaged Business Enterprise" or "DBE" means a firm certified as such by the Department in accordance with 49 CFR Part 26.

E. "Good Faith Effort" means efforts to achieve a DBE goal or other requirement of this special provision which, by their scope, intensity, and appropriateness to the objective, can reasonably be expected to fulfill the program requirements.

F. "Manufacturing Material Supplier" is a firm that operates or maintains a factory or establishment that produces or significantly alters on the premises the materials, supplies, articles or equipment required under the contract and of the general character described by the specifications. Brokers, packagers, manufacturers' representatives or persons who arrange or expedite transactions shall not be regarded as manufacturers.

G. "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 regular dealer, the firm must be an established regular business that engages in, as its principal business and in its own name, the purchase and sale of the products in question.

A regular dealer in such bulk items as steel, cement, gravel, stone, and petroleum products need not keep such products in stock if it owns or operates distribution equipment for the product. Brokers, packagers, manufacturers' representatives or other persons who arrange or expedite transactions shall not be regarded as regular dealers. Any supplementing of a regular dealers own distribution equipment shall be by a long-term lease agreement and not on an adhoc or contract-by-contract basis.

H. "Broker" is an intermediary or middleman that does not take possession of a commodity or act as a regular dealer selling to the public.

I. "Race-neutral DBE Participation" means any participation by a DBE through customary competition procurement procedures.

3. PERCENTAGE GOAL. The percentage goal for DBE participation in the work to be performed under this contract is (12.1)% of the contract amount.

4. CONTRACTOR'S RESPONSIBILITIES. These requirements must be satisfied by the Contractor.

A. After conditional award of the contract, the Contractor shall furnish the following information so as to arrive in the Sponsor's office not later than 5:00 p.m. on the fourteenth (14th) day after the conditional award of the contract. When requested, additional time, not to exceed 15 days, may be granted based on documentation submitted by the Contractor.

(1) The names and addresses of the DBE subcontractors he intends to use to satisfy the DBE goal,

(2) An agreement for each proposed DBE containing:

→ The items of work to be performed

- The quantities of work or materials
- The unit of measure
- The unit price
- The total amount for each item
- The total amount of the DBE commitment signed by an officer of the contracting firm and the proposed DBE agreeing that if the contract is signed by the Contractor, the proposed DBE will be given the opportunity to do the respective subcontract work.
- Material Suppliers listed on Contractor commitments must give an explanation of the function they will perform on each project. Details of any arrangements made with other material suppliers, manufacturers, distributors, hauling firms, freight companies, etc. must be submitted to the Sponsor with the commitment.

B. DBE Prime Contractors may receive credit toward the DBE goal for work performed by his/her own forces and work subcontracted to DBEs. A DBE prime must make a good faith effort to meet the goals. In the event a DBE prime subcontracts to a non-DBE, that information must be reported to the Sponsor.

C. A Contractor who cannot meet the contract goal, in whole or in part, shall document the good faith efforts taken to obtain DBE participation. The following is a list of the types of actions that may be considered as good faith efforts. It is not intended to be a mandatory checklist nor is it intended to be exclusive or exhaustive. Other factors or types of efforts may be relevant in appropriate cases.

- (1) Soliciting through all reasonable and available means the interest of all certified DBEs who have the capability to perform the work of the contract. The solicitation must be done within sufficient time to allow the DBEs to respond to it. Appropriate steps must be taken to follow up initial solicitations to determine, with certainty, if the DBEs are interested.
- (2) Selecting portions of the work to be performed by DBEs in order to increase the likelihood that the DBE goals will be achieved. This includes, where appropriate, breaking out contract work items into economically feasible units to facilitate DBE participation, even when the Contractor might otherwise prefer to perform the work items with its own forces.
- (3) Providing interested DBEs with adequate information about the plans, specifications, and requirements of the contract in a timely manner to assist them in responding to a solicitation.
- (4) Negotiating in good faith with interested DBEs by making a portion of the work available to DBE subcontractors and suppliers and selecting those portions of the work or material needs consistent with the available DBE subcontractors and suppliers.
- (5) The ability or desire of the Contractor to perform the work of a contract with its own organization does not relieve the Contractor's responsibility to make a good faith effort. Additional costs involved in finding and using DBEs is not in itself sufficient reason for a Contractor's failure to meet the contract DBE goal, as long as such costs are reasonable.

Contractors are not, however, required to accept higher quotes from DBEs if the price difference is excessive or unreasonable.

- (6) Not rejecting DBEs as being unqualified without sound reasons based on a thorough investigation of their capabilities.
- (7) Making efforts to assist interested DBEs in obtaining bonding, lines of credit, or insurance as required by the Contractor.
- (8) Making efforts to assist interested DBEs in obtaining necessary equipment, supplies, materials or related assistance or services.
- (9) Effectively using the services of available minority/women community organizations; minority/women contractors' groups; local, state, and Federal minority/women business assistance offices; and other organizations as allowed on a case-by-case basis to provide assistance in the recruitment and placement of DBEs.

D. The preceding information shall be submitted directly to the Airport Manager.

E. Should the bidder to whom the contract is conditionally awarded refuse, neglect or fail to meet the DBE goal or comply with good faith effort requirements, the proposal guaranty filed with the bid shall become the property of the Sponsor, not as a penalty, but a liquidated damages to the Sponsor.

F. The Contractor shall make all reasonable efforts to honor commitments to DBE subcontractors named in the commitment submitted under Section 4. a. of this Provision. Prior to terminating or removing a DBE subcontractor named in the commitment, the Contractor must demonstrate to the satisfaction of the Sponsor that the originally designated DBE was not able or willing to perform.

G. The Contractor shall also make a good faith effort to replace a DBE subcontractor that is unable to perform successfully with another DBE, to the extent needed to meet the contract goal. The Contractor shall submit a commitment agreement for the substitute DBE firm(s).

Any substitution of DBEs shall be subject to approval by the Sponsor. Prior to approving the substitution, the Sponsor may request a statement from the DBE concerning it being replaced.

H. The Contractor shall designate a DBE liaison officer who will administer the Contractor's DBE program and who will be responsible for maintenance of records of efforts and contacts made to subcontract with DBEs.

I. Contractors are encouraged to investigate the services offered by banks owned and controlled by disadvantaged individuals and to make use of these banks where feasible.

5. ELIGIBILITY OF DBEs.

A. The Department of Transportation (Department) certifies the eligibility of DBEs, DBE joint ventures and DBE truck-owner operators to perform subcontract work on DOT financially assisted contracts.

B. This certification will be accomplished through the use of the appropriate certification schedule contained in this Department's DBE Program.

C. The Department publishes annually a Directory of Disadvantaged Business Enterprises containing the names of firms that have been certified to be eligible to participate as DBEs on

DOT financially assisted contracts. This Directory is available from the Department's Construction Division, Business Opportunity Programs Section. A monthly update of the Directory can be found on the Internet at [www.dot.state.tx.us/insdot/orgchart/cmd/cserve/dbelst/](http://www.dot.state.tx.us/insdot/orgchart/cmd/cserve/dbelst/).

- D. Only DBE firms certified at the time commitments are submitted are eligible to be used in the information furnished by the Contractor as required under Section 4.a. and 4.g. above. For purposes of the DBE goal on this project, DBEs will only be allowed to perform work in the categories of work for which they are certified.
6. DETERMINATION OF DBE PARTICIPATION. DBE participation shall be counted toward meeting the DBE goal in this contract in accordance with the following:
- A. Once a firm is determined to be an eligible DBE, the total eligible dollar amount paid on the contract or purchase order awarded to the DBE is counted toward the DBE goal. When a DBE subcontracts part of the work of its contract to another firm, the value of the subcontracted work may be counted toward DBE goals only if the subcontractor is itself a DBE. Work that a DBE subcontracts to a non-DBE firm does not count toward DBE goals.
- B. A Contractor may count toward its DBE goal contract fees paid to disadvantaged truck owner-operators provided the following requirements are met:
- (1) The contractor furnishes the following information on each owner-operator to be used:
    - name of owner-operator
    - social security number
    - DBE vendor number
  - (2) The record of payments to each disadvantaged Truck Owner-Operator, whether paid by the prime Contractor or one of his subcontractors, must be attached to the prime Contractor's monthly report for the respective month to receive credit toward the DBE goal.
- C. A Contractor may count toward its DBE goal a portion of the dollar amount paid to a joint venture equal to the distinct, clearly defined portion of the work of the contract performed by the DBE.
- D. Commercially Useful Function
- (1) A Contractor may count toward its DBE goal only expenditures to DBEs that perform a commercially useful function in the work of a contract or purchase order. A DBE is considered to perform a commercially useful function when it is responsible for execution of the work of the contract and is carrying out its responsibilities by actually performing, managing, and supervising the work involved. To perform a commercially useful function, the DBE must also be responsible, with respect to materials and supplies used on the contract, for negotiating price, determining quality and quantity, ordering the material, and installing (where applicable) and paying for the material itself.
  - (2) Consistent with industry practices and the Department's DBE Program, a DBE subcontractor may enter into second-tier subcontracts, amounting to up to 70 percent of their contract. Work subcontracted to a non-DBE does not count towards DBE goals. Brokers and firms with brokerage-type operations will only receive credit for their commission.

- (3) A DBE trucking firm is considered to be performing a commercially useful when the DBE is responsible for the management and supervision of the entire trucking operation for which it is responsible on a particular contract and the DBE itself owns and operates at least one fully licensed, insured, and operational truck used on the contract.

The Contractor receives credit for the total value of the transportation services the DBE provides on a contract using trucks it owns, insures, and operates using drivers it employs.

The DBE may lease trucks from another DBE firm, including certified disadvantaged truck owner-operators. The Contractor receives credit for the total value of the transportation services provided by the lessee.

The DBE may lease trucks from a non-DBE, including owner-operators; however, the Contractor may only receive credit for the fee or commission the DBE receives as a result of the lease arrangement.

A lease must indicate that the DBE has exclusive use of and control over the truck, giving the DBE absolute priority for use of the leased trucks. Leased trucks must display the name and identification number of the DBE.

- (4) When a DBE is presumed not to be performing a commercially useful function, the DBE may present evidence to rebut this presumption.

E. A Contractor may count toward its DBE goal expenditures for materials and supplies obtained from DBE suppliers and manufacturers, provided that the DBEs assume the actual and contractual responsibility for the provision of the materials, goods and services.

- (1) The Contractor may count its entire expenditure to a DBE manufacturing material supplier. In order to be considered a manufacturing firm, a DBE must conform to the definition given in Section 2.f. of this provision. Should the DBE firm obtain the final product(s) provided to the Contractor from a source other than its own factory or establishment, then the DBE firm, for that case, will not be considered to be a manufacturing material supplier and its supply work will be credited toward the DBE goal using an adjustment percentage no greater than that used for a regular dealer.
- (2) The Contractor may count 60 percent of its expenditures to a DBE regular dealer. In order to be considered as a regular dealer, the DBE must conform to the definition given in Section 2.g. of this provision.

F. A Contractor may count toward its DBE goal the following expenditures to DBE firms that are not manufacturing material suppliers or regular dealers, provided that the fee or commission is determined by the Department to be reasonable and not excessive as compared with fees customarily allowed for similar services:

- (1) The fees or commissions charged by a DBE for providing a bona fide service, such as professional, technical, consultant, or managerial services, and assistance in the procurement of materials, or supplies required for performance of the contract.
- (2) The fees charged for delivery of materials and supplies required on a job site (but not the cost of the materials and supplies themselves) when the hauler, trucker, or delivery service is not also the manufacturer of or a regular dealer in the materials and supplies.
- (3) The fees or commissions charged for providing any bonds or insurance specifically required for the performance of the contract.

- G. If a Contractor chooses to assist a DBE firm, other than a manufacturing material supplier or regular dealer, by assuring payment for the materials to be placed in the DBE's work and wants to receive credit toward the DBE goal for the cost of the material, then the material supplier may invoice the DBE firm and be paid by remittance from the DBE firm or the material supplier may invoice the prime Contractor and the DBE firm jointly and be paid by the prime Contractor making remittance to the DBE firm and the material supplier jointly. The DBE firm must agree to the joint check arrangement. No credit will be given toward the DBE goal for the cost of the DBE's required materials paid by the prime Contractor directly to the material supplier.
- H. No credit will be given toward the DBE goal for the cost of materials placed by a DBE firm or for the cost of equipment leased or rented and used in the DBE firm's work when payment for those costs is effected by making a deduction from the prime Contractor's payment(s) to the DBE firm.

7. RECORDS AND REPORTS.

- A. The Contractor shall submit monthly reports, after work begins, on DBE payments to meet the DBE goal and for race neutral participation. One copy of each monthly report is to be sent to the Sponsor. These reports will be due within fifteen (15) days after the end of a calendar month. These reports will be required until all DBE subcontracting or contracting or material supply activity is completed. The DBE Monthly Progress Report Form is to be used for monthly reporting. The DBE Final Report is to be used as a final summary of DBE activity submitted upon completion of the project. These forms may be obtained from the Sponsor or may be reproduced by the Contractor. The Sponsor may verify the amounts being reported as paid to DBEs by requesting copies of cancelled checks paid to DBEs on a random basis. Cancelled checks and invoices should reference the Department's project number.
- B. DBE subcontractors and/or material suppliers should be identified on the monthly report by Vendor Number, name, and the amount of actual payment made to each during the monthly period.
- C. Monthly reports for Truck Owner-Operators should be in the form of a list of Truck Owner-Operators paid that month, including Vendor Number and the amount of payment made to each.
- D. All such records must be retained for a period of three years following completion of the contract work, and shall be available at reasonable times and places for inspection by authorized representatives of the Sponsor or the DOT.
- E. Prior to receiving final payment, the Contractor shall submit an affidavit detailing the DBE subcontract payments. The DBE Final Report is to be used for the Final Report. This form may be obtained from the Department or may be reproduced by the Contractor. If the DBE goal requirement is not met, documentation supporting Good Faith Efforts, as outlined in Section 4.c. of the Provision, must be submitted with the DBE Final Report.

- 8. COMPLIANCE OF CONTRACTOR. To ensure that DBE requirements of this DOT assisted contract are complied with, the Sponsor will monitor the Contractor's efforts to involve DBEs during the performance of this contract. This will be accomplished by a review of monthly reports submitted to the Sponsor by the Contractor indicating his progress in achieving the DBE contract goal, and by compliance reviews conducted on the project site by the Sponsor.

The Contractor shall receive credit toward the DBE goal based on actual payments to the DBE subcontractor. The Contractor shall notify the Sponsor if he/she withholds or reduces payment to any DBE

subcontractor. The Contractor shall submit an affidavit detailing the DBE subcontract payments prior to receiving final payment for the contract.

Contractors' requests for substitutions of DBE subcontractors shall be accompanied by a detailed explanation, which should substantiate the need for a substitution. The Sponsor may verify the explanation with the DBE firm being replaced before giving approval of the substitution. The Contractor may not be allowed to count work on those items being substituted toward the DBE goal prior to approval of the substitution from the Sponsor.

The Contractor's providing work crews and equipment to DBEs is prohibited. The occasional formal leasing of a major piece of equipment with or without operator by the prime Contractor to a DBE will be considered on a case-by-case basis by the Sponsor.

A. Contractor's failure to comply with the requirements of this Special Provision shall constitute a material breach of this contract. In such a case, the Sponsor reserves the right to terminate the contract; to deduct the amount of DBE goal not accomplished by DBEs from the money due or to become due the Contractor, not as a penalty but as liquidated damages to the Sponsor; or such other remedy or remedies as the Sponsor deems appropriate.

#### ARTICLE B: Race-Neutral Disadvantaged Business Enterprise

It is the policy of the DOT that Disadvantaged Business Enterprises (DBE) as defined in 49 CFR Part 26, Subpart A, be given the opportunity to compete fairly for contracts and subcontracts financed in whole or in part with Federal funds and that a maximum feasible portion of the Sponsor's overall DBE goal be met using race-neutral means. Consequently, if there is no DBE goal, the DBE requirements of 49 CFR Part 26, apply to this contract as follows:

The Contractor will offer DBEs as defined in 49 CFR Part 26, Subpart A, the opportunity to compete fairly for contracts and subcontracts financed in whole or in part with Federal funds. Race-Neutral DBE participation on projects with no DBE goal should be reported to the Sponsor. Payments to DBEs reported are subject to the requirements of Article A, Section 5, "Determination of DBE Participation".

The Contractor and any Subcontractors shall not discriminate on the basis of race, color, national origin or sex in the award and performance of contracts financed in whole or in part with Federal funds.

These requirements shall be physically included in any subcontract. Failure to carry out the requirements set forth above shall constitute a material breach of this contract and, may result in termination of the contract by the Sponsor or other such remedy, as the Sponsor deems appropriate.



**WAGE RATE  
DETERMINATION**

General Decision Number: TX190004 01/04/2019 TX4

Superseded General Decision Number: TX20180011

State: Texas

Construction Types: Heavy and Highway

Counties: Bowie, Gregg, Rusk, Smith and Upshur Counties in Texas.

#### HEAVY & HIGHWAY CONSTRUCTION PROJECTS

Note: Under Executive Order (EO) 13658, an hourly minimum wage of \$10.60 for calendar year 2019 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, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.60 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2019. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR 5.5(a)(1)(ii) (or the EO minimum wage rate, if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at [www.dol.gov/whd/govcontracts](http://www.dol.gov/whd/govcontracts).

Modification Number	Publication Date
0	01/04/2019

\* SUTX2011-004 08/02/2011

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER (Paving and Structures).....	\$ 13.16	
ELECTRICIAN.....	\$ 19.87	
FORM BUILDER/FORM SETTER Paving & Curb.....	\$ 13.93	
Structures.....	\$ 13.38	

## LABORER

Asphalt Raker.....	\$ 12.02
Flagger.....	\$ 8.50
Laborer, Common.....	\$ 10.08
Laborer, Utility.....	\$ 12.70
Pipelayer.....	\$ 14.64
Work Zone Barricade	
Servicer.....	\$ 11.46

## POWER EQUIPMENT OPERATOR:

Asphalt Distributor.....	\$ 13.88
Asphalt Paving Machine.....	\$ 12.35
Broom or Sweeper.....	\$ 10.08
Crane, Lattice Boom 80	
tons or less.....	\$ 13.85
Crawler Tractor.....	\$ 13.62
Excavator 50,000 pounds or	
less.....	\$ 13.67
Excavator Operator over	
50,000 pounds.....	\$ 13.52
Foundation Drill, Truck	
Mounted.....	\$ 22.05
Front End Loader , over 3	
cy.....	\$ 12.33
Front End Loader, 3 cy or	
less.....	\$ 13.40
Loader/Backhoe.....	\$ 12.97
Mechanic.....	\$ 17.47
Milling Machine.....	\$ 12.22
Motor Grader, Fine Grade....	\$ 16.88
Motor Grader, Rough.....	\$ 15.83
Pavement Marking Machine....	\$ 13.10
Roller, Asphalt.....	\$ 11.96
Roller, Other.....	\$ 10.44
Scraper.....	\$ 10.85
Spreader Box.....	\$ 13.12

Servicer.....\$ 14.11

Steel Worker (Reinforcing).....\$ 17.53

## TRUCK DRIVER

Lowboy-Float.....	\$ 13.41
Off-Road Hauler.....	\$ 10.08
Single Axle.....	\$ 10.75
Single or Tandem Axle Dump..	\$ 11.95
Tandem Axle Tractor w/Semi	
Trailer.....	\$ 12.50

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](http://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 Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations  
Wage and Hour Division  
U.S. Department of Labor  
200 Constitution Avenue, N.W.

Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION

**DIVISION II**  
**GENERAL PROVISIONS**

## Part 1 – General Contract Provisions

### Section 10 Definition of Terms

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

Paragraph Number	Term	Definition
10-01	AASHTO	The American Association of State Highway and Transportation Officials.
10-02	Access Road	The right-of-way, the roadway and all improvements constructed thereon connecting the airport to a public roadway.
10-03	Advertisement	A public announcement, as required by local law, inviting bids for work to be performed and materials to be furnished.
10-04	Airport	Airport means an area of land or water which is used or intended to be used for the landing and takeoff of aircraft; an appurtenant area used or intended to be used for airport buildings or other airport facilities or rights of way; airport buildings and facilities located in any of these areas, and a heliport.
10-05	Airport Improvement Program (AIP)	A grant-in-aid program, administered by the Federal Aviation Administration (FAA).
10-06	Air Operations Area (AOA)	The term air operations area (AOA) shall mean any area of the airport used or intended to be used for the landing, takeoff, or surface maneuvering of aircraft. An air operation area shall include such paved or unpaved areas that are used or intended to be used for the unobstructed movement of aircraft in addition to its associated runway, taxiway, or apron.
10-07	Apron	Area where aircraft are parked, unloaded or loaded, fueled and/or serviced.
10-08	ASTM International (ASTM)	Formerly known as the American Society for Testing and Materials (ASTM).



<b>Paragraph Number</b>	<b>Term</b>	<b>Definition</b>
<b>10-09</b>	<b>Award</b>	The Owner's notice to the successful bidder of the acceptance of the submitted bid.
<b>10-10</b>	<b>Bidder</b>	Any individual, partnership, firm, or corporation, acting directly or through a duly authorized representative, who submits a proposal for the work contemplated.
<b>10-11</b>	<b>Building Area</b>	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.
<b>10-12</b>	<b>Calendar Day</b>	Every day shown on the calendar.
<b>10-13</b>	<b>Certificate of Analysis (COA)</b>	The COA is the manufacturer's Certificate of Compliance (COC) including all applicable test results required by the specifications.
<b>10-14</b>	<b>Certificate of Compliance (COC)</b>	The manufacturer's certification stating that materials or assemblies furnished fully comply with the requirements of the contract. The certificate shall be signed by the manufacturer's authorized representative.
<b>10-15</b>	<b>Change Order</b>	A written order to the Contractor covering changes in the plans, specifications, or proposal quantities and establishing the basis of payment and contract time adjustment, if any, for work within the scope of the contract and necessary to complete the project.
<b>10-16</b>	<b>Contract</b>	<p>A written agreement between the Owner and the Contractor that establishes the obligations of the parties including but not limited to performance of work, furnishing of labor, equipment and materials and the basis of payment.</p> <p>The awarded contract includes but may not be limited to: Advertisement, Contract form, Proposal, Performance bond, payment bond, General provisions, certifications and representations, Technical Specifications, Plans, Supplemental Provisions, standards incorporated by reference and issued addenda.</p>
<b>10-17</b>	<b>Contract Item (Pay Item)</b>	A specific unit of work for which a price is provided in the contract.
<b>10-18</b>	<b>Contract Time</b>	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

Paragraph Number	Term	Definition
		calendar or working days, the contract shall be completed by that date.
10-19	<b>Contractor</b>	The individual, partnership, firm, or corporation primarily liable for the acceptable performance of the work contracted and for the payment of all legal debts pertaining to the work who acts directly or through lawful agents or employees to complete the contract work.
10-20	<b>Contractors Quality Control (QC) Facilities</b>	The Contractor's QC facilities in accordance with the Contractor Quality Control Program (CQCP).
10-21	<b>Contractor Quality Control Program (CQCP)</b>	Details the methods and procedures that will be taken to assure that all materials and completed construction required by the contract conform to contract plans, technical specifications and other requirements, whether manufactured by the Contractor, or procured from subcontractors or vendors.
10-22	<b>Control Strip</b>	A demonstration by the Contractor that the materials, equipment, and construction processes results in a product meeting the requirements of the specification.
10-23	<b>Construction Safety and Phasing Plan (CSPP)</b>	The overall plan for safety and phasing of a construction project developed by the airport operator, or developed by the airport operator's consultant and approved by the airport operator. It is included in the invitation for bids and becomes part of the project specifications.
10-24	<b>Drainage System</b>	The system of pipes, ditches, and structures by which surface or subsurface waters are collected and conducted from the airport area.
10-25	<b>Engineer</b>	The individual, partnership, firm, or corporation duly authorized by the Owner to be responsible for engineering, inspection, and/or observation of the contract work and acting directly or through an authorized representative.
10-26	<b>Equipment</b>	All machinery, together with the necessary supplies for upkeep and maintenance; and all tools and apparatus necessary for the proper construction and acceptable completion of the work.
10-27	<b>Extra Work</b>	An item of work not provided for in the awarded contract as previously modified by change order or supplemental agreement, but which is found by the Owner's Engineer or Resident Project Representative (RPR) to be necessary to

Paragraph Number	Term	Definition
		complete the work within the intended scope of the contract as previously modified.
10-28	FAA	The Federal Aviation Administration. When used to designate a person, FAA shall mean the Administrator or their duly authorized representative.
10-29	Federal Specifications	The federal specifications and standards, commercial item descriptions, and supplements, amendments, and indices prepared and issued by the General Services Administration.
10-30	Force Account	<p><b>a.</b> Contract Force Account - A method of payment that addresses extra work performed by the Contractor on a time and material basis.</p> <p><b>b.</b> Owner Force Account - Work performed for the project by the Owner's employees.</p>
10-31	Intention of Terms	<p>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 <del>and/or Resident Project Representative (RPR)</del> 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 <del>and/or RPR</del>, subject in each case to the final determination of the Owner.</p> <p>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.</p>
10-32	Lighting	A system of fixtures providing or controlling the light sources used on or near the airport or within the airport buildings. The field lighting includes all luminous signals, markers, floodlights, and illuminating devices used on or near the airport or to aid in the operation of aircraft landing at, taking off from, or taxiing on the airport surface.
10-33	Major and Minor Contract Items	A major contract item shall be any item that is listed in the proposal, the total cost of which is equal to or greater than 20% of the total amount of the award contract. All other items shall be considered minor contract items.

<b>Paragraph Number</b>	<b>Term</b>	<b>Definition</b>
<b>10-34</b>	<b>Materials</b>	Any substance specified for use in the construction of the contract work.
<b>10-35</b>	<b>Modification of Standards (MOS)</b>	Any deviation from standard specifications applicable to material and construction methods in accordance with FAA Order 5300.1.
<b>10-36</b>	<b>Notice to Proceed (NTP)</b>	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.
<b>10-37</b>	<b>Owner</b>	The term "Owner" shall mean the party of the first part or the contracting agency signatory to the contract. Where the term "Owner" is capitalized in this document, it shall mean airport Sponsor only.
<b>10-38</b>	<b>Passenger Facility Charge (PFC)</b>	Per 14 Code of Federal Regulations (CFR) Part 158 and 49 United States Code (USC) § 40117, a PFC is a charge imposed by a public agency on passengers enplaned at a commercial service airport it controls.
<b>10-39</b>	<b>Pavement Structure</b>	The combined surface course, base course(s), and subbase course(s), if any, considered as a single unit.
<b>10-40</b>	<b>Payment bond</b>	The approved form of security furnished by the Contractor and their own surety as a guaranty that the Contractor will pay in full all bills and accounts for materials and labor used in the construction of the work.
<b>10-41</b>	<b>Performance bond</b>	The approved form of security furnished by the Contractor and their own surety as a guaranty that the Contractor will complete the work in accordance with the terms of the contract.
<b>10-42</b>	<b>Plans</b>	The official drawings or exact reproductions which show the location, character, dimensions and details of the airport and the work to be done and which are to be considered as a part of the contract, supplementary to the specifications. Plans may also be referred to as 'contract drawings.'
<b>10-43</b>	<b>Project</b>	The agreed scope of work for accomplishing specific airport development with respect to a particular airport.
<b>10-44</b>	<b>Proposal</b>	The written offer of the bidder (when submitted on the approved proposal form) to perform the contemplated work

Paragraph Number	Term	Definition
		and furnish the necessary materials in accordance with the provisions of the plans and specifications.
10-45	<b>Proposal guaranty</b>	The security furnished with a proposal to guarantee that the bidder will enter into a contract if their own proposal is accepted by the Owner.
10-46	<b>Quality Assurance (QA)</b>	Owner's responsibility to assure that construction work completed complies with specifications for payment.
10-47	<b>Quality Control (QC)</b>	Contractor's responsibility to control material(s) and construction processes to complete construction in accordance with project specifications.
10-48	<b>Quality Assurance (QA) Inspector</b>	An authorized representative of the Engineer <del>and/or Resident Project Representative (RPR)</del> assigned to make all necessary inspections, observations, tests, and/or observation of tests of the work performed or being performed, or of the materials furnished or being furnished by the Contractor.
10-49	<b>Quality Assurance (QA) Laboratory</b>	The official quality assurance testing laboratories of the Owner or such other laboratories as may be designated by the Engineer <del>or RPR</del> . May also be referred to as Engineer's, Owner's, or QA Laboratory.
10-50	<b>Resident Project Representative (RPR)</b>	The individual, partnership, firm, or corporation duly authorized by the Owner to be responsible for all necessary inspections, observations, tests, and/or observations of tests of the contract work performed or being performed, or of the materials furnished or being furnished by the Contractor, and acting directly or through an authorized representative.
10-51	<b>Runway</b>	The area on the airport prepared for the landing and takeoff of aircraft.
10-52	<b>Runway Safety Area (RSA)</b>	A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to aircraft. See the construction safety and phasing plan (CSPP) for limits of the RSA.
10-53	<b>Safety Plan Compliance Document (SPCD)</b>	Details how the Contractor will comply with the CSPP.
10-54	<b>Specifications</b>	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

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

<b>Paragraph Number</b>	<b>Term</b>	<b>Definition</b>
		the construction safety and phasing plan (CSPP) for limits of the TSA.
<b>10-64</b>	<b>Work</b>	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.
<b>10-65</b>	<b>Working day</b>	A working day shall be any day other than a legal holiday, Saturday, or Sunday on which the normal working forces of the Contractor may proceed with regular work for at least six (6) hours toward completion of the contract. When work is suspended for causes beyond the Contractor's control, it will not be counted as a working day. Saturdays, Sundays and holidays on which the Contractor's forces engage in regular work will be considered as working days.

**END OF SECTION 10**

## Section 20 Proposal Requirements and Conditions

**20-01 Advertisement (Notice to Bidders).** Notice to bidders can be found in Division I Bid and Contract Documents.

**20-02 Qualification of bidders.** Each bidder shall submit evidence of competency and evidence of financial responsibility to perform the work to the Owner at the time of bid opening.

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

Each bidder shall furnish the Owner satisfactory evidence of their financial responsibility. Evidence of financial responsibility, unless otherwise specified, shall consist of a confidential statement or report of the bidder's financial resources and liabilities as of the last calendar year or the bidder's last fiscal year. Such statements or reports shall be certified by a public accountant. At the time of submitting such financial statements or reports, the bidder shall further certify whether their financial responsibility is approximately the same as stated or reported by the public accountant. If the bidder's financial responsibility has changed, the bidder shall qualify the public accountant's statement or report to reflect the bidder's true financial condition at the time such qualified statement or report is submitted to the Owner.

Unless otherwise specified, a bidder may submit evidence that they are prequalified with the State Highway Division and are on the current "bidder's list" of the state in which the proposed work is located. Evidence of State Highway Division prequalification may be submitted as evidence of financial responsibility in lieu of the certified statements or reports specified above.

Each bidder shall submit "evidence of competency" and "evidence of financial responsibility" to the Owner at the time of bid opening.

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

**20-04 Issuance of proposal forms.** The Owner reserves the right to refuse to issue a proposal form to a prospective bidder if the bidder is in default for any of the following reasons:

- a. Failure to comply with any prequalification regulations of the Owner, if such regulations are cited, or otherwise included, in the proposal as a requirement for bidding.
- b. Failure to pay, or satisfactorily settle, all bills due for labor and materials on former contracts in force with the Owner at the time the Owner issues the proposal to a prospective bidder.
- c. Documented record of Contractor default under previous contracts with the Owner.
- d. Documented record of unsatisfactory work on previous contracts with the Owner.

**20-05 Interpretation of estimated proposal quantities.** An estimate of quantities of work to be done and materials to be furnished under these specifications is given in the proposal. It is the result of careful



calculations and is believed to be correct. It is given only as a basis for comparison of proposals and the award of the contract. The Owner does not expressly, or by implication, agree that the actual quantities involved will correspond exactly therewith; nor shall the bidder plead misunderstanding or deception because of such estimates of quantities, or of the character, location, or other conditions pertaining to the work. Payment to the Contractor will be made only for the actual quantities of work performed or materials furnished in accordance with the plans and specifications. It is understood that the quantities may be increased or decreased as provided in the Section 40, paragraph 40-02, Alteration of Work and Quantities, without in any way invalidating the unit bid prices.

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

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

The bidder shall correctly sign the proposal in ink. If the proposal is made by an individual, their name and post office address must be shown. If made by a partnership, the name and post office address of each member of the partnership must be shown. If made by a corporation, the person signing the proposal shall give the name of the state where the corporation was chartered and the name, titles, and business address of the president, secretary, and the treasurer. Anyone signing a proposal as an agent shall file evidence of their authority to do so and that the signature is binding upon the firm or corporation.

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

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

**20-09 Irregular proposals.** Proposals shall be considered irregular for the following reasons:

- a. If the proposal is on a form other than that furnished by the Owner, or if the Owner's form is altered, or if any part of the proposal form is detached.
- b. If there are unauthorized additions, conditional or alternate pay items, or irregularities of any kind that make the proposal incomplete, indefinite, or otherwise ambiguous.
- c. If the proposal does not contain a unit price for each pay item listed in the proposal, except in the case of authorized alternate pay items, for which the bidder is not required to furnish a unit price.
- d. If the proposal contains unit prices that are obviously unbalanced.
- e. If the proposal is not accompanied by the proposal guaranty specified by the Owner.
- f. If the applicable Disadvantaged Business Enterprise information is incomplete.

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

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

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

**20-12 Withdrawal or revision of proposals.** A bidder may withdraw or revise (by withdrawal of one proposal and submission of another) a proposal provided that the bidder's request for withdrawal is received by the Owner in writing or by email before the time specified for opening bids. Revised proposals must be received at the place specified in the advertisement before the time specified for opening all bids.

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

**20-14 Disqualification of bidders.** A bidder shall be considered disqualified for any of the following reasons:

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

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

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

**20-15 Discrepancies and Omissions.** A Bidder who discovers discrepancies or omissions with the project bid documents shall immediately notify the Owner's Engineer of the matter. A bidder that has doubt as to the true meaning of a project requirement may submit to the Owner's Engineer a written request for interpretation no later than 3 days prior to bid opening.

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

**END OF SECTION 20**

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## Section 30 Award and Execution of Contract

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

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

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

b. If the bidder is disqualified for any of the reasons specified Section 20, paragraph 20-14, *Disqualification of Bidders*.

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

**30-02 Award of contract.** The award of a contract, if it is to be awarded, shall be made within 90 calendar days of the date specified for publicly opening proposals, unless otherwise specified herein.

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

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

**30-04 Return of proposal guaranty.** All proposal guaranties, except those of the two lowest bidders, will be returned immediately after the Owner has made a comparison of bids as specified in the paragraph 30-01, *Consideration of Proposals*. Proposal guaranties of the two lowest bidders will be retained by the Owner until such time as an award is made, at which time, the unsuccessful bidder's proposal guaranty will be returned. The successful bidder's proposal guaranty will be returned as soon as the Owner receives the contract bonds as specified in paragraph 30-05, *Requirements of Contract Bonds*.

**30-05 Requirements of contract bonds.** At the time of the execution of the contract, the successful bidder shall furnish the Owner a surety bond or bonds that have been fully executed by the bidder and the surety guaranteeing the performance of the work and the payment of all legal debts that may be incurred by reason of the Contractor's performance of the work. The surety and the form of the bond or bonds shall be acceptable to the Owner. Unless otherwise specified in this subsection, the surety bond or bonds shall be in a sum equal to the full amount of the contract.

**30-06 Execution of contract.** The successful bidder shall sign (execute) the necessary agreements for entering into the contract and return the signed contract to the Owner, along with the fully executed surety bond or bonds specified in paragraph 30-05, *Requirements of Contract Bonds*, of this section, within 15 calendar days from the date mailed or otherwise delivered to the successful bidder.

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

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

**END OF SECTION 30**

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## Section 40 Scope of Work

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

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

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

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

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

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

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

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

When determined by the Engineer to be in the Owner's best interest, the Engineer may order the Contractor to proceed with extra work as provided in Section 90, paragraph 90-05, *Payment for Extra Work*. Extra work that is necessary for acceptable completion of the project, but is not within the general scope of the

work covered by the original contract shall be covered by a supplemental agreement as defined in Section 10, paragraph 10-59, *Supplemental Agreement*.

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

Any claim for payment of extra work that is not covered by written agreement (change order or supplemental agreement) shall be rejected by the Owner. ***No payment shall be made for any work outside of the original contract unless approved by the County prior to any work being performed.***

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

a. It is understood and agreed that the Contractor shall provide for the free and unobstructed movement of aircraft in the air operations areas (AOAs) of the airport with respect to their own operations and the operations of all subcontractors as specified in Section 80, paragraph 80-04, *Limitation of Operations*. It is further understood and agreed that the Contractor shall provide for the uninterrupted operation of visual and electronic signals (including power supplies thereto) used in the guidance of aircraft while operating to, from, and upon the airport as specified in Section 70, paragraph 70-15, *Contractor's Responsibility for Utility Service and Facilities of Others*.

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

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

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

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

Except as provided in Section 40, paragraph 40-07, *Rights in and Use of Materials Found in the Work*, it is intended that all existing materials or structures that may be encountered (within the lines, grades, or grading sections established for completion of the work) shall be used in the work as otherwise provided for in the contract and shall remain the property of the Owner when so used in the work.



**40-07 Rights in and use of materials found in the work.** Should the Contractor encounter any material such as (but not restricted to) sand, stone, gravel, slag, or concrete slabs within the established lines, grades, or grading sections, the use of which is intended by the terms of the contract to be embankment, the Contractor may at their own option either:

- a. Use such material in another contract item, providing such use is approved by the **Engineer RPR** and is in conformance with the contract specifications applicable to such use; or,
- b. Remove such material from the site, upon written approval of the **Engineer RPR**; or
- c. Use such material for the Contractor's own temporary construction on site; or,
- d. Use such material as intended by the terms of the contract.

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

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

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

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

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

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

#### END OF SECTION 40

## Section 50 Control of Work

**50-01 Authority of the Engineer Resident Project Representative (RPR).** The Engineer RPR has final authority regarding the interpretation of project specification requirements. The Engineer RPR shall determine acceptability of the quality of materials furnished, method of performance of work performed, and the manner and rate of performance of the work. The Engineer RPR does not have the authority to accept work that does not conform to specification requirements.

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

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

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

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

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

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

**50-03 Coordination of contract, plans, and specifications.** The contract, plans, specifications, and all referenced standards cited are essential parts of the contract requirements. If electronic files are provided and used on the project and there is a conflict between the electronic files and hard copy plans, the hard copy plans shall govern. A requirement occurring in one is as binding as though occurring in all. They are intended to be complementary and to describe and provide for a complete work. In case of discrepancy, calculated dimensions will govern over scaled dimensions; contract technical specifications shall govern over contract general provisions, plans, cited standards for materials or testing, and cited advisory circulars (ACs); contract general provisions shall govern over plans, cited standards for materials or testing, and cited

ACs; plans shall govern over cited standards for materials or testing and cited ACs. If any paragraphs contained in the Special Provisions conflict with General Provisions or Technical Specifications, the Special Provisions shall govern.

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

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

**50-04 List of Special Provisions.** Refer to Division III Special Conditions section of the contract documents for the list of Special Conditions.

**50-05 Cooperation of Contractor.** The Contractor shall be supplied with 3 hard copies or an electronic PDF of the plans and specifications. The Contractor shall have available on the construction site at all times one hardcopy each of the plans and specifications. Additional hard copies of plans and specifications may be obtained by the Contractor for the cost of reproduction.

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

**50-06 Cooperation between Contractors.** The Owner reserves the right to contract for and perform other or additional work on or near the work covered by this contract.

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

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

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

**50-07 Construction layout and stakes.** The Engineer/RPR shall establish necessary horizontal and vertical control. The establishment of Survey Control and/or reestablishment of survey control shall be by a State Licensed Land Surveyor. Contractor is responsible for preserving integrity of horizontal and vertical controls established by Engineer/RPR. In case of negligence on the part of the Contractor or their employees, resulting in the destruction of any horizontal and vertical control, the resulting costs will be deducted as a liquidated damage against the Contractor.

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

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

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

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

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

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

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

If the Engineer RPR requests it, the Contractor, at any time before acceptance of the work, shall remove or uncover such portions of the finished work as may be directed. After examination, the Contractor shall restore said portions of the work to the standard required by the specifications. Should the work thus exposed or examined prove acceptable, the uncovering, or removing, and the replacing of the covering or making good of the parts removed will be paid for as extra work; but should the work so exposed or examined prove unacceptable, the uncovering, or removing, and the replacing of the covering or making good of the parts removed will be at the Contractor's expense.

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

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

**50-10 Removal of unacceptable and unauthorized work.** All work that does not conform to the requirements of the contract, plans, and specifications will be considered unacceptable, unless otherwise determined acceptable by the Engineer RPR as provided in paragraph 50-02, *Conformity with Plans and Specifications*.

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

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

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

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

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

**50-12 Maintenance during construction.** The Contractor shall maintain the work during construction and until the work is accepted. Maintenance shall constitute continuous and effective work prosecuted day by day, with adequate equipment and forces so that the work is maintained in satisfactory condition at all times.

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

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

**50-13 Failure to maintain the work.** Should the Contractor at any time fail to maintain the work as provided in paragraph 50-12, *Maintenance during Construction*, the Engineer RPR shall immediately notify the Contractor of such noncompliance. Such notification shall specify a reasonable time within which the Contractor shall be required to remedy such unsatisfactory maintenance condition. The time specified will give due consideration to the exigency that exists.

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

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

**50-15 Final acceptance.** Upon due notice from the Contractor of presumptive completion of the entire project, the Engineer, RPR and Owner will make an inspection. If all construction provided for and contemplated by the contract is found to be complete in accordance with the contract, plans, and

specifications, such inspection shall constitute the final inspection. The **Engineer RPR** shall notify the Contractor in writing of final acceptance as of the date of the final inspection.

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

**50-16 Claims for adjustment and disputes.** If for any reason the Contractor deems that additional compensation is due for work or materials not clearly provided for in the contract, plans, or specifications or previously authorized as extra work, the Contractor shall notify the **Engineer RPR** in writing of their intention to claim such additional compensation before the Contractor begins the work on which the Contractor bases the claim. If such notification is not given or the **Engineer RPR** is not afforded proper opportunity by the Contractor for keeping strict account of actual cost as required, then the Contractor hereby agrees to waive any claim for such additional compensation. Such notice by the Contractor and the fact that the **Engineer RPR** has kept account of the cost of the work shall not in any way be construed as proving or substantiating the validity of the claim. When the work on which the claim for additional compensation is based has been completed, the Contractor shall, within 10 calendar days, submit a written claim to the **Engineer RPR** who will present it to the Owner for consideration in accordance with local laws or ordinances.

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

#### **END OF SECTION 50**

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## Section 60 Control of Materials

**60-01 Source of supply and quality requirements.** The materials used in the work shall conform to the requirements of the contract, plans, and specifications. Unless otherwise specified, such materials that are manufactured or processed shall be new (as compared to used or reprocessed).

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

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

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

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

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

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

A copy of all Contractor QC test data shall be provided to the Engineer and RPR 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 RPR showing all test data reports, plus an analysis of all results showing ranges, averages, and corrective action taken on all failing tests.

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

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



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

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

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

- a. Conformance to the specified performance, testing, quality or dimensional requirements; and,
- b. Suitability of the material or assembly for the use intended in the contract work.

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

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

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

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

- a. The **Engineer RPR** shall have the cooperation and assistance of the Contractor and the producer with whom the Contractor has contracted for materials.
- b. The **Engineer RPR** shall have full entry at all reasonable times to such parts of the plant that concern the manufacture or production of the materials being furnished.
- c. If required by the **Engineer RPR**, the Contractor shall arrange for adequate office or working space that may be reasonably needed for conducting plant inspections. Place office or working space in a convenient location with respect to the plant.

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

**60-05 Engineer/ Resident Project Representative (RPR) field office.** An Engineer/RPR field office is not required.

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

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

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

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

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

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

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

**END OF SECTION 60**

## Section 70 Legal Regulations and Responsibility to Public

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

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

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

**70-04 Restoration of surfaces disturbed by others.** The Owner reserves the right to authorize the construction, reconstruction, or maintenance of any public or private utility service, FAA or National Oceanic and Atmospheric Administration (NOAA) facility, or a utility service of another government agency at any time during the progress of the work. To the extent that such construction, reconstruction, or maintenance has been coordinated with the Owner, such authorized work (by others) must be shown on the plans and is indicated as follows: None.

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 RPR**.

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

**70-05 Federal Participation.** The United States Government has agreed to reimburse the Owner for some portion of the contract costs. The contract work is subject to the inspection and approval of duly authorized representatives of the FAA Administrator. No requirement of this contract shall be construed as making the United States a party to the contract nor will any such requirement interfere, in any way, with the rights of either party to the contract.

**70-06 Sanitary, health, and safety provisions.** The Contractor's worksite and facilities shall comply with applicable federal, state, and local requirements for health, safety and sanitary provisions.

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

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

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

**70-08 Construction Safety and Phasing Plan (CSPP).** The Contractor shall complete the work in accordance with the approved Construction Safety and Phasing Plan (CSPP) developed in accordance with AC 150/5370-2, Operational Safety on Airports During Construction. The CSPP is on sheet(s) 4 of the project plans.

**70-09 Use of explosives.** The use of explosives is not permitted on this project.

**70-10 Protection and restoration of property and landscape.** The Contractor shall be responsible for the preservation of all public and private property, and shall protect carefully from disturbance or damage all land monuments and property markers until the Engineer and RPR have witnessed or otherwise referenced their location and shall not move them until directed.

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

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

**70-11 Responsibility for damage claims.** The Contractor shall indemnify and hold harmless the Engineer, RPR and the Owner and their officers, agents, and employees from all suits, actions, or claims, of any character, brought because of any injuries or damage received or sustained by any person, persons, or property on account of the operations of the Contractor; or on account of or in consequence of any neglect in safeguarding the work; or through use of unacceptable materials in constructing the work; or because of any act or omission, neglect, or misconduct of said Contractor; or because of any claims or amounts recovered from any infringements of patent, trademark, or copyright; or from any claims or amounts arising or recovered under the "Workmen's Compensation Act," or any other law, ordinance, order, or decree. Money due the Contractor under and by virtue of their own contract considered necessary by the Owner for such purpose may be retained for the use of the Owner or, in case no money is due, their own surety may be held until such suits, actions, or claims for injuries or damages shall have been settled and suitable evidence to that effect furnished to the Owner, except that money due the Contractor will not be withheld

when the Contractor produces satisfactory evidence that he or she is adequately protected by public liability and property damage insurance.

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

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

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

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

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

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

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

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

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

**70-15 Contractor's responsibility for utility service and facilities of others.** As provided in paragraph 70-04, *Restoration of Surfaces Disturbed by Others*, the Contractor shall cooperate with the owner of any

public or private utility service, FAA or NOAA, or a utility service of another government agency that may be authorized by the Owner to construct, reconstruct or maintain such utility services or facilities during the progress of the work. In addition, the Contractor shall control their operations to prevent the unscheduled interruption of such utility services and facilities.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Should the Owner order suspension of the Contractor's operations in order to protect an archaeological or historical finding, or order the Contractor to perform extra work, such shall be covered by an appropriate contract change order or supplemental agreement as provided in Section 40, paragraph 40-04, *Extra Work*, and Section 90, paragraph 90-05, *Payment for Extra Work*. If appropriate, the contract change order or supplemental agreement shall include an extension of contract time in accordance with Section 80, paragraph 80-07, *Determination and Extension of Contract Time*.

## END OF SECTION 70

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## Section 80 Execution and Progress

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

The Contractor shall perform, with his organization, an amount of work equal to at least 25 percent of the total contract cost.

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

**The Contractor shall provide copies of all subcontracts to the Engineer ~~RPR~~ 14 days prior to being utilized on the project. As a minimum, the information shall include the following:**

- Subcontractor's legal company name.
- Subcontractor's legal company address, including County name.
- Principal contact person's name, telephone and fax number.
- Complete narrative description, and dollar value of the work to be performed by the subcontractor.
- Copies of required insurance certificates in accordance with the specifications.
- Minority/ non-minority status.

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

**80-03 Execution and progress.** Unless otherwise specified, the Contractor shall submit their coordinated construction schedule showing all work activities for the Engineer's ~~RPR's~~ review and acceptance at least 10 days prior to the start of work. The Contractor's progress schedule, once accepted by the Engineer ~~RPR~~, will represent the Contractor's baseline plan to accomplish the project in accordance with the terms and conditions of the Contract. The Engineer and RPR will compare actual Contractor progress against the baseline schedule to determine that status of the Contractor's performance. 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 ~~RPR's~~ request, submit a revised schedule for completion of the work within the contract time and modify their operations to provide such additional materials, equipment, and labor necessary to meet the revised schedule. Should the execution of the work be discontinued for any reason, the Contractor shall notify the Engineer ~~RPR~~ at least 24 hours in advance of resuming operations.

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

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

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

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

When the work requires the Contractor to conduct their operations within an AOA of the airport, the work shall be coordinated with airport operations (through the Engineer RPR) at least 48 hours prior to commencement of such work. The Contractor shall not close an AOA until so authorized by the Engineer RPR and until the necessary temporary marking, signage and associated lighting is in place as provided in Section 70, paragraph 70-08, *Construction Safety and Phasing Plan (CSPP)*.

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

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

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

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

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

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

**80-05 Character of workers, methods, and equipment.** The Contractor shall, at all times, employ sufficient labor and equipment for prosecuting the work to full completion in the manner and time required by the contract, plans, and specifications.

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

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

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

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

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

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

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

In the event that the Contractor is ordered by the Owner, in writing, to suspend work for some unforeseen cause not otherwise provided for in the contract and over which the Contractor has no control, the Contractor may be reimbursed for actual money expended on the work during the period of shutdown. No allowance will be made for anticipated profits. The period of shutdown shall be computed from the effective date of the written order to suspend work to the effective date of the written order to resume the work. Claims for such compensation shall be filed with the Engineer RPR within the time period stated in the Engineer's RPR's order to resume work. The Contractor shall submit with their own claim information substantiating the amount shown on the claim. The Engineer RPR will forward the Contractor's claim to

the Owner for consideration in accordance with local laws or ordinances. No provision of this article shall be construed as entitling the Contractor to compensation for delays due to inclement weather or for any other delay provided for in the contract, plans, or specifications.

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

**80-07 Determination and extension of contract time.** The number of calendar days shall be stated in the proposal and contract and shall be known as the Contract Time.

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

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

At the time of final payment, the contract time shall be increased in the same proportion as the cost of the actually completed quantities bears to the cost of the originally estimated quantities in the proposal. Such increase in the contract time shall not consider either cost of work or the extension of contract time that has been covered by a change order or supplemental agreement. Charges against the contract time will cease as of the date of final acceptance. ]

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

Schedule	Liquidated Damages Cost	Allowed Construction Time
Base Bid	\$1,000/ Calendar Day	One Hundred Fifty (150) Calendar Days

The maximum construction time allowed for Schedules **Base Bid and Additive Alternate** will be the sum of the time allowed for individual schedules but not more than **150** days. Permitting the Contractor to continue and finish the work or any part of it after the time fixed for its completion, or after the date to which the time for completion may have been extended, will in no way operate as a waiver on the part of the Owner of any of its rights under the contract.

**80-09 Default and termination of contract.** The Contractor shall be considered in default of their contract and such default will be considered as cause for the Owner to terminate the contract for any of the following reasons, if the Contractor:

- a. Fails to begin the work under the contract within the time specified in the Notice to Proceed, or
- b. Fails to perform the work or fails to provide sufficient workers, equipment and/or materials to assure completion of work in accordance with the terms of the contract, or
- c. Performs the work unsuitably or neglects or refuses to remove materials or to perform anew such work as may be rejected as unacceptable and unsuitable, or
- d. Discontinues the execution of the work, or
- e. Fails to resume work which has been discontinued within a reasonable time after notice to do so, or
- f. Becomes insolvent or is declared bankrupt, or commits any act of bankruptcy or insolvency, or
- g. Allows any final judgment to stand against the Contractor unsatisfied for a period of 10 days, or
- h. Makes an assignment for the benefit of creditors, or
- i. For any other cause whatsoever, fails to carry on the work in an acceptable manner.

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

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

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

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

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 RPR.

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

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

**END OF SECTION 80**

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## Section 90 Measurement and Payment

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

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

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

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

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

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

### Measurement and Payment Terms

Term	Description
<b>Excavation and Embankment Volume</b>	In computing volumes of excavation, the average end area method will be used unless otherwise specified.
<b>Measurement and Proportion by Weight</b>	The term “ton” will mean the short ton consisting of 2,000 pounds (907 kg) avoirdupois. All materials that are measured or proportioned by weights shall be weighed on accurate, independently certified scales by competent, qualified personnel at locations designated by the <b>Engineer RPR</b> . 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 <b>Engineer RPR</b> directs, and each truck shall bear a plainly legible identification mark.
<b>Measurement by Volume</b>	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

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



Term	Description
	<p>In the event inspection reveals the scales have been “overweighing” (indicating more than correct weight) they will be immediately adjusted. All materials received subsequent to the last previous correct weighting-accuracy test will be reduced by the percentage of error in excess of 0.5%.</p> <p>In the event inspection reveals the scales have been under-weighing (indicating less than correct weight), they shall be immediately adjusted. No additional payment to the Contractor will be allowed for materials previously weighed and recorded.</p> <p>Beams, dials, platforms, and other scale equipment shall be so arranged that the operator and the <b>Engineer and RPR</b> can safely and conveniently view them.</p> <p>Scale installations shall have available ten standard 50-pound (2.3 km) weights for testing the weighing equipment or suitable weights and devices for other approved equipment.</p> <p>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.</p>
<b>Rental Equipment</b>	<p>Rental of equipment will be measured by time in hours of actual working time and necessary traveling time of the equipment within the limits of the work. Special equipment ordered in connection with extra work will be measured as agreed in the change order or supplemental agreement authorizing such work as provided in paragraph 90-05 <i>Payment for Extra Work</i>.</p>
<b>Pay Quantities</b>	<p>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 <b>Engineer RPR</b>. 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.</p>

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

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

**90-03 Compensation for altered quantities.** When the accepted quantities of work vary from the quantities in the proposal, the Contractor shall accept as payment in full, so far as contract items are concerned, payment at the original contract price for the accepted quantities of work actually completed and accepted. No allowance, except as provided for in Section 40, paragraph 40-02, *Alteration of Work*

*and Quantities*, will be made for any increased expense, loss of expected reimbursement, or loss of anticipated profits suffered or claimed by the Contractor which results directly from such alterations or indirectly from their own unbalanced allocation of overhead and profit among the contract items, or from any other cause.

**90-04 Payment for omitted items.** As specified in Section 40, paragraph 40-03, *Omitted Items*, the Engineer RPR shall have the right to omit from the work (order nonperformance) any contract item, except major contract items, in the best interest of the Owner.

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

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

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

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

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

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

(1) Contractor may request release of retainage on work that has been partially accepted by the Owner in accordance with Section 50-03. Contractor must provide a certified invoice to the Engineer RPR that supports the value of retainage held by the Owner for partially accepted work.

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

b. The Contractor is required to pay all subcontractors for satisfactory performance of their contracts no later than 30 days after the Contractor has received a partial payment. Contractor must provide the Owner evidence of prompt and full payment of retainage held by the prime Contractor to the subcontractor within 30 days after the subcontractor's work is satisfactorily completed. A subcontractor's work is

satisfactorily completed when all the tasks called for in the subcontract have been accomplished and documented as required by the Owner. When the Owner has made an incremental acceptance of a portion of a prime contract, the work of a subcontractor covered by that acceptance is deemed to be satisfactorily completed.

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

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

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

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

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

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

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

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

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

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

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

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

No partial payment will be made for stored or stockpiled living or perishable plant materials.

The Contractor shall bear all costs associated with the partial payment of stored or stockpiled materials in accordance with the provisions of this paragraph.

**90-08 Payment of withheld funds.** At the Contractor's option, if an Owner withholds retainage in accordance with the methods described in paragraph 90-06 *Partial Payments*, the Contractor may request that the Owner deposit the retainage into an escrow account. The Owner's deposit of retainage into an escrow account is subject to the following conditions:

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

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

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

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

**90-09 Acceptance and final payment.** When the contract work has been accepted in accordance with the requirements of Section 50, paragraph 50-15, *Final Acceptance*, the Engineer RPR will prepare the final estimate of the items of work actually performed. The Contractor shall approve the Engineer's RPR's final estimate or advise the Engineer RPR of the Contractor's objections to the final estimate which are based on disputes in measurements or computations of the final quantities to be paid under the contract as amended by change order or supplemental agreement. The Contractor and the Engineer RPR shall resolve all disputes (if any) in the measurement and computation of final quantities to be paid within 30 calendar days of the Contractor's receipt of the Engineer's RPR's final estimate. If, after such 30-day period, a dispute still exists, the Contractor may approve the Engineer's RPR's estimate under protest of the quantities in dispute, and such disputed quantities shall be considered by the Owner as a claim in accordance with Section 50, paragraph 50-16, *Claims for Adjustment and Disputes*.

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

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

**90-10 Construction warranty.**

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

**b.** This warranty shall continue for a period of one year from the date of final acceptance of the work, except as noted. If the Owner takes possession of any part of the work before final acceptance, this warranty shall continue for a period of one year from the date the Owner takes possession.

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

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

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

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

**g.** With respect to all warranties, express or implied, from subcontractors, manufacturers, or suppliers for work performed and materials furnished under this contract, the Contractor shall: (1) Obtain all warranties that would be given in normal commercial practice; (2) Require all warranties to be executed, in writing, for the benefit of the Owner, as directed by the Owner, and (3) Enforce all warranties for the benefit of the Owner.

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

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

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

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

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

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

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

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

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

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

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

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

**k.** Security for Construction Warranty.

**l.** Equipment commissioning documentation submitted, if required.

**END OF SECTION 90**

**DIVISION III**  
**SPECIAL PROVISIONS**

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**SPECIFICATIONS**  
**SPECIAL PROVISIONS**

**SP-01.**    **GENERAL DESCRIPTION OF WORK:** Detailed descriptions of the several items of work are given in the Technical Specifications that follow.

**SP-02.**    **RESTRICTIONS ON TIME FOR WORK:**

- A.    It is the intent of this Contract to perform the work and limit the amount of time to a minimum that active areas are closed.
- B.    See "Special Instructions" on Plans for ingress or egress to the project work areas.
- C.    The control tower at the East Texas Regional Airport is manned or operational during working hours. The Contractor shall monitor ground control radio at all times that work is being performed in the airfield. The radio shall be capable of both transmitting and receiving on the ground control frequency of 121.6 MHz. If for any reason emergency use of any runway and taxiway is required, the Contractor shall remove his equipment, tools, and men, leaving the runway clear as possible to a point at least two hundred fifty (250) feet from the centerline of any runway and one hundred (100) feet from the centerline of a taxiway.

**SP-03.**    **SEPARATE INSURANCE:** The Contractor will be required to maintain insurance of the types and amounts as stated in the Standard Terms and Conditions.

A.    Other Insurance Requirements

Prior to Start of Work: Contractor shall furnish to Engineer certificates or copies of the policies, plainly and clearly evidencing required insurance and thereafter new certificates **prior to the expiration date of any prior certificate**. Contractor understands that it is its sole responsibility to provide this necessary information and that failure to provide this information can be viewed as a breach of this contract.

Insurance required herein shall be issued by a company or companies of sound and adequate financial responsibility and authorized to do business in the State of Texas. All policies shall be subject to examination and approval by the District Attorney's office for their adequacy as to form, content, form of protection and providing company.

Insurance required by this contract for the County and Engineer as additional insured shall be primary insurance and not contributing with any other insurance available to County or Engineer, under any third part liability policy.

Contractor further agrees that with respect to the above required insurance, ETRA/Gregg County and Engineer shall:

- 1.    Be named as additional insured/or an insured, as its interest may appear.
- 2.    Be provided with a waiver of subrogation
- 3.    Be provided with thirty (30) days advance notice, in writing, of cancellation or material change.

**SP-04. TIME FOR COMPLETION AND LIQUIDATED DAMAGES:**

- A. The number of calendar days allowed for completion of the project is stipulated in the Proposal and in the Contract and shall be known as the Contract Time.
1. It is understood and agreed by and between the Owner and the Contractor that the time of completion herein set out is a reasonable time. The Contractor shall perform fully, entirely and in an acceptable manner, the work contracted for within the calendar days stated in the Contract. The calendar days stated in the Contract shall be counted from ten days after the effective date of the Owner's order to commence work or the date work commences, whichever occurs first and shall include all Sundays, holidays and non-work days. All calendar days, elapsing between the effective dates of any orders of the Engineer to suspend work and to resume work, for suspensions not the fault of the Contractor, shall be excluded. No allowances shall be made for delay or suspension of the prosecution of the work due to the fault of the Contractor.
  2. Extensions of time for completion, under the condition of (2) (a) next below, will be granted; extensions may be granted under other stated conditions.
    - (a) If the satisfactory execution and completion of the Contract shall require work or material in greater amounts or quantities than those set forth in the Contract, then the Contract time shall be increased in the same proportion as the additional work bears to the original work contracted for.
    - (b) An average or usual number of inclement days, when work cannot proceed, is to be anticipated during the construction period and is not to be considered as warranting extension of time. If, however, it appears that the Contractor is delayed by conditions of weather, times, and seasons, so unusual as not to be reasonably anticipated, extensions of time may be granted.
    - (c) Should the work under the Contract be delayed by other causes which could not have been prevented or contemplated by the Contractor, and which are beyond the Contractor's power to prevent or remedy, extensions of time may be granted. Such causes of delay shall include, but not necessarily be limited to, the following:
      1. Priority or allocation order duly issued by the Federal Government.
      2. Acts of God, acts of the public enemy, acts of the Owner except as provided in these Specifications, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and unusually severe weather.
      3. The amount of all extensions of time for whatever reasons granted shall be determined by the Owner. In general, only actual and not hypothetical days of delay will be considered. The Owner shall have authority to grant additional extensions of time as the Owner may deem justifiable.
    - (d) The amount of Liquidated Damages to be assessed shall be \$1,000 per day.

1. Time is an essential element of the Contract and it is important that the work be pressed vigorously to completion. Loss will accrue to the public due to delayed completion of the facility and the cost to the Owner of the administration of the Contract, including engineering, inspection, and supervision, will be increased as the time occupied in the work is lengthened.
  2. Should the Contractor fail to complete the work as set forth in the Specifications and within the time stipulated in the Contract, there shall be deducted the amount shown in the schedule above, for each day of delay, from any monies or which may thereafter become due him, not as a penalty, but as ascertained and liquidated damages.
  3. Should the amount otherwise due to Contractor be less than the amount of such ascertained and liquidated damages, the Contractor and his Surety shall be liable to the Owner for such deficiency.
- (e) If the Contractor finds it impossible for reasons beyond his 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 this request. 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 completions 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.

**SP-05.** **LEGAL HOLIDAYS:** January 1st, Memorial Day, July 4th, Labor Day, Thanksgiving, and December 25th will be considered as being holidays; no other days will be so considered. No engineering supervision will be furnished on legal holidays or Sundays, except in an emergency. However, these days shall not be excluded from Contract time.

**SP-06.** **DOCUMENTS FOR THE CONTRACTOR:** The Engineer will furnish to the Contractor three (3) set of Specifications, and three (3) sets of Full Size Plans. Additional sets, if requested, will be furnished at the costs of reproduction.

**SP-07.** **CLEAN UP:**

- A. From time to time the Contractor shall clean up the site, including any work areas at the airport, in order that the site presents a neat appearance and the progress of the work is not impeded. One such period of clean up shall immediately precede final inspection.
- B. Immediately following acceptance of the work by the Owner, the Contractor shall remove all temporary plant, equipment, surplus materials, and debris resulting from his operations, and leave the site in a condition fully acceptable to the Owner.
- C. Following each work shift, runways, taxiway, and aprons shall be left clean of all loose aggregate, trash and other foreign matter.
- D. Clean up will not be measured for separate payment, but shall be considered subsidiary work pertaining to the several items of the Contract.

**SP-08. ENTRANCE AND PARKING AREAS:**

- A. Forces of the Engineer and of the Contractor shall enter and leave the airfield at the entrance gates shown on the Plans.
- B. During hours of work, privately owned vehicles shall be parked in the approved areas.
- C. During non-work hours, the Contractor's equipment which is to be left on the site shall be stored in the area designated on the approved parking and storage plan.
- D. Material hauling trucks shall enter the airfield at the gates shown on the Plans, and shall proceed to the area of work by the most direct route, as approved by the manager of the Airport. They shall leave the airfield by the same route and gate. Where required by the Engineer, barricades to define driving lanes on the airport shall be employed.
- E. At the gate, the Contractor shall station a credentialed watchman to assure that closing of the gate when not in use and to minimize the entry of unauthorized persons and vehicles. The watchman shall enter on duty one (1) hour before the beginning of the scheduled work period, and shall remain on duty one (1) hour past the end of the actual work period.

**SP-09. CLEARANCE FOR USE WITH FAA:** At the end of each work period, the Engineer and Owner's Representative shall determine that the taxiway or apron is ready for return to service. They will inform the representative of Federal Aviation Administration in the control tower, of the results of their inspection. It shall be the privilege of the FAA representative to make inspections also. If such inspection is desired, the representative and the Engineer shall develop a method of inspection that will produce the required information, and without interference with the work.

**SP-10. SAFETY:**

- A. Safety at the airport is a prime concern of the Owner. The Contractor promptly shall comply with any instruction given by the Owner or his representative.
- B. All construction shall be subject to the inspection of the Owner, and shall meet his approval.

**SP-11. EXISTING CABLES:** All airfield lighting cables, all FAA cables and any foreign cables shall be located prior to construction. The Contractor shall locate all airfield lighting cable; FAA and the Engineer shall locate the FAA cables. Construction shall not begin until all parties have located all of their respective cables.

**SP-12. REPAIR OF EXISTING UTILITIES:** There are some existing utilities in the area of the reconstruction. The Contractor shall immediately notify the Engineer of any utility encountered and report any interruption of any utility immediately to the utility and the Engineer. Any damaged facilities shall be replaced or repaired in accordance with FAA Specifications or as directed by the Engineer.

**SP-13. DAYTIME WORK RESTRICTION:**

- A. In order to maintain air traffic at the East Texas Regional Airport during the construction of the project, the Contractor shall construct the area of improvements, in phases as outlined on the phasing plans in the contract drawings.

It shall be the responsibility of the Contractor to insure that the apron is cleared of all debris as a result of his construction activity prior to opening said area for traffic.

- B. It shall be the full and sole responsibility of the Contractor to provide the required coordination, and to receive and comply with all instruction issued to him by traffic control or the engineer.
- C. Contact and control shall be by two-way aviation band radio, tuned to the specified frequency and shall be monitored at all times during the hours of work to assure receipt of information and instructions.
  - 1. The Contractor shall provide, for use of his personnel, at least one (1) aviation band radio. The radio shall be maintained in good and operable condition at all times.
  - 2. The radio furnished by the Contractor for use of his personnel shall remain his property and shall be recovered by him.
- D. Upon direction from air traffic control at the East Texas Regional Airport, the Contractor shall move all of his equipment and personnel to an area, or areas, at least two hundred fifty (250) feet from the edge of runway pavement, and at least one hundred (100) feet from the edge of taxiway pavement. Equipment and personnel shall not be returned to the restricted work area until permission for such return is granted by air traffic control.

In the clearing of restricted work areas, movement shall not be to any area opposite the ends of the runway.

**SP-14. CONSTRUCTION ACTIVITY AND AIRCRAFT MOVEMENTS:**

- A. Safety requirements for construction activity affecting aircraft movement area have been coordinated with the airport owner, FAA and other interested parties. As a result of this coordination, a work sequence intending a minimum of disruption to aircraft operations has been developed. The resulting restriction imposed on the Contractor has been included as a part of the Contract provisions.
- B. During the time that the Contractor is performing the work, the aprons, taxiways, and runways at the airport will remain in use by aircraft, to the maximum extent allowable. The use by aircraft of runways and taxiways adjacent to the areas where the Contractor is working will be so scheduled as to minimize disturbance to the Contractor's operations. Aircraft operations, unless otherwise specified in the Contract Specifications, shall always have priority over any and all of the Contractor's operations. The Contractor shall not allow his employees, Subcontractors, material suppliers, or any other persons over whom he has control, to enter or remain upon any part of the airport which would be a hazardous location. Should aprons, runways, or taxiways be required for use of aircraft, and should the Contractor be too close to the portion used by aircraft for safety, the Engineer may at his sole discretion order the Contractor to suspend his operations, remove his personnel plant, equipment, and materials to a safe distance and stand by until the runway and taxiways are no longer required for use by aircraft.

**SP-15. LIMITATIONS ON CONSTRUCTION:** The following restrictions shall normally pertain for activity at The East Texas Regional Airport. In cases where it has been determined that the following restrictions are inappropriate, similar requirements shall be developed resulting from the provisions of paragraph SP-17 a. on a case-by-case basis.

- A. When construction work is being accomplished adjacent to an active runway when visibility minimums area as low as 3/4 mile as determined by The East Texas Regional Airport tower, equipment shall not be permitted within 250 feet from the runway centerline, or within 200 feet horizontally of any aircraft on an active runway used by air

carriers, whichever is greater; i.e., construction activity at an airport with DC-10 aircraft will require clearance of  $200 + 1/2$  wing spread of DC-10 or 200 feet + 80 feet = 280 feet from the centerline. For VFR runways used by general aviation only, equipment shall not be permitted within 125 feet from the runway centerline.

- B. When construction is being accomplished adjacent to an active runway when visibility minimums are below  $3/4$  mile as determined by The East Texas Regional Airport tower, equipment shall not be permitted within 500 feet from the runway centerline.
- C. All work which is too close to the runway for accomplishment during condition SP-14 a. above shall be performed during periods when the runway is not in used. (Ref. NOTAM requirements paragraph SP-17).
- D. When construction work is being accomplished adjacent to an active runway, equipment below the VFR 7:1 slope, but penetrating the IFR 7:1 slope shall be obstruction-marked and lighted for night operations.
- E. Men, equipment, or other construction related materials will be permitted in the approach or departure zones of active runways, provided that the construction activity is conducted below a 20:1 (or 34:1 where visibility minimum are below  $3/4$  mile) approach plane originating 200 feet from end of runway. Any construction activity which is contemplated in the approach zones which would violate these plans will require special consideration (threshold displacement, lighting, etc.). Threshold displacement where visibility minimums are  $3/4$  mile will be 200 feet from the intersection of the 20:1 slope. For visibility minimums of one mile or more, the threshold will be located where the 20:1 slope intersects the runway except that at least 200-foot safety area will be required between the obstruction and the displaced threshold.
- F. Men, equipment, or other construction related material will be permitted adjacent to an apron or active taxiway provided that such activity is first coordinated with the users and appropriate NOTAMS issued. Additionally, barricades with flashers for night operations will be required to mark the area to prevent aircraft from inadvertently entering the construction area.
- G. Open trenches, excavation, and stockpiled material will normally not be permitted within 250 feet of the centerline of active runways at air carrier airports and for runways having a precision instrument approach. In some cases the agency has previously approved 400 foot wide safety areas. In those cases, work can be accomplished up to 200 feet from the centerline. For runways serving transport and executive aircraft, the distance is 150 feet and for utility runways 50-75 feet from the centerline depending on the exact classification. Coverings for open trenched must be of such strength as to support the weight of the heaviest aircraft operating on the runway.
- H. Flare pots will not be permitted for temporary lighting of pavement areas or to denote construction limits.
- I. Construction equipment shall not exceed a height of 150 feet above the airport surface. Any equipment exceeding a height of 75 feet shall be obstruction-marked and lighted at night, and when not in used lowered to its stowed height.

**SP-16.** **CONSTRUCTION ACTIVITY IN THE VICINITY OF NAVIGATIONAL AIDES:** Construction activity in the vicinity of FAA navigational aids (e.g., ILS, VOR, ASR, ATCT) requires special consideration. Prospective bidders are alerted to this fact and will be required to closely coordinate the work with the local Airway Facilities Sector thru the Owner as a condition of bid.

**SP-17. NOTAMS:**

- A. The Airport Operations Director will issue the necessary NOTAMS to reflect hazardous conditions. It is important that NOTAMS be kept current and reflect the actual condition with respect to construction situations. Active NOTAMS shall be reviewed periodically and revised to reflect the current conditions.
- B. Inspection. Frequent inspections will be made by both the Owner and FAA personnel during critical phases of the work to insure that the Contractor is following the required safety procedures.

**SP-18. MOTORIZED VEHICLES:**

- A. When any vehicle (other than airport vehicles) is required to travel over any portion of the airfield, it should be either (1) driven by a person that has been given proper airport driver training with a vehicle properly marked, lighted and in communication with ATCT or (2) escorted at all times by a vehicle driven by a person that has been given proper airport driver training with a vehicle properly marked, lighted, and in communication with ATCT.
- B. No ground vehicles are permitted onto active taxiways or runways unless they are in two-way radio communications with air traffic control, or escorted by a vehicle with such communications, and have been appropriately cleared by air traffic control.
- C. All contract vehicles must be marked with contractor's business name as per the CSPP unless the vehicle is being escorted.
- D. Debris. Waste and loose material capable of causing damage to aircraft landing gears, propellers or being ingested in jet engines shall not be placed on active aircraft movement areas. Material tracked on these areas shall be removed continuously during the work project.

**SP-19. LABORATORY:** All quality assurance testing for acceptance shall be done by the laboratory employed by the Owner. The Contractor shall provide his own quality control testing and pay for all quality control testing at no cost to the Owner. Any quality assurance tests which indicate that the material is not meeting the requirements of the plans or specifications shall be paid for by the Contractor at no cost to the Owner. The cost for all failed tests shall be invoiced to the Contractor by the testing laboratory. Invoices for failed tests shall be paid within 30 calendar days.

**SP-20. THIRD PARTY COVERAGE:** The Owner and KSA Engineers, Inc., shall be named as additional insured on the Contractor's insurance policies.

**SP-21. SURFACE PREPARATION:** Before any tack is applied, the Contractor should expect that there will be areas on the aprons and taxiway that will require blading to remove any grass or dirt build-up. Particular attention should be given to the edges of pavement. It will be the decision of the Engineer as to which areas receive blading. This work shall be considered incidental to various bid items.

**SP-22. CONSTRUCTION STAKING:** The Contractor shall be responsible for setting any and all construction stakes and markings which he may need during this project. The Engineer will provide horizontal and vertical control points (only) for use by the Contractor's surveyors in establishing line and grade stakes.

**SP-23. WORKING HOURS:** All work shall be conducted between the hours of 7:00 a.m. and 8:00 p.m. In all cases, a representative from the Engineer's office shall be notified each day of the

next day's schedule. Contractor does have the option to do preparation and set-up during night-time hours provided sufficient project lighting is utilized. No paving operations will be permitted during night-time hours. Storage of equipment shall be at a site specified by the Engineer.

**SP-24.** **RADIO OPERATIONS:** Whenever the Contractor is in the active movement area, he shall maintain constant radio contact with the Control Tower and be properly badged and airport driver trained.

**SP-25.** **ACCESS ROUTES:** This set of plans has designated access routes onto various spots around the airport. If the Contractor wishes to propose routes other than those established, consideration will be given to them during the Preconstruction Conference. Regardless of the routes chosen, the Contractor will be required to leave the route in as good or in better condition than he found them in the opinion of the Engineer. If this route requires the Contractor to cross an existing grassed area, he shall expect that all pavement, rock or anything other than soil shall be removed upon completion of the usage of this route, and re-graded and seeded to a condition comparable to the existing state. The Contractor shall be considerate to others using these routes. If the Contractor has to go through an existing gate, or is required to build a gate, he shall work with the Airport Division of the Sheriff's office to obtain access to a gate. The Contractor shall repair all access roads which are damaged by construction traffic to original or better condition at no expense to the owner. Repair, regrading, and re-establishing grass of access roads shall be considered subsidiary to the mobilization bid item.

**SP-26.** **SAFETY DURING CONSTRUCTION:** The Contractor shall adhere to the requirements and recommendation as set forth in Advisory Circular 150/5370-2F (or latest edition), which is located in the Appendix of this contract.

**SP-27.** **MARKING:** All pavement markings shall be in accordance with Item P-620, "*Standards for Airport Markings*" and Advisory Circular 150/5340-1L (or latest edition).

**SP-28.** **GEOTECHNICAL INVESTIGATIONS:** N/A

**SP-29.** **ENGINEER:** The word "Engineer" in these specifications shall be understood as referring to KSA Engineers, Inc., supervisor or inspector as may be authorized by said Owner to act in any particular position.

**SP-30.** **SCOPE OF WORK:** The Contractor shall furnish all materials required and shall furnish all labor, equipment, tools, machinery, superintendence and all else required to complete all construction according to the "Proposal" and as shown on the plans for the contract. The work covered under this contract includes the construction of apron improvements as shown on the plans and all appurtenances and related items.

**SP-31.** **ARREARS:** No money shall be paid by the County upon any claim, debt, demand or account whatsoever, to any person, firm or corporation who is in arrears to Gregg County for taxes. The County shall be entitled to counterclaim and offset against any such debt, claim, demand or account in the amount of taxes so in arrears and no assignments or transfers of such debt, claim, demand or account after the said taxes are due shall affect the right of the County to so offset the said taxes against the same.

**SP-32.** **PROJECT PROGRESS TO COMPLETION:** The Contractor shall diligently pursue the job from the date work commenced without extended interruption until the project is complete and accepted.

When work is commenced, absence from the project for more than ten (10) days without written consent will constitute abandonment of the project. Absence shall be defined as



making no measurable progress toward completion of the project. For example, checking to ensure that barricades are up and lighted shall not constitute progress toward the completion of the project.

The Contractor shall complete the project with the time bid.

**SP-33.** **PARTIAL AND FINAL PAYMENT:** On the last day of each month, when the Contractor is due to receive either partial or final payment for the work that has been performed, an estimate shall be made by the Engineer and supplied to the Contractor for his approval. The Contractor shall verify the quantities as shown with the Inspector prior to signing the monthly estimate as approved. The Contractor will be allowed ten (10) days in which to protest the correctness of the estimate, otherwise the estimate will stand. The Contractor must submit their certified payroll records for each request for payment period prior to the Owner processing the request for payment.

**SP-34.** **RECORDS OF MATERIALS PURCHASED:** By the first of each month, the Contractor shall furnish to the Engineer one (1) copy of all invoices for materials furnished to be incorporated into the work plus a statement of all materials previously included on monthly estimates and incorporated into the work during the preceding month. This information is to be used to determine the value of materials on hand to be included in the monthly estimate for periodical payments as prepared by the Engineer.

If the Contractor fails to furnish this information, no materials shall be included on the monthly estimates until they are permanently incorporated into the work.

**SP-35.** **SUBCONTRACTORS:** No part of this project shall be subcontracted without written permission from the Engineer. In the event permission is given for a subcontract, the Owner and the Engineer will not recognize such subcontractors in supervision of the construction or in making monthly payments for work accomplished. The general Contractor shall be primarily responsible for all work, and shall receive all payments.

**SP-36.** **MATERIALS AND WORKMANSHIP:** No materials which have been used by the Contractor for any temporary purpose whatever are to be incorporated in the permanent structure without written consent of the Engineer. All materials to be used shall be new.

Where materials or equipment are specified by a trade or brand name, it is not the intention of the Owner to discriminate against an equal product of another manufacturer, but rather to set a definite standard of quality or performance, and to establish an equal basis for the evaluation of bids. Where the words "or accepted equal" are used, they shall be understood to mean that the thing referred to shall be proper, the equivalent of, or equal to some other thing in the opinion or judgment of the Engineer. Unless otherwise specified, all materials shall be the best of their respective kinds and shall be in all cases fully equal to approved samples. Notwithstanding that the words "or accepted equal" or other such expressions may be used in the specifications in connection with a material, manufactured article or process, the material, article or process specifically designated shall be used unless a substitute shall be approved in writing by the Engineer, and the Engineer shall have the right to require the use of such specifically designated material, article or process.

**SP-37.** **SUPERINTENDENCE OF CONSTRUCTION:** The Contractor shall be personally in charge of all construction work or shall have on the job a competent construction superintendent. In the absence of the superintendent from the job site, an acting-superintendent shall be appointed to be in full charge of the work. The superintendent and acting-superintendent shall be given full authority to follow any and all instructions given by the Engineer or his representative.

**SP-38.** **GUARANTEE:** The Contractor shall guarantee the materials he furnishes and the installation he has performed for a period of one (1) year of operation after the date of final acceptance by the Owner.

In the event a defect is found during the guarantee period, the Contractor will be notified and he shall immediately repair the defect, furnishing and installing all materials as necessary to repair the apron and taxiway improvements and/or appurtenances constructed under this contract in a manner satisfactory to the Owner and the Engineer.

The period of the guarantee shall be one (1) year of satisfactory service from the date of final acceptance of the work by the Owner and the Engineer. In the event it is necessary to take the apron or taxiway or an appurtenance out of service because of defective materials or workmanship, the period of guarantee shall be extended until the apron or taxiway or appurtenance has been in continuous service for a period of one (1) year.

Prior to final acceptance, the Contractor will furnish an affidavit of bills paid and a one (1) year maintenance bond for 100 percent of the total contract in favor of Gregg County, Texas, to Gregg County, Texas.

**SP-39.** **DISADVANTAGED BUSINESS ENTERPRISE:** The purpose of this special provision is to carry out the DBE plan requirements at the East Texas Regional Airport. These provisions will be required in addition to all DOT requirements contained in the contract documents.

Contract Assurance

Failure by the Contractor to carry out all requirements of 49 CFR Part 26 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.

Prompt Payment

The prime contractor agrees to pay each subcontractor under this prime contract for satisfactory performance of its contract no later than 30 days from the receipt of each payment the prime contractor receives from The East Texas Regional Airport. The prime contractor agrees further to return retainage payments to each subcontractor within 30 days after the subcontractor's work is satisfactorily completed. Any delay or postponement of payment from the above referenced time frame may occur only for good cause following written approval of the East Texas Regional Airport. This clause applies to both DBE and non-DBE subcontractors. In the event of delay or postponement or payment, The East Texas Regional Airport may withhold or cause to be withheld from the contractor so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics employed by the contractor or any subcontractor on the work, the full amount of wages required by this contract.

Good Faith Efforts When a DBE is Required on a Contract

The contractor shall make good faith efforts to replace a DBE that is terminated or has otherwise failed to complete its work on a contract with another certified DBE, to the extent needed to meet the contract goal. The prime contractor shall notify the DBE Liaison Officer immediately of the DBE's inability or unwillingness to perform and provide reasonable documentation.

In this situation, the prime contractor shall obtain our prior approval of the substitute DBE and shall provide copies of new or amended subcontracts, or documentation of good faith efforts. If the contractor fails or refuses to comply in the time specified, the Owner will issue an order

stopping all or part of payment/work until satisfactory action has been taken. If the contractor still fails to comply, the Owner may issue a termination for default proceeding.

#### Information Collection and Reporting

In addition to the required documentation required by the DOT, the East Texas Regional Airport will require additional information.

#### Bidders List

The Contractor shall supply a list of all DBE and non-DBE subcontractors that bid or quote on this contract. The bidders list will include the name, address, DBE/non-DBE status, age, and annual gross receipts of firms.

#### Monitoring Payments to DBEs

The Contractor shall maintain records and documents of payments to DBEs for three years following the performance of the contract. The Contractor shall make these records available for inspection upon request. This reporting requirement also extends to any certified DBE subcontractor.

The contractor shall provide a running tally of actual payments to DBE firms.

**SP-40.** **BADGES:** Contractor shall have adequate personnel badged. There are no charges for badges; however, if a badge is not returned then a charge of \$100 will be charged for each unreturned badge.

**DIVISION IV**

**TECHNICAL SPECIFICATIONS**

**FAA STANDARD SPECIFICATIONS  
AND MODIFICATION PAGES**

## Part 2 – General Construction Items

### 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 Notice to Proceed (NTP) ~~CQCP Workshop~~. The Contractor's CQCP and QC testing laboratory must be approved in writing by the RPR prior to the Notice to Proceed (NTP).

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

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

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

**100-3 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 100-03a and 100-03b. The organizational chart shall indicate which personnel are Contractor employees and which are provided by an outside organization.

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

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

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

- (1) Professional Engineer with one (1) year of airport paving experience.
- (2) Engineer-in-training with two (2) years of airport paving experience.
- (3) National Institute for Certification in Engineering Technologies (NICET) Civil Engineering Technology Level IV with three (3) years of airport paving experience.
- (4) An individual with four (4) years of airport paving experience, with a Bachelor of Science Degree in Civil Engineering, Civil Engineering Technology or Construction.

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

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

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

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

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. No separate measurement for payment will be made. The work covered by this section shall be considered as a subsidiary obligation of the Contractor and covered under the other contract items

### **REFERENCES**

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

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 and water, soil erosion, and siltation through the use of silt fences, berms, dikes, dams, sediment basins, fiber mats, gravel, mulches, grasses, slope drains, and other erosion control devices or methods.

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

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

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

### MATERIALS

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

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

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

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

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

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

### 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 required will be performed as scheduled or directed by the RPR. Completed and accepted work will be measured as follows:

- a. Temporary seeding and mulching will be measured by the square yard (square meter).
- b. Temporary slope drains will be measured by the linear foot (meter).
- c. Temporary benches, dikes, dams, and sediment basins will be measured by the cubic yard (cubic meter) of excavation performed, including necessary cleaning of sediment basins, and the cubic yard (cubic meter) of embankment placed as directed by the RPR.
- d. All fertilizing will be measured by the ton (kg).
- e. Installation and removal of silt fence will be measured by the linear foot (meter). This price shall be full compensation for furnishing all materials and for all preparation, assembly, and installation and maintenance of these materials, and for all labor, equipment, tools, and incidentals necessary to complete this item.
- f. Rock Filter Dam will be measured by the linear feet installed and accepted by the Engineer in accordance with the plans and specifications. This price shall be full compensation for furnishing all materials and for all preparation, assembly, and installation and maintenance of these materials, and for all labor, equipment, tools, and incidentals necessary to complete this item.
- g. Stone Outlet Sediment Traps will be measured by the linear feet installed and accepted by the Engineer in accordance with the plans and specifications. This price shall be full compensation for furnishing all materials and for all preparation, assembly, and installation and maintenance of these materials, and for all labor, equipment, tools, and incidentals necessary to complete this item.
- h. Rock Construction Exits will be measured by each exit installed and accepted by the Engineer in accordance with the plans and specifications. This price shall be full compensation for furnishing all materials and for all preparation, assembly, and installation and maintenance of these materials, and for all labor, equipment, tools, and incidentals necessary to complete this item.
- i. Temporary Sediment Basins will be measured by each basin installed and accepted by the Engineer in accordance with the plans and specifications. This price shall be full compensation for furnishing all materials and for all preparation, assembly, and installation and maintenance of these materials, and for all labor, equipment, tools, and incidentals necessary to complete this item.
- j. Erosion Control Mating will be measured by the square yardage installed and accepted by the Engineer in accordance with the plans and specifications. This price shall be full compensation for furnishing all materials and for all preparation, assembly, and installation and maintenance of these materials, and for all labor, equipment, tools, and incidentals necessary to complete this item.
- k. All work performed and materials furnished as prescribed for the Stormwater Pollution Prevention Plan (SWP3) Document shall be measured as a lump sum price for "Stormwater Pollution Prevention Plan (SWP3) Document". The total lump sum shall be paid pro-rata per month and the monthly amount shall be calculated by dividing the lump sum by the contract time in months.

If the Contractor fails to update the SWP3, and provide and properly maintain control measures in compliance with the Contract requirements, as determined by the Engineer, the Contractor will be considered in noncompliance with this Item. Each month's pay request will not be processed until the SWP3 has been updated. The total payment for this Item will not exceed 10% of the total Contract amount before 70% native vegetative cover has been established or final stabilization has been approved by the Engineer and the NOT has been submitted in accordance with the TPDES GP TXR150000. If all work is completed in accordance with the TPDES GP TXR 150000 and accepted by the Engineer and before payment of the amount allowed by this Item, the balance due shall be paid on the next estimate after the Engineer's approval that 70% native background vegetative cover is met or equivalent permanent stabilization have been employed in accordance with the TPDES GP TXR 150000.

**102-4.2** 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, will not be measured and paid for directly but shall be considered as a subsidiary obligation of the Contractor.

### **BASIS OF PAYMENT**

**102-5.1** Accepted quantities of temporary water pollution, soil erosion, and siltation control work ordered by the RPR and measured as provided in paragraph 102-4.1 will be paid for under:

Item C-102-5.1a	Temporary seeding and mulching - per square yard (square meter)
Item C-102-5.1b	Temporary slope drains - per linear foot (meter)
Item C-102-5.1c	Temporary benches, dikes, dams and sediment basins - per cubic yard (cubic meter)
Item C-102-5.1d	Fertilizing - per ton (kg)
Item C-102-5.1e	Installation and removal of silt fence per linear feet (meter)
Item C-102-5.1f	Rock Filter Dam – per linear feet (meter)
Item C-102-5.1g	Stone Outlet Sediment Traps – per linear feet (meter)
Item C-102-5.1h	Rock Construction Exit – per each
Item C-102-5.1i	Temporary Sediment Control Basins – per each
Item C-102-5.1j	Erosion Control Mating – per square yard
Item C-102-5.1k	Storm Water Pollution Prevention Plan (SWPPP) – per lump sum

Where other directed work falls within the specifications for a work item that has a contract price, the units of work shall be measured and paid for at the contract unit price bid for the various items.

Temporary control features not covered by contract items that are ordered by the RPR will be paid for in accordance with Section 90, paragraph 90-05 *Payment for Extra Work*.

### **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

**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.** An Engineer/RPR field office is not required.

### METHOD OF MEASUREMENT

**105-5 Basis of measurement and payment.** Based upon the contract lump sum price for “Mobilization” partial payments will be allowed as follows:

- a. With first pay request, 25%.
- b. When 25% or more of the original contract is earned, an additional 25%.
- c. When 50% or more of the original contract is earned, an additional 40%.
- d. After Final Inspection, Staging area clean-up and delivery of all Project Closeout materials as required by Section 90, paragraph 90-11, *Contractor Final Project Documentation*, the final 10%.

### BASIS OF PAYMENT

**105-6 Payment will be made under:**

Item C-105      Mobilization

### 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 ( $\bar{X}$ ) 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 subplot 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 ( $\bar{X}$ ) for all subplot test values within the lot by using the following formula:

$$\bar{X} = (x_1 + x_2 + x_3 + \dots + x_n) / n$$

Where:  $\bar{X}$  = Sample average of all subplot test values within a lot

$x_1, x_2, \dots, x_n$  = Individual subplot test values

$n$  = Number of subplot test values

- e. Find the sample standard deviation ( $S_n$ ) by use of the following formula:

$$S_n = [(d_1^2 + d_2^2 + d_3^2 + \dots + d_n^2)/(n-1)]^{1/2}$$

Where:  $S_n$  = Sample standard deviation of the number of subplot test values in the set

$d_1, d_2, \dots, d_n$  = Deviations of the individual subplot test values  $x_1, x_2, \dots$  from the average value  $\bar{X}$

that is:  $d_1 = (x_1 - X)$ ,  $d_2 = (x_2 - X)$  ...  $d_n = (x_n - X)$   
 $n$  = Number of subplot test values

**f.** For single sided specification limits (i.e., L only), compute the Lower Quality Index  $Q_L$  by use of the following formula:

$$Q_L = (X - L) / S_n$$

Where: L = specification lower tolerance limit

Estimate the percentage of material within limits (PWL) by entering Table 1 with  $Q_L$ , using the column appropriate to the total number (n) of measurements. If the value of  $Q_L$  falls between values shown on the table, use the next higher value of PWL.

**g.** For double-sided specification limits (i.e., L and U), compute the Quality Indexes  $Q_L$  and  $Q_U$  by use of the following formulas:

$$Q_L = (X - L) / S_n$$

**and**

$$Q_U = (U - X) / S_n$$

Where: L and U = specification lower and upper tolerance limits

Estimate the percentage of material between the lower (L) and upper (U) tolerance limits (PWL) by entering Table 1 separately with  $Q_L$  and  $Q_U$ , using the column appropriate to the total number (n) of measurements, and determining the percent of material above  $P_L$  and percent of material below  $P_U$  for each tolerance limit. If the values of  $Q_L$  fall between values shown on the table, use the next higher value of  $P_L$  or  $P_U$ . Determine the PWL by use of the following formula:

$$PWL = (P_U + P_L) - 100$$

Where:  $P_L$  = percent within lower specification limit  
 $P_U$  = percent within upper specification limit

### EXAMPLE OF PWL CALCULATION

**Project:** Example Project

**Test Item:** Item P-401, Lot A.

#### A. PWL Determination for Mat Density.

(1) Density of four random cores taken from Lot A.

$$A-1 = 96.60$$

$$A-2 = 97.55$$

$$A-3 = 99.30$$

$$A-4 = 98.35$$

$$n = 4$$

(2) Calculate average density for the lot.

$$\bar{X} = (x_1 + x_2 + x_3 + \dots + x_n) / n$$

$$\bar{X} = (96.60 + 97.55 + 99.30 + 98.35) / 4$$

$$X = 97.95\% \text{ density}$$

- (3) Calculate the standard deviation for the lot.

$$S_n = [((96.60 - 97.95)^2 + (97.55 - 97.95)^2 + (99.30 - 97.95)^2 + (98.35 - 97.95)^2) / (4 - 1)]^{1/2}$$

$$S_n = [(1.82 + 0.16 + 1.82 + 0.16) / 3]^{1/2}$$

$$S_n = 1.15$$

- (4) Calculate the Lower Quality Index  $Q_L$  for the lot. ( $L=96.3$ )

$$Q_L = (X - L) / S_n$$

$$Q_L = (97.95 - 96.30) / 1.15$$

$$Q_L = 1.4348$$

- (5) Determine PWL by entering Table 1 with  $Q_L = 1.44$  and  $n = 4$ .

$$PWL = 98$$

### B. PWL Determination for Air Voids.

- (1) Air Voids of four random samples taken from Lot A.

$$A-1 = 5.00$$

$$A-2 = 3.74$$

$$A-3 = 2.30$$

$$A-4 = 3.25$$

- (2) Calculate the average air voids for the lot.

$$X = (x_1 + x_2 + x_3 + \dots + x_n) / n$$

$$X = (5.00 + 3.74 + 2.30 + 3.25) / 4$$

$$X = 3.57\%$$

- (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  $(97.95 + 1.463 \times 1.15) = 99.63\%$

OR

less than  $(97.95 - 1.463 \times 1.15) = 96.27\%$ .

**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

Percent Within Limits (P <sub>L</sub> and P <sub>U</sub> )	Positive Values of Q (Q <sub>L</sub> and Q <sub>U</sub> )							
	n=3	n=4	n=5	n=6	n=7	n=8	n=9	n=10
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 <sub>L</sub> and P <sub>U</sub> )	Negative Values of Q (Q <sub>L</sub> and Q <sub>U</sub> )							
	n=3	n=4	n=5	n=6	n=7	n=8	n=9	n=10
49	-0.0363	-0.0300	-0.0281	-0.0272	-0.0267	-0.0264	-0.0262	-0.0260
48	-0.0725	-0.0600	-0.0562	-0.0544	-0.0534	-0.0528	-0.0524	-0.0521
47	-0.1087	-0.0900	-0.0843	-0.0817	-0.0802	-0.0793	-0.0786	-0.0781
46	-0.1447	-0.1200	-0.1125	-0.1090	-0.1070	-0.1057	-0.1049	-0.1042
45	-0.1806	-0.1500	-0.1406	-0.1363	-0.1338	-0.1322	-0.1312	-0.1304
44	-0.2164	-0.1800	-0.1688	-0.1636	-0.1607	-0.1588	-0.1575	-0.1566
43	-0.2519	-0.2100	-0.1971	-0.1911	-0.1877	-0.1855	-0.1840	-0.1829
42	-0.2872	-0.2400	-0.2254	-0.2186	-0.2147	-0.2122	-0.2105	-0.2093
41	-0.3222	-0.2700	-0.2537	-0.2461	-0.2418	-0.2391	-0.2372	-0.2358
40	-0.3568	-0.3000	-0.2822	-0.2738	-0.2691	-0.2660	-0.2639	-0.2624
39	-0.3911	-0.3300	-0.3107	-0.3016	-0.2964	-0.2931	-0.2908	-0.2892
38	-0.4251	-0.3600	-0.3392	-0.3295	-0.3239	-0.3203	-0.3179	-0.3161



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
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**

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## Part 3 – Sitework

### 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. No material is to be wasted on the airport site. 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 underlying 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.

**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.

**c. Repair or removal of Base, Subbase, and/or Subgrade.** All failed material including surface, base course, subbase course, and subgrade shall be removed and repaired as shown on the plans or as directed by the RPR. Materials and methods of construction shall comply with the applicable sections of these specifications. Any damage caused by Contractor's removal process shall be repaired at the Contractor's expense.

**101-3.2 Preparation of joints and cracks prior to overlay/surface treatment.** Remove all vegetation and debris from cracks to a minimum depth of 1 inch (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 1/4 inch (6 mm). Any excess joint or crack sealer shall be removed from the pavement surface.

**101-3.3 Removal of Foreign Substances/contaminates.** Removal of foreign substances/contaminates from existing pavement that will affect the bond of the new treatment shall consist of removal of rubber, fuel spills, oil, crack sealer, at least 90% of paint, and other foreign substances from the surface of the pavement. Areas that require removal are designated on the plans and as directed by the RPR in the field during construction.

If chemicals are used, they shall comply with the state's environmental protection regulations. Removal methods used shall not cause major damage to the pavement, or to any structure or utility within or adjacent to the work area. Major damage is defined as changing the properties of the pavement, removal of asphalt causing the aggregate to ravel, or removing pavement over 1/8 inch (3 mm) deep. If it is deemed by the RPR that damage to the existing pavement is caused by operational error, such as permitting the application method to dwell in one location for too long, the Contractor shall repair the damaged area without compensation and as directed by the RPR.

Removal of foreign substances shall not proceed until approved by the RPR. Water used for high-pressure water equipment shall be provided by the Contractor at the Contractor's expense. No material shall be deposited on the pavement shoulders. All wastes shall be disposed of in areas indicated in this specification or shown on the plans.

**101-3.4 Concrete spall or failed asphaltic concrete pavement repair.**

**a. Repair of concrete spalls in areas to be overlaid with asphalt.** 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. 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 with asphalt mixture with aggregate sized appropriately for the depth of the patch. The material shall be compacted with equipment approved by the RPR until the material is dense and no movement or marks are visible. The material shall not be placed in lifts over 4 inches (100 mm) in depth. This method of repair applies only to pavement to be overlaid.

**b. Asphalt pavement repair.** The Contractor shall repair all spalled concrete as shown on the plans or as directed by the RPR. The failed areas shall be removed as specified in paragraph 101-3.1b. All failed material including surface, base course, subbase course, and subgrade shall be removed. Materials and methods of construction shall comply with the applicable sections of these specifications.

**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 underlying 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 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 -6mm)

of the specified grade. The machine must cut vertical edges and have a positive method of dust control. The machine must have the ability to remove the millings or cuttings from the pavement and load them into a truck. All millings shall be removed and disposed of off the airport.

**c. Clean-up.** The Contractor shall sweep the milled surface daily and immediately after the milling until all residual materials are removed from the pavement surface. Prior to paving, the Contractor shall wet down the milled pavement and thoroughly sweep and/or blow the surface to remove loose residual material. Waste materials shall be collected and removed from the pavement surface and adjacent areas by sweeping or vacuuming. Waste materials shall be removed and disposed off Airport property.

**101-3.6. Preparation of asphalt pavement surfaces prior to surface treatment.** Existing asphalt pavements to be treated with a surface treatment shall be prepared as follows:

**a.** Patch asphalt pavement surfaces that have been softened by petroleum derivatives or have failed due to any other cause. Remove damaged pavement to the full depth of the damage and replace with new asphalt pavement similar to that of the existing pavement in accordance with paragraph 101-3.4b.

**b.** Repair joints and cracks in accordance with paragraph 101-3.2.

**c.** Remove oil or grease that has not penetrated the asphalt pavement by scrubbing with a detergent and washing thoroughly with clean water. After cleaning, treat these areas with an oil spot primer.

**d.** Clean pavement surface immediately prior to placing the surface treatment so that it is free of dust, dirt, grease, vegetation, oil or any type of objectionable surface film.

**101-3.7 Maintenance.** The Contractor shall perform all maintenance work necessary to keep the pavement in a satisfactory condition until the full section is complete and accepted by the RPR. The surface shall be kept clean and free from foreign material. The pavement shall be properly drained at all times. If cleaning is necessary or if the pavement becomes disturbed, any work repairs necessary shall be performed at the Contractor's expense.

**101-3.8 Preparation of Joints in Rigid Pavement prior to resealing.** 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 in Flexible Pavement prior to sealing.** Prior to application of sealant material, clean and dry the joints of all scale, dirt, dust, old sealant, curing compound, moisture and other foreign matter. The Contractor shall demonstrate, in the presence of the RPR that the method used cleans the cracks and does not damage the pavement.

**101-3.9.1 Preparation of Crack.** Widen crack with router by removing a minimum of 1/16 inch (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.** Crack sealant material and installation will be in accordance with Item P-605 .

**101-3.9.4 Removal of Pipe and other Buried Structures.**

**a. Removal of Existing Pipe Material.** Remove the types of pipe as indicated on the plans. The pipe material shall be legally disposed of off-site in a timely manner following removal. Trenches shall be backfilled with material equal to or better in quality than adjacent embankment. Trenches under paved areas must be compacted to 95% of ASTM D698.

**b. Removal of Inlets/Manholes.** Where indicated on the plans or as directed by the RPR, inlets and/or manholes shall be removed and legally disposed of off-site in a timely fashion after removal. Excavations after removal shall be backfilled with material equal or better in quality than adjacent embankment. When under paved areas must be compacted to 95% of ASTM D698 , when outside of paved areas must be compacted to 95% of ASTM D698.

### METHOD OF MEASUREMENT

**101-4.1 Pavement removal.** The unit of measurement for pavement removal shall be the number of square yards (square meters) removed by the Contractor. Any pavement removed outside the limits of removal because the pavement was damaged by negligence on the part of the Contractor shall not be included in the measurement for payment. No direct measurement or payment shall be made for saw cutting. Saw cutting shall be incidental to pavement removal. Dowel bar installation shall be incidental to pavement removal.

**101-4.7 Removal of Pipe and other Buried Structures.** The unit of measurement for removal of pipe and other buried structures will be 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.

### 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	Pavement Removal - per square yard (square meter)
Item P-101-5.7	Removal of Pipe and other Buried Structures – 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-151 Clearing and Grubbing

### DESCRIPTION

**151-1.1** This item shall consist of clearing or clearing and grubbing, including the disposal of materials, for all areas within the limits designated on the plans or as required by the Resident Project Representative (RPR).

**a. Clearing** shall consist of the cutting and removal of all trees, stumps, brush, logs, hedges, the removal of fences and other loose or projecting material from the designated areas. The grubbing of stumps and roots will not be required.

**b. Clearing and grubbing** shall consist of clearing the surface of the ground of the designated areas of all trees, stumps, down timber, logs, snags, brush, undergrowth, hedges, heavy growth of grass or weeds, fences, structures, debris, and rubbish of any nature, natural obstructions or such material which in the opinion of the RPR is unsuitable for the foundation of strips, pavements, or other required structures, including the grubbing of stumps, roots, matted roots, foundations, and the disposal from the project of all spoil materials resulting from clearing and grubbing.

**c. Tree Removal** Tree Removal shall consist of the cutting and removal of isolated single trees or isolated groups of trees, and the grubbing of stumps and roots. The removal of all the trees of this classification shall be in accordance with the requirements for the particular area being cleared.

### CONSTRUCTION METHODS

**151-2.1 General.** The areas denoted on the plans to be cleared and grubbed shall be staked on the ground by the Contractor as indicated on the plans.

The removal of existing structures and utilities required to permit orderly progress of work shall be accomplished by local agencies, unless otherwise shown on the plans. Whenever a telephone pole, pipeline, conduit, sewer, roadway, or other utility is encountered and must be removed or relocated, the Contractor shall advise the RPR who will notify the proper local authority or owner to secure prompt action.

**151-2.1.1 Disposal.** All materials removed by clearing or by clearing and grubbing shall be disposed of outside the Airport's limits at the Contractor's responsibility, except when otherwise directed by the RPR. As far as practicable, waste concrete and masonry shall be placed on slopes of embankments or channels. When embankments are constructed of such material, this material shall be placed in accordance with requirements for formation of embankments. Any broken concrete or masonry that cannot be used in construction and all other materials not considered suitable for use elsewhere, shall be disposed of by the Contractor. In no case, shall any discarded materials be left in windrows or piles adjacent to or within the airport limits. The manner and location of disposal of materials shall be subject to the approval of the RPR and shall not create an unsightly or objectionable view. When the Contractor is required to locate a disposal area outside the airport property limits, the Contractor shall obtain and file with the RPR permission in writing from the property owner for the use of private property for this purpose.

**151-2.1.2 Blasting.** Blasting shall not be allowed

**151-2.2 Clearing.** The Contractor shall clear the staked or indicated area of all materials as indicated on the plans. Trees unavoidably falling outside the specified clearing limits must be cut up, removed, and disposed of in a satisfactory manner. To minimize damage to trees that are to be left standing, trees shall

be felled toward the center of the area being cleared. The Contractor shall preserve and protect from injury all trees not to be removed. The trees, stumps, and brush shall be cut flush with the original ground surface. The grubbing of stumps and roots will not be required.

Fences shall be removed and disposed of as directed by the RPR. Fence wire shall be neatly rolled and the wire and posts stored on the airport if they are to be used again, or stored at a location designated by the RPR if the fence is to remain the property of a local owner or authority.

**151-2.3 Clearing and grubbing.** In areas designated to be cleared and grubbed, all stumps, roots, buried logs, brush, grass, and other unsatisfactory materials as indicated on the plans, shall be removed, except where embankments exceeding 3-1/2 feet (105 cm) in depth will be constructed outside of paved areas. For embankments constructed outside of paved areas, all unsatisfactory materials shall be removed, but sound trees, stumps, and brush can be cut off flush with the original ground and allowed to remain. Tap roots and other projections over 1-1/2 inches (38 mm) in diameter shall be grubbed out to a depth of at least 18 inches (0.5 m) below the finished subgrade or slope elevation.

Any buildings and miscellaneous structures that are shown on the plans to be removed shall be demolished or removed, and all materials shall be disposed of by removal from the site. The cost of removal is incidental to this item. The remaining or existing foundations, wells, cesspools, and like structures shall be destroyed by breaking down the materials of which the foundations, wells, cesspools, etc., are built to a depth at least 2 feet (60 cm) below the existing surrounding ground. Any broken concrete, blocks, or other objectionable material that cannot be used in backfill shall be removed and disposed of at the Contractor's expense. The holes or openings shall be backfilled with acceptable material and properly compacted.

All holes in embankment areas remaining after the grubbing operation shall have the sides of the holes flattened to facilitate filling with acceptable material and compacting as required in Item P-152. The same procedure shall be applied to all holes remaining after grubbing in areas where the depth of holes exceeds the depth of the proposed excavation.

### METHOD OF MEASUREMENT

**151-3.1** The quantities of clearing as shown by the limits on the plans shall be the number of acres (square meters) of land specifically cleared.

**151-3.2** The quantities of clearing and grubbing as shown by the limits on the plans shall be the number of acres (square meters) or fractions thereof of land specifically cleared and grubbed.

**151-3.3** The quantity of tree removal as shown on the plans shall be the number of individual trees of land specifically cleared.

### BASIS OF PAYMENT

**151-4.1** Payment shall be made at the contract unit price per acre (square meter) or fractions thereof for clearing. This price shall be full compensation for furnishing all materials and for all labor, equipment, tools, and incidentals necessary to complete the item.

**151-4.2** Payment shall be made at the contract unit price per acre (square meter) for clearing and grubbing. This price shall be full compensation for furnishing all materials and for all labor, equipment, tools, and incidentals necessary to complete the item.

**151-4.3** Payment shall be made at the contract unit price per number of individual trees for tree removal. This price shall be full compensation for furnishing all materials and for all labor, equipment, tools, and incidentals necessary to complete the item.



Payment will be made under:

Item P-151-4.1	Clearing – per acre (square meter) or fractions thereof
Item P-151-4.2	Clearing and grubbing - per acre (square meter) or fractions thereof
Item P-152-4.3	Tree Removal – per number of individual trees

**END OF ITEM P-151**

## Item P-152 Excavation, Subgrade, and Embankment

### DESCRIPTION

**152-1.1** This item covers excavation, disposal, placement, and compaction of all materials within the limits of the work required to construct safety areas, runways, taxiways, aprons, and intermediate areas as well as other areas for drainage, building construction, parking, or other purposes in accordance with these specifications and in conformity to the dimensions and typical sections shown on the plans.

**152-1.2 Classification.** All material excavated shall be classified as defined below:

**a. Unclassified excavation.** Unclassified excavation shall consist of the excavation and disposal of all material, regardless of its nature

**152-1.3 Unsuitable excavation.** Unsuitable material shall be disposed in designated waste areas as shown on the plans. Materials containing vegetable or organic matter, such as muck, peat, organic silt, or sod shall be considered unsuitable for use in embankment construction. Material suitable for topsoil may be used on the embankment slope when approved by the RPR.

### CONSTRUCTION METHODS

**152-2.1 General.** Before beginning excavation, grading, and embankment operations in any area, the area shall be cleared or cleared and grubbed in accordance with Item P-151.

The suitability of material to be placed in embankments shall be subject to approval by the RPR. All unsuitable material shall be disposed of in waste areas as shown on the plans. All waste areas shall be graded to allow positive drainage of the area and adjacent areas. The surface elevation of waste areas shall be specified on the plans or approved by the RPR.

When the Contractor's excavating operations encounter artifacts of historical or archaeological significance, the operations shall be temporarily discontinued and the RPR notified per Section 70, paragraph 70-20. At the direction of the RPR, the Contractor shall excavate the site in such a manner as to preserve the artifacts encountered and allow for their removal. Such excavation will be paid for as extra work.

Areas outside the limits of the pavement areas where the top layer of soil has become compacted by hauling or other Contractor activities shall be scarified and disked to a depth of 4 inches (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 as shown on the plans.

The grade shall be maintained so that the surface is well drained at all times.

When the volume of the excavation exceeds that required to construct the embankments to the grades as indicated on the plans, the excess shall be used to grade the areas of ultimate development or disposed as directed by the RPR. When the volume of excavation is not sufficient for constructing the embankments to the grades indicated, the deficiency shall be obtained from borrow areas.

**a. Selective grading.** When selective grading is indicated on the plans, the more suitable material designated by the RPR shall be used in constructing the embankment or in capping the pavement subgrade. If, at the time of excavation, it is not possible to place this material in its final location, it shall be stockpiled in approved areas until it can be placed. The more suitable material shall then be placed and compacted as specified. Selective grading shall be considered incidental to the work involved. The cost of stockpiling and placing the material shall be included in the various pay items of work involved.

**b. Undercutting.** Rock, shale, hardpan, loose rock, boulders, or other material unsatisfactory for safety areas, subgrades, roads, shoulders, or any areas intended for turf shall be excavated to a minimum depth of 12 inches (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 (per cubic meter). 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.** Drainage excavation shall consist of excavating drainage ditches including intercepting, inlet, or outlet ditches; or other types as shown on the plans. The work shall be performed in sequence with the other construction. Ditches shall be constructed prior to starting adjacent excavation operations. All satisfactory material shall be placed in embankment fills; unsuitable material shall be placed in designated waste areas or as directed by the RPR. All necessary work shall be performed true to final line, elevation, and cross-section. The Contractor shall maintain ditches constructed on the project to the required cross-section and shall keep them free of debris or obstructions until the project is accepted.

**152-2.5 Preparation of cut areas or areas where existing pavement has been removed.** In those areas on which a subbase or base course is to be placed, the top 12 inches of subgrade shall be compacted to not less than 100 % of maximum density for non-cohesive soils, and 95% of maximum density for cohesive soils as determined by ASTM D698. 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. The necessary clearing and grubbing and the quantity of excavation removed will be paid for under the respective items of work.

**152-2.7 Control Strip.** The first half-day of construction of subgrade and/or embankment shall be considered as a control strip for the Contractor to demonstrate, in the presence of the RPR, that the materials, equipment, and construction processes meet the requirements of this specification. The sequence and manner of rolling necessary to obtain specified density requirements shall be determined. The maximum compacted thickness may be increased to a maximum of 12 inches (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  $\pm 2\%$  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 RPR will take samples of excavated materials which will be used in embankment for testing to obtain a Moisture-Density Relations of Soils Report (Proctor) in accordance with ASTM D698. A new Proctor shall be obtained for each soil type based on visual classification.

Density tests will be taken by the RPR for every 1,000 square yards of compacted embankment for each lift which is required to be compacted, or other appropriate frequencies as determined by the RPR.

If the material has greater than 30% retained on the 3/4-inch (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 95% of maximum density for non-cohesive soils, and 100% of maximum density for cohesive soils as determined by ASTM D698. Under all areas to be paved, the embankments shall be compacted to a depth of 8 inches and to a density of not less than 95 percent of the maximum density as determined by ASTM D-698. As used in this specification, "non-cohesive" shall mean those soils having a plasticity index (PI) of less than 3 as determined by ASTM D4318.

On all areas outside of the pavement areas, no compaction will be required on the top 4 inches which shall be prepared for a seedbed in accordance with Item T-905.

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 Engineer's presence and provide the test results upon completion to the Engineer 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, borrow, or other items.

**152-2.9 Proof rolling.** The purpose of proof rolling the subgrade is to identify any weak areas in the subgrade and not for compaction of the subgrade. Before start of embankment, and After compaction is completed, the subgrade area shall be proof rolled with a 20 ton (18.1 metric ton) or greater Tandem axle Dual Wheel Dump Truck loaded to the legal limit with tires inflated to 80/100/150 psi (0.551 MPa/0.689 MPa/1.034 MPa) in the presence of the RPR. Apply a minimum of **8 inches** coverage, or as specified by the RPR, under pavement areas. A coverage is defined as the application of one tire print over the designated area. Soft areas of subgrade that deflect more than 1 inch (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 8 inches and to a density of not less than 95 percent of the maximum dry density as determined by ASTM D698. The subgrade in areas outside the limits of the pavement areas shall be compacted to a depth of 8 inches and to a density of not less than 95 percent of the maximum density as determined by ASTM D698.

The material to be compacted shall be within  $\pm 2\%$  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  $\frac{3}{4}$  inch (19.0 mm) sieve, follow the methods in ASTM D698. Tests for moisture content and compaction will be taken at a minimum of 1,000 S.Y. of subgrade. All quality assurance testing shall be done by the Contractor's laboratory in the presence of the Engineer, and density test results shall be furnished upon completion to the Engineer 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.

Density tests will be taken by the RPR for every 1,000 square yards of completed subgrade.

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 (cubic meter) 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.

**152-3.1** The quantity of unclassified excavation to be paid for shall be the number of cubic yards (cubic meters) 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.

**152-3.2** The quantity of embankment in place shall be the number of cubic yards (cubic meters) measured in its final position.

### BASIS OF PAYMENT

**152-4.1** Unclassified excavation payment shall be made at the contract unit price per cubic yard (cubic meter). This price shall be full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the item.

**152-4.2** For embankment in place, payment shall be made at the contract unit price per cubic yard (cubic meter). 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 - per cubic yard (cubic meter)
Item P-152-4.2	Embankment in place - per cubic yard (cubic meter)

### 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
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## ASTM International (ASTM)

ASTM D698	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft <sup>3</sup> (600 kN-m/m <sup>3</sup> ))
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 <sup>3</sup> (2700 kN-m/m <sup>3</sup> ))
ASTM D6938	Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

## Advisory Circulars (AC)

AC 150/5370-2	Operational Safety on Airports During Construction Software
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## Software

FAARFIELD –	FAA Rigid and Flexible Iterative Elastic Layered Design
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## U.S. Department of Transportation

FAA RD-76-66	Design and Construction of Airport Pavements on Expansive Soils
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**END OF ITEM P-152**

## Item P-155 Lime-Treated Subgrade

### DESCRIPTION

**155-1.1** This item shall be used for soil modification that require strength gain to a specific level. This item shall consist of constructing one or more courses of a mixture of soil, lime, and water in accordance with this specification, and in conformity with the lines, grades, thicknesses, and typical cross-sections shown on the plans.

### MATERIALS

**155-2.1 Lime.** Quicklime, hydrated lime, and either high-calcium dolomitic, or magnesium lime, as defined by ASTM C51, shall conform to the requirements of ASTM C977. Lime not produced from calcining limestone is not permitted.

**155-2.2 Commercial lime slurry.** Commercial lime slurry shall be a pumpable suspension of solids in water. The water or liquid portion of the slurry shall not contain dissolved material injurious or objectionable for the intended purpose. The solids portion of the mixture, when considered on the basis of “solids content,” shall consist principally of hydrated lime of a quality and fineness sufficient to meet the following chemical composition and residue requirements.

**a. Chemical composition.** The “solids content” of the lime slurry shall consist of a minimum of 70%, by weight, of calcium and magnesium oxides.

**b. Residue.** The percent by weight of residue retained in the “solids content” of lime slurry shall conform to the following requirements:

- Residue retained on a No. 6 (3.35  $\mu\text{m}$ ) sieve = maximum 0.0%
- Residue retained on a No. 10 (2.00  $\mu\text{m}$ ) sieve = maximum 1.0%
- Residue retained on a No. 30 (600  $\mu\text{m}$ ) sieve = maximum 2.5%

**c. Grade.** Commercial lime slurry shall conform to one of the following two grades:

- Grade 1. The “dry solids content” shall be at least 31% by weight, of the slurry.
- Grade 2. The “dry solids content” shall be at least 35%, by weight, of the slurry.

**155-2.3 Water.** Water used in mixing or curing shall be from potable water sources. Other sources shall be tested in accordance with ASTM C1602 prior to use.

**155-2.4 Soil.** The soil for this work shall consist of on-site materials free of roots, sod, weeds, and stones larger than 2-1/2 inches (60 mm) and have a sulfate content of less than 0.3%.

### COMPOSITION

**155-3.1 Soil-lime mixture.** Lime shall be applied at 8 % dry unit weight of soil for the depth of subgrade treatment as shown on the plans.

**155-3.2 Tolerances.** At final compaction, the lime and water content for each course of subgrade treatment shall conform to the following tolerances:

#### Tolerances

Material	Tolerance
Lime	+ 0.5%
Water	+ 2%, -0%

#### WEATHER LIMITATIONS

**155-4.1 Weather limitation.** Subgrade shall not be constructed when weather conditions detrimentally affect the quality of the materials. Lime shall not be applied unless the air temperature is at least 40°F (4°C) and rising. Lime shall not be applied to soils that are frozen or contain frost. Protect completed lime-treated areas by approved methods against the detrimental effects of freezing if the air temperature falls below 35°F (2°C). Remove and replace any damaged portion of the completed soil-lime treated area with new soil-lime material in accordance with this specification.

#### EQUIPMENT

**155-5.1 Equipment.** All equipment necessary to grade, scarify, spread, mix and compact the material shall be provided. The Resident Project Representative (RPR) must approve the Contractor's proposed equipment prior to the start of the treatment.

#### CONSTRUCTION METHODS

**155-6.1 General.** This specification is to construct a subgrade consisting of a uniform lime mixture which shall be free from loose or segregated areas. The subgrade shall be of uniform density and moisture content, well mixed for its full depth, and have a smooth surface suitable for placing subsequent lifts. The Contractor shall be responsible to meet the above requirements.

Prior to any treatment, the subgrade shall be constructed as specified in Item P-152, Excavation, Subgrade and Embankment, and shaped to conform to the typical sections, lines, and grades as shown on the plans.

The mixing equipment must give visible indication at all times that it is cutting, pulverizing and mixing the material uniformly to the proper depth over the full width of the cut.

**155-6.2 Application.** Lime shall be uniformly spread only over an area where the initial mixing operations can be completed during the same work day. Lime shall not be applied when wind conditions are detrimental to proper application. A motor grader shall not be used to spread the lime. Adequate moisture shall be added to the cement/soil mixture to maintain the proper moisture content. Materials shall be handled, stored, and applied in accordance with all federal, state, and local requirements.

**155-6.3 Mixing.** The mixing procedure shall be as described below:

**a. Preliminary mixing.** The full depth of the treated subgrade shall be mixed with an approved mixing machine. Lime shall not be left exposed for more than six (6) hours. The mixing machine shall make two coverages. Water shall be added to the subgrade during mixing to provide a moisture content approximately 3% to 5% above the optimum moisture of the material and to ensure chemical reaction of the lime and subgrade. After mixing, the subgrade shall be lightly rolled to seal the surface and help prevent evaporation of moisture. The water content of the subgrade mixture shall be maintained at a moisture

content above the optimum moisture content for a minimum of 4 to 24 hours or until the material becomes friable. During the mellowing period, the material shall be sprinkled as directed by the RPR.

**b. Final mixing.** After the required mellowing time, the material shall be uniformly mixed by approved methods. Any clods shall be reduced in size by blading, discing, harrowing, scarifying, or by the use of other approved pulverization methods. After curing, pulverize lime treated material until 100% of soil particles pass a one-inch (25.0 mm) sieve and 60% pass the No. 4 (4.75 mm) sieve when tested dry by laboratory sieves. If resultant mixture contains clods, reduce their size by scarifying, remixing, or pulverization to meet specified gradation.

**155-6.4 Control Strip.** The first half-day of construction shall be considered the control strip. The Contractor shall demonstrate, in the presence of the RPR, that the materials, equipment, and construction processes meet the requirements of the specification. The sequence and manner of rolling necessary to obtain specified density requirements shall be determined. Control strips that do not meet specification requirements shall be reworked, re-compacted, or removed and replaced at the Contractor's expense. Full operations shall not continue until the control strip has been accepted by the RPR. Upon acceptance of the control strip by the RPR, the Contractor shall use the same equipment, materials, and construction methods for the remainder of construction, unless adjustments made by the Contractor are approved in advance by the RPR.

**155-6.5 Treatment Application and Depth Checks.** The depth and amount of stabilization shall be measured by the Contractor with no less than 2 tests per day of material placed; test shall be witnessed by the RPR. Measurements shall be made in test holes excavated to show the full depth of mixing and the pH checked by spraying the side of the test hole with a pH indicator such as phenolphthalein. Phenolphthalein changes from clear to red between pH 8.3 and 10. The color change indicates the location of the bottom of the mixing zone. pH indicators other than phenolphthalein can be used to measure pH levels. If the pH is not at least 8.3 and/or if the depth of the treated subgrade is more than 1/2 inch (12 mm) deficient, additional lime treatment shall be added and the material remixed. The Contractor shall correct all such areas in a manner satisfactory to the RPR.

**155-6.6 Compaction.** Compaction of the mixture shall immediately follow the final mixing operation with the mixture compacted within 1 to 4 hours after final mixing. The material shall be at the moisture content specified in paragraph 155-3.2 during compaction. The field density of the compacted mixture shall be at least 95% of the maximum density as specified in paragraph 155-6.10. Perform in-place density test to determine degree of compaction between 24 and 72 hours after final compaction and the 24-hour moist cure period. If the material fails to meet the density requirements, it shall be reworked to meet the density requirements. Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

**155-6.7 Finishing and curing.** After the final lift or course of lime-treated subgrade has been compacted, it shall be brought to the required lines and grades in accordance with the typical sections. The completed section shall then be finished by rolling, as directed by the RPR, with a pneumatic or other suitable roller sufficiently light to prevent hairline cracking. The finished surface shall not vary more than 1/2-inch (12 mm) when tested with a 12-foot (3.7 m) straightedge applied parallel with and at right angles to the pavement centerline. Any variations in excess of this tolerance shall be corrected by the Contractor at the Contractor's expense in a manner satisfactory to the RPR.

The completed section shall be moist-cured for a minimum of seven (7) days before further courses are added or any traffic is permitted, unless otherwise directed by the RPR. The final lift should not be exposed for more than 14 days without protection or the placement of a base course material.

**155-6.8 Maintenance.** The Contractor shall protect and maintain the lime-treated subgrade from yielding until the lime-treated subgrade is covered by placement of the next lift. When material has been exposed to excessive rain, snow, or freeze-thaw conditions, prior to placement of additional material, the Contractor

shall verify that materials still meets all specification requirements. The maintenance cost shall be incidental to this item.

**155-6.9 Surface tolerance.** In those areas on which a subbase or base course is to be placed, the surface shall be tested for smoothness and accuracy of grade and crown. Any portion lacking the required smoothness or failing in accuracy of grade or crown shall be scarified to a depth of at least 3 inches (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.

**155-6.10 Acceptance sampling and testing.** The lime treated subgrade shall be accepted for density and thickness on an area basis. Testing frequency shall be a minimum of one compaction and thickness test per 1000 square yards of lime treated subgrade, but not less than three (4) tests per construction area. Sampling locations will be determined on a random basis per ASTM D3665.

**a. Density.** All testing shall be done by the Contractor's laboratory in the presence of the Engineer and density test results shall be furnished upon completion to the Engineer for acceptance determination.

The field density of the compacted mixture shall be at least 95% of the maximum density of laboratory specimens prepared from samples taken from the material in place. The specimens shall be compacted and tested in accordance with ASTM D698 to determine maximum density and optimum moisture content. The in-place field density shall be determined in accordance with ASTM D6938, Procedure A, direct transmission method. If the material fails to meet the density requirements, the area represented by the failed test shall be reworked to meet the density requirements. Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

**b. Thickness.** The thickness of the course shall be within +0 and -1/2 inch (12 mm) of the specified thickness as determined by depth tests taken by the Contractor in the presence of the RPR for each area. Where the thickness is deficient by more than 1/2-inch (12 mm), the Contractor shall correct such areas at no additional cost. The Contractor shall replace, at his expense, material where depth tests have been taken.

**155-6.11 Handling and safety.** The Contractor shall obtain and enforce the lime supplier's instructions for proper safety and handling of the lime to prevent physical eye or skin contact with lime during transport or application.

## METHOD OF MEASUREMENT

**155-7.1** Lime-treated subgrade shall be paid for by the square yard (square meter) in the completed and accepted work.

**155-7.2** Lime shall be paid by the number of tons (kg) of Hydrated Lime applied at the application rate specified in paragraph 155-3.1.

**a.** Hydrated lime delivered to the project in dry form will be measured according to the actual tonnage either spread on the subgrade or batched on site into a slurry, whichever is applicable.

b. Quicklime delivered to the project in dry form will be measured for payment on the basis of the tons of equivalent hydrated lime using the following formula:

$$\text{Equivalent Hydrated Lime (Ca(OH)}_2\text{)} = \text{Total Quicklime (CaO)} \times 1.32$$

c. Lime delivered to the project in slurry form will be measured for payment in tons, dry weight of hydrated lime or equivalent hydrated lime in accordance with paragraph b above.

### BASIS OF PAYMENT

**155-8.1** Payment shall be made at the contract unit price per square yard (square meter) for the lime-treated subgrade at the thickness specified. The price shall be full compensation for furnishing all material, except the lime, and for all preparation, delivering, placing and mixing these materials, and all labor, equipment, tools and incidentals necessary to complete this item.

**155-8.2** Payment shall be made at the contract unit price per ton (kg). This price shall be full compensation for furnishing, delivery, and placing this material.

Payment will be made under:

Item P-155-8.1	8" Lime-treated subgrade - per square yard (m <sup>2</sup> )
Item P-155-8.2	Lime (8%) - per ton (kg)

### REFERENCES

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

ASTM International (ASTM)

ASTM C51	Standard Terminology Relating to Lime and Limestone (as used by the Industry)
ASTM C977	Standard Specification for Quicklime and Hydrated Lime for Soil Stabilization
ASTM C1602	Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
ASTM D698	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft <sup>3</sup> ) (600 kN-m/m <sup>3</sup> )
ASTM D1556	Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D2487	Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D6938	Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

Software

FAARFIELD –	FAA Rigid and Flexible Iterative Elastic Layered Design
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**END OF ITEM P-155**



## Part 6 – Flexible Pavements

### Item P-401 Asphalt Mix Pavement

#### DESCRIPTION

**401-1.1** This item shall consist of pavement courses composed of mineral aggregate and asphalt binder mixed in a central mixing plant and placed on a prepared base or stabilized course in accordance with these specifications and shall conform to the lines, grades, thicknesses, and typical cross-sections shown on the plans. Each course shall be constructed to the depth, typical section, and elevation required by the plans and shall be rolled, finished, and approved before the placement of the next course.

#### MATERIALS

**401-2.1 Aggregate.** Aggregates shall consist of crushed stone, crushed gravel, crushed slag, screenings, natural sand, and mineral filler, as required. The aggregates should have no known history of detrimental pavement staining due to ferrous sulfides, such as pyrite. Coarse aggregate is the material retained on the No. 4 (4.75 mm) sieve. Fine aggregate is the material passing the No. 4 (4.75 mm) sieve.

**a. Coarse aggregate.** Coarse aggregate shall consist of sound, tough, durable particles, free from films of matter that would prevent thorough coating and bonding with the asphalt material and free from organic matter and other deleterious substances. Coarse aggregate material requirements are given in the table below.



### Coarse Aggregate Material Requirements

Material Test	Requirement	Standard
Resistance to Degradation	Loss: 40% maximum	ASTM C131
Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate	Loss after 5 cycles: 12% maximum using Sodium sulfate - or - 18% maximum using magnesium sulfate	ASTM C88
Clay lumps and friable particles	0.3% maximum	ASTM C142
Percentage of Fractured Particles	For pavements designed for aircraft gross weights of 60,000 pounds (27200 kg) or more: Minimum 75% by weight of particles with at least two fractured faces and 85% with at least one fractured face <sup>1</sup>	ASTM D5821
	For pavements designed for aircraft gross weights less than 60,000 pounds (27200 kg): Minimum 50% by weight of particles with at least two fractured faces and 65% with at least one fractured face <sup>1</sup>	
Flat, Elongated, or Flat and Elongated Particles	8% maximum, by weight, of flat, elongated, or flat and elongated particles at 5:1 <sup>2</sup>	ASTM D4791
Bulk density of slag <sup>3</sup>	Weigh not less than 70 pounds per cubic foot (1.12 Mg/cubic meter)	ASTM C29.

<sup>1</sup> 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.

<sup>2</sup> 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).

<sup>3</sup> 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: 10% maximum using Sodium sulfate - or - 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) 70-22 .

**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 the gyratory compactor in accordance with ASTM D6925.

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 coarse 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.
- Number of blows or gyrations
- Laboratory mixing and compaction temperatures.
- Supplier-recommended field mixing and compaction temperatures.
- Plot of the combined gradation on a 0.45 power gradation curve.
- Graphical plots of air voids, voids in the mineral aggregate (VMA), and unit weight versus asphalt content. To achieve minimum VMA during production, the mix design needs to account for material breakdown during production.
- Tensile Strength Ratio (TSR).

- Type and amount of Anti-strip agent when used.
- Asphalt Pavement Analyzer (APA) results.
- Date the JMF was developed. Mix designs that are not dated or which are from a prior construction season shall not be accepted.

**Table 1. Asphalt Design Criteria**

Test Property	Value	Test Method
Number of blows or gyrations	75	
Air voids (%)	3.5	ASTM D3203
Percent voids in mineral aggregate (VMA), minimum	See Table 2	ASTM D6995
Tensile Strength Ratio (TSR) <sup>1</sup>	not less than 80 at a saturation of 70-80%	ASTM D4867
Asphalt Pavement Analyzer (APA) <sup>2</sup>	Less than 10 mm @ 4000 passes	AASHTO T340 at 250 psi hose pressure at 64°C test temperature

<sup>1</sup> Test specimens for TSR shall be compacted at  $7 \pm 1.0$  % air voids. In areas subject to freeze-thaw, use freeze-thaw conditioning in lieu of moisture conditioning per ASTM D4867.

<sup>2</sup> 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
1 inch (25.0 mm)	-
3/4 inch (19.0 mm)	100
1/2 inch (12.5 mm)	90-100
3/8 inch (9.5 mm)	72-88
No. 4 (4.75 mm)	53-73
No. 8 (2.36 mm)	38-60
No. 16 (1.18 mm)	26-48
No. 30 (600 $\mu$ m)	18-38
No. 50 (300 $\mu$ m)	11-27
No. 100 (150 $\mu$ m)	6-18
No. 200 (75 $\mu$ m)	3-6

Sieve Size	Percentage by Weight Passing Sieve
<b>Minimum Voids in Mineral Aggregate (VMA)<sup>1</sup></b>	15.0
<b>Asphalt Percent:</b>	
Stone or gravel	5.0-7.5
Slag	6.5-9.5
<b>Recommended Minimum Construction Lift Thickness</b>	2 inch

<sup>1</sup> To achieve minimum VMA during production, the mix design needs to account for material breakdown during production.

The aggregate gradations shown are based on aggregates of uniform specific gravity. The percentages passing the various sieves shall be corrected when aggregates of varying specific gravities are used, as indicated in the Asphalt Institute MS-2 Mix Design Manual, 7th Edition.

**401-3.4 Reclaimed asphalt pavement (RAP).** RAP shall not be used.

**401-3.5 Control Strip.** A control strip is not required.

## 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 <sup>1</sup>	4
Greater than 2 inches (50 mm) but less than 3 inches (7.5 cm)	45	7

**401-4.2 Asphalt plant.** Plants used for the preparation of asphalt shall conform to the requirements of American Association of State Highway and Transportation Officials (AASHTO) M156 including the following items.

**a. Inspection of plant.** The RPR, or RPR's authorized representative, shall have access, at all times, to all areas of the plant for checking adequacy of equipment; inspecting operation of the plant: verifying weights, proportions, and material properties; and checking the temperatures maintained in the preparation of the mixtures.

**b. Storage bins and surge bins.** The asphalt mixture stored in storage and/or surge bins shall meet the same requirements as asphalt mixture loaded directly into trucks. Asphalt mixture shall not be stored in storage and/or surge bins for a period greater than twelve (12) hours. If the RPR determines there is an excessive heat loss, segregation, or oxidation of the asphalt mixture due to temporary storage, temporary storage shall not be allowed.

**401-4.3 Aggregate stockpile management.** Aggregate stockpiles shall be constructed in a manner that prevents segregation and intermixing of deleterious materials. Aggregates from different sources shall be stockpiled, weighed and batched separately at the asphalt batch plant. Aggregates that have become segregated or mixed with earth or foreign material shall not be used.

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 prime coat in accordance with Item P-602 shall be applied to aggregate base prior to placing the asphalt mixture.

A tack coat shall be applied in accordance with Item P-603 to all vertical and horizontal asphalt and concrete surfaces prior to placement of the first and each subsequent lift of asphalt mixture.

**401-4.12 Laydown plan, transporting, placing, and finishing.** Prior to the placement of the asphalt, the Contractor shall prepare a laydown plan with the sequence of paving lanes and width to minimize the number of cold joints; the location of any temporary ramps; laydown temperature; and estimated time of completion for each portion of the work (milling, paving, rolling, cooling, etc.). The laydown plan and any modifications shall be approved by the RPR.

Deliveries shall be scheduled so that placing and compacting of asphalt is uniform with minimum stopping and starting of the paver. Hauling over freshly placed material shall not be permitted until the material has been compacted, as specified, and allowed to cool to approximately ambient temperature. The Contractor, at their expense, shall be responsible for repair of any damage to the pavement caused by hauling operations.

Contractor shall survey each lift of asphalt surface course and certify to RPR that every lot of each lift meets the grade tolerances of paragraph 401-6.2d before the next lift can be placed.

Edges of existing asphalt pavement abutting the new work shall be saw cut and the cut off material and laitance removed. Apply a tack coat in accordance with P-603 before new asphalt material is placed against it.

The speed of the paver shall be regulated to eliminate pulling and tearing of the asphalt mat. Placement of the asphalt mix shall begin along the centerline of a crowned section or on the high side of areas with a one way slope unless shown otherwise on the laydown plan as accepted by the RPR. The asphalt mix shall be placed in consecutive adjacent lanes having a minimum width of 10 feet except where edge lanes require less width to complete the area. Additional screed sections attached to widen the paver to meet the minimum lane width requirements must include additional auger sections to move the asphalt mixture uniformly along the screed extension.

The longitudinal joint in one course shall offset the longitudinal joint in the course immediately below by at least one foot (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 grooving is not required.



**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 a surface treatment per P-608 to all areas that have been subject to grinding.

**401-4.17 Nighttime paving requirements.** The Contractor shall provide adequate lighting during any nighttime construction. A lighting plan shall be submitted by the Contractor and approved by the RPR prior to the start of any nighttime work. All work shall be in accordance with the approved CSPP and lighting plan.

### CONTRACTOR QUALITY CONTROL (CQC)

**401-5.1 General.** The Contractor shall develop a Contractor Quality Control Program (CQCP) in accordance with Item C-100. No partial payment will be made for materials without an approved CQCP.

**401-5.2 Contractor quality control (QC) facilities.** The Contractor shall provide or contract for testing facilities in accordance with Item C-100. The Engineer and RPR shall be permitted unrestricted access to inspect the Contractor's QC facilities and witness QC activities. The Engineer 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 or a rolling inclinometer meeting the requirements of ASTM E2133. 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 is used, the data may be evaluated using the FAA profile program, ProFAA, 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 20ft (6 m) or greater.

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 a surface treatment in accordance with Item P-608. To avoid the surface treatment creating any conflict with runway or taxiway markings, it may be necessary to seal a larger area.

Control charts shall be kept to show area of each day's placement and the percentage of corrective grinding required. Corrections to production and placement shall be initiated when corrective grinding is required. If the Contractor's machines and/or methods produce significant areas that need corrective actions in excess of 10 percent of a day's production, production shall be stopped until corrective measures are implemented by the Contractor.

**h. Grade.** Grade shall be evaluated daily to allow adjustments to paving operations when grade measurements do not meet specifications. As a minimum, grade shall be evaluated prior to and after the placement of the first lift and after placement of the surface lift.

Measurements will be taken at appropriate gradelines (as a minimum at center and edges of paving lane) and longitudinal spacing as shown on cross-sections and plans. The final surface of the pavement will not vary from the gradeline elevations and cross-sections shown on the plans by more than 1/2 inch (12 mm) vertically and 0.1 feet (30 mm) laterally. The documentation will be provided by the Contractor to the RPR by the end of the following working day.

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 1/2 inch and replacing with new material. Skin patching is not allowed.

**401-5.4 Sampling.** When directed by the RPR, the Contractor shall sample and test any material that appears inconsistent with similar material being sampled, unless such material is voluntarily removed and replaced or deficiencies corrected by the Contractor. All sampling shall be in accordance with standard procedures specified.

**401-5.5 Control charts.** The Contractor shall maintain linear control charts for both individual measurements and range (i.e. difference between highest and lowest measurements) for aggregate gradation, asphalt content, and VMA. The VMA for each day will be calculated and monitored by the QC laboratory.

Control charts shall be posted in a location satisfactory to the RPR and kept current. As a minimum, the control charts shall identify the project number, the contract item number, the test number, each test parameter, the Action and Suspension Limits applicable to each test parameter, and the Contractor's test results. The Contractor shall use the control charts as part of a process control system for identifying potential problems and assignable causes before they occur. If the Contractor's projected data during production indicates a problem and the Contractor is not taking satisfactory corrective action, the RPR may suspend production or acceptance of the material.

**a. Individual measurements.** Control charts for individual measurements shall be established to maintain process control within tolerance for aggregate gradation, asphalt content, and VMA. The control charts shall use the job mix formula target values as indicators of central tendency for the following test parameters with associated Action and Suspension Limits:

**Control Chart Limits for Individual Measurements**

Sieve	Action Limit	Suspension Limit
3/4 inch (19.0 mm)	±6%	±9%
1/2 inch (12.5 mm)	±6%	±9%
3/8 inch (9.5 mm)	±6%	±9%
No. 4 (4.75 mm)	±6%	±9%
No. 16 (1.18 mm)	±5%	±7.5%
No. 50 (300 µm)	±3%	±4.5%
No. 200 (75 µm)	±2%	±3%
<b>Asphalt Content</b>	±0.45%	±0.70%
<b>Minimum VMA</b>	-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 $\mu$ m)	6%
No. 200 (75 $\mu$ m)	3.5%
<b>Asphalt Content</b>	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.

## 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 subplot basis.

**(1) Sampling.** Material from each subplot 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 subplot in accordance with ASTM D3203 for a set of compacted specimens prepared in accordance with ASTM D6925.

**d. In-place asphalt mat and joint density.** Each subplot 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 subplot 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 subplot 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 subplot. 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 subplot sample by the TMD for that subplot.

**(5) Joint density.** One core centered over the longitudinal joint shall be taken for each subplot 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.**

**c. 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 and Profilograph roughness.

**b. Air Voids and Mat density.** Acceptance of each lot of plant produced material for mat density and air voids will be based on the percentage of material within specification limits (PWL). If the PWL of the lot equals or exceeds 90%, the lot will be acceptable. Acceptance and payment will be determined in accordance with paragraph 401-8.1.

**c. Joint density.** Acceptance of each lot of plant produced asphalt for joint density will be based on the PWL. If the PWL of the lot is equal to or exceeds 90%, the lot will be considered acceptable. If the PWL is less than 90%, the Contractor shall evaluate the reason and act accordingly. If the PWL is less than 80%, the Contractor shall cease operations and until the reason for poor compaction has been determined. If the PWL is less than 71%, the pay factor for the lot used to complete the joint will be reduced by five (5)

percentage points. This lot pay factor reduction will be incorporated and evaluated in accordance with paragraph 401-8.1.

**d. Grade.** The final finished surface of the pavement shall be surveyed to verify that the grade elevations and cross-sections shown on the plans do not deviate more than 1/2 inch (12 mm) vertically.

Cross-sections of the pavement shall be taken at a minimum 50-foot (15-m) longitudinal spacing and at all longitudinal grade breaks. Minimum cross-section grade points shall include grade at centerline,  $\pm$  10 feet of centerline, and edge of taxiway pavement.

The survey and documentation shall be stamped and signed by a licensed surveyor. Payment for sublots that do not meet grade for over 25% of the subplot shall not be more than 95%.

**e. Profilograph roughness for QA Acceptance.** The final profilograph shall be the full length of the project to facilitate testing of roughness between lots. The Contractor, in the presence of the RPR shall perform a profilograph roughness test on the completed project with a profilograph meeting the requirements of ASTM E1274 or a Class I inertial profiler meeting ASTM E950. Data and results shall be provided within 48 hrs of profilograph roughness tests.

The pavement shall have an average profile index less than 15 inches per mile per 1/10 mile. The equipment shall utilize electronic recording and automatic computerized reduction of data to indicate "must grind" bumps and the Profile Index for the pavement using a 0.2-inch (5 mm) blanking band. The bump template must span one inch (25 mm) with an offset of 0.4 inches (10 mm). The profilograph must be calibrated prior to use and operated by a factory or State DOT approved, trained operator. Profilograms shall be recorded on a longitudinal scale of one inch (25 mm) equals 25 feet (7.5 m) and a vertical scale of one inch (25 mm) equals one inch (25 mm). Profilograph shall be performed one foot right and left of project centerline and 15 feet (4.5 m) right and left of project centerline. Any areas that indicate "must grind" shall be corrected with diamond grinding per paragraph 401-4.16 or by removing and replacing full depth of surface course, as directed by the Engineer. Where corrections are necessary, a second profilograph run shall be performed to verify that the corrections produced an average profile index of 15 inches per mile per 1/10 mile or less.

**401-6.3 Percentage of material within specification limits (PWL).** The PWL will be determined in accordance with procedures specified in Item C-110. The specification tolerance limits (L) for lower and (U) for upper are contained in Table 5.

**Table 5. Acceptance Limits for Air Voids and Density**

Test Property	Pavements Specification Tolerance Limits	
	L	U
<b>Air Voids Total Mix (%)</b>	2.0	5.0
<b>Surface Course Mat Density (%)</b>	92.8	-
<b>Base Course Mat Density (%)</b>	91.8	-
<b>Joint density (%)</b>	90.5	--

**a. Outliers.** All individual tests for mat density and air voids will be checked for outliers (test criterion) in accordance with ASTM E178, at a significance level of 5%. Outliers will be discarded, and the PWL will be determined using the remaining test values. The criteria in Table 5 is based on production processes which have a variability with the following standard deviations: Surface Course Mat Density (%), 1.20; Base Course Mat Density (%), 1.55; Joint Density (%), 1.8.

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% with 1.20% or less variability, (2) 90 PWL is achieved when consistently producing a base course with an average mat density of at least 93.5% with 1.8% or less variability, and (3) 90 PWL is achieved when consistently producing joints with an average joint density of at least 91% with 1.8% 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%.

### **METHOD OF MEASUREMENT**

**401-7.1 Measurement.** Asphalt shall be measured by the number of tons of asphalt used in the accepted work. Batch weights or truck scale weights will be used to determine the basis for the tonnage.

### **BASIS OF PAYMENT**

**401-8.1 Payment.** Payment for a lot of asphalt meeting all acceptance criteria as specified in paragraph 401-6.2 shall be made based on results of tests for mat density and air voids. Payment for acceptable lots shall be adjusted according to paragraph 401-8.1c for mat density and air voids; and paragraph 401-6.2c for joint density, subject to the limitation that:

**a.** The total project payment for plant mix asphalt pavement shall not exceed 100 percent of the product of the contract unit price and the total number of tons (kg) of asphalt used in the accepted work.

**b.** The price shall be compensation for furnishing all materials, for all preparation, mixing, and placing of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

**c. Basis of adjusted payment.** The pay factor for each individual lot shall be calculated in accordance with Table 6. A pay factor shall be calculated for both mat density and air voids. The lot pay factor shall be the higher of the two values when calculations for both mat density and air voids are 100% or higher. The lot pay factor shall be the product of the two values when only one of the calculations for either mat density or air voids is 100% or higher. The lot pay factor shall be the lower of the two values when calculations for both mat density and air voids are less than 100%. If PWL for joint density is less than 71% then the lot pay factor shall be reduced by 5% but be no higher than 95%.

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 subplot shall be reduced by 5%.

**Table 6. Price adjustment schedule<sup>1</sup>**

<b>Percentage of material within specification limits (PWL)</b>	<b>Lot pay factor (percent of contract unit price)</b>
96 – 100	106
90 – 95	PWL + 10
75 – 89	0.5 PWL + 55
55 – 74	1.4 PWL – 12
Below 55	Reject <sup>2</sup>

<sup>1</sup> 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.

<sup>2</sup> The lot shall be removed and replaced. However, the RPR may decide to allow the rejected lot to remain. In that case, if the RPR and Contractor agree in writing that the lot shall not be removed, it shall be paid for at 50% of the contract unit price and the total project payment shall be reduced by the amount withheld for the rejected lot.

**d. Profilograph Roughness.** The Contractor will receive full payment when the profilograph average profile index is in accordance with paragraph 401-6.2e. When the final average profile index for the entire length of pavement does not exceed 15 inches per mile per 1/10 mile, payment will be made at the contract unit price for the completed pavement.

#### **401-8.1 Payment.**

Payment will be made under:

Item P-401-8.1                      Asphalt Surface Course - per ton (kg)

#### **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- $\mu$ m (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 D6925	Standard Test Method for Preparation and Determination of the Relative Density of Hot Mix Asphalt (HMA) Specimens by Means of the SuperPave Gyratory Compactor.
ASTM D6926	Standard Practice for Preparation of Bituminous Specimens Using Marshall Apparatus
ASTM D6927	Standard Test Method for Marshall Stability and Flow of Bituminous Mixtures
ASTM D6995	Standard Test Method for Determining Field VMA based on the Maximum Specific Gravity of the Mix (Gmm)
ASTM E11	Standard Specification for Woven Wire Test Sieve Cloth and Test Sieves
ASTM E178	Standard Practice for Dealing with Outlying Observations
ASTM E1274	Standard Test Method for Measuring Pavement Roughness Using a Profilograph
ASTM E950	Standard Test Method for Measuring the Longitudinal Profile of Traveled Surfaces with an Accelerometer Established Inertial Profiling Reference
ASTM E2133	Standard Test Method for Using a Rolling Inclinometer to Measure Longitudinal and Transverse Profiles of a Traveled Surface
American Association of State Highway and Transportation Officials (AASHTO)	
AASHTO M156	Standard Specification for Requirements for Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures.
AASHTO T329	Standard Method of Test for Moisture Content of Hot Mix Asphalt (HMA) by Oven Method
AASHTO T324	Standard Method of Test for Hamburg Wheel-Track Testing of Compacted Asphalt Mixtures

AASHTO T 340                      Standard Method of Test for Determining the Rutting Susceptibility of Hot Mix Asphalt (APA) Using the Asphalt Pavement Analyzer (APA)

Asphalt Institute (AI)

Asphalt Institute Handbook MS-26, Asphalt Binder

Asphalt Institute MS-2              Mix Design Manual, 7th Edition

AI State Binder Specification Database

Federal Highway Administration (FHWA)

Long Term Pavement Performance Binder Program

Advisory Circulars (AC)

AC 150/5320-6                      Airport Pavement Design and Evaluation

FAA Orders

5300.1                                  Modifications to Agency Airport Design, Construction, and Equipment Standards

Software

FAARFIELD

**END OF ITEM P-401**



## Item P-403 Asphalt Mix Pavement Base Course

### DESCRIPTION

**403-1.1** 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 course in accordance with these specifications and shall conform to the lines, grades, thicknesses, and typical cross-sections shown on the plans. Each course shall be constructed to the depth, typical section, and elevation required by the plans and shall be rolled, finished, and approved before the placement of the next course.

### MATERIALS

**403-2.1 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 for surface, asphalt binder, and leveling course Loss: 50% maximum for base course	ASTM C131
Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate	Loss after 5 cycles: 12% maximum using Sodium sulfate - or - 18% maximum using magnesium sulfate	ASTM C88
Clay lumps and friable particles	0.3% maximum	ASTM C142
Percentage of Fractured Particles	For pavements designed for aircraft gross weights of 60,000 pounds (27200 kg) or more:  Minimum 75% by weight of particles with at least two fractured faces and 85% with at least one fractured face <sup>1</sup>	ASTM D5821
	For pavements designed for aircraft gross weights less than 60,000 pounds (27200 kg):  Minimum 50% by weight of particles with at least two fractured faces and 65% with at least one fractured face <sup>1</sup>	
Flat, Elongated, or Flat and Elongated Particles	8% maximum, by weight, of flat, elongated, or flat and elongated particles with a value of 5:1 <sup>2</sup>	ASTM D4791
Bulk density of slag <sup>3</sup>	Weigh not less than 70 pounds per cubic foot (1.12 Mg/cubic meter)	ASTM C29.

<sup>1</sup> 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.

<sup>2</sup> 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).

<sup>3</sup> 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 aggregate blend or to improve the workability of the mix. Fine aggregate material requirements are listed in the table below.

### Fine Aggregate Material Requirements

Material Test	Requirement	Standard
Liquid limit	25 maximum	ASTM D4318
Plasticity Index	4 maximum	ASTM D4318
Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate	Loss after 5 cycles: 10% maximum using Sodium sulfate - or - 15% maximum using magnesium sulfate	ASTM C88
Clay lumps and friable particles	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, and ASTM C183 shall be used in sampling mineral filler.

**403-2.2 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

**403-2.3 Asphalt binder.** Asphalt binder shall conform to ASTM D6373 Performance Grade (PG) 70-22.

**403-2.4 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

**403-3.1 Composition of mixture.** The asphalt plant mix shall be composed of a mixture of well-graded aggregate, filler and anti-strip agent if required, and asphalt binder. The several 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).

**403-3.2 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 listed on the accrediting authority's website. A copy of the laboratory's current accreditation and accredited test methods shall be submitted to the RPR prior to start of construction.

**403-3.3 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 403-3.2. 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 the gyratory compactor in accordance with ASTM D6925.

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 submitted 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 403-2.3. 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 403-2.4.
- Certified material test reports for the course and fine aggregate and mineral filler in accordance with paragraphs 403-2.1 and 403-2.2.
- 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 course 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.
- Number of blows or gyrations.
- Laboratory mixing and compaction temperatures.
- Supplier recommended mixing and compaction temperatures.
- Plot of the combined gradation on the 0.45 power gradation curve.
- Graphical plots of air voids, voids in the mineral aggregate (VMA), and unit weight versus asphalt content. To achieve minimum VMA during production, the mix design needs to account for material breakdown during production.
- Tensile Strength Ratio (TSR).



- Type and amount of Anti-strip agent when used.
- Asphalt Pavement Analyzer (APA) results.
- Date the JMF was developed. Mix designs that are not dated or which are from a prior construction season shall not be accepted.

**Table 1. Asphalt Design Criteria**

Test Property	Value	Test Method
Number of blows/gyrations	75	
Air voids (%)	3.5	ASTM D3203
Percent voids in mineral aggregate (VMA), minimum	See Table 2	ASTM D6995
TSR <sup>1</sup>	not less than 80 at a saturation of 70-80%	ASTM D4867
Asphalt Pavement Analyzer (APA) <sup>2</sup>	Less than 10 mm @ 4000 passes	AASHTO T340 at 250 psi hose pressure at 64°C test temperature

<sup>1</sup> Test specimens for TSR shall be compacted at  $7 \pm 1.0$  % air voids. In areas subject to freeze-thaw, use freeze-thaw conditioning in lieu of moisture conditioning per ASTM D4867.

<sup>2</sup> 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
1 inch (25.0 mm)	100
3/4 inch (19.0 mm)	90-100
1/2 inch (12.5 mm)	68-88
3/8 inch (9.5 mm)	60-82
No. 4 (4.75 mm)	45-67
No. 8 (2.36 mm)	32-54
No. 16 (1.18 mm)	22-44
No. 30 (600 µm)	15-35
No. 50 (300 µm)	9-25
No. 100 (150 µm)	6-18
No. 200 (75 µm)	3-6
<b>Voids in Mineral Aggregate (VMA)<sup>1</sup></b>	14
<b>Asphalt Percent:</b>	
Stone or gravel	4.5-7.0
Slag	5.0-7.5
<b>Recommended Minimum Construction Lift Thickness</b>	3 inches

<sup>1</sup> 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.

**403-3.4 Reclaimed Asphalt Pavement (RAP).** RAP shall not be used.

**403-3.5 Control strip.** A control strip is not required.

## CONSTRUCTION METHODS

**403-4.1 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)	
	Degrees F	Degrees 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

**403-4.2 Asphalt plant.** Plants used for the preparation of asphalt shall conform to the requirements of American Association of State Highway and Transportation Officials (AASHTO) M156 including the following items:

**a. Inspection of plant.** The RPR, or RPR's authorized representative, shall have access, at all times, to all areas of the plant for checking adequacy of equipment; inspecting operation of the plant: verifying weights, proportions, and material properties; and checking the temperatures maintained in the preparation of the mixtures.

**b. Storage bins and surge bins.** The asphalt mixture stored in storage and/or surge bins shall meet the same requirements as asphalt mixture loaded directly into trucks. Asphalt mixture shall not be stored in storage and/or surge bins for a period greater than twelve (12) hours. If the RPR determines there is an excessive heat loss, segregation or oxidation of the asphalt mixture due to temporary storage, temporary storage shall not be allowed.

**403-4.3 Aggregate stockpile management.** Aggregate stockpiles shall be constructed 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.

A continuous supply of materials shall be provided to the work to ensure continuous placement.

**403-4.4 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.

**403-4.4.1 Material transfer vehicle (MTV).** Material transfer Vehicles shall be required due to the improvement in smoothness and decrease in both physical and thermal segregation. To transfer the material from the hauling equipment to the paver, 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.

**403-4.5 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 401-4.11.

**403-4.6 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, 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.

**403-4.6.1 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 also supply a qualified technician during all paving operations to calibrate the density 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.

**403-4.7 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 material to the mixer at a uniform temperature. The temperature of the 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.

**403-4.8 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.

**403-4.9 Preparation of asphalt mixture.** The aggregates and the asphalt binder shall be weighed or metered and introduced into the mixer 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%.

**403-4.10 Application of Prime and Tack Coat.** Immediately before placing the asphalt mixture, the underlying course shall be cleaned of all dust and debris.

A prime coat in accordance with Item P-602 shall be applied to aggregate base prior to placing the asphalt mixture.

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.

**403-4.11 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 401-6.2e before the next lift can be placed.

Edges of existing asphalt pavement abutting the new work shall be saw cut and the cut off material and laitance removed. Apply a tack coat in accordance with P-603 before new asphalt material is placed against it.

The speed of the paver shall be regulated to eliminate pulling and tearing of the asphalt mat. Placement of the asphalt mix shall begin along the centerline of a crowned section or on the high side of areas with a one way slope unless shown otherwise on the laydown plan as accepted by the RPR. The asphalt mix shall be placed in consecutive adjacent lanes having a minimum width of 10 feet (m) 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 1 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.

**403-4.12 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.

**403-4.13 Joints.** The formation of all joints shall be made in such a manner as 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. An asphalt tack coat or other product approved by the RPR 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.

**403-4.14 Saw-cut grooving.** Saw-cut grooving is not required.

**403-4.15 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 minimum of 55 to 60 blades per 12 inches (300 mm) of cutting head width; 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 causes ravels, aggregate fractures, spalls or disturbance to the pavement will not be permitted.

Grinding will be tapered in all directions to provide smooth transitions to areas not requiring grinding. The slurry resulting from the grinding operation shall be continuously removed and the pavement left in a clean condition. The Contractor shall apply a surface treatment per P-608 to all areas that have been subject to grinding.

**403-4.16 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)

**403-5.1 General.** The Contractor shall develop a CQCP in accordance with Item C-100. No partial payment will be made for materials that are subject to specific QC requirements without an approved CQCP.

**403-5.2 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.

**403-5.3 Quality Control (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 lot from mechanical analysis of extracted aggregate in accordance with ASTM D5444 and 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 lot in accordance with ASTM C566.

**d. Moisture content of asphalt.** The moisture content of the asphalt shall be determined once per lot in accordance with AASHTO T329 or ASTM D1461.

**e. Temperatures.** Temperatures shall be checked, at least four times per lot, 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 or a rolling inclinometer meeting the requirements of ASTM E2133. 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 is used, the data may be evaluated using the FAA profile program, ProFAA, 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 will 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 will 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.

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 403-4.15 or by removing and replacing the surface course to full depth. Grinding shall be tapered in all directions to provide smooth transitions to areas not requiring grinding. All areas in which diamond grinding has been performed shall be subject to the final pavement thickness tolerances specified in paragraph 401-6.1d(3). Areas that have been ground shall be sealed with a surface treatment in accordance with Item P-608. To avoid the surface treatment creating any conflict with runway or taxiway markings, it may be necessary to seal a larger area.

Control charts shall be kept to show area of each day's placement and the percentage of corrective grinding required. Corrections to production and placement shall be initiated when corrective grinding is required. If the Contractor's machines and/or methods produce significant areas that need corrective actions in excess of 10 percent of a day's production, production shall be stopped until corrective measures are implemented by the Contractor.

**h. Grade.** Grade shall be evaluated daily to allow adjustments to paving operations when grade measurements do not meet specifications. As a minimum, grade shall be evaluated prior to the placement of the first lift and then prior to and after placement of the surface lift.

Measurements will be taken at appropriate gradelines (as a minimum at center and edges of paving lane) and longitudinal spacing as shown on cross-sections and plans. The final surface of the pavement will not vary from the gradeline elevations and cross-sections shown on the plans by more than 1/2 inch (12 mm) vertically and 0.1 feet (30 mm) laterally. The documentation will be provided by the Contractor to the RPR by the end of the following working day .

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 403-4.15.

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 1/2 inch and replacing with new material. Skin patching is not allowed.

**403-5.4 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.

**403-5.5 Control charts.** The Contractor shall maintain linear control charts both for individual measurements and range (i.e., difference between highest and lowest measurements) for aggregate gradation, asphalt content, and VMA. The VMA for each day shall 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, and VMA. The control charts shall use the JMF 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 for range shall be established to control process variability for the test parameters and Suspension Limits listed below. The range shall be computed for each lot 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 ( $n = 2$ )

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 sets of 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.

**403-5.6 Quality control (QC) reports.** The Contractor shall maintain records and shall submit reports of QC activities daily, in accordance with the CQCP described in Item C-100.

## MATERIAL ACCEPTANCE

**403-6.1. Quality Assurance 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 subplot basis.

**(1) Sampling.** Material from each subplot 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 subplot in accordance with ASTM D3203 for a set of compacted specimens prepared in accordance with ASTM D6925 .

**d. In-place asphalt mat and joint density.** Each subplot 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 inches (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 subplot 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 subplot 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 subplot. 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 subplot sample by the TMD for that subplot.

**(5) Joint density.** One core centered over the longitudinal joint shall be taken for each subplot which contains 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.

#### 403-6.2 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 and Profilograph smoothness

**b. Air voids.** Acceptance of each lot of plant produced material for air voids will be based upon the average air void from the sublots. If the average air voids of the lot are equal to or greater than 2% and equal to or less than 5%, then the lot will be acceptable. If the average is below 2% or greater than 5%, the lot shall be removed and replaced at the Contractor's expense.

**c. Mat density.** Acceptance of each lot of plant produced material for mat density will be based on the average of all of the densities taken from the sublots. If the average mat density of the lot so established equals or exceeds 94%, the lot will be acceptable. If the average mat density of the lot is below 94%, the lot shall be removed and replaced at the Contractor's expense.

**d. Joint density.** Acceptance of each lot of plant produced asphalt for joint density will be based on the average of all of the joint densities taken from the sublots. If the average joint density of the lot so established equals or exceeds 92%, the lot will be acceptable. If the average joint density of the lot is less than 92%, the Contractor shall stop production and evaluate the method of compacting joints. Production may resume once the reason for poor compaction has been determined and appropriate measures have been taken to ensure proper compaction.

**e. Grade.** The final finished surface of the pavement of the completed project shall be surveyed to verify that the grade elevations and cross-sections shown on the plans do not deviate more than 1/2 inch (12 mm) vertically.

Cross-sections of the pavement shall be taken at a minimum 50-foot (15-m) longitudinal spacing and at all longitudinal grade breaks. Minimum cross-section grade points shall include grade at centerline,  $\pm$  10 feet of centerline, and edge of taxiway pavement.

The survey and documentation shall be stamped and signed by a licensed surveyor. Payment for sublots that do not meet grade for over 25% of the sublot shall not be more than 95%.

**f. Profilograph roughness for QA Acceptance.** The final profilograph shall be the full length of the project to facilitate testing of roughness between lots. The Contractor, in the presence of the RPR shall perform a profilograph roughness test on the completed project with a profilograph meeting the requirements of ASTM E1274 or a Class I inertial profiler meeting ASTM E950. Data and results shall be provided within [ 48 hrs ] of profilograph roughness tests.

The pavement shall have an average profile index less than 15 inches per mile per 1/10 mile. The equipment shall utilize electronic recording and automatic computerized reduction of data to indicate "must grind" bumps and the Profile Index for the pavement using a 0.2-inch (5 mm) blanking band. The bump template must span one inch (25 mm) with an offset of 0.4 inches (10 mm). The profilograph must be calibrated prior to use and operated by a factory or State DOT approved, trained operator. Profilograms shall be recorded on a longitudinal scale of one inch (25 mm) equals 25 feet (7.5 m) and a vertical scale of one inch (25 mm) equals one inch (25 mm). Profilograph shall be performed one foot right and left of project centerline and 15 feet (4.5 m) right and left of project centerline. Any areas that indicate "must grind" shall be corrected with diamond grinding per paragraph 401-4.15 or by removing and replacing full depth of surface course, as directed by the Engineer. 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.

### 403-6.3 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 403-6.1. Only one resampling per lot will be permitted.

(1) A redefined mat density will be calculated for the resampled lot. The number of tests used to calculate the redefined mat density 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 mat density for a resampled lot will be used to evaluate the acceptance of that lot in accordance with paragraph 403-6.2.

**c. Outliers.** Check for outliers in accordance with ASTM E178, at a significance level of 5%. Outliers will be discarded and density determined using the remaining test values.

## METHOD OF MEASUREMENT

**403-7.1 Measurement.** Plant mix asphalt mix pavement shall be measured by the number of tons (kg) of asphalt pavement used in the accepted work. Recorded batch weights or truck scale weights will be used to determine the basis for the tonnage.

## BASIS OF PAYMENT

**403-8.1 Payment.** Payment for a lot of asphalt mixture meeting all acceptance criteria as specified in paragraph 403-6.2 shall be made at the contract unit price per ton (kg) for asphalt. 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.

Payment will be made under:

Item P-403-8.1	Asphalt Base Course - per ton (kg)
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## REFERENCES

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

ASTM International (ASTM)

ASTM 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- $\mu$ m (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 C183	Standard Practice for Sampling and the Amount of Testing of Hydraulic Cement
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 Bituminous Paving Mixtures
ASTM D1073	Standard Specification for Fine Aggregate for Bituminous Paving Mixtures
ASTM D1074	Standard Test Method for Compressive Strength of Bituminous Mixtures
ASTM D1461	Standard Test Method for Moisture or Volatile Distillates in Bituminous Paving Mixtures
ASTM D2041	Standard Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
ASTM D2172	Standard Test Method for Quantitative Extraction of Bitumen from 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 D4125	Standard Test Methods for Asphalt Content of Bituminous mixtures by the Nuclear Method

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 D5444	Standard Test Method for Mechanical Size Analysis of Extracted Aggregate
ASTM D5581	Standard Test Method for Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus (6 inch-Diameter Specimen)
ASTM D5821	Standard Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate
ASTM D6307	Standard Test Method for Asphalt Content of Hot-Mix Asphalt by Ignition Method
ASTM D6373	Standard Specification for Performance Graded Asphalt Binder
ASTM D6752	Standard Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Automatic Vacuum Sealing Method
ASTM D6925	Standard Test Method for Preparation and Determination of the Relative Density of Hot Mix Asphalt (HMA) Specimens by Means of the SuperPave Gyrotory Compactor
ASTM D6926	Standard Practice for Preparation of Bituminous Specimens Using Marshall Apparatus
ASTM D6927	Standard Test Method for Marshall Stability and Flow of Bituminous Mixtures
ASTM D6995	Standard Test Method for Determining Field VMA based on the Maximum Specific Gravity of the Mix (Gmm)
ASTM E11	Standard Specification for Woven Wire Test Sieve Cloth and Test Sieves
ASTM E178	Standard Practice for Dealing with Outlying Observations
ASTM 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 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)

MS-2 Mix Design Manual, 7th Edition

MS-26 Asphalt Binder Handbook  
AI State Binder Specification Database

## FAA Orders

5300.1 Modifications to Agency Airport Design, Construction, and  
Equipment Standards

## Federal Highway Administration (FHWA)

Long Term Pavement Performance Binder program

## Software

FAARFIELD

**END OF ITEM P-403**





## Part 9– Miscellaneous

### Item P-602 Emulsified Asphalt Prime Coat

#### DESCRIPTION

**602-1.1** This item shall consist of an application of emulsified asphalt material on the prepared base course in accordance with these specifications and in reasonably close conformity to the lines shown on the plans.

#### MATERIALS

**602-2.1 Emulsified Asphalt material.** The emulsified asphalt material shall be as specified in ASTM D3628 for use as a prime coat appropriate to local conditions. The Contractor shall provide a copy of the manufacturer's Certificate of Analysis (COA) for the emulsified asphalt material. The COA shall be provided to and approved by the Resident Project Representative (RPR) before the emulsified asphalt material is applied. The furnishing of the COA for the emulsified 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

**602-3.1 Weather limitations.** The emulsified asphalt prime coat shall be applied only when the existing surface is dry; the atmospheric temperature is 50°F (10°C) or above, and 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.

**602-3.2 Equipment.** The equipment shall include a self-powered pressure asphalt material distributor and equipment for heating asphalt material.

Provide a distributor with pneumatic tires of such size and number that the load produced on the base surface does not exceed 65.0 psi (4.5 kg/sq cm) of tire width to prevent rutting, shoving or otherwise damaging the base, surface or other layers in the pavement structure. Design and equip the distributor to spray the asphalt material in a uniform coverage at the specified temperature, at readily determined and controlled rates from 0.05 to 1.0 gallons per square yard (0.23 to 4.5 L/square meter), with a pressure range of 25 to 75 psi (172.4 to 517.1 kPa) and with an allowable variation from the specified rate of not more than ±5%, and at variable widths. Include with the distributor equipment a separate power unit for the bitumen pump, full-circulation spray bars, tachometer, pressure gauges, volume-measuring devices, adequate heaters for heating of materials to the proper application temperature, a thermometer for reading the temperature of tank contents, and a hand hose attachment suitable for applying asphalt material manually to areas inaccessible to the distributor. Equip the distributor to circulate and agitate the asphalt material during the heating process. If the distributor is not equipped with an operable quick shutoff valve, the prime operations shall be started and stopped on building paper.

A power broom and power blower suitable for cleaning the surfaces to which the asphalt coat is to be applied, shall be provided.

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.

**602-3.3 Application of emulsified asphalt material.** Immediately before applying the prime coat, the full width of the surface to be primed shall be swept with a power broom to remove all loose dirt and other objectionable material.

The asphalt emulsion material shall be uniformly applied with an asphalt distributor at the rate of 0.15 to 0.30 gallons per square yard (0.68 to 1.36 liters per square meter) depending on the base course surface texture. The type of asphalt material and application rate shall be approved by the RPR prior to application.

Following application of the emulsified asphalt material and prior to application of the succeeding layer of pavement, allow the asphalt coat to cure and to obtain evaporation of any volatiles or moisture. Maintain the coated surface until the succeeding layer of pavement is placed, by protecting the surface against damage and by repairing and recoating deficient areas. Allow the prime coat to cure without being disturbed for a period of at least 48 hours or longer, as may be necessary to attain penetration into the treated course. Furnish and spread sand to effectively blot up and cure excess asphalt material. The Contractor shall remove blotting sand prior to asphalt concrete lay down operations at no additional expense to the Owner. Keep traffic off surfaces freshly treated with asphalt material. Provide sufficient warning signs and barricades so that traffic will not travel over freshly treated surfaces.

**602-3.4 Trial application rates.** The Contractor shall apply a minimum of three lengths of at least 100 feet (30 m) for the full width of the distributor bar to evaluate the amount of emulsified asphalt material that can be satisfactorily applied with the equipment. Apply three different application rates of emulsified asphalt materials within the application range specified in paragraph 602-3.3. Other trial applications can be made using various amounts of material as directed by the RPR. The trial application is to demonstrate the equipment can uniformly apply the emulsified asphalt material within the rates specified and determine the application rate for the project.

**602-3.5 Freight and waybills.** The Contractor shall submit waybills and delivery tickets during the progress of the work. Before the final estimate 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

**602-4.1** The emulsified asphalt material for prime coat shall be measured by the gallon (liter). Volume shall be corrected to the volume at 60°F (16°C) in accordance with ASTM D4311. 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

**602-5.1** Payment shall be made at the contract unit price per gallon (liter) for emulsified asphalt prime coat. This price shall be full compensation for furnishing all materials and for all preparation, delivering, and applying the materials, and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

Item P-602-5.1	Emulsified Asphalt Prime Coat - per gallon (liter)
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### REFERENCES

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

ASTM International (ASTM)

ASTM 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 OF ITEM P-602**



## 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)	.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 (liter) 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 (liter)
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**REFERENCES**

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

ASTM International (ASTM)

ASTM 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-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
3/4 inch (19 mm)	67
1/2 inch (12.5 mm)	7

**610-2.2.1 Coarse Aggregate susceptibility to durability (D) cracking.** Not used.

**610-2.3 Fine aggregate.** The fine aggregate for concrete shall meet all fine aggregate requirements of ASTM C33.

**610-2.4 Cement.** Cement shall conform to the requirements of ASTM C150 Type I.

#### 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 reinforcing steel, welded steel wire fabric, and welded deformed steel fabric conforming to the requirements of ASTM A615, ASTM A706, ASTM A775, ASTM A934, and ASTM A1064 .

**610-2.11 Materials for curing concrete.** Curing materials shall conform to ASTM C309 for White-pigmented Liquid Membrane-Forming Compound, Type 2, Class B.

## 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 85°F (30 °C), 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.

### BASIS OF PAYMENT

**610-6.1** Concrete shall be considered incidental and no separate payment shall be made

### REFERENCES

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

ASTM International (ASTM)

ASTM A184	Standard Specification for Welded Deformed Steel Bar Mats for Concrete Reinforcement
ASTM A615	Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM A704	Standard Specification for Welded Steel Plain Bar or Rod Mats for Concrete Reinforcement
ASTM A706	Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement
ASTM A775	Standard Specification for Epoxy-Coated Steel Reinforcing Bars
ASTM A884	Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement
ASTM A934	Standard Specification for Epoxy-Coated Prefabricated Steel Reinforcing Bars
ASTM A1064	Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
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)
<u>ASTM C1365</u>	<u>Standard Test Method for Determination of the Proportion of Phases in Portland Cement and Portland-Cement Clinker Using X-Ray Powder Diffraction Analysis</u>
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 <sup>1</sup>				Glass Beads <sup>2</sup>	
Type	Color	Fed Std. 595 Number	Application Rate Maximum	Type	Application Rate Minimum
II	Yellow	33538 or 33655	115 ft <sup>2</sup> /gal (2.8 m <sup>2</sup> /l)	III	10 lb/gal (1.2 kg/l)

<sup>1</sup> See paragraph 620-2.2a

<sup>2</sup> 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. 33538 or 33655

**Waterborne.** Paint shall meet the requirements of Federal Specification TT-P-1952F, Type II. The non-volatile portion of the vehicle for all paint types shall be composed of a 100% acrylic polymer as determined by infrared spectral analysis.

**(f) Reflective media.** Glass beads for white and yellow paint shall meet the requirements for Federal Specification TT-B-1325D Type I, Gradation A.

Glass beads for red and pink paint shall meet the requirements for 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 and green paint.

Type III glass beads shall not be used in red and pink paint.

Federal Specification TT-B-1325D, Type III. Initial readings typically yield 600 mcd/m<sup>2</sup>/lux on white markings and 300 mcd/m<sup>2</sup>/lux on yellow markings at installation and once in service, the reflectance values are approximately the same as Type I beads.

## 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 contaminants that would reduce the bond between the paint and the pavement. Use of any chemicals or impact abrasives during surface preparation shall be approved in advance by the RPR. After the cleaning operations, sweeping, blowing, or rinsing with pressurized water shall be performed to ensure the surface is clean and free of grit or other debris left from the cleaning process.

**a. Preparation of new pavement surfaces.** The area to be painted shall be cleaned by broom, blower, water blasting, or by other methods approved by the RPR to remove all contaminants, including PCC curing compounds, minimizing damage to the pavement surface.

**b. Preparation of pavement to remove existing markings.** Existing pavement markings shall be removed by rotary grinding, water blasting, or by other methods approved by the RPR minimizing damage to the pavement surface. The removal area may need to be larger than the area of the 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**

<b>Dimension and Spacing</b>	<b>Tolerance</b>
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 readings 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 <sup>2</sup> /lux		
	White	Yellow	Red
Initial Type I	300	175	35
Initial Type III	600	300	35
Initial Thermoplastic	225	100	35
All materials, remark when less than <sup>1</sup>	100	75	10

<sup>1</sup> 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 surface preparation shall be measured by the number of square feet (square meters) for each type of surface preparation specified in paragraph 620-3.3.

**620-4.1b** The quantity of markings shall be paid for shall be measured by the number of square feet (square meters) of painting.

**620-4.1c** The quantity of reflective media shall be paid for by the number of pounds (kg) of reflective media.

### 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.

Payment will be made under:

Item P-620-5.1                      Taxiway Markings per square foot (square meter)

### 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 D476                      Standard Classification for Dry Pigmentary Titanium Dioxide Products

ASTM D968	Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive
ASTM D1652	Standard Test Method for Epoxy Content of Epoxy Resins
ASTM D2074	Standard Test Method for Total, Primary, Secondary, and Tertiary Amine Values of Fatty Amines by Alternative Indicator Method
ASTM D2240	Standard Test Method for Rubber Property - Durometer Hardness
ASTM D7585	Standard Practice for Evaluating Retroreflective Pavement Markings Using Portable Hand-Operated Instruments
ASTM E303	Standard Test Method for Measuring Surface Frictional Properties Using the British Pendulum Tester
ASTM E1710	Standard Test Method for Measurement of Retroreflective Pavement Marking Materials with CEN-Prescribed Geometry Using a Portable Retroreflectometer
ASTM E2302	Standard Test Method for Measurement of the Luminance Coefficient Under Diffuse Illumination of Pavement Marking Materials Using a Portable Reflectometer
ASTM G154	Standard Practice for Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Nonmetallic Materials
Code of Federal Regulations (CFR)	
40 CFR Part 60, Appendix A-7, Method 24	Determination of volatile matter content, water content, density, volume solids, and weight solids of surface coatings
29 CFR Part 1910.1200 Hazard Communication	
Federal Specifications (FED SPEC)	
FED SPEC TT-B-1325D	Beads (Glass Spheres) Retro-Reflective
FED SPEC TT-P-1952F	Paint, Traffic and Airfield Marking, Waterborne
FED STD 595	Colors used in Government Procurement
Commercial Item Description	
A-A-2886B	Paint, Traffic, Solvent Based
Advisory Circulars (AC)	
AC 150/5340-1	Standards for Airport Markings
AC 150/5320-12	Measurement, Construction, and Maintenance of Skid Resistant Airport Pavement Surfaces

**END OF ITEM P-620**



## Part 10– Fencing

### 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.** Barbed wire shall be 2-strand 12-1/2 gauge zinc-coated wire with 4-point barbs and shall conform to the requirements of **ASTM A121, Class 3**.

**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 pipe 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 of 3000 psi (2670 kPa).

**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 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 - per linear foot (meter)
Item F-162-5.2	Vehicle Gates - 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.

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 Marcellled 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**



## Part 11 – Drainage

### Item D-701 Pipe for Storm Drains and Culverts

#### DESCRIPTION

**701-1.1** This item shall consist of the construction of pipe culverts and storm drains in accordance with these specifications and in reasonably close conformity with the lines and grades shown on the plans.

#### MATERIALS

**701-2.1** Materials shall meet the requirements shown on the plans and specified below. Underground piping and components used in drainage systems for terminal and aircraft fueling ramp drainage shall be noncombustible and inert to fuel in accordance with National Fire Protection Association (NFPA) 415.

**701-2.2 Pipe.** The pipe shall be of the type called for on the plans or in the proposal and shall be in accordance with the following appropriate requirements:

AASHTO R73	Standard Practice for Evaluation of Precast Concrete Drainage Productions
ASTM C76	Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
ASTM C1479	Standard Practice for Installation of Precast Concrete Sewer, Storm Drain, and Culvert Pipe Using Standard Installations
ASTM C1786	Standard Specification for Segmental Precast Reinforced Concrete Box Sections for Culverts, Storm Drains, and Sewers Designed According to AASHTO LRFD
ASTM C1840	Standard Practice for Inspection and Acceptance of Installed Reinforced Concrete Culvert, Storm Drain, and Storm Sewer Pipe

**701-2.3 Concrete.** Concrete for pipe cradles shall have a minimum compressive strength of 2000 psi (13.8 MPa) at 28 days and conform to the requirements of ASTM C94.

**701-2.4 Rubber gaskets.** Rubber gaskets for rigid pipe shall conform to the requirements of ASTM C443. Rubber gaskets for PVC pipe, polyethylene, and polypropylene pipe shall conform to the requirements of ASTM F477.

**701-2.5 Joint mortar.** Pipe joint mortar shall consist of one part Portland cement and two parts sand. The Portland cement shall conform to the requirements of ASTM C150, Type I. The sand shall conform to the requirements of ASTM C144.

**701-2.6 Joint fillers.** Poured filler for joints shall conform to the requirements of ASTM D6690.

**701-2.7 Plastic gaskets.** Not used.

**701-2.8. Controlled low-strength material (CLSM).** Not used.

**701-2.9 Precast box culverts.** Manufactured in accordance with and conforming to ASTM C1433.

**701-2.10 Precast concrete pipe.** Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or another RPR approved third party certification program.

### CONSTRUCTION METHODS

**701-3.1 Excavation.** The width of the pipe trench shall be sufficient to permit satisfactory jointing of the pipe and thorough tamping of the bedding material under and around the pipe, but it shall not be less than the external diameter of the pipe plus 12 inches (300 mm) on each side. The trench walls shall be approximately vertical.

The Contractor shall comply with all current federal, state and local rules and regulations governing the safety of men and materials during the excavation, installation and backfilling operations. Specifically, the Contractor shall observe that all requirements of the Occupational Safety and Health Administration (OSHA) relating to excavations, trenching and shoring are strictly adhered to. The width of the trench shall be sufficient to permit satisfactorily jointing of the pipe and thorough compaction of the bedding material under the pipe and backfill material around the pipe, but it shall not be greater than the widths shown on the plans trench detail.

Where rock, hardpan, or other unyielding material is encountered, the Contractor shall remove it from below the foundation grade for a depth of at least 8 inch (200 mm) or 1/2 inch (12 mm) for each foot of fill over the top of the pipe (whichever is greater) but for no more than three-quarters of the nominal diameter of the pipe. The excavation below grade should be filled with granular material to form a uniform foundation.

Where a firm foundation is not encountered at the grade established, due to soft, spongy, or other unstable soil, the unstable soil shall be removed and replaced with approved granular material for the full trench width. The RPR shall determine the depth of removal necessary. The granular material shall be compacted to provide adequate support for the pipe.

The excavation for pipes placed in embankment fill shall not be made until the embankment has been completed to a height above the top of the pipe as shown on the plans.

**701-3.2 Bedding.** The bedding surface for the pipe shall provide a foundation of uniform density to support the pipe throughout its entire length.

**a. Rigid pipe.** The pipe bedding shall be constructed uniformly for the full length of the pipe barrel, as required on the plans. The maximum aggregate size shall be 1 in when the bedding thickness is less than 6 inches, and 1-1/2 in when the bedding thickness is greater than 6 inches. Bedding shall be loosely placed uncompacted material under the middle third of the pipe prior to placement of the pipe.

**b. Flexible pipe.** For flexible pipe, the bed shall be roughly shaped to fit the pipe, and a bedding blanket of sand or fine granular material shall be provided as follows:

**Flexible Pipe Bedding**

Pipe Corrugation Depth		Minimum Bedding Depth	
inch	mm	inch	mm
1/2	12	1	25
1	25	2	50
2	50	3	75
2-1/2	60	3-1/2	90

**c. Other pipe materials.** For PVC, polyethylene, polypropylene, or fiberglass pipe, the bedding material shall consist of coarse sands and gravels with a maximum particle size of 3/4 inches (19 mm). For pipes installed under paved areas, no more than 12% of the material shall pass the No. 200 (0.075 mm) sieve. For all other areas, no more than 50% of the material shall pass the No. 200 (0.075 mm) sieve. The bedding shall have a thickness of at least 6 inches (150 mm) below the bottom of the pipe and extend up around the pipe for a depth of not less than 50% of the pipe's vertical outside diameter.

**701-3.3 Laying pipe.** The pipe laying shall begin at the lowest point of the trench and proceed upgrade. The lower segment of the pipe shall be in contact with the bedding throughout its full length. Bell or groove ends of rigid pipes and outside circumferential laps of flexible pipes shall be placed facing upgrade.

Paved or partially lined pipe shall be placed so that the longitudinal center line of the paved segment coincides with the flow line.

Elliptical and elliptically reinforced concrete pipes shall be placed with the manufacturer's reference lines designating the top of the pipe within five degrees of a vertical plane through the longitudinal axis of the pipe.

**701-3.4 Joining pipe.** Joints shall be made with (1) cement mortar, (2) cement grout, (3) rubber gaskets, (4) plastic gaskets, or (5) coupling bands.

Mortar joints shall be made with an excess of mortar to form a continuous bead around the outside of the pipe and shall be finished smooth on the inside. Molds or runners shall be used for grouted joints to retain the poured grout. Rubber ring gaskets shall be installed to form a flexible watertight seal.

**a. Concrete pipe.** Concrete pipe may be either bell and spigot or tongue and groove. Pipe sections at joints shall be fully seated and the inner surfaces flush and even. Concrete pipe joints shall be sealed with butyl mastic meeting ASTM C990 or mortar when soil tight joints are required. Joints shall be thoroughly wetted before applying mortar or grout.

**b. Metal pipe.** Metal pipe shall be firmly joined by form-fitting bands conforming to the requirements of ASTM A760 for steel pipe and AASHTO M196 for aluminum pipe.

**c. PVC, Polyethylene, or Polypropylene pipe.** Joints for PVC, Polyethylene, or Polypropylene pipe shall conform to the requirements of ASTM D3212 when leak resistant joints are required. Joints for PVC and Polyethylene pipe shall conform to the requirements of AASHTO M304 when soil tight joints are required. Fittings for polyethylene pipe shall conform to the requirements of AASHTO M252 or ASTM M294. Fittings for polypropylene pipe shall conform to ASTM F2881, ASTM F2736, or ASTM F2764.

**701-3.5 Embedment and Overfill.** Pipes shall be inspected before any fill material is placed; any pipes found to be out of alignment, unduly settled, or damaged shall be removed and re-laid or replaced at the Contractor's expense.

#### **701-3.5-1 Embedment Material Requirements**

**a. Concrete Pipe.** Embedment material and compaction requirements shall be in accordance with the applicable Type of Standard Installation (Types 1, 2, 3, or 4) per ASTM C1479. If a concrete cradle or CLSM embedment material is used, it shall conform to the plan details.

**b. Plastic and fiberglass Pipe.** Embedment material shall meet the requirements of ASTM D3282, A-1, A-2-4, A-2-5, or A-3. Embedment material shall be free of organic material, stones larger than 1.5 inches in the greatest dimension, or frozen lumps. Embedment material shall extend to 12 inches above the top of the pipe.

**c. Metal Pipe.** Embedment material shall be granular as specified in the contract document and specifications, and shall be free of organic material, rock fragments larger than 1.5 inches in the greatest

dimension and frozen lumps. As a minimum, backfill materials shall meet the requirements of ASTM D3282, A-1, A-2, or A-3. Embedment material shall extend to 12 inches above the top of the pipe.

#### **701-3.5-2 Placement of Embedment Material**

The embedment material shall be compacted in layers not exceeding 6 inches (150 mm) on each side of the pipe and shall be brought up one foot (30 cm) above the top of the pipe or to natural ground level, whichever is greater. Thoroughly compact the embedment material under the haunches of the pipe without displacing the pipe. Material shall be brought up evenly on each side of the pipe for the full length of the pipe.

When the top of the pipe is above the top of the trench, the embedment material shall be compacted in layers not exceeding 6 inches (150 mm) and shall be brought up evenly on each side of the pipe to one foot (30 cm) above the top of the pipe. All embedment material shall be compacted to a density required under Item P-152.

Concrete cradles and flowable fills, such as controlled low strength material (CLSM) or controlled density fill (CDF), may be used for embedment provided adequate flotation resistance can be achieved by restraints, weighing, or placement technique.

It shall be the Contractor's responsibility to protect installed pipes and culverts from damage due to construction equipment operations. The Contractor shall be responsible for installation of any extra strutting or backfill required to protect pipes from the construction equipment.

#### **701-3.6 Overfill**

Pipes shall be inspected before any overfill is in place. Any pipes found to be out of alignment, unduly settled, or damaged shall be removed and relaid or replaced at the Contractor's expense. Evaluation of any damage to RCP shall be evaluated based on AASHTO R73.

Overfill material shall be placed and compacted in layers as required to achieve compaction to at least 95 percent standard proctor per ASTM D698. The soil shall contain no debris, organic matter, frozen material, or stones with a diameter greater than one half the thickness of the compacted layers being placed.

#### **701-3.7 Inspection Requirements**

An initial post installation inspection shall be performed by the RPR no sooner than 30 days after completion of installation and final backfill. Clean or flush all lines prior to inspection.

Use a camera with lighting suitable to allow a clear picture of the entire periphery of the pipe interior. Center the camera in the pipe both vertically and horizontally and be able to pan and tilt to a 90 degree angle with the axis of the pipe rotating 360 degrees. Use equipment to move the camera through the pipe that will not obstruct the camera's view or interfere with proper documentation of the pipe's condition. The video image shall be clear, focused, and relatively free from roll, static, or other image distortion qualities that would prevent the reviewer from evaluating the condition of the pipe.

Incorporate specific inspection requirements for the various types of pipes beneath the general inspection requirements.

Reinforced concrete pipe shall be inspected, evaluated, and reported on in accordance with ASTM C1840, "Standard Practice for Inspection and Acceptance of Installed Reinforced Concrete Culvert, Storm Drain, and Storm Sewer Pipe." Any issues reported shall include still photo and video documentation. The zoom ratio shall be provided for all still or video images that document any issues of concern by the inspection firm.



### METHOD OF MEASUREMENT

**701-4.1** The length of pipe shall be measured in linear feet (m) of pipe in place, completed, and accepted. It shall be measured along the centerline of the pipe from end or inside face of structure to the end or inside face of structure, whichever is applicable. The class, types and size of pipe shall be measured separately. All fittings shall be included in the footage as typical pipe sections in the pipe being measured.

### BASIS OF PAYMENT

**701-5.0** These prices shall fully compensate the Contractor for furnishing all materials and for all preparation, excavation, and installation of these materials; and for all labor, equipment, tools, and incidentals necessary to complete the item.

**701-5.1** Payment will be made at the contract unit price per linear foot (meter) for each class and size of pipe.

Payment will be made under:

Item 701-5.1	18 Inch ASTM C-76, Class III RCP per linear foot (meter)
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### REFERENCES

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

American Association of State Highway and Transportation Officials (AASHTO)

AASHTO M167	Standard Specification for Corrugated Steel Structural Plate, Zinc-Coated, for Field-Bolted Pipe, Pipe-Arches, and Arches
AASHTO M190	Standard Specification for Bituminous-Coated Corrugated Metal Culvert Pipe and Pipe Arches
AASHTO M196	Standard Specification for Corrugated Aluminum Pipe for Sewers and Drains
AASHTO M219	Standard Specification for Corrugated Aluminum Alloy Structural Plate for Field-Bolted Pipe, Pipe-Arches, and Arches
AASHTO M243	Standard Specification for Field Applied Coating of Corrugated Metal Structural Plate for Pipe, Pipe-Arches, and Arches
AASHTO M252	Standard Specification for Corrugated Polyethylene Drainage Pipe
AASHTO M294	Standard Specification for Corrugated Polyethylene Pipe, 300- to 1500-mm (12- to 60-in.) Diameter
AASHTO M304	Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Wall Drain Pipe and Fittings Based on Controlled Inside Diameter
AASHTO MP20	Standard Specification for Steel Reinforced Polyethylene (PE) Ribbed Pipe, 300- to 900-mm (12- to 36-in.) Diameter
ASTM International (ASTM)	
ASTM A760	Standard Specification for Corrugated Steel Pipe, Metallic Coated for Sewers and Drains

ASTM A761	Standard Specification for Corrugated Steel Structural Plate, Zinc Coated, for Field-Bolted Pipe, Pipe-Arches, and Arches
ASTM A762	Standard Specification for Corrugated Steel Pipe, Polymer Precoated for Sewers and Drains
ASTM A849	Standard Specification for Post-Applied Coatings, Pavings, and Linings for Corrugated Steel Sewer and Drainage Pipe
ASTM B745	Standard Specification for Corrugated Aluminum Pipe for Sewers and Drains
ASTM C14	Standard Specification for Nonreinforced Concrete Sewer, Storm Drain, and Culvert Pipe
ASTM C76	Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
ASTM C94	Standard Specification for Ready Mixed Concrete
ASTM C144	Standard Specification for Aggregate for Masonry Mortar
ASTM C150	Standard Specification for Portland Cement
ASTM C443	Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets
ASTM C506	Standard Specification for Reinforced Concrete Arch Culvert, Storm Drain, and Sewer Pipe
ASTM C507	Standard Specification for Reinforced Concrete Elliptical Culvert, Storm Drain and Sewer Pipe
ASTM C655	Standard Specification for Reinforced Concrete D-Load Culvert, Storm Drain and Sewer Pipe
ASTM C990	Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants
ASTM C1433	Standard Specification for Precast Reinforced Concrete Monolithic Box Sections for Culverts, Storm Drains, and Sewers
ASTM D1056	Standard Specification for Flexible Cellular Materials Sponge or Expanded Rubber
ASTM D3034	Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings
ASTM D3212	Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
ASTM D3262	Standard Specification for "Fiberglass" (Glass-Fiber Reinforced Thermosetting Resin) Sewer Pipe
ASTM D3282	Standard Practice for Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes
ASTM D4161	Standard Specification for "Fiberglass" (Glass-Fiber Reinforced Thermosetting Resin) Pipe Joints Using Flexible Elastomeric Seals
ASTM D6690	Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements

ASTM F477	Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe
ASTM F667	Standard Specification for 3 through 24 in. Corrugated Polyethylene Pipe and Fittings
ASTM F714	Standard Specification for Polyethylene (PE) Plastic Pipe (DR PR) Based on Outside Diameter
ASTM F794	Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe & Fittings Based on Controlled Inside Diameter
ASTM F894	Standard Specification for Polyethylene (PE) Large Diameter Profile Wall Sewer and Drain Pipe
ASTM F949	Standard Specification for Poly (Vinyl Chloride) (PVC) Corrugated Sewer Pipe with a Smooth Interior and Fittings
ASTM F2435	Standard Specification for Steel Reinforced Polyethylene (PE) Corrugated Pipe
ASTM F2562	Specification for Steel Reinforced Thermoplastic Ribbed Pipe and Fittings for Non-Pressure Drainage and Sewerage
ASTM F2736	Standard Specification for 6 to 30 in. (152 to 762 mm) Polypropylene (PP) Corrugated Single Wall Pipe and Double Wall Pipe
ASTM F2764	Standard Specification for 30 to 60 in. (750 to 1500 mm) Polypropylene (PP) Triple Wall Pipe and Fittings for Non-Pressure Sanitary Sewer Applications
ASTM F2881	Standard Specification for 12 to 60 in. (300 to 1500 mm) Polypropylene (PP) Dual Wall Pipe and Fittings for Non-Pressure Storm Sewer Applications
National Fire Protection Association (NFPA)	
NFPA 415	Standard on Airport Terminal Buildings, Fueling Ramp Drainage, and Loading Walkways

**END ITEM D-701**



## Item D-752 Concrete Culverts, Headwalls, and Miscellaneous Drainage Structures

### DESCRIPTION

**752-1.1** This item shall consist of reinforced concrete culverts, headwalls, and miscellaneous drainage structures constructed in accordance with these specifications, at the specified locations and conforming to the lines, grades, and dimensions shown on the plans or required by the RPR.

### MATERIALS

**752-2.1 Concrete.** Reinforced concrete shall meet the requirements of Item P-610.

### CONSTRUCTION METHODS

#### **752-3.1 Unclassified excavation.**

**a.** Trenches and foundation pits for structures or structure footings shall be excavated to the lines and grades and elevations shown on the plans. The excavation shall be of sufficient size to permit the placing of the full width and length of the structure or structure footings shown. The elevations of the bottoms of footings, as shown on the plans, shall be considered as approximate only; and the RPR may approve, in writing, changes in dimensions or elevations of footings necessary to secure a satisfactory foundation.

**b.** Boulders, logs, or any other objectionable material encountered in excavation shall be removed. All rock or other hard foundation material shall be cleaned of all loose material and cut to a firm surface either level, stepped, or serrated, as directed by the RPR. All seams or crevices shall be cleaned out and grouted. All loose and disintegrated rock and thin strata shall be removed. When concrete will rest on a surface other than rock, the bottom of the excavation shall not be disturbed and excavation to final grade shall not be made until immediately before the concrete or reinforcing steel is placed.

**c.** The Contractor shall do all bracing, sheathing, or shoring necessary to perform and protect the excavation and the structure as required for safety or conformance to governing laws. The cost of bracing, sheathing, or shoring shall be included in the unit price bid for excavation.

**d.** All bracing, sheathing, or shoring shall be removed by the Contractor after the completion of the structure. Removal shall not disturb or damage the finished concrete. The cost of removal shall be included in the unit price bid for excavation.

**e.** After each excavation is completed, the Contractor shall notify the RPR. No concrete or reinforcing steel shall be placed until the RPR has approved the depth of the excavation and the character of the foundation material.

#### **752-3.2 Backfilling.**

**a.** After a structure has been completed, backfilling with approved material shall be accomplished by applying the fill in horizontal layers not to exceed 8 inches (200 mm) in loose depth, and compacted. The field density of the compacted material shall be at least 90% of the maximum density for cohesive soils and 95% of the maximum density for noncohesive soils. The maximum density shall be determined in accordance with ASTM D698. The field density shall be determined in accordance with ASTM D1556.

**b.** No backfilling shall be placed against any structure until approved by the RPR. For concrete, approval shall not be given until the concrete has been in place seven (7) days, or until tests establish that the concrete has attained sufficient strength to withstand any pressure created by the backfill or the placement methods.

**c.** Fill placed around concrete culverts shall be deposited on each side at the same time and to approximately the same elevation. All slopes bounding or within the areas to be backfilled shall be stepped or serrated to prevent wedge action against the structure.

**d.** Backfill will not be measured for direct payment. Performance of this work shall be considered as a subsidiary obligation of the Contractor, covered under the contract unit price for “unclassified excavation for structures.”

**752-3.3 Weep holes.** Weep holes shall be constructed as shown on the plans.

**752-3.4 Cleaning and restoration of site.** After the backfill is completed, the Contractor shall dispose of all surplus material, dirt, and rubbish from the site. Surplus dirt may be deposited in embankment, shoulders, or as approved by the RPR. The Contractor shall restore all disturbed areas to their original condition. The Contractor shall remove all tools and equipment, leaving the entire site free, clear, and in good condition.

#### METHOD OF MEASUREMENT

**752-4.1** The quantity of unclassified excavation for structures shall be the number of cubic yards (cubic meters), measured in original position, of material excavated in accordance with the plans, or as approved by the RPR; but in no case shall any yardage be included in the measurement for payment which is outside of a volume bounded by vertical planes 18 inches (0.5 m) outside of and parallel to the neat lines of the footings.

**752-4.2** Concrete shall be measured by the number of cubic yards (cubic meters) of concrete, complete in place and accepted. In computing the yardage of concrete for payment, the dimensions used shall be those shown on the plans or approved by the RPR. No measurements or other allowances shall be made for forms, false work, cofferdams, pumping, bracing, expansion joints, or finishing of the concrete. No deductions in yardage shall be made for the volumes of reinforcing steel or embedded items.

**752-4.3** The quantity of reinforcing steel shall be the calculated theoretical number of pounds (km) placed as shown on the plans, complete in place and accepted. The unit weight used for deformed bars shall be the weight of plain square or round bars, as the case may be, of equal nominal size.

#### BASIS OF PAYMENT

**752-5.1** Payment will be made at the contract unit price per cubic yard (cubic meter) for unclassified excavation for structures.

**752-5.2** Payment will be made at the contract unit price per cubic yard (cubic meter) for concrete for the structures.

**752-5.3** Payment will be made at the contract unit price per pound (km) for reinforcing steel.

These prices shall be full compensation for furnishing all materials and for all preparation, excavation, and placing the materials, and for all labor, equipment, tools, and incidentals necessary to complete the structure.

**752-5.4** Payment will be made at the contract unit price per each safety end treatment installed in place as shown and specified in the plans.

Payment will be made under:

Item D-752-5.1	Unclassified Excavation for Structures - per cubic yard (cubic meter)
Item D-752-5.2	Structural Concrete - per cubic yard (cubic meter)
Item D-752-5.3	Reinforcing Steel - per pound (km)
Item D-752-5.4	Pre-Cast Safety End Treatments for Culvert Pipe – 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.

ASTM International (ASTM)

ASTM D698	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lb/ft <sup>3</sup> (600 kN-m/m <sup>3</sup> ))
ASTM D1556	Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method

**END OF ITEM D-752**

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## Part 12 – Turfing

### Item T-901 Seeding

#### DESCRIPTION

**901-1.1** This item shall consist of soil preparation, seeding, and fertilizing the areas shown on the plans or as directed by the RPR in accordance with these specifications.

#### MATERIALS

**901-2.1 Seed.** The species and application rates of grass, legume, and cover-crop seed furnished shall be those stipulated herein. Seed shall conform to the requirements of Federal Specification JJJ-S-181, Federal Specification, Seeds, Agricultural.

Seed shall be furnished separately or in mixtures in standard containers labeled in conformance with the Agricultural Marketing Service (AMS) Seed Act and applicable state seed laws with the seed name, lot number, net weight, percentages of purity and of germination and hard seed, and percentage of maximum weed seed content clearly marked for each kind of seed. The Contractor shall furnish the RPR duplicate signed copies of a statement by the vendor certifying that each lot of seed has been tested by a recognized laboratory for seed testing within six (6) months of date of delivery. This statement shall include: name and address of laboratory, date of test, lot number for each kind of seed, and the results of tests as to name, percentages of purity and of germination, and percentage of weed content for each kind of seed furnished, and, in case of a mixture, the proportions of each kind of seed. Wet, moldy, or otherwise damaged seed will be rejected.

Seeds shall be applied as follows: as per TxDOT Standard Specification.

#### 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.)
*	*	*	*

Seeding shall be performed during the period between February 1st and May 15th inclusive, 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 **1000 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 discing, 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.** Lime, if required, shall be applied separately, in the quantity specified, prior to the fertilizing and seeding operations. Not more than 220 pounds (100 kg) of lime shall be added to and mixed with each 100 gallons (380 liters) of water. 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.** Lime, if required, shall be sprayed only upon previously prepared seedbeds. After the applied lime mixture has dried, the lime shall be worked into the top 3 inches (75 mm), after which the seedbed shall again be properly graded and dressed to a smooth finish.

Mixtures of seed and fertilizer shall only be sprayed upon previously prepared seedbeds on which the lime, if required, shall already have been worked in. The mixtures shall be applied by means of a high-pressure spray that shall always be directed upward into the air so that the mixtures will fall to the ground like rain in a uniform spray. Nozzles or sprays shall never be directed toward the ground in such a manner as might produce erosion or runoff.

Particular care shall be exercised to ensure that the application is made uniformly and at the prescribed rate and to guard against misses and overlapped areas. Proper predetermined quantities of the mixture in accordance with specifications shall be used to cover specified sections of known area.

Checks on the rate and uniformity of application may be made by observing the degree of wetting of the ground or by distributing test sheets of paper or pans over the area at intervals and observing the quantity of material deposited thereon.

On surfaces that are to be mulched as indicated by the plans or designated by the RPR, seed and fertilizer applied by the spray method need not be raked into the soil or rolled. However, on surfaces on which mulch is not to be used, the raking and rolling operations will be required after the soil has dried.

**901-3.4 Maintenance of seeded areas.** The Contractor shall protect seeded areas against traffic or other use by warning signs or barricades, as approved by the RPR. Surfaces gullied or otherwise damaged 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 units acre (sq m) 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 (sq m) 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 901-5.1	Seeding - per acre (sq m)
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### REFERENCES

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

ASTM International (ASTM)

ASTM C602	Standard Specification for Agricultural Liming Materials
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Federal Specifications (FED SPEC)

FED SPEC	JJJ-S-181, Federal Specification, Seeds, Agricultural
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Advisory Circulars (AC)

AC 150/5200-33	Hazardous Wildlife Attractants on or Near Airports
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FAA/United States Department of Agriculture

	Wildlife Hazard Management at Airports, A Manual for Airport Personnel
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**END OF ITEM T-901**



## Item T-905 Topsoil

### DESCRIPTION

**905-1.1** This item shall consist of preparing the ground surface for topsoil application, removing topsoil from designated stockpiles or areas to be stripped on the site or from approved sources off the site, and placing and spreading the topsoil on prepared areas in accordance with this specification at the locations shown on the plans or as directed by the RPR.

### MATERIALS

**905-2.1 Topsoil.** Topsoil shall be the surface layer of soil with no admixture of refuse or any material toxic to plant growth, and it shall be reasonably free from subsoil and stumps, roots, brush, stones (2 inches (50 mm) or more in diameter), and clay lumps or similar objects. Brush and other vegetation that will not be incorporated with the soil during handling operations shall be cut and removed. Ordinary sod and herbaceous growth such as grass and weeds are not to be removed, but shall be thoroughly broken up and intermixed with the soil during handling operations. Heavy sod or other cover, which cannot be incorporated into the topsoil by discing or other means, shall be removed. The topsoil or soil mixture, unless otherwise specified or approved, shall have a pH range of approximately 5.5 pH to 7.6 pH, when tested in accordance with the methods of testing of the Association of Official Agricultural Chemists in effect on the date of invitation of bids. The organic content shall be not less than 3% nor more than 20% as determined by the wet-combustion method (chromic acid reduction). There shall be not less than 20% nor more than 80% of the material passing the 200 mesh (75  $\mu$ m) sieve as determined by the wash test in accordance with ASTM C117.

Natural topsoil may be amended by the Contractor with approved materials and methods to meet the above specifications.

**905-2.2 Inspection and tests.** Within 10 days following acceptance of the bid, the RPR shall be notified of the source of topsoil to be furnished by the Contractor. The topsoil shall be inspected to determine if the selected soil meets the requirements specified and to determine the depth to which stripping will be permitted. At this time, the Contractor may be required to take representative soil samples from several locations within the area under consideration and to the proposed stripping depths, for testing purposes as specified in paragraph 905-2.1.

### CONSTRUCTION METHODS

**905-3.1 General.** Areas to be topsoiled shall be shown on the plans. If topsoil is available on the site, the location of the stockpiles or areas to be stripped of topsoil and the stripping depths shall be shown on the plans.

Suitable equipment necessary for proper preparation and treatment of the ground surface, stripping of topsoil, and for the handling and placing of all required materials shall be on hand, in good condition, and approved by the RPR before the various operations are started.

**905-3.2 Preparing the ground surface.** Immediately prior to dumping and spreading the topsoil on any area, the surface shall be loosened by discs or spike-tooth harrows, or by other means approved by the RPR, to a minimum depth of 2 inches (50 mm) to facilitate bonding of the topsoil to the covered subgrade soil.

The surface of the area to be topsoiled shall be cleared of all stones larger than 2 inches (50 mm) in any diameter and all litter or other material which may be detrimental to proper bonding, the rise of capillary moisture, or the proper growth of the desired planting. Limited areas, as shown on the plans, which are too compact to respond to these operations shall receive special scarification.

Grades on the area to be topsoiled, which have been established by others as shown on the plans, shall be maintained in a true and even condition. Where grades have not been established, the areas shall be smooth-graded and the surface left at the prescribed grades in an even and compacted condition to prevent the formation of low places or pockets where water will stand.

**905-3.3 Obtaining topsoil.** Prior to the stripping of topsoil from designated areas, any vegetation, briars, stumps and large roots, rubbish or stones found on such areas, which may interfere with subsequent operations, shall be removed using methods approved by the RPR. Heavy sod or other cover, which cannot be incorporated into the topsoil by discing or other means shall be removed.

When suitable topsoil is available on the site, the Contractor shall remove this material from the designated areas and to the depth as directed by the RPR. The topsoil shall be spread on areas already tilled and smooth-graded, or stockpiled in areas approved by the RPR. Any topsoil stockpiled by the Contractor shall be rehandled and placed without additional compensation. Any topsoil that has been stockpiled on the site by others, and is required for topsoil purposes, shall be removed and placed by the Contractor. The sites of all stockpiles and areas adjacent thereto which have been disturbed by the Contractor shall be graded if required and put into a condition acceptable for seeding.

When suitable topsoil is secured off the airport site, the Contractor shall locate and obtain the supply, subject to the approval of the RPR. The Contractor shall notify the RPR sufficiently in advance of operations in order that necessary measurements and tests can be made. The Contractor shall remove the topsoil from approved areas and to the depth as directed. The topsoil shall be hauled to the site of the work and placed for spreading, or spread as required. Any topsoil hauled to the site of the work and stockpiled shall be rehandled and placed without additional compensation.

**905-3.4 Placing topsoil.** The topsoil shall be evenly spread on the prepared areas to a uniform depth of 2 inches (50 mm) after compaction, unless otherwise shown on the plans or stated in the special provisions. Spreading shall not be done when the ground or topsoil is frozen, excessively wet, or otherwise in a condition detrimental to the work. Spreading shall be carried on so that turfing operations can proceed with a minimum of soil preparation or tilling.

After spreading, any large, stiff clods and hard lumps shall be broken with a pulverizer or by other effective means, and all stones or rocks (2 inches (50 mm) or more in diameter), roots, litter, or any foreign matter shall be raked up and disposed of by the Contractor. After spreading is completed, the topsoil shall be satisfactorily compacted by rolling with a cultipacker or by other means approved by the RPR. The compacted topsoil surface shall conform to the required lines, grades, and cross-sections. Any topsoil or other dirt falling upon pavements as a result of hauling or handling of topsoil shall be promptly removed.

## METHOD OF MEASUREMENT

**905-4.1** Topsoil obtained on the site shall be measured by the number of cubic yards (cubic meters) of topsoil measured in its original position and stripped or excavated. Topsoil stockpiled by others and removed for topsoil by the Contractor shall be measured by the number of cubic yards (cubic meters) of topsoil measured in the stockpile. Topsoil shall be measured by volume in cubic yards (cubic meters) computed by the method of end areas.

**905-4.2** Topsoil obtained off the site shall be measured by the number of square yards (cubic meters) of topsoil measured in its original position and stripped or excavated. Topsoil shall be measured by volume in cubic yards (meters) computed by the method of end areas.



### BASIS OF PAYMENT

**905-5.1** Payment will be made at the contract unit price per cubic yard (cubic meter) for topsoil (obtained on the site). This price shall be full compensation for furnishing all materials and for all preparation, placing, and spreading of the materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

**905-5.2** Payment will be made at the contract unit price per cubic yard (cubic meter) for topsoil (obtained off the site). This price shall be full compensation for furnishing all materials and for all preparation, placing, and spreading of the materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item T-905-5.1	Topsoil (Obtained on Site or Removed from Stockpile - per cubic yard (cubic meter)
Item T-905-5.2	Topsoil (Furnished from Off the Site) - per square yard (cubic meter)

### REFERENCES

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

ASTM International (ASTM)

ASTM C117	Materials Finer than 75 $\mu\text{m}$ (No. 200) Sieve in Mineral Aggregates by Washing
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Advisory Circulars (AC)

AC 150/5200-33	Hazardous Wildlife Attractants on or Near Airports
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FAA/United States Department of Agriculture

Wildlife Hazard Management at Airports, A Manual for Airport Personnel

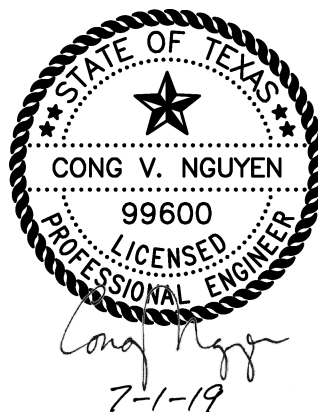
**END OF ITEM T-905**



PART 13 - LIGHTING INSTALLATION

**ELECTRICAL SPECIFICATIONS**

- ITEM L-108 - UNDERGROUND POWER CABLE FOR AIRPORTS
- ITEM L-110 - AIRPORTS UNDERGROUND ELECTRICAL DUCT BANKS AND CONDUITS
- ITEM L-115 - ELECTRICAL MANHOLES AND JUNCTION STRUCTURE
- ITEM L-125 - INSTALLATION OF AIRPORT LIGHTING SYSTEMS
- ITEM S-E16100 - BASIC MATERIALS AND METHODS FOR ELECTRICAL INSTALLATIONS
- ITEM S-E16200 - ELECTRIC UTILITY SERVICE
- ITEM S-E16300 - POWER DISTRIBUTION DEVICES
- ITEM S-E16400 - GATE SECURITY ACCESS CONTROL SYSTEM



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## Item L-108 Underground Power Cable for Airports

### DESCRIPTION

**108-1.1** This item shall consist of furnishing and installing power cables that are direct buried and furnishing and/or installing power cables within conduit or duct banks per these specifications at the locations shown on the plans. It includes excavation and backfill of trench for direct-buried cables only. Also included are the installation of counterpoise wires, ground wires, ground rods and connections, cable splicing, cable marking, cable testing, and all incidentals necessary to place the cable in operating condition as a completed unit to the satisfaction of the RPR. This item shall not include the installation of duct banks or conduit, trenching and backfilling for duct banks or conduit, or furnishing or installation of cable for FAA owned/operated facilities.

### EQUIPMENT AND MATERIALS

#### 108-2.1 General.

**a.** Airport lighting equipment and materials covered by advisory circulars (AC) shall be approved under the Airport Lighting Equipment Certification Program per AC 150/5345-53, current version.

**b.** All other equipment and materials covered by other referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification, when requested by the RPR.

**c.** Manufacturer's certifications shall not relieve the Contractor of the responsibility to provide materials per these specifications. Materials supplied and/or installed that do not comply with these specifications shall be removed (when directed by the RPR) and replaced with materials that comply with these specifications at the Contractor's cost.

**d.** All materials and equipment used to construct this item shall be submitted to the RPR for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify products or models applicable to this project. Indicate all optional equipment and delete any non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment to which they apply on each submittal sheet. Markings shall be made bold and clear with arrows or circles (highlighting is not acceptable). The Contractor is solely responsible for delays in the project that may accrue directly or indirectly from late submissions or resubmissions of submittals.

**e.** The data submitted shall be sufficient, in the opinion of the RPR, to determine compliance with the plans and specifications. The Contractor's submittals shall be electronically submitted in pdf format. 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. Conductors for use on 20 ampere primary airfield lighting series circuits shall be single conductor, seven strand, #6 AWG, L-824, 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 per ASTM B33. For voltage powered circuits, the equipment grounding conductor shall comply with NEC Article 250.

Ground rods shall be solid copper-clad steel. The ground rods shall be of the length and diameter specified on the plans, but in no case be less than 8 feet(2.4 m)long and 5/8 inch (16 mm) in diameter.

**108-2.4 Cable connections.** In-line connections or splices of underground primary cables shall be of the type called for on the plans, and shall be one of the types listed below. No separate payment will be made for cable connections.

**a. The cast splice.** A cast splice, employing a plastic mold and using epoxy resin equivalent to that manufactured by 3M™ Company, "Scotchcast" Kit No. 82-B, or an approved equivalent, used for potting the splice is acceptable.

**b. The field-attached plug-in splice.** Field attached plug-in splices shall be installed as shown on the plans. The Contractor shall determine the outside diameter of the cable to be spliced and furnish appropriately sized connector kits and/or adapters. Tape or heat shrink tubing with integral sealant shall be in accordance with the manufacturer's requirements. Primary Connector Kits manufactured by Amerace, "Super Kit", Integro "Complete Kit", or approved equal is acceptable.

**c. The factory-molded plug-in splice.** Specification for L-823 Connectors, Factory-Molded to Individual Conductors, is acceptable.

**d. The taped or heat-shrink splice.** Taped splices employing field-applied rubber, or synthetic rubber tape covered with plastic tape is acceptable. The rubber tape should meet the requirements of ASTM D4388 and the plastic tape should comply with Military Specification MIL-I-24391 or Commercial Item Description A-A-55809. Heat shrinkable tubing shall be heavy-wall, self-sealing tubing rated for the voltage of the wire being spliced and suitable for direct-buried installations. The tubing shall be factory coated with a thermoplastic adhesive-sealant that will adhere to the insulation of the wire being spliced forming a moisture- and dirt-proof seal. Additionally, heat shrinkable tubing for multi-conductor cables, shielded cables, and armored cables shall be factory kits that are designed for the application. Heat shrinkable tubing and tubing kits shall be manufactured by Tyco Electronics/ Raychem Corporation, Energy Division, or approved equivalent.

In all the above cases, connections of cable conductors shall be made using crimp connectors using a crimping tool designed to make a complete crimp before the tool can be removed. All L-823/L-824 splices and terminations shall be made per the manufacturer's recommendations and listings.

All connections of counterpoise, grounding conductors and ground rods shall be made by the exothermic process or approved equivalent, except that a light base ground clamp connector shall be used for attachment to the light base. All exothermic connections shall be made per the manufacturer's recommendations and listings.

**108-2.5 Splicer qualifications.** Every airfield lighting cable splicer shall be qualified in making airport cable splices and terminations on cables rated at or above 5,000 volts AC. The Contractor shall submit to the RPR proof of the qualifications of each proposed cable splicer for the airport cable type and voltage level to be worked on. Cable splicing/terminating personnel shall have a minimum of three (3) years continuous experience in terminating/splicing medium voltage cable.

**108-2.6 Concrete.** Concrete shall be proportioned, placed, and cured per Item P-610, Concrete for Miscellaneous Structures.

**108-2.7 Flowable backfill.** Flowable material used to backfill trenches for power cable trenches shall conform to the requirements of Item P-153, Controlled Low Strength Material.

**108-2.8 Cable identification tags.** Cable identification tags shall be made from a non-corrosive material with the circuit identification stamped or etched onto the tag. The tags shall be of the type as detailed on the plans.

**108-2.9 Tape.** Electrical tapes shall be Scotch™ Electrical Tapes –Scotch™ 88 (1-1/2 inch (38 mm) wide) and Scotch™ 130C® linerless rubber splicing tape (2-inch (50 mm) wide), as manufactured by the Minnesota Mining and Manufacturing Company (3M™), or an approved equivalent.

**108-2.10 Electrical coating.** Electrical coating shall be Scotchkote™ as manufactured by 3M™, or an approved equivalent.

**108-2.11 Existing circuits.** Whenever the scope of work requires connection to an existing circuit, the existing circuit's insulation resistance shall be tested, in the presence of the RPR. The test shall be performed per this item and prior to any activity that will affect the respective circuit. The Contractor shall record the results on forms acceptable to the RPR. When the work affecting the circuit is complete, the circuit's insulation resistance shall be checked again, in the presence of the RPR. The Contractor shall record the results on forms acceptable to the RPR. The second reading shall be equal to or greater than the first reading or the Contractor shall make the necessary repairs to the existing circuit to bring the second reading above the first reading. All repair costs including a complete replacement of the L-823 connectors, L-830 transformers and L-824 cable, if necessary, shall be borne by the Contractor. All test results shall be submitted in the Operation and Maintenance (O&M) Manual.

**108-2.12 Detectable warning tape.** Plastic, detectable, American Public Works Association (APWA) Red (electrical power lines, cables, conduit and lighting cable) with continuous legend tape shall be polyethylene film with a metalized foil core and shall be 3-6 inches (75-150 mm) wide. Detectable tape is incidental to the respective bid item. Detectable warning tape for communication cables shall be orange. Detectable warning tape color code shall comply with the APWA Uniform Color Code.

## CONSTRUCTION METHODS

**108-3.1 General.** The Contractor shall install the specified cable at the approximate locations indicated on the plans. Unless otherwise shown on the plans, all cable required to cross under pavements expected to carry aircraft loads shall be installed in concrete encased duct banks. Cable shall be run without splices, from fixture to fixture.

Cable connections between lights will be permitted only at the light locations for connecting the underground cable to the primary leads of the individual isolation transformers. The Contractor shall be responsible for providing cable in continuous lengths for home runs or other long cable runs without connections unless otherwise authorized in writing by the RPR or shown on the plans.

In addition to connectors being installed at individual isolation transformers, L-823 cable connectors for maintenance and test points shall be installed at locations shown on the plans. Cable circuit identification markers shall be installed on both sides of the L-823 connectors installed and on both sides of slack loops where a future connector would be installed.

Provide not less than 3 feet (1 m) of cable slack on each side of all connections, isolation transformers, light units, and at points where cable is connected to field equipment. Where provisions must be made for testing or for future above grade connections, provide enough slack to allow the cable to be extended at least one foot (30 cm) vertically above the top of the access structure. This requirement also applies where primary cable passes through empty light bases, junction boxes, and access structures to allow for future connections, or as designated by the RPR.

Primary airfield lighting cables installed shall have cable circuit identification markers attached on both sides of each L-823 connector and on each airport lighting cable entering or leaving cable access points, such as manholes, hand holes, pull boxes, junction boxes, etc. Markers shall be of sufficient length for imprinting the cable circuit identification legend on one line, using letters not less than 1/4 inch (6 mm) in size. The cable circuit identification shall match the circuits noted on the construction plans.

**108-3.2 Installation in duct banks or conduits.** This item includes the installation of the cable in duct banks or conduit per the following paragraphs. The maximum number and voltage ratings of cables installed in each single duct or conduit, and the current-carrying capacity of each cable shall be per the latest version of the National Electric Code, or the code of the local agency or authority having jurisdiction.



The Contractor shall make no connections or splices of any kind in cables installed in conduits or duct banks.

Unless otherwise designated in the plans, where ducts are in tiers, use the lowest ducts to receive the cable first, with spare ducts left in the upper levels. Check duct routes prior to construction to obtain assurance that the shortest routes are selected and that any potential interference is avoided.

Duct banks or conduits shall be installed as a separate item per Item L-110, Airport Underground Electrical Duct Banks and Conduit. The Contractor shall run a mandrel through duct banks or conduit prior to installation of cable to ensure that the duct bank or conduit is open, continuous and clear of debris. The mandrel size shall be compatible with the conduit size. The Contractor shall swab out all conduits/ducts and clean light bases, manholes, etc., interiors immediately prior to pulling cable. Once cleaned and swabbed, the light bases and all accessible points of entry to the duct/conduit system shall be kept closed except when installing cables. Cleaning of ducts, light bases, manholes, etc., is incidental to the pay item of the item being cleaned. All raceway systems left open, after initial cleaning, for any reason shall be re-cleaned at the Contractor's expense. The Contractor shall verify existing ducts proposed for use in this project as clear and open. The Contractor shall notify the RPR of any blockage in the existing ducts.

The cable shall be installed in a manner that prevents harmful stretching of the conductor, damage to the insulation, or damage to the outer protective covering. The ends of all cables shall be sealed with moisture-seal tape providing moisture-tight mechanical protection with minimum bulk, or alternately, heat shrinkable tubing before pulling into the conduit and it shall be left sealed until connections are made. Where more than one cable is to be installed in a conduit, all cable shall be pulled in the conduit at the same time. The pulling of a cable through duct banks or conduits may be accomplished by hand winch or power winch with the use of cable grips or pulling eyes. Maximum pulling tensions shall not exceed the cable manufacturer's recommendations. A non-hardening cable-pulling lubricant recommended for the type of cable being installed shall be used where required.

The Contractor shall submit the recommended pulling tension values to the RPR prior to any cable installation. If required by the RPR, pulling tension values for cable pulls shall be monitored by a dynamometer in the presence of the RPR. Cable pull tensions shall be recorded by the Contractor and reviewed by the RPR. Cables exceeding the maximum allowable pulling tension values shall be removed and replaced by the Contractor at the Contractor's expense.

The manufacturer's minimum bend radius or NEC requirements (whichever is more restrictive) shall apply. Cable installation, handling and storage shall be per manufacturer's recommendations. During cold weather, particular attention shall be paid to the manufacturer's minimum installation temperature. Cable shall not be installed when the temperature is at or below the manufacturer's minimum installation temperature. At the Contractor's option, the Contractor may submit a plan, for review by the RPR, for heated storage of the cable and maintenance of an acceptable cable temperature during installation when temperatures are below the manufacturer's minimum cable installation temperature.

Cable shall not be dragged across base can or manhole edges, pavement or earth. When cable must be coiled, lay cable out on a canvas tarp or use other appropriate means to prevent abrasion to the cable jacket.

**108-3.3 Installation of direct-buried cable in trenches.** Unless otherwise specified, the Contractor shall not use a cable plow for installing the cable. Cable shall be unreeled uniformly in place alongside or in the trench and shall be carefully placed along the bottom of the trench. The cable shall not be unreeled and pulled into the trench from one end. Slack cable sufficient to provide strain relief shall be placed in the trench in a series of S curves. Sharp bends or kinks in the cable shall not be permitted.

Where cables must cross over each other, a minimum of 3 inches (75 mm) vertical displacement shall be provided with the topmost cable depth at or below the minimum required depth below finished grade.

**a. Trenching.** Where turf is well established and the sod can be removed, it shall be carefully stripped and properly stored. Trenches for cables may be excavated manually or with mechanical trenching equipment. Walls of trenches shall be essentially vertical so that a minimum of surface is disturbed. Graders shall not be used to excavate the trench with their blades. The bottom surface of trenches shall be essentially smooth and free from coarse aggregate. Unless otherwise specified, cable trenches shall be excavated to a minimum depth of 18 inches (0.5 m) below finished grade per NEC Table 300.5, except as follows:

- When off the airport or crossing under a roadway or driveway, the minimum depth shall be 36 inches (91 cm) unless otherwise specified.
- Minimum cable depth when crossing under a railroad track, shall be 42 inches (1 m) unless otherwise specified.

The Contractor shall excavate all cable trenches to a width not less than 6 inches (150 mm). Unless otherwise specified on the plans, all cables in the same location and running in the same general direction shall be installed in the same trench.

When rock is encountered, the rock shall be removed to a depth of at least 3 inches (75 mm) below the required cable depth and it shall be replaced with bedding material of earth or sand containing no mineral aggregate particles that would be retained on a 1/4-inch (6.3 mm) sieve. Flowable backfill material may alternatively be used.

Duct bank or conduit markers temporarily removed for trench excavations shall be replaced as required.

It is the Contractor's responsibility to locate existing utilities within the work area prior to excavation. Where existing active cables cross proposed installations, the Contractor shall ensure that these cables are adequately protected. Where crossings are unavoidable, no splices will be allowed in the existing cables, except as specified on the plans. Installation of new cable where such crossings must occur shall proceed as follows:

(1) Existing cables shall be located manually. Unearthed cables shall be inspected to assure absolutely no damage has occurred.

(2) Trenching, etc., in cable areas shall then proceed, with approval of the RPR, with care taken to minimize possible damage or disruption of existing cable, including careful backfilling in area of cable.

In the event that any previously identified cable is damaged during the course of construction, the Contractor shall be responsible for the complete repair or replacement.

**b. Backfilling.** After the cable has been installed, the trench shall be backfilled. The first layer of backfill in the trench shall encompass all cables ; be 3 inches (75 mm) deep, loose measurement; and shall be either earth or sand containing no mineral aggregate particles that would be retained on a 1/4-inch (6.3 mm) sieve. This layer shall not be compacted. The second layer shall be 5 inches (125 mm) deep, loose measurement, and shall contain no particles that would be retained on a one inch (25.0 mm) sieve. The remaining third and subsequent layers of backfill shall not exceed 8 inches (20 cm) of loose measurement and be excavated or imported material and shall not contain stone or aggregate larger than 4 inches (100 mm) maximum diameter.

The second and subsequent layers shall be thoroughly tamped and compacted to at least the density of the adjacent material. If the cable is to be installed in locations or areas where other compaction requirements are specified (under pavements, embankments, etc.) the backfill compaction shall be to a minimum of 100 percent of ASTM D1557 for unpaved areas and backfill with controlled low strength material (CLSM) in accordance with P-153 for areas under pavements.

Trenches shall not contain pools of water during backfilling operations. The trench shall be completely backfilled and tamped level with the adjacent surface, except that when turf is to be established over the trench, the backfilling shall be stopped at an appropriate depth consistent with the type of turving operation to be accommodated. A proper allowance for settlement shall also be provided. Any excess excavated material shall be removed and disposed of per the plans and specifications.

Underground electrical warning (caution) tape shall be installed in the trench above all direct-buried cable. Contractor shall submit a sample of the proposed warning tape for acceptance by the RPR. If not shown on the plans, the warning tape shall be located 6 inches (150 mm) above the direct-buried cable or the counterpoise wire if present. A 3-6 inch (75 - 150 mm) wide polyethylene film detectable tape, with a metalized foil core, shall be installed above all direct buried cable or counterpoise. The tape shall be of the color and have a continuous legend as indicated on the plans. The tape shall be installed 8 inches (200 mm) minimum below finished grade.

**c. Restoration.** Following restoration of all trenching near airport movement surfaces, the Contractor shall visually inspect the area for foreign object debris (FOD) and remove any that is found. Where soil and sod has been removed, it shall be replaced as soon as possible after the backfilling is completed. All areas disturbed by work shall be restored to its original condition. The restoration shall include the sodding, topsoiling, fertilizing, liming, seeding, sprigging, and /or mulching as shown on the plans. The Contractor shall be held responsible for maintaining all disturbed surfaces and replacements until final acceptance. When trenching is through paved areas, restoration shall be equal to existing conditions. If the cable is to be installed in locations or areas where other compaction requirements are specified (under pavements, embankments, etc.) the backfill compaction shall be backfill with controlled low strength material (CLSM) in accordance with P-153. Restoration shall be considered incidental to the pay item of which it is a component part.

**108-3.4 Cable markers for direct-buried cable.** The location of direct buried circuits shall be marked by a concrete slab marker, 2 feet (60 cm) square and 4-6 inch (10 - 15 cm) thick, extending approximately one inch (25 mm) above the surface. Each cable run from a line of lights and signs to the equipment vault shall be marked at approximately every 200 feet (61 m) along the cable run, with an additional marker at each change of direction of cable run. All other direct-buried cable shall be marked in the same manner. Cable markers shall be installed directly above the cable. The Contractor shall impress the word "CABLE" and directional arrows on each cable marking slab. The letters shall be approximately 4 inches (100 mm) high and 3 inches (75 mm) wide, with width of stroke 1/2 inch (12 mm) and 1/4 inch (6 mm) deep. Stencils shall be used for cable marker lettering; no hand lettering shall be permitted.

At the location of each underground cable connection/splice, except at lighting units, or isolation transformers, a concrete marker slab shall be installed to mark the location of the connection/splice. The Contractor shall impress the word "SPICE" on each slab. The Contractor also shall impress additional circuit identification symbols on each slab as directed by the RPR. All cable markers and splice markers shall be painted international orange. Paint shall be specifically manufactured for uncured exterior concrete. After placement, all cable or splice markers shall be given one coat of high-visibility aviation orange paint as approved by the RPR. Furnishing and installation of cable markers is incidental to the respective cable pay item.

**108-3.5 Splicing.** Connections of the type shown on the plans shall be made by experienced personnel regularly engaged in this type of work and shall be made as follows:

**a. Cast splices.** These shall be made by using crimp connectors for jointing conductors. Molds shall be assembled, and the compound shall be mixed and poured per the manufacturer's instructions and to the satisfaction of the RPR.

**b. Field-attached plug-in splices.** These shall be assembled per the manufacturer's instructions. These splices shall be made by plugging directly into mating connectors. The joint where the connectors

come together shall be finished by one of the following methods: (1) wrapped with at least one layer of rubber or synthetic rubber tape and one layer of plastic tape, one-half lapped, extending at least 1-1/2 inches (38 mm) on each side of the joint (2) Covered with heat shrinkable tubing with integral sealant extending at least 1-1/2 inches (38 mm) on each side of the joint or (3) On connector kits equipped with water seal flap; roll-over water seal flap to sealing position on mating connector.

**c. Factory-molded plug-in splices.** These shall be made by plugging directly into mating connectors. The joint where the connectors come together shall be finished by one of the following methods: (1) Wrapped with at least one layer of rubber or synthetic rubber tape and one layer of plastic tape, one-half lapped, extending at least 1-1/2 inches (38 mm) on each side of the joint. (2) Covered with heat shrinkable tubing with integral sealant extending at least 1-1/2 inches (38 mm) on each side of the joint. or (3) On connector kits so equipped with water seal flap; roll-over water seal flap to sealing position on mating connector.

**d. Taped or heat-shrink splices.** A taped splice shall be made in the following manner:

Bring the cables to their final position and cut so that the conductors will butt. Remove insulation and jacket allowing for bare conductor of proper length to fit compression sleeve connector with 1/4 inch (6 mm) of bare conductor on each side of the connector. Prior to splicing, the two ends of the cable insulation shall be penciled using a tool designed specifically for this purpose and for cable size and type. Do not use emery paper on splicing operation since it contains metallic particles. The copper conductors shall be thoroughly cleaned. Join the conductors by inserting them equidistant into the compression connection sleeve. Crimp conductors firmly in place with crimping tool that requires a complete crimp before tool can be removed. Test the crimped connection by pulling on the cable. Scrape the insulation to assure that the entire surface over which the tape will be applied (plus 3 inches (75 mm) on each end) is clean. After scraping, wipe the entire area with a clean lint-free cloth. Do not use solvents.

Apply high-voltage rubber tape one-half lapped over bare conductor. This tape should be tensioned as recommended by the manufacturer. Voids in the connector area may be eliminated by highly elongating the tape, stretching it just short of its breaking point. The manufacturer's recommendation for stretching tape during splicing shall be followed. Always attempt to exactly half-lap to produce a uniform buildup. Continue buildup to 1-1/2 times cable diameter over the body of the splice with ends tapered a distance of approximately one inch (25 mm) over the original jacket. Cover rubber tape with two layers of vinyl pressure-sensitive tape one-half lapped. Do not use glyptol or lacquer over vinyl tape as they react as solvents to the tape. No further cable covering or splice boxes are required.

Heat shrinkable tubing shall be installed following manufacturer's instructions. Direct flame heating shall not be permitted unless recommended by the manufacturer. Cable surfaces within the limits of the heat-shrink application shall be clean and free of contaminants prior to application.

**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.** – may be used by the RPR for areas that have high rates of lightning strikes. The counterpoise size is determined by the RPR. 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.

All components rise and fall at the same potential; with no potential difference, no damaging arcing and no damaging current flow.

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** – used in areas where lightning strikes are not common. Counterpoise size is selected by the RPR. The isolation method is an alternate method for use only with edge lights installed in turf and stabilized soils and raceways installed parallel to and adjacent to the edge of the pavement. NFPA 780 uses 15 feet to define “adjacent to”.

The counterpoise conductor shall be installed halfway between the pavement edge and the light base, mounting stake, raceway, or cable being protected.

The counterpoise conductor shall be installed 8 inches (203 mm) minimum below grade. The counterpoise is not connected to the light base or mounting stake. An additional grounding electrode is required at each light base or mounting stake. The grounding electrode is bonded to the light base or mounting stake with a 6 AWG solid copper conductor.

See AC 150/5340-30, Design and Installation Details for Airport Visual Aids and NFPA 780, Standard for the Installation of Lightning Protection Systems, Chapter 11, for a detailed description of the Isolation Method of lightning protection.

**c. Common Installation requirements.** When a metallic light base is used, the grounding electrode shall be bonded to the metallic light base or mounting stake with a No. 6 AWG bare, annealed or soft drawn, solid copper conductor.

When a nonmetallic light base is used, the grounding electrode shall be bonded to the metallic light fixture or metallic base plate with a No. 6 AWG bare, annealed or soft drawn, solid copper conductor.

Grounding electrodes may be rods, ground dissipation plates, radials, or other electrodes listed in the NFPA 70 (NEC) or NFPA 780.

Where raceway is installed by the directional bore, jack and bore, or other drilling method, the counterpoise conductor shall be permitted to be installed concurrently with the directional bore, jack and bore, or other drilling method raceway, external to the raceway or sleeve.

The counterpoise wire shall also be exothermically welded to ground rods installed as shown on the plans but not more than 500 feet (150 m) apart around the entire circuit. The counterpoise system shall be continuous and terminate at the transformer vault or at the power source. It shall 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.** 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 50 megohms. 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.

**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 measured by the linear feet (meters) of trench, including the excavation, backfill, and restoration, completed, measured as excavated, and accepted as satisfactory. When specified, separate measurement shall be made for trenches of various specified widths.

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, and trench marking tape ready for operation, and accepted as satisfactory. Separate measurement shall be made for each cable or counterpoise wire installed in trench, duct bank or conduit. The measurement for this item shall 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	No. 8 AWG, 5 KV, L-824, Type C Cable, installed in Conduit – per linear foot
Item L-108-5.2	No. 6 AWG, Solid, Bare Counterpoise Wire, installed in Trench, Including Ground Rods and Ground Connectors - per linear foot
Item L-108-5.3	Remove No. 8 AWG, 5 KV, L-824, Type C Cable – 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
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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** This item shall consist of underground electrical conduits and duct banks (single or multiple conduits encased in concrete or buried in sand) installed per this specification at the locations and per the dimensions, designs, and details shown on the plans. This item shall include furnishing and installing of all underground electrical duct banks and individual and multiple underground conduits and removal of existing duct banks. It shall also include all turving 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 W-C-1094-Conduit fittings all types, classes 1 thru 3 and 6 thru 10.
- UL 514C covers W-C-1094- all types, Class 5 junction box and cover in plastic (PVC).
- UL 651 covers W-C-1094-Rigid PVC Conduit, types I and II, Class 4.
- UL 651A covers W-C-1094-Rigid PVC Conduit and high-density polyethylene (HDPE) Conduit type III and Class 4.

Underwriters Laboratories Standards UL-651 and Article 352 of the current National Electrical Code shall be one of the following, as shown on the plans:

a. Type I—Schedule 40 and Schedule 80 PVC suitable for underground use either direct-buried or encased in concrete.

b. Type II—Schedule 40 PVC suitable for either above ground or underground use.

c. Type III – Schedule 80 PVC suitable for either above ground or underground use either direct-buried or encased in concrete.

d. Type III –HDPE pipe, minimum standard dimensional ratio (SDR) 11, suitable for placement with directional boring under pavement.

The type of solvent cement shall be as recommended by the conduit/fitting manufacturer.

**110-2.4 Split conduit.** Split conduit shall be pre-manufactured for the intended purpose and shall be made of steel or plastic.

**110-2.5 Conduit spacers.** Conduit spacers shall be prefabricated interlocking units manufactured for the intended purpose. They shall be of double wall construction made of high grade, high density polyethylene complete with interlocking cap and base pads. They shall be designed to accept No. 4 reinforcing bars installed vertically.

**110-2.6 Concrete.** Concrete shall be proportioned, placed, and cured per Item P-610, Concrete for Miscellaneous Structures.

**110-2.7 Precast concrete structures.** Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or another RPR approved third party certification program. Precast concrete structures shall conform to ASTM C478.

**110-2.8 Flowable backfill.** Flowable material used to back fill conduit and duct bank trenches shall conform to the requirements of Item P-153, Controlled Low Strength Material.

**110-2.9 Detectable warning tape.** Plastic, detectable, American Public Works Association (APWA) red (electrical power lines, cables, conduit and lighting cable), orange (telephone/fiber optic cabling) with continuous legend magnetic tape shall be polyethylene film with a metallized foil core and shall be 3-6 inches (75-150 mm) wide. Detectable tape is incidental to the respective bid item.

## CONSTRUCTION METHODS

**110-3.1 General.** The Contractor shall install underground duct banks and conduits at the approximate locations indicated on the plans. The RPR shall indicate specific locations as the work progresses, if required to differ from the plans. Duct banks and conduits shall be of the size, material, and type indicated on the plans or specifications. Where no size is indicated on the plans or in the specifications, conduits shall be not less than 2 inches (50 mm) inside diameter or comply with the National Electrical Code based on cable to be installed, whichever is larger. All duct bank and conduit lines shall be laid so as to grade toward access points and duct or conduit ends for drainage. Unless shown otherwise on the plans, grades shall be at least 3 inches (75 mm) per 100 feet (30 m). On runs where it is not practicable to maintain the grade all one way, the duct bank and conduit lines shall be graded from the center in both directions toward access points or conduit ends, with a drain into the storm drainage system. Pockets or traps where moisture may accumulate shall be avoided. Under pavement, the top of the duct bank shall not be less than 18 inches (0.5 m) below the subgrade; in other locations, the top of the duct bank or underground conduit shall be not less than 18 inches (0.5 m) below finished grade.

The Contractor shall mandrel each individual conduit whether the conduit is direct-buried or part of a duct bank. An iron-shod mandrel, not more than 1/4 inch (6 mm) smaller than the bore of the conduit shall be pulled or pushed through each conduit. The mandrel shall have a leather or rubber gasket slightly larger than the conduit hole.

The Contractor shall swab out all conduits/ducts and clean base can, manhole, pull boxes, etc., interiors immediately prior to pulling cable. Once cleaned and swabbed the light bases, manholes, pull boxes, etc., and all accessible points of entry to the duct/conduit system shall be kept closed except when installing cables. Cleaning of ducts, base cans, manholes, etc., is incidental to the pay item of the item being cleaned. All raceway systems left open, after initial cleaning, for any reason shall be recleaned at the Contractor's expense. All accessible points shall be kept closed when not installing cable. The Contractor shall verify existing ducts proposed for use in this project as clear and open. The Contractor shall notify the RPR of any blockage in the existing ducts.

For pulling the permanent wiring, each individual conduit, whether the conduit is direct-buried or part of a duct bank, shall be provided with a 200-pound (90 kg) test polypropylene pull rope. The ends shall be secured and sufficient length shall be left in access points to prevent it from slipping back into the conduit. Where spare conduits are installed, as indicated on the plans, the open ends shall be plugged with removable tapered plugs, designed for this purpose.

All conduits shall be securely fastened in place during construction and shall be plugged to prevent contaminants from entering the conduits. Any conduit section having a defective joint shall not be installed. Ducts shall be supported and spaced apart using approved spacers at intervals not to exceed 5 feet (1.5 m).

Unless otherwise shown on the plans, concrete encased duct banks shall be used when crossing under pavements expected to carry aircraft loads, such as runways, taxiways, taxilanes, ramps and aprons. When under paved shoulders and other paved areas, conduit and duct banks shall be encased using flowable fill for protection.

All conduits within concrete encasement of the duct banks shall terminate with female ends for ease in current and future use. Install factory plugs in all unused ends. Do not cover the ends or plugs with concrete.

Where turf is well established and the sod can be removed, it shall be carefully stripped and properly stored.

Trenches for conduits and duct banks may be excavated manually or with mechanical trenching equipment unless in pavement, in which case they shall be excavated with mechanical trenching

equipment. Walls of trenches shall be essentially vertical so that a minimum of shoulder surface is disturbed. Blades of graders shall not be used to excavate the trench.

When rock is encountered, the rock shall be removed to a depth of at least 3 inches (75 mm) below the required conduit or duct bank depth and it shall be replaced with bedding material of earth or sand containing no mineral aggregate particles that would be retained on a 1/4-inch (6.3 mm) sieve. Flowable backfill may alternatively be used

Underground electrical warning (Caution) tape shall be installed in the trench above all underground duct banks and conduits in unpaved areas. Contractor shall submit a sample of the proposed warning tape for approval by the RPR. If not shown on the plans, the warning tape shall be located 6 inches above the duct/conduit or the counterpoise wire if present.

Joints in plastic conduit shall be prepared per the manufacturer's recommendations for the particular type of conduit. Plastic conduit shall be prepared by application of a plastic cleaner and brushing a plastic solvent on the outside of the conduit ends and on the inside of the couplings. The conduit fitting shall then be slipped together with a quick one-quarter turn twist to set the joint tightly. Where more than one conduit is placed in a single trench, or in duct banks, joints in the conduit shall be staggered a minimum of 2 feet (60 cm).

Changes in direction of runs exceeding 10 degrees, either vertical or horizontal, shall be accomplished using manufactured sweep bends.

Whether or not specifically indicated on the drawings, where the soil encountered at established duct bank grade is an unsuitable material, as determined by the RPR, the unsuitable material shall be removed per Item P-152 and replaced with suitable material. Additional duct bank supports shall be installed, as approved by the RPR.

All excavation shall be unclassified and shall be considered incidental to Item L-110. Dewatering necessary for duct installation, and erosion per federal, state, and local requirements is incidental to Item L-110.

Unless otherwise specified, excavated materials that are deemed by the RPR to be unsuitable for use in backfill or embankments shall be removed and disposed of offsite.

Any excess excavation shall be filled with suitable material approved by the RPR and compacted per Item P-152.

It is the Contractor's responsibility to locate existing utilities within the work area prior to excavation. Where existing active cables cross proposed installations, the Contractor shall ensure that these cables are adequately protected. Where crossings are unavoidable, no splices will be allowed in the existing cables, except as specified on the plans. Installation of new cable where such crossings must occur shall proceed as follows:

**a.** Existing cables shall be located manually. Unearthed cables shall be inspected to assure absolutely no damage has occurred

**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 not less than 6 inches (150 mm) apart in a vertical direction.

Trenches shall be opened the complete length between normal termination points before conduit is installed so that if any unforeseen obstructions are encountered, proper provisions can be made to avoid them.

Conduits shall be installed using conduit spacers. No. 4 reinforcing bars shall be driven vertically into the soil a minimum of 6 inches (150 mm) to anchor the assembly into the earth while backfilling. For this purpose, the spacers shall be fastened down with locking collars attached to the vertical bars. Spacers shall be installed at 5-foot (1.5-m) intervals. Spacers shall be in the proper sizes and configurations to fit the conduits. Locking collars and spacers shall be submitted to the RPR for review prior to use.

**110-3.4 Markers.** The location of each end and of each change of direction of conduits and duct banks shall be marked by a concrete slab marker 2 feet (60 cm) square and 4 - 6 inches (100 - 150 mm) thick extending approximately one inch (25 mm) above the surface. The markers shall also be located directly above the ends of all conduits or duct banks, except where they terminate in a junction/access structure or building. Each cable or duct run from a line of lights and signs to the equipment vault must be marked at approximately every 200 feet (61 m) along the cable or duct run, with an additional marker at each change of direction of cable or duct run.

The Contractor shall impress the word "DUCT" or "CONDUIT" on each marker slab. Impression of letters shall be done in a manner, approved by the RPR, for a neat, professional appearance. All letters and words must be neatly stenciled. After placement, all markers shall be given one coat of high-visibility orange paint, as approved by the RPR. The Contractor shall also impress on the slab the number and size of conduits beneath the marker along with all other necessary information as determined by the RPR. The letters shall be 4 inches (100 mm) high and 3 inches (75 mm) wide with width of stroke 1/2 inch (12 mm) and 1/4 inch (6 mm) deep or as large as the available space permits. Furnishing and installation of duct markers is incidental to the respective duct pay item.

**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 the sodding, topsoiling, fertilizing, liming, seeding, sprigging, and /or mulching as 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.

#### **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 removal and disposal of existing duct banks and conduits as shown on the plans, furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete this item per the provisions and intent of the plans and specifications.

Payment will be made under:

Item L-110-5.1	Install 2" PVC Schedule 40 Conduit in Trench including Excavation and Backfill – per linear foot
Item L-110-5.2	Remove Existing 2" Conduit Including Excavation and Backfill – per linear foot

#### **REFERENCES**

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

Advisory Circular (AC)

AC 150/5340-30	Design and Installation Details for Airport Visual Aids
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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-115 Electrical Manholes and Junction Structures

### DESCRIPTION

**115-1.1** This item shall consist of electrical manholes and junction structures (hand holes, pull boxes, junction cans, etc.) installed per this specification, at the indicated locations and conforming to the lines, grades and dimensions shown on the plans or as required by the RPR. This item shall include the installation of each electrical manhole and/or junction structures with all associated excavation, backfilling, sheeting and bracing, concrete, reinforcing steel, ladders, appurtenances, testing, dewatering and restoration of surfaces to the satisfaction of the RPR including removal of existing manholes and junction structures as shown on the plans.

### EQUIPMENT AND MATERIALS

#### 115-2.1 General.

**a.** All equipment and materials covered by referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification when so requested by the RPR.

**b.** Manufacturer's certifications shall not relieve the Contractor of the responsibility to provide materials per these specifications. Materials supplied and/or installed that do not comply with these specifications shall be removed (when directed by the RPR) and replaced with materials that comply with these specifications at the Contractor's cost.

**c.** All materials and equipment used to construct this item shall be submitted to the RPR for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify products or models applicable to this project. Indicate all optional equipment and delete any non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment to which they apply on each submittal sheet. Markings shall be made bold and clear with arrows or circles (highlighting is not acceptable). The Contractor is solely responsible for delays in the project that may accrue directly or indirectly from late submissions or resubmissions of submittals.

**d.** The data submitted shall be sufficient, in the opinion of the RPR, to determine compliance with the plans and specifications. The Contractor's submittals shall be electronically submitted in pdf format, tabbed by specification section. The RPR reserves the right to reject any and all equipment, materials or procedures that do not meet the system design and the standards and codes, specified in this document.

**e.** All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from the date of final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

**115-2.2 Concrete structures.** Concrete shall be proportioned, placed, and cured per Item P-610, Concrete for Miscellaneous Structures. Cast-in-place concrete structures shall be as shown on the plans.

**115-2.3 Precast concrete structures.** Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or another engineer approved third party certification program. Provide precast concrete structures where shown on the plans.

Precast concrete structures shall be an approved standard design of the manufacturer. Precast units shall have mortar or bitumastic sealer placed between all joints to make them watertight. The structure shall be designed to withstand aircraft loads, unless otherwise shown on the plans. Openings or knockouts shall be provided in the structure as detailed on the plans.

Threaded inserts and pulling eyes shall be cast in as shown on the plans.

If the Contractor chooses to propose a different structural design, signed and sealed shop drawings, design calculations, and other information requested by the RPR shall be submitted by the Contractor to allow for a full evaluation by the RPR. The RPR shall review per the process defined in the General Provisions.

**115-2.4 Junction boxes.** Junction boxes shall be L-867 Class 1 (non-load bearing) or L-868 Class 1 (load bearing) airport light bases that are encased in concrete. The light bases shall have a L-894 blank cover, gasket, and stainless steel hardware. All bolts, studs, nuts, lock washers, and other similar fasteners used for the light fixture assemblies must be fabricated from 316L (equivalent to EN 1.4404), 18-8, 410, or 416 stainless steel. If 18-8, 410, or 416 stainless steel is utilized it shall be passivated and be free from any discoloration. Covers shall be 3/8-inch (9-mm) thickness for L-867 and 3/4-inch (19-mm) thickness for L-868. All junction boxes shall be provided with both internal and external ground lugs.

**115-2.5 Mortar.** The mortar shall be composed of one part of cement and two parts of mortar sand, by volume. The cement shall be per the requirements in ASTM C150, Type I. The sand shall be per the requirements in ASTM C144. Hydrated lime may be added to the mixture of sand and cement in an amount not to exceed 15% of the weight of cement used. The hydrated lime shall meet the requirements of ASTM C206. Water shall be potable, reasonably clean and free of oil, salt, acid, alkali, sugar, vegetable, or other substances injurious to the finished product.

**115-2.6 Concrete.** All concrete used in structures shall conform to the requirements of Item P-610, Concrete for Miscellaneous Structures.

**115-2.7 Frames and covers.** The frames shall conform to one of the following requirements:

- a. ASTM A48      Gray iron castings
- b. ASTM A47      Malleable iron castings
- c. ASTM A27      Steel castings
- d. ASTM A283, Grade D      Structural steel for grates and frames
- e. ASTM A536      Ductile iron castings
- f. ASTM A897      Austempered ductile iron castings

All castings specified shall withstand a maximum tire pressure of as detailed on the drawings and maximum load of as detailed on the drawings.

All castings or structural steel units shall conform to the dimensions shown on the plans and shall be designed to support the loadings specified.

Each frame and cover unit shall be provided with fastening members to prevent it from being dislodged by traffic, but which will allow easy removal for access to the structure.

All castings shall be thoroughly cleaned. After fabrication, structural steel units shall be galvanized to meet the requirements of ASTM A123.

Each cover shall have the word "ELECTRIC" or other approved designation cast on it. Each frame and cover shall be as shown on the plans or approved equivalent. No cable notches are required.

Each manhole shall be provided with a "DANGER -- PERMIT-REQUIRED CONFINED SPACE, DO NOT ENTER" safety warning sign as detailed in the Contract Documents and in accordance with OSHA 1910.146 (c)(2).

**115-2.8 Ladders.** Ladders, if specified, shall be galvanized steel or as shown on the plans.

**115-2.9 Reinforcing steel.** All reinforcing steel shall be deformed bars of new billet steel meeting the requirements of ASTM A615, Grade 60.

**115-2.10 Bedding/special backfill.** Bedding or special backfill shall be as shown on the plans.

**115-2.11 Flowable backfill.** Flowable material used to backfill shall conform to the requirements of Item P-153, Controlled Low Strength Material.

**115-2.12 Cable trays.** Cable trays shall be of galvanized steel or aluminum. Cable trays shall be located as shown on the plans.

**115-2.13 Plastic conduit.** Plastic conduit shall comply with Item L-110, Airport Underground Electrical Duct Banks and Conduits.

**115-2.14 Conduit terminators.** Conduit terminators shall be pre-manufactured for the specific purpose and sized as required or as shown on the plans.

**115-2.15 Pulling-in irons.** Pulling-in irons shall be manufactured with 7/8-inch (22 mm) diameter hot-dipped galvanized steel or stress-relieved carbon steel roping designed for concrete applications (7 strand, 1/2-inch (12 mm) diameter with an ultimate strength of 270,000 psi (1862 MPa)). Where stress-relieved carbon steel roping is used, a rustproof sleeve shall be installed at the hooking point and all exposed surfaces shall be encapsulated with a polyester coating to prevent corrosion.

**115-2.16 Ground rods.** Ground rods shall be one piece, solid copper clad steel. The ground rods shall be of the length and diameter specified on the plans, but in no case shall they be less than 8 feet (2.4 m) long nor less than 5/8 inch (16 mm) in diameter.

## CONSTRUCTION METHODS

**115-3.1 Unclassified excavation.** It is the Contractor's responsibility to locate existing utilities within the work area prior to excavation. Damage to utility lines, through lack of care in excavating, shall be repaired or replaced to the satisfaction of the RPR without additional expense to the Owner.

The Contractor shall perform excavation for structures and structure footings to the lines and grades or elevations shown on the plans or as staked by the RPR. The excavation shall be of sufficient size to permit the placing of the full width and length of the structure or structure footings shown.

All excavation shall be unclassified and shall be considered incidental to Item L-115. Dewatering necessary for structure installation and erosion per federal, state, and local requirements is incidental to Item L-115.

Boulders, logs and all other objectionable material encountered in excavation shall be removed. All rock and other hard foundation material shall be cleaned of all loose material and cut to a firm surface either level, stepped or serrated, as directed by the RPR. All seams, crevices, disintegrated rock and thin strata shall be removed. When concrete is to rest on a surface other than rock, special care shall be taken not to disturb the bottom of the excavation. Excavation to final grade shall not be made until just before the concrete or reinforcing is to be placed.

The Contractor shall provide all bracing, sheeting and shoring necessary to implement and protect the excavation and the structure as required for safety or conformance to governing laws. The cost of bracing, sheeting and shoring shall be included in the unit price bid for the structure.

Unless otherwise provided, bracing, sheeting and shoring involved in the construction of this item shall be removed by the Contractor after the completion of the structure. Removal shall be effected in a manner that will not disturb or mar finished masonry. The cost of removal shall be included in the unit price bid for the structure.

After each excavation is completed, the Contractor shall notify the RPR. Structures shall be placed after the RPR has approved the depth of the excavation and the suitability of the foundation material.

Prior to installation the Contractor shall provide a minimum of 6 inches (150 mm) of sand or a material approved by the RPR as a suitable base to receive the structure. The base material shall be compacted and graded level and at proper elevation to receive the structure in proper relation to the conduit grade or ground cover requirements, as indicated on the plans.

**115-3.2 Concrete structures.** Concrete structures shall be built on prepared foundations conforming to the dimensions and form indicated on the plans. The concrete and construction methods shall conform to the requirements specified in Item P-610. Any reinforcement required shall be placed as indicated on the plans and shall be approved by the RPR before the concrete is placed.

**115-3.3 Precast unit installations.** Precast units shall be installed plumb and true. Joints shall be made watertight by use of sealant at each tongue-and-groove joint and at roof of manhole. Excess sealant shall be removed and severe surface projections on exterior of neck shall be removed.

**115-3.4 Placement and treatment of castings, frames and fittings.** All castings, frames and fittings shall be placed in the positions indicated on the Plans or as directed by the RPR and shall be set true to line and to correct elevation. If frames or fittings are to be set in concrete or cement mortar, all anchors or bolts shall be in place and position before the concrete or mortar is placed. The unit shall not be disturbed until the mortar or concrete has set.

Field connections shall be made with bolts, unless indicated otherwise. Welding will not be permitted unless shown otherwise on the approved shop drawings and written approval is granted by the casting manufacturer. Erection equipment shall be suitable and safe for the workman. Errors in shop fabrication or deformation resulting from handling and transportation that prevent the proper assembly and fitting of parts shall be reported immediately to the RPR and approval of the method of correction shall be obtained. Approved corrections shall be made at Contractor's expense.

Anchor bolts and anchors shall be properly located and built into connection work. Bolts and anchors shall be preset by the use of templates or such other methods as may be required to locate the anchors and anchor bolts accurately.

Pulling-in irons shall be located opposite all conduit entrances into structures to provide a strong, convenient attachment for pulling-in blocks when installing cables. Pulling-in irons shall be set directly into the concrete walls of the structure.

**115-3.5 Installation of ladders.** Ladders shall be installed such that they may be removed if necessary. Mounting brackets shall be supplied top and bottom and shall be cast in place during fabrication of the structure or drilled and grouted in place after erection of the structure.

**115-3.6 Removal of sheeting and bracing.** In general, all sheeting and bracing used to support the sides of trenches or other open excavations shall be withdrawn as the trenches or other open excavations are being refilled. That portion of the sheeting extending below the top of a structure shall be withdrawn, unless otherwise directed, before more than 6 inches (150 mm) of material is placed above the top of the structure and before any bracing is removed. Voids left by the sheeting shall be carefully refilled with

selected material and rammed tight with tools especially adapted for the purpose or otherwise as may be approved.

The RPR may direct the Contractor to delay the removal of sheeting and bracing if, in his judgment, the installed work has not attained the necessary strength to permit placing of backfill.

**115-3.7 Backfilling.** After a structure has been completed, the area around it shall be backfilled in horizontal layers not to exceed 6 inches (150 mm) in thickness measured after compaction to the density requirements in Item P-152. Each layer shall be deposited all around the structure to approximately the same elevation. The top of the fill shall meet the elevation shown on the plans or as directed by the RPR.

Backfill shall not be placed against any structure until approval is given by the RPR. In the case of concrete, such approval shall not be given until tests made by the laboratory under supervision of the RPR establish that the concrete has attained sufficient strength to provide a factor of safety against damage or strain in withstanding any pressure created by the backfill or the methods used in placing it.

Where required, the RPR may direct the Contractor to add, at his own expense, sufficient water during compaction to assure a complete consolidation of the backfill. The Contractor shall be responsible for all damage or injury done to conduits, duct banks, structures, property or persons due to improper placing or compacting of backfill.

**115-3.8 Connection of duct banks.** To relieve stress of joint between concrete-encased duct banks and structure walls, reinforcement rods shall be placed in the structure wall and shall be formed and tied into duct bank reinforcement at the time the duct bank is installed.

**115-3.9 Grounding.** A ground rod shall be installed in the floor of all concrete structures so that the top of rod extends 6 inches (150 mm) above the floor. The ground rod shall be installed within one foot (30 cm) of a corner of the concrete structure. Ground rods shall be installed prior to casting the bottom slab. Where the soil condition does not permit driving the ground rod into the earth without damage to the ground rod, the Contractor shall drill a 4-inch (100 mm) diameter hole into the earth to receive the ground rod. The hole around the ground rod shall be filled throughout its length, below slab, with Portland cement grout. Ground rods shall be installed in precast bottom slab of structures by drilling a hole through bottom slab and installing the ground rod. Bottom slab penetration shall be sealed watertight with Portland cement grout around the ground rod.

A grounding bus of 4/0 bare stranded copper shall be exothermically bonded to the ground rod and loop the concrete structure walls. The ground bus shall be a minimum of one foot (30 cm) above the floor of the structure and separate from other cables. No. 2 American wire gauge (AWG) bare copper pigtailed shall bond the grounding bus to all cable trays and other metal hardware within the concrete structure. Connections to the grounding bus shall be exothermic. If an exothermic weld is not possible, connections to the grounding bus shall be made by using connectors approved for direct burial in soil or concrete per UL 467. Hardware connections may be mechanical, using a lug designed for that purpose.

**115-3.10 Cleanup and repair.** After erection of all galvanized items, damaged areas shall be repaired by applying a liquid cold-galvanizing compound per MIL-P-21035. Surfaces shall be prepared and compound applied per the manufacturer's recommendations.

Prior to acceptance, the entire structure shall be cleaned of all dirt and debris.

**115-3.11 Restoration.** After the backfill is completed, the Contractor shall dispose of all surplus material, dirt and rubbish from the site. The Contractor shall restore all disturbed areas equivalent to or better than their original condition. All sodding, grading and restoration shall be considered incidental to the respective Item L-115 pay item.

The Contractor shall grade around structures as required to provide positive drainage away from the structure.

Areas with special surface treatment, such as roads, sidewalks, or other paved areas shall have backfill compacted to match surrounding areas, and surfaces shall be repaired using materials comparable to original materials.

Following restoration of all trenching near airport movement surfaces, the Contractor shall thoroughly visually inspect the area for foreign object debris (FOD), and remove any such FOD that is found. This FOD inspection and removal shall be considered incidental to the pay item of which it is a component part.

After all work is completed, the Contractor shall remove all tools and other equipment, leaving the entire site free, clear and in good condition.

**115-3.12 Inspection.** Prior to final approval, the electrical structures shall be thoroughly inspected for conformance with the plans and this specification. Any indication of defects in materials or workmanship shall be further investigated and corrected. The earth resistance to ground of each ground rod shall not exceed 25 ohms. Each ground rod shall be tested using the fall-of-potential ground impedance test per American National Standards Institute / Institute of Electrical and Electronic Engineers (ANSI/IEEE) Standard 81. This test shall be performed prior to establishing connections to other ground electrodes.

**115-3.13 Manhole elevation adjustments.** The Contractor shall adjust the tops of existing manholes in areas designated in the Contract Documents to the new elevations shown. The Contractor shall be responsible for determining the exact height adjustment required to raise or lower the top of each manhole to the new elevations. The existing top elevation of each manhole to be adjusted shall be determined in the field and subtracted/added from the proposed top elevation.

The Contractor shall remove/extend the existing top section or ring and cover on the manhole structure or manhole access. The Contractor shall install precast concrete sections or grade rings of the required dimensions to adjust the manhole top to the new proposed elevation or shall cut the existing manhole walls to shorten the existing structure, as required by final grades. The Contractor shall reinstall the manhole top section or ring and cover on top and check the new top elevation.

The Contractor shall construct a concrete slab around the top of adjusted structures located in graded areas that are not to be paved. The concrete slab shall conform to the dimensions shown on the plans.

**115-3.14 Duct extension to existing ducts.** Where existing concrete encased ducts are to be extended, the duct extension shall be concrete encased plastic conduit. The fittings to connect the ducts together shall be standard manufactured connectors designed and approved for the purpose. The duct extensions shall be installed according to the concrete encased duct detail and as shown on the plans.

## METHOD OF MEASUREMENT

**115-4.1** Electrical manholes and junction structures shall be measured by each unit completed in place and accepted. The following items shall be included in the price of each unit: All required excavation and dewatering;; sheeting and bracing; all required backfilling with on-site materials; restoration of all surfaces and finished grading and turfing; all required connections; temporary cables and connections; and ground rod testing

**115-4.2 Manhole elevation adjustments** shall be measured by the completed unit installed, in place, completed, and accepted. Separate measurement shall not be made for the various types and sizes.

## BASIS OF PAYMENT

**115-5.1** The accepted quantity of electrical manholes and junction structures will be paid for at the Contract unit price per each, complete and in place. This price shall be full compensation for furnishing

all materials and for all preparation, excavation, backfilling and placing of the materials, furnishing and installation of appurtenances and connections to duct banks and other structures as may be required to complete the item as shown on the plans and for all labor, equipment, tools and incidentals necessary to complete the structure.

**115-5.2** Payment shall be made at the contract unit price for manhole elevation adjustments. This price shall be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary, including but not limited to, spacers, concrete, rebar, dewatering, excavating, backfill, topsoil, sodding and pavement restoration, where required, to complete this item as shown in the plans and to the satisfaction of the RPR.

Payment will be made under:

Item L-115-5.1	Install L-867D Electrical Handhole, Including Concrete Encasement, Grounding, and Appurtenances – Per Each
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### REFERENCES

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

American National Standards Institute / Insulated Cable Engineers Association (ANSI/ICEA)

ANSI/IEEE STD 81	IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System
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Advisory Circular (AC)

AC 150/5345-7	Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits
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AC 150/5345-26	Specification for L-823 Plug and Receptacle, Cable Connectors
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AC 150/5345-42	Specification for Airport Light Bases, Transformer Housings, Junction Boxes, and Accessories
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AC 150/5340-30	Design and Installation Details for Airport Visual Aids
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AC 150/5345-53	Airport Lighting Equipment Certification Program
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Commercial Item Description (CID)

A-A 59544	Cable and Wire, Electrical (Power, Fixed Installation)
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ASTM International (ASTM)

ASTM A27	Standard Specification for Steel Castings, Carbon, for General Application
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ASTM A47	Standard Specification for Ferritic Malleable Iron Castings
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ASTM A48	Standard Specification for Gray Iron Castings
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ASTM A123	Standard Specification for Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products
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ASTM A283	Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates
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ASTM A536	Standard Specification for Ductile Iron Castings
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ASTM A615	Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM A897	Standard Specification for Austempered Ductile Iron Castings
ASTM C144	Standard Specification for Aggregate for Masonry Mortar
ASTM C150	Standard Specification for Portland Cement
ASTM C206	Standard Specification for Finishing Hydrated Lime
FAA Engineering Brief (EB)	
EB #83	In Pavement Light Fixture Bolts
Mil Spec	
MIL-P-21035	Paint High Zinc Dust Content, Galvanizing Repair
National Fire Protection Association (NFPA)	
NFPA-70	National Electrical Code (NEC)

**END OF ITEM L-115**

## **Item L-125 Installation of Airport Lighting Systems**

### **DESCRIPTION**

**125-1.1** This section shall consist of all lighting systems furnished and installed in accordance with the project plans and this specifications and the applicable advisory circulars (AC) including sign, transformer, base can, base plate, mounting assemblies, connections, lamps, testing of the installed system and all incidentals and appurtenances necessary to place the systems in operation as completed units to the satisfaction of the RPR.

**a.** The systems shall be installed at the locations and following the dimensions, design and details shown on plans. It is the intent and meaning of the plans and specifications that the Contractor shall provide an electrical installation that is complete, including all items and appurtenances necessary, reasonably incidental or customarily included, even though each and every item is not specifically called out or shown.

**b.** Installations and construction under these provisions shall be coordinated with the RPR. Specification requirements for approvals, reviews or other involvement of the Engineer shall be transmitted by the Contractor through the RPR to the Engineer.

### **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 perform 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.

## **EQUIPMENT AND MATERIALS**

**125-2.2 Conduit/Duct.** Conduit shall conform to Specification Item L-110 Airport Underground Electrical Duct Banks and Conduits.

**125-2.3 Cable and Counterpoise.** Cable and Counterpoise shall conform to Item L-108 Underground Power Cable for Airports.

**125-2.4 Tape.** Rubber and plastic electrical tapes shall be Scotch Electrical Tape Numbers 23 and 88 respectively, as manufactured by 3M Company or an approved equal.

**125-2.5 Cable Connections.** Cable Connections shall conform to Item L-108 Installation of Underground Cable for Airports.

**125-2.6 Retroreflective Markers.** Not required.

**125-2.7 Runway and Taxiway Lights.** Not required.

**125-2.8 Runway and Taxiway Signs.** Taxiway Guidance Sign should conform to the requirements of AC 150/5345-44.

**125-2.9 Runway End Identifier Light (REIL).** Not required.

**125-2.10 Precision Approach Path Indicator (PAPI).** Not required.

**125-2.11 Circuit Selector Cabinet.** Not Required.

**125-2.12 Light Base and Transformer Housings.** Light Base and Transformer Housings should conform to the requirements of AC 150/5345-42. Light bases shall be Type L-867, Class 1A, 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.

**125-2.13 Isolation Transformers.** Isolation Transformers shall be Type L-830, size as required for each installation. Transformer shall conform to AC 150/5345-47.

## **INSTALLATION**

**125-3.1 Installation.** The Contractor shall furnish, install, connect and test all equipment, accessories, conduit, cables, wires, buses, grounds and support items necessary to ensure a complete and operable airport lighting system as specified here and shown in the plans.

The equipment installation and mounting shall comply with the requirements of the National Electrical Code and state and local code agencies having jurisdiction.

The Contractor shall install the specified equipment in accordance with the applicable advisory circulars and the details shown on the plans.

**125-3.2 Testing.** All lights shall be fully tested by continuous operation for not less than 24 hours as a completed system prior to acceptance. The test shall include operating the constant current regulator in each step not less than 10 times at the beginning and end of the 24-hour test. The fixtures shall illuminate properly during each portion of the test.

**125-3.3 Shipping and Storage.** Equipment shall be shipped in suitable packing material to prevent damage during shipping. Store and maintain equipment and materials in areas protected from weather and physical damage. Any equipment and materials, in the opinion of the RPR, damaged during construction or storage shall be replaced by the Contractor at no additional cost to the owner. Painted or galvanized surfaces that are damaged shall be repaired in accordance with the manufacturer's recommendations.

### **METHOD OF MEASUREMENT**

**125-4.1.** 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.

### **BASIS OF PAYMENT**

**125-5.1** Payment will be made at the Contract unit price for each complete runway or taxiway guidance sign, 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 New Airfield Size 1, 2 Module, Quartz Lamp Lighted Sign, Transformer, Base Can, Concrete Pad and Appurtenances – per each
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### **REFERENCES**

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

#### 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**

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## ITEM S-E16100

### BASIC MATERIALS AND METHODS FOR ELECTRICAL INSTALLATIONS

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. It is the intent of the contract documents that upon completion of the electrical work, the entire system shall be in a finished workable condition. Therefore, furnish all work, labor, tools, superintendence, material, equipment, and accessories necessary to provide for a complete and workable electrical system as defined by the contract documents.
- B. All work that may be called for in the specifications but not shown on the drawings, or all work that may be shown on the drawings but not called for in the specifications, shall be formed by the Contractor as if described in both. Should work be required which is not set forth in either document, but is nevertheless required for fulfilling the intent thereof, then the Contractor shall perform all such work as fully as if it were specifically set forth in the contract documents.
- C. The drawings and specifications of other divisions of this contract, as well as supplements issued thereto, information to bidders, and other pertinent documents issued by the Owner's Representatives are a part of these drawings and specifications and shall be complied with in all respects. All the above documents will be on file at the office of the Owner's Representative and shall be examined by the Contractor. Failure to examine all documents shall not relieve the Contractor of any responsibility nor shall it be used as a basis for additional compensation due to omission of details of other divisions from the electrical documents.
- D. The use of the word "furnish" or "install" or "provide" shall be taken to mean that the item or facility is to be both furnished and installed unless specifically stated to the contrary.
- E. The use of the term "as (or where) indicated"; "as (or where) shown"; "as (or where) specified"; or "as (or where) scheduled" shall be taken to mean that the reference is made to the contract documents, either under the drawings or the specifications, or both documents.
- F. The Contractor shall be responsible for visiting the site, checking the existing conditions, and shall determine the conditions to be met for installing the work and plan accordingly.
- G. The Contractor shall review the electrical underground system and the civil yard piping. Coordinate and install the electrical underground system in a manner that avoids conflicts with manholes, piping, etc. provided under other Divisions of the specifications.

##### 1.2 RELATED WORK

- A. Item S-E16200 – Utility Service

- B. Item S-E16300 – Power Distribution Devices
- C. Item S-E16400 – Gate Security Access Control System

### 1.3 SUBMITTALS

- A. The following is also applicable to Item S-E16200, Item S-E16300, and Item S-E16400.
- B. Each submittal shall be accompanied by a cover memo in which the contents of the submitted documents are described. This memo shall identify the project, whether the documents are “For Information”, “For Review and Approval” or “For Record”, and shall identify to which specification and section the attached documents are attempting to fulfill the submittal requirements thereof. Any documents submitted without the reference to which specification and section they are attempting to fulfill shall be rejected in whole without review.
- C. Submit the following.
  - 1. For Information:
    - a. Equipment outline Drawings showing elevation, plan and interior views, front panel arrangement, dimensions, weight, shipping splits, conduit entrances and anchor bolt pattern. Indicate all options, special features, ratings and deviations from this Section. Furnish complete Bill of Materials indicating manufacturer's part numbers.
    - b. Elementary diagrams showing internal wiring of manufactured devices and assemblies.
    - c. Point to point wiring diagrams showing terminations and wire numbers for each assembly.
    - d. Dimension prints for each device or assembly
    - e. Installation manual for each device or assembly
    - f. Dimensions of areas required for servicing device or assembly
    - g. Nameplate data and ratings for all devices
    - h. Recommended spare parts and special tools list for maintaining equipment in service for one year and five year periods
    - i. Catalog literature for each device or assembly
  - 2. For Review and Approval:



- a. Review shall not remove responsibility for furnishing material or devices of acceptable dimensions, quantity, quality, or errors thereof.
  - b. Drawings not clearly marked or lacking the Contractor's approval stamp shall be rejected.
  - c. Elementary (loop) diagrams showing schematically each device in a loop or control scheme, when not furnished with the ISSUED FOR CONSTRUCTION drawings.
  - d. Panel layouts with bills of material.
3. For Record:
- a. Operation and maintenance manuals shall be compiled six weeks prior to project completion for each device or assembly.
  - b. Markup deviations to ISSUED FOR CONSTRUCTION drawings with red pencil and provide original to Engineer for record.
4. The following shall be submittal for review and approval.
- a. Raceways, Boxes, Connectors, Hubs, and Fittings
  - b. Channels, Struts, and Clamps
  - c. Wires and Cables
  - d. Panelboard
  - e. Knox Box and Switch
  - f. Vehicle Gate Access Enclosure
  - g. Card Reader
  - h. Gate Access Post
  - i. Fusible Safety Switch
  - j. Ground Rod and Wire
5. The following shall be submittal for record.
- a. 600V wires insulation resistance test results.

D. Exceptions for Submittals

1. Exceptions to the Specifications or Drawings shall be clearly defined by the CONTRACTOR in a separate section of each submittal package. The submittal shall contain the reason for the exception, the exact nature of the exception and the proposed substitution so that a proper evaluation

may be made by the Engineer. The acceptability of any device or methodology submitted as an "or equal" or "exception" to the Specifications shall be at the sole discretion of the Engineer.

2. Submittals for certain major items such motor switchboards, transformers, variable frequency drives, etc. shall include a complete copy of their specification section with each paragraph and sub-paragraph noted with the comment "compliance" , "deviation", or "alternate".
  - a. By noting the term "compliance", it shall be understood that the manufacturer is in full compliance with the item specified and will provide exactly the same with no deviations.
  - b. By noting the term "deviation", it shall be understood that the manufacturer prefers to provide a different component in lieu of the one specified and in so doing, takes full responsibility for making the equipment work as specified and will provide any and all ancillary components to make the equipment work at no extra cost to the Owner.
  - c. By noting the term "alternate", it shall be understood that the manufacturer proposes to provide the same operating function but prefers to do it in a different manner and in so doing, takes full responsibility for making the equipment work as specified and will provide any and all ancillary components to make the equipment work at no extra cost to the Owner. The alternate method shall be fully described with schematic diagrams and one-line diagrams as applicable.

#### 1.4 QUALITY ASSURANCE

##### A. Regulatory Requirements

1. Secure all permits, licenses, and inspections as required by all authorities having jurisdiction. Give all notices and comply with all laws, ordinances, rules, regulations, and contract requirements bearing on the work.
2. Codes and ordinances having jurisdiction over the work shall serve as minimum requirements, but, if the contract documents indicate requirements which are in excess of those minimum requirements, then the requirements of the contract documents shall be followed. Should there be any conflicts between the contract documents and codes, or any ordinances having jurisdiction, then report these.
3. Determine the exact requirements for the utility services as set by the utilities that will serve the facility, and pay for and form all work as required by those utilities. The Contractor shall notify the serving utility immediately upon award of the contract.

#### 1.5 COMMISSIONING

##### A. 600 Volt Wire Insulation Test

1. Test the insulation value of each service entrance cable, each feeder cable, and each branch circuit wire. Tests shall be made by means of a noncrank-type ohmmeter (megger) that impresses 1000 volts dc across the insulation. Test duration value shall be one minute. Each ungrounded conductor shall have its insulation integrity tested after installation within its raceways from termination-to-termination. However, testing shall be made prior to connection to line or load. Notify the Owner's Representative in writing 48 hours prior to testing. All such testing shall be done in the presence of the Owner's Representative and the test results shall be submitted in writing to the engineer for review. The insulation value of each installed cable and wire shall be equal to, or greater than 250 Megohms. Should the insulation value be less than 250 Megohms for any conductor tested, the faulty conductor shall be replaced, and re-tested until compliance is achieved.

## PART 2 PRODUCTS

### 2.1 MATERIALS

- A. All materials and devices shall conform to the requirements of the contract documents. They shall be new and free from defects and shall conform to the requirements of the latest edition of NFPA 70, the National Electrical Code.
- B. All materials and devices of the same class shall be supplied by the same manufacturer unless otherwise specified and shall be UL listed.

### 2.2 ENCLOSURE TYPES

- A. Unless otherwise required, electrical enclosures shall be NEMA Types as follows:
  1. NEMA 3R, NEMA 4, and NEMA 4X in damp or wet indoor locations and outdoor locations. Specific NEMA type for each equipment enclosure shall be identified on the drawings; otherwise, Contractor shall provide

### 2.3 BOXES

- A. Wet Location Boxes
  1. NEMA 4 terminal boxes, junction boxes, pull boxes, etc, shall be powder painted steel inside and out, unless otherwise shown on the Drawings. Boxes shall have continuously welded seams and mounting feet. Welds shall be ground smooth. Boxes shall be flanged and shall not have holes or knockouts. Box bodies shall not be less than 14 gauge metal and covers shall not be less than 14 gauge metal. Covers shall be gasketed and fastened with stainless steel clamps or latches. Terminal boxes shall be furnished with hinged doors, terminal mounting straps and brackets.
  2. Cast or malleable iron device boxes shall be Type FD. Boxes and fittings shall have cadmium-zinc finish with cast covers and stainless steel screws.

3. Cast aluminum device boxes shall be Type FD. Boxes and fittings shall be copper free aluminum with cast aluminum covers and stainless steel screws
4. Acceptable Manufacturers are Crouse-Hinds, Steel City, Hoffman, or equal.

## 2.4 RACEWAYS AND FITTINGS

- A. Rigid metallic conduit shall be hot-dipped galvanized steel as manufactured in accordance with ANSI C80.1 and UL-6, inside and out. Conduit couplings shall be threaded steel with hot-dipped galvanized finish. Such conduit shall be Allied Tube and Conduit, Wheatland Tube Co., Republic Conduit, or equal.
- B. Non metallic conduit shall be rigid polyvinyl chloride (PVC) schedule 40. Rigid PVC conduit shall comply in accordance with UL 651 and NEMA TC2 and shall be rated for 90 degree C conductors in accordance with the National Electrical Code. Such conduit shall be Carlon Corp. or equal.
- C. Non metallic fittings shall be rigid polyvinyl chloride (PVC). Rigid PVC fittings shall comply in accordance with UL 651 and NEMA TC3 and shall be rated for 90 degree C conductors in accordance with the National Electrical Code. Such conduit fittings shall be Carlon Corp. or equal.
- D. PVC jacketed rigid metallic conduit shall meet the specifications for rigid conduit above and shall have a 40 mil minimum thickness PVC coating on exterior metallic surfaces and a minimum 2 mil urethane coating on interior metallic surfaces. Couplings shall be sleeved. Such conduit shall be RobRoy Industries "Plasti-Bond Red", Thomas & Betts "Ocal", or equal.
- E. Flexible liquid-tight metallic conduit shall have an extruded thermoplastic cover with interlocked galvanized steel core. The conduit shall be U.L. listed. Such conduit shall be Anamet Electrical, Electri-flex, or equal.
- F. Flexible Metallic Tubing shall be for use under the provisions of NEC Article 360. Flexible metallic tubing shall be aluminum or hot-dipped galvanized steel strips shaped into interlocking convolutions firmly joined to one another assuring a complete lock. Flexible metallic tubing shall be used only indoors for connection to lighting fixtures in administration and office areas above panel ceiling. Furnish and install insulated bushings at terminations for conductor protection. The conduit shall be U.L. listed. Such conduit shall be Southwire Company, or equal.
- G. Non-metallic flexible conduit shall be seamless, liquid-tight UL 1660 listed, Type B conduit with rigid non-metallic reinforcing embedded in integral flexible PVC lining and jacket wall and shall be oil, acid, ozone and alkaline resistant, rated 105 degree C, 60 degree C wet, 70 degree C oil resistant. Non metallic conduit fittings shall be dusttight, liquid-tight, chemical resistant thermoplastic/nylon construction with tapered thread hub and neoprene O-ring gasket. Such conduit shall be Carflon, Thomas and Betts, or equal.
- H. Rigid metallic conduit locknuts shall be galvanized steel in sizes under 2" and galvanized malleable iron on sizes 2½" and larger. Sealing locknuts shall have in addition to that specified above, an integrally fused thermoplastic gasket so that the locknut is rated NEMA-4.

- I. Rigid metal conduit insulating bushings shall be molded canvas bake-a-lite type and suitable for operation in 100°C rise over 40°C ambient. Polypropylene bushings are not acceptable.
- J. Grounding type bushings shall have threaded steel body, insulated throat, and ground lug. Insulated throat shall meet specifications under Article I above. Such bushings shall be Crouse Hinds, O.Z./Gedney, or equal.
- K. Rigid metallic conduit expansion/deflection fittings shall be watertight with a flexible plastic sleeve that allows ¾" movements in all directions. Hubs shall be threaded, galvanized malleable iron. Clamping bands shall be stainless steel. There shall be an equipment bonding ground jumper. Expansion deflection fittings shall be Crouse Hinds, O.Z./Gedney, or equal.
- L. Rigid metallic conduit hubs shall be liquid-tight type with threaded female body, with sealing ring on conduit side and threaded male tapered steel body with hardened steel locknut on box side. Plastic jacketed hubs shall have 40 mils PVC coating. Such fittings shall be T&B, Crouse Hinds, or equal.
- M. Chase nipples, reducers, enlargers, "Ericksons", capped els, short els, long els, split couplings and fittings shall be hot dipped galvanized malleable iron threaded type for use with rigid metallic conduit.
- N. Rigid metallic conduit bodies shall be cast aluminum with threaded hubs and gasketed cast metal covers with stainless steel screws. Conduit bodies shall be Crouse-Hinds Form 7 Condulets, Appleton Form 35 Unilets, or Engineer approved equal for non-hazardous and Division 02 locations. Listed explosion-proof fittings shall be used in Division 01 locations.
- O. Liquid-tight flexible conduit fittings shall be hot-dipped galvanized steel body with captive grounding ferrule, sealing ring, and compression nut. Connector body shall have nylon-insulated throat. Pullout resistance of each completed connector shall be at least 1½ times U.L. minimum. Such fittings shall be T&B Crouse-Hinds, Appleton, or equal.
- P. Rigid metal conduit boxes shall be cast aluminum with threaded integrally-cast hubs, cast metal cover, and with stainless steel cover screws. Such boxes shall be Crouse-Hinds "Condulets", Appleton "Unilets", or equal. Plastic jacketed type shall have 40 mils minimum coating of PVC.
- Q. Cadmium plated devices and hardware shall not be acceptable.
- R. Any and all conduits penetrating fire rated walls shall do so only through UL listed openings having a fire rating equal to or greater than the fire rating of the wall which they penetrate. All such openings shall be installed in accordance with the manufacturer's instructions.

## 2.5 DUCTBANKS

- A. Detectable Warning Tape (Tracer Tape)
  - 1. Each ductbank section shall be marked by means of a detectable warning tape as shown on the Drawings. The detectable warning tape shall be

capable of being detected or located by either conductive or inductive location techniques.

2. Detectable warning tape shall be polyethylene film with a metalized foil core and shall be 4-6 inches (75-150 MM) wide. Tape shall be red with black letters marked "CAUTION – ELECTRICAL LINED BURIED BELOW". Tape shall be as manufactured by Mutual Industries, Inc., Reef Industries, or equal.
- B. Raceways shall be polyvinyl chloride conduit direct buried. Refer to the drawings for material requirements.
- C. Direct buried raceways for site lighting shall be polyvinyl chloride conduit. Refer to the drawings for embedment and installation requirements.
- D. PVC Duct Spacers
1. PVC duct spacers shall be installed for more than one conduit in the ductbank. Duct spacers shall be of the type recommended by the conduit manufacturer.
  2. Install spacers at intervals between 4' to 10' depending on size of conduit.  

Duct Size - 0.5" to 2"	Spacing – 4 to 6 Feet
Duct Size - 3"	Spacing – 6 to 8 Feet
Duct Size - 4" to 6"	Spacing – 8 to 10 Feet
  3. PVC spacers and mounts shall be used for supports and spacing of the conduits for encased concrete conduits. Do not use concrete blocks or other means to support and spacing of the conduits.

## 2.6 WIRING

- A. 600 Volt Building Wire:
1. All conductors for power and control wiring shall be of annealed, 98 percent conductivity, stranded, soft drawn copper.
  2. Insulation for Power and Control Circuitry shall be THHN/THWN-2 rated for 90 degree C in wet location.
  3. All wire shall be color coded or coded using electrical tape in sizes where colored insulation is not available. Where tape is used as the identification system, it shall be applied in all junction boxes, manholes and other accessible intermediate locations as well as at each termination.
    - a. 240/120 Volts, Single Phase, 3 Wire and 208Y/120 Volts, 3 Phase, 4 Wire:  
Phase A - Red, Phase B - Black, Phase C - Blue  
Grounding Conductor - Green  
Grounded Conductor - White

- b. 240V/120 Volts, 3 Phase, 4 Wire Delta Center Tap and 480Y/277 Volts, 3 Phase, 4 Wire:  
Phase A – Brown, Phase B – Orange, Phase C- Yellow  
Grounding Conductor - Green  
Grounded Conductor - Grey
  - 4. Bare conductors for grounding purposes shall be stranded, annealed copper wire ASTM-B3 alloy coated soft copper electrical wire ASTM B189.
  - 5. Equipment grounding conductors shall be NEC Type THW green and sized in accordance with NEC Table 250-122, unless otherwise specified.
  - 6. Acceptable wire and cable manufacturers are General Cable, Southwire Co., The Okonite Co., or equal.
- C. Connectors for Controls and Instrumentation Wires
- 1. Mechanical connectors shall be bolted pressure type with tin-plated bronze body and tin-plated silicon-bronze hardware.
  - 2. Insulated setscrew connectors shall consist of copper body with flame-retardant, 600V class insulated shell. Such connectors shall be Ideal, T & B, 3M, or equal.
  - 3. Terminal connectors for flat-head terminal screws shall be locking spade type with vinyl insulated compression indent shaft, T&B, Ideal, Amp, or equal.
  - 4. Terminal blocks shall be NEMA type rated at 20 amperes minimum, 600 Volt, channel mounted, with tubular screw and pressure plate. Such devices shall be Square D, Cutler-Hammer, Allen Bradley, or equal.
- D. Terminations for Instrumentation Wires
- 1. Termination connectors shall be of the locking fork-end (upturned leg ends) type as manufactured by 3M Co.; Panduit Corp. or equal.
- E. Motor Connections
- 1. Motor connections shall be ring type mechanical compression terminations installed on the branch circuit wires and the motor leads and secured with bolt, nut and spring washer. Connections shall be insulated with a Raychem Type RVC, roll-on stub insulator; Thomas & Betts, Shrink-Kon MSCV20; or equal. For wire sizes No. 8 and larger, long barrel, tin plated copper compression (hydraulically pressed) type connections (Burndy Co., or equal) shall be installed on the branch circuit wires and the motor leads. Connections shall be insulated with heavy duty heat shrinkable material (Raychem Corp., or equal.)
- F. Labels
- 1. Marking labels for wire numbering shall be typed-on heatshrink plastic. Such labels shall be Raychem "Shrinkmark", or equal.

2. Write-on type labels for identification of conduits shall be weather resistant polyester with flat surface for marking pen application.
3. Colored bonding tape shall be 5 mil stretchable vinyl, self-adhesive (with permanent solid colors corresponding to hereinbefore specified wire colors) Plymouth "Slipknot 45", 3M "Scotch 35", or equal.

## 2.7 EQUIPMENT IDENTIFICATION NAMEPLATES AND SIGNS

- A. Equipment identification nameplates shall be engraved, laminated plastic, not less than 1/16" inch thick, lengths as required to accommodate lettering, and in 3/4" and 2 1/2" widths with minimum 3/16" high white letters on a black background. Each plate shall have adhesive backing with pull-apart resistance of at least 100 psi. Plates shall be laminated type with black background and white letters. Nameplates shall be installed on all motor starters, switches, control panel, panelboards, etc. Nameplate designations are shown on the drawings.
- B. Signs shall be similar to nameplates in (A) above with the size, type, and wording as indicated on the contract drawings.

## 2.8 SUPPORTING DEVICES

- A. Slotted channel supports and framing members shall be cold rolled steel. Finish for inside, dry location in finished areas (such as offices) shall be factory painted with backed-on enamel. Finish for outside and damp or wet locations shall be hot dipped galvanized after fabrication. Size of slotted channels unless otherwise indicated, shall be 1 5/8" x 1 5/8" in cross-section. Acceptable manufacturers are Unistrut P1000, Elcen, B-Line Systems, or equal. Special purpose slotted channel support shall be furnished as indicated.
- B. Double channel supports and framing members shall be constructed similar to Item A above. Such channel shall be Unistrut P1001 or equal.
- C. Hanger rods shall be hot dipped-galvanized and shall be all-thread type, 3/8" minimum diameter and length as required.
- D. Beam clamps, side-beam connectors, and one-hole clamps shall be hot-dipped galvanized malleable iron, and shall be Steel City, T&B, or O.Z./Gedney. Plastic coated types shall have 40 mils, minimum PVC covering.
- E. Pressed steel, two-piece single bolt, slotted channel conduit straps shall be electro-galvanized and shall be of the same manufacturer as the slotted channel. Plastic coated types shall have 40 mils, minimum PVC covering and hardware shall be stainless steel.
- F. Single rod-hung "J" conduit clamps shall be adjustable type with hot dipped galvanized finish and shall be Unistrut J-1200 series, Elcen figure 90, or equal.
- G. Indoor, dry-location slotted channel hardware (nuts, bolts, washers, etc.) shall have electro-galvanized finish. Outdoor, wet location slotted channel hardware shall be stainless steel.



- H. Stainless steel hardware shall be AISI Type 304 or 316.
- I. Concrete and masonry anchors shall be stainless steel type equal to Hilti brand.

## 2.9 GROUNDING DEVICES

- 1. Ground rods shall be copper clad steel, 3/4 in. dia. X 10 ft. long, unless otherwise specified on the drawings. Ground rods shall be Blackburn, Erico, Copperweld, or equal.
- 2. Ground rod connectors shall be copper alloy with silicon bronze bolts and in sizes to fit ground rod diameters. Furnish O.Z./Gedney, Burndy, or equal.
- 3. Thermal welding devices shall consist of correct size molds to fit application and correct amount of weld metal. Furnish Enrico "Cadweld", Burndy "Thermoweld", or equal.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Except where specifically detailed or shown, the locations and elevations of equipment are approximate and are subject to small revisions as may prove necessary, or desirable, at the time the work is installed. Final locations shall be confirmed with the Engineer in advance of construction. Confirmed locations shall be made for the following: poles, receptacles, rough-ins and connections for equipment furnished under other sections, lighting fixtures, outlets, motor control centers, switchboards, panelboards, etc.
- B. The drawings are diagrammatic and do not give exact details as to elevations or routings of conduits, nor do they show all offsets and fittings; nevertheless, install the conduit system to conform to the structural and mechanical conditions of the construction. Unless locations and routing of exposed conduits are dimensioned, confirm locations and routing prior to installation with the Engineer.

### 3.2 INSTALLATION

- A. All work shall be done in the best and most workmanlike manner by qualified, careful electricians who are skilled in their trade. The electrical Contractor shall employ a Texas licensed master electrician assigned to this project and all electricians serving this project shall be Texas licensed electricians. The standard of work required throughout shall be of the first class only and electricians whose work is unsatisfactory to the Engineer shall be dismissed from the work upon written notice from the Engineer. All work must meet the approval of the Engineer.
- B. Cabling inside equipment shall be carefully routed, trained, and laced. Cables so placed that they obstruct equipment devices shall not be accepted.
- C. Equipment shall be set level and plumb. Supporting devices installed shall be set and braced so that equipment is held in a rigid, tight-fitting manner.

### 3.3 DUCTBANK

#### A. Ductbank

1. Install duct to locate top of ductbank at depths as indicated on drawings.
2. Install duct with minimum slope of 4 inches per 100 feet (0.33 percent). Slope duct away from building entrances.
3. Cut duct square using saw or pipe cutter; de-burr cut ends.
4. Insert duct to shoulder of fittings; fasten securely.
5. Join nonmetallic duct using adhesive as recommended by manufacturer.
6. Wipe nonmetallic duct dry and clean before joining. Apply full even coat of adhesive to entire area inserted in fitting. Allow joint to cure for 20 minutes, minimum.
7. Install no more than equivalent of three 90-degree bends between pull points.
8. Where bends in raceways are required, use long radius elbows, sweeps and offsets.
9. Provide suitable fittings to accommodate expansion and deflection where required.
10. Terminate duct at manhole entries using end bell.
11. Stagger duct joints vertically in concrete encasement 6 inches minimum.
12. Use suitable separators and chairs installed not greater than 4 feet on centers. Separators shall provide not less than 2-in clearance between raceways and edge of concrete envelope. Power system raceways shall be separated by 7.5-in center-to-center. Non-power system raceways shall be separated by 4.5-in center-to-center.
13. Securely anchor duct to prevent movement during concrete placement.
14. Place concrete under provisions of Section 03300. Use mineral pigment to color concrete red.
15. Provide minimum 2-inch concrete cover at bottom, top, and sides of ductbank.
16. Provide two (2) No. 4 steel reinforcing bars in top of bank under paved areas.
17. Connect to existing concrete encasement using dowels.
18. Connect to manhole wall using dowels.

19. Provide JetLine PL232 pull line in each empty duct except sleeves and nipples.
20. Swab duct. Use suitable caps to protect installed duct against entrance of dirt and moisture.
21. Backfill trenches.
22. Interface installation of underground warning tape with backfilling. Install tape 6 inches below finished surface.
23. Place #4/0 bare copper ground wire atop each duct after concrete is cured and tie to ground grid wire at each building location.

### 3.4 RACEWAYS / WIRING

- A. Conduits and conductors for lighting, switches, receptacles and other miscellaneous low voltage power and signal systems as specified are not shown on the Drawings. Raceways and conductors shall be provided as required for a complete and operating system. Raceways shall be installed concealed in all finished spaces and may be installed exposed or concealed in all process spaces. Raceways installed exposed shall be near the ceiling or along walls of the areas through which they pass and shall be routed to avoid conflicts with HVAC ducts, cranes hoists, monorails, equipment hatches, doors, windows, etc. Raceways installed concealed shall be run in the center of concrete floor slabs, above suspended ceilings, or in partitions as required.
- B. Install the conduit system to provide the facility with the utmost degree of reliability and maintenance free operation. Kinked conduit, conduit inadequately supported or carelessly installed shall not be accepted.
- C. Raceways shall be installed for all wiring runs except as otherwise indicated.
- D. Conduit sizes, where not indicated, shall be code-sized to accommodate the number and diameter of wires to be pulled into the conduit. Use NEC tables for sizing.
- E. Exposed runs of conduit shall be installed parallel to the lines of the structure.
- F. PVC runs shall be joined with manufacturer's approved cement.
- G. Finished installation of conduit runs from each terminus to each terminus shall be watertight.
- H. Generally, raceways shall be installed exposed on the structures and in the buildings except as otherwise specified. Horizontal runs shall be supported on 24" centers and vertical runs on 48" centers.
- I. Conduit runs in finished areas within building shall be installed concealed within the structure but not in the slab, except as otherwise specified.
- J. Except where up-turns to structures and equipment is made. The up-turn shall be made with 40 mil PVC coated steel 90° elbow and conduit. Depth of lateral runs shall be 24" minimum unless otherwise indicated. Coordinate installation with site work finished grades. Duct bank depths shall be as indicated on the drawings.

- K. Conduit runs that enter an enclosure without penetrating the sheet metal, such as bottom entry into motor control centers, shall be equipped with bushings.
- L. Conduit bodies such as "LB, "T", Condulets, Unilets, or equal shall be installed in exposed runs of conduit wherever required to overcome obstructions, and to provide pulling access to wiring. Covers for such fittings shall be accessible and unobstructed by the adjacent construction.
- M. Conduit shall enter all wireways, boxes, motor control centers, panelboards and other enclosures straight and true. Conduits installed cocked and not parallel to the lines of the enclosure shall not be acceptable.
- N. Conduit entrances into equipment shall be carefully planned. Cutting away of enclosure structure, torching out braces, and removal of enclosure channels and sills shall not be accepted.
- O. Use approved hole cutting tool for entrances into sheet metal enclosures. Use of cutting torch or incorrect tool shall not be accepted.
- P. Install expansion or expansion/deflection fittings where conduit runs across an expansion joint within the concrete, or where conduit runs across an expansion joint and the runs are rigidly attached to the structure.
- Q. Plastic jacketed flexible metallic conduit shall be used for connections to motors, solenoids, pressure switches, electric valve operators, unit heaters, motorized louvers, torque switch devices, flowmeters, limit switches, lay-in lighting fixtures, and other devices that may need to be removed for servicing in non-hazardous locations.
- R. Flex runs shall be joined with specified flex connectors and these connectors shall be made up tightly onto the lengths of flex and onto its connected devices. All plastic jacketed flexible conduit connections shall be watertight.
- S. Cap each end of conduits as soon as placed to prevent mud, dirt, debris, and water from entering raceways. Each run shall be swabbed clean prior to wire pulling.
- T. All junction and pull boxes shall be equipped with blank covers.
- U. All boxes shall be installed with their axes parallel to the lines of the building structure.
- V. All conductors shall be the size as indicated and where no size is given, the conductor size shall be #12 AWG, unless otherwise specified.
- W. Generally, control wiring shall be #14 AWG.
- X. All wiring shall be installed in raceways unless otherwise indicated.
- Y. All power and control wiring shall be made with insulated, stranded copper wire.

- Z. No wire or cable shall be drawn into a conduit until all work of a nature which may cause injury is completed. A cable pulling compound shall be used as a lubricant and its composition shall not affect the conductor or its insulation.
- AA. Do not exceed cable manufacturer's recommended pulling tensions.
- BB. Service and feeder wiring runs shall be made from terminus to terminus without splice.
- CC. Branch circuits shall run from supply to load without splice except where taps and splices are required for receptacle, light fixture, and small appliance loads.
- DD. Taps, splices, and connections shall be made with tinned copper alloy compression connectors. Make up connection tightly to produce as low a resistance as if the conductor were continuous. Such connectors shall be insulated with a smooth cover of void-filling insulation putty and then covered with at least four (4) half lapped layers of electrical tape. Insulated connector shall have at least 1½ KV insulation value.
- EE. Specified sizes of wire shall be installed with factory-pigmented colors. Phase label black pigmented wires with colored banding tape as specified. Install labels at each terminus.
- FF. Numbered marking labels shall be installed to identify circuit numbers from panelboards and to identify control wires. Install labels on each wire in each panelboard, junction and pullbox, and device and control connection.
- GG. Label each wiring run with write-on waterproof labels inside each motor control center, switchboard, pullbox and handhole. Wrap label ties around wire group at conduit entrance and write on label the wire size, conduit size, and service.
- HH. Control wiring that terminates onto flat head type terminals shall be equipped with crimp-type spade lugs. Label each wire with number to correspond with terminal strip number.
- II. All wiring inside enclosures shall be neatly trained and laced with tie-wraps.
- JJ. All raceway systems, outlets, boxes, wireways, cabinets, enclosures, lighting fixtures, transformers, and related equipment shall be adequately and safely supported with at least 3-1 safety factor.
- KK. Slotted channels shall be used to support equipment that is mounted free of structure. Use factory fabricated back-to-back hot-dipped galvanized members 3¼" deep that have welded feet.

### 3.5 GROUNDING

- A.. Install equipment grounding conductors with all feeders and branch circuits.
- B. Bond all steel building columns in new structures together with ground wire in steel conduit and connect to the main distribution equipment ground bus, as shown on the Drawings.

- C. Ground wire connections to structural steel columns shall be made with exothermic welds.
- D. Liquid tight flexible metal conduit in sizes 1-1/2-in and larger shall have bonding jumpers. Bonding jumpers shall be external, run parallel (not spiraled) and fastened with plastic tie wraps.
- E. Ground transformer neutrals to the nearest available grounding electrode with a conductor sized in accordance with NEC Article 250-66.
- F. Molds used for thermal welding shall be new. The number of welds made per mold shall not exceed manufacturer's recommendations
- G. Bond metal poles supporting outdoor lighting fixtures to a supplemental grounding electrode (rod) in addition to the separate equipment grounding conductor run with the supply branch circuit.

### 3.6 EXCAVATION AND BACKFILLING

- A. Complete excavating and back-filling necessary for the installation of the work. This includes shoring and pumping in ditches to keep them dry until the work has been installed. Shoring required to protect the excavation and safeguard employees shall be properly performed.
- B. All excavations shall be made to the proper depth, with allowances made for floor slabs, forms, beams, finished grades, etc. Soil under conduits shall be well compacted before conduits are installed.
- C. All backfill shall be made with selected soil, free of rocks and debris and shall be pneumatically tamped in six-inch layers to secure a field density ration of 90 percent, unless otherwise specified.
- D. All excavated material not suitable and not used in the backfill shall be removed to the on-site disposal area. The disposal area shall be as directed by the Engineer.

### 3.7 CUTTING AND PATCHING

- A. Cutting and patching required under this section shall be done in a neat workmanlike manner. Cutting lines shall be uniform and smooth.
- B. Use concrete saws for large cuts in concrete and use core drills for small round cuts in concrete.
- C. Where large openings are cut through metal surfaces, attach metal angles around the opening.
- D. Patch concrete openings that are to be filled with nonmetallic, non-shrinking grout. Finished concrete patching shall be troweled smooth and shall be uniform with surrounding surfaces.
- E. No cutting of structural elements shall be done without permission of the Engineer.

- F. Where openings are cut through masonry walls, provide lintel or other structural supports to protect the remaining masonry. Adequate support shall be provided during the cutting operation to prevent damage to the masonry.
- G. Holes for raceway penetration into sheet metal cabinets and boxes shall be accurately made with a hole-punch. Cutting openings with a torch or other device that produces a jagged, rough-cut shall not be accepted.
- H. Raceway entry into equipment shall be carefully planned. Cutting of enclosure framework to accommodate poorly planned raceway placement shall not be accepted.

### 3.8 REPAIR/RESTORATION

- A. Field check and verify the locations of all underground utilities prior to any excavation. Avoid disturbing these as far as possible. In the event existing utilities are broken into or damaged, they shall be repaired so as to make their operation equal to that before the excavation was started.
- B. Where the excavation requires the opening of existing walks, drives, or other existing pavement, these facilities shall be cut as required to install new lines and to make connections to existing lines. The sizes of the cuts shall be held to a minimum, consistent with the work to be installed. After installation of new work is completed and the excavation has been backfilled in accordance with the above, then repair existing walks, drives, or other existing pavement to match existing installation.

### 3.9 CLEANING

- A. Remove all temporary labels, dirt, paint, grease, and stains from all exposed equipment. Upon completion of work, clean equipment and the entire installation to present a first class job suitable for occupancy. No loose parts or scraps of equipment shall be left on the premises.
- B. Equipment paint scars shall be repaired with paint kits supplied by the equipment manufacturer, or with an approved paint.
- C. Clean interiors of each item of electrical equipment. At completion of work, all equipment interiors shall be free from dust, dirt, and debris.

### 3.10 PROTECTION

- A. Provide suitable protection for all equipment, work, and property against damage during construction.
- B. Assume full responsibility for material and equipment stored at the site and incorporated within the project.
- C. Conduit openings shall be closed with caps or plugs during installation. All outlet boxes and cabinets shall be kept free of concrete, plaster, dirt, and debris.
- D. Equipment shall be covered and tightly sealed against entrance of dust, dirt, and moisture.

## PART 4 METHOD OF MEASUREMENT

- 4.1 All work performed and materials furnished shall be measured by the lump sum for two slide gates, completed in place in accordance with the contract drawings and specifications and accepted by the Engineer. Unless specifically provided for as an item for payment in the proposal, all work, material, equipment, and labor shall be considered subsidiary to the cost of the lump sum price for "Electrical Service and Access Control for Slide Gates".

## PART 5 BASIS OF PAYMENT

- 5.1 The proposed electrical service installation of the Slide Gates at the locations as shown on the plans, including the coordination of the utility companies, and associated appurtenances will be paid for at the unit bid price per lump sum for two slide gates. This price shall fully compensate the Contractor for providing shop drawings; for furnishing all materials; for all preparation; for all necessary excavation/embankment; installation; for all labor, equipment, tools; start-up; testing; training; and incidentals necessary to complete the item as specified herein and as described on the contract drawings.

No separate payment shall be made for sawcutting, trenching, embedment, backfilling, pavement repair, sod and soil repair, and/or concrete encasing for the installation of the underground duct bank.

The lump sum prices shall also include payment for the furnishing of tools and construction equipment needed to perform the construction; for supervision of the construction; for furnishing the water and electricity needed for construction; for bonds and insurance; for the cost of keeping records and so forth; for moving in and moving out; and for all other overhead items of any kind; and for profit.

Payment shall be made under:

Item S-E16100-5.1 Electrical Service and Access Control for Slide Gates – Per Lump Sum

END OF ITEM S-E16100



## ITEM S-E16200

### ELECTRIC UTILITY SERVICE

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. A new electric utility service to a new power panel at the north electric gate operator shall be provided. The interface to the utility company consists of coordinating, providing, and installing the listed materials and work as described below. Contractor shall be responsible for obtaining the utility company service handbook or installation guide/standards and perform all work as specified herein.

##### 1.2 SYSTEM DESCRIPTION

- A. The utility company serving this project is Southwestern Electric Power Company (SWEPCO), a unit of American Electric Power (AEP). Contact Jose Corral at 903-234-7354 to coordinate for the required service. Service will be obtained at 120/240 Volts, 1 Phase, 3 Wire, 60 Hz from an existing power poles with new or existing pole-mounted transformer.
- B. Power Company will be responsible for the following work:
  - 1. Installing electric overhead service conductors.
  - 2. Furnishing and installing pole mounted transformer.
  - 3. Furnishing revenue meter and meter socket.
  - 4. Terminating wires at meter socket and transformer
  - 5. Provide inspection of work described below performed by the contractor.
- D. The Contractor shall be responsible for the following coordination, materials, and work in accordance with the utility company standards:
  - 1. Make all arrangements with the utility company for obtaining electrical utility services, pay all utility company charges up to the allowance amount and furnish all labor and material required for the electrical utility service. If the power company charges exceed the allowance amount, the difference will be provided to the Contractor by change order. If the power company charges are less than the allowance amount, the balance will be credited back to the Owner.
  - 2. Furnishing and installing conduit, weatherhead fitting, overhead conductors and conductors at meter pole per the Power Company requirements and as detailed on the drawings.
  - 3. Installing power company furnished meter socket.
  - 4. Furnishing and installing meter pole (As required by Power Company).

5. Furnishing and installing fusible safety switch. (As required by Power Company).
6. Furnishing and installing wires, conduits and conduit fittings at service meter pole. (As required by Power Company).

### 1.3 EXECUTION

- A. The contractor shall: notify the serving utility immediately upon award of the contract, determine the exact requirements for the utility services as set by the utilities that will serve the facility, pay for, and form all work required by those utilities.

### PART 2 MEASUREMENT AND PAYMENT

- 2.1 All work performed and materials furnished shall be measured by the lump sum, completed in place in accordance with the contract drawings and specifications and accepted by the Engineer. Unless specifically provided for as an item for payment in the proposal, all work, material, equipment, and labor shall be considered subsidiary to the cost of the lump sum price for "Electrical Service and Access Control for Slide Gates" as described in Item S-E16100. The cost of this item will be subsidiary to Item S-E16100-5.1.

END OF ITEM S-E16200

## ITEM S-E16300

### POWER DISTRIBUTION DEVICES

#### PART 1 GENERAL

##### 1.1 SCOPE OF WORK

- A. Furnish, install, and test all power distribution devices as shown on the drawings and as specified herein.

##### 1.2 ARC FLASH – SHOCK PROTECTION

- A. All equipment shall be labeled in accordance with NFPA 70 Article 110.16 (latest edition) to warn qualified personnel of potential electric arc flash hazards.
- B. All flash hazard reduction and shock protection features available as factory options for power distribution devices shall be provided. Such features may include, but are not limited to thermography windows, view ports and finger safe voltage test points.

#### PART 2 MATERIALS

##### 2.1 PANELBOARD

- A. Panelboard ratings shall be as shown on the Drawings. All panelboards shall be rated for the intended voltage.
- B. Panelboards shall be manufactured by Siemens, Square D Co., Eaton, General Electric Co., or equal.
- C. Panelboards shall be dead-front type and shall be manufactured in accordance with Underwriters' Laboratories, Inc., standard for Panelboards (UL67).
- D. Cabinets shall be manufactured in accordance with Underwriters' Laboratories, Inc., standard for Cabinets and Boxes (UL 50) and shall provide a minimum of four inches wiring gutter on all sides. Cabinet fronts shall include doors with semi-concealed hinges, combination lock and catch on doors and a directory frame with circuit directory behind clear plastic, mounted on back of door. The front shall be attached to the box with suitable provision to provide proper alignment of trims.
- E. The panelboards shall include automatic short circuit and over-current protective devices of the molded case circuit breaker type. All multi-pole breakers shall be so designed that an overload on one pole automatically causes all poles of the circuit breaker to open. The circuit breakers shall be quick make, and quick break on manual as well as automatic operation and shall have inverse time trips. Circuit breakers shall have the short circuit interrupting ratings indicated on the drawings.
- F. Interiors shall be assembled on reinforced mounting pans or rails which provide protection against damage during handling or installation. Circuit breakers shall be assembled in accordance with the panel schedules included on the drawings. Design shall permit replacement of individual breakers without disturbing adjacent units or without disturbing main bus or branch circuit connectors. Interior design shall permit changing of branch circuits or the addition of circuit breakers to future spaces without additional machining, drilling, or tapping. Main

bus bars and branch circuit connectors shall be made of copper. In-and-out adjustments of the panel interior shall be provided.

- G. Panel bussing shall be arranged to maintain sequence phasing throughout, that is, adjacent poles shall be of unlike polarity and rotated in sequence. Circuit members shall be provided for each pole space or breaker space as shown on the panel schedule.
- H. A nameplate shall be provided listing manufacturer's name, panel type and rating.
- I. Install a 1-in by 3-in laminated plastic nameplate with 1/4-in black letters on a white background on each panelboard. Nameplate lettering shall be as shown on the panel schedules.
- J. Residential load centers shall not be accepted in lieu of panelboards.
- K. Install new circuit directory cards in each panelboard. New directories shall be heavy card stock with machine printed text. Verify all existing circuits and update circuit directories giving location and description of every load served by the panel.

## 2.2 FUSED SAFETY SWITCH

- A. Fused safety switch shall be service entrance rated, heavy duty, quick make, quick break, 2 pole, 240 volt, with visible break contacts, equipped with solid neutral, Class R fuse clips for 200 amps or less, and current limiting fuses size as shown on the Drawings.
  - 1. Fuses shall be furnished for each fused overcurrent device and, in addition, three spare fuses for each rating required shall be furnished.
  - 2. Fuses rated 600 amperes or less shall be dual element Class R, time-delay type. Such fuses shall incorporate separate thermal overload and short circuit elements. The design shall provide time delay of not less than ten seconds at 500 percent of ampere rating. The interrupting rating shall be at least 100,000 amperes RMS symmetrical.
  - 3. Fuses shall be Bussman, Chase Shawmut, or equal.
- B. Enclosure shall be painted steel, NEMA 3R.
- C. Switch shall be as manufactured by the Square D Co., General Electric, Eaton, or equal.

## PART 3 EXECUTION

### 3.1 INSTALLATION

- A. Follow manufacturer's installation instructions. Set line-ups in place and shim level. Bolt rails to concrete with 1/2" diameter stainless steel concrete anchors.
- B. Each conduit terminus shall be equipped with insulating grounding bushing.

- C. All cables inside enclosures shall be neatly arranged, bundled, and bound with plastic tie-wraps.
- D. Tighten all wire and busbar connectors to factory recommended torque settings.
- E. Apply anti-corrosive compound equal to Kopr-Shield to all wire terminations.
- F. Touch up damaged paint finishes.

### 3.2 CLEANING

- A. Remove all rubbish and debris from inside and around the equipment/enclosure. Remove dirt, dust, or concrete spatter from the interior and exterior of the equipment using brushes, vacuum cleaner, or clean, lint-free rags. Do not use compressed air.

## PART 4 MEASUREMENT AND PAYMENT

- 4.1 All work performed and materials furnished shall be measured by the lump sum, completed in place in accordance with the contract drawings and specifications and accepted by the Engineer. Unless specifically provided for as an item for payment in the proposal, all work, material, equipment, and labor shall be considered subsidiary to the cost of the lump sum price for "Electrical Service and Access Control for Slide Gates" as described in Item S-E16100. The cost of this item will be subsidiary to Item S-E16100-5.1.

END OF ITEM S-E16300

ITEM S-E16400

GATE SECURITY ACCESS CONTROL SYSTEM

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. The intent of this document is to specify the minimum criteria for the design, supply, installation, and commissioning of an integrated access control system for the motor operated gates at the East Texas Regional Airport Access Road.
- B. The Contractor shall provide or procure the services of a single Access Control System Supplier (ACSS) to design, furnish, and install all drawings, materials, equipment, labor and services required to achieve a fully integrated and operational system as specified herein, in other related specification listed below, and as shown on the drawings.
- C. The work shall include the following Sections:

<u>Section No</u>	<u>Title</u>
S-E16100	Basic Materials and Methods for Electrical Installations
S-E16300	Power Distribution Devices
- D. Auxiliary and accessory devices necessary for system operation or performance, such as transmitters, receivers, power supply, surge suppression, relays, signal amplifiers, antenna, signal isolators, software, and drivers to interface with existing equipment or equipment provided by others under this section or other sections of these specifications, shall be included whether they are shown on the drawings or not.
- E. Equipment shall be fabricated, assembled, installed and placed in operating condition in full conformity with the project specifications, drawings, engineering data, instructions, and recommendations of the equipment manufacturer as approved by the Engineer and the Owner.
- F. To facilitate the Owner's future operation and maintenance, similar products shall be supplied from the same manufacturer, unless approved by the Owner.
- G. All equipment and installations shall satisfy applicable Federal, State and local codes.
- H. East Texas Regional Airport is an existing operational facility, and all work shall be coordinated with its operating personnel to minimize impact on daily operation.
- I. All materials, equipment, labor, and services necessary to achieve the monitoring and control functions described herein shall be provided in a timely manner so that the monitoring and control functions are available when the equipment is ready to be placed into service.

- J. The ACSS shall coordinate and schedule all required testing and training with the Contractor, all affected Subcontractors, Owner, and Engineer.
- K. Gate vendor packaged systems are being provided under separate Bid Item of this contract and will interface with the Access Control System via hard-wired inputs. Refer to the associated specification sections and the drawings for details. The ACSS shall be responsible for coordination, purchasing, installing, and configuring any communication devices and/or software drivers necessary to ensure that the Access Control can communicate with each of the vendor-furnished systems.
- L. The ACSS shall design and coordinate the gate access control for proper operation with related equipment and materials furnished by other suppliers under other sections of these specifications and with related existing equipment. Should any coordination issues arise with the ACSS, the Contractor shall be ultimately responsible to resolve and insure proper coordination between the ACSS and other manufacturer supplied equipment.
- M. The ACSS shall provide overall coordination, installation, and supervision for installation of the gate access control to include hardware, software, panels, communications hardware/software, and manufacturer recommended cabling.
- O. The ACSS shall provide coordination with the electrical sub-contractor to review the conduit and/or raceway layout and construction sequencing prior to installation, and review these layouts with the cable manufacturers to ensure conduit and/or raceway compatibility with the systems and materials being furnished.

## 1.02 REFERENCES

- A. The Codes and Regulations listed below form a part of this specification to the extent referenced. Work shall be performed in accordance with the applicable international, federal, state, and local codes or standards current at the commencement of installation. The following list summarizes applicable standards:
  - 1. UL 294, UL 1076, ULC
  - 2. FCC – Part 15, Part 68
  - 3. NFPA 70, NEC
  - 4. IEEE, RS 170 variable standard
  - 5. IEEE, NTSC (color camera broadcast)
  - 6. PAL (color camera broadcast, Europe)
  - 7. CCIR (monochrome standard, Europe)
  - 8. RoHS

- B. Where more than one code or regulation is applicable, the more stringent shall apply.
- C. Cable installation, identification and termination shall be performed in addition to the applicable codes above.

## PART 2 PRODUCTS

### 2.1 VEHICLE GATE ACCESS ENCLOSURE (VGAE)

#### A. Enclosure Housing

1. Enclosure shall be a weather resistant stainless steel enclosure mounted on a single height stanchion pedestal located at the entry and exit sides of each of the vehicle gates. The enclosure will be sized to accommodate the proximity card reader, Knox key switch, keypad and accessories such as power supply, switches, relays, etc. (Only the entry side VGAE have the Knox box and keyswitch).
2. A 120VAC, 15A power supply shall be provided to the power strip located inside the VGAE.
3. The enclosure shall be lockable with a key.

#### B. Card Reader

1. A programmable card reader shall be installed on the door of VGAE and shall be able to activate the opening of the gate. The card reader shall meet the characteristics described herein.
  - a. The card reader shall have a memory of at least 1000 individual cards, unless noted otherwise by the Owner. Coordinate and provide quantity of cards as required by Owner.
  - b. The card reader shall be small sized with beeper and multicolor LED and approved for outdoor installation.
  - c. The card reader can read HID cards with format up to 85 bits.
  - d. The card reader shall be compatible with all standard access control system.
  - e. The card reader shall be the same or compatible to the same manufacturer (HID Proxpoint Plus) as is currently in use at the airport.

#### C. Access Control Keypad

1. A programmable access control keypad shall be installed on the front



door of the VGAE and shall be able to communicate in conjunction with the card reader and Knox switch to activate the opening of the gate.

2. Features and Specifications

- a. Stand-alone applications
- b. Specifically for controlling gate.
- c. Add or delete individual codes from keypad.
- d. EEPROM memory.
- e. Store up to 1000 4-digit entry codes, unless noted otherwise by the Owner.
- f. Two form C dry Contact relays.
- g. Time zone inputs.
- h. Approved for outdoor installation.
- i. Lighted key pad

D. Knox Key Switch and Knox Box

1. A Knox key switch Model #3502 with "Fire Dept" inscription shall be installed on the side of the vehicle gate access enclosure. It will be interconnected with the access control system to simultaneously open the gate while identifying this function in the access control system as an authorized entry.
2. A Knox Box Series Model 3200, approved by the City of Longview Fire Department shall be installed on the pedestal or bollard next to the vehicle gate access enclosure.

E. Mounting Pedestal

1. Mounting pedestal shall be pad mounted, 42" - 45" high.
2. Pedestal shall be offset (Gooseneck) style for vehicular traffic.
3. Pedestal mounting plate shall be sized to accommodate all the equipment described above.
4. Pedestal shall be constructed minimum of 3" x 3" steel, baked on enamel finish for weather resistance.

F. Power, Controls and Communication Interconnection Wiring

1. Provide and install all required power, controls, and communication wires as per equipment manufacturer specification for a complete functional system.

H. Functionality of the Vehicular Gate Access Enclosure (VGAE)

1. The VGAE shall accept inputs from the card reader, keypad, and the Knox switch. The VGAE shall process the inputs and determine when and to whom to grant access. The VGAE shall activate the gate operator to open and close the gate in conjunction with the detector loops and safety devices.
2. Matching VGAE shall be installed on both sides of gate (Entry and exit) locations are as shown on the drawings. VGAE located on the exit side will not require Knox box and Knox switch.

I. Training

1. The Contractor shall provide the services of a trained technician to install and train the Airport staff on the use of the access control system. The system shall be fully operable prior to acceptance by the Airport.

PART 3 BASIS OF PAYMENT

- 3.1 The proposed installation of the Gate Security Access System and associated appurtenances will be paid for at the unit bid price per lump sum price for "Electrical Service and Access Control for Slide Gates" as described in Item S-E16100. The cost of this item will be subsidiary to Item S-E16100-5.1.

END OF ITEM E-S16400

Part 14 – Special

## ITEM KSA-101 SHOP DRAWINGS, PROJECT DATA, AND SAMPLES

### DESCRIPTION

**101-1.1** Contractor shall furnish all labor, materials, tools, equipment, and perform all work and services necessary for or incidental to the furnishing, processing, delivery, reproduction and other necessary functions incidental to scheduling and handling of shop drawings, project data, and samples as indicated on the plans and/or as specified, in accordance with provisions of the Contract Documents, and completely coordinated with work of all trades.

- a. Although such work is not specifically shown or specified, all supplementary or miscellaneous items, appurtenances, and devices incidental to or necessary for completion of work under this item shall be furnished and performed as part of this item.
- b. See appropriate sections for specific items for which data and/or samples are required.

**101-2.1 SUBMITTAL, ADDRESS.** All items shall be submitted electronically. The preferred method of submission is utilizing the Newforma Info Exchange project page provided by KSA. KSA will provide a link to the project page for the Contractor to make submittals, to submit RFI's, and upload large files as necessary. There is no cost for using this service. If for some reason the Contractor cannot utilize the Newforma Info Exchange project page for submission, the Contractor shall submit one scanned copy of the submittal via the email to the Project Manager, Brittney Smith, at bsmith@ksaeng.com.

### **101-3.1 SUBMITTALS, GENERAL.**

- a. Contractor shall be responsible for and make all submissions. All items shall be transmitted electronically and include a Contractor's review stamp.
- b. Each transmittal will be sequentially numbered starting with No. 1.
  - (1) An item that is resubmitted will retain the original number but with an added suffix starting with A.
  - (2) Only one specification division should be covered by one letter of transmission.
  - (3) Sufficient catalog information together with catalog cuts and technical data must be submitted to allow an evaluation to be made to determine whether or not the item in question is acceptable.
- c. No submittals will be returned to subcontractors. Submittals transmitted to the Engineer by anyone other than the Prime Contractor will be returned to the Prime Contractor.
- d. Submit items sufficiently in advance of date required to allow reasonable time for review, and to allow for resubmission if necessary. Items submitted without Contractor's approval stamp will be returned, without action, for resubmission. Items that are not submitted in accord with the provisions of this item will be returned, without action, for resubmission.
- e. Operation and Maintenance Manual, and/or warranties where required, shall be separate transmittal.

**101-4.1 SUBMITTALS, SHOP DRAWINGS PROCEDURE.**

- a. Submit as indicated above. Identify submittals as to manufacturer, item, use, type, project designation, specification section or drawing detail reference, and other pertinent information.
- b. Submit an electronic copy of each submittal until approval is obtained.
- c. Allow clear space for stamping on right hand side. Contractor shall stamp his approval on drawings prior to submission to Engineer as indication of his checking and verification of dimensions and coordination with interrelated items. Marks on submittals by Contractor shall not be in red.
- d. Submit standard items like equipment brochures, cuts of fixtures, or standard catalog items (reproducible not required). Indicate exact item or model and all proposed options. Include scale details, sizes, dimensions, performance characteristics, capacities, wiring diagrams, controls, and other pertinent data.

**101-5.1 SUBMITTALS, SAMPLES.**

- a. Submit to address indicated above. Identify submittals as to manufacturer, item, use, type, project designation, specification section of drawing detail reference, and other pertinent information.
- b. Forward with transmittal letters. Include brochures, shop drawings, and installation instruction. Contractor shall stamp his approval on drawings prior to submission to Engineer as indication of his checking and verification of dimensions and coordination with interrelated items. Resubmit samples of rejected items.
- c. Approved samples submitted or constructed, constitute criterion for judging completed work. Finished work or items not equal to samples will be rejected.
- d. Samples will be retained for comparison purposes and/or the Contractor shall remove samples as directed. Contractor shall pay all costs of furnishing and removing samples.

**101-6.1 SUBMITTALS, APPROVAL OR REJECTION.**

- a. Transmittals returned with Approval are considered ready for fabrication and/or installation. If for any reason a transmittal that has an A or B approval is resubmitted, it must be accompanied by a letter pointing out the changes that have been made and the reason for the re-submittal. It shall be the Contractor's responsibility to assure that the previously approved documents are destroyed when they are superseded by a re-submittal as such.
- b. Transmittals with approval combined with Action "Revise and Resubmit" or "Rejected" will be individually analyzed giving consideration as follows:
  - (1) If the items or system proposed is acceptable and the majority of the major individual components (Drawings or Documents) are in compliance; however, there are some minor items not in compliance. The portion of the transmittal given "Revise and Resubmit" or "Rejected" will not be distributed (unless previously agreed to otherwise). Copies of the "Revise and Resubmit" or "Rejected" drawings will be marked up and returned to the Contractor electronically. It shall be the Contractor's responsibility to insure that these items are corrected and resubmitted.

- (2) If the items or system proposed are acceptable; however, the major part of the individual drawings or documents are incomplete or require revision, the entire submittal will be given "Revise and Resubmit" or "Rejected" action. Again, it is reiterated that this is at the sole discretion of the Engineer and some drawings may contain relatively few or no comments for the statement, "Resubmit" to maintain a complete package. Distribution to the Owner and field will not be made unless previously agreed to otherwise.
- (3) Approval is general and does not permit departure from Contract Documents; relieve Contractor from responsibility for errors in detail, dimensions or related items; approve departure from previous instructions or details; components, wiring, etc., required to make item operational or usable.
- (4) Manufacture or fabrication of items prior to final approval is at Contractor's own risk.

**101-7.1 REQUIRED SHOP DRAWINGS, CERTIFICATE, OR REPORTS.** Shop drawings, certificate, or reports shall be submitted on the following items, as appropriate, for approval. The following list is not considered all-inclusive. The Contractor shall supply all submittals required by the plans and specifications.

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>a. Concrete Mix Design for each class of concrete used</li> </ul>                            | <ul style="list-style-type: none"> <li>k. Precast Headwalls and/or Safety End Treatments</li> </ul>         |
| <ul style="list-style-type: none"> <li>b. Reinforcing Steel</li> </ul>  | <ul style="list-style-type: none"> <li>l. Pavement Paint Certificates</li> </ul>                            |
| <ul style="list-style-type: none"> <li>c. Seed, Fertilizer, Hydromulch, Lime, and Nutrients Certificates</li> </ul>                 | <ul style="list-style-type: none"> <li>m. Bituminous Prime Coat</li> </ul>                                  |
| <ul style="list-style-type: none"> <li>d. Joint Sealing Materials (Backer Rods, Sealants &amp; Expansion Material)</li> </ul>       | <ul style="list-style-type: none"> <li>n. Bituminous Tack Coat</li> </ul>                                   |
| <ul style="list-style-type: none"> <li>e. Glass Beads for Pavement Markings</li> </ul>  | <ul style="list-style-type: none"> <li>o. Reinforced Concrete Pipe</li> </ul>                               |
| <ul style="list-style-type: none"> <li>f. Aggregate Samples and Test Results for Crushed Aggregate Base Material</li> </ul>         | <ul style="list-style-type: none"> <li>p. Pipe Bedding Material</li> </ul>                                  |
| <ul style="list-style-type: none"> <li>g. HMAC Mix Designs</li> </ul>   | <ul style="list-style-type: none"> <li>q. Storm Water Pollution Prevention Plan (Not for Review)</li> </ul> |
| <ul style="list-style-type: none"> <li>h. Lime Certificates and Data for Material to be Used in Lime Stabilized Subgrade</li> </ul> | <ul style="list-style-type: none"> <li>r. Embankment Material</li> </ul>                                    |
| <ul style="list-style-type: none"> <li>i. Erosion Control Matting</li> </ul>  | <ul style="list-style-type: none"> <li>s. Topsoil</li> </ul>  |
| <ul style="list-style-type: none"> <li>j. Silt Fencing</li> </ul>   | <ul style="list-style-type: none"> <li>t. Electrical Components</li> </ul>                                  |
|   | <ul style="list-style-type: none"> <li>u. Structural Geogrid Subgrade Materials</li> </ul>                  |
|   | <ul style="list-style-type: none"> <li>v. Underdrain Materials</li> </ul>                                   |

**END OF ITEM 101**

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**ITEM KSA-105 BARRICADES AND MARKINGS FOR PAVEMENT CLOSURES**

**DESCRIPTION**

**105-1.1** The work covered by this section consists of furnishing all materials, equipment, and labor and performing all necessary operations to maintain a satisfactory and safe barricade system, runway and taxiway closures and temporary displaced thresholds for the duration of the project. The required project barricades, markings and lighting are detailed in the project plans. The Contractor shall be responsible for maintaining the barricades, lights, markings and displaced thresholds in their proper location, in good working order, and clean for 24 hours per day throughout the contract period.

**105-1.2** The Contractor will be required to remove barricades and runway or taxiway closure markings at the end of the work day and to reinstall the same prior to commencing work the following morning in some cases to allow for the reopening of certain sections of the airport for evening and night-time operations.

**105-1.3** This section also includes the installation and maintenance of temporary displaced threshold markings (out board) with temporary displaced threshold lights in accordance with the details in the plans.

**METHOD OF MEASUREMENT**

**105-2.1** Measurement for this item will be by lump sum as the work progresses.

**BASIS OF PAYMENT**

**105-3.1** All work performed and materials furnished as prescribed in this item shall be measured and paid for at the contract lump sum price for "Barricades and Markings for Pavement Closures". The total lump sum shall be paid pro-rata per month and the monthly amount shall be calculated by dividing the lump sum by the contract time in months.

Payment will be made under:

Item 105-3.1	Barricades and Markings for Pavement Closures	Per lump sum
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**END OF ITEM 105**



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## ITEM KSA-107 TRENCH AND EXCAVATION SAFETY SYSTEMS

### DESCRIPTION

**107-1.1** This section covers excavation and supporting systems for trenches and other excavated areas to protect the safety of workers, provide suitable means for constructing utility lines, culverts, storm sewers, inlets, junction boxes, headwalls, electrical cable and conduit, etc. and to protect public or private property, including existing utilities. This section shall govern the designing, furnishing, installing, maintaining and removing of temporary Trench and Excavation Safety System(s) for protecting workers in excavations.

**107-1.2** Where existing buildings, utilities, streets, highways, or other structures are in close proximity to the trench, adequate protection shall be provided by the use of sheeting and shoring to protect the buildings, utilities, streets, highways, or other structures from possible damage. In the case of utilities, the Contractor may elect to remove the utility provided that the removal and subsequent replacement meets with the approval of the Construction Manager, the utility owner, or whoever has jurisdiction of the structure. In all cases, it shall be the responsibility of the Contractor to protect public and private property and any person or persons who might, as a result of the Contractor's work, be injured.

**107-1.3** Trenches as used herein, shall be considered as follows:

- a. Any narrow excavation (in relation to its depth) made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench (measured at the bottom) is not greater than 15 feet.
- b. Trench safety system requirements apply to larger open excavations if the erection of structures or other installations limits the space between the excavation slope and the installation to dimensions equivalent to a trench as defined.

**107-1.4** The current edition of the Occupational Safety and Health Administration (OSHA) Standard for Excavation and Trench Safety Systems (29 CFR 1926, Subpart P) is hereby incorporated into the Contract Documents by reference and shall be deemed to be included in the Contract the same as though being written out in full. The requirements of 29 CFR 1926 shall be the minimum requirements for this specification.

“Trench and Excavation Safety System” as used herein shall apply to all methods and materials used to provide for worker safety in excavation and trenching operations required during the project or to provide protection of buildings, utilities, streets, highways, or other structures from possible damage.

It is the sole responsibility of the Contractor, and not the City or Engineer, to design, furnish, install, and maintain for the specific applicability of a Trench and Excavation Safety System to the field conditions to be encountered on the job site during the project.

It is the sole responsibility of the Contractor to design, implement, and maintain Trench and Excavation Safety System(s) meeting the requirements of the referenced OSHA regulations.

The Contractor shall indemnify and hold harmless the City and Engineer from all damages and cost that may result from failure of methods or equipment used by the Contractor to provide Trench and Excavation Safety System(s).

### SUBMITTALS

**107-2.1** Submittals shall be in accordance with specification Item KSA-101, Shop Drawings, Project Data, and Samples. Excavation shall not proceed until the Owner and Engineer have received the Contractor's Trench and Excavation Safety System Plan(s) for the project. Prior to starting any excavation, the Contractor shall submit to the Owner and Engineer:

- a. A Trench and Excavation Safety System Plan(s) developed specifically for the project. The Trench and Excavation Safety System Plan(s) shall include all engineering calculations used for design and shall be sealed by a professional engineer, licensed in the State of Texas.
- b. Shop drawings containing, at a minimum, the following information:
  1. Detailed drawings of the Trench and Excavation Safety System(s) meeting the requirements of the referenced OSHA regulations. The drawings shall note the required load carrying capacity, dimensions, materials, and other physical properties or characteristics in sufficient detail to describe thoroughly and completely the Trench and Excavation Safety System(s).
  2. Drawings, notes, or tables clearly detailing the specific areas of the project in which each Trench and Excavation Safety System shall be used, the permissible size of the excavation, the length of time that the excavation shall remain open, the means of egress from the excavation, the location of material storage sites in relation to the excavation, the methods for placing/compacting bedding/backfill within the safety of the system, any excavation safety equipment restrictions and subsequent removal of the system.
  3. Recommendations and limitations for using the Trench and Excavation Safety System(s).
- c. Manufacturer's tabulated data or other tabulated data for Trench and Excavation Safety System(s) consisting of pre-engineered protective systems such as trench shields, aluminum hydraulic shoring, timber shoring, pneumatic shoring, or trench jacks, or benching or sloping or other protective systems that are not designed specifically for the Project. Manufacturer's tabulated data shall meet the requirements in OSHA and shall describe the specific equipment to be used on the Project. Tabulated data must bear the seal of the licensed professional engineer who approved the data. Manufacturer's tabulated data shall be an attachment to the Contractor's Trench and Excavation Safety System Plan(s).

## **EXECUTION**

**107-3.1** The Contractor shall implement the Trench and Excavation Safety System(s) and conduct affected work in accordance with the same.

**107-3.2** The system shall be in use during all phases of construction, as required.

**107-3.3** Neither the Engineer nor the Owner will be responsible for ensuring the trench safety system is constructed and utilized in accordance with the Trench and Excavation Safety System plan. This shall be the sole responsibility of the Contractor.

**107-3.4** Provide dewatering and drainage services in accordance with specification Item KSA-202, Dewatering the Project Site.

## **METHOD OF MEASUREMENT**

**107-4.1** Trench safety shall be measured on a linear foot basis only for those trenches that workers would reasonably be expected to enter and only for those trenches exceeding five feet in depth. No evaluation of the adequacy of the trench safety precautions will be made by the Engineer since the means, methods, and responsibility for safety rest solely with the Contractor.

**BASIS OF PAYMENT**

**107-5.1** Payment for trench safety, measured as prescribed above, will be made at unit bid price per centerline linear foot of trench. The unit bid price shall include full compensation for designing, furnishing, and installing the system; for dewatering; and for maintaining, replacing, repairing, and removing the Trench and Excavation Safety System and for sloping, special clearing, and excavation necessary to safely implement the Trench and Excavation Safety System. No payment will be made for Trench and Excavation Safety Systems made necessary by the Contractor's selection of an optional design or sequence of work that creates the need for the Trench and Excavation Safety System.

Payment will be made under:

Item 107-5.1	Trench Excavation Safety Protection	Per linear foot
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**END OF ITEM 107**



**ITEM KSA-108 TEMPORARY MOVABLE CONSTRUCTION FENCE**

**DESCRIPTION**

**108-1.1** This item shall govern for the installation of a temporary movable construction fence as shown and at locations shown in the plans or as directed by the Engineer. The work covered by this section consists of furnishing all materials, equipment, and labor to provide and install the movable fence and any gates shown in conjunction with the fence.

**MEASUREMENT AND PAYMENT**

**108-2.1** The work performed and equipment furnished in accordance with this item will be paid for at the contract unit price bid for linear feet of Temporary Movable Construction Fence. Cost of temporary gates required in conjunction with the movable fence shall be considered subsidiary to the unit price bid for temporary fence.

Payment will be made under:

KSA 108-1.1	Temporary Movable Construction Fence	Per Month
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**END OF ITEM 108**

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## **ITEM KSA-202 DEWATERING THE PROJECT SITE**

### **DESCRIPTION**

**202-1.1** The work covered by this section consists of furnishing all materials, equipment, and labor and performing all necessary operations to dewater and drain project excavations of water for the duration of the project.

### **EXECUTION**

**202-2.1** Provide dewatering and drainage as necessary to keep excavations free of water. Dewatering system shall maintain the water level a minimum of 3 feet below the excavation. Contractor shall provide and maintain all dewatering equipment during excavation, construction, and backfill, until the disturbed area can freely drain without ponding water. The Contractor shall operate the dewatering system continuously without interruption during weekends and/or holidays.

**202-2.2** The Contractor shall be responsible for protecting the project site and its surrounding area from erosion. The Contractor shall provide temporary erosion controls as necessary to protect the site at no direct pay. The Contractor shall also be responsible for repair of any damaged or eroded areas outside the scope of work by means and methods as approved by the Engineer at no direct pay.

### **METHOD OF MEASUREMENT**

**202-3.1** This item will not be measured for separate payment.

### **BASIS OF PAYMENT**

**202-4.1** No separate payment shall be made for this work. This work shall be considered subsidiary to the various bid items of the specifications. This shall include all operations required as described herein, for furnishing all materials, for all preparation, delivering, and placing of the material, and for all labor, equipment tools, and incidentals necessary to complete the item.

### **END OF ITEM 202**



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## ITEM KSA-701 INSTALLATION OF RUNWAY AND TAXIWAY RETROREFLECTIVE MARKERS

### DESCRIPTION

**701-1.1** This item shall consist of runway and taxiway retroreflective markers furnished and installed in accordance with this specification at the locations and in conformity with the dimensions, design, and details shown on the plans. This item shall include the furnishing of all labor, materials, equipment and incidentals necessary to install the markers as completed units to the satisfaction of the Engineer.

### EQUIPMENT AND MATERIALS

#### **701-2.1 GENERAL.**

- a. Airport lighting equipment and materials covered by the FAA specifications shall have the prior approval of the Federal Aviation Administration, Airports Service, Washington, D.C. 20591, and shall be listed in Advisory Circular 150/5345-1, Approved Airport Lighting Equipment.
- b. All other equipment and materials covered by other referenced specifications shall be subject to acceptance through the manufacturer's certification of compliance with the applicable specifications.
- c. All materials and equipment for which no reference specification has been shown shall be of the highest commercial quality available.

**701-2.2 RETROREFLECTIVE MARKERS.** Retroreflective markers shall conform to FAA Specification L-853, "Runway and Taxiway Retroreflective Markers" and shall be of the type and color(s) shown on the plans.

**701-2.3 ADHESIVE.** The adhesive used to secure the markers to the pavement shall be a two-part epoxy sealant furnished with the markers.

**701-2.4 TEMPLATE.** A template shall be provided to assure that the thickness of the adhesive between the bottom of the marker and the pavement is in accordance with the installation details in paragraph 701-3.4. The template shall be furnished by the manufacturer of the marker unless otherwise approved by the Engineer. The use of any template other than that furnished by the manufacturer shall be approved by the Engineer prior to its use.

### CONSTRUCTION METHODS

**701-3.1 GENERAL.** The markers shall be installed at the approximate locations shown on the plans. The exact locations shall be as directed by the Engineer.

**701-3.2 PAVEMENT PREPARATION.** The pavement shall be dry and free of any oil, grease, dirt, loose particles or other materials which might adversely affect the bonding of the adhesive to the pavement surface. All pavement surfaces on which the markers are to be placed shall be cleaned of any loose materials or dirt by the use of brooms or power blowers prior to the placing of the adhesive.

**701-3.3 ADHESIVE.** The adhesive shall be furnished with the markers and shall be mixed in strict accordance with the manufacturer's instructions. Any adhesive mixture which becomes too viscous to extrude freely at the edges of the marker shall be discarded.

**701-3.4 MARKER PLACEMENT.** The pavement area on which the marker is to be placed shall be covered with

a sufficient quantity of the adhesive, using the template furnished by the manufacturer or fabricated by the Contractor. Any irregularities in the pavement surface shall be filled with the adhesive. Any voids in the adhesive shall be eliminated by applying pressure on the marker until it is in firm contact with the pavement. Prior to applying pressure, the thickness of the adhesive shall be between 1/16 and 1/8 inch, which is determined by the template furnished by the manufacturer or fabricated by the Contractor. After the marker is in its final position, any excess adhesive shall be removed and the reflective faces cleaned in accordance with the manufacturer's instructions.

**701-3.5 INSPECTION.** The completed installation shall be inspected at night using a light source approved by the engineer.

**METHOD OF MEASUREMENT**

**701-4.1** The quantity of retroreflective markers to be paid for under this item shall be the number of each type and color installed as completed units in place, ready for service and accepted by the Engineer.

**BASIS OF PAYMENT**

**701-5.1** Payment shall be made at the unit price bid for each retroreflective marker installed in place and accepted by the Engineer. This price shall be full compensation for furnishing all materials; for all preparation, assembly and installation of these materials; and for all labor, equipment, tools and incidentals necessary to complete this item.

Payment shall be made under:

Item 701-5.1	Taxiway Centerline Retroreflective Markers (Green)	Per each
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**END OF ITEM 701**

## ITEM KSA-801 SLIDING GATES (AUTOMATIC SECURITY GATES)

### DESCRIPTION

**801-1.1** This item shall consist of providing and installing automatic security gates at locations shown on the plans and as specified herein. All automatic gates shall have barbwire tops meeting the requirements of FAA Item F-162, Chain-Link Fences. Each sliding gate shall be controlled by access control panels located on both sides.

Automatic security gates shall meet FAA, other federal agencies and local, state and federal codes as they apply. The automatic gates shall also be NEC 250 and UL 325 compliant and installed per manufacturer recommendations.

### EQUIPMENT AND MATERIALS

**801-2.1 SUBMITTALS.** All submittals shall be in compliance with Item KSA-101, Shop Drawings, Project Data, and Samples. Submit shop drawings showing connections to adjacent construction, range of travel, and all electrical and mechanical connections to the Engineer. Drawings shall also show the size and location of the concrete mounting pad. Underground electrical runs shall be shown on shop drawings. Submit two (2) copies of manufacturer's installation instructions for this specific project. Affidavits from the manufacturer demonstrating that the gate mechanism has been tested to 200,000 cycles without breakdown shall be submitted to the Engineer. Each operator shall bear a label indicating that the operator mechanism has been tested for full power and pressure of all hydraulic components, full stress tests of all mechanical components and electrical tests of all overload devices.

**801-2.2 QUALITY ASSURANCE.** Qualified distributor and service organization of all products proposed shall be within 150 miles of the East Texas Regional Airport in Longview, Texas. The distributor shall have sufficient parts in stock to repair equipment furnished. Organization shall have a minimum of five (5) years experience and have furnished and installed equipment specified to at least five (5) similar installations.

**801-2.3 WARRANTY.** Provide a five (5) year limited warranty against all defects in materials or workmanship, except batteries, which are covered under a one (1) year warranty. Defective materials shall be replaced with comparable materials furnished by the manufacturer, at no cost to the owner. Freight, labor and other incidental costs are not covered under the factory warranty, but may be covered by a separate service agreement between installing company and the owner.

**801-2.4 PRODUCT DELIVERY AND STORAGE.** Store products upright in the original shipping containers, covered, ventilated and protected from all weather conditions prior to installation.

**801-2.5 CHAIN DRIVEN OPERATOR FOR SLIDE GATE.** Each gate assembly shall consist of three components: control stand, barrier, and yoke.

**801-2.6 CHAIN DRIVEN OPERATORS.** The prospective manufacturer of the gate operators must have experience building chain driven operators for over five (5) years, provide a five (5) year manufacturer's warranty, and have a factory trained and authorized dealer within 150 miles of the East Texas Regional Airport in Longview, Texas.

The operator shall be a heavy duty design ideal for commercial application. Operator shall move the gate at a minimum speed of 1 feet per second.

All components shall be of the best quality industrial grade and shall be thoroughly tested prior to shipment.

Gate operators shall be a complete unit ready for mounting on a concrete base. Anchor bolts must be concealed within the operator housing so as to prohibit vandalism.

**801-2.7 ELECTRICAL REQUIREMENTS.** Operator shall be UL listed.

- a. Each Gate: Operator Motor - 1 HP, 230 VAC, 1-Phase, 60 Hz

An integral thermal overload protection circuit shall be provided to cut power to the drive motor in case of overheating, and a grounding system for the operator consisting of No. 10 bare copper grounding clips and rod, 10 feet minimum shall be required and installed by the Contractor.

**801-2.8 SAFETY FEATURES.** The chain driven operator shall have the following safety devices:

- a. A manual valve to bypass the solenoid valve to permit throttling of the gate speed during set up and the ability to stop movement of the gate in case the stop or power disconnect button cannot be reached.
- b. An automatic reversing device in the form of ground loops.
- c. The electrical enclosure shall have a power disconnect switch located on the front side opposite the moving gate panel.
- d. Electrical grounds shall be placed at fence line end posts on both sides of all gate openings.
- e. A wireless photoelectric sensor shall be installed on both the inside and outside of the gate to reverse or stop the movement of the gate when the beam is broken.
- f. One (1) guard post shall be installed on each side of the hydraulic gate operator to protect the gate operator from vehicular impact.
- g. One physical stop at each end of the track.

**801-2.9** The drive mechanism must be capable of being completely disengaged from the unit without the use of tools.

**801-2.10 Gate Access Control Panel.** Refer to electrical specification section 16400 for gate access control panel requirements. Gate access control panel shall be subsidiary to Bid Item S-E16100-5.1 "Electrical Service and Access Control for Slide Gates".

**801-2.11 LOOP DETECTOR.** Loops shall be installed in the pavement on each side of each gate. Gates shall not open automatically when the presence of a vehicle is detected. A double safety loop shall be installed on the outside of each gate to prevent the gate from closing until vehicles are clear of the gate. Each loop shall be a 6' x 6' (nominal) square consisting of (2) turns (or as required by detector manufacturer) of No. 14 AWG stranded copper wire. The wire shall be installed in a 1/4" wide by 1 1/2" deep groove cut into the existing pavement. After installation of the wire, the groove shall be filled with a sealant approved by the Engineer. The location of the loops shall be as indicated on the plans. Final location shall be confirmed with the Engineer prior to construction.

**801-2.12 SLIDE GATES.** The slide gate shall be supported by the use of four (minimum) steel rollers mounted on two (minimum) posts. The gate shall be constructed of steel members with wire meshing. The top rail

pipe shall have an outside diameter of 2-3/8 inches for all proposed heights, as shown in the plans. All vertical rail pipes shall have an outside diameter of 2-3/8 inches. All glide posts shall have an outside diameter of 2-3/8 inches. The bottom rail pipe shall have an outside diameter of 2-3/8 inches. All brace tubing shall have an outside diameter of 1-5/8 inches. A design of the proposed gate shall be submitted to the Engineer for approval. The gate shall be industrial grade for heavy traffic service.

**801-2.13 ACCESSORIES.** The Contractor shall provide appropriate signs for all gates as shown on the plans. The Contractor shall be responsible for providing all signs to match existing gates, regardless if they are shown in the plans. Sign installation shall be considered incidental to gate installation.

### **TESTING**

**801-3.1 FACTORY TESTING.** Fully assemble and test, at the factory, each gate operator to assure smooth operation, sequencing and electrical connection integrity. Apply physical loads to the operator to simulate field conditions. Tests shall simulate physical and electrical loads equal to the fully rated capacity of the operator components. Check all mechanical connections for tightness and alignment. Check all welds for completeness and continuity. Check welded corners and edges to assure they are square and straight. Inspect painted finish for completeness and gloss. Touch up imperfections prior to shipment. Check all electrical wires to assure that chafing cannot occur during shipping or operation.

**801-3.2 SITE TESTING.** Test gate operator through ten full cycles and adjust for operation without binding, scraping or uneven motion. All anchor bolts shall be fully concealed in the finished installation. Train Owner's personnel in the general maintenance of the gate operator and accessories and provide two (2) copies of Operations and Maintenance manual for the Owner's use. Manuals will identify parts of the equipment for future procurement.

### **INSTALLATION**

**801-4.1** The Contractor shall install each gate in accordance with these specifications and as shown on the plans.

**801-4.2** The Contractor shall investigate the site to determine the proper elevation of the concrete pad to be installed and the relationship of the roadway in order that proper clearance may be obtained prior to installation. Any grading required to obtain proper clearance for operation of the gate shall be considered subsidiary to gate installation.

**801-4.3** The Contractor shall provide an anchor bolt layout in accordance with the manufacturer's recommendation prior to installation.

**801-4.4** The Contractor shall install each slide gate operator in accordance with the manufacturer's printed instructions, current at the time of installation. Coordinate locations of slide gate operators with plans, other trades and shop drawings.

### **METHOD OF MEASUREMENT**

**801-5.1** Measurement for work performed under this item shall be specified under FAA Item F-162, Chain-Link Fences.

### **BASIS OF PAYMENT**

**801-6.1** Payment for work performed under this item shall be as specified under FAA Item F-162, Chain-Link Fences, and shall include full compensation for all materials including the slide gate, the gate operator, and any other control equipment required to complete the item, equipment, labor, and incidentals to provide a complete and working installation.

**END OF ITEM 801**

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## **ITEM S-15 SAW CUT EXISTING PAVEMENT**

### **DESCRIPTION**

**S-15-1.1** This item shall consist of the saw cutting of existing asphaltic concrete or concrete pavement as shown on the plans or as directed by the Engineer. Saw cutting of existing pavements may be required for the abutment of new pavement to existing pavement. This item shall include the furnishing of all labor, materials, equipment and incidentals necessary to perform the work to the satisfaction of the Engineer.

### **EQUIPMENT AND MATERIALS**

**S-15-2.1** There shall be few limitations on joint sawing equipment provided the equipment is approved by the Engineer and is in proper working order. Both wet sawing, with diamond impregnated blades, and dry sawing, with silicon carbide or Carborundum blades may be used.

### **CONSTRUCTION METHODS**

**S-15-3.1** Contractor shall saw cut existing asphaltic concrete or concrete pavement as shown on the plans to provide a straight, uniform edge for new pavements. Minimum depth of cut shall be as required to reach the full depth of the existing pavements. Pavement removal adjacent to the saw cut shall leave a clean and sharply defined pavement edge, thereby creating a smooth and straight paving joint at the existing pavement and the proposed pavement interface.

### **METHOD OF MEASUREMENT**

**S-15-4.1** The quantity of saw cutting of existing pavement shall not be measured for payment.

### **BASIS OF PAYMENT**

**S-15-5.1** Payment shall not be made for saw cutting of existing pavement. The cost of this item shall be subsidiary to other items of work. The Contractor will still be responsible for furnishing all equipment and materials; for all preparation; and for all labor, tools and incidentals necessary to complete this item.

**END OF ITEM S-15**

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## ITEM S-33 WATER SYSTEMS

### DESCRIPTION

**S-33-1.1** This item covers the furnishing and installation of pipe and fittings for water lines including, supply lines, potable water distribution lines, fire hydrants, fittings, and appurtenances.

### EQUIPMENT AND MATERIALS

#### **S-33-2.1 DELIVERY, STORAGE, AND HANDLING.**

- a. Each load of pipe delivered to the job site shall be inspected by the Engineer.
  - (1) Pipe transported without adequate protection shall be rejected and removed immediately from the job site.
  - (2) Inadequate wall thickness or tolerances greater than specified: Randomly selected samples of the pipe shall be forwarded immediately to an approved testing laboratory with instructions to check the pipe for compliance with applicable product standards, ASTM Specifications, and other applicable specifications.
  - (3) If the testing laboratory reports concur that the pipe does not meet specifications, the defective pipe shall be removed immediately from the job site by the Contractor.
  - (4) If defective, all costs for shipping of samples, laboratory testing, removal of defective pipe, and replacement pipe shall be the sole responsibility of the Contractor.
  - (5) Pipes with excessive "pitting", cracks, mold scares and/or other surface defects may be rejected by the Engineer at his discretion. The Contractor and supplier shall remove the pipe from the project site and shall replace the material at no additional cost to the Owner.

#### **S-33-2.2 PIPE.**

PVC Water Pipe - Pressure Class: AWWA C900

- a. DR 18 - Pressure Class 150.
- b. All pipe shall bear NSF Seal of Approval.
- c. Joints shall be integral bell with flexible elastomeric seal.

### Restrained Joint PVC Water Pipe

- a. Pipe shall be DR 18 pressure class 235.
- b. All pipe shall bear the NSF seal of approval.
- c. The restrained joint pipe system shall meet all short and long term pressure test requirements of AWWA C900 and C905.
- d. Pipe and coupling shall be made from unplasticized PVC compounds having a minimum cell classification of 12454-B as defined in ASTM D1784.
- e. The compound shall qualify for a Hydrostatic Design Base of 4000 psi of water at 73.4° F in accordance with the requirements of ASTM D2837.
- f. Blue pipe shall be supplied unless otherwise agreed upon at time of purchase.
- g. Restrained joint PVC pipe products shall have been tested and approved by an independent third-party laboratory for continuous use at rated pressures.
  1. Copies of agency approval reports or product listing shall be provided to the Engineer if requested.
  2. Products intended for contact with potable water shall be evaluated, tested, and certified for conformance with NSF Standard 61 or the health effects portion of NSF Standard 14 by an acceptable certifying organization when required by the regulatory authority having jurisdiction.
- h. Pipe shall be joined using non-metallic couplings which, together, have been designed as an integral system for maximum reliability and interchangeability.
  1. High-strength flexible thermoplastic splines shall be inserted into mating precision-machined grooves in the pipe and coupling to provide full 360° restraint with evenly distributed loading.
  2. MJ Gland Adapters shall be used to anchor this restrained-joint PVC pipe to ductile iron accessories such as fittings and valves.
  3. Couplings shall be designed for use at the rated pressures of the pipe with which they are utilized and shall incorporate twin elastomeric sealing gaskets meeting the requirements of ASTM F477.
  4. Joints shall be designed to meet the leakage test requirements of ASTM D3139.
- i. Install pipe as specified in AWWA C605

### **S-33-2.3 FITTINGS.** Buried Fittings

- a. Ductile iron, AWWA C110 or AWWA C111.
- b. Cement lined interior, AWWA C104.
- c. Exterior shall be bituminous coated, AWWA C110.
- d. Fittings shall be push-on, mechanical joint or flanged as shown.
- e. Working pressure rated to 350 psi.

**S-33-2.5 COUPLINGS.**

- a. Supply couplings with a steel center band, steel gland rings, gaskets and bolts.
- b. Couplings shall be rated for 1.25 times the maximum operating pressure of line connected.
- c. All couplings near bends, fittings, or valves shall be restrained with Engineer approved mechanical restraint system.

**S-33-2.6 BOLTS AND GASKETS.**

- a. Gaskets shall be 1/16-inch cloth insert, red rubber, full face.
- b. Bolts shall be in accordance with the following:
  - (1) Non-Pressure Applications: ASTM A307A.
  - (2) Pressure Applications: ASTM A307B.
  - (3) Submerged/Splashed: 316 stainless steel.

**S-33-2.7 PIPE SUPPORTS.** Install adjustable pipe supports as shown on the plans.

**S-33-2.8 TRACER WIRE.** A continuous 12 gauge solid insulated copper wire shall be installed along with all PVC water pipe to assist in locating the line following installation. Tracer wire splices shall utilize a direct bury splice kit. Wires should be tied together at splices to prevent pulling the splices apart. The tracer wire should stubup near valves, but should not be installed in the valve box. The distance between stubups should not exceed 2,000 feet. Color shall be in accordance with the American Public Works Association color code.

**S-33-2.9 TAPPING SLEEVES**

- a. Sleeves shall be designed for a working pressure of at least 150 psi and furnished with a brass or stainless steel test plug through the body for hydrostatic pressure testing.
- b. The outlet shall conform to ANSI B16.1, Class 125 flanges designed to accept tapping valves.
- c. Sleeves shall be designed to properly fit the type and class of pipe on which they will be used. Sleeves may be cast iron, ductile iron, or welded steel.
- d. Tapping sleeves, unless otherwise specified, shall be stainless steel or epoxy coated with stainless steel nuts and bolts.

- e. Sleeves which are designed in such a manner that the watertight seal around the outlet is achieved by a gasket placed between the sleeve body and the pipe barrel shall be provided with a recess in the sleeve body to accommodate the gasket.

#### **S-33-2.10 STEEL ENCASEMENT**

- a. **Casing Material** - The Contractor shall use steel pipe for all casing pipe. The material specification for casing pipe are the minimum acceptable. The Contractor shall be fully responsible to ensure the materials used are of sufficient strength for the installation method chosen and the soil conditions encountered. Steel casing pipe shall have minimum yield strength of 35,000 psi. Casing shall meet ASTM A-36, ASTM A-570, ASTM A-135, ASTM A-139, or approved equal. Pipe shall be coated and lined in accordance with AWWA C-210 or approved equal. Pipe joints shall be welded in accordance with AWWA C-206. After pipe is welded, coating and lining shall be repaired.
- b. **Bore and Tunnel Methods** - Unless specified otherwise, the Contractor may use boring and jacking or tunneling for the installation method of casing material. The Contractor shall be fully responsible to ensure the methods used are adequate for the protection of workers, pipe, property, and the public. Provide a finished product as required.
- c. **CASING INSULATORS.** Use casing insulators for all types of carrier pipe. Insulators shall consist of pre-manufactured steel bands with plastic lining and plastic runners. Insulators shall fit snug over the carrier pipe and position the carrier pipe approximately in the center of the casing pipe, to provide adequate clearance between the carrier pipe bell and the casing pipe.

#### **S-33-2.11 SERVICE LINES**

- a. Water service lines shall be HDPE unless otherwise specified on the plans.
- b. The water service lines shall be sized to match existing services, with a minimum line size of 1"

#### **S-33-2.12 DISINFECTION CHEMICALS**

- a. AWWA B300, Hypochlorite

### **CONSTRUCTION METHODS**

#### **S-33-3.1 CONSTRUCTION.**

- a. **Removal.** Water pipe shown on the plans and deemed by the Engineer for removal shall be by the following means.
  - (1) **Pipes.** Avoid damaging appurtenances determined by the Engineer to be salvageable.

- (2) **Concrete, Brick, or Stone Structures.** Portions of structures that will not interfere with the proposed construction may remain in place 2 ft. or more below the permanent ground line. Square off remaining structures and cut reinforcement flush with the surface of the concrete.
- b. **Salvage.** Avoid damage to materials shown in the plans to be salvaged. Deliver materials to be retained by the Department to the location shown in the plans. Block up salvaged steel materials off the ground.
- c. **Disposal.** Material removed that is not deemed to be salvageable is the property of the Contractor. Dispose of removed material off the right of way in accordance with federal, state, and local regulations.
- d. **Backfill.** Backfilling existing water main shall include plugging and filling existing water main. Existing pavement shall remain in place and any damage shall be repaired at no cost to the owner.
  - (1) **Pipe.** Existing pipe shall be backfilled in accordance with FAA P-610.
  - (2) **Encasement.** Encasement shall be backfilled in accordance with FAA P-610. Existing pipe shall be removed prior to backfill.

#### **S-33-3.2 PIPE INSTALLATION.**

- a. **Pipe Bedding and Backfill.** Prior to installing the pipe, an aggregate bed shall be installed as shown on the plans. Payment for bedding shall be subsidiary to structure costs.
- b. **Placing and Laying.**
  - (1) Bury water lines as shown.
  - (2) Intersecting lines shall be joined by an appropriate fitting.
  - (3) Install pipe sleeves where seamless steel piping passes through concrete walls.

#### **S-33-3.3 JOINTS.**

- a. Install mechanical joints in accordance with manufacturer's recommendations.
- b. Make push-on joints in accordance with manufacturer's recommendations.
- c. Install solvent weld joints in accordance with ASTM D 2855.
- d. Joint lubricant shall be as recommended by the pipe manufacturer.
- e. Install joints in the field by cleaning all joint surfaces and gaskets with soapy water, tighten bolts alternately, evenly and to the specified torques. Extension wrenches shall not be used to secure greater leverage. Install electrical bonding or insulation during manufacture of joints.
- f. Complete installation of pipe and appurtenances as set forth in AWWA C600 and as specified.

**S-33-3.4 ANCHORAGE OF FITTINGS - THRUST BLOCK.** Pipe fittings shall be blocked with Class B concrete thrust blocks as necessary and as shown on the plans. Place blocks so that the joints will be accessible for inspection and repair. Joints shall be wrapped in plastic prior to placing concrete.

#### **S-33-3.5 STEEL ENCASEMENT**

**a. Steel Encasement Installed by Boring**

- (1) Do not allow excavation over the limits of the bore or tunnel as specified. Trench walls of access pits adjacent to the bore or tunnel face shall be truly vertical. Shore the trench walls as necessary to protect workmen, the public, structures, roadways, and other improvements.
- (2) Perform the boring from the low or downstream end unless specified otherwise. Bore the holes mechanically and use a pilot hole. By this method, an approximate 2" pilot hole shall be bored the entire length of the crossing and shall be checked for line and grade. This pilot hole shall serve as the centerline of the larger diameter hole to be bored. Place excavated material near the top of the working pit and dispose of material as required. The use of water or other fluids in connection with the boring operation will be permitted only to the extent to lubricate cuttings. Jetting shall not be permitted.
- (3) In unconsolidated soil formations, a gel-forming colloidal drilling fluid consisting of at least 10% of high grade carefully processed bentonite may be used to consolidate cuttings of the bit, seal the walls of the hole, and furnish lubrication for subsequent removal of cuttings and installation of the pipe immediately thereafter.
- (4) In locations where the soil formation is other than consolidated rock, insert the casing pipe simultaneously with the boring operation. This requirement applies to all bored holes of 18" or greater in diameter. For smaller diameter bored holes, it is desirable that the casing be installed as the boring progresses, but because of differences in soil formations, the time for inserting the casing shall be the Contractor's responsibility. In the event that caving sand or water bearing materials are encountered, insert the casing pipe simultaneously with the boring operation regardless of the diameter of the bored hole. In all cases, the security and integrity of the roadway is the primary concern. The Contractor shall be held fully responsible for the continued integrity of the structure of the roadway being crossed, whether or not a casing pipe is inserted simultaneously with the boring operation.

**b. Installing Carrier Pipe in Casing**

- (1) Pipe to be installed within the casing or tunnel liner shall meet the requirements for the type of pipe as specified. Where indicated, place, align, and anchor guide rails and/or casing insulators inside the casing. If guide rails are used, place cement mortar on both sides of the rails.
- (2) Pull or skid pipe into place inside the casing. Lubricants such as flax soap or drilling mud may be used to ease pipe installation. Do not use petroleum products, oil or grease for this purpose. If guide rails are used, install pipe and hold down jacks after installation of carrier pipe.
- (3) After installation of the carrier pipe, mortar inside and outside of the joints as applicable.
- (4) After carrier pipe installation is complete, seal or plug the ends of the casing as shown in the plans.

**c. Installation of Pressure Grout Mix**

- (1) Install pressure grout mix in the void space between the outside of the casing pipe or tunnel liner and the excavation. For bore or jacks with casing pipe, install pressure grout mix immediately upon completion of setting casing pipe.



**S-33-3.6 HYDROSTATIC TESTING.**

- a. Complete hydrostatic testing as set forth in AWWA C600 and as specified.
- b. Testing shall be completed for each subsection of pipeline between main line valves. The test pressure and allowable leakage shall be calculated based on each subsection of the pipeline between the main line valves.
- c. Once the subsections have passed the hydrostatic testing, the entire pipeline shall be hydrostatically tested. The test pressure and allowable leakage shall be calculated based on the entire pipeline.
- d. Refer to AWWA C600 for additional testing procedures and allowable leakage calculations.

**S-33-3.7 WATERLINE STERILIZATION**

- a. Verify that the piping system has been cleaned, inspected, and pressure tested.
- b. Disinfection of water line shall be accomplished by the Contractor in accordance with the requirements of AWWA C651 using the tablet, continuous feed or slug methods as described therein. The tablet method of disinfection shall be as follows.
- c. The tablet method consists of placing calcium hypochlorite granules and tablets in the water main as it is being installed and filling the main with potable water when installation is completed.
- d. This method may be used only if the pipes and appurtenances are kept clean and dry during construction.
- e. For calcium hypochlorite granules, during construction, the granules shall be placed at the upstream end of the first section of pipe, at the upstream end of each branch main, and at 500 ft. intervals. The quantity of granules shall be as shown in the following table.

WARNING: This procedure must not be used on solvent-welded plastic or on screwed-joint steel pipe because of the danger of fire or explosion from the reaction of the joint compounds with the calcium hypochlorite.

**OUNCES OF CALCIUM HYPOCHLORITE GRANULES  
TO BE PLACED AT BEGINNING OF MAIN AND  
AT EACH 500 FT. INTERVAL**

Pipe Diameter (inches)	Calcium Hypochlorite Granules (ounces)
4	0.5
6	1.0
8	2.0
12	4.0
16 and larger	8.0

- f. For calcium hypochlorite tablets, during construction, 5-g tablets shall be placed in each section of pipe and also one such tablet shall be placed in each hydrant, hydrant branch, and other appurtenance. The number of 5-g tablets required for each pipe section shall be  $0.0012d^2L$  rounded to the next higher integer, where d is the inside pipe diameter, in inches, and L is the length of the pipe section, in feet. The following table shows the number of tablets required for commonly used sizes of pipe. The tablets shall be attached by an adhesive such as Permatex No. 1 or equal. There shall be no adhesive on the tablet except on the broad side attached to the surface of the pipe. Attach all the tablets inside and at the top of the main, with approximately equal numbers of tablets at each end of a given pipe length. If the tablets are attached before the pipe section is placed in the trench, their position shall be marked on the section so it can be readily determined that the pipe is installed with the tablets at the top.

NUMBER OF 5-g CALCIUM HYPOCHLORITE TABLETS  
REQUIRED FOR DOSE OF 25 mg/L\*

Pipe Diameter (inches)	Length of Pipe Section (feet)				
	13 or less	18	20	30	40
	Number of 5-g Calcium Hypochlorite Tablets				
4	1	1	1	1	1
6	1	1	1	2	2
8	1	2	2	3	4
10	2	3	3	4	5
12	3	4	4	6	7
16	4	6	7	10	13

\*Based on 3.25 g available chlorine per tablet; any portion of table rounded to next higher number.

- g. When installation has been completed, the main shall be filled with water at a rate such that water within the main will flow at a velocity no greater than 1 ft/s. Precautions shall be taken to assure that air pockets are eliminated. This water shall remain in the pipe for at least 24 hours. If the water temperature is less than 41°F (5°C), the water shall remain in the pipe for at least 48 hours. Valves shall be positioned so that the strong chlorine solutions in the treated main will not flow into water mains in active service.

**METHOD OF MEASUREMENT**

**S-33-4.1** Measurement for waterlines shall be per the linear foot. Fittings and other related appurtenances shall be considered subsidiary to the item and shall not be measured for payment.

**BASIS OF PAYMENT**

**S-33-5.1** Payment for waterlines shall be per the contract unit price. This shall include all materials, equipment, labor, and incidentals necessary to complete the item.

Payment shall be made under:

Item S-33-5.1	6" AWWA C900 DR18 Waterline	Per linear foot
Item S-33-5.2	6" Restrained Joint PVC Waterline	Per linear foot
Item S-33-5.3	12" AWWA C900 DR18 Waterline	Per linear foot
Item S-33-5.4	Connect to Existing Waterline	Per each
Item S-33-5.5	Water Line Pressure Testing and Sterilization	Per lump sum
Item S-33-5.6	Connect to Existing Fire Hydrant	Per each

**END OF ITEM S-33**

**ITEM S-34 PIPELINES CROSSING HIGHWAYS, STREETS AND  
RAILROADS BY BORING, TUNNELING OR OPEN CUT**

**DESCRIPTION**

**S-34-1.1** This item covers the furnishing of labor, materials, equipment and incidentals necessary to install pipe casings or tunnel liners by boring, or open cut as shown on the plans. This item sets forth the requirements for utility lines crossing roadways or railroads using bore, or open cut methods.

**S-34-1.2 JOB CONDITIONS, PERMITS, AND EASEMENTS.**

- a. Where the work is in the public right-of-way or railroad company right-of-way, the Owner will secure the appropriate permits or easements. The Contractor shall observe regulations and instructions of the right-of-way Owner as to the methods of performing the work and take precautions for the safety of the property and the public. Negotiations and coordination with the right-of-way Owner shall be carried on by the Contractor, not less than five (5) days prior to the time of his intentions to begin work on the right-of-way or as required by the Owner's permit.
- b. Comply with the requirements of the permit and/or easement. The work within Texas Department of Transportation (TxDOT) right-of-way shall comply with TxDOT specifications. If required by the rights-of-way Owner, obtain Protective Liability Insurance in the amount required by the particular company or other insurance as is specified in the permit at no cost to the Owner. Acquiring a permit, agreement, or work order from the right-of-way Owner is required.
- c. Construction along roads and railroads shall be performed in such manner that the excavated material be kept off the roads and railroads at all times, as well as, all operating equipment. Construction shall not interfere with the operations of the roads and railroads.
- d. Barricades, warning signs, and flagmen, when necessary and specified, shall be provided by the Contractor.
- e. No blasting shall be allowed. Existing pipelines are to be protected. The Contractor shall verify location and elevation of any pipelines, telephone cable, and other utilities before proceeding with the construction and plan his construction so as to avoid damage to the existing pipelines, telephone cables, or utilities. Verification of location of existing utilities shall be the complete responsibility of the Contractor.

**EQUIPMENT AND MATERIALS**

**S-34-2.1 CASING MATERIAL.** The Contractor shall use steel pipe for all casing pipe. The material specification for casing pipe are the minimum acceptable. The Contractor shall be fully responsible to ensure the materials used are of sufficient strength for the installation method chosen and the soil conditions encountered. Steel casing pipe shall have minimum yield strength of 35,000 psi. Casing shall meet ASTM A-36, ASTM A-570, ASTM A-135, ASTM A-139, or approved equal. Pipe shall be coated and lined in accordance with AWWA C-210 or approved equal. Pipe joints shall be welded in accordance with AWWA C-206. After pipe is welded, coating and lining shall be repaired.

**S-34-2.2 BORE AND TUNNEL METHODS.** Unless specified otherwise, the Contractor may use boring and jacking or tunneling for the installation method of casing material. The Contractor shall be fully responsible to ensure the methods used are adequate for the protection of workers, pipe, property, and the public. Provide a finished product as required.

**S-34-2.3 MIXES.**

- a. Cement Mortar: Consisting of one (1) part cement to two (2) parts clean sand with sufficient water to make a thick workable mix.
- b. Pressure Grout Mix: Comprised of 1 cubic foot of cement and 3.5 cubic feet of clean fine sand with sufficient water added to provide free flowing thick slurry. If desired to maintain solids in the mixture in suspension, one cubic foot of commercial grade bentonite may be added to each 12 to 15 cubic feet of the slurry.

**S-34-2.4 CASING INSULATORS.** Use casing insulators for all types of carrier pipe. Insulators shall consist of pre-manufactured steel bands with plastic lining and plastic runners. Insulators shall fit snug over the carrier pipe and position the carrier pipe approximately in the center of the casing pipe, to provide adequate clearance between the carrier pipe bell and the casing pipe. Insulators shall be as manufactured by RACI, PSI, or Engineer approved equal.

**S-34-2.5 END SEALS.** All casing ends shall be sealed. Seals for carrier pipe under 18" shall be one-piece rubber with stainless steel bands. End seal shall be molded to fit the casing pipe and carrier pipe. Seals for carrier pipe above 18" shall consist of modular seals "Link Seal" or approved equal. Completely seal all openings so that there are no annular spaces between the carrier pipe and the casing pipe.

## **CONSTRUCTION METHODS**

**S-34-3.1 EXCAVATION AND BACKFILL OF ACCESS PITS.**

- a. Do not allow excavation over the limits of the bore or tunnel as specified. Trench walls of access pits adjacent to the bore or tunnel face shall be truly vertical. Shore the trench walls as necessary to protect workmen, the public, structures, roadways, and other improvements.
- b. Excavations within the right-of-way and not under surfacing shall be backfilled and consolidated by tamping in 6" horizontal layers to 95% of maximum density as measured by ASTM D-698. Surplus material shall be removed from the right-of-way and the excavation finished to original grades. Backfill pits immediately after the installation of the carrier pipe is completed. If carrier pipe is not installed immediately after casing pipe installation, the Right-of-Way Owner may require the access pits be temporarily backfilled until installation of carrier pipe.
- c. Where seeding or sodding is disturbed by excavation or backfilling operations, such areas shall be replaced by seeding or sodding as specified.

**S-34-3.2 INSTALLING CARRIER PIPE IN CASINGS.**

- a. Pipe to be installed within the casing or tunnel liner shall meet the requirements for the type of pipe as specified. Where indicated, place, align, and anchor guide rails and/or casing insulators inside the casing. If guide rails are used, place cement mortar on both sides of the rails.
- b. Pull or skid pipe into place inside the casing. Lubricants such as flax soap or drilling mud may be used to ease pipe installation. Do not use petroleum products, oil or grease for this purpose. If guide rails are used, install pipe and hold down jacks after installation of carrier pipe.
- c. After installation of the carrier pipe, mortar inside and outside of the joints as applicable.
- d. After carrier pipe installation is complete, seal or plug the ends of the casing.

**S-34-3.3 FREE-AIR SYSTEM.** If required by OSHA standards, free-air systems shall be installed and maintained.

**S-34-3.4 INSTALLATION OF PRESSURE GROUT MIX.**

- a. Install pressure grout mix in the void space between the outside of the casing pipe or tunnel liner and the excavation. For bore or jacks with casing pipe, install pressure grout mix immediately upon completion of setting casing pipe.

**S-34-3.4 CROSSINGS INSTALLED BY BORING.**

- a. Perform the boring from the low or downstream end unless specified otherwise. Bore the holes mechanically and use a pilot hole. By this method, an approximate 2" pilot hole shall be bored the entire length of the crossing and shall be checked for line and grade. This pilot hole shall serve as the centerline of the larger diameter hole to be bored. Place excavated material near the top of the working pit and dispose of material as required. The use of water or other fluids in connection with the boring operation will be permitted only to the extent to lubricate cuttings. Jetting shall not be permitted.
- b. In unconsolidated soil formations, a gel-forming colloidal drilling fluid consisting of at least 10% of high grade carefully processed bentonite may be used to consolidate cuttings of the bit, seal the walls of the hole, and furnish lubrication for subsequent removal of cuttings and installation of the pipe immediately thereafter.
- c. In locations where the soil formation is other than consolidated rock, insert the casing pipe simultaneously with the boring operation. This requirement applies to all bored holes of 18" or greater in diameter. For smaller diameter bored holes, it is desirable that the casing be installed as the boring progresses, but because of differences in soil formations, the time for inserting the casing shall be the Contractor's responsibility. In the event that caving sand or water bearing materials are encountered, insert the casing pipe simultaneously with the boring operation regardless of the diameter of the bored hole. In all cases, the security and integrity of the roadway is the primary concern. The Contractor shall be held fully responsible

for the continued integrity of the structure of the roadway being crossed, whether or not a casing pipe is inserted simultaneously with the boring operation.

**METHOD OF MEASUREMENT**

**S-34-4.1** Measurement for boring and encasement shall be by the linear foot.

**BASIS OF PAYMENT**

**S-34-5.1** No separate measurement for payment will be made. The work covered by this section shall be considered as a subsidiary obligation of the Contractor and covered under the other contract items

**END OF ITEM S-34**

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## S-35 VALVES AND COUPLINGS

### DESCRIPTION

**S-35-1.1** This section includes all material, labor and other items necessary to furnish, install, and test, all pipe, pipe supports, anchors, fittings, valves, specials as shown and specified, and the installation of in-line equipment and appurtenances furnished by others, for process piping systems, and plumbing piping systems.

### EQUIPMENT AND MATERIALS

#### S-35-2.1 COUPLINGS AND FITTINGS.

##### a. Flanges, Gaskets and Bolts.

- (1) Cast iron flanges shall conform to ANSI B16.1 Class 125 or 250 as required on the Drawings.
  - (a) Thickness shall be  $\frac{1}{16}$ " for pipe 10" and less and  $\frac{1}{8}$ " for larger pipe.
  - (b) Flange assembly bolts shall be standard square head carbon steel machine bolts with heavy, hot pressed, hexagon nuts, ANSI B18.2.
  - (c) Threads shall conform to ANSI B1.1, coarse thread series, Class 2 fit. Bolt length shall be such that after joints are made up the bolt shall protrude through the nut, but not more than  $\frac{1}{2}$ ".
  - (d) Bolts for use in submerged service shall be galvanized.
  - (e) All screwed flanges on cast iron pipe shall be refaced, as required, after fabrication to ensure that pipe ends are flush with face of flange.
- (2) Forged steel flanges shall conform to ANSI B16.5, R.F.
  - (a) Flange gaskets shall match raised faces and shall be asbestos composition.
  - (b) On 3½" flanges and smaller, gaskets shall be  $\frac{1}{16}$ " thick.
  - (c) On 4" flanges and larger, gaskets shall be  $\frac{1}{8}$ " thick.
  - (d) Flange assembly bolts shall be standard square head carbon steel machine bolts with heavy, hot pressed hexagon nuts, ANSI B18.2.

- (e) 150 psi steel flanges may be bolted to cast iron valves, fittings or other parts, having either integral Class 125 cast iron flanges or screwed Class 125 companion flanges.
  - (f) When such construction is used, the raised face on the steel flange shall be removed.
  - (g) Where shown on the Drawings, steel flanges shall match the bolt pattern of ANSI B16.1 Class 250.
- b. Pipe Threads.** Unless noted otherwise, all pipe threads shall conform in dimensions and limits of size to ANSI B2.1, taper joint thread.
- c. Flange Coupling Adapters.**
  - (1) Flanged coupling adapters shall be Clow F-2535, Dresser Style 127 or 128, or equal.
  - (2) Coupling gaskets shall be as recommended by the coupling manufacturer for the service intended.
- d. Compression Fittings.** Compression fittings for copper pipe shall be Dresser Style 88, McDonald, or equal.
- e. Joints.**
  - (1) All other joints shall be mechanical type or push-on type.
  - (2) Lubricant for push-on type shall be that recommended by the manufacturer of the pipe.
- f. Flexible Couplings.**
  - (1) There shall be installed where shown on the Plans and as required for proper pipe make-up, sleeve-type couplings equal to Style 38 couplings, as manufactured by the Dresser Manufacturing Division of Dresser Industries.
  - (2) They shall be designed to fit accurately, the outside diameters of the pipe to which they are to connect.
  - (3) Gaskets shall be of molded rubber, Dresser Plain, Grade 27 or equal.
  - (4) Couplings shall be furnished complete with bolts, nuts, and gaskets.
  - (5) Middle rings shall be made up without a pipe stop where necessary for pipe installation or future removal of valves and fittings.
  - (6) The ends of pipe and fittings which are to receive sleeve-type couplings shall be dressed for a distance of not less than the length of the middle ring plus the width of

one follower ring in order to remove welding beads or any obstruction to free the movement of the middle ring.

- (7) There shall be harnesses provided on steel pipe where shown on the Plans, or as necessary for restraint.
- (8) The harnesses shall be designed for the design operating pressure of the pipeline with a safety factor of 2.
- (9) The harnesses are to be designed in accordance with AWWA Manual M11, Steel Pipe Design and Installation.

## **S-35-2.2 Valves**

### **a. General.**

- (1) Valves shall be as specified in the Piping Specification Sheets, or as specified herein. A union or flagged connection shall be provided within 2 feet of each threaded end valve unless the valve can be otherwise easily removed from the piping. Unless otherwise indicated, the direction of rotation of the valve operating wheel, wrench nut, or lever shall be to the left (counterclockwise) to open the valve.
- (2) All valves, except those, which are equipped with power/pneumatic operators, shall be provided with manual operators. Unless otherwise specified, each manual operator shall be equipped with an operating wheel.
- (3) Chain wheels and operating chains shall be provided on all valves 4" and larger with centerline more than 7'6" above the floor except where other operator types are specifically required. Each chain wheel operated valve shall be equipped with a chain guide which will permit rapid handling of the operating chain without "gagging" of the wheel and will also permit reasonable side pull on the chain. Operating chains shall be heavily plated with zinc or cadmium and shall be looped to extend to within 4 feet of the floor below the valve. Where recommended by the manufacturer, the operator shall be provided with a hammer blow wheel.
- (4) Wrench nuts shall be provided on all buried valves, on all valves which are to be operated through floor boxes, and where shown. All wrench nuts shall comply with Section 20 of AWWA C-500. Not less than two operating keys shall be provided for operation of the wrench nut operated valves.
- (5) For all valves buried at a depth of greater than 3 feet, an extension stem shall be provided to bring the operating nut within 2 feet of the finished elevation.
- (6) Bolt patterns for the flange connections shall match the pipe either Class 125 or Class 250 as shown on the plans.

### **b. Buried Valve Boxes and Extension Stems.**

- (1) Valves buried in the ground shall be provided with cast iron valve boxes of proper dimensions to fit over the valve bonnets and to extend to such elevation at or slightly above the finished ground line as directed by the Engineer.
- (2) Tops shall be complete with covers and shall be adjustable.
- (3) Valve boxes shall be set vertical and concentric with the valve stem.
- (4) Any valve box, which has so moved from its original position as to prevent the application of the valve key, shall be satisfactorily reset by the Contractor at his own expense.
- (5) A concrete pad 1.5' x 1.5' x 4" thick shall be poured around all valve boxes which are not to be located within proposed or existing pavements.
- (6) Extension stems shall be provided and installed for all valves with 2" square nut operators so that operating nut is within 2' of the ground surface.
- (7) Valve boxes shall be the H-10346, 562-A, two-piece, sliding type, 5½" shaft, 24-36" extension, with drop cover marked water as manufactured by the Mueller Co. or Engineer approved equal.
- (8) Except as may be otherwise approved by the Engineer, all gate valves required for this Contract shall be from one manufacturer, and similar types and sizes shall be identical and the parts interchangeable.

**c. Gate Valves.**

- (1) Gate valves, 2 inches through 12 inches shall be designed for a working pressure 200 psi.
- (2) Valves shall conform to AWWA C509/C515 R/S "550 Coated Epoxy" with iron bonnet (bronze mounted), non-rising stem resilient seat, two O-ring stem seals and 2" x 2" square operating nut.
- (3) Valves shall open when the operating nut is turned to the left (counterclockwise).
- (4) Unless otherwise specified, valves 12 inches in diameter and larger shall be design for horizontal installation with totally enclosed gear cases.
- (5) Valve ends shall be mechanical joint complete with accessories or as specified.
- (6) Tapping valves shall conform to above specification except that the connections shall be ANSI B16.1, Class 125 flange on one side (inlet) and mechanical joint on the other (outlet) or as specified.
- (7) Wedge shall be constructed of ductile iron, fully encapsulated in synthetic rubber except for guide and wedge nut areas.

- (8) Wedge rubber shall be molded in place and bonded to the ductile iron portion, and shall not be mechanically attached with screws, rivets, or similar fasteners.
- (9) Valve operator shall be capable of seating and unseating valves and operating through their full stroke against pressures and velocities as shown by conditions on the Plans.
- (10) Manual operators shall be the worm gear type having permanently grease lubricated totally enclosed gearing with operating nut and gear ratio design to require not more than 40 lbs. pull. Operator shall be provided with adjustable limit stops on the input shaft to the operator. Limit stops on output shaft of operator will not be permitted. Operator shall be designed for direct burial service and valve box shall be provided over operating nut. Extension stem shall be provided to bring operating nut within 2 feet of ground surface.
- (11) Pre-approved Acceptable Manufacturers
  - (a) Mueller
  - (b) American flow control / American Darling
  - (c) M & H
  - (d) Clow R/S
  - (e) AVK

**d. Tapping Valves.**

- (1) Tapping valves, 2 inches through 12 inches shall be designed for a working pressure of 200 psi.
- (2) Valves shall conform to AWWA C509/C515 R/S "550 Coated Epoxy" with iron bonnet (bronze mounted), non-rising stem resilient seat, two O-ring stem seals and 2" x 2" square operating nut.
- (3) Valves shall open when the operating nut is turned to the left (counterclockwise).
- (4) Unless otherwise specified, valves 12 inches in diameter and larger shall be design for horizontal installation with totally enclosed gear cases.
- (5) Valve ends shall be mechanical joint complete with accessories or as specified.
- (6) Tapping valves shall conform to above specification except that the connections shall be ANSI B16.1, Class 125 flange on one side (inlet) and mechanical joint on the other (outlet) or as specified.

- (7) Wedge shall be constructed of ductile iron, fully encapsulated in synthetic rubber except for guide and wedge nut areas.
- (8) Wedge rubber shall be molded in place and bonded to the ductile iron portion, and shall not be mechanically attached with screws, rivets, or similar fasteners.
- (9) Valve operator shall be capable of seating and unseating valves and operating through their full stroke against pressures and velocities as shown by conditions on the Plans.
- (10) Manual operators shall be the worm gear type having permanently grease lubricated totally enclosed gearing with operating nut and gear ratio design to require not more than 40 lbs. pull. Operator shall be provided with adjustable limit stops on the input shaft to the operator. Limit stops on output shaft of operator will not be permitted. Operator shall be designed for direct burial service and valve box shall be provided over operating nut. Extension stem shall be provided to bring operating nut within 2 feet of ground surface.

(11) Pre-approved Acceptable Manufacturers

- (a) Mueller
- (b) American flow control / American Darling
- (c) M & H
- (d) Clow R/S

**e. Pipe Supports.** All exposed piping shall be supported in conformance with the pipe support and structural attachment details of this section.

**f. Joint Restraint.**

- (1) Where thrust rod anchors are shown or specified the Star Joint Restraint System as manufactured by Star National Products of Columbus, Ohio shall be utilized.
- (2) This system consists of the use of Super Star tie bolts, tie nuts, tie rods (¾") and tie couplings.
- (3) The number of tie rods required is listed as follows:

<u>Pipe Size (in.)</u>	<u>Number of ¾" Rods Required</u>
6	2
8	2
10	2
12	4
14	4

16	6
18	6
20	8
24	10
30	12

(4) Joint restraint for PVC pipe shall be installed at all ductile iron fittings and valves, and shall be Midco Joint Restraint as manufactured by Midland Manufacturing or approved equal.

**CONSTRUCTION METHODS**

**S-35-3.1** Construct valves in accordance with the plans.

**METHOD OF MEASUREMENT**

**S-35-4.1** Measurement for individual fittings and coupling will not be made but will be considered subsidiary to the contract unit price of waterline. Measurement of gate valves and hydrants shall be on a per each basis.

**BASIS OF PAYMENT**

**S-35-5.1** Payment for valves and hydrants will be at the contract unit price and shall include all materials, concrete, formwork, excavation, embankment, bedding, tracer wire, fittings, couplings, equipment, labor and incidentals necessary for the completion of the item.

Item S-35-5.1	Furnish and Install 6" Gate Valve	Per each
Item S-35-5.2	Furnish and Install 12" Gate Valve	Per each

**END OF ITEM S-35**





## ITEM S-36 SANITARY SEWER MANHOLES AND COVERS

### DESCRIPTION

**S-36-1.1** Modular precast concrete manhole sections with tongue-and-groove joints, risers with flat-top sections, covers, anchorage, and accessories.

### EQUIPMENT AND MATERIALS

**S-36-2.1** Precast Concrete Manholes shall be in accordance with ASTM C478 with gaskets in accordance with ASTM C923.

**S-36-2.2** Covers and Frame shall be PAMREX (32") or similar approved Manhole Cover and Frame. Covers and Frames shall be manufactured from Ductile Iron in accordance with ISO 1083. Covers shall be one-man operable using standard tools and shall be capable of withstanding an average load of 120,000 lbs. Covers to be hinged and incorporate a 90° blocking system to prevent accidental closure. Frames shall be circular and shall incorporate a seating gasket; frame depth shall not exceed 5". The flange shall incorporate bedding slots and bolt holes. All components shall be black coated.

**S-36-2.3** Base pads shall be precast in accordance with ASTM C478.

**S-36-2.4** Bituminous or non-shrink grout forming a watertight seal.

**S-36-2.5 RESILIENT CONNECTORS.** A-Lock or Engineer approved equal in accordance with ASTM C-923.

### CONSTRUCTION METHODS

**S-36-3.1 SHAFT CONSTRUCTION.** Concentric with concentric top section as shown on the drawings; lipped male/female joints; sleeved to receive pipe sections. Joints shall be sealed with compression seal. Seal shall be Forsheda No. 114 or Engineer approved equal.

**S-36-3.2 SHAPE.** Cylindrical.

- S-36-3.3 CLEAR INSIDE DIMENSIONS.** Minimum inside diameter of 48 inches for standard manhole sections or as otherwise required. For manhole section other than standard, the minimum inside diameter shall be as indicated on the Drawings.
- S-36-3.4 DESIGN DEPTH.** As indicated in the Construction Drawings.
- S-36-3.5 CLEAR LID OPENING.** 30 inches in diameter or as indicated in the Construction Drawings.
- S-36-3.6 PIPE ENTRY.** Provide openings as required or as indicated in the Construction Drawings.
- S-36-3.7 PIPE CONNECTIONS.** Resilient connections cast into the wall of the precast base.
- S-36-3.8 MANHOLE INVERTS.** Grout inverts after pipes are in place. Bench sides as required. Slope for drainage. Inverts shall meet the requirements of 30 TAC 217.55.(l)(2).
- S-36-3.9 COATINGS.** The exterior of all precast manhole sections shall be factory coated with a 12 to 16 mil thickness of epoxy coal tar paint. Paint shall be similar and equal to that manufactured by Tnemec Company, Inc. and shall meet the requirements of Corps of Engineers Specification C-200. Paint shall be applied according to the manufacturer's instructions. Only touch-up painting shall be performed at the job site.
- S-36-3.10 PLACING MANHOLES.** Excavate to a uniform depth to permit the installation of a minimum of 12 inches of gravel material for base pad subgrade. Adjust elevation of gravel material as required to attain proper grade and alignment of the base section. Place base pad, set top surface level. Place manhole in accordance with manufacturer's recommendations. Place manhole sections plumb and level, trim to correct elevations, anchor to base pad. Cutouts in the bottom sections shall be appropriate for the pipe being laid and shall have identifying markings to facilitate their being used in the correct locations. The connecting pipe for concrete manhole installation with resilient connectors shall be plain end, square cut, spigots, which shall not protrude more than one inch inside the manhole. Stubs for future connections shall be provided at locations shown. Stubs shall be a minimum of one pipe joint long (13 feet) and terminate in a bell with a plug at the distal end. Grout base of shaft sections to achieve slope to exit piping. Trowel smooth. Contour as required. Set cover frames and covers level without tipping, to correct elevations. Coordinate with other sections of work to provide correct size, shape, and location. Manhole height shall be adjusted by using variable height risers set at the lowest section below natural grade.
- S-36-3.11 INVERTS.** The bottom of each manhole shall be provided with a "U" shaped channel that is a smooth continuation of the inlet and outlet pipes. In manholes with pipes of different sizes, the tops of the pipes shall be placed at the same elevation, unless otherwise shown on the drawings, and flow channels in the invert sloped on an even slope from pipe to pipe. The surface of the concrete slab shaped to form the invert shall be sloped upward from the edge of the invert to the manhole wall. The upper half of any pipe extending inside the manhole shall be cut substantially flush with the wall. Any rough edge shall be smoothed with mortar. Mortar used in manholes shall be mixed in the proportions by volume of 1 part cement to 4 parts sand. Mortar shall have a workable consistency, but shall be as dry as feasible. The centerline projection of all pipes shall pass through the centerline of the manhole.

**S-36-3.12 CONNECTION TO EXISTING MANHOLES.** Connection to existing manholes shall not be made until all downstream manholes and sewer lines have been completed, cleaned, tested, inspected, and epoxy lined in accordance with the specification. The Engineer must grant approval prior to connection to existing manholes. Connections to existing manholes shall be made by cutting a hole in the wall of the existing manhole, shaping the bottom of the manhole to fit the invert of the connections, inserting a length of sewer pipe through the opening and filling around the pipe with cement mortar and troweling the cement mortar inside and outside the manhole to a neat finish. When necessary to satisfactorily perform the work, the flow of sewage shall be blocked at a time of minimum flow. If necessary to prevent flow back up in the line to the extent that the damage would occur, the Contractor shall maintain the flow level with a trench pump section inserted in the line or in the next upstream manhole. Discharge shall be made into an appropriate manhole downstream of the construction. Connections to manholes, mains, and services shall be made in a thoroughly workmanlike manner to the satisfaction of the Engineer. All bypass pumping shall be considered subsidiary to the construction of the connection and shall be provided by the Contractor at no additional expense to the Owner.

**S-36-3.13 CONNECTION TO EXISTING GRAVITY SEWER MAINS.** Connection to existing gravity sewer mains shall not be made until all downstream manhole and sewer lines have been completed, cleaned, tested, and inspected in accordance with the specifications. The Engineer must grant approval prior to connection to existing gravity sewer mains. Contractor shall carefully excavate around existing gravity sewer main and construct manhole base so as not to disrupt service of existing main. Contractor shall take all precautions and actions necessary to protect existing main. Connections to existing main shall be made by excavating around the main constructing the manhole to fit the existing main and the proposed effluent line. Once the manhole has been properly constructed, cut the existing main, plug the existing main effluent and direct the flow through the new main. When necessary to satisfactorily perform the work, the flow of sewage shall be blocked at a time of minimum flow. If necessary to prevent flow backup in the line to the extent that damage would occur, the Contractor shall maintain the flow level with a trench pump inserted in the line or the upstream manhole. Discharge shall be made into an appropriate manhole downstream of construction. All bypass pumping shall be considered subsidiary to the construction of connection to existing sewer mains and shall be provided by the Contractor at no additional expense to the Owner.

**S-36-3.14 MANHOLE ACCESS.** Entrance into manholes in excess of four feet deep shall be accomplished by means of a portable ladder. Contractor shall provide such ladder as necessary during construction.

**S-36-3.15 TESTING.** Manholes shall be tested for leakage separately and independently of the wastewater lines by hydrostatic exfiltration testing, vacuum testing, or other approved method. The maximum leakage for hydrostatic testing shall be 0.025 gallons per foot diameter per foot of manhole depth per hour. Alternate test methods must ensure compliance with the above allowable leakage. Hydrostatic exfiltration testing shall be accomplished by sealing all wastewater lines coming into the manhole with an internal pipe plug. The manhole shall then be filled with water and maintained for at least one hour. For concrete manholes a wetting period of 24 hours may be used prior to testing in order to allow saturation of the concrete. If a manhole fails a leakage test, the manhole must be made watertight and retested at the Contractor's expense. Testing must meet the requirements of 30 TAC 217.58.

#### **METHOD OF MEASUREMENT**

**S-36-4.1** Measurement for standard manholes and tying into existing manholes shall be per each. Vertical risers shall not be measured for separate payment and shall be considered subsidiary to the manholes.

**BASIS OF PAYMENT**

**S-36-5.1** Payment for four foot standard manholes shall be made at the contract unit price. This shall include all risers, cones, ring and cover, bedding, excavation, embankment, materials, labor, equipment, testing, and other incidentals necessary to complete this item.

Payment for tying into existing manholes shall be made at the contract unit price. Price shall include by-pass pumping, re-working inverts, plugging existing mains, cutting into existing manholes, seals, materials, labor, equipment and other incidentals necessary to complete this item in accordance with the plans and specifications.

Payment shall be made under:

Item S-36-5.1	4' Standard Sanitary Sewer Manhole	Per each
Item S-36-5.2	Tie into Existing Sanitary Sewer Manhole	Per each

**END OF ITEM S-36**

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## ITEM S-37 SMALL DIAMETER SANITARY SEWER SYSTEMS

### DESCRIPTION

**S-37-1.1** Sanitary sewer lines including, blocking, joints, fittings, and other appurtenances for sewer lines less than 18 inches in diameter.

### EQUIPMENT AND MATERIALS

**S-37-2.1 PIPE.** Poly Vinyl Chloride Pipe (PVC) shall be in accordance with ASTM D3034.

- a. SDR 35 - Pressure Class 150.
- b. All pipe shall bear NSF Seal of Approval.

**S-37-2.2 JOINTS.**

- a. Joints shall be mechanical joint or push-on joint conforming to AWWA C111. Joint material for Ductile Iron Pipe shall be rubber gasket type conforming to ANSI/AWWA C111/A21.11. The gaskets shall be furnished by the pipe manufacturer.
- b. Each mechanical joint shall consist of a bell cast integrally with the pipe or fitting and provided with an exterior flange having bolt holes and a socket with annular recesses for the sealing gasket and the plain end of the pipe or fitting; a pipe or plain end; a sealing gasket; a follower gland with bolt holes; and tee-head bolts and hexagonal nuts. The mechanical joint shall meet the requirements of ANSI/AWWA C111/A21.11-85.
- c. Push-on (bell and spigot) joints shall consist of a bell cast integrally with the pipe or fitting and a socket with annular recesses for the sealing gasket and the plain end of the pipe or fitting. The push-on joints shall meet the requirements of ANSI/AWWA C111/A21.11-85. Joints for PVC pipe shall conform to ASTM D-3212 with elastomeric seals conforming to ASTM F-477.
- d. All piping shall be push-on as shown on the drawings, unless otherwise specified.

**S-37-2.3 FITTINGS.**

- a. **Standard Fittings.** All bends, tees, plugs, adapters, wyes, and other fittings shall meet the requirements of the type and kind of pipe used.
- b. **Adapters.** When joining dissimilar pipe materials or repairing pipe, suitable adapters shall be used. The adapters shall be insert or bonded coupling type and shall meet strength and chemical requirements of ASTM C594.
- c. **Ductile Iron.** Fittings shall be push-on type meeting ANSI/AWWA C110/A21.10. Fittings shall be cement lined in accordance with ANSI/AWWA C104/A21.4 and shall have a bituminous coated exterior per ANSI/AWWA C110/A21.10 or C153/A21.53.
- d. The pipe shall have light colored interior fully loaded and co-extruded pipe structure. The bond between the layers shall be strong and uniform.
- e. Each length of pipe shall be clearly marked at intervals of 5 feet or less with the manufacturers name or trademark, nominal pipe size, cell classification, and SDR.

#### **S-37-2.4 ACCESSORIES.**

- a. **Non-shrink grout.** Gifford-Hill – Supreme, L&M – Crystex, Master Builders – Masterflow 713 Grout, Sauereisen Cements – F0100 Level Fill Grout, Others as approved by the Engineer.
- b. **Waterstops.** Waterstops shall be as recommended by pipe manufacturer and approved by the Engineer.

### **CONSTRUCTION METHODS**

#### **S-37-3.1 PREPARATION.**

- a. Stake locations of fittings, and accessories prior to installation for review by Engineer.
- b. Prior to installation, remove foreign matter from within pipes and fittings and verify material is in satisfactory condition.
- c. Trench sufficiently ahead of pipe installation to uncover any potential conflicts with grade.
- d. Each joint shall be carefully inspected before being placed in the trench. Any joint found to be cracked or otherwise damaged as to impair its usefulness shall be plainly marked then removed from the site as soon as possible.

#### **S-37-3.2 PIPE INSTALLATION.**

- a. Pipe shall be installed in accordance with ASTM D2321/ASTM D2231.
- b. Do not lay pipe in water, or when trench or weather are unsuitable for work. Keep water out of trench until jointing is complete and bedding is placed to top of pipe. When work is not in progress, close ends of pipe and fittings securely so that no trench water, earth or other substances will enter pipes or fittings.
- c. Keep inside of pipe free from foreign matter during operations by plugging or other approved method.
- d. Place pipe so that full length of each section rests solidly upon pipe bed, with recesses excavated to accommodate bells and joints. Take up and relay pipe when grade or joint is disturbed after laying.
- e. Handle pipe and accessories so that pipe placed in trench is sound and undamaged. Take particular care not to injure pipe coating when applicable.
- f. Cut neatly, using approved type mechanical cutter without damaging pipe. Use wheel cutters when practicable.
- g. Bedding. As shown on the plans.
- h. Placing and Laying. Set and bury lines accurately to grades as shown on the plans. Do not exceed 75 percent of pipe manufacturer's recommendations for deflections from straight line or grade as required by vertical curves, horizontal curves, or offsets. If alignment requires deflections in excess of these limitations, use fittings.
- i. Intersecting lines shall be joined by an appropriate fitting.

- j. Any adjustment to obtain correct line shall be made by tamping or removing soil and in no case by wedging or blocking pipe.
- k. Pipe shall be secured against upheaval or floating during the placement of concrete bedding, encasement, or anchors.
- l. **Joints.** Make push-on joints in accordance with manufacturer's recommendations. Lay spigot ends downstream and push-on to full depth. Spigot and bells shall be cleaned thoroughly before the application of lubricant and attachment of the preformed joint gasket.
- m. **Connections to Existing Sewers.** Connections to existing sewers shall not be made until all of the proposed sewer lines and manholes have been constructed, cleaned and approval granted by the Engineer for making connection. No connection shall be made until all new sewers have passed specified leakage test.
- n. Terminal sections pipe that are joined within the insertion pit shall be connected with a full circle pipe repair clamp. The butt gap between pipe ends shall not exceed one-half (1/2) inch.

**S-37-3.3 REMOVAL OF EXISTING PIPE.** The contractor shall remove and dispose of existing pipe, fittings, manholes, or other related appurtenances after all proposed have been placed and are in operation.

**S-37-3.4 PLUG EXISTING SANITARY SEWER PIPE.** The contractor shall plug existing sewer pipes as indicated in the plans.

**METHOD OF MEASUREMENT**

**S-37-4.1** Measurement for Sanitary Sewer lines shall be by the linear foot. Measurement for plugging existing sewer lines shall be per each.

**BASIS OF PAYMENT**

**S-37-5.1** Payment for Sanitary Sewer lines and plugging existing lines shall at the contract unit price. This shall include all materials, labor, and incidentals necessary for the completion of the item.

Payment shall be made under:

Item S-37-5.1	6" SDR 26 PVC Sanitary Sewer Line	Per linear foot
Item S-37-5.2	Single Stub Cleanout	Per each
Item S-37-5.3	Double Stub Cleanout	Per each

**END OF ITEM S-37**



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**TxDOT Standard Specifications and Modification Pages**

# Item 247

## Flexible Base



### 1. DESCRIPTION

Construct a foundation course composed of flexible base.

### 2. MATERIALS

Furnish uncontaminated materials of uniform quality that meet the requirements of the plans and specifications. Notify the Engineer of the proposed material sources and of changes to material sources. The Engineer may sample and test project materials at any time before compaction throughout the duration of the project to assure specification compliance. Use Tex-100-E material definitions.

- 2.1. **Aggregate.** Furnish aggregate of the type and grade shown on the plans and meeting the requirements of Table 1. Each source must meet Table 1 requirements for liquid limit, plasticity index, and wet ball mill for the grade specified. Do not use additives, such as but not limited to lime, cement, or fly ash to modify aggregates to meet the requirements of Table 1 unless shown on the plans.

**Table 1**  
**Material Requirements**

Property	Test Method	Grade 1-2	Grade 3	Grade 4 <sup>2</sup>	Grade 5
Sampling	Tex-400-A				
Master gradation sieve size (cumulative % retained)	Tex-110-E			As shown on the plans	
2-1/2"		0	0		0
1-3/4"		0-10	0-10		0-5
7/8"		10-35	-		10-35
3/8"		30-65	-		35-65
#4		45-75	45-75		45-75
#40	65-90	50-85	70-90		
Liquid Limit, % Max	Tex-104-E	40	40	As shown on the plans	35
Plasticity Index, Max <sup>1</sup>	Tex-106-E	10	12	As shown on the plans	10
Plasticity index, Min <sup>1</sup>		As shown on the plans	As shown on the plans	As shown on the plans	As shown on the plans
Wet ball mill, % Max	Tex-116-E	40	-	As shown on the plans	40
Wet ball mill, % Max increase passing the #40 sieve		20	-	As shown on the plans	20
Min compressive strength, psi	Tex-117-E			As shown on the plans	
lateral pressure 0 psi		35	-		-
lateral pressure 3 psi		-	-		90
lateral pressure 15 psi		175	-		175

- Determine plastic index in accordance with Tex-107-E (linear shrinkage) when liquid limit is unattainable as defined in Tex-104-E.
- Grade 4 may be further designated as Grade 4A, Grade 4B, etc.

- 2.1.1. **Material Tolerances.** The Engineer may accept material if no more than 1 of the 5 most recent gradation tests has an individual sieve outside the specified limits of the gradation.

When target grading is required by the plans, no single failing test may exceed the master grading by more than 5 percentage points on sieves No. 4 and larger or 3 percentage points on sieves smaller than No. 4.

The Engineer may accept material if no more than 1 of the 5 most recent plasticity index tests is outside the specified limit. No single failing test may exceed the allowable limit by more than 2 points.

- 2.1.2 **Material Types.** Do not use fillers or binders unless approved. Furnish the type specified on the plans in accordance with the following:
- 2.1.2.1. **Type A.** Crushed stone produced and graded from oversize quarried aggregate that originates from a single, naturally occurring source. Do not use gravel or multiple sources.
- 2.1.2.2. **Type B.** Crushed or uncrushed gravel. Blending of 2 or more sources is allowed.
- 2.1.2.3. **Type C.** Crushed gravel with a minimum of 60% of the particles retained on a No. 4 sieve with 2 or more crushed faces as determined by Tex-460-A, Part I. Blending of 2 or more sources is allowed.
- 2.1.2.4. **Type D.** Type A material or crushed concrete. Crushed concrete containing gravel will be considered Type D material. Crushed concrete must meet the requirements in Section 247.2.1.3.2., "Recycled Material (Including Crushed Concrete) Requirements," and be managed in a way to provide for uniform quality. The Engineer may require separate dedicated stockpiles in order to verify compliance.
- 2.1.2.5. **Type E.** Caliche, iron ore or as otherwise shown on the plans.
- 2.1.3. **Recycled Material.** Recycled asphalt pavement (RAP) and other recycled materials may be used when shown on the plans. Request approval to blend 2 or more sources of recycled materials.
- 2.1.3.1. **Limits on Percentage.** Do not exceed 20% RAP by weight, when RAP is allowed, unless otherwise shown on the plans. The percentage limitations for other recycled materials will be as shown on the plans.
- 2.1.3.2. **Recycled Material (Including Crushed Concrete) Requirements.**
- 2.1.3.2.1. **Contractor-Furnished Recycled Materials.** Provide recycled materials that have a maximum sulfate content of 3,000 ppm when tested in accordance with Tex-145-E. When the Contractor furnishes the recycled materials, including crushed concrete, the final product will be subject to the requirements of Table 1 for the grade specified. Certify compliance with DMS-11000, "Evaluating and Using Nonhazardous Recyclable Materials Guidelines," for Contractor furnished recycled materials. In addition, recycled materials must be free from reinforcing steel and other objectionable material and have at most 1.5% deleterious material when tested in accordance with Tex-413-A. For RAP, do not exceed a maximum percent loss from decantation of 5.0% when tested in accordance with Tex-406-A. Test RAP without removing the asphalt.
- 2.1.3.2.2. **Department-Furnished Required Recycled Materials.** When the Department furnishes and requires the use of recycled materials, unless otherwise shown on the plans:
- Department-required recycled material will not be subject to the requirements in Table 1,
  - Contractor-furnished materials are subject to the requirements in Table 1 and this Item,
  - the final product, blended, will be subject to the requirements in Table 1, and
  - for final product, unblended (100% Department-furnished required recycled material), the liquid limit, plasticity index, wet ball mill, and compressive strength is waived.
- Crush Department-furnished RAP so that 100% passes the 2 in. sieve. The Contractor is responsible for uniformly blending to meet the percentage required.
- 2.1.3.2.3. **Department-Furnished and Allowed Recycled Materials.** When the Department furnishes and allows the use of recycled materials or allows the Contractor to furnish recycled materials, the final blended product is subject to the requirements of Table 1 and the plans.
- 2.1.3.3. **Recycled Material Sources.** Department-owned recycled material is available to the Contractor only when shown on the plans. Return unused Department-owned recycled materials to the Department stockpile location designated by the Engineer unless otherwise shown on the plans.

The use of Contractor-owned recycled materials is allowed when shown on the plans. Contractor-owned surplus recycled materials remain the property of the Contractor. Remove Contractor-owned recycled materials from the project and dispose of them in accordance with federal, state, and local regulations before project acceptance. Do not intermingle Contractor-owned recycled material with Department-owned recycled material unless approved.

- 2.2. **Water.** Furnish water free of industrial wastes and other objectionable matter.
- 2.3. **Material Sources.** Expose the vertical faces of all strata of material proposed for use when non-commercial sources are used. Secure and process the material by successive vertical cuts extending through all exposed strata, when directed.

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### 3. EQUIPMENT

Provide machinery, tools, and equipment necessary for proper execution of the work.

- 3.1. Provide rollers in accordance with Item 210, "Rolling." Provide proof rollers in accordance with Item 216, "Proof Rolling," when required.
- 3.2. When ride quality measurement is required, provide a high speed or lightweight inertial profiler certified at the Texas A&M Transportation Institute. Provide equipment certification documentation. Display a current decal on the equipment indicating the certification expiration date.

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### 4. CONSTRUCTION

Construct each layer uniformly, free of loose or segregated areas, and with the required density and moisture content. Provide a smooth surface that conforms to the typical sections, lines, and grades shown on the plans or as directed.

Stockpile base material temporarily at an approved location before delivery to the roadway. Build stockpiles in layers no greater than 2 ft. thick. Stockpiles must have a total height between 10 and 16 ft. unless otherwise approved. After construction and acceptance of the stockpile, loading from the stockpile for delivery is allowed. Load by making successive vertical cuts through the entire depth of the stockpile.

Do not add or remove material from temporary stockpiles that require sampling and testing before delivery unless otherwise approved. Charges for additional sampling and testing required as a result of adding or removing material will be deducted from the Contractor's estimates.

Haul approved flexible base in clean trucks. Deliver the required quantity to each 100-ft. station or designated stockpile site as shown on the plans. Prepare stockpile sites as directed. When delivery is to the 100-ft. station, manipulate in accordance with the applicable Items.

- 4.1. **Preparation of Subgrade or Existing Base.** Remove or scarify existing asphalt concrete pavement in accordance with Item 105, "Removing Treated and Untreated Base and Asphalt Pavement," when shown on the plans or as directed. Shape the subgrade or existing base to conform to the typical sections shown on the plans or as directed.

When new base is required to be mixed with existing base, deliver, place, and spread the new flexible base in the required amount per station. Manipulate and thoroughly mix the new base with existing material to provide a uniform mixture to the specified depth before shaping.

Proof roll the roadbed in accordance with Item 216, "Proof Rolling," before pulverizing or scarifying when shown on the plans or directed. Correct soft spots as directed.

- 4.2. **Placing.** Spread and shape flexible base into a uniform layer with an approved spreader the same day as delivered unless otherwise approved. Construct layers to the thickness shown on the plans. Maintain the

shape of the course. Control dust by sprinkling, as directed. Correct or replace segregated areas as directed, at no additional expense to the Department.

Place successive base courses and finish courses using the same construction methods required for the first course.

- 4.3. **Compaction.** Compact using density control unless otherwise shown on the plans. Multiple lifts are permitted when shown on the plans or approved. Bring each layer to the moisture content directed. When necessary, sprinkle the material in accordance with Item 204, "Sprinkling."
- Begin rolling longitudinally at the sides and proceed towards the center, overlapping on successive trips by at least 1/2 the width of the roller unit. Begin rolling at the low side and progress toward the high side on superelevated curves. Offset alternate trips of the roller. Operate rollers at a speed between 2 and 6 mph as directed.
- Rework, re-compact, and refinish material that fails to meet or that loses required moisture, density, stability, or finish requirements before the next course is placed or the project is accepted. Continue work until specification requirements are met. Perform the work at no additional expense to the Department.
- Before final acceptance, the Engineer will select the locations of tests and measure the flexible base depth in accordance with Tex-140-E. Correct areas deficient by more than 1/2 in. in thickness by scarifying, adding material as required, reshaping, re-compacting, and refinishing at the Contractor's expense.
- 4.3.1. **Ordinary Compaction.** Roll with approved compaction equipment as directed. Correct irregularities, depressions, and weak spots immediately by scarifying the areas affected, adding or removing approved material as required, reshaping, and re-compacting.
- 4.3.2. **Density Control.** Compact to at least 100% of the maximum dry density determined by Tex-113-E, unless otherwise shown on the plans. Maintain moisture during compaction within  $\pm 2$  percentage points of the optimum moisture content as determined by Tex-113-E. Measure the moisture content of the material in accordance with Tex-115-E or Tex-103-E during compaction daily and report the results the same day to the Engineer, unless otherwise shown on the plans or directed. Do not achieve density by drying the material after compaction.
- The Engineer will determine roadway density and moisture content of completed sections in accordance with Tex-115-E. The Engineer may accept the section if no more than 1 of the 5 most recent density tests is below the specified density and the failing test is no more than 3 pcf below the specified density.
- 4.4. **Finishing.** After completing compaction, clip, skin, or tight-blade the surface with a maintainer or subgrade trimmer to a depth of approximately 1/4 in. Remove loosened material and dispose of it at an approved location. Seal the clipped surface immediately by rolling with a pneumatic tire roller until a smooth surface is attained. Add small increments of water as needed during rolling. Shape and maintain the course and surface in conformity with the typical sections, lines, and grades as shown on the plans or as directed.
- Correct grade deviations greater than 1/4 in. in 16 feet measured longitudinally or greater than 1/4 in. over the entire width of the cross-section in areas where surfacing is to be placed. Correct by loosening and adding, or removing material. Reshape and re-compact in accordance with Section 247.4.3., "Compaction."
- 4.5. **Curing.** Cure the finished section until the moisture content is at least 2 percentage points below optimum or as directed before applying the next successive course or prime coat.
- 4.6. **Ride Quality.** This section applies to the final travel lanes that receive a 1 or 2 course surface treatment for the final surface, unless otherwise shown on the plans. Measure ride quality of the base course after placement of the prime coat and before placement of the surface treatment, unless otherwise approved. Use a certified profiler operator from the Department's MPL. When requested, furnish the Engineer documentation for the person certified to operate the profiler.

Provide all profile measurements to the Engineer in electronic data files within 3 days after placement of the prime coat using the format specified in Tex-1001-S. The Engineer will use Department software to evaluate longitudinal profiles to determine areas requiring corrective action. Correct 0.1-mi.sections having an average international roughness index (IRI) value greater than 100.0 in. per mile to an IRI value of 100.0 in. per mile or less for each wheel path, unless otherwise shown on the plans.

Re-profile and correct sections that fail to maintain ride quality until placement of the next course, as directed. Correct re-profiled sections until specification requirements are met, as approved. Perform this work at no additional expense to the Department.

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## 5. MEASUREMENT

Flexible base will be measured as follows:

- **Flexible Base (Complete In Place).** The ton, square yard, or any cubic yard method.
- **Flexible Base (Roadway Delivery).** The ton or any cubic yard method.
- **Flexible Base (Stockpile Delivery).** The ton, cubic yard in vehicle, or cubic yard in stockpile.

Measurement by the cubic yard in final position and square yard is a plans quantity measurement. The quantity to be paid for is the quantity shown in the proposal unless modified by Article 9.2., "Plans Quantity Measurement." Additional measurements or calculations will be made if adjustments of quantities are required.

Measurement is further defined for payment as follows.

- 5.1. **Cubic Yard in Vehicle.** By the cubic yard in vehicles of uniform capacity at the point of delivery.
- 5.2. **Cubic Yard in Stockpile.** By the cubic yard in the final stockpile position by the method of average end areas.
- 5.3. **Cubic Yard in Final Position.** By the cubic yard in the completed and accepted final position. The volume of base course is computed in place by the method of average end areas between the original subgrade or existing base surfaces and the lines, grades, and slopes of the accepted base course as shown on the plans.
- 5.4. **Square Yard.** By the square yard of surface area in the completed and accepted final position. The surface area of the base course is based on the width of flexible base as shown on the plans.
- 5.5. **Ton.** By the ton of dry weight in vehicles as delivered. The dry weight is determined by deducting the weight of the moisture in the material at the time of weighing from the gross weight of the material. The Engineer will determine the moisture content in the material in accordance with Tex-103-E from samples taken at the time of weighing.

When material is measured in trucks, the weight of the material will be determined on certified scales, or the Contractor must provide a set of standard platform truck scales at a location approved by the Engineer. Scales must conform to the requirements of Item 520, "Weighing and Measuring Equipment."

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## 6. PAYMENT

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for the types of work shown below. No additional payment will be made for thickness or width exceeding that shown on the typical section or provided on the plans for cubic yard in the final position or square yard measurement.

Sprinkling and rolling, except proof rolling, will not be paid for directly but will be subsidiary to this Item unless otherwise shown on the plans. When proof rolling is shown on the plans or directed, it will not be paid for separately but will be considered subsidiary to TxDOT bid item 247.

Where subgrade is constructed under this Contract, correction of soft spots in the subgrade will be at the Contractor's expense. Where subgrade is not constructed under this Contract, correction of soft spots in the subgrade will be paid in accordance with pertinent Items or Article 4.4., "Changes in the Work."

- 6.1. **Flexible Base (Complete In Place).** Payment will be made for the type and grade specified. For cubic yard measurement, "In Vehicle," "In Stockpile," or "In Final Position" will be specified. For square yard measurement, a depth will be specified. This price is full compensation for furnishing materials, temporary stockpiling, assistance provided in stockpile sampling and operations to level stockpiles for measurement, loading, hauling, delivery of materials, spreading, blading, mixing, shaping, placing, compacting, reworking, finishing, correcting locations where thickness is deficient, curing, furnishing scales and labor for weighing and measuring, and equipment, labor, tools, and incidentals.
- 6.2. **Flexible Base (Roadway Delivery).** Payment will be made for the type and grade specified. For cubic yard measurement, "In Vehicle," "In Stockpile," or "In Final Position" will be specified. The unit price bid will not include processing at the roadway. This price is full compensation for furnishing materials, temporary stockpiling, assistance provided in stockpile sampling and operations to level stockpiles for measurement, loading, hauling, delivery of materials, furnishing scales and labor for weighing and measuring, and equipment, labor, tools, and incidentals.
- 6.3. **Flexible Base (Stockpile Delivery).** Payment will be made for the type and grade specified. For cubic yard measurement, "In Vehicle" or "In Stockpile" will be specified. The unit price bid will not include processing at the roadway. This price is full compensation for furnishing and disposing of materials, preparing the stockpile area, temporary or permanent stockpiling, assistance provided in stockpile sampling and operations to level stockpiles for measurement, loading, hauling, delivery of materials to the stockpile, furnishing scales and labor for weighing and measuring, and equipment, labor, tools, and incidentals.



## Item 340

### Dense-Graded Hot-Mix Asphalt (Small Quantity)



#### 1. DESCRIPTION

Construct a hot-mix asphalt (HMA) pavement layer composed of a compacted, dense-graded mixture of aggregate and asphalt binder mixed hot in a mixing plant. This specification is intended for small quantity (SQ) HMA projects, typically under 5,000 tons total production.

#### 2. MATERIALS

Furnish uncontaminated materials of uniform quality that meet the requirements of the plans and specifications.

Notify the Engineer of all material sources and before changing any material source or formulation. The Engineer will verify that the specification requirements are met when the Contractor makes a source or formulation change, and may require a new laboratory mixture design, trial batch, or both. The Engineer may sample and test project materials at any time during the project to verify specification compliance in accordance with Item 6, "Control of Materials."

- 2.1. **Aggregate.** Furnish aggregates from sources that conform to the requirements shown in Table 1 and as specified in this Section. Aggregate requirements in this Section, including those shown in Table 1, may be modified or eliminated when shown on the plans. Additional aggregate requirements may be specified when shown on the plans. Provide aggregate stockpiles that meet the definitions in this Section for coarse, intermediate, or fine aggregate. Aggregate from reclaimed asphalt pavement (RAP) is not required to meet Table 1 requirements unless otherwise shown on the plans. Supply aggregates that meet the definitions in Tex-100-E for crushed gravel or crushed stone. The Engineer will designate the plant or the quarry as the sampling location. Provide samples from materials produced for the project. The Engineer will establish the Surface Aggregate Classification (SAC) and perform Los Angeles abrasion, magnesium sulfate soundness, and Micro-Deval tests. Perform all other aggregate quality tests listed in Table 1. Document all test results on the mixture design report. The Engineer may perform tests on independent or split samples to verify Contractor test results. Stockpile aggregates for each source and type separately. Determine aggregate gradations for mixture design and production testing based on the washed sieve analysis given in Tex-200-F, Part II.

- 2.1.1. **Coarse Aggregate.** Coarse aggregate stockpiles must have no more than 20% material passing the No. 8 sieve. Aggregates from sources listed in the Department's *Bituminous Rated Source Quality Catalog* (BRSQC) are preapproved for use. Use only the rated values for hot-mix listed in the BRSQC. Rated values for surface treatment (ST) do not apply to coarse aggregate sources used in hot-mix asphalt.

For sources not listed on the Department's BRSQC:

- build an individual stockpile for each material;
- request the Department test the stockpile for specification compliance; and
- once approved, do not add material to the stockpile unless otherwise approved.

Provide aggregate from non-listed sources only when tested by the Engineer and approved before use. Allow 30 calendar days for the Engineer to sample, test, and report results for non-listed sources.

Provide coarse aggregate with at least the minimum SAC shown on the plans. SAC requirements only apply to aggregates used on the surface of travel lanes. SAC requirements apply to aggregates used on surfaces other than travel lanes when shown on the plans. The SAC for sources on the Department's *Aggregate Quality Monitoring Program* (AQMP) (Tex-499-A) is listed in the BRSQC.

- 2.1.1.1. **Blending Class A and Class B Aggregates.** Class B aggregate meeting all other requirements in Table 1 may be blended with a Class A aggregate to meet requirements for Class A materials. Ensure that at least 50% by weight, or volume if required, of the material retained on the No. 4 sieve comes from the Class A aggregate source when blending Class A and B aggregates to meet a Class A requirement. Blend by volume if the bulk specific gravities of the Class A and B aggregates differ by more than 0.300. Coarse aggregate from RAP and Recycled Asphalt Shingles (RAS) will be considered as Class B aggregate for blending purposes.

The Engineer may perform tests at any time during production, when the Contractor blends Class A and B aggregates to meet a Class A requirement, to ensure that at least 50% by weight, or volume if required, of the material retained on the No. 4 sieve comes from the Class A aggregate source. The Engineer will use the Department's mix design Excel template, when electing to verify conformance, to calculate the percent of Class A aggregate retained on the No. 4 sieve by inputting the bin percentages shown from readouts in the control room at the time of production and stockpile gradations measured at the time of production. The Engineer may determine the gradations based on either washed or dry sieve analysis from samples obtained from individual aggregate cold feed bins or aggregate stockpiles. The Engineer may perform spot checks using the gradations supplied by the Contractor on the mixture design report as an input for the Excel template; however, a failing spot check will require confirmation with a stockpile gradation determined by the Engineer.

- 2.1.2. **Intermediate Aggregate.** Aggregates not meeting the definition of coarse or fine aggregate will be defined as intermediate aggregate. Supply intermediate aggregates, when used, that are free from organic impurities.

The Engineer may test the intermediate aggregate in accordance with Tex-408-A to verify the material is free from organic impurities. Supply intermediate aggregate from coarse aggregate sources, when used, that meet the requirements shown in Table 1 unless otherwise approved.

Test the stockpile if 10% or more of the stockpile is retained on the No. 4 sieve, and verify that it meets the requirements in Table 1 for crushed face count (Tex-460-A) and flat and elongated particles (Tex-280-F).

- 2.1.3. **Fine Aggregate.** Fine aggregates consist of manufactured sands, screenings, and field sands. Fine aggregate stockpiles must meet the gradation requirements in Table 2. Supply fine aggregates that are free from organic impurities. The Engineer may test the fine aggregate in accordance with Tex-408-A to verify the material is free from organic impurities. No more than 15% of the total aggregate may be field sand or other uncrushed fine aggregate. Use fine aggregate, with the exception of field sand, from coarse aggregate sources that meet the requirements shown in Table 1 unless otherwise approved.

Test the stockpile if 10% or more of the stockpile is retained on the No. 4 sieve, and verify that it meets the requirements in Table 1 for crushed face count (Tex-460-A) and flat and elongated particles (Tex-280-F).

**Table 1**  
**Aggregate Quality Requirements**

Property	Test Method	Requirement
<b>Coarse Aggregate</b>		
SAC	Tex-499-A (AQMP)	As shown on the plans
Deleterious material, %, Max	Tex-217-F, Part I	1.5
Decantation, %, Max	Tex-217-F, Part II	1.5
Micro-Deval abrasion, %	Tex-461-A	Note <sup>1</sup>
Los Angeles abrasion, %, Max	Tex-410-A	40
Magnesium sulfate soundness, 5 cycles, %, Max	Tex-411-A	30
Crushed face count, <sup>2</sup> %, Min	Tex-460-A, Part I	85
Flat and elongated particles @ 5:1, %, Max	Tex-280-F	10
<b>Fine Aggregate</b>		
Linear shrinkage, %, Max	Tex-107-E	3
<b>Combined Aggregate<sup>3</sup></b>		
Sand equivalent, %, Min	Tex-203-F	45

1. Not used for acceptance purposes. Optional test used by the Engineer as an indicator of the need for further investigation.
2. Only applies to crushed gravel.
3. Aggregates, without mineral filler, RAP, RAS, or additives, combined as used in the job-mix formula (JMF).

**Table 2**  
**Gradation Requirements for Fine Aggregate**

Sieve Size	% Passing by Weight or Volume
3/8"	100
#8	70-100
#200	0-30

- 2.2. **Mineral Filler.** Mineral filler consists of finely divided mineral matter such as agricultural lime, crusher fines, hydrated lime, or fly ash. Mineral filler is allowed unless otherwise shown on the plans. Use no more than 2% hydrated lime or fly ash unless otherwise shown on the plans. Use no more than 1% hydrated lime if a substitute binder is used unless otherwise shown on the plans or allowed. Test all mineral fillers except hydrated lime and fly ash in accordance with Tex-107-E to ensure specification compliance. The plans may require or disallow specific mineral fillers. Provide mineral filler, when used, that:
- is sufficiently dry, free-flowing, and free from clumps and foreign matter as determined by the Engineer;
  - does not exceed 3% linear shrinkage when tested in accordance with Tex-107-E; and
  - meets the gradation requirements in Table 3.

**Table 3**  
**Gradation Requirements for Mineral Filler**

Sieve Size	% Passing by Weight or Volume
#8	100
#200	55-100

- 2.3. **Baghouse Fines.** Fines collected by the baghouse or other dust-collecting equipment may be reintroduced into the mixing drum.
- 2.4. **Asphalt Binder.** Furnish the type and grade of performance-graded (PG) asphalt specified on the plans.
- 2.5. **Tack Coat.** Furnish CSS-1H, SS-1H, or a PG binder with a minimum high-temperature grade of PG 58 for tack coat binder in accordance with Item 300, "Asphalts, Oils, and Emulsions." Specialized or preferred tack coat materials may be allowed or required when shown on the plans. Do not dilute emulsified asphalts at the terminal, in the field, or at any other location before use.

The Engineer will obtain at least one sample of the tack coat binder per project in accordance with Tex-500-C, Part III, and test it to verify compliance with Item 300, "Asphalts, Oils, and Emulsions." The Engineer will obtain the sample from the asphalt distributor immediately before use.

- 2.6. **Additives.** Use the type and rate of additive specified when shown on the plans. Additives that facilitate mixing, compaction, or improve the quality of the mixture are allowed when approved. Provide the Engineer

with documentation, such as the bill of lading, showing the quantity of additives used in the project unless otherwise directed.

2.6.1. **Lime and Liquid Antistripping Agent.** When lime or a liquid antistripping agent is used, add in accordance with Item 301, "Asphalt Antistripping Agents." Do not add lime directly into the mixing drum of any plant where lime is removed through the exhaust stream unless the plant has a baghouse or dust collection system that reintroduces the lime into the drum.

2.6.2. **Warm Mix Asphalt (WMA).** Warm Mix Asphalt (WMA) is defined as HMA that is produced within a target temperature discharge range of 215°F and 275°F using approved WMA additives or processes from the Department's MPL.

WMA is allowed for use on all projects and is required when shown on the plans. When WMA is required, the maximum placement or target discharge temperature for WMA will be set at a value below 275°F.

Department-approved WMA additives or processes may be used to facilitate mixing and compaction of HMA produced at target discharge temperatures above 275°F; however, such mixtures will not be defined as WMA.

2.7. **Recycled Materials.** Use of RAP and RAS is permitted unless otherwise shown on the plans. Do not exceed the maximum allowable percentages of RAP and RAS shown in Table 4. The allowable percentages shown in Table 4 may be decreased or increased when shown on the plans. Determine asphalt binder content and gradation of the RAP and RAS stockpiles for mixture design purposes in accordance with Tex-236-F. The Engineer may verify the asphalt binder content of the stockpiles at any time during production. Perform other tests on RAP and RAS when shown on the plans. Asphalt binder from RAP and RAS is designated as recycled asphalt binder. Calculate and ensure that the ratio of the recycled asphalt binder to total binder does not exceed the percentages shown in Table 5 during mixture design and HMA production when RAP or RAS is used. Use a separate cold feed bin for each stockpile of RAP and RAS during HMA production.

Surface, intermediate, and base mixes referenced in Tables 4 and 5 are defined as follows:

- **Surface.** The final HMA lift placed at or near the top of the pavement structure;
- **Intermediate.** Mixtures placed below an HMA surface mix and less than or equal to 8.0 in. from the riding surface; and
- **Base.** Mixtures placed greater than 8.0 in. from the riding surface.

2.7.1. **RAP.** RAP is salvaged, milled, pulverized, broken, or crushed asphalt pavement. Crush or break RAP so that 100% of the particles pass the 2 in. sieve. Fractionated RAP is defined as 2 or more RAP stockpiles, divided into coarse and fine fractions.

Use of Contractor-owned RAP, including HMA plant waste, is permitted unless otherwise shown on the plans. Department-owned RAP stockpiles are available for the Contractor's use when the stockpile locations are shown on the plans. If Department-owned RAP is available for the Contractor's use, the Contractor may use Contractor-owned fractionated RAP and replace it with an equal quantity of Department-owned RAP. This allowance does not apply to a Contractor using unfractionated RAP. Department-owned RAP generated through required work on the Contract is available for the Contractor's use when shown on the plans. Perform any necessary tests to ensure Contractor- or Department-owned RAP is appropriate for use. The Department will not perform any tests or assume any liability for the quality of the Department-owned RAP unless otherwise shown on the plans. The Contractor will retain ownership of RAP generated on the project when shown on the plans.

The coarse RAP stockpile will contain only material retained by processing over a 3/8-in. or 1/2-in. screen unless otherwise approved. The fine RAP stockpile will contain only material passing the 3/8-in. or 1/2-in. screen unless otherwise approved. The Engineer may allow the Contractor to use an alternate to the 3/8-in. or 1/2-in. screen to fractionate the RAP. The maximum percentages of fractionated RAP may be comprised of coarse or fine fractionated RAP or the combination of both coarse and fine fractionated RAP.

Do not use Department- or Contractor-owned RAP contaminated with dirt or other objectionable materials. Do not use Department- or Contractor-owned RAP if the decantation value exceeds 5% and the plasticity index is greater than 8. Test the stockpiled RAP for decantation in accordance with Tex-406-A, Part I. Determine the plasticity index in accordance with Tex-106-E if the decantation value exceeds 5%. The decantation and plasticity index requirements do not apply to RAP samples with asphalt removed by extraction or ignition.

Do not intermingle Contractor-owned RAP stockpiles with Department-owned RAP stockpiles. Remove unused Contractor-owned RAP material from the project site upon completion of the project. Return unused Department-owned RAP to the designated stockpile location.

**Table 4**  
**Maximum Allowable Amounts of RAP<sup>1</sup>**

Maximum Allowable Fractionated RAP <sup>2</sup> (%)			Maximum Allowable Unfractionated RAP <sup>3</sup> (%)		
Surface	Intermediate	Base	Surface	Intermediate	Base
20.0	30.0	40.0	10.0	10.0	10.0

1. Must also meet the recycled binder to total binder ratio shown in Table 5.
2. Up to 5% RAS may be used separately or as a replacement for fractionated RAP.
3. Unfractionated RAP may not be combined with fractionated RAP or RAS.

2.7.2.

**RAS.** Use of post-manufactured RAS or post-consumer RAS (tear-offs) is permitted unless otherwise shown on the plans. Up to 5% RAS may be used separately or as a replacement for fractionated RAP in accordance with Table 4 and Table 5. RAS is defined as processed asphalt shingle material from manufacturing of asphalt roofing shingles or from re-roofing residential structures. Post-manufactured RAS is processed manufacturer's shingle scrap by-product. Post-consumer RAS is processed shingle scrap removed from residential structures. Comply with all regulatory requirements stipulated for RAS by the TCEQ. RAS may be used separately or in conjunction with RAP.

Process the RAS by ambient grinding or granulating such that 100% of the particles pass the 3/8 in. sieve when tested in accordance with Tex-200-F, Part I. Perform a sieve analysis on processed RAS material before extraction (or ignition) of the asphalt binder.

Add sand meeting the requirements of Table 1 and Table 2 or fine RAP to RAS stockpiles if needed to keep the processed material workable. Any stockpile that contains RAS will be considered a RAS stockpile and be limited to no more than 5.0% of the HMA mixture in accordance with Table 4.

Certify compliance of the RAS with DMS-11000, "Evaluating and Using Nonhazardous Recyclable Materials Guidelines." Treat RAS as an established nonhazardous recyclable material if it has not come into contact with any hazardous materials. Use RAS from shingle sources on the Department's MPL. Remove substantially all materials before use that are not part of the shingle, such as wood, paper, metal, plastic, and felt paper. Determine the deleterious content of RAS material for mixture design purposes in accordance with Tex-217-F, Part III. Do not use RAS if deleterious materials are more than 0.5% of the stockpiled RAS unless otherwise approved. Submit a sample for approval before submitting the mixture design. The Department will perform the testing for deleterious material of RAS to determine specification compliance.

2.8.

**Substitute Binders.** Unless otherwise shown on the plans, the Contractor may use a substitute PG binder listed in Table 5 instead of the PG binder originally specified, if the substitute PG binder and mixture made with the substitute PG binder meet the following:

- the substitute binder meets the specification requirements for the substitute binder grade in accordance with Section 300.2.10., "Performance-Graded Binders"; and
- the mixture has less than 10.0 mm of rutting on the Hamburg Wheel test (Tex-242-F) after the number of passes required for the originally specified binder. Use of substitute PG binders may only be allowed at the discretion of the Engineer if the Hamburg Wheel test results are between 10.0 mm and 12.5 mm.

**Table 5**  
**Allowable Substitute PG Binders and Maximum Recycled Binder Ratios**

Originally Specified PG Binder	Allowable Substitute PG Binder	Maximum Ratio of Recycled Binder <sup>1</sup> to Total Binder (%)		
		Surface	Intermediate	Base
<b>HMA</b>				
76-22 <sup>2</sup>	70-22 or 64-22	20.0	20.0	20.0
	70-28 or 64-28	30.0	35.0	40.0
70-22 <sup>2</sup>	64-22	20.0	20.0	20.0
	64-28 or 58-28	30.0	35.0	40.0
64-22 <sup>2</sup>	58-28	30.0	35.0	40.0
76-28 <sup>2</sup>	70-28 or 64-28	20.0	20.0	20.0
	64-34	30.0	35.0	40.0
70-28 <sup>2</sup>	64-28 or 58-28	20.0	20.0	20.0
	64-34 or 58-34	30.0	35.0	40.0
64-28 <sup>2</sup>	58-28	20.0	20.0	20.0
	58-34	30.0	35.0	40.0
<b>WMA<sup>3</sup></b>				
76-22 <sup>2</sup>	70-22 or 64-22	30.0	35.0	40.0
70-22 <sup>2</sup>	64-22 or 58-28	30.0	35.0	40.0
64-22 <sup>4</sup>	58-28	30.0	35.0	40.0
76-28 <sup>2</sup>	70-28 or 64-28	30.0	35.0	40.0
70-28 <sup>2</sup>	64-28 or 58-28	30.0	35.0	40.0
64-28 <sup>4</sup>	58-28	30.0	35.0	40.0

1. Combined recycled binder from RAP and RAS.
2. Use no more than 20.0% recycled binder when using this originally specified PG binder.
3. WMA as defined in Section 340.2.6.2., "Warm Mix Asphalt (WMA)."
4. When used with WMA, this originally specified PG binder is allowed for use at the maximum recycled binder ratios shown in this table.

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### 3. EQUIPMENT

Provide required or necessary equipment in accordance with Item 320, "Equipment for Asphalt Concrete Pavement."

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### 4. CONSTRUCTION

Produce, haul, place, and compact the specified paving mixture. In addition to tests required by the specification, Contractors may perform other QC tests as deemed necessary. At any time during the project, the Engineer may perform production and placement tests as deemed necessary in accordance with Item 5, "Control of the Work." Schedule and participate in a pre-paving meeting with the Engineer on or before the first day of paving unless otherwise directed.

- 4.1. **Certification.** Personnel certified by the Department-approved hot-mix asphalt certification program must conduct all mixture designs, sampling, and testing in accordance with Table 6. Supply the Engineer with a list of certified personnel and copies of their current certificates before beginning production and when personnel changes are made. Provide a mixture design developed and signed by a Level 2 certified specialist.

**Table 6**  
**Test Methods, Test Responsibility, and Minimum Certification Levels**

Test Description	Test Method	Contractor	Engineer	Level <sup>1</sup>
<b>1. Aggregate and Recycled Material Testing</b>				
Sampling	Tex-221-F	✓	✓	1A
Dry sieve	Tex-200-F, Part I	✓	✓	1A
Washed sieve	Tex-200-F, Part II	✓	✓	1A
Deleterious material	Tex-217-F, Parts I & III	✓	✓	1A
Decantation	Tex-217-F, Part II	✓	✓	1A
Los Angeles abrasion	Tex-410-A		✓	TxDOT
Magnesium sulfate soundness	Tex-411-A		✓	TxDOT
Micro-Deval abrasion	Tex-461-A		✓	2
Crushed face count	Tex-460-A	✓	✓	2
Flat and elongated particles	Tex-280-F	✓	✓	2
Linear shrinkage	Tex-107-E	✓	✓	2
Sand equivalent	Tex-203-F	✓	✓	2
Organic impurities	Tex-408-A	✓	✓	2
<b>2. Asphalt Binder &amp; Tack Coat Sampling</b>				
Asphalt binder sampling	Tex-500-C, Part II	✓	✓	1A/1B
Tack coat sampling	Tex-500-C, Part III	✓	✓	1A/1B
<b>3. Mix Design &amp; Verification</b>				
Design and JMF changes	Tex-204-F	✓	✓	2
Mixing	Tex-205-F	✓	✓	2
Molding (TGC)	Tex-206-F	✓	✓	1A
Molding (SGC)	Tex-241-F	✓	✓	1A
Laboratory-molded density	Tex-207-F	✓	✓	1A
VMA <sup>2</sup> (calculation only)	Tex-204-F	✓	✓	2
Rice gravity	Tex-227-F	✓	✓	1A
Ignition oven correction factors <sup>3</sup>	Tex-236-F	✓	✓	2
Indirect tensile strength	Tex-226-F	✓	✓	2
Hamburg Wheel test	Tex-242-F	✓	✓	2
Boil test	Tex-530-C	✓	✓	1A
<b>4. Production Testing</b>				
Mixture sampling	Tex-222-F	✓	✓	1A
Molding (TGC)	Tex-206-F		✓	1A
Molding (SGC)	Tex-241-F		✓	1A
Laboratory-molded density	Tex-207-F		✓	1A
VMA <sup>2</sup> (calculation only)	Tex-204-F		✓	1A
Rice gravity	Tex-227-F		✓	1A
Gradation & asphalt binder content <sup>3</sup>	Tex-236-F		✓	1A
Moisture content	Tex-212-F		✓	1A
Hamburg Wheel test	Tex-242-F		✓	2
Boil test	Tex-530-C		✓	1A
<b>5. Placement Testing</b>				
Trimming roadway cores	Tex-207-F	✓	✓	1A/1B
In-place air voids	Tex-207-F		✓	1A/1B
Establish rolling pattern	Tex-207-F	✓		1B
Ride quality measurement	Tex-1001-S	✓	✓	Note <sup>4</sup>

1. Level 1A, 1B, and 2 are certification levels provided by the Hot Mix Asphalt Center certification program.
2. Voids in mineral aggregates.
3. Refer to Section 340.4.8.3., "Production Testing," for exceptions to using an ignition oven.
4. Profiler and operator are required to be certified at the Texas A&M Transportation Institute facility when Surface Test Type B is specified.

4.2. **Reporting, Testing, and Responsibilities.** Use Department-provided Excel templates to record and calculate all test data pertaining to the mixture design. The Engineer will use Department Excel templates for any production and placement testing. Obtain the latest version of the Excel templates at <http://www.txdot.gov/inside-txdot/forms-publications/consultants-contractors/forms/site-manager.html> or from the Engineer.

The maximum allowable time for the Engineer to exchange test data with the Contractor is as given in Table 7 unless otherwise approved. The Engineer will immediately report to the Contractor any test result that requires suspension of production or placement or that fails to meet the specification requirements.

Subsequent mix placed after test results are available to the Contractor, which require suspension of operations, may be considered unauthorized work. Unauthorized work will be accepted or rejected at the discretion of the Engineer in accordance with Article 5.3., "Conformity with Plans, Specifications, and Special Provisions."

**Table 7**  
**Reporting Schedule**

Description	Reported By	Reported To	To Be Reported Within
<b>Production Testing</b>			
Gradation	Engineer	Contractor	1 working day of completion of the test
Asphalt binder content			
Laboratory-molded density			
VMA (calculation)			
Hamburg Wheel test			
Moisture content			
Boil test			
Binder tests	<b>Placement Testing</b>		
In-place air voids	Engineer	Contractor	1 working day of completion of the test <sup>1</sup>

1. 2 days are allowed if cores cannot be dried to constant weight within 1 day.

#### 4.3. Mixture Design.

4.3.1. **Design Requirements.** The Contractor may design the mixture using a Texas Gyrotory Compactor (TGC) or a Superpave Gyrotory Compactor (SGC) unless otherwise shown on the plans. Use the typical weight design example given in Tex-204-F, Part I, when using a TGC. Use the Superpave mixture design procedure given in Tex-204-F, Part IV, when using a SGC. Design the mixture to meet the requirements listed in Tables 1, 2, 3, 4, 5, 8, 9, and 10.

4.3.1.1. **Target Laboratory-Molded Density When The TGC Is Used.** Design the mixture at a 96.5% target laboratory-molded density. Increase the target laboratory-molded density to 97.0% or 97.5% at the Contractor's discretion or when shown on the plans or specification.

4.3.1.2. **Design Number of Gyration (Ndesign) When The SGC Is Used.** Design the mixture at 50 gyrations (Ndesign). Use a target laboratory-molded density of 96.0% to design the mixture; however, adjustments can be made to the Ndesign value as noted in Table 9. The Ndesign level may be reduced to no less than 35 gyrations at the Contractor's discretion.

Use an approved laboratory from the Department's MPL to perform the Hamburg Wheel test in accordance with Tex-242-F, and provide results with the mixture design, or provide the laboratory mixture and request that the Department perform the Hamburg Wheel test. The Engineer will be allowed 10 working days to provide the Contractor with Hamburg Wheel test results on the laboratory mixture design.

The Engineer will provide the mixture design when shown on the plans. The Contractor may submit a new mixture design at any time during the project. The Engineer will verify and approve all mixture designs (JMF1) before the Contractor can begin production.

Provide the Engineer with a mixture design report using the Department-provided Excel template. Include the following items in the report:

- the combined aggregate gradation, source, specific gravity, and percent of each material used;
- asphalt binder content and aggregate gradation of RAP and RAS stockpiles;
- the target laboratory-molded density (or Ndesign level when using the SGC);



- results of all applicable tests;
- the mixing and molding temperatures;
- the signature of the Level 2 person or persons that performed the design;
- the date the mixture design was performed; and
- a unique identification number for the mixture design.

**Table 8**  
**Master Gradation Limits (% Passing by Weight or Volume) and VMA Requirements**

Sieve Size	A Coarse Base	B Fine Base	C Coarse Surface	D Fine Surface	F Fine Mixture
2"	100.0 <sup>1</sup>	–	–	–	–
1-1/2"	98.0–100.0	100.0 <sup>1</sup>	–	–	–
1"	78.0–94.0	98.0–100.0	100.0 <sup>1</sup>	–	–
3/4"	64.0–85.0	84.0–98.0	95.0–100.0	100.0 <sup>1</sup>	–
1/2"	50.0–70.0	–	–	98.0–100.0	100.0 <sup>1</sup>
3/8"	–	60.0–80.0	70.0–85.0	85.0–100.0	98.0–100.0
#4	30.0–50.0	40.0–60.0	43.0–63.0	50.0–70.0	70.0–90.0
#8	22.0–36.0	29.0–43.0	32.0–44.0	35.0–46.0	38.0–48.0
#30	8.0–23.0	13.0–28.0	14.0–28.0	15.0–29.0	12.0–27.0
#50	3.0–19.0	6.0–20.0	7.0–21.0	7.0–20.0	6.0–19.0
#200	2.0–7.0	2.0–7.0	2.0–7.0	2.0–7.0	2.0–7.0
<b>Design VMA, % Minimum</b>					
–	12.0	13.0	14.0	15.0	16.0
<b>Production (Plant-Produced) VMA, % Minimum</b>					
–	11.5	12.5	13.5	14.5	15.5

1. Defined as maximum sieve size. No tolerance allowed.

**Table 9**  
**Laboratory Mixture Design Properties**

Mixture Property	Test Method	Requirement
Target laboratory-molded density, % (TGC)	Tex-207-F	96.5 <sup>1</sup>
Design gyrations (N <sub>design</sub> for SGC)	Tex-241-F	50 <sup>2</sup>
Indirect tensile strength (dry), psi	Tex-226-F	85–200 <sup>3</sup>
Boil test <sup>4</sup>	Tex-530-C	–

1. Increase to 97.0% or 97.5% at the Contractor's discretion or when shown on the plans or specification.
2. Adjust within a range of 35–100 gyrations when shown on the plans or specification or when mutually agreed between the Engineer and Contractor.
3. The Engineer may allow the IDT strength to exceed 200 psi if the corresponding Hamburg Wheel rut depth is greater than 3.0 mm and less than 12.5 mm.
4. Used to establish baseline for comparison to production results. May be waived when approved.

**Table 10**  
**Hamburg Wheel Test Requirements**

High-Temperature Binder Grade	Test Method	Minimum # of Passes <sup>1</sup> @ 12.5 mm <sup>2</sup> Rut Depth, Tested @ 50°C
PG 64 or lower	Tex-242-F	10,000
PG 70		15,000
PG 76 or higher		20,000

1. May be decreased or waived when shown on the plans.
2. When the rut depth at the required minimum number of passes is less than 3 mm, the Engineer may require the Contractor to increase the target laboratory-molded density (TGC) by 0.5% to no more than 97.5% or lower the N<sub>design</sub> level (SGC) to no less than 35 gyrations.

#### 4.3.2.

**Job-Mix Formula Approval.** The job-mix formula (JMF) is the combined aggregate gradation, target laboratory-molded density (or N<sub>design</sub> level), and target asphalt percentage used to establish target values

for hot-mix production. JMF1 is the original laboratory mixture design used to produce the trial batch. When WMA is used, JMF1 may be designed and submitted to the Engineer without including the WMA additive. When WMA is used, document the additive or process used and recommended rate on the JMF1 submittal. Furnish a mix design report (JMF1) with representative samples of all component materials and request approval to produce the trial batch. Provide approximately 10,000 g of the design mixture and request that the Department perform the Hamburg Wheel test if opting to have the Department perform the test. The Engineer will verify JMF1 based on plant-produced mixture from the trial batch unless otherwise determined. The Engineer may accept an existing mixture design previously used on a Department project and may waive the trial batch to verify JMF1. Provide split samples of the mixtures and blank samples used to determine the ignition oven correction factors. The Engineer will determine the aggregate and asphalt correction factors from the ignition oven used for production testing in accordance with Tex-236-F.

The Engineer will use a TGC calibrated in accordance with Tex-914-K in molding production samples. Provide an SGC at the Engineer's field laboratory for use in molding production samples if the SGC is used to design the mix.

The Engineer may perform Tex-530-C and retain the tested sample for comparison purposes during production. The Engineer may waive the requirement for the boil test.

4.3.3. **JMF Adjustments.** If JMF adjustments are necessary to achieve the specified requirements, the adjusted JMF must:

- be provided to the Engineer in writing before the start of a new lot;
- be numbered in sequence to the previous JMF;
- meet the mixture requirements in Table 4 and Table 5;
- meet the master gradation limits shown in Table 8; and
- be within the operational tolerances of the current JMF listed in Table 11.

The Engineer may adjust the asphalt binder content to maintain desirable laboratory density near the optimum value while achieving other mix requirements.

**Table 11**  
**Operational Tolerances**

Description	Test Method	Allowable Difference Between Trial Batch and JMF1 Target	Allowable Difference from Current JMF Target
Individual % retained for #8 sieve and larger	Tex-200-F or Tex-236-F	Must be within master grading limits in Table 8	±5.0 <sup>1,2</sup>
Individual % retained for sieves smaller than #8 and larger than #200			±3.0 <sup>1,2</sup>
% passing the #200 sieve			±2.0 <sup>1,2</sup>
Asphalt binder content, %	Tex-236-F	±0.5	±0.3 <sup>2</sup>
Laboratory-molded density, %	Tex-207-F	±1.0	±1.0
VMA, %, min	Tex-204-F	Note <sup>3</sup>	Note <sup>3</sup>

1. When within these tolerances, mixture production gradations may fall outside the master grading limits; however, the % passing the #200 will be considered out of tolerance when outside the master grading limits.
2. Only applies to mixture produced for Lot 1 and higher.
3. Mixture is required to meet Table 8 requirements.

4.4. **Production Operations.** Perform a new trial batch when the plant or plant location is changed. Take corrective action and receive approval to proceed after any production suspension for noncompliance to the specification. Submit a new mix design and perform a new trial batch when the asphalt binder content of:

- any RAP stockpile used in the mix is more than 0.5% higher than the value shown on the mixture design report; or
- RAS stockpile used in the mix is more than 2.0% higher than the value shown on the mixture design report.

4.4.1. **Storage and Heating of Materials.** Do not heat the asphalt binder above the temperatures specified in Item 300, "Asphalts, Oils, and Emulsions," or outside the manufacturer's recommended values. Provide the Engineer with daily records of asphalt binder and hot-mix asphalt discharge temperatures (in legible and

discernible increments) in accordance with Item 320, "Equipment for Asphalt Concrete Pavement," unless otherwise directed. Do not store mixture for a period long enough to affect the quality of the mixture, nor in any case longer than 12 hr. unless otherwise approved.

- 4.4.2. **Mixing and Discharge of Materials.** Notify the Engineer of the target discharge temperature and produce the mixture within 25°F of the target. Monitor the temperature of the material in the truck before shipping to ensure that it does not exceed 350°F (or 275°F for WMA) and is not lower than 215°F. The Department will not pay for or allow placement of any mixture produced above 350°F.

Produce WMA within the target discharge temperature range of 215°F and 275°F when WMA is required. Take corrective action any time the discharge temperature of the WMA exceeds the target discharge range. The Engineer may suspend production operations if the Contractor's corrective action is not successful at controlling the production temperature within the target discharge range. Note that when WMA is produced, it may be necessary to adjust burners to ensure complete combustion such that no burner fuel residue remains in the mixture.

Control the mixing time and temperature so that substantially all moisture is removed from the mixture before discharging from the plant. The Engineer may determine the moisture content by oven-drying in accordance with Tex-212-F, Part II, and verify that the mixture contains no more than 0.2% of moisture by weight. The Engineer will obtain the sample immediately after discharging the mixture into the truck, and will perform the test promptly.

- 4.5. **Hauling Operations.** Clean all truck beds before use to ensure that mixture is not contaminated. Use a release agent shown on the Department's MPL to coat the inside bed of the truck when necessary.

Use equipment for hauling as defined in Section 340.4.6.3.2., "Hauling Equipment." Use other hauling equipment only when allowed.

- 4.6. **Placement Operations.** Collect haul tickets from each load of mixture delivered to the project and provide the Department's copy to the Engineer approximately every hour, or as directed. Use a hand-held thermal camera or infrared thermometer to measure and record the internal temperature of the mixture as discharged from the truck or Material Transfer Device (MTD) before or as the mix enters the paver and an approximate station number or GPS coordinates on each ticket unless otherwise directed. Calculate the daily yield and cumulative yield for the specified lift and provide to the Engineer at the end of paving operations for each day unless otherwise directed. The Engineer may suspend production if the Contractor fails to produce and provide haul tickets and yield calculations by the end of paving operations for each day.

Prepare the surface by removing raised pavement markers and objectionable material such as moisture, dirt, sand, leaves, and other loose impediments from the surface before placing mixture. Remove vegetation from pavement edges. Place the mixture to meet the typical section requirements and produce a smooth, finished surface with a uniform appearance and texture. Offset longitudinal joints of successive courses of hot-mix by at least 6 in. Place mixture so that longitudinal joints on the surface course coincide with lane lines, or as directed. Ensure that all finished surfaces will drain properly.

Place the mixture at the rate or thickness shown on the plans. The Engineer will use the guidelines in Table 12 to determine the compacted lift thickness of each layer when multiple lifts are required. The thickness determined is based on the rate of 110 lb./sq. yd. for each inch of pavement unless otherwise shown on the plans.

**Table 12**  
**Compacted Lift Thickness and Required Core Height**

Mixture Type	Compacted Lift Thickness Guidelines		Minimum Untrimmed Core Height (in.) Eligible for Testing
	Minimum (in.)	Maximum (in.)	
A	3.00	6.00	2.00
B	2.50	5.00	1.75
C	2.00	4.00	1.50
D	1.50	3.00	1.25
F	1.25	2.50	1.25

- 4.6.1. **Weather Conditions.** Place mixture when the roadway surface temperature is at or above 60°F unless otherwise approved. Measure the roadway surface temperature with a hand-held thermal camera or infrared thermometer. The Engineer may allow mixture placement to begin before the roadway surface reaches the required temperature if conditions are such that the roadway surface will reach the required temperature within 2 hr. of beginning placement operations. Place mixtures only when weather conditions and moisture conditions of the roadway surface are suitable as determined by the Engineer. The Engineer may restrict the Contractor from paving if the ambient temperature is likely to drop below 32°F within 12 hr. of paving.
- 4.6.2. **Tack Coat.** Clean the surface before placing the tack coat. The Engineer will set the rate between 0.04 and 0.10 gal. of residual asphalt per square yard of surface area. Apply a uniform tack coat at the specified rate unless otherwise directed. Apply the tack coat in a uniform manner to avoid streaks and other irregular patterns. Apply a thin, uniform tack coat to all contact surfaces of curbs, structures, and all joints. Allow adequate time for emulsion to break completely before placing any material. Prevent splattering of tack coat when placed adjacent to curb, gutter, and structures. Roll the tack coat with a pneumatic-tire roller to remove streaks and other irregular patterns when directed.
- 4.6.3. **Lay-Down Operations.**
- 4.6.3.1. **Windrow Operations.** Operate windrow pickup equipment so that when hot-mix is placed in windrows substantially all the mixture deposited on the roadbed is picked up and loaded into the paver.
- 4.6.3.2. **Hauling Equipment.** Use belly dumps, live bottom, or end dump trucks to haul and transfer mixture; however, with exception of paving miscellaneous areas, end dump trucks are only allowed when used in conjunction with an MTD with remixing capability unless otherwise allowed.
- 4.6.3.3. **Screed Heaters.** Turn off screed heaters, to prevent overheating of the mat, if the paver stops for more than 5 min.
- 4.7. **Compaction.** Compact the pavement uniformly to contain between 3.8% and 8.5% in-place air voids.
- Furnish the type, size, and number of rollers required for compaction as approved. Use a pneumatic-tire roller to seal the surface unless excessive pickup of fines occurs. Use additional rollers as required to remove any roller marks. Use only water or an approved release agent on rollers, tamps, and other compaction equipment unless otherwise directed.
- Use the control strip method shown in Tex-207-F, Part IV, on the first day of production to establish the rolling pattern that will produce the desired in-place air voids unless otherwise directed.
- Use tamps to thoroughly compact the edges of the pavement along curbs, headers, and similar structures and in locations that will not allow thorough compaction with rollers. The Engineer may require rolling with a trench roller on widened areas, in trenches, and in other limited areas.
- Complete all compaction operations before the pavement temperature drops below 160°F unless otherwise allowed. The Engineer may allow compaction with a light finish roller operated in static mode for pavement temperatures below 160°F.

Allow the compacted pavement to cool to 160°F or lower before opening to traffic unless otherwise directed. Sprinkle the finished mat with water or limewater, when directed, to expedite opening the roadway to traffic.

4.8. **Production Acceptance.**

4.8.1. **Production Lot.** Each day of production is defined as a production lot. Lots will be sequentially numbered and correspond to each new day of production. Note that lots are not subdivided into sublots for this specification.

4.8.2. **Production Sampling.**

4.8.2.1. **Mixture Sampling.** The Engineer may obtain mixture samples in accordance with Tex-222-F at any time during production.

4.8.2.2. **Asphalt Binder Sampling.** The Engineer may obtain or require the Contractor to obtain 1 qt. samples of the asphalt binder at any time during production from a port located immediately upstream from the mixing drum or pug mill in accordance with Tex-500-C, Part II. The Engineer may test any of the asphalt binder samples to verify compliance with Item 300, "Asphalts, Oils, and Emulsions."

4.8.3. **Production Testing.** The Engineer will test at the frequency listed in the Department's *Guide Schedule of Sampling and Testing* and this specification. The Engineer may suspend production if production tests do not meet specifications or are not within operational tolerances listed in Table 11. Take immediate corrective action if the Engineer's laboratory-molded density on any sample is less than 95.0% or greater than 98.0%, to bring the mixture within these tolerances. The Engineer may suspend operations if the Contractor's corrective actions do not produce acceptable results. The Engineer will allow production to resume when the proposed corrective action is likely to yield acceptable results.

The Engineer may use alternate methods for determining the asphalt binder content and aggregate gradation if the aggregate mineralogy is such that Tex-236-F does not yield reliable results. Use the applicable test procedure if an alternate test method is selected.

**Table 13**  
**Production and Placement Testing**

Description	Test Method
Individual % retained for #8 sieve and larger	Tex-200-F or Tex-236-F
Individual % retained for sieves smaller than #8 and larger than #200	
% passing the #200 sieve	
Laboratory-molded density	Tex-207-F
Laboratory-molded bulk specific gravity	
In-Place air voids	
VMA	Tex-204-F
Moisture content	Tex-212-F, Part II
Theoretical maximum specific (Rice) gravity	Tex-227-F
Asphalt binder content	Tex-236-F
Hamburg Wheel test	Tex-242-F
Recycled Asphalt Shingles (RAS) <sup>1</sup>	Tex-217-F, Part III
Asphalt binder sampling and testing	Tex-500-C
Tack coat sampling and testing	Tex-500-C, Part III
Boil test	Tex-530-C

1. Testing performed by the Construction Division or designated laboratory.

4.8.3.1. **Voids in Mineral Aggregates (VMA).** The Engineer may determine the VMA for any production lot. Take immediate corrective action if the VMA value for any lot is less than the minimum VMA requirement for production listed in Table 8. Suspend production and shipment of the mixture if the Engineer's VMA result is more than 0.5% below the minimum VMA requirement for production listed in Table 8. In addition to suspending production, the Engineer may require removal and replacement or may allow the lot to be left in place without payment.

- 4.8.3.2. **Hamburg Wheel Test.** The Engineer may perform a Hamburg Wheel test at any time during production, including when the boil test indicates a change in quality from the materials submitted for JMF1. In addition to testing production samples, the Engineer may obtain cores and perform Hamburg Wheel tests on any areas of the roadway where rutting is observed. Suspend production until further Hamburg Wheel tests meet the specified values when the production or core samples fail the Hamburg Wheel test criteria in Table 10. Core samples, if taken, will be obtained from the center of the finished mat or other areas excluding the vehicle wheel paths. The Engineer may require up to the entire lot of any mixture failing the Hamburg Wheel test to be removed and replaced at the Contractor's expense.

If the Department's or Department-approved laboratory's Hamburg Wheel test results in a "remove and replace" condition, the Contractor may request that the Department confirm the results by re-testing the failing material. The Construction Division will perform the Hamburg Wheel tests and determine the final disposition of the material in question based on the Department's test results.

- 4.8.4. **Individual Loads of Hot-Mix.** The Engineer can reject individual truckloads of hot-mix. When a load of hot-mix is rejected for reasons other than temperature, contamination, or excessive uncoated particles, the Contractor may request that the rejected load be tested. Make this request within 4 hr. of rejection. The Engineer will sample and test the mixture. If test results are within the operational tolerances shown in Table 11, payment will be made for the load. If test results are not within operational tolerances, no payment will be made for the load.

4.9. **Placement Acceptance.**

- 4.9.1. **Placement Lot.** A placement lot is defined as the area placed during a production lot (one day's production). Placement lot numbers will correspond with production lot numbers.

- 4.9.2. **Miscellaneous Areas.** Miscellaneous areas include areas that typically involve significant handwork or discontinuous paving operations, such as temporary detours, driveways, mailbox turnouts, crossovers, gores, spot level-up areas, and other similar areas. Miscellaneous areas also include level-ups and thin overlays when the layer thickness specified on the plans is less than the minimum untrimmed core height eligible for testing shown in Table 12. The specified layer thickness is based on the rate of 110 lb./sq. yd. for each inch of pavement unless another rate is shown on the plans. Compact miscellaneous areas in accordance with Section 340.4.7., "Compaction." Miscellaneous areas are not subject to in-place air void determination except for temporary detours when shown on the plans.

- 4.9.3. **Placement Sampling.** Provide the equipment and means to obtain and trim roadway cores on site. On site is defined as in close proximity to where the cores are taken. Obtain the cores within one working day of the time the placement lot is completed unless otherwise approved. Obtain two 6-in. diameter cores side-by-side at each location selected by the Engineer for in-place air void determination unless otherwise shown on the plans. For Type D and Type F mixtures, 4-in. diameter cores are allowed. Mark the cores for identification, measure and record the untrimmed core height, and provide the information to the Engineer. The Engineer will witness the coring operation and measurement of the core thickness.

Visually inspect each core and verify that the current paving layer is bonded to the underlying layer. Take corrective action if an adequate bond does not exist between the current and underlying layer to ensure that an adequate bond will be achieved during subsequent placement operations.

Trim the cores immediately after obtaining the cores from the roadway in accordance with Tex-207-F if the core heights meet the minimum untrimmed value listed in Table 12. Trim the cores on site in the presence of the Engineer. Use a permanent marker or paint pen to record the date and lot number on each core as well as the designation as Core A or B. The Engineer may require additional information to be marked on the core and may choose to sign or initial the core. The Engineer will take custody of the cores immediately after they are trimmed and will retain custody of the cores until the Department's testing is completed. Before turning the trimmed cores over to the Engineer, the Contractor may wrap the trimmed cores or secure them in a manner that will reduce the risk of possible damage occurring during transport by the Engineer. After testing, the Engineer will return the cores to the Contractor.

The Engineer may have the cores transported back to the Department's laboratory at the HMA plant via the Contractor's haul truck or other designated vehicle. In such cases where the cores will be out of the Engineer's possession during transport, the Engineer will use Department-provided security bags and the Roadway Core Custody protocol located at <http://www.txdot.gov/business/specifications.htm> to provide a secure means and process that protects the integrity of the cores during transport.

Instead of the Contractor trimming the cores on site immediately after coring, the Engineer and the Contractor may mutually agree to have the trimming operations performed at an alternate location such as a field laboratory or other similar location. In such cases, the Engineer will take possession of the cores immediately after they are obtained from the roadway and will retain custody of the cores until testing is completed. Either the Department or Contractor representative may perform trimming of the cores. The Engineer will witness all trimming operations in cases where the Contractor representative performs the trimming operation.

Dry the core holes and tack the sides and bottom immediately after obtaining the cores. Fill the hole with the same type of mixture and properly compact the mixture. Repair core holes with other methods when approved.

4.9.4. **Placement Testing.** The Engineer may measure in-place air voids at any time during the project to verify specification compliance.

4.9.4.1. **In-Place Air Voids.** The Engineer will measure in-place air voids in accordance with Tex-207-F and Tex-227-F. Cores not meeting the height requirements in Table 12 will not be tested. Before drying to a constant weight, cores may be pre-dried using a Corelok or similar vacuum device to remove excess moisture. The Engineer will use the corresponding theoretical maximum specific gravity to determine the air void content of each core. The Engineer will use the average air void content of the 2 cores to determine the in-place air voids at the selected location.

The Engineer will use the vacuum method to seal the core if required by Tex-207-F. The Engineer will use the test results from the unsealed core if the sealed core yields a higher specific gravity than the unsealed core. After determining the in-place air void content, the Engineer will return the cores and provide test results to the Contractor.

Take immediate corrective action when the in-place air voids exceed the range of 3.8% and 8.5% to bring the operation within these tolerances. The Engineer may suspend operations or require removal and replacement if the in-place air voids are less than 2.7% or greater than 9.9%. The Engineer will allow paving to resume when the proposed corrective action is likely to yield between 3.8% and 8.5% in-place air voids. Areas defined in Section 340.9.2., "Miscellaneous Areas," are not subject to in-place air void determination.

4.9.5. **Irregularities.** Identify and correct irregularities including segregation, rutting, raveling, flushing, fat spots, mat slippage, irregular color, irregular texture, roller marks, tears, gouges, streaks, uncoated aggregate particles, or broken aggregate particles. The Engineer may also identify irregularities, and in such cases, the Engineer will promptly notify the Contractor. If the Engineer determines that the irregularity will adversely affect pavement performance, the Engineer may require the Contractor to remove and replace (at the Contractor's expense) areas of the pavement that contain irregularities and areas where the mixture does not bond to the existing pavement. If irregularities are detected, the Engineer may require the Contractor to immediately suspend operations or may allow the Contractor to continue operations for no more than one day while the Contractor is taking appropriate corrective action.

4.9.6. **Ride Quality.** Use Surface Test Type A to evaluate ride quality in accordance with Item 585, "Ride Quality for Pavement Surfaces," unless otherwise shown on the plans.

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**5. MEASUREMENT**

Hot mix will be measured by the ton of composite hot-mix, which includes asphalt, aggregate, and additives. Measure the weight on scales in accordance with Item 520, "Weighing and Measuring Equipment."

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**6. PAYMENT**

The work performed and materials furnished in accordance with this Item and measured as provided under Section 340.5., "Measurement," will be paid for at the unit bid price for "Dense Graded Hot-Mix Asphalt (SQ)" of the mixture type, SAC, and binder specified. These prices are full compensation for surface preparation, materials including tack coat, placement, equipment, labor, tools, and incidentals. Trial batches will not be paid for unless they are included in pavement work approved by the Department. Pay adjustment for ride quality, if applicable, will be determined in accordance with Item 585, "Ride Quality for Pavement Surfaces."



**DIVISION V**  
**ATTACHMENTS**

**ATTACHMENT 1**

**AC 150/5370-2G**

**Operational Safety on Airports During Construction**



U.S. Department  
of Transportation  
**Federal Aviation  
Administration**

# Advisory Circular

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**Subject:** Operational Safety on  
Airports During Construction

**Date:** 12/13/2017

**AC No:** 150/5370-2G

**Initiated By:** AAS-100

**Change:**

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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.**

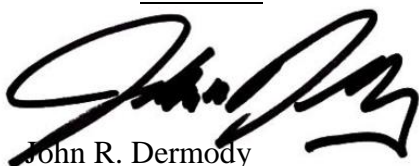
Throughout this AC, U.S. customary units are used followed with “soft” (rounded) conversion to metric units. The U.S. customary units govern.

7 **Where to Find this AC.**

You can view a list of all ACs at [http://www.faa.gov/regulations\\_policies/advisory\\_circulars/](http://www.faa.gov/regulations_policies/advisory_circulars/). You can view the Federal Aviation Regulations at [http://www.faa.gov/regulations\\_policies/faa\\_regulations/](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)<sup>1</sup> for each affected taxiway; designated approach visibility minimums;

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<sup>1</sup> 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](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.

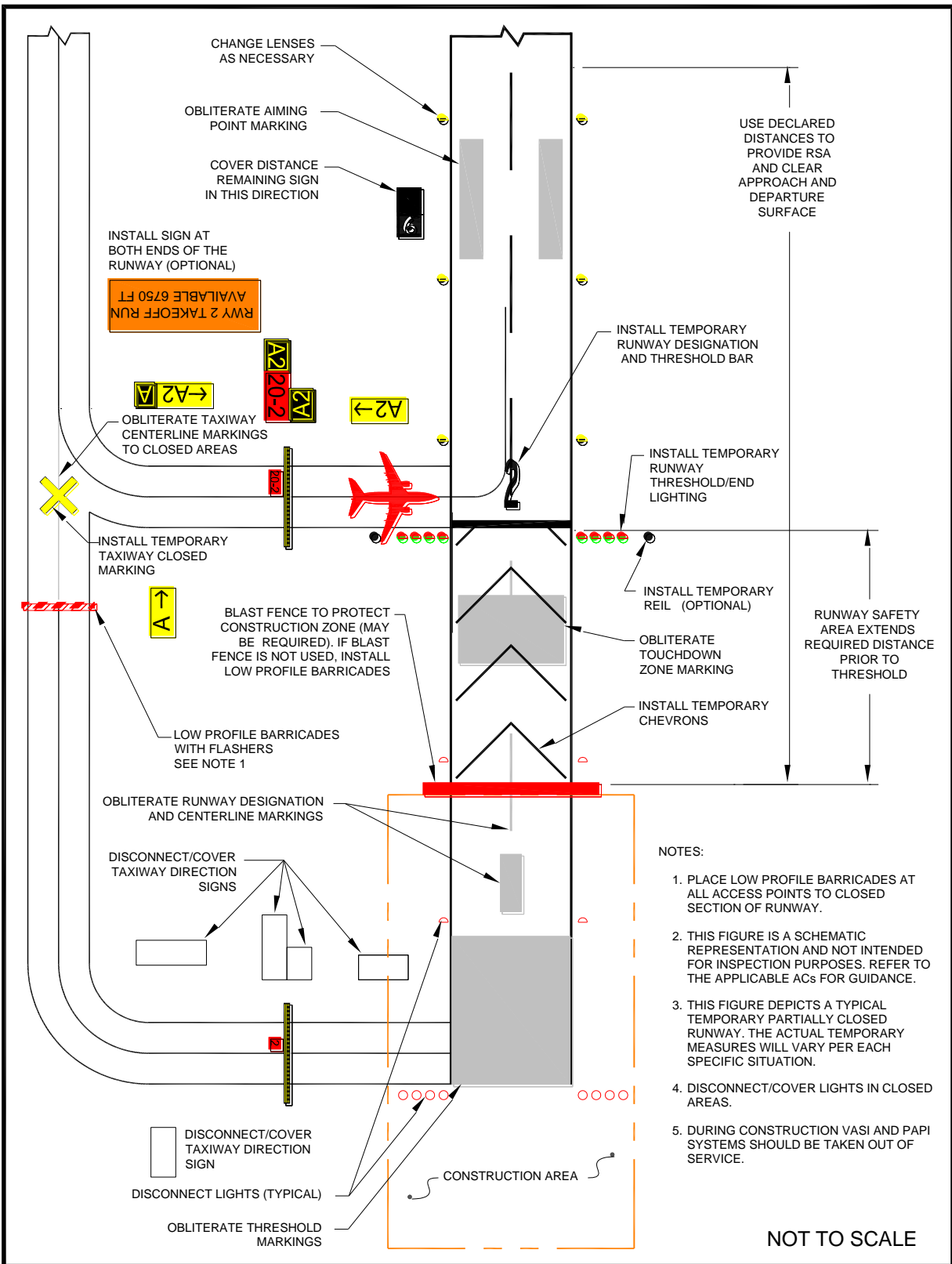
2.7.1.4 Interruption of utilities, including water supplies for fire fighting.

2.7.1.5 Approach/departure surfaces affected by heights of objects.

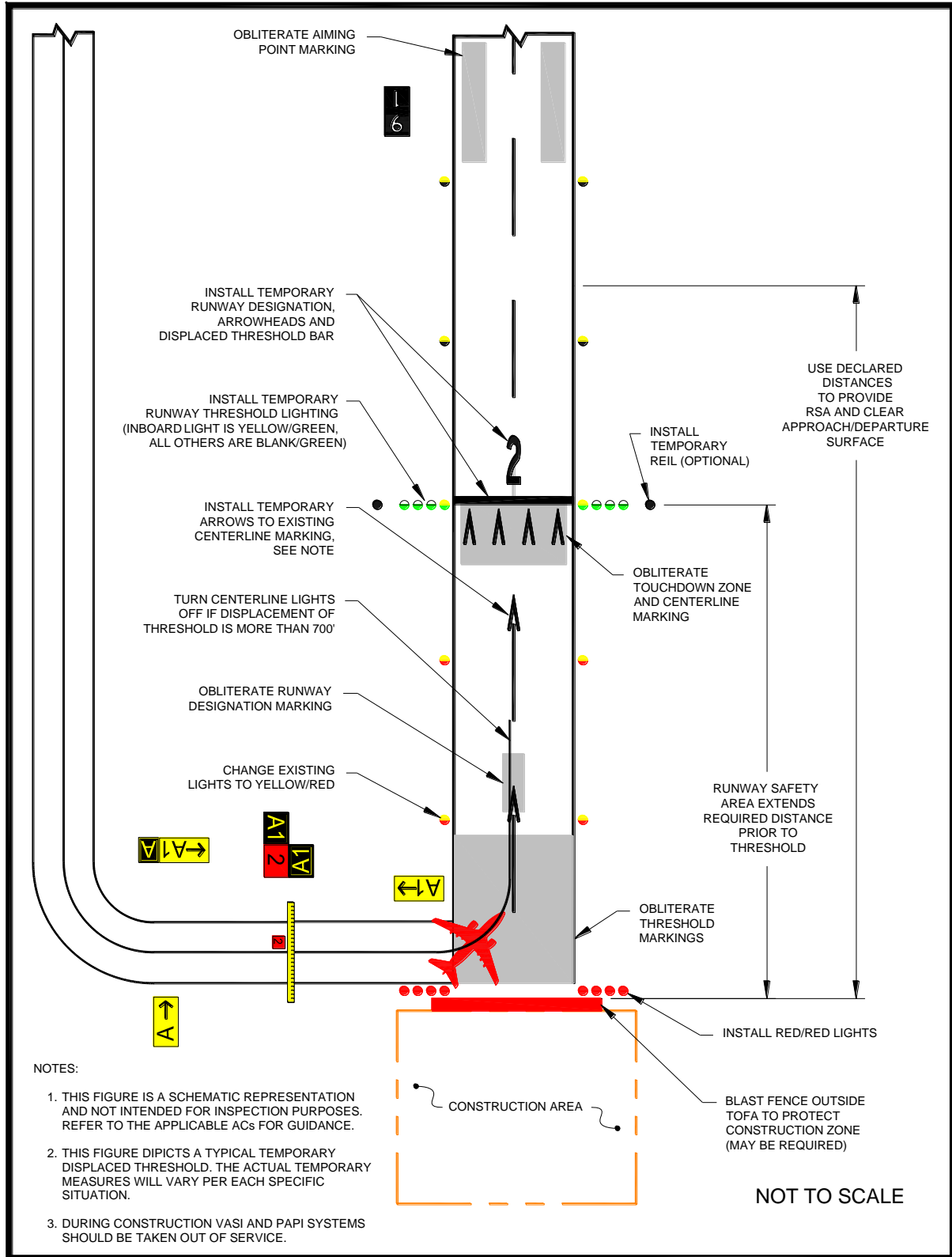
2.7.1.6 Construction areas, storage areas, and access routes near runways, taxiways, aprons, or helipads.



**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/](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 States 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](http://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**

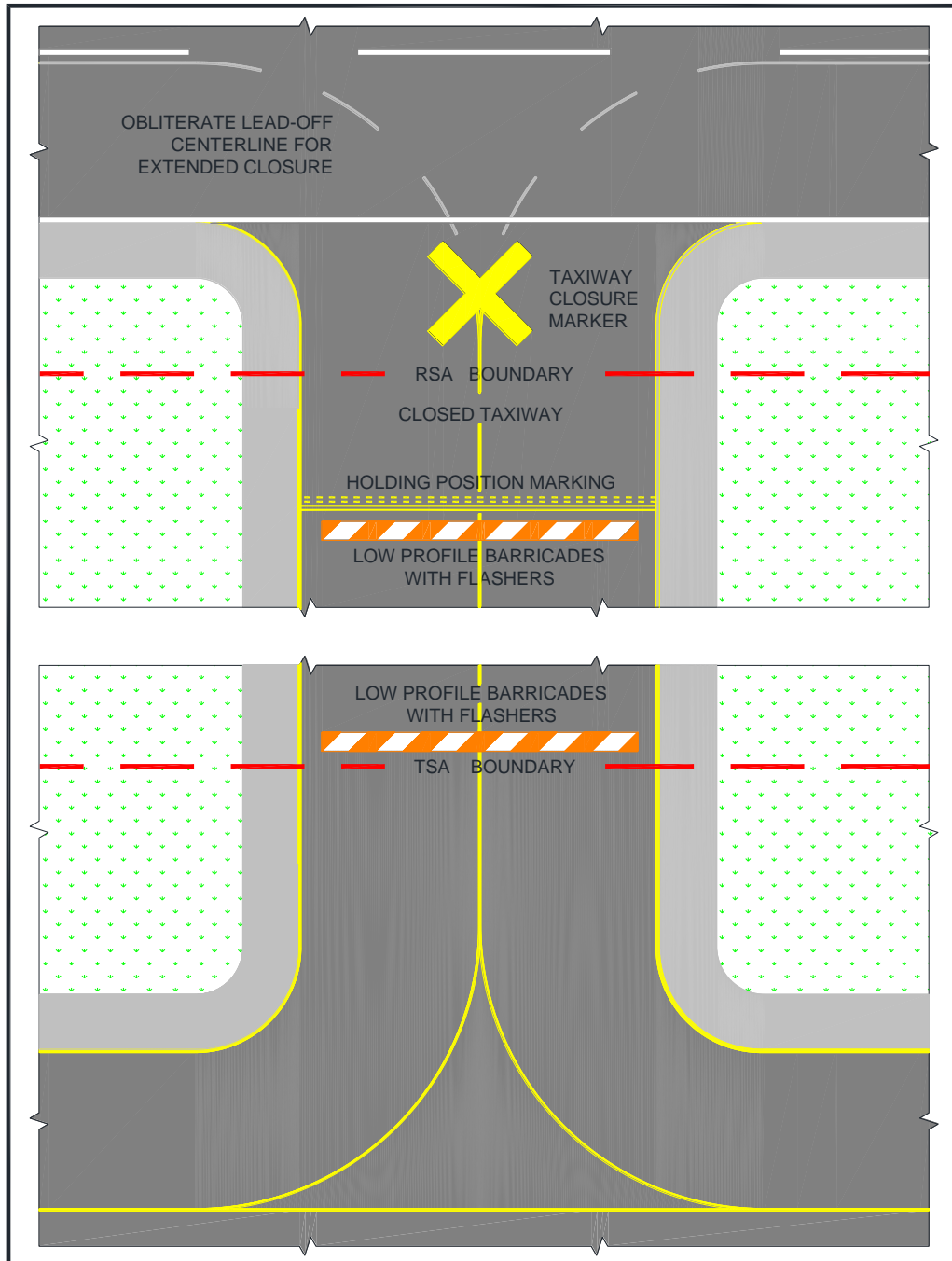


1. **Partially Closed Runways.** Pavement markings for temporary closed portions of the runway consist of a runway threshold bar, runway designation, and yellow chevrons to identify pavement areas that are unsuitable for takeoff or landing (see [AC 150/5340-1](#)). Obliterate or cover markings prior 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.

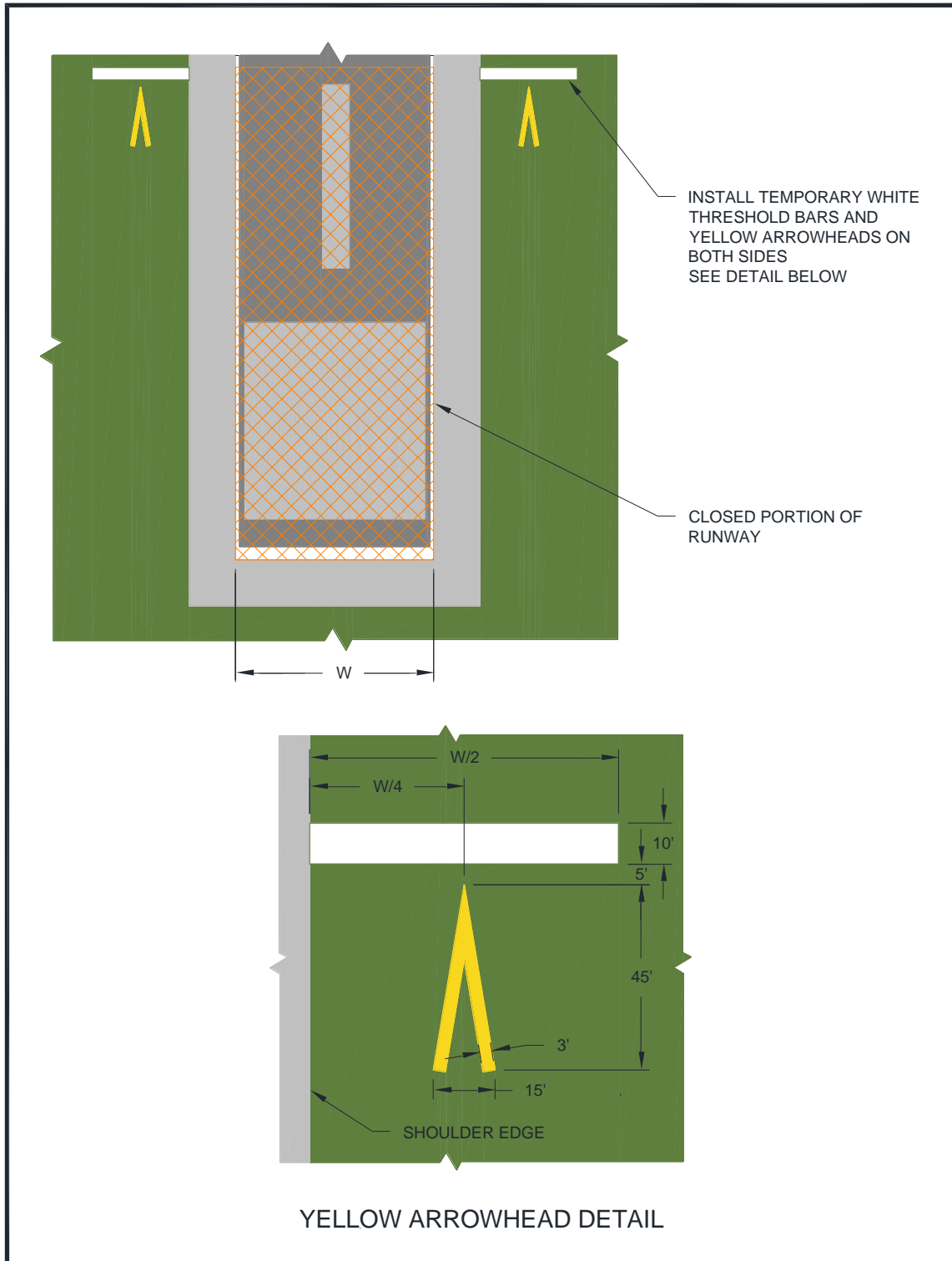
- 2.18.2.3 It may be necessary to remove or cover runway markings, including but not limited to, runway designation markings, threshold markings, centerline markings, edge stripes, touchdown zone markings and aiming point markings, depending on the length of construction and type of activity at the airport. 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 be 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**

<b>Number</b>	<b>Title and Description</b>
<u>AC 150/5200-28</u>	<i>Notices to Airmen (NOTAMs) for Airport Operators</i> Guidance for using the NOTAM System in airport reporting.
<u>AC 150/5200-30</u>	<i>Airport Field Condition Assessments and Winter Operations Safety</i> Guidance for airport owners/operators on the development of an acceptable airport snow and ice control program and on appropriate field condition reporting procedures.
<u>AC 150/5200-33</u>	<i>Hazardous Wildlife Attractants On or Near Airports</i> Guidance on locating certain land uses that might attract hazardous wildlife to public-use airports.
<u>AC 150/5210-5</u>	<i>Painting, Marking, and Lighting of Vehicles Used on an Airport</i> Guidance, specifications, and standards for painting, marking, and lighting vehicles operating in the airport air operations areas.
<u>AC 150/5210-20</u>	<i>Ground Vehicle Operations to include Taxiing or Towing an Aircraft on Airports</i> Guidance to airport operators on developing ground vehicle operation training programs.
<u>AC 150/5300-13</u>	<i>Airport Design</i> 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.
<u>AC 150/5210-24</u>	<i>Airport Foreign Object Debris (FOD) Management</i> Guidance for developing and managing an airport foreign object debris (FOD) program

<b>Number</b>	<b>Title and Description</b>
<u>AC 150/5320-15</u>	<i>Management of Airport Industrial Waste</i> 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.
<u>AC 150/5340-1</u>	<i>Standards for Airport Markings</i> FAA standards for the siting and installation of signs on airport runways and taxiways.
<u>AC 150/5340-18</u>	<i>Standards for Airport Sign Systems</i> FAA standards for the siting and installation of signs on airport runways and taxiways.
<u>AC 150/5345-28</u>	<i>Precision Approach Path Indicator (PAPI) Systems</i> FAA standards for PAPI systems, which provide pilots with visual glide slope guidance during approach for landing.
<u>AC 150/5340-30</u>	<i>Design and Installation Details for Airport Visual Aids</i> Guidance and recommendations on the installation of airport visual aids.
<u>AC 150/5345-39</u>	<i>Specification for L-853, Runway and Taxiway Retroreflective Markers</i>
<u>AC 150/5345-44</u>	<i>Specification for Runway and Taxiway Signs</i> FAA specifications for unlighted and lighted signs for taxiways and runways.
<u>AC 150/5345-53</u>	<i>Airport Lighting Equipment Certification Program</i> Details on the Airport Lighting Equipment Certification Program (ALECP).
<u>AC 150/5345-50</u>	<i>Specification for Portable Runway and Taxiway Lights</i> 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.
<u>AC 150/5345-55</u>	<i>Specification for L-893, Lighted Visual Aid to Indicate Temporary Runway Closure</i>



<b>Number</b>	<b>Title and Description</b>
<u>AC 150/5370-10</u>	<i>Standards for Specifying Construction of Airports</i> Standards for construction of airports, including earthwork, drainage, paving, turfing, lighting, and incidental construction.
<u>AC 150/5370-12</u>	<i>Quality Management for Federally Funded Airport Construction Projects</i>
EB 93	<i>Guidance for the Assembly and Installation of Temporary Orange Construction Signs</i>
FAA Order 5200.11	<u>FAA Airports (ARP) Safety Management System (SMS)</u> 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	<i>Grasses Attractive to Hazardous Wildlife</i> Guidance on grass management and seed selection.
FAA Form 7460-1	<u>Notice of Proposed Construction or Alteration</u>
FAA Form 7480-1	<u>Notice of Landing Area Proposal</u>
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**

<b>Number</b>	<b>Title</b>
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**

<b>Term</b>	<b>Definition</b>
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, <i>Safe, Efficient Use, and Preservation of the Navigable Airspace</i> . (See guidance available on the FAA web site at <a href="https://oeaaa.faa.gov">https://oeaaa.faa.gov</a> .) The form may be downloaded at <a href="http://www.faa.gov/airports/resources/forms/">http://www.faa.gov/airports/resources/forms/</a> , or filed electronically at: <a href="https://oeaaa.faa.gov">https://oeaaa.faa.gov</a> .
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 <a href="http://www.faa.gov/airports/resources/forms/">http://www.faa.gov/airports/resources/forms/</a> .
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

<b>Term</b>	<b>Definition</b>
	the authority of 14 CFR Part 139, <i>Certification of Airports</i> .
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.

<b>Term</b>	<b>Definition</b>
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 <a href="#">AC 150/5300-13</a> 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 <a href="#">AC 150/5300-13</a> 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 <a href="#">AC 150/5300-13</a> .
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 <a href="#">AC 150/5300-13</a> .
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 <a href="#">AC 150/5300-13</a> for guidance on declared distances.
TSA	Taxiway Safety Area, or Transportation Security Administration
UNICOM	A radio communications system of a type used at small airports.
VASI	Visual Approach Slope Indicator
VGSI	Visual Glide Slope Indicator. A device that provides a visual glide slope indicator to landing pilots. These systems include precision approach path indicator (PAPI), visual approach slope indicator (VASI), and pulse light approach slope indicator (PLASI).
VFR	Visual Flight Rules
VOR	Very High Frequency Omnidirectional Radio Range
VPD	Vehicle / Pedestrian Deviation

**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	
<b>General Considerations</b>					
Requirements for predesign, prebid, and preconstruction conferences to introduce the subject of airport operational safety during construction are specified.	<u>2.5</u>				
Operational safety is a standing agenda item for construction progress meetings.	<u>2.5</u>				
Scheduling of the construction phases is properly addressed.	<u>2.6</u>				
Any formal agreements are established.	<u>2.5.3</u>				
<b>Areas and Operations Affected by Construction Activity</b>					
Drawings showing affected areas are included.	<u>2.7.1</u>				
Closed or partially closed runways, taxiways, and aprons are depicted on drawings.	<u>2.7.1.1</u>				
Access routes used by ARFF vehicles affected by the project are addressed.	<u>2.7.1.2</u>				
Access routes used by airport and airline support vehicles affected by the project are addressed.	<u>2.7.1.3</u>				
Underground utilities, including water supplies for firefighting and drainage.	<u>2.7.1.4</u>				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
Approach/departure surfaces affected by heights of temporary objects are addressed.	<u>2.7.1.5</u>				
Construction areas, storage areas, and access routes near runways, taxiways, aprons, or helipads are properly depicted on drawings.	<u>2.7.1</u>				
Temporary changes to taxi operations are addressed.	<u>2.7.2.1</u>				
Detours for ARFF and other airport vehicles are identified.	<u>2.7.2.2</u>				
Maintenance of essential utilities and underground infrastructure is addressed.	<u>2.7.2.3</u>				
Temporary changes to air traffic control procedures are addressed.	<u>2.7.2.4</u>				
<b>NAVAIDs</b>					
Critical areas for NAVAIDs are depicted on drawings.	<u>2.8</u>				
Effects of construction activity on the performance of NAVAIDs, including unanticipated power outages, are addressed.	<u>2.8</u>				
Protection of NAVAID facilities is addressed.	<u>2.8</u>				
The required distance and direction from each NAVAID to any construction activity is depicted on drawings.	<u>2.8</u>				
Procedures for coordination with FAA ATO/Technical Operations, including identification of points of contact, are included.	<u>2.8, 2.13.1, 2.13.5.3.1, 2.18.1</u>				
<b>Contractor Access</b>					
The CSPP addresses areas to which contractor will have access and how	<u>2.9</u>				



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.	<u>2.9</u>				
The location of stockpiled construction materials is depicted on drawings.	<u>2.9.1</u>				
The requirement for stockpiles in the ROFA to be approved by FAA is included.	<u>2.9.1</u>				
Requirements for proper stockpiling of materials are included.	<u>2.9.1</u>				
Construction site parking is addressed.	<u>2.9.2.1</u>				
Construction equipment parking is addressed.	<u>2.9.2.2</u>				
Access and haul roads are addressed.	<u>2.9.2.3</u>				
A requirement for marking and lighting of vehicles to comply with <i>AC 150/5210-5, Painting, Marking and Lighting of Vehicles Used on an Airport</i> , is included.	<u>2.9.2.4</u>				
Proper vehicle operations, including requirements for escorts, are described.	<u>2.9.2.5, 2.9.2.6</u>				
Training requirements for vehicle drivers are addressed.	<u>2.9.2.7</u>				
Two-way radio communications procedures are described.	<u>2.9.2.9</u>				
Maintenance of the secured area of the airport is addressed.	<u>2.9.2.10</u>				
<b>Wildlife Management</b>					
The airport operator's wildlife management procedures are addressed.	<u>2.10</u>				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
<b>Foreign Object Debris Management</b>					
The airport operator's FOD management procedures are addressed.	<u>2.11</u>				
<b>Hazardous Materials Management</b>					
The airport operator's hazardous materials management procedures are addressed.	<u>2.12</u>				
<b>Notification of Construction Activities</b>					
Procedures for the immediate notification of airport user and local FAA of any conditions adversely affecting the operational safety of the airport are detailed.	<u>2.13</u>				
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.	<u>2.13.1</u>				
A list of local ATO/Technical Operations personnel is included.	<u>2.13.1</u>				
A list of ATCT managers on duty is included.	<u>2.13.1</u>				
A list of authorized representatives to the OCC is included.	<u>2.13.2</u>				
Procedures for coordinating, issuing, maintaining and cancelling by the airport operator of NOTAMS about airport conditions resulting from construction are included.	<u>2.8, 2.13.2, 2.18.3.3.9</u>				
Provision of information on closed or hazardous conditions on airport movement areas by the airport operator to the OCC is specified.	<u>2.13.2</u>				
Emergency notification procedures for medical, fire fighting, and police	<u>2.13.3</u>				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
response are addressed.					
Coordination with ARFF personnel for non-emergency issues is addressed.	<u>2.13.4</u>				
Notification to the FAA under 14 CFR parts 77 and 157 is addressed.	<u>2.13.5</u>				
Reimbursable agreements for flight checks and/or design and construction for FAA owned NAVAIDs are addressed.	<u>2.13.5.3.2</u>				
<b>Inspection Requirements</b>					
Daily and interim inspections by both the airport operator and contractor are specified.	<u>2.14.1, 2.14.2</u>				
Final inspections at certificated airports are specified when required.	<u>2.14.3</u>				
<b>Underground Utilities</b>					
Procedures for protecting existing underground facilities in excavation areas are described.	<u>2.15</u>				
<b>Penalties</b>					
Penalty provisions for noncompliance with airport rules and regulations and the safety plans are detailed.	<u>2.16</u>				
<b>Special Conditions</b>					
Any special conditions that affect the operation of the airport or require the activation of any special procedures are addressed.	<u>2.17</u>				
<b>Runway and Taxiway Visual Aids - Marking, Lighting, Signs, and Visual NAVAIDs</b>					
The proper securing of temporary airport markings, lighting, signs, and visual NAVAIDs is addressed.	<u>2.18.1</u>				
Frangibility of airport markings, lighting, signs, and visual NAVAIDs is specified.	<u>2.18.1, 2.18.3, 2.18.4.2, 2.20.2.4</u>				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
The requirement for markings to be in compliance with <u>AC 150/5340-1</u> , <i>Standards for Airport Markings</i> , is specified.	<u>2.18.2</u>				
Detailed specifications for materials and methods for temporary markings are provided.	<u>2.18.2</u>				
The requirement for lighting to conform to <u>AC 150/5340-30</u> , <i>Design and Installation Details for Airport Visual Aids</i> ; <u>AC 150/5345-50</u> , <i>Specification for Portable Runway and Taxiway Lights</i> ; and <u>AC 150/5345-53</u> , <i>Airport Lighting Certification Program</i> , is specified.	<u>2.18.3</u>				
The use of a lighted X is specified where appropriate.	<u>2.18.2.1.2</u> , <u>2.18.3.2</u>				
The requirement for signs to conform to <u>AC 150/5345-44</u> , <i>Specification for Runway and Taxiway Signs</i> ; <u>AC 150/5340-18</u> , <i>Standards for Airport Sign Systems</i> ; and <u>AC 150/5345-53</u> , <i>Airport Lighting Certification Program</i> , is specified.	<u>2.18.4</u>				
<b>Marking and Signs For Access Routes</b>					
The CSPP specifies that pavement markings and signs intended for construction personnel should conform to <u>AC 150/5340-18</u> and, to the extent practicable, with the MUTCD and/or State highway specifications.	<u>2.18.4.2</u>				
<b>Hazard Marking and Lighting</b>					
Prominent, comprehensible warning indicators for any area affected by construction that is normally accessible to aircraft, personnel, or vehicles are specified.	<u>2.20.1</u>				

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.	<u>2.20.1</u>				
The CSPP considers less obvious construction-related hazards.	<u>2.20.1</u>				
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.	<u>2.20.2.1</u>				
The spacing of barricades is specified such that a breach is physically prevented barring a deliberate act.	<u>2.20.2.1</u>				
Red lights meeting the luminance requirements of the State Highway Department are specified.	<u>2.20.2.2</u>				
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.	<u>2.20.2.3</u>				
Barricades are specified to indicate construction locations in which no part of an aircraft may enter.	<u>2.20.2.3</u>				
Highly reflective barriers with lights are specified to barricade taxiways leading to closed runways.	<u>2.20.2.5</u>				
Markings for temporary closures are specified.	<u>2.20.2.5</u>				
The provision of a contractor's representative on call 24 hours a day for emergency maintenance of airport hazard lighting and barricades is specified.	<u>2.20.2.7</u>				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
<b>Work Zone Lighting for Nighttime Construction</b>					
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.	<u>2.21</u>				
<b>Protection of Runway and Taxiway Safety Areas</b>					
The CSPP clearly states that no construction may occur within a safety area while the associated runway or taxiway is open for aircraft operations.	<u>2.22.1.1,</u> <u>2.22.3.1</u>				
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.	<u>2.22.1.2,</u> <u>2.22.3.2</u>				
Procedures for ensuring adequate distance for protection from blasting operations, if required by operational considerations, are detailed.	<u>2.22.3.3</u>				
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.	<u>2.22.1.4</u>				
Appropriate covering of excavations in the RSA or TSA that cannot be backfilled before the associated runway or taxiway is open is detailed.	<u>2.22.1.4</u>				
The CSPP includes provisions for prominent marking of open trenches and excavations at the construction site.	<u>2.22.1.4</u>				
Grading and soil erosion control to maintain RSA/TSA standards are	<u>2.22.3.5</u>				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
addressed.					
The CSPP specifies that equipment is to be removed from the ROFA when not in use.	<u>2.22.2</u>				
The CSPP clearly states that no construction may occur within a taxiway safety area while the taxiway is open for aircraft operations.	<u>2.22.3</u>				
Appropriate details are specified for any construction work to be accomplished in a taxiway object free area.	<u>2.22.4</u>				
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.	<u>2.22.4.3.6</u>				
Provisions for protection of runway approach/departure areas and clearways are included.	<u>2.22.6</u>				
<b>Other Limitations on Construction</b>					
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.	<u>2.23.1.2</u>				
The CSPP prohibits the use of electrical blasting caps on or within 1,000 ft (300 m) of the airport property.	<u>2.23.1.3</u>				

**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**

<b>Item</b>	<b>Action Required (Describe)</b>	<b>No Action Required (Check)</b>
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		



<b>Item</b>	<b>Action Required (Describe)</b>	<b>No Action Required (Check)</b>
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.		

<b>Item</b>	<b>Action Required (Describe)</b>	<b>No Action Required (Check)</b>
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).		

<b>Item</b>	<b>Action Required (Describe)</b>	<b>No Action Required (Check)</b>
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.		

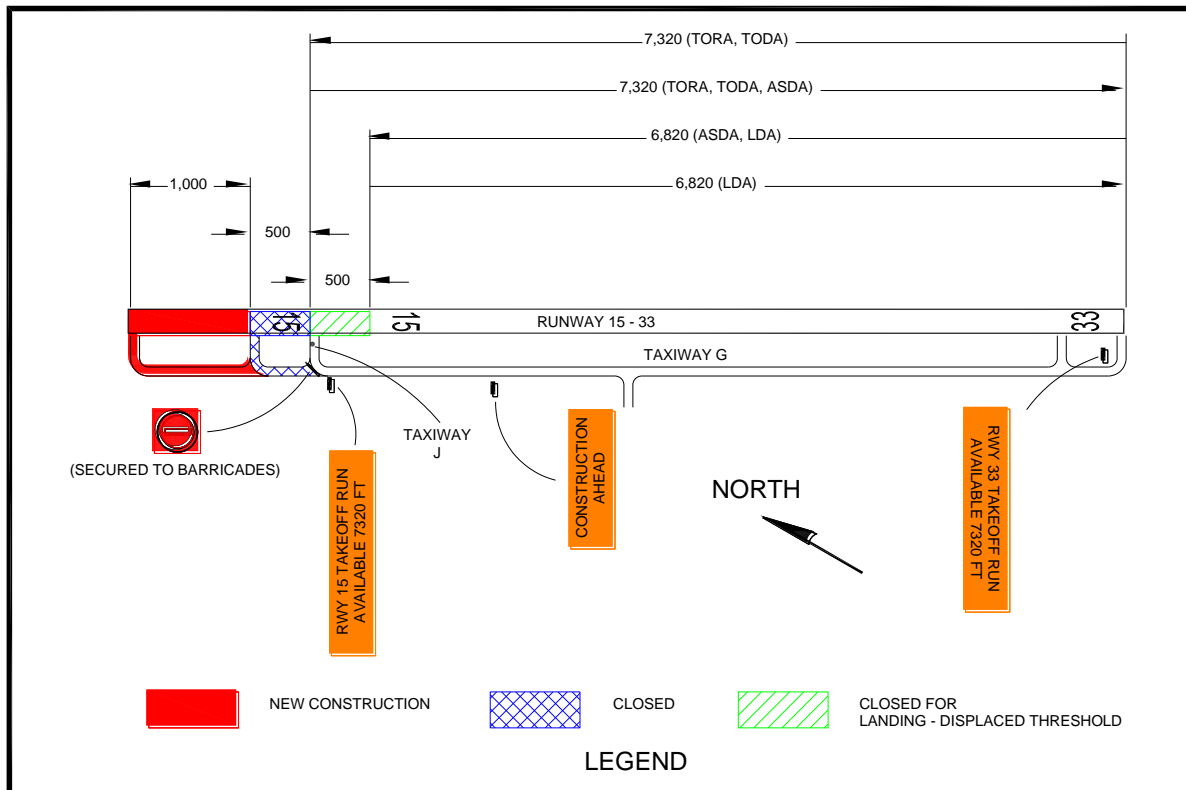
**APPENDIX E. SAMPLE OPERATIONAL EFFECTS TABLE**

**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**

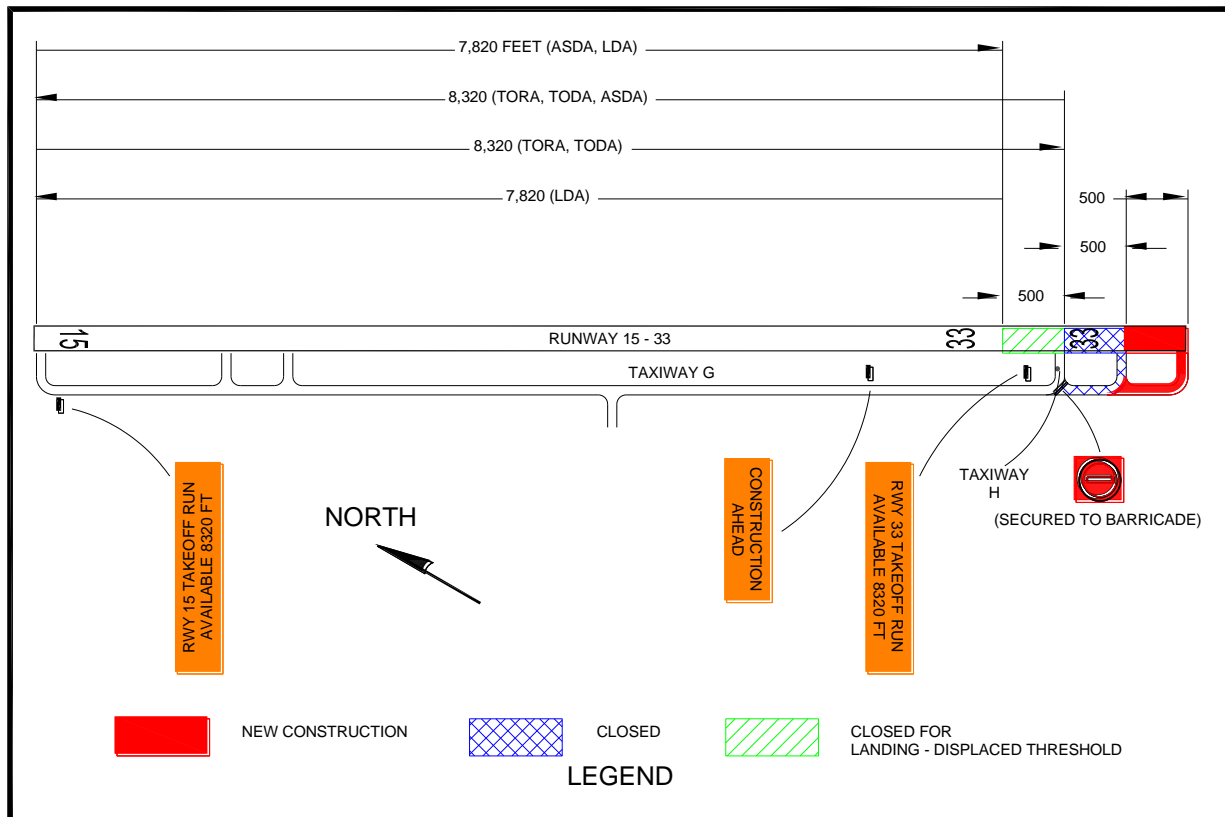


**Note 1:** Where hold signs are installed on both sides of a taxiway, install the TORA sign on the left side of the taxiway before the final turn to the runway intersection.

**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**

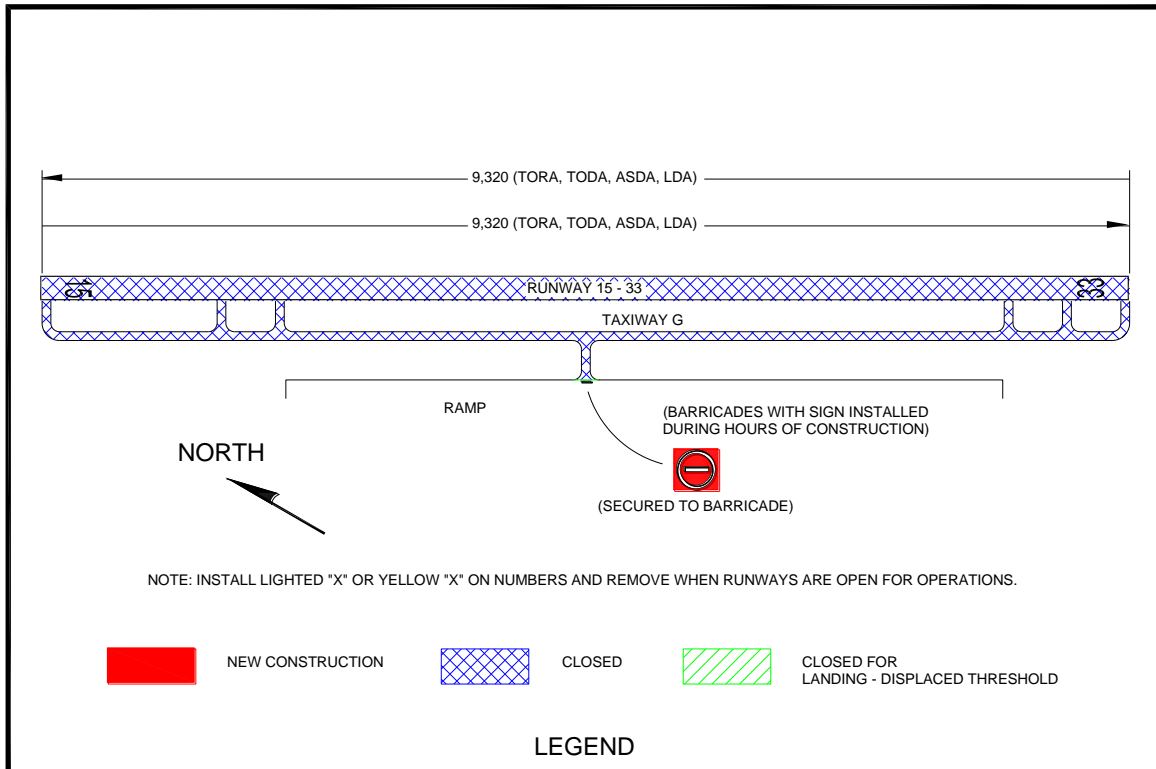


**Note 1:** Where hold signs are installed on both sides of a taxiway, install the TORA sign on the left side of the taxiway before the final turn to the runway intersection.

**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**

<b>Project</b>	<b>Runway 15-33 Extension and Repaving</b>			
<b>Phase</b>	<b>Normal (Existing)</b>	<b>Phase I: Extend Runway 15 End</b>	<b>Phase II: Extend Runway 33 End</b>	<b>Phase III: Repave Runway</b>
<b>Scope of Work</b>	N/A	Extend Runway 15-33 1,000 ft on north end with Hot Mix Asphaltic Concrete (HMA).	Extend Runway 15-33 500 ft on south end with Hot Mix Asphaltic Concrete (HMA).	Repave existing runway with HMA Relocate Runway 33 Glide Slope
<b>Effects of Construction Operations</b>	N/A	Existing North 500 ft closed	Existing South 500 ft closed	Runway closed between 8:00 pm and 5:00 am Edge lighting out of service
<b>Construction Phase</b>	N/A	Phase I (Anticipated)	Phase II (Anticipated)	Phase III (Anticipated)
<b>Runway 15 Average Aircraft Operations</b>	Carrier: 52 /day GA: 26 /day Military: 11 /day	Carrier: 40 /day GA: 26 /day Military: 0 /day	Carrier: 45 /day GA: 26 /day Military: 5 /day	Carrier: 45 / day GA: 20 / day Military: 0 /day
<b>Runway 33 Average Aircraft Operations</b>	Carrier: 40 /day GA: 18 /day Military: 10 /day	Carrier: 30 /day GA: 18 /day Military: 0 /day	Carrier: 25 /day GA: 18 /day Military: 5 /day	Carrier: 20 /day GA: 5 /day Military: 0 /day
<b>Runway 15-33 Aircraft Category</b>	C-IV	C-IV	C-IV	C-IV
<b>Runway 15 Approach Visibility Minimums</b>	1 mile	1 mile	1 mile	1 mile
<b>Runway 33 Approach Visibility Minimums</b>	$\frac{3}{4}$ mile	$\frac{3}{4}$ mile	$\frac{3}{4}$ mile	1 mile

**Note:** Proper coordination with Flight Procedures group is necessary to maintain instrument approach procedures during construction.

<b>Project</b>		<b>Runway 15-33 Extension and Repaving</b>			
<b>Phase</b>		<b>Normal (Existing)</b>	<b>Phase I: Extend Runway 15 End</b>	<b>Phase II: Extend Runway 33 End</b>	<b>Phase III: Repave Runway</b>
<b>Runway 15 Declared Distances</b>	<b>TORA</b>	7,820	7,320	8,320	9,320
	<b>TODA</b>	7,820	7,320	8,320	9,320
	<b>ASDA</b>	7,820	7,320	7,820	9,320
	<b>LDA</b>	7,820	6,820	7,820	9,320
<b>Runway 33 Declared Distances</b>	<b>TORA</b>	7,820	7,320	8,320	9,320
	<b>TODA</b>	7,820	7,320	8,320	9,320
	<b>ASDA</b>	8,320	6,820	8,320	9,320
	<b>LDA</b>	7,820	6,820	7,820	9,320
<b>Runway 15 Approach Procedures</b>	LOC only	LOC only	LOC only	LOC only	LOC only
	RNAV	RNAV	RNAV	RNAV	RNAV
	VOR	VOR	VOR	VOR	VOR
<b>Runway 33 Approach Procedures</b>	ILS	ILS	ILS	ILS	LOC only
	RNAV	RNAV	RNAV	RNAV	RNAV
	VOR	VOR	VOR	VOR	VOR
<b>Runway 15 NAVAIDs</b>	LOC	LOC	LOC	LOC	
<b>Runway 33 NAVAIDs</b>	ILS, MALSR	ILS, MALSR	ILS, MALSR	LOC, MALSR	
<b>Taxiway G ADG</b>	IV	III	IV	IV	
<b>Taxiway G TDG</b>	4	4	4	4	
<b>ATCT (hours open)</b>	24 hours	24 hours	24 hours	0500 - 2000	
<b>ARFF Index</b>	D	D	D	D	



<b>Project</b>	<b>Runway 15-33 Extension and Repaving</b>			
<b>Phase</b>	<b>Normal (Existing)</b>	<b>Phase I: Extend Runway 15 End</b>	<b>Phase II: Extend Runway 33 End</b>	<b>Phase III: Repave Runway</b>
<b>Special Conditions</b>	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
<b>Information for NOTAMs</b>		Refer above for applicable declared distances. Taxiway G limited to 118 ft wingspan	Refer above for applicable declared distances.	Refer above for applicable declared distances. Airport closed 2000 – 0500. Runway 15 glide slope OTS.

**Note:** This table is one example. It may be advantageous to develop a separate table for each project phase and/or to address the operational status of the associated NAVAIDs per construction phase.

Complete the following chart for each phase to determine the area that must be protected along the runway and taxiway edges:

**Table E-2. Runway and Taxiway Edge Protection**

<b>Runway/Taxiway</b>	<b>Aircraft Approach Category* A, B, C, or D</b>	<b>Airplane Design Group* I, II, III, or IV</b>	<b>Safety Area Width in Feet Divided by 2*</b>

\*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	: 1
			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.

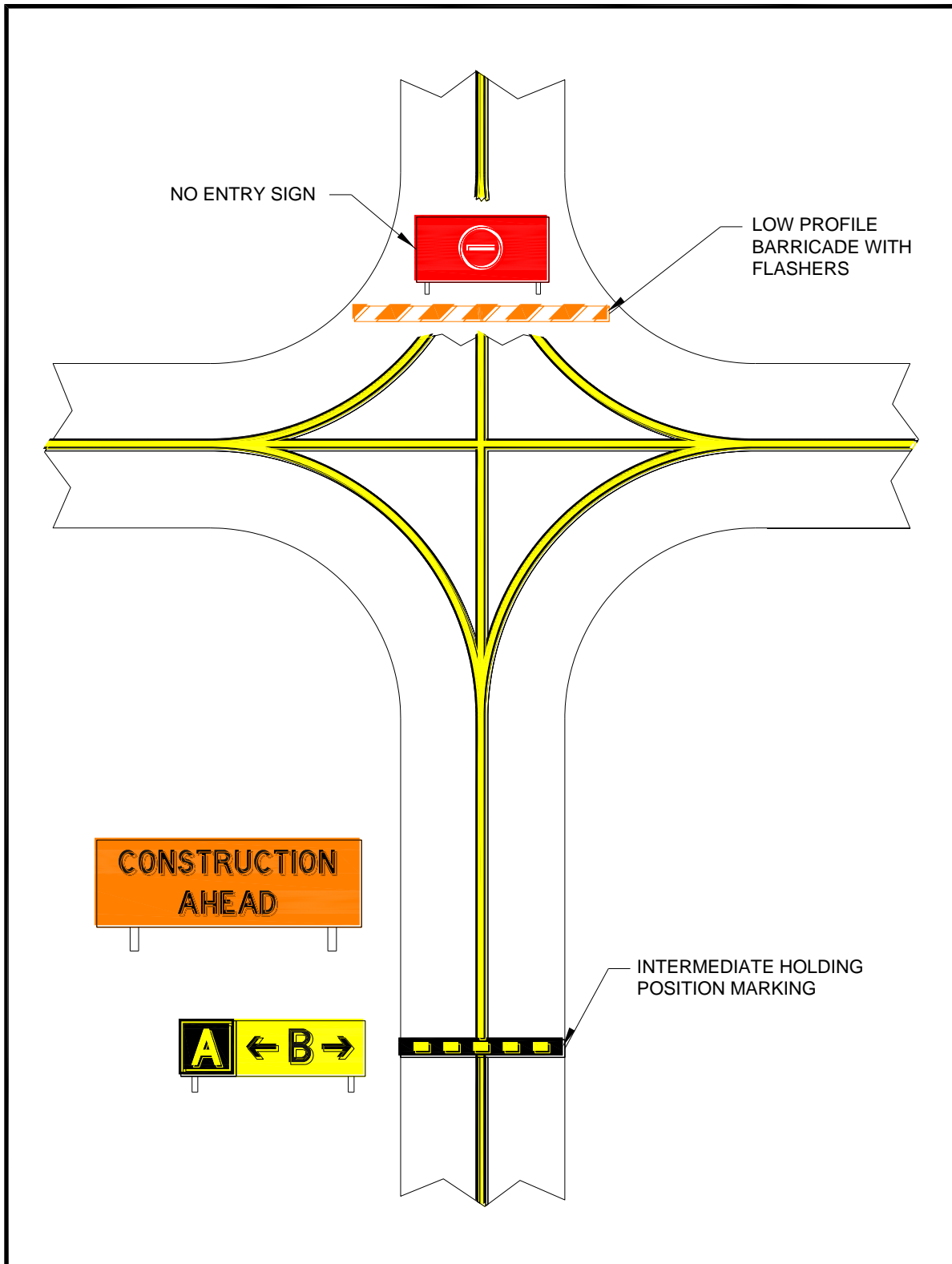
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**APPENDIX F. ORANGE CONSTRUCTION SIGNS**

**Figure F-1. Approved Sign Legends**

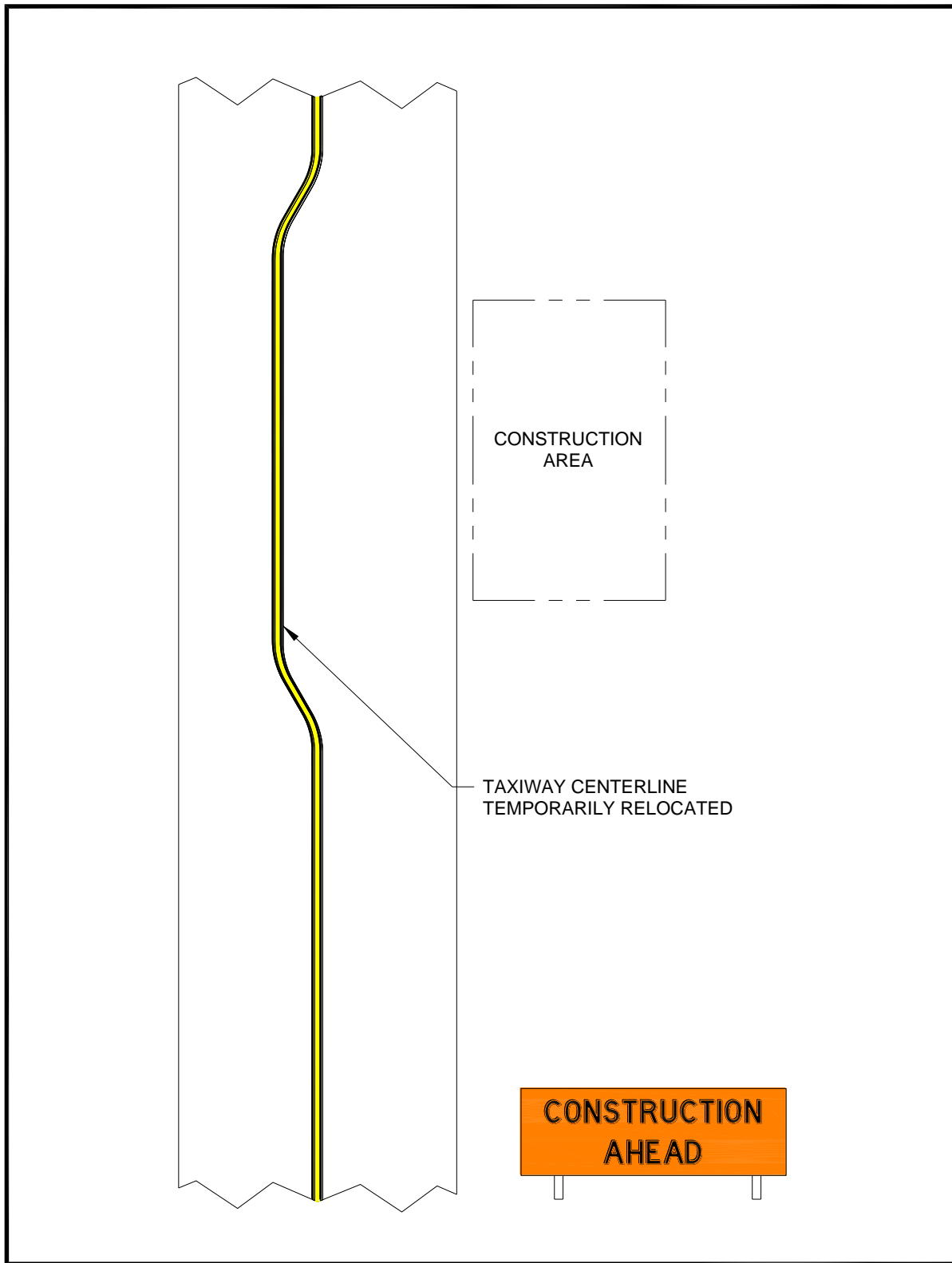


**Figure F-2. Orange Construction Sign Example 1**



**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: \_\_\_\_\_



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**ATTACHMENT 2**  
**Geotechnical Report**



GEOTECHNICAL ENGINEERING  
ENVIRONMENTAL CONSULTING  
CONSTRUCTION MATERIALS ENGINEERING AND TESTING

May 14, 2019

Mr. Michael A. Burns, P.E.  
Vice President  
**KSA Engineers, Inc.**  
140 East Tyler Street, Suite 600  
Longview, Texas 75601

**Re: Geotechnical Investigation  
Southwest GA Area Taxilane Extension – Phase II  
East Texas Regional Airport  
Gregg County, Texas  
KSA Project No. GC.113  
AGG Report No. LE19-007**

Dear Mr. Burns:

Submitted herein is our geotechnical report for the project referenced above. This study was performed in general accordance with KSA Task Order No. GC.113 GEO/CMT, dated May 14, 2019. This report describes the results of our field and laboratory investigations together with recommendations for the design and construction of the planned project.

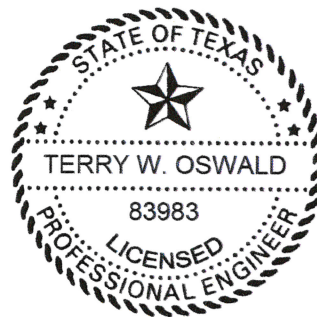
For your construction materials testing and related quality assurance requirements, it is recommended that this work be performed by Alliance Geotechnical Group, Inc. in order to maintain continuity of inspection and testing services for the project under the direction of the geotechnical project engineer.

We appreciate the opportunity to assist you on this project phase. Please call should you have any questions or when we can be of further assistance.

Sincerely,

**ALLIANCE GEOTECHNICAL GROUP, INC.**

Terry W. Oswald, P.E.  
Vice President



5/14/19

TBPE Firm Registration  
Number 1970

Electronic Copy (PDF) Submitted Via E-Mail



**GEOTECHNICAL INVESTIGATION**  
**SOUTHWEST GA AREA TAXILANE EXTENSION – PHASE II**  
**EAST TEXAS REGIONAL AIRPORT**  
**GREGG COUNTY, TEXAS**  
**KSA PROJECT NO. GC.113**  
**AGG REPORT NO. LE19-007**

**TO**  
**KSA ENGINEERS, INC.**  
**LONGVIEW, TEXAS**

**BY**  
**ALLIANCE GEOTECHNICAL GROUP, INC.**  
**LONGVIEW, TEXAS**

**MAY 14, 2019**

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**GEOTECHNICAL INVESTIGATION  
SOUTHWEST GA AREA TAXILANE EXTENSION – PHASE II  
EAST TEXAS REGIONAL AIRPORT  
GREGG COUNTY, TEXAS  
KSA PROJECT NO. GC.113**

**1. PROJECT DESCRIPTION**

The proposed project includes the construction of a new approximately 916 feet long hangar access taxilane and associated approximately 100 feet long extension to the recently constructed (Phase 1) Hangar Access Taxilane at the East Texas Regional Airport in Gregg County, Texas. Specifically, the recently constructed hangar access taxilane (Phase 1) will be extended approximately 100 feet to the west, where it will intersect the new approximately 916 feet long hangar access taxilane, which will extend in a north-south direction. The project also includes construction of approximately 600 feet of new 24' wide Perimeter Maintenance Road, parallel to the new Hangar Access Taxilane. Specifically, the new Perimeter Maintenance Road will extend south from Skyway Drive to tie into the recently constructed section of Perimeter Maintenance Road, north of Corporate Road. The new hangar access taxilane will be designed and constructed to meet FAA design requirements, based on aircraft traffic and loading conditions provided by the Engineer. Based on discussions with the Engineer, the planned Perimeter Maintenance Road will be designed and constructed to support Fuel Truck and ARFF vehicle loading conditions. The preliminary pavement section for the new Perimeter Maintenance Road consists of approximately four (4) inches of asphaltic concrete pavement (TxDOT Item 340, Type "D"), constructed over approximately six (6) inches of crushed stone base (TxDOT Item 247) and eight (8) inches of lime treated subgrade (FAA Item P-155). Final grading plans were not completed at the time of this report. However, based on visual observations of the existing topography and discussions with the Engineer, it is assumed that minimal site grading (cuts and fills of less than about 1 to 2 feet) will be required to achieve finished grades along the majority of the respective alignments. Isolated areas may require additional site grading to facilitate surface water drainage improvements and new construction. A general layout of the site is shown on the Plan of Borings, Figure 1.

**2. PURPOSE AND SCOPE**

This investigation was designed to evaluate subsurface conditions at the project site and to develop engineering soil design parameters and recommendations to be used to guide design and construction of the planned project. Our scope of services included:

1. obtaining samples of the subsurface soil formations and making groundwater observations within the limits of seven (7) exploratory borings for evaluation of general soil and groundwater conditions;
2. obtaining representative samples of the anticipated subgrade soils for laboratory Proctor compaction and California Bearing Ratio (CBR) tests for evaluation of load bearing characteristics of the existing subgrade soils;
3. performing laboratory soil tests for soil classification of the subsurface strata;
4. performing laboratory Proctor compaction and California Bearing Ratio (CBR) tests for evaluation of the design CBR values;

5. performing pavement design studies for new pavement construction in accordance with FAA design requirements, based on aircraft traffic and loading conditions provided by the client;
6. providing recommended pavement sections (asphaltic concrete and Portland cement concrete) for new pavement construction;
7. providing recommendations for pavement subgrade preparation, including recommended dosage rates of stabilization additives and guideline specifications for subgrade stabilization;
8. providing recommendations for compaction of earthwork and recommendations for suitable fill materials, placement, and compaction; and;
9. discussion of potential construction problems.

### **3. FIELD INVESTIGATION**

Subsurface conditions were evaluated by a total of seven (7) sample test borings drilled on April 29, 2019 within the limits of the proposed improvements. Boring locations were selected jointly by representatives of KSA Engineers, Inc. and Alliance Geotechnical Group, Inc. and located in the field by representatives of KSA Engineers, Inc. The approximate boring locations are shown on the Plan of Borings, Figure 1.

Borings were drilled to depths of about 10 feet below existing grade to evaluate subsurface conditions within the limits of the proposed improvements. Sample depth, soil description and classification (based on the Unified Soil Classification System) are shown on the Logs of Borings, Figures 2 through 8. A key to the descriptive terms and symbols used on the logs is presented on Figure 9. The locations and elevations indicated on the boring logs were provided by the client.

The borings were advanced using continuous flight augers. The subsurface soils were sampled using a split-barrel sampler in conjunction with the Standard penetration test (SPT). The samples were visually examined in the field by an Alliance Geotechnical Group, Inc. geotechnical engineer, classified, and packaged for transport to the laboratory for further identification and classification. Borings were drilled dry, without the aid of drilling fluids, to allow groundwater observations while drilling. Groundwater observations were made during drilling and after completion of the respective borings. These observations are reported on the boring logs. All borings were backfilled with soil cuttings and tamped upon completion of the respective borings.

One (1) representative bulk subgrade sample was obtained for evaluation of Proctor compaction and California Bearing Ratio (CBR) characteristics. The CBR sample, CBR-1, consisted of the clay subgrade soils obtained within the upper soil profiles at Borings B-1 through B-7 and combined to produce one (1) representative bulk subgrade sample.

### **4. LABORATORY INVESTIGATION**

Upon return to the laboratory, representative specimens were selected for testing. The laboratory testing program was directed toward evaluation of physical and engineering characteristics of the subsurface soils.



Classifications were verified by determination of natural moisture content, liquid and plastic limits, and percent fines passing the No. 200 sieve. The results of these tests are tabulated at the appropriate sample depth on the boring logs.

Strength characteristics of the subsurface soils were evaluated by Standard penetration tests (SPT), which were performed in the field. These test results are also shown on the boring logs.

Laboratory analytical tests were performed on representative samples of the subgrade soils in accordance with TxDOT Test Method Tex-145-E, Part II (Colorimetric Method) to determine concentrations of sulfates for evaluation of the potential for sulfate induced heave. These test results are summarized on Figure 10.

The optimum content of stabilization additives were evaluated by a series of liquid and plastic limit tests on lime treated soils. These results are shown on Figure 11.

One (1) California Bearing Ratio (CBR) test was performed on recompacted subgrade soil samples. The CBR sample, CBR-1, consisted of the clay subgrade soils obtained within the upper soil profiles at Borings B-1 through B-7. A total of five (5) CBR values were determined on samples compacted to varying moisture contents and densities. The samples were soaked for 96 hours prior to determination of the CBR value. The results of these tests are shown on Figure 12.

All field and laboratory tests were performed in accordance with ASTM and/or TxDOT test standards.

## **5. GENERAL SITE AND SUBSURFACE CONDITIONS**

### **5.1 Site Conditions**

The site of the proposed new approximately 916 feet long hangar access taxilane extends in a north-south direction, approximately 100 feet west of the west end of the recently constructed (Phase 1) Hangar Access Taxilane at the East Texas Regional Airport in Gregg County, Texas. Specifically, the recently constructed hangar access taxilane (Phase 1) will be extended approximately 100 feet to the west, where it will intersect the new approximately 916 feet long hangar access taxilane, which will extend in a north-south direction. The new hangar access taxilane will extend approximately 239 feet south of the centerline of the recently constructed (Phase 1) Hangar Access Taxilane, and approximately 677 feet north of the centerline of the recently constructed (Phase 1) Hangar Access Taxilane. The project also includes construction of approximately 600 feet of new 24' wide Perimeter Maintenance Road, parallel to the new Hangar Access Taxilane. Specifically, the new Perimeter Maintenance Road will extend south from Skyway Drive to tie into the recently constructed section of Perimeter Maintenance Road, north of Corporate Road. In general, the site is relatively flat to gently sloping downwards towards the north and south from a high point near the middle portions of the site. Specifically, the topography along the proposed Perimeter Maintenance Road alignment (Borings B-1 through B-3) slopes gently downwards towards the north (towards Boring B-1) and south (towards Boring B-3) from the high point near Boring B-2 with borehole elevations ranging from about El 366.35 (Boring B-1) to about El 371.82 (Boring B-2). Similarly, the topography along the proposed Hangar Access Taxilane alignment (Borings B-4 through B-7) slopes gently downwards towards the north (towards Boring B-4) and south (towards

Boring B-7) from the high point near Boring B-6 with borehole elevations ranging from about El 366.91 (Boring B-4) to about El 371.70 (Boring B-6). As a result of recent construction activities in the area, a significant portion of the site has been disturbed. Exposed soils are present across the majority of the site. Surface vegetation, where present, consists of native grasses and weeds. Final grading plans were not completed at the time of this report. However, based on visual observations of the existing topography and discussions with the Engineer, it is assumed that minimal site grading (cuts and fills of less than about 1 to 2 feet) will be required to achieve finished grades along the majority of the respective alignments. Isolated areas may require additional site grading to facilitate surface water drainage improvements and new construction. A general layout of the site is shown on the Plan of Borings, Figure 1.

## 5.2 Subsurface Conditions

The site of the proposed improvements is geologically located in an area underlain by the Reklaw Formation, as indicated on the Tyler Sheet of the Geologic Atlas of Texas. Soil formations encountered at the site are shown in detail on the boring logs, Figures 2 through 8. The subsurface soil conditions are typical of alluvial deposits. These soils generally consist of silty sand to sandy silt strata (SM & ML), relatively low plasticity silty clayey sand (SC), moderately plastic silty sandy clays (CL), and highly plastic (CL-CH & CH) clay, silty clays, and silty sandy clay soils, both fill and natural. The consistency changes horizontally and vertically over rather short distances. Note that the depth on the boring logs refers to the depth from the existing grade or ground surface present at the time of the investigation. Boundaries between the various soil types are approximate, and the actual transition may be gradual.

The subsurface soils generally consist of moderately to highly plastic (CL and CH) clay soils containing varying amounts of silt and sand to the 10-foot drilled depths of the borings. The consistency changes horizontally and vertically over rather short distances. Low plasticity silty clayey sand (SC) was encountered in Boring B-2, between depths of about 2 to 4 feet below existing grade at the boring location. These sandy soils exhibited a liquid limit of about 35 and a plasticity index (PI) of about 15. Non-plastic (PI=0) silty fine sand (SM) was noted in Boring B-2 at a depth of about 7 feet below existing grade at the boring location. In addition, non-plastic (PI=0) sandy silt to silty very fine sand (ML) was encountered in Boring B-3, between depths of about 2 to 3 feet below existing grade at the boring location. These sandy and/or silty soil strata contained about 36 to 62 percent fines (silt and clay passing the No. 200 sieve).

Obvious fill soils consisting of moderately to highly plastic (CL and CH) silty sandy clay and clay soils were encountered in Borings B-3, B-6, and B-7 to depths ranging from about 2 to 4.5 feet below existing grade at the boring locations. These clay fill soils are considered medium stiff to stiff in consistency at the present time, having Standard penetration test (SPT) blow counts ranging from about 7 to 9 blows per foot of penetration. These clay fill soils exhibited liquid limits ranging from about 36 to 70, plasticity indices (PI's) ranging from about 20 to 49, and contained about 71 to 82 percent fines (silt and clay passing the No. 200 sieve). In their present moisture content (moisture contents ranging from about 1 to 9 percentage points above (+1% to +9%) their respective plastic limits), these clay fill soils are generally considered moderately expansive with future increases in moisture.

The moderately to highly plastic (CL and CH) clay soils encountered at the site are considered medium stiff to very stiff in consistency at the present time, having Standard

penetration test (SPT) blow counts ranging from about 9 to 25 blows per foot of penetration. These clay soils exhibited liquid limits ranging from about 35 to 101, plasticity indices (PI's) ranging from about 17 to 69, and contained about 69 to 100 percent fines (silt and clay passing the No. 200 sieve). In their present moisture content (moisture contents ranging from about 2 percentage points below to 8 percentage points above (-2% to +8%) their respective plastic limits), these clay soils are generally considered moderately to highly expansive with future increases in moisture.

### **5.3 Groundwater Conditions**

At the time of this investigation, groundwater seepage was not encountered during the drilling operations. Groundwater level measurements performed upon completion of the respective borings indicated groundwater levels below the drilled depths of the borings at the time of our investigation as indicated on the boring logs. The respective borings were dry and open to their completion depths upon completion of the drilling operations as indicated on the boring logs. It should be recognized that groundwater levels will fluctuate with variations in seasonal precipitation, and surficial runoff. If construction occurs during or following periods of heavy rainfall, shallow groundwater should be anticipated in the form of seepage within the granular soil layers and through the cracks, fissures and fractures within the overburden clay soils. Future construction activities may also alter the surface and subsurface drainage characteristics of this site. Therefore, the depth of groundwater should be verified just prior to construction. If there is a noticeable change from the conditions reported herein, Alliance Geotechnical Group, Inc. should be notified immediately to review the effects it may have on the design recommendations. It is not possible to accurately predict the magnitude of subsurface water fluctuation that might occur based upon short-term observations.

Shallow groundwater levels are not desired for optimum pavement performance. At the time of our investigation (borings drilled April 29, 2019, after several years of relatively prolonged periods of hot and dry (drought) summer and mild winter weather conditions), shallow groundwater seepage was not encountered during drilling operations. However, due to the presence of highly plastic (CH) clay soils at this site and the potential for trapping surface water within granular (aggregate) base layers, subgrade drainage systems should be considered adjacent to all pavement sections containing granular (aggregate) base materials, if applicable. The purpose of the subsurface drainage system is to intercept any surface water and/or groundwater seepage trapped (perched) within the adjacent granular (aggregate) base layers. In addition, due to the sloping topography along portions of the alignments, subgrade drainage improvements should be considered in other areas of the site in an attempt to intercept groundwater seepage from the adjacent sloping (and elevated) landscape during the construction phase and to aid in the long term performance of the new pavement sections. Specifically, subgrade drainage systems should be considered in areas where the adjacent landscape is elevated significantly above the pavement sections. This applies to areas where the adjacent landscape is elevated significantly above the pavement sections or where portions of the alignment are elevated significantly above the adjacent pavement sections. Recommendations regarding subgrade drainage improvements are presented in the following section of this report, Section 6.9, Pavement Subgrade Drainage.

#### **5.4 Evaluation of Sulfate Concentrations**

Analytical testing was performed on representative samples of the subgrade soils to determine their concentrations of sulfates in accordance with TxDOT Test Method Tex-145-E, Part II (Colorimetric Method) for evaluation of the potential for sulfate induced heave. Results of these tests are summarized on Figure 10. Large detectable gypsiferous crystals were not detected during visual examination of the test samples. Likewise, test results indicated concentrations of sulfates within the selected test samples of less than 100 parts per million (ppm). According to recent research regarding "sulfate induced heave", sulfate concentrations in excess of 2,000 ppm (threshold level) indicates a moderate potential for "sulfate induced heave" if these soils are treated lime, cement, fly-ash or other additives having a pH in excess of 10. Sulfate concentrations in excess of 5,000 ppm indicates a high potential for "sulfate induced heave". Likewise, concentrations in excess of 10,000 ppm indicates that a serious problem associated with "sulfate induced heave" could occur during or after construction. Since concentrations of sulfates in the selected subgrade samples were less than 100 ppm (well below the threshold level of 2,000 ppm), the subgrade soils encountered at the site should be suitable for treatment with stabilization additives.

### **6. ANALYSES AND GEOTECHNICAL RECOMMENDATIONS**

The recommendations given in this report were prepared exclusively for KSA Engineers, Inc., the East Texas Regional Airport, Gregg County, Texas, the Federal Aviation Administration (FAA), and their design consultants. The information supplied herein is applicable for the design of the previously described improvements to be constructed at the location indicated at this site and should not be used for any other purpose.

#### **6.1 Pavement Subgrade Design Parameters**

The new pavement sections for the new Hangar Access Taxilane will be designed and constructed to meet FAA design requirements, based on aircraft traffic and loading conditions provided by the Engineer. Based on discussions with the Engineer, the new pavement section for the planned Perimeter Maintenance Road will be designed and constructed to support Fuel Truck and ARFF vehicle loading conditions. The preliminary pavement section for the new Perimeter Maintenance Road consists of approximately four (4) inches of asphaltic concrete pavement (TxDOT Item 340, Type "D"), constructed over approximately six (6) inches of crushed stone base (TxDOT Item 247) and eight (8) inches of lime treated subgrade (TxDOT Item 260). Final grading plans were not completed at the time of this report. However, based on visual observations of the existing topography and discussions with the Engineer, it is assumed that minimal site grading (cuts and fills of less than about 1 to 2 feet) will be required to achieve finished grades along the majority of the respective alignments. Isolated areas may require additional site grading to facilitate surface water drainage improvements and new construction. Therefore, exposed subgrade soils are anticipated to consist of moderately to highly plastic (CL and CH) silty sandy clay and clay soils, both fill and natural. It is recommended that the subgrade soils in all pavement areas be treated with stabilization additives to provide a stable working platform for new pavement construction and increase the long term performance of the new pavement sections.

California Bearing Ratio (CBR) test results performed on the moderately to highly plastic (CL) reddish brown, brown and light gray to gray clay soils shown on Figure 12 indicate a CBR value ranging from about 1 to 5 at about 95% standard Proctor density compaction

and moisture contents ranging from about 16.5 to 25.8 percent (about 4.0 percentage points below (-4.0%) to about 5.3 percentage points above (+5.3%) the optimum moisture value). Likewise, at moisture contents within 3 percentage points of the optimum moisture value ( $\pm 3\%$ ) and compaction levels (percent densities) ranging from about 96.8% to 98.0% of the maximum dry density value determined by the standard Proctor test (ASTM D698), these clay soils indicate a CBR value ranging from about 1 or 2 to about 6 or 7.

It should be noted that these CBR values represent “soaked” subgrade conditions and are not always indicative of actual field conditions. Typically, natural (not reworked and/or recompacted) clay soils having moisture contents 6 to 7 (or higher) percentage points above their respective optimum moisture values tend to yield (pump) during proofrolling operations. Therefore, it cannot be overemphasized that the proofrolling is imperative to assure that a firm subgrade is present beneath the new pavement sections. The proofrolling operations should be performed prior to lime treatment operations to ensure that a firm subgrade is present prior to the treatment operations. Based on the results of the CBR tests and the above recommendation regarding proofrolling of the subgrade soils prior to construction, it recommended that a CBR value of about 3 be used for the design of these pavement sections. It is our opinion that a CBR value of 3 is relatively conservative and should be representative of actual field conditions. The recommended CBR value indicated below for pavement design is based on the assumption that a firm subgrade (verified by proofrolling), having adequate moisture content and density, be provided and maintained during construction.

It should be noted that FAA pavement design criteria indicates that a CBR value of 20 be used for subbase materials (FAA Item P-154). Materials meeting this specification consist of hard, durable particles or fragments of granular aggregates. Based on our experience, lime treated subgrade soils (subbase) meeting FAA Item P-155 typically exhibit CBR values ranging from about 10 to 20 at about 95% standard Proctor density compaction. Based on our experience, it is recommended that a CBR value of about 12 (for lime treated subgrade soils) be used for the design of these pavement sections. Since surface and subsurface drainage improvements are planned and subgrade stabilization will be performed for this project, it is our opinion that a CBR value of 12 is relatively conservative and should be representative of actual field conditions.

Pavement design requires the use of soil properties or the results of specific tests to determine appropriate design parameters. Based on the results of the field and laboratory investigation, on soil plasticity properties and the above recommendations concerning providing firm subgrade soils, the following parameters were used:

Subgrade Soil:	Silty Sandy Clays and Clays, Both Fill and Natural
Classification by USCS:	CL and CH
California Bearing Ratio (CBR):	
Subgrade:	3 (E = 4,500 psi)
Subbase (Lime Treated Subgrade):	12 (E = 18,000 psi)

## 6.2 Aircraft Pavement Sections

### 6.2.1 Aircraft Loading Conditions

As requested by the client, pavement sections were analyzed and developed for the mixture of design aircraft loading conditions listed below, including the various aircraft, gear type, maximum gross takeoff (taxi) weight, estimated annual operations, and corresponding estimated annual departures of the individual aircraft. At the request of the client, pavement analyses and design studies were performed for a 20-year design life, utilizing these aircraft traffic loading conditions with a 0.5% annual traffic growth rate.

<u>Aircraft Type</u>	<u>Gear (Wheel) Type</u>	<u>Maximum Gross Takeoff Weight (lbs.)</u>	<u>Annual Operations of Individual Aircraft</u>	<u>Annual Departures of Individual Aircraft</u>
Cessna Citation CJ2	Single	12,500	100	50
Cessna Citation CJ3	Single	13,870	70	35
Cessna CitationJet/CJ1	Single	11,850	200	100
Cessna Citation II/Bravo	Single	15,100	100	50
Cessna Citation V/ Ultra/Encore	Single	16,300	150	75
Cessna Excel/XLS	Single	20,200	120	60
Cessna Citation Sovereign	Dual	30,775	8	4
Cessna Citation X	Dual	21,600	30	15
Bombardier (Canadair) Challenger 300	Dual	38,850	60	30
Bombardier Challenger 600/601/604	Dual	48,200	12	6
Embraer Phenom 100	Single	10,582	20	10
Embraer Phenom 300	Single	17,968	30	15
Eclipse 500	Single	5,950	60	30
Gulfstream G280	Dual	39,600	10	5
Gulfstream IV/G400	Dual	73,200	100	50
BAe HS 125/700-800/ Hawker 800	Dual	28,000	20	10
Bombardier Learjet 60	Dual	23,500	10	5
Learjet 75	Dual	21,500	10	5
Ratheon Premier 1/ 390 Premier 1	Single	12,500	16	8

### 6.2.2 FAA Pavement Analyses and Design Studies

Pavement analyses and design studies have been performed in accordance with FAA methods using the FAA Airport Pavement Design Computer Program, FAARFIELD, v 1.42.003 (9/18/17), and the Advisory Circular AC 150/5320-6F, Airport Pavement Design and Evaluation, dated 11/10/2016. As requested by the client, pavement sections were analyzed and developed for the design aircraft loading conditions as outlined above in Section 6.2.1, Aircraft Loading Conditions. Print-outs of these pavement design studies are included in Appendix A.

**Due to the presence of highly plastic (CH) clay soils anticipated in the upper soil profile, rigid pavement sections are preferred over flexible pavement sections. Portland concrete pavement sections are capable of resisting differential ground movements caused by seasonal shrink/swell of the highly active clay soils. Differential ground movements are much more evident beneath asphalt pavement sections due to the low flexural strength of the asphaltic concrete.**

If hot mix asphaltic concrete (HMAC) pavement sections must be used due to economic considerations, it is recommended that full depth asphalt pavement sections be utilized for this project in lieu of using flexible base (crushed stone) due to the presence of highly active clays. Full depth asphalt pavement sections placed over lime stabilized subgrade soils is more likely to resist cracking at the ground surface caused by differential ground movements. It is believed that flexible base pavement sections using a crushed stone base course will require more frequent maintenance.

In addition, due to the presence of highly plastic (CH) clay soils and the potential for trapping surface water within granular (aggregate) base layers, subgrade drainage systems should be considered adjacent to all pavement sections containing granular (aggregate) base materials. Surface water has the potential of infiltrating granular (aggregate) base materials through joints in the pavement, as well as along the pavement edges. When saturated, granular (aggregate) base materials experience a significant reduction in their load bearing characteristics, resulting in premature deterioration of the pavement sections. Likewise, perched (trapped) water within the granular (aggregate) base materials cause swelling, as well as strength loss, of clay subgrade soils, ultimately resulting in premature deterioration of the pavement sections. In addition, in accordance with paragraph 3.13.1 of Advisory Circular AC 150/5320-6F, Airport Pavement Design and Evaluation, dated 11/10/2016, "non-drained pervious granular layers must not be located between two impervious layers, which is referred to as sandwich construction. This is to prevent trapping water in the granular layer, which could result in a loss of pavement strength and performance." Therefore, due to the potential for trapping surface water within granular (crushed stone) base layers, it is recommended that a pavement section containing a stabilized base course (hot mix asphaltic concrete) be utilized for this project in lieu of a granular (aggregate (crushed stone)) base course.

If granular base materials (crushed aggregate base course) must be used due to economic considerations, subgrade drainage improvements should be considered to aid in the long term performance of the pavement sections. The purpose of the subsurface drainage system is to intercept any surface water and/or groundwater seepage trapped (perched) within the adjacent granular (aggregate) base layers. Recommendations regarding subgrade drainage improvements are presented in the following section of this report, Section 6.9, Pavement Subgrade Drainage.

#### **6.2.2.1 Rigid (Portland Cement Concrete) Pavement Design**

Utilizing the procedures outlined in Advisory Circular AC 150/5320-6F, Airport Pavement Design and Evaluation, dated 11/10/2016, and the FAA Airport Pavement Design Computer Program, FAARFIELD v 1.42.003 (9/18/17), the following rigid (Portland cement concrete) pavement sections were determined. Using FAARFIELD, the lime treated subbase/subgrade (FAA Item P-155) is referred to as an "User Defined" layer having a CBR of 12 and an associated Modulus (E) value of 18,000 psi. It should be noted that the minimum thickness of stabilized base course (FAA Item P-401 / P-403) allowed by the

FAARFIELD computer program is 5 inches. In order to allow placement of the stabilized base course (HMAC – FAA Item P-403) in one (1) 4-inch thick lift, the stabilized base course was referred to as a “Variable St (flex)” having a Modulus (E) value of 400,000 psi. Print-outs of these pavement design studies are included in Appendix A.

Pavement Course	Pavement Component	Thickness (inch)	
Surface Course	Portland Cement Concrete, FAA Item P-501, Minimum 650 psi Flexural Strength at 28 days. All coarse aggregate <b>shall</b> consist of <b>crushed</b> stone.	9.0	9.0
Stabilized Base Course	Hot Mix Asphaltic Concrete, FAA Item P-401 or Item P-403 (3/4" or 1" maximum nominal size aggregate, 75-gyratation (Superpave) gyratory compaction)	4.0	---
Aggregate Base Course	Crushed Aggregate Base Course, FAA Item P-209, compacted in maximum 8-inch lifts to a minimum of 95% of the <u>modified</u> Proctor maximum dry density (ASTM D1557), at a moisture content within three percentage points ( $\pm 3\%$ ) of optimum moisture.	---	9.0 <sup>(1)</sup>
Subgrade (Subbase Course)	Lime Stabilized Subgrade, FAA Item P-155, minimum 8% hydrated lime by dry weight (minimum 54 pounds per square yard), compacted to a minimum of 95% <u>standard</u> Proctor maximum dry density (ASTM D698), at a moisture content within three percentage points ( $\pm 3\%$ ) of optimum moisture.	8.0	8.0

**NOTE:** In accordance with Advisory Circular AC 150/5320-6F, Airport Pavement Design and Evaluation, dated 11/10/2016, the pavement component thicknesses indicated above are rounded to the nearest 0.5 inch.

<sup>(1)</sup> **If the design section includes granular base materials (crushed aggregate base course), subgrade drainage improvements should be considered to aid in the long term performance of the pavement sections.**

Careful attention should be given to subgrade preparation, subgrade treatment, and drainage since pavement performance is highly dependent on proper subgrade support and drainage. Guideline specifications for pavement subgrade preparation, pavement subgrade treatment, flexible base course, and hot mix asphaltic concrete (HMAC) pavement are provided in the following sections of this report. Concrete flexural strength (Modulus of Rupture) should be at least 650 psi at 28 days. It is recommended that concrete pavement be jointed, reinforced, if applicable, and load transfer dowels provided in accordance with FAA Standards.

#### **6.2.2.2 Flexible (Hot Mix Asphaltic Concrete) Pavement Design**

FAARFIELD, by default, computes the structural thickness required for the base course, using a subbase layer which is assumed to provide the equivalent bearing capacity of a CBR 20 subgrade. Since the design subbase course (FAA Item P-155) is assumed to have a CBR value of 12, the final pavement design consists of an iterative process whereby the



thickness of the respective base courses (Stabilized Base Course (FAA Item P-401/P-403) or Aggregate Base Course (FAA Item P-209) are varied in order to compute a subbase thickness (FAA Item P-155) of less than eight (8) inches. Using FAARFIELD, the lime treated subbase/subgrade (FAA Item P-155) is referred to as an “User Defined” layer having a CBR of 12 and an associated Modulus (E) value of 18,000 psi.

Utilizing the procedures outlined in Advisory Circular AC 150/5320-6F, Airport Pavement Design and Evaluation, dated 11/10/2016, and the FAA Airport Pavement Design Computer Program, FAARFIELD v 1.42.003 (9/18/17), the following flexible (Hot Mix Asphaltic Concrete) pavement sections were determined. Print-outs of these pavement design studies are included in Appendix A.

Pavement Course	Pavement Component	Thickness (inch)	
Surface Course	Hot Mix Asphaltic Concrete, FAA Item P-401 (1/2" or 3/4" maximum nominal size aggregate, 75-gyration (Superpave) gyratory compaction)	4.0	4.0
Stabilized Base Course	Hot Mix Asphaltic Concrete, FAA Item P-401 or Item P-403 (3/4" or 1" maximum nominal size aggregate, 75-gyration (Superpave) gyratory compaction)	6.0	---
Aggregate Base Course	Crushed Aggregate Base Course, FAA Item P-209, compacted in maximum 8-inch lifts to a minimum of 95% of the <u>modified</u> Proctor maximum dry density (ASTM D1557), at a moisture content within three percentage points ( $\pm 3\%$ ) of optimum moisture.	---	11.5 <sup>(1)</sup>
Subgrade (Subbase Course)	Lime Stabilized Subgrade, FAA Item P-155, minimum 8% hydrated lime by dry weight (minimum 54 pounds per square yard), compacted to a minimum of 95% <u>standard</u> Proctor maximum dry density (ASTM D698), at a moisture content within three percentage points ( $\pm 3\%$ ) of optimum moisture.	8.0	8.0

**NOTE:** In accordance with Advisory Circular AC 150/5320-6F, Airport Pavement Design and Evaluation, dated 11/10/2016, the pavement component thicknesses indicated above are rounded to the nearest 0.5 inch.

**(1) If the design section includes granular base materials (crushed aggregate base course), subgrade drainage improvements should be considered to aid in the long term performance of the pavement sections.**

Careful attention should be given to subgrade preparation, subgrade treatment, and drainage since pavement performance is highly dependent on proper subgrade support and drainage. Guideline specifications for pavement subgrade preparation, pavement subgrade treatment, flexible base course, and hot mix asphaltic concrete (HMAC) pavement are provided in the following sections of this report.

### 6.3 Perimeter Maintenance Road Pavement Sections

#### 6.3.1 Traffic and Loading Conditions

Traffic data required for our pavement analyses and design studies were provided by the client. Listed below is a summary of traffic data provided by the client, including the design vehicle and anticipated traffic frequency for this project.

Design Vehicle No. 1:	3,000 Gallon Fuel Truck
Gross Vehicle Weight:	36,200 lbs. (max. 2%± correction) (36,500 lbs. used in design studies)
Axle Configuration:	Single Axles, Dual Rear Wheels (Gross Weight of Vehicle Split Equally on Each Axle – 2 Axles)
Estimated Traffic:	4 applications per day
Design Vehicle No. 2:	ARFF Vehicle
Gross Vehicle Weight:	58,000 lbs.
Axle Configuration:	Single Axles, Single (Wide) Wheels (Gross Weight of Vehicle Split Equally on Each Axle – 2 Axles)
Estimated Traffic:	1 application per day

It is understood that on-site maintenance personnel will likely utilize this new roadway periodically. Therefore, we have also assumed some daily standard pick-up truck traffic loading (assumed approximately 10 applications per day) during our analyses and design studies. It should be noted that these infrequent light traffic load applications have very little to no effect on the required pavement section in accordance with the design criteria. The thickness design is controlled by the infrequent loading of the relatively heavy Fuel Truck and ARFF vehicle.

#### 6.3.2 Pavement Design – AASHTO Guide for Design of Pavement Structures (1993)

It is understood that flexible (hot mix asphaltic concrete) pavement sections are planned for the proposed new roadway. The preliminary pavement section for the new roadway consists of approximately four (4) inches of asphaltic concrete pavement (TxDOT Item 340, Type "D"), constructed over approximately six (6) inches of crushed stone base (TxDOT Item 247) and eight (8) inches of lime treated subgrade (FAA Item P-155).

Due to the presence of moderately to highly plastic (CL and CH) silty sandy clay and clay subgrade soils anticipated in the upper soil profile at this site, a full depth asphaltic concrete (HMAC) pavement section is preferred for this project in lieu of using a flexible base (crushed stone). A full depth asphalt pavement section placed over a treated subgrade is more likely to resist cracking at the ground surface caused by differential ground movements. It is believed that a flexible base pavement section using a crushed stone base course will require more frequent maintenance. In addition, surface water has the potential of infiltrating granular (crushed stone) base materials through joints in the pavement, as well as along the pavement edges. When saturated, these granular (crushed stone) base materials experience a significant reduction in their load bearing characteristics,

resulting in premature deterioration of the pavement sections. Likewise, perched (trapped) water within the granular (crushed stone) base materials cause softening and strength loss of subgrade soils, ultimately resulting in premature deterioration of the pavement sections. Therefore, it is believed that flexible base pavement sections using a crushed stone base course will require more frequent maintenance.

If granular base materials (crushed stone base course) must be used due to economic considerations, subgrade drainage improvements should be considered to aid in the long term performance of the pavement sections. The purpose of the subsurface drainage system is to intercept any surface water and/or groundwater seepage trapped (perched) within the adjacent granular (crushed stone) base layers. Recommendations regarding subgrade drainage improvements are presented in the following section of this report, Section 6.9, Pavement Subgrade Drainage.

Likewise, Type "C" HMAC surface course (TxDOT Item 340) should be considered for this project. The larger aggregate tends to provide a longer service life for infrequent heavy truck traffic. The drawback to the use of the larger aggregate HMAC is the serviceability ("ride-ability") for smaller vehicles.

Pavement analyses and design studies were performed in accordance with AASHTO Guide for Design of Pavement Structures (1993), using the computer program 'Pavement Analysis Software (WinPAS)', published by the American Concrete Pavement Association, based on traffic and loading conditions provided by the client. Print-outs of these pavement design studies are included in Appendix B.

Utilizing the traffic data listed above, the following parameters were used during our pavement analyses and design studies:

Pavement Design Parameters

Design Life:	20 years
Estimated Annual Traffic Growth:	0%
Reliability:	85%
Overall Deviation:	0.45
Initial Serviceability Index:	4.2
Terminal Serviceability Index:	2.5
Drainage Coefficient:	1.0
Traffic (Flexible Pavement):	160,662 18-kip ESAL

The following layer coefficients were used in all pavement analyses and design.

<u>Pavement Component</u>	<u>Layer Coefficient</u>
HMAC Surface Course: (TxDOT Item 340, Type "C" or "D")	0.40
HMAC Base Course: (TxDOT Item 340, Type "B")	0.34
Crushed Stone Base Course: (TxDOT Item 247, Type A, Grade 1-2)	0.14
Lime Treated Subgrade: (TxDOT Item 260 / FAA Item P-155)	0.09

Based on the traffic data and design parameters listed above, the following pavement sections were determined in accordance AASHTO Guide for Design of Pavement Structures (1993), using the computer program 'Pavement Analysis Software (WinPAS)', published by the American Concrete Pavement Association. Print-outs of these pavement design studies are included in Appendix B. Adequate subgrade preparation, subgrade stabilization and drainage is essential to pavement performance in accordance with design criteria.

As indicated above, due to the presence of moderately to highly plastic (CL and CH) silty sandy clay and clay soils anticipated in the upper soil profile, a full depth asphaltic concrete (HMAC) pavement section is preferred for this project in lieu of using flexible base (crushed stone). If granular base materials (crushed stone base course) must be used due to economic considerations, subgrade drainage improvements should be considered to aid in the long term performance of the pavement sections. The purpose of the subsurface drainage system is to intercept any surface water and/or groundwater seepage trapped (perched) within the adjacent granular (crushed stone) base layers. Recommendations regarding subgrade drainage improvements are presented in the following section of this report, Section 6.9, Pavement Subgrade Drainage.

Listed below are the recommended pavement sections for new pavement construction. These pavement sections should be adequate to support the present traffic and loading conditions.

Pavement Course	Pavement Component	Thickness (inch)	
Surface Course	Hot Mix Asphaltic Concrete, TxDOT Item 340 (2014 Edition), Type "C" or "D", Air Void Control.	3.0	4.0
Stabilized Base Course	Hot Mix Asphaltic Concrete, TxDOT Item 340 (2014 Edition), Type "B", Air Void Control.	4.0	---
Aggregate Base Course	Crushed Stone Base, TxDOT Item 247 (2014 Edition), Type A, Grade 1-2, compacted to a minimum of 95% <u>modified</u> Proctor maximum dry density (ASTM D1557), at a moisture content within three percentage points ( $\pm 3\%$ ) of optimum moisture.	---	6.0 <sup>(1)</sup>
Subgrade (Subbase Course)	Lime Stabilized Subgrade, FAA Item P-155, minimum 8% hydrated lime by dry weight (minimum 54 pounds per square yard), compacted to a minimum of 95% <u>standard</u> Proctor maximum dry density (ASTM D698), at a moisture content within three percentage points ( $\pm 3\%$ ) of optimum moisture.	8.0	8.0

**NOTE:**

- <sup>(1)</sup> If the design section includes granular base materials (crushed aggregate base course), subgrade drainage improvements should be considered to aid in the long term performance of the pavement sections.

Careful attention should be given to subgrade preparation and drainage since pavement performance is highly dependent on proper subgrade support and drainage. Guideline specifications for pavement subgrade preparation, pavement subgrade treatment, flexible base course, and hot mix asphaltic concrete (HMAC) pavement are provided in the following sections of this report.

#### **6.4 Differential Upward Pavement Movements**

It is important to consider the potential for differential upward pavement movement due to post-construction soil swelling in areas where new pavement construction is performed adjacent to existing pavement sections. Optimum moisture levels are usually present beneath existing pavement sections since the existing pavement section serves as a moisture barrier in preventing moisture losses in the underlying clays. However, where new construction is performed over unpaved and unprotected highly plastic clay soils exposed to moisture losses through evaporation, the clay soils in these unprotected areas usually have a higher swell potential (higher PVR) unless construction occurs during and/or after the rainy season when the surficial clays are moist. However, if construction occurs during or after prolonged periods of hot and dry weather conditions, the surficial clays will dry rapidly, resulting in a higher swell potential.

As indicated above, at the time of our investigation (borings drilled April 29, 2019), the clay soils in the upper soil profiles were relatively moist as a result of recent rainfall. Therefore, the potential for differential pavement movement is not considered to be large at the present time due to the relatively moist condition of the underlying clay soils. At the present time, differential PVR is estimated to be on the order of about one (1) to two (2) inches. If construction occurs during or after prolonged periods of hot and dry weather and the surficial clays are allowed to become dry and desiccated, differential upward pavement movements on the order of two (2) to five (5) inches could occur between the existing pavement section and the proposed new construction, due to post-construction swelling of the active CH clay soils beneath new (presently unprotected) construction.

On previous paving projects where new pavement sections are constructed over expansive clay soils, the standard of care used was to reduce the differential PVR to less than about one (1) inch by means of excavation/mechanical reworking or water injection stabilization. Differential movements of greater magnitude can generally be tolerated if concrete pavement sections are provided and the pavement section is thickened (adjacent to existing pavements) and/or provided with reinforcement to resist differential post-construction upward ground movements due to soil swelling.

Due to the relatively small paving area abutting existing pavements, water pressure injection to pre-swell the clay soils at this site would likely be cost prohibitive. Therefore, it appears that excavation/mechanical reworking of the on-site clays would be required to reduce the potential for post-construction upward pavement movements.

Due to the presence of highly plastic (CH) clay soils anticipated in the upper soil profile at this site, excavation/mechanical reworking of the on-site clays (in areas adjacent to existing paving) in moisture and density controlled lifts may be required to minimize potential upward pavement movements. If construction occurs in late winter or spring (after the rainy season), it is possible that excavation/mechanical reworking of the clay subgrade soils may not be required. However, if construction occurs in late summer or fall (after prolonged periods of hot and dry weather conditions), the near surface clay soils will become

desiccated due to the hot and dry weather conditions, and excavation/mechanical reworking of the clay subgrade soils should be considered to minimize the potential for differential upward pavement movements due to post-construction soil swelling. Excavation/mechanical reworking of the on-site clays (in areas presently unpaved) in moisture controlled lifts should be considered to minimum depths of about 36 inches (3 feet) below the bottom of the lime treated subgrade as outlined in the following section in order to minimize potential upward pavement movements. The potential for differential upward pavement movements due to post-construction soil swelling is of particular concern adjacent to and/or within about 100 feet of existing pavement sections. The depth (below the bottom of the lime treated subgrade soils) of excavation/mechanical reworking of the clay subgrade soils may be tapered from a minimum depth of 36 inches below the bottom of the lime treated subgrade soils within 50 feet of existing pavement sections to about 18 inches below the bottom of the lime treated subgrade soils from about 50 to 100 feet of existing pavement sections. A contingency for this additional subgrade preparation and stabilization, if required, should be included as a possible line item in the construction documents. During construction, the subgrade soils shall be inspected by an experienced Alliance Geotechnical Group, Inc. geotechnical engineer to evaluate the moisture condition of the clay subgrade soils and/or field delineate areas requiring excavation/mechanical reworking at the time of construction.

#### **6.5 Pavement Subgrade Preparation**

Final grading plans were not completed at the time of this report. However, based on visual observations of the existing topography and discussions with the Engineer, it is assumed that minimal site grading (cuts and fills of less than about 1 to 2 feet) will be required to achieve finished grades along the majority of the respective alignments. Isolated areas may require additional site grading to facilitate surface water drainage improvements and new construction. Therefore, exposed subgrade soils are anticipated to consist of moderately to highly plastic (CL ad CH) silty sandy clay and clay soils, both fill and natural. It is recommended that the subgrade soils in all pavement areas be treated with stabilization additives to provide a stable working platform for new pavement construction and increase the long term performance of the new pavement sections.

**Due to the presence of highly plastic (CH) clay soils in the upper soils at this site, excavation/mechanical reworking of the on-site clays in moisture and density controlled lifts in areas adjacent to existing paving should be considered to minimize potential upward pavement movements, as discussed above in Section 6.4, Differential Upward Pavement Movements.** Excavation/mechanical reworking of the on-site clays in moisture controlled lifts, if required, should be performed as outlined below.

Prior to lime treatment operations, it is recommended that analytical testing be performed on representative samples of the (untreated) subgrade soils after the pavement areas have been brought to final subgrade elevation to determine their concentrations of sulfates for evaluation of the potential for sulfate induced heave. Subgrade soils suitable for lime stabilization operations shall have sulfate concentrations of 1,000 parts per million (ppm) or less as determined by TxDOT Test Method Tex-145-E, Part II (Colorimetric Method).

Surface drainage is critical to the performance of these pavements. Water should be allowed to exit the pavement surface quickly. The maximum slope of the finished grades allowed by FAA should be used for this project. It cannot be overemphasized that it is imperative that a firm subgrade condition be provided (verified by proofrolling) and

maintained during construction. Recommended earthwork construction and pavement subgrade preparation procedures are as follows:

1. Remove and waste any surface vegetation, organic topsoil, loose organics, debris, and any undesirable materials from the construction area. Usable topsoil should be stockpiled for later use in landscaping. Topsoil is defined as the surface soil layer containing organic matter and minor plant roots, free of debris or other deleterious materials.

As part of the site preparation, good surface drainage should be initiated at the beginning of construction and maintained thereafter to prevent ponding of water in the pavement and fill areas. Surface water should be pumped immediately from the construction area after each rain and a firm subgrade maintained.

2. As indicated above, due to the presence of highly plastic (CH) clay soils in the upper soils profile at this site, excavation/mechanical reworking of the on-site clays in moisture and density controlled lifts in areas adjacent to existing paving may be required to minimize potential upward pavement movements, as discussed above in Section 6.4, Differential Upward Pavement Movements.

It is recommended that shallow test pit excavations be performed by the contractor (at the time of construction) within the areas presently unpaved. In cut areas, the soil shall be cut to grade prior to excavation of the shallow test pits. In place (nuclear) density tests (ASTM D6938) should then be performed on the subgrade soils at each 6-inch depth increment (and six (6) inch (probe depth) tests) to depths of at least 30 inches below the bottom of the lime treated subgrade at each test pit excavation (i.e., six (6) inch (probe depth) tests at a depth corresponding to the bottom of the lime treated subgrade; at a depth of about six (6) inches below the bottom of the lime treated subgrade; at a depth of about twelve (12) inches below the bottom of the lime treated subgrade; etc. to a depth of about thirty (30) inches below the bottom of the lime treated subgrade). If the moisture content of the clay subgrade soils at the time of construction meets project specifications, based on the plasticity index (PI) of the respective subgrade soils, excavation/mechanical reworking of the subgrade soils will not be required. During construction, the subgrade soils shall be inspected by an experienced Alliance Geotechnical Group, Inc. geotechnical engineer to field delineate areas requiring excavation/mechanical reworking at the time of construction.

If excavation/mechanical reworking of the on-site clays within presently unpaved areas in moisture and density controlled lifts is required to minimize potential upward pavement movements, the upper 38 inches of subgrade (to a depth of about 30 inches below the bottom of the 8-inch thick lime treated subgrade) shall be excavated and stockpiled on-site. Where possible, excavation shall extend a minimum of five (5) feet beyond the limits of the pavement section. The underlying clay subgrade soils at the base of the excavation shall then be scarified to a minimum depth of six (6) inches, the moisture content adjusted and the subgrade recompacted in accordance with Item 4, below. Subsequent fill placement should be performed in maximum six (6) inch lifts in accordance with the moisture content and density requirements indicated below, Item 4. The first lift of fill shall be placed within 48 hours of satisfactory compaction of the underlying subgrade soils. Likewise, subsequent lifts of fill shall be placed and compacted within 48 hours of satisfactory compaction of the previous lift of fill.

The potential for differential upward pavement movements due to post-construction soil swelling is of particular concern adjacent to and/or within about 100 feet of existing pavement sections. The depth (below the bottom of the lime treated subgrade soils) of excavation/mechanical reworking of the clay subgrade soils may be tapered from a minimum depth of 36 inches below the bottom of the lime treated subgrade soils within 50 feet of existing pavement sections to about 18 inches below the bottom of the lime treated subgrade soils from about 50 to 100 feet of existing pavement sections.

**Note:** A pulverizing rotary mixer (commonly used during subgrade stabilization operations) shall be used to achieve a relatively uniform moisture content within each lift of clay fill, as specified above, prior to compaction of each lift.

3. All pavement and fill areas shall be proofrolled prior to fill placement and/or new pavement construction to detect any areas of weakness. In cut areas, the soil shall be cut to rough grade prior to proofrolling. Proofrolling shall be performed in accordance with Item P-152 of the latest change to the Federal Aviation Administration (FAA) Standards for Specifying Construction of Airports, AC 150/5370-10H, dated December 21, 2018, Paragraph 152-2.9, Proofrolling.

As a minimum, the proofrolling should be accomplished using a heavy (20 ton or greater total weight) pneumatic tired roller making several passes over the areas. The proofrolling operations should be observed by an experienced Alliance Geotechnical Group, Inc. engineer or geotechnician to verify that firm non-yielding subgrade soils are present. Any soft or compressible areas detected during proofrolling shall be undercut until firm soil is exposed. Low areas resulting from undercutting shall be filled in compacted lifts in accordance with Item 4, below. It cannot be overemphasized that the proofrolling is imperative to assure that a firm subgrade is present beneath the new pavement section. It is also imperative that a firm subgrade be provided and maintained during construction.

4. In fill areas, scarify the exposed subgrade (after proofrolling) to a minimum depth of eight (8) inches, adjust the moisture content and recompact to within the limits indicated below. Sandy soils having a plasticity index (PI) of 15 or less shall be compacted to a minimum of 95% of the maximum density defined by ASTM D698 (standard Proctor), at a moisture content within three percentage points ( $\pm 3\%$ ) of the optimum moisture value. Sandy clay soils having a plasticity index (PI) between 16 and 25 shall be compacted to a minimum of 95% of the maximum density defined by ASTM D698 (standard Proctor), at a moisture content ranging from one percentage point below to five percentage points above the optimum moisture value (-1% to +5%). Clay soils having a plasticity index (PI) of 26 or more shall be compacted to between 95% and 100% of the maximum density defined by ASTM D698 (standard Proctor), at a moisture content ranging from one to six percentage points above the optimum moisture value (+1% to +6%). The recommended moisture content at the time of compaction and the density limits are listed below based on the plasticity index (PI) of the respective subgrade and/or fill soils. Overcompaction shall not be allowed.



<u>Plasticity Index (PI)</u>	<u>Moisture Content Range at Time of Compaction (%)</u>	<u>Percent Maximum Dry Density (%) *</u>
≤ 15	±3%	95% +
16 to 25	-1% to +5%	95% +
≥ 26	+1% to +6%	95% to 100%

\* Percent of the maximum density defined by ASTM D-698 (standard Proctor).

- Where fill is required to achieve the desired grades, such material may consist of on-site clay soils, or their approved off site equal. All off-site clay fill soils shall be free of organic matter, or rock fragments larger than two (2) inches in any dimension, and possessing a plastic index (PI) between 10 and 45, with a liquid limit of 70 or less. Use of rock fragments and/or soil clods greater than two (2) inches in any dimension should be prohibited, since attaining uniform moisture and density without voids would be difficult. All fill shall be placed in properly benched horizontal lifts not exceeding eight (8) inches in thickness and compacted in accordance with the moisture content and density requirements indicated above in Item 4. The first lift of fill shall be placed within 48 hours of satisfactory compaction of the underlying subgrade soils. Likewise, subsequent lifts of fill shall be placed and compacted within 48 hours of satisfactory compaction of the previous lift of fill.

Analytical testing shall be performed on all off-site fill soils required for grading operations prior to placement operations to determine their concentrations of sulfates for evaluation of the potential for sulfate induced heave. Acceptable off-site fill soils shall have sulfate concentrations of 1,000 parts per million (ppm) or less as determined by TxDOT Test Method Tex-145-E, Part II (Colorimetric Method).

All fill shall be placed in properly benched horizontal lifts not exceeding eight (8) inches in thickness and compacted in accordance with the moisture content and density requirements indicated above in Item 4. If shallow fills are required along sideslopes, the sideslopes shall be properly benched prior to fill placement to allow placement of fill soils in horizontal compacted lifts. Horizontal benches must be sufficiently wide to accommodate both the construction equipment and to allow for the related placement and compaction operations. Placement of fill soils in sloped lifts shall not be allowed, regardless of fill depths. Where cuts are required along existing sideslopes, the slopes should be compacted after excavation to final grade to tighten the surficial soils loosened during excavation operations.

- The upper eight (8) inches of the subgrade in all pavement areas should be lime treated in accordance with the applicable provisions of Item P-155 of the latest change to the Federal Aviation Administration (FAA) Standards for Specifying Construction of Airports, AC 150/5370-10H, dated December 21, 2018. A minimum of eight percent (8%) hydrated lime (minimum 54 pounds per square yard for an eight (8) inch treatment depth) should be used in all pavement areas as outlined below in Section 6.6, Lime Treatment of Pavement Subgrade Soils.

Prior to lime treatment operations, analytical testing should be performed on the subgrade soils after the pavement areas have been brought to final subgrade elevation

to determine their concentrations of sulfates for evaluation of the potential for sulfate induced heave. As a minimum, analytical testing should be performed on the subgrade soils at a rate of at least one test per 1,000 square yards of surface area or a minimum of three (3) tests per construction area, whichever is greater. Subgrade soils suitable for lime stabilization operations shall have sulfate concentrations of 1,000 parts per million (ppm) or less as determined by TxDOT Test Method Tex-145-E, Part II (Colorimetric Method).

7. Verify compaction of pavement fill and/or treated subgrade soils by in-place (nuclear) density tests (ASTM D6938) at the rate of at least one test per 1,000 square yards of surface area or a minimum of three (3) tests per construction area, whichever is greater, for each lift of material placed.

At each in-place density test location performed on the treated subgrade soils, a representative sample of the treated subgrade soils shall be obtained and laboratory oven dried moisture content tests (ASTM D2216) performed to determine the moisture content of the subgrade soils. The dry density values used for evaluating compaction levels (percent density) shall be calculated based on the wet density values determined in the field in accordance with ASTM D6938 (nuclear method) and the oven dried moisture contents determined in the laboratory in accordance with ASTM D2216.

Areas adjacent to existing pavement should be compacted per specification requirements so that a strip of poorly compacted soils is not left due to access limitations of the heavy equipment. Hand compaction equipment may be required to achieve adequate compaction levels along edges of new construction abutting existing pavement sections. This includes compaction of the treated and untreated subgrade soils.

8. Each construction area should be shaped to provide drainage of surface water. Surface water should not be allowed to pond. Surface water should be pumped immediately from each construction area after each rain and a firm subgrade maintained.
9. The moisture content and density within the completed subgrade shall be maintained during construction, until application of the prime coat has been completed, if applicable.

#### **6.6 Lime Treatment of Pavement Subgrade Soils**

Lime treatment of the pavement subgrade soils should be accomplished with the applicable provisions of Item P-155 of the latest change to the Federal Aviation Administration (FAA) Standards for Specifying Construction of Airports, AC 150/5370-10H, dated December 21, 2018. The compaction requirements indicated below should be specified in lieu of the requirements recommended by the FAA.

Prior to lime treatment operations, analytical testing should be performed on the subgrade soils after the pavement areas have been brought to final subgrade elevation to determine their concentrations of sulfates for evaluation of the potential for sulfate induced heave. As a minimum, analytical testing should be performed on the subgrade soils at a rate of at least one test per 1,000 square yards of surface area or a minimum of three (3) tests per construction area, whichever is greater. Subgrade soils suitable for lime stabilization operations shall have sulfate concentrations of 1,000 parts per million (ppm) or less as determined by TxDOT Test Method Tex-145-E, Part II (Colorimetric Method).

Where possible, it would be beneficial to treat the subgrade soils at least five (5) feet beyond the proposed paving limits. These extended limits should aid in reducing pavement movements and cracking along the pavement edges due to seasonal moisture variations after construction.

Lime should be added to the subgrade after removal of all surface vegetation and debris. A minimum of eight percent (8%) hydrated lime should be used in all pavement areas. The required application rate for an eight percent (8%) treatment depth of eight (8) inches is outlined below.

<u>Application (percent)</u>	<u>Depth of Treatment (inches)</u>	<u>Lime Required (pounds/square yard)*</u>
8	8	54

\* The recommended lime quantities have been adjusted to compensate for construction tolerances (non-uniformity) associated with lime spreading and rotary mixing.

Rotary mixing to depths in excess of those specified should be prohibited in order to prevent dilution of the required lime dosage. The mixing depths during construction should not be less than the specified depth of treatment and should be no more than one (1) inch deeper than the specified treatment depth.

Project specifications should allow a “mellowing” period between initial and final mixing of the lime stabilized soils. After initial mixing, the lime treated subgrade should be lightly rolled and maintained at or within 5 percentage points above the soil’s optimum moisture content until final mixing and compaction. We recommend a minimum 3-day “mellowing” period for these soils.

Approval of final mixing operations should be based on pulverization (field gradation) tests with at least 100 percent of the treated materials passing the 1-inch sieve, and at least 60 percent of the treated soil passing the No. 4 sieve, at a moisture content near optimum, in accordance with FAA standards and as outlined below.

<u>Sieve Size</u>	<u>Minimum Percent Passing Respective Sieve</u>
1"	100%
#4	60%

Pulverization (field gradation) tests shall be performed at the rate of at least one test per 1,000 square yards of surface area or a minimum of three (3) tests per construction area, whichever is greater.

The lime treated soil should be compacted to a minimum of 95 percent of the maximum dry density defined by the standard Proctor test (ASTM D698), at a moisture content within three

percentage points ( $\pm 3\%$ ) of the optimum moisture value determined by the standard Proctor test (ASTM D698).

Verify compaction of pavement subgrade by in-place (nuclear) density tests (ASTM D6938) performed at the rate of at least one test per 1,000 square yards of surface area or a minimum of three (3) tests per construction area, whichever is greater. At each in-place density test location, a representative sample of the treated subgrade soils shall be obtained and laboratory oven dried moisture content tests (ASTM D2216) performed to determine the moisture content of the subgrade soils. The dry density values used for evaluating compaction levels (percent density) shall be calculated based on the wet density values determined in the field in accordance with ASTM D6938 (nuclear method) and the oven dried moisture contents determined in the laboratory in accordance with ASTM D2216.

Untreated leveling sand should be specifically prohibited beneath pavement areas during final grading (after stabilization), since these more porous soils can allow water inflow, resulting in strength loss of subgrade soils. It should be specified that only lime treated soil will be allowed for fine grading. After fine grading each area in preparation for paving, the subgrade surface should be lightly moistened, as needed, and recompact to obtain a tight non-yielding subgrade.

After blue top stakes have been set in preparation for fine grading, the depth of the treated subgrade should be measured to verify that the specified depth of treatment has been achieved below final pavement subgrade elevation. Verify thickness of the lime treated subgrade soils at the rate of at least one test per 1,000 square yards of surface area or a minimum of three (3) tests per construction area, whichever is greater.

It cannot be overemphasized that the mixing depths be monitored during construction in order to prevent dilution of the required lime dosage. The rotary mixing depth during construction should not be less than the specified depth of treatment and should be no more than one (1) inch deeper than the specified treatment depth.

The moisture content and density within the completed subgrade shall be maintained during construction, until application of the prime coat has been completed, if applicable.

### **6.7 Crushed Aggregate Base Course**

1. Crushed aggregate base material placed in any aircraft pavement area shall comply with specifications for Item P-209 of the latest change to the Federal Aviation Administration (FAA) Standards for Specifying Construction of Airports, AC 150/5370-10H, dated December 21, 2018.

Crushed aggregate base material placed along the Perimeter Maintenance Road shall comply with specifications for TxDOT Item 247, Type A, Grade 1-2 as defined by the Texas Department of Transportation, Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges, 2014 Edition.

2. The material should be scarified, wetted, mixed, bladed, and rolled to secure a uniform mixture complying with specifications.

3. The uniform mixture should be compacted in maximum eight (8) inch lifts to at least 95 percent (95%) of the maximum density defined by ASTM D1557 (Modified Proctor), at a moisture content within three percentage points ( $\pm 3$ ) of the optimum moisture value.
4. Verify compaction of crushed aggregate base by in-place (nuclear) density tests (ASTM D6938) at the rate of at least one test per 1,000 square yards of surface area or a minimum of three (3) tests per construction area, whichever is greater, for each lift of material placed

Areas adjacent to existing pavement should be compacted per specification requirements so that a strip of poorly compacted crushed aggregate base is not left due to access limitations of the heavy equipment. Hand compaction equipment may be required to achieve adequate compaction levels along edges of new construction abutting existing pavement sections.

5. After fine grading, the depth of crushed aggregate base materials should be measured to verify that the specified depth (thickness) of base materials has been provided. Verify thickness of the flexible base materials at the rate of at least one test per 1,000 square yards of surface area (of the final lift, if multiple lifts required) or a minimum of three (3) tests per construction area, whichever is greater.
6. Each construction area should be shaped to provide drainage of surface water. Surface water should not be allowed to pond. Surface water should be pumped immediately from each construction area after each rain and a firm base maintained.
7. The moisture content and density within the completed base course shall be maintained during construction, until application of the prime coat has been completed, if applicable.

## **6.8 Hot Mix Asphaltic Concrete**

1. Hot mix asphaltic concrete (HMAC) Surface Course placed in aircraft pavement areas shall be designed in accordance with Item P-401 (1/2" or 3/4" maximum nominal size aggregate, 75-yratation (Superpave) gyratory compaction) of the latest change to the Federal Aviation Administration (FAA) Standards for Specifying Construction of Airports, AC 150/5370-10H, dated December 21, 2018

Hot mix asphaltic concrete (HMAC) Stabilized Base Course placed in aircraft pavement areas may be designed in accordance with Item P-401 or Item P-403 (3/4" or 1" maximum nominal size aggregate, 75-yratation (Superpave) gyratory compaction) of the latest change to the Federal Aviation Administration (FAA) Standards for Specifying Construction of Airports, AC 150/5370-10H, dated December 21, 2018.

Hot mix asphaltic concrete placed along the Perimeter Maintenance Road shall be designed in accordance with Item 340, Type "D" (fine surface course), Type "C" (coarse surface course), or Type "B" (fine base course), issued by the Texas Department of Transportation, Standard Specification for Construction and Maintenance of Highways, Streets and Bridges, 2014 Edition.

Current mix designs (within the last 12 months) should be furnished by the paving contractor (or supplier) prior to paving operations for each type of asphaltic concrete

placed at this site. The most recent job mix formula (JMF) should be furnished by the paving contractor (or supplier) prior to placement of any asphaltic concrete at the job site.

2. The placement temperature and lay-down thickness of hot mix asphaltic concrete should be monitored during placement operations.

Hot Mix Asphaltic Concrete (FAA Item P-401 or P-403) samples should be obtained and laboratory tests performed in accordance with the rates (frequencies) indicated by the FAA guidelines. Asphaltic concrete cores should be obtained for verification of thickness and in-place density in accordance with the rates (frequencies) indicated by the FAA guidelines.

Hot Mix Asphaltic Concrete (TxDOT Item 340) samples for paving along the Perimeter Maintenance Road should be obtained and laboratory tests performed (Extraction/Gradation, Maximum Theoretical (Rice) Specific Gravity, and Laboratory Density) at the rate of at least one sample for every 1,000 tons of production (or fraction thereafter) or for each day's operation, whichever is less. Asphaltic concrete cores should be obtained (minimum of 3 cores per set) for verification of thickness and in-place density (or air voids) at the rate of at least one set for every 1,000 tons of production (or fraction thereafter) or for each day's operation, whichever is less.

## **6.9 Pavement Subgrade Drainage**

Shallow groundwater levels are not desired for optimum pavement performance. Shallow groundwater levels cause strength loss of granular (aggregate) base and/or subgrade soils, resulting in premature deterioration of the pavement sections. At the time of our investigation (borings drilled April 8, 2017, after relatively prolonged periods of hot and dry (drought) summer and mild winter weather conditions), shallow groundwater seepage was not encountered during drilling operations.

Due to the presence of highly plastic (CH) clay soils at this site and the potential for trapping surface water within granular (aggregate) base layers, subgrade drainage systems should be provided adjacent to all pavement sections containing granular (aggregate) base materials, if applicable. The purpose of the subsurface drainage system is to intercept any surface water and/or groundwater seepage trapped (perched) within the adjacent granular (aggregate) base layers. Surface water has the potential of infiltrating granular (aggregate) base materials through joints in the pavement, as well as along the pavement edges. When saturated, the granular (aggregate) base materials experience a significant reduction in their load bearing characteristics, resulting in premature deterioration of the pavement sections. Likewise, perched (trapped) water within the granular (aggregate) base materials cause swelling, as well as strength loss, of clay subgrade soils, ultimately resulting in premature deterioration of the pavement sections. In addition, in accordance with paragraph 3.13.1 of Advisory Circular AC 150/5320-6F, Airport Pavement Design and Evaluation, dated 11/10/2016, "non-drained pervious granular layers must not be located between two impervious layers, which is referred to as sandwich construction. This is to prevent trapping water in the granular layer, which could result in a loss of pavement strength and performance." The purpose of the subsurface drainage system is to intercept any surface water and/or groundwater seepage trapped (perched) within the adjacent granular (aggregate) base layers. Therefore, if granular base materials (crushed stone base course) must be used due to economic considerations, subgrade drainage improvements should be considered to aid in the long term performance of the pavement sections.

It is important to note that subsurface drains can be effective in improving subgrade drainage. However, subgrade drainage will not prevent future increases in the subgrade moisture content since all moisture infiltration cannot be intercepted. If the design sections are to include subgrade drainage improvements, it is recommended that subgrade drains be installed along the pavement edges to depths of at least three (3) feet below final pavement subgrade. The subgrade drains shall be installed no greater than one (1) foot behind the edge of pavement, and shall be connected to the granular (aggregate) base course. In addition, lateral drains should also be considered in order to intercept water beneath the pavement section. These lateral drains should be connected to the edge drain systems. The subgrade drains shall be sloped to allow gravity drainage to convenient discharge points. The subgrade drainage system may consist of a conventional french drain system or a manufactured edge drain system. If a manufactured edge drain system is used, the edge drains shall be installed in accordance with the manufacturer's recommendations. Due to the significant amounts of fines (silt and clay) present within the existing subsurface soils, a suitable needle-punched, non-woven filter fabric such as Mirafi 140N, or an approved equal, shall be placed between the free draining granular backfill and the existing soils to prevent migration of fines and possible eventual clogging of the drainage system. The extra layer of filter fabric shall be installed in addition to the filter fabric wrapping the perforated pipe (conventional french drain system) or the filter fabric provided for the manufactured edge drain systems. This design detail shall be utilized regardless of the type of edge drain construction.

#### **6.10 Quality Assurance**

1. The suitability of on-site and/or off-site fill materials and asphalt materials should be verified by laboratory testing prior to installation at the jobsite.
2. The Moisture-Density Relationship (Proctor curves) of each material type should be determined prior to compaction. Such tests typically require at least three (3) to four (4) days to complete.
3. Prior to lime treatment operations, analytical testing should be performed on the subgrade soils after the pavement areas have been brought to final subgrade elevation to determine their concentrations of sulfates for evaluation of the potential for sulfate induced heave. As a minimum, analytical testing should be performed on the subgrade soils at a rate of at least one test per 1,000 square yards of surface area or a minimum of three (3) tests per construction area, whichever is greater. Subgrade soils suitable for lime stabilization operations shall have sulfate concentrations of 1,000 parts per million (ppm) or less as determined by TxDOT Test Method Tex-145-E, Part II (Colorimetric Method).
4. Pulverization (field gradation) tests should be performed on the treated subgrade soils at the rate of at least one test per 1,000 square yards of surface area or a minimum of three (3) tests per construction area, whichever is greater.
5. In-place (nuclear) density tests (ASTM D6938) should be performed at the rate of at least one (1) test per 1,000 square yards (SY) of surface area or a minimum of three (3) tests per construction area, whichever is greater, for each lift of material placed.

At each in-place density test location performed on the treated subgrade soils, a representative sample of the treated subgrade soils shall be obtained and laboratory oven dried moisture content tests (ASTM D2216) performed to determine the moisture content

of the subgrade soils. The dry density values used for evaluating compaction levels (percent density) shall be calculated based on the wet density values determined in the field in accordance with ASTM D6938 (nuclear method) and the oven dried moisture contents determined in the laboratory in accordance with ASTM D2216.

Compliance with compaction specifications should be required prior to the placement of additional lifts.

6. After fine grading, verify thickness of the treated subgrade soils and/or the flexible (aggregate) base materials, if applicable, at the rate of at least one test per 1,000 square yards of surface area or a minimum of three (3) tests per construction area, whichever is greater.
7. The placement temperature and lay-down thickness of hot mix asphaltic concrete should be monitored during placement operations.

Hot Mix Asphaltic Concrete (FAA Item P-401 or P-403) samples should be obtained and laboratory tests performed in accordance with the rates (frequencies) indicated by the FAA guidelines. Asphaltic concrete cores should be obtained for verification of thickness and in-place density in accordance with the rates (frequencies) indicated by the FAA guidelines.

Hot Mix Asphaltic Concrete (TxDOT Item 340) samples for paving along the Perimeter Maintenance Road should be obtained and laboratory tests performed (Extraction/Gradation, Maximum Theoretical (Rice) Specific Gravity, and Laboratory Density) at the rate of at least one sample for every 1,000 tons of production (or fraction thereafter) or for each day's operation, whichever is less. Asphaltic concrete cores should be obtained (minimum of 3 cores per set) for verification of thickness and in-place density (or air voids) at the rate of at least one set for every 1,000 tons of production (or fraction thereafter) or for each day's operation, whichever is less.

8. Portland cement concrete pavement (FAA Item P-501) shall be sampled and tested in accordance with the rates (frequencies) indicated by the FAA guidelines. Concrete placed for aircraft paving shall have a minimum concrete flexural strength (Modulus of Rupture) of 650 psi at 28 days.
9. One set of four (4) concrete test cylinders shall be cast along with one air test and one slump test per every 60 cubic yards or less, for each day's placement of Structural Concrete and shall be tested for compressive strength as indicated below. One (1) concrete test cylinder shall be tested 7 days after placement, while two (2) concrete test cylinders shall be tested 28 days after placement. One (1) concrete test cylinder shall be held (not tested), unless required for confirmation of companion 28-day concrete compressive strength results (within ASTM standards of acceptable test results for companion cylinders).

## **7. INSPECTION AND TESTING**

Many problems can be avoided or solved in the field if proper inspection and testing services are provided. It is recommended that all site and subgrade preparation, proofrolling, fill placement, and pavement construction be monitored by a qualified engineering technician. Density tests should be performed to verify compaction and



moisture content of all earthwork. Inspection should be performed prior to and during concrete placement operations. Alliance Geotechnical Group, Inc. employs a group of experienced, well-trained technicians for inspection and construction materials testing. We would be pleased to assist on this project phase.

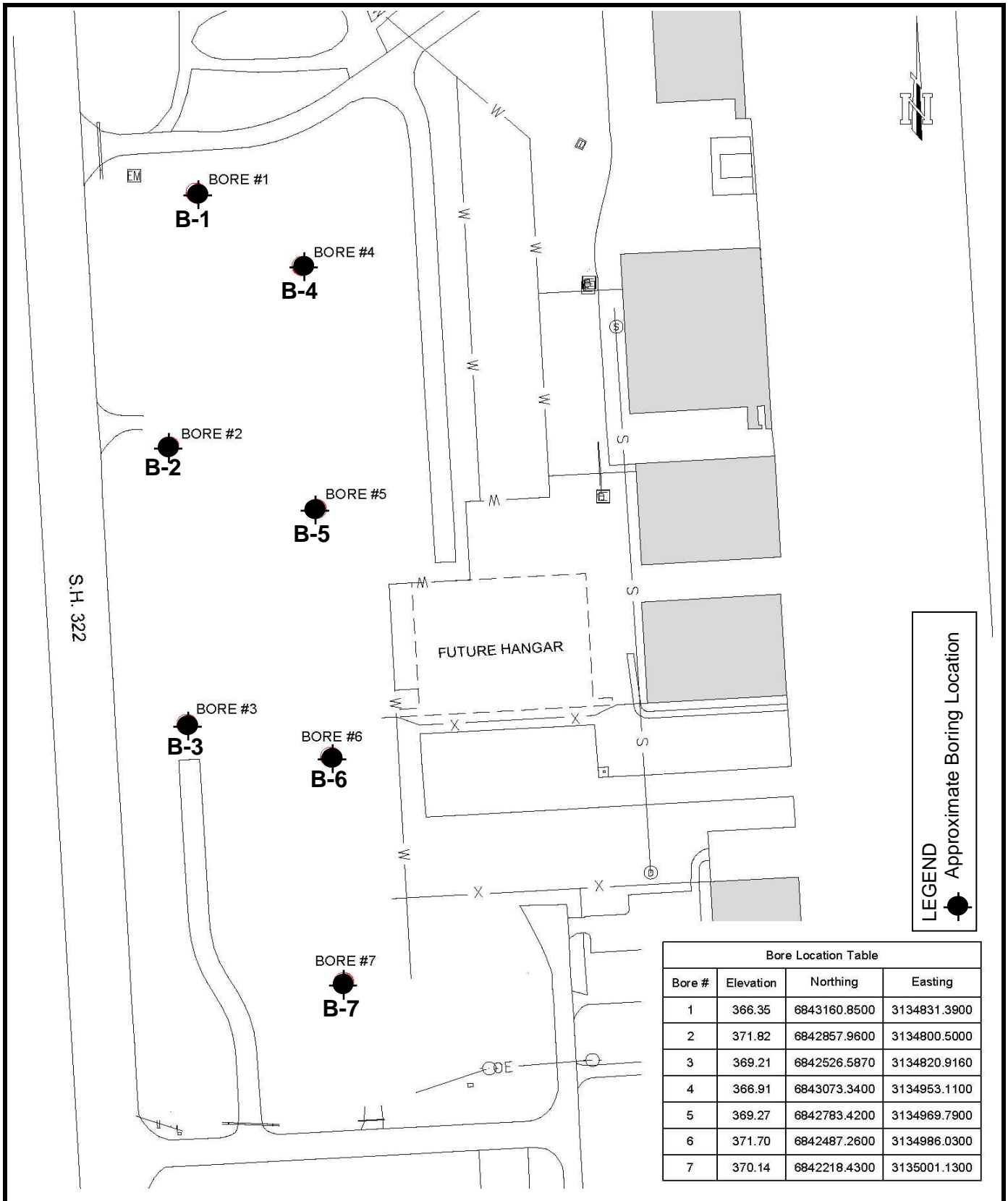
## **8. LIMITATIONS**

The professional services, which have been performed, the findings obtained, and the recommendations prepared were accomplished in accordance with currently accepted geotechnical engineering principles and practices. Although our field personnel visually survey the site for surface features indicative of variable soil conditions, the possibility always exists that the subsurface conditions at the site may vary somewhat from those encountered in the boreholes. The number and spacing of test borings were chosen in such a manner as to decrease the possibility of undiscovered abnormalities, while considering the nature of loading, size, and cost of the project. If there are any unusual conditions differing significantly from those described herein, Alliance Geotechnical Group, Inc. should be notified immediately so that the effects of these conditions on design and construction can be addressed.

This study was conducted for the exclusive use of KSA Engineers, Inc., the East Texas Regional Airport, Gregg County, Texas, the Federal Aviation Administration (FAA), and their design consultants. The reproduction of this report or any part thereof, in plans or other documents supplied to persons other than the owner, should bear language indicating that the information contained therein is for general design purposes. All contractors referring to this geotechnical report should draw their own conclusions for bidding purposes. This report is intended to guide preparation of project specifications and should not be used as a substitute for the project specifications.

We will retain the samples acquired for this project for a period of 60 days subsequent to the submittal date printed on the report. After this period, the samples will be discarded unless otherwise notified by the client in writing.

**ILLUSTRATIONS**



TBPE Firm #1970  
 317 W. Harrison Road  
 Longview, Texas 75604  
 (903) 759-5395

**Southwest GA Area Taxilane  
 Extension - Phase II  
 East Texas Regional Airport  
 Gregg County, Texas**

**PLAN OF BORINGS**

Scale:  
 Not-to-Scale

Project No.:  
 LE19-007

**FIGURE NO.**

**1**

## LOG OF BORING BORING B-1

Project: **Southwest GA Area Taxilane Extension - Phase II; ETRA; Gregg County, Texas**  
 Project No.: **LE19-007**                      Surface Elev.: **366.35**                      Date Drilled: **04-29-19**  
 Location: **See Plan of Borings - Figure 1**    Northing: **6843160.8500**    Easting: **3134831.3900**  
 Depth to water at completion of boring: **Dry (Backfilled)**  
 Depth to water when checked: **N/A**                      was: **N/A**  
 Depth to caving when checked: **N/A**                      was: **N/A**

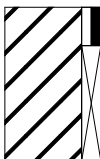
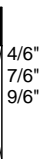
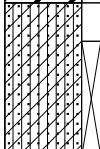
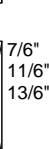
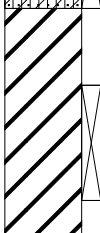
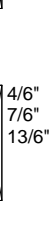
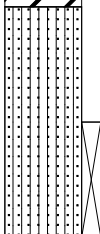
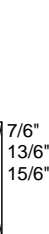
ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS & FIELD TEST DATA	DESCRIPTION	MC %	LL %	PL %	PI	-200 %	D.D. pcf	P.PEN tsf	UNCON. tsf
0		Medium stiff to stiff reddish brown CLAY								
365		(CH)	30	78	24	54	85			
2.5		Stiff reddish brown & light gray CLAY w/ silty sand seams & layers & ironstone fragments	32	64	25	39	94			
362.5		-3" silty sand layer @ 3.5'								
5		-6" silty sand layer @ 5.5'								
360		-w/ numerous silty sand seams & layers below 7'								
7.5		(CH & CL)	30	48	24	24	76			
357.5		Stiff to very stiff light grayish brown silty CLAY w/ iron stained slickensided fractures	41	96	33	63	100			
10		(CH)								
355										
12.5										
352.5										
15										
350										

Notes: Completion Depth: 10'  
 Boring Backfilled with Soil Cuttings and Tamped Upon Completion.

FIGURE NO.: 2

# LOG OF BORING BORING B-2

Project: **Southwest GA Area Taxilane Extension - Phase II; ETRA; Gregg County, Texas**  
 Project No.: **LE19-007** Surface Elev.: **371.82** Date Drilled: **04-29-19**  
 Location: **See Plan of Borings - Figure 1** Northing: **6842857.9600** Easting: **3134800.5000**  
 Depth to water at completion of boring: **Dry (Backfilled)**  
 Depth to water when checked: **N/A** was: **N/A**  
 Depth to caving when checked: **N/A** was: **N/A**

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS & FIELD TEST DATA	DESCRIPTION	MC %	LL %	PL %	PI	-200 %	D.D. pcf	P.PEN tsf	UNCON. tsf
0		Medium stiff to stiff reddish brown CLAY								
370		(CH)	27	69	22	47	69			
2.5		Medium dense reddish brown & brown silty clayey fine SAND								
367.5		(SC)	17	35	20	15	36			
5		Very stiff light gray & reddish brown CLAY w/ numerous silty sand seams & layers								
365		(CH)	27	58	28	30	85			
7.5		Medium dense light gray & yellowish brown silty fine SAND w/ iron stains & occasional clay seams & layers								
362.5		(SM)	24	--	--	NP	36			
10										
360										
12.5										
357.5										
15										
355										

Notes: Completion Depth: 10'  
 Boring Backfilled with Soil Cuttings and Tamped Upon Completion.

FIGURE NO.: 3



## LOG OF BORING BORING B-4

Project: **Southwest GA Area Taxilane Extension - Phase II; ETRA; Gregg County, Texas**  
 Project No.: **LE19-007**                      Surface Elev.: **366.91**                      Date Drilled: **04-29-19**  
 Location: **See Plan of Borings - Figure 1**    Northing: **6843073.3400**    Easting: **3134953.1100**  
 Depth to water at completion of boring: **Dry (Backfilled)**  
 Depth to water when checked: **N/A**    was: **N/A**  
 Depth to caving when checked: **N/A**    was: **N/A**

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS & FIELD TEST DATA	DESCRIPTION	MC %	LL %	PL %	PI	-200 %	D.D. pcf	P.PEN tsf	UNCON. tsf
0		Medium stiff to stiff reddish brown & light gray CLAY w/ silty sand seams & layers	30	61	28	33	84			
365	4/6" 6/6" 8/6"	-6" light grayish brown silty clay layer @ 1.5'								
2.5	3/6" 6/6" 8/6"	-6" silty sand layer @ 3'	34	53	26	27	94			
362.5										
5	4/6" 7/6" 7/6"	-4" silty sand layer @ 6'	34	56	30	26	82			
360										
7.5		(CH)								
357.5	6/6" 9/6" 11/6"	Stiff to very stiff light grayish brown to grayish brown silty CLAY w/ iron stained fractures	42	101	39	62	97			
10		-iron stained high angle fracture @ 9.5' (CH)								
355										
12.5										
352.5										
15										
350										

Notes: Completion Depth: 10'  
 Boring Backfilled with Soil Cuttings and Tamped Upon Completion.

FIGURE NO.: 5

## LOG OF BORING BORING B-5

Project: **Southwest GA Area Taxilane Extension - Phase II; ETRA; Gregg County, Texas**  
 Project No.: **LE19-007**                      Surface Elev.: **369.27**                      Date Drilled: **04-29-19**  
 Location: **See Plan of Borings - Figure 1**    Northing: **6842783.4200**    Easting: **3134969.7900**  
 Depth to water at completion of boring: **Dry (Backfilled)**  
 Depth to water when checked: **N/A**                      was: **N/A**  
 Depth to caving when checked: **N/A**                      was: **N/A**

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS & FIELD TEST DATA	DESCRIPTION	MC %	LL %	PL %	PI	-200 %	D.D. pcf	P.PEN tsf	UNCON. tsf
0		Medium stiff to stiff reddish brown & light gray CLAY w/ silty sand seams & layers	31	55	28	27	75			
367.5		(CH)								
2.5		Stiff to very stiff light gray & reddish brown silty sandy CLAY	27	44	27	17	80			
365		-w/ clay seams & layers below 5' (CL & CH)	31	57	29	28	80			
5		Very stiff grayish brown silty CLAY w/ iron stained fractures	41	91	40	51	89			
362.5		(CH)								
7.5			40	96	42	54	98			
360										
10										
357.5										
12.5										
355										
15										
352.5										

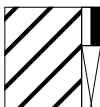
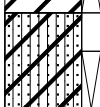
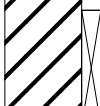
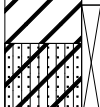
Notes: Completion Depth: 10'  
 Boring Backfilled with Soil Cuttings and Tamped Upon Completion.

FIGURE NO.: 6



## LOG OF BORING BORING B-6

Project: **Southwest GA Area Taxilane Extension - Phase II; ETRA; Gregg County, Texas**  
 Project No.: **LE19-007**                      Surface Elev.: **371.70**                      Date Drilled: **04-29-19**  
 Location: **See Plan of Borings - Figure 1**    Northing: **6842487.2600**    Easting: **3134986.0300**  
 Depth to water at completion of boring: **Dry (Backfilled)**  
 Depth to water when checked: **N/A**                      was: **N/A**  
 Depth to caving when checked: **N/A**                      was: **N/A**

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS & FIELD TEST DATA	DESCRIPTION	MC %	LL %	PL %	PI	-200 %	D.D. pcf	P.PEN tsf	UNCON. tsf
0		Medium stiff to stiff reddish brown, light gray & brown CLAY w/ silty sand seams, layers & pockets								
370		(FILL) (CH)	25	56	21	35	77			
2.5		Medium stiff to stiff light reddish brown & brown silty sandy CLAY								
367.5		(CL)	17	35	12	23	73			
5		Stiff to very stiff reddish brown & light gray CLAY								
365		(CH)	24	58	23	35	75			
7.5		-w/ silty sand seams & layers below 7'								
362.5		(CH)								
10		Stiff to very stiff light gray & reddish brown silty sandy CLAY w/ occasional gray clay seams	25	44	25	19	90			
360		(CL)								
12.5										
357.5										
15										
355										

Notes: Completion Depth: 10'  
 Boring Backfilled with Soil Cuttings and Tamped Upon Completion.

FIGURE NO.: 7

## LOG OF BORING BORING B-7

Project: **Southwest GA Area Taxilane Extension - Phase II; ETRA; Gregg County, Texas**  
 Project No.: **LE19-007**                      Surface Elev.: **370.14**                      Date Drilled: **04-29-19**  
 Location: **See Plan of Borings - Figure 1**    Northing: **6842218.4300**    Easting: **3135001.1300**  
 Depth to water at completion of boring: **Dry (Backfilled)**  
 Depth to water when checked: **N/A**                      was: **N/A**  
 Depth to caving when checked: **N/A**                      was: **N/A**

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS & FIELD TEST DATA	DESCRIPTION	MC %	LL %	PL %	PI	-200 %	D.D. pcf	P.PEN tsf	UNCON. tsf
370 0  367.5 2.5  365 5  362.5 7.5  360 10  357.5 12.5  355 15		Medium stiff to stiff reddish brown, brown & light gray silty sandy CLAY w/ clay seams & layers  -4" silty sand layer @ 3.5' (FILL)                      (CL & CH)  Stiff reddish brown & gray CLAY          (CH)	17  27  31  38	36  65  88  99	16  19  25  30	20  46  63  69	71  82  88  97			

Notes: Completion Depth: 10'  
 Boring Backfilled with Soil Cuttings and Tamped Upon Completion.

FIGURE NO.: 8

## KEY TO LOG TERMS & SYMBOLS

Symbol Description

### Strata symbols



CLAY



silty CLAY



silty clayey SAND



silty SAND



silty sandy CLAY



sandy SILT

### Soil Samplers



Auger



Standard Penetration Test (SPT)

### Notes:

1. Exploratory borings were drilled on dates indicated using standard truck-mounted drilling equipment.
2. Water level observations are noted on boring logs.
3. Results of laboratory tests conducted on samples recovered are reported on the boring logs.

Abbreviations used are:

MC = natural moisture content (%)

LL = liquid limit (%)

PL = plastic limit (%)

PI = plasticity index (%)

-200 = percent fines passing the #200 sieve (%)

D.D. = dry unit weight (pcf)

P.Pen. = hand penetrometer (tsf)

UNCON. = unconfined compression (tsf)

NP = Non-Plastic (PI=0)

NR = No Recovery

W = Weight of Drill Rods & Hammer

FIGURE NO.: 9

## SUMMARY OF RESULTS

### SULFATE CONTENT IN SOILS – COLORIMETRIC METHOD (TEX-145-E, PART II)

Boring Number	Depth (ft)	Material Description	Sulfate Content (PPM)
B-1	2.5 – 3	Reddish Brown & Light Gray CLAY w/ Silty Sand Seams & Layers & Ironstone Fragments (CH)	< 100
B-2	0.5 – 2	Reddish Brown CLAY (CH)	< 100
B-3	1 – 2	Reddish Brown, Brown & Gray CLAY (FILL) (CH)	< 100
B-4	0.5 – 1	Reddish Brown & Light Gray CLAY w/ Silty Sand Seams & Layers (CH)	< 100
B-5	0.5 – 2	Reddish Brown & Light Gray CLAY w/ Silty Sand Seams & Layers (CH)	< 100
B-6	0.5 – 2	Reddish Brown, Light Gray & Brown CLAY w/ Silty Sand Seams, Layers & Pockets (FILL) (CH)	< 100
B-7	0.5 – 2	Reddish Brown, Brown & Light Gray Silty Sandy CLAY w/ Clay Seams & Layers (FILL) (CL & CH)	< 100
B-7	5 – 6.5	Reddish Brown & Gray CLAY (CH)	< 100

**NOTE:** Large detectable gypsiferous crystals were not detected during visual examination of the test samples. According to published research regarding "sulfate induced heave", sulfate concentrations in excess of 2,000 ppm (threshold level) indicates a moderate potential for "sulfate induced heave" if these soils are treated with lime, cement, fly-ash or other additives having a pH in excess of 10. Sulfate concentrations in excess of 5,000 ppm indicates a high potential for "sulfate induced heave". Likewise, concentrations in excess of 10,000 ppm indicates that a serious problem associated with "sulfate induced heave" could occur during or after construction.

FIGURE NO.: 10

## SUMMARY OF RESULTS

### ATTERBERG LIMIT DETERMINATION ON LIME STABILIZED SOILS

Location: B-1  
Depth: 0.5' – 1'  
Description: Reddish Brown CLAY (CH)

<u>LIME CONTENT (%)</u>	<u>LIQUID LIMIT (%)</u>	<u>PLASTIC LIMIT (%)</u>	<u>PLASTICITY INDEX (PI)</u>
0	78	24	54
4	74	40	34
6	69	51	18
8	67	54	13
10	67	55	12

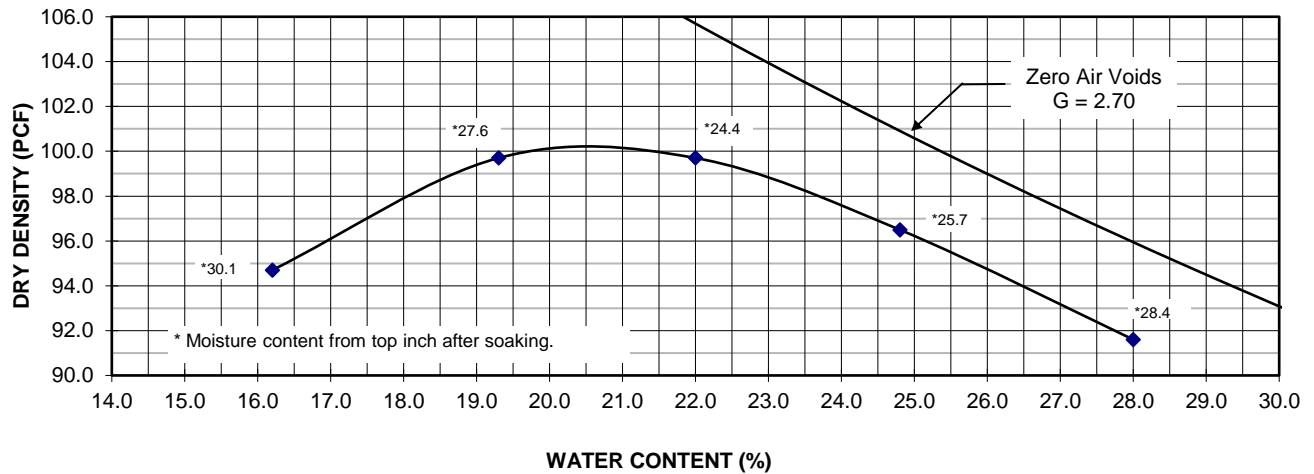
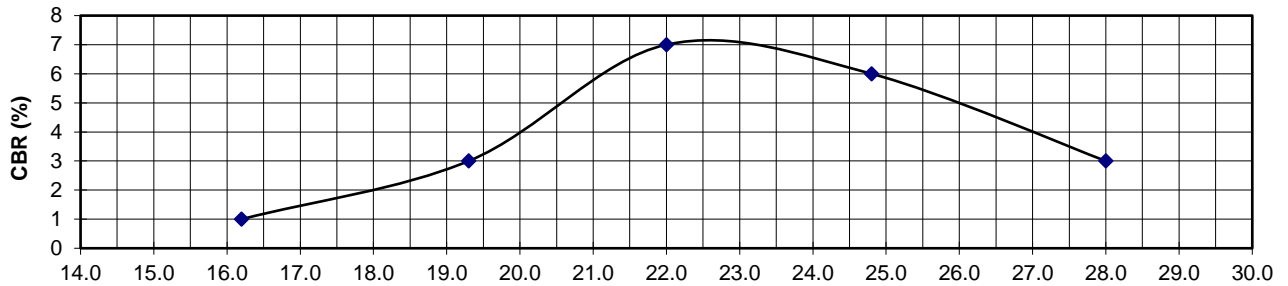
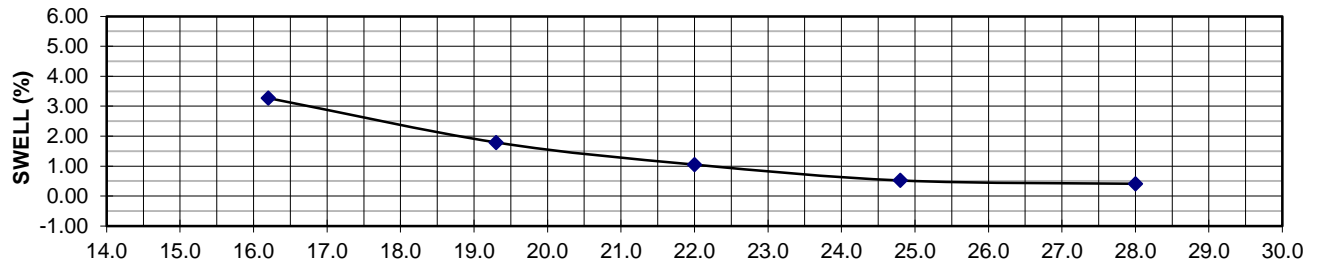
Location: B-4  
Depth: 0.5' – 1'  
Description: Reddish Brown & Light Gray CLAY w/ Silty Sand Seams & Layers (CH)

<u>LIME CONTENT (%)</u>	<u>LIQUID LIMIT (%)</u>	<u>PLASTIC LIMIT (%)</u>	<u>PLASTICITY INDEX (PI)</u>
0	61	28	33
4	55	34	21
6	53	38	15
8	53	42	11
10	52	42	10

FIGURE NO.: 11

# CALIFORNIA BEARING RATIO (CBR) TEST REPORT

## CBR-1



### California Bearing Ratio ASTM D 1883

Approximate Location	Elev./ Depth	Classification	Atterberg Limits ASTM D 4318			% Passing	
		USCS	LL	PL	PI	No. 4	No. 200
B-1 thru B-7	1' - 4'±	CL	47	21	26	99 (est.)	76.2

### Proctor Test Results ASTM D 698, Method C

Optimum Moisture = 20.5 %  
Maximum Dry Density = 100.2 pcf

### Material Description

Reddish brown, brown & light gray to gray CLAY, slightly sandy w/ ironstone fragments

AGG REPORT NO.: LE19-007

DATE: 5/14/19

PROJECT: Southwest GA Area Taxilane Extension - Phase II  
East Texas Regional Airport  
Gregg County, Texas

### REMARKS:

Bulk sample specimens were soaked for 4 days and penetrated under a 25 pound surcharge.



## **APPENDIX A**

**FAA PAVEMENT ANALYSES AND DESIGN STUDIES  
(PRINT-OUTS FROM FAARFIELD COMPUTER DESIGN PROGRAM)**

# FAARFIELD

## FAARFIELD v 1.42 - Airport Pavement Design

Section PCC\_HMAC in Job LE19-007\_ETRA.

Working directory is F:\DATA\FAARFIELD Data Files\

The structure is New Rigid.

Design Life = 20 years.

A design for this section was completed on 05/09/19 at 17:12:41.

### Pavement Structure Information by Layer, Top First

No.	Type	Thickness in	Modulus psi	Poisson's Ratio	Strength R,psi
1	PCC Surface	8.79	4,000,000	0.15	650
2	Variable St (flex)	4.00	400,000	0.35	0
3	User Defined	7.50	18,000	0.00	0
4	Subgrade	0.00	4,500	0.40	0

Total thickness to the top of the subgrade = 20.29 in

### Airplane Information

No.	Name	Gross Wt. lbs	Annual Departures	% Annual Growth
1	S-12.5	12,500	50	0.50
2	S-12.5	13,870	35	0.50
3	S-12.5	11,850	100	0.50
4	S-15	15,100	50	0.50
5	S-15	16,300	75	0.50
6	S-20	20,200	60	0.50
7	D-30	30,775	4	0.50
8	Citation-X	21,600	15	0.50
9	D-35	38,850	30	0.50
10	Challenger-CL-604	48,200	6	0.50
11	S-10	10,582	10	0.50
12	S-15	17,968	15	0.50
13	S-5	5,950	30	0.50
14	Gulfstream-G-II	39,600	5	0.50
15	Gulfstream-G-IV	73,200	50	0.50
16	Hawker-800	28,000	10	0.50
17	Learjet-55	23,500	5	0.50
18	Learjet-35A/65A	21,500	5	0.50
19	S-12.5	12,500	8	0.50

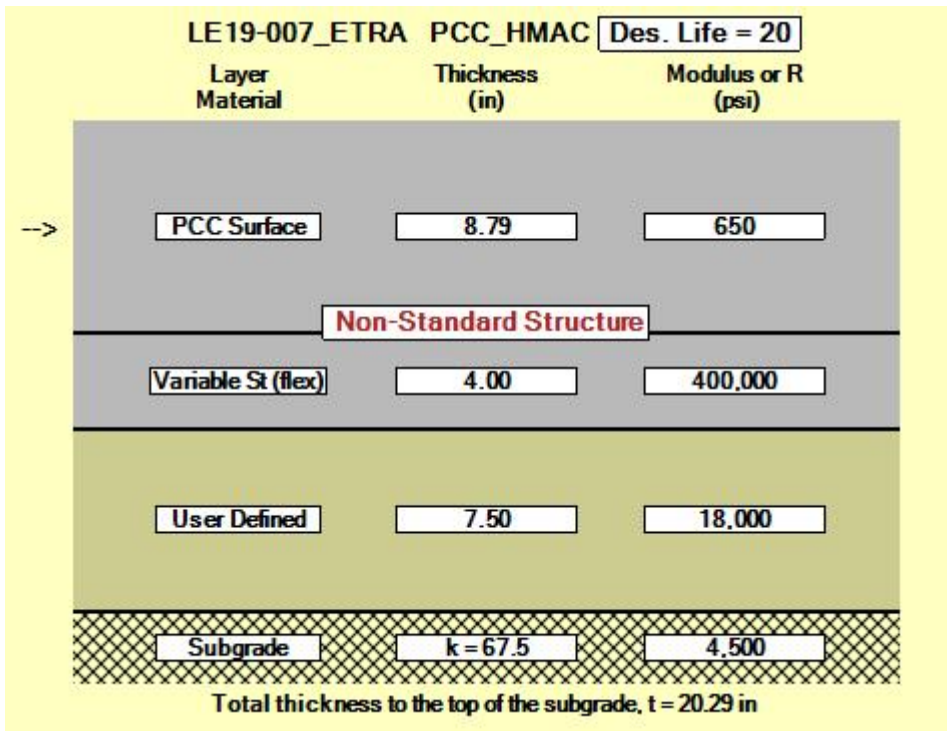
### Additional Airplane Information

No.	Name	CDF Contribution	CDF Max for Airplane	P/C Ratio
-----	------	---------------------	-------------------------	--------------



1	S-12.5	0.00	0.00	0.00
2	S-12.5	0.00	0.00	0.00
3	S-12.5	0.00	0.00	0.00
4	S-15	0.00	0.00	0.00
5	S-15	0.00	0.00	0.00
6	S-20	0.00	0.00	0.00
7	D-30	0.00	0.00	0.00
8	Citation-X	0.00	0.00	0.00
9	D-35	0.00	0.00	0.00
10	Challenger-CL-604	0.00	0.00	0.00
11	S-10	0.00	0.00	0.00
12	S-15	0.00	0.00	0.00
13	S-5	0.00	0.00	0.00
14	Gulfstream-G-II	0.00	0.00	0.00
15	Gulfstream-G-IV	0.00	0.00	0.00
16	Hawker-800	0.00	0.00	0.00
17	Learjet-55	0.00	0.00	0.00
18	Learjet-35A/65A	0.00	0.00	0.00
19	S-12.5	0.00	0.00	0.00

User is responsible for checking frost protection requirements.



# FAARFIELD

## FAARFIELD v 1.42 - Airport Pavement Design

Section PCC\_Flex in Job LE19-007\_ETRA.

Working directory is F:\DATA\FAARFIELD Data Files\

The structure is New Rigid.

Design Life = 20 years.

A design for this section was completed on 05/09/19 at 16:42:29.

### Pavement Structure Information by Layer, Top First

No.	Type	Thickness in	Modulus psi	Poisson's Ratio	Strength R,psi
1	PCC Surface	8.81	4,000,000	0.15	650
2	P-209 Cr Ag	9.00	52,515	0.35	0
3	User Defined	7.50	18,000	0.35	0
4	Subgrade	0.00	4,500	0.40	0

Total thickness to the top of the subgrade = 25.31 in

### Airplane Information

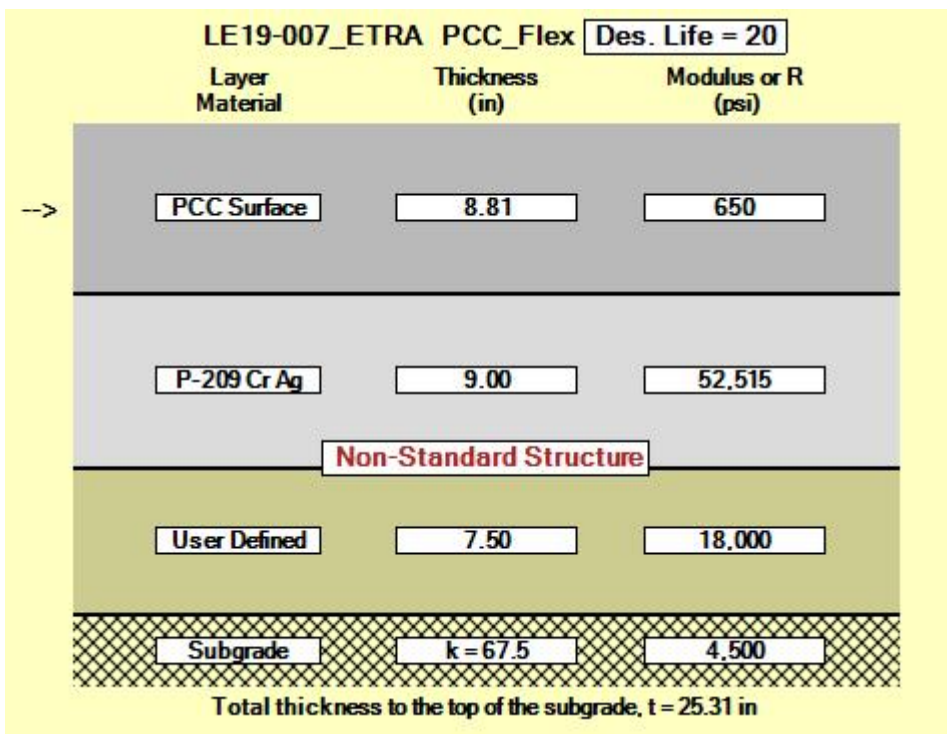
No.	Name	Gross Wt. lbs	Annual Departures	% Annual Growth
1	S-12.5	12,500	50	0.50
2	S-12.5	13,870	35	0.50
3	S-12.5	11,850	100	0.50
4	S-15	15,100	50	0.50
5	S-15	16,300	75	0.50
6	S-20	20,200	60	0.50
7	D-30	30,775	4	0.50
8	Citation-X	21,600	15	0.50
9	D-35	38,850	30	0.50
10	Challenger-CL-604	48,200	6	0.50
11	S-10	10,582	10	0.50
12	S-15	17,968	15	0.50
13	S-5	5,950	30	0.50
14	Gulfstream-G-II	39,600	5	0.50
15	Gulfstream-G-IV	73,200	50	0.50
16	Hawker-800	28,000	10	0.50
17	Learjet-55	23,500	5	0.50
18	Learjet-35A/65A	21,500	5	0.50
19	S-12.5	12,500	8	0.50

### Additional Airplane Information

No.	Name	CDF Contribution	CDF Max for Airplane	P/C Ratio
-----	------	---------------------	-------------------------	--------------

1	S-12.5	0.00	0.00	0.00
2	S-12.5	0.00	0.00	0.00
3	S-12.5	0.00	0.00	0.00
4	S-15	0.00	0.00	0.00
5	S-15	0.00	0.00	0.00
6	S-20	0.00	0.00	0.00
7	D-30	0.00	0.00	0.00
8	Citation-X	0.00	0.00	0.00
9	D-35	0.00	0.00	0.00
10	Challenger-CL-604	0.00	0.00	0.00
11	S-10	0.00	0.00	0.00
12	S-15	0.00	0.00	0.00
13	S-5	0.00	0.00	0.00
14	Gulfstream-G-II	0.00	0.00	0.00
15	Gulfstream-G-IV	0.00	0.00	0.00
16	Hawker-800	0.00	0.00	0.00
17	Learjet-55	0.00	0.00	0.00
18	Learjet-35A/65A	0.00	0.00	0.00
19	S-12.5	0.00	0.00	0.00

User is responsible for checking frost protection requirements.



# FAARFIELD

## FAARFIELD v 1.42 - Airport Pavement Design

Section FullDepth in Job LE19-007\_ETRA.

Working directory is F:\DATA\FAARFIELD Data Files\

The structure is New Flexible. Asphalt CDF was not computed.

Design Life = 20 years.

A design for this section was completed on 05/09/19 at 17:14:30.

### Pavement Structure Information by Layer, Top First

No.	Type	Thickness in	Modulus psi	Poisson's Ratio	Strength R,psi
1	P-401/ P-403 HMA Surface	4.00	200,000	0.35	0
2	P-401/ P-403 St (flex)	6.00	400,000	0.35	0
3	User Defined	7.28	18,000	0.35	0
4	Subgrade	0.00	4,500	0.35	0

Total thickness to the top of the subgrade = 17.28 in

### Airplane Information

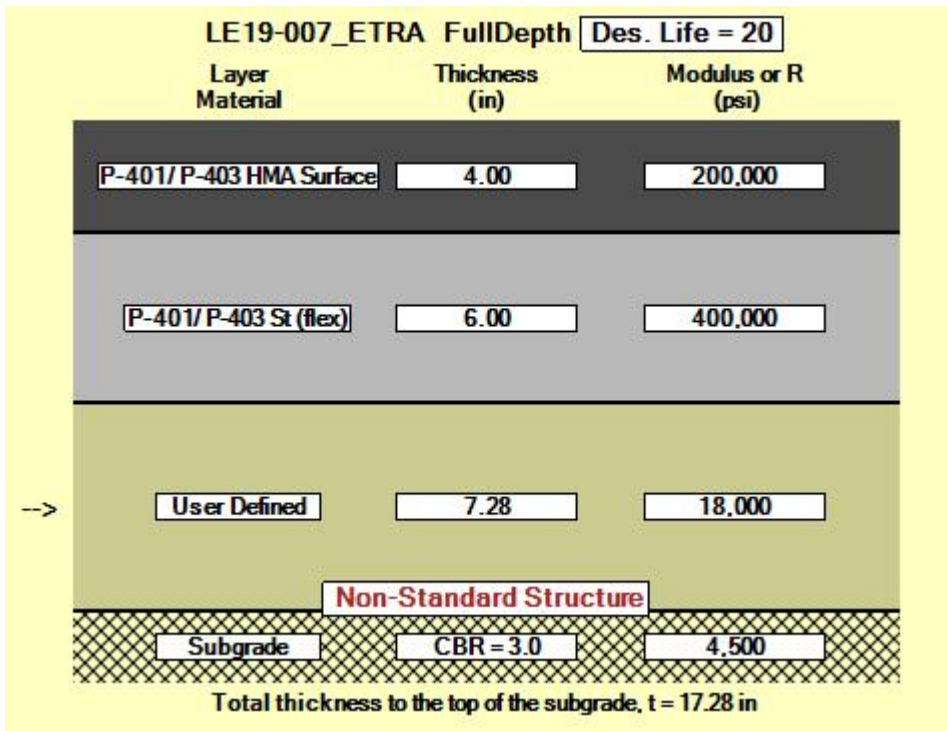
No.	Name	Gross Wt. lbs	Annual Departures	% Annual Growth
1	S-12.5	12,500	50	0.50
2	S-12.5	13,870	35	0.50
3	S-12.5	11,850	100	0.50
4	S-15	15,100	50	0.50
5	S-15	16,300	75	0.50
6	S-20	20,200	60	0.50
7	D-30	30,775	4	0.50
8	Citation-X	21,600	15	0.50
9	D-35	38,850	30	0.50
10	Challenger-CL-604	48,200	6	0.50
11	S-10	10,582	10	0.50
12	S-15	17,968	15	0.50
13	S-5	5,950	30	0.50
14	Gulfstream-G-II	39,600	5	0.50
15	Gulfstream-G-IV	73,200	50	0.50
16	Hawker-800	28,000	10	0.50
17	Learjet-55	23,500	5	0.50
18	Learjet-35A/65A	21,500	5	0.50
19	S-12.5	12,500	8	0.50

### Additional Airplane Information

Subgrade CDF

No.	Name	CDF Contribution	CDF Max for Airplane	P/C Ratio
1	S-12.5	0.00	0.00	0.00
2	S-12.5	0.00	0.00	0.00
3	S-12.5	0.00	0.00	0.00
4	S-15	0.00	0.00	0.00
5	S-15	0.00	0.00	0.00
6	S-20	0.00	0.00	0.00
7	D-30	0.00	0.00	0.00
8	Citation-X	0.00	0.00	0.00
9	D-35	0.00	0.00	0.00
10	Challenger-CL-604	0.00	0.00	0.00
11	S-10	0.00	0.00	0.00
12	S-15	0.00	0.00	0.00
13	S-5	0.00	0.00	0.00
14	Gulfstream-G-II	0.00	0.00	0.00
15	Gulfstream-G-IV	0.00	0.00	0.00
16	Hawker-800	0.00	0.00	0.00
17	Learjet-55	0.00	0.00	0.00
18	Learjet-35A/65A	0.00	0.00	0.00
19	S-12.5	0.00	0.00	0.00

User is responsible for checking frost protection requirements.



# FAARFIELD

## FAARFIELD v 1.42 - Airport Pavement Design

Section HMAC\_Flex in Job LE19-007\_ETRA.

Working directory is F:\DATA\FAARFIELD Data Files\

The structure is New Flexible. Asphalt CDF was not computed.

Design Life = 20 years.

A design for this section was completed on 05/09/19 at 17:14:49.

### Pavement Structure Information by Layer, Top First

No.	Type	Thickness in	Modulus psi	Poisson's Ratio	Strength R,psi
1	P-401/ P-403 HMA Surface	4.00	200,000	0.35	0
2	P-209 Cr Ag	11.50	56,366	0.35	0
3	User Defined	7.22	18,000	0.35	0
4	Subgrade	0.00	4,500	0.35	0

Total thickness to the top of the subgrade = 22.72 in

### Airplane Information

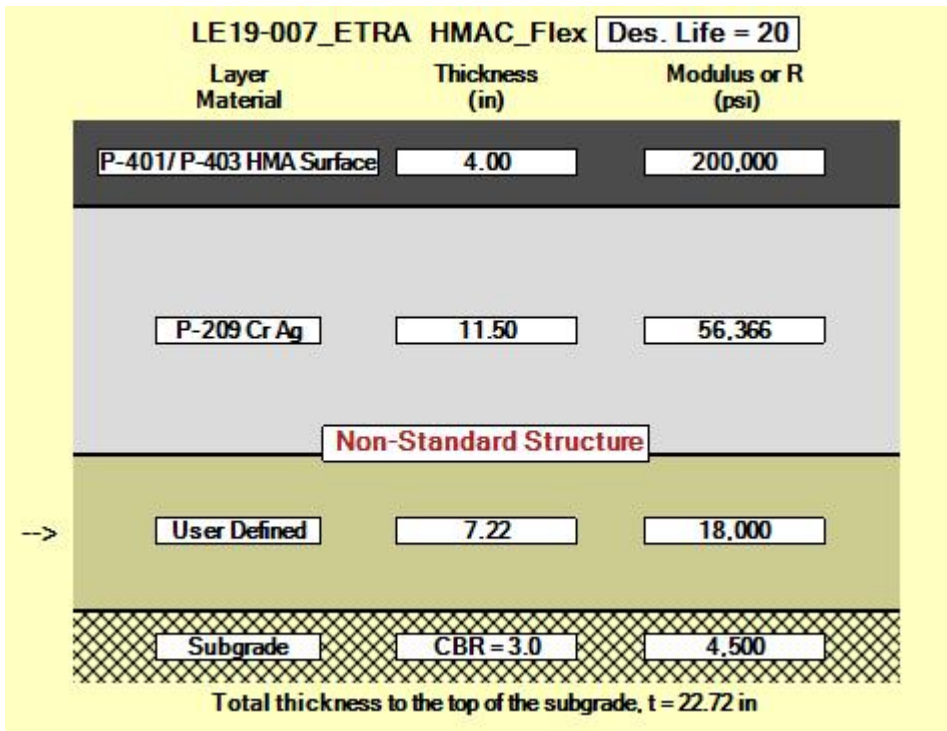
No.	Name	Gross Wt. lbs	Annual Departures	% Annual Growth
1	S-12.5	12,500	50	0.50
2	S-12.5	13,870	35	0.50
3	S-12.5	11,850	100	0.50
4	S-15	15,100	50	0.50
5	S-15	16,300	75	0.50
6	S-20	20,200	60	0.50
7	D-30	30,775	4	0.50
8	Citation-X	21,600	15	0.50
9	D-35	38,850	30	0.50
10	Challenger-CL-604	48,200	6	0.50
11	S-10	10,582	10	0.50
12	S-15	17,968	15	0.50
13	S-5	5,950	30	0.50
14	Gulfstream-G-II	39,600	5	0.50
15	Gulfstream-G-IV	73,200	50	0.50
16	Hawker-800	28,000	10	0.50
17	Learjet-55	23,500	5	0.50
18	Learjet-35A/65A	21,500	5	0.50
19	S-12.5	12,500	8	0.50

### Additional Airplane Information

Subgrade CDF

No.	Name	CDF Contribution	CDF Max for Airplane	P/C Ratio
1	S-12.5	0.00	0.00	0.00
2	S-12.5	0.00	0.00	0.00
3	S-12.5	0.00	0.00	0.00
4	S-15	0.00	0.00	0.00
5	S-15	0.00	0.00	0.00
6	S-20	0.00	0.00	0.00
7	D-30	0.00	0.00	0.00
8	Citation-X	0.00	0.00	0.00
9	D-35	0.00	0.00	0.00
10	Challenger-CL-604	0.00	0.00	0.00
11	S-10	0.00	0.00	0.00
12	S-15	0.00	0.00	0.00
13	S-5	0.00	0.00	0.00
14	Gulfstream-G-II	0.00	0.00	0.00
15	Gulfstream-G-IV	0.00	0.00	0.00
16	Hawker-800	0.00	0.00	0.00
17	Learjet-55	0.00	0.00	0.00
18	Learjet-35A/65A	0.00	0.00	0.00
19	S-12.5	0.00	0.00	0.00

User is responsible for checking frost protection requirements.



## **APPENDIX B**

**AASHTO PAVEMENT DESIGN  
AASHTO GUIDE FOR DESIGN OF PAVEMENT STRUCTURES (1993),  
USING THE COMPUTER PROGRAM  
'PAVEMENT ANALYSES SOFTWARE (PAS)',  
PUBLISHED BY THE AMERICAN CONCRETE PAVEMENT ASSOCIATION**



# WinPAS 12

Pavement Thickness Design According to  
**1993 AASHTO Guide for Design of Pavements Structures**  
 American Concrete Pavement Association

## ESAL Data by Vehicle Type








Project Name: Southwest GA Area Taxilane Extension - Phase II  
 Route: Perimeter Maintenance Road  
 Location: East Texas Regional Airport  
 Owner/Agency: Gregg County, Texas  
 Design Engineer:

### Traffic Factor

Estimated Rigid Thickness	4.00 inches
Estimated Structural Number	3.1
Terminal Serviceability	2.5
Design Life	20 years
Annual Growth Rate	0.00 percent
Traffic Input by	Day

### Traffic Input by

Design Lane	
Design Lane Distribution	0.00 percent
Directional Distribution	0.00 percent

Vehicle	Axle Load	Axle Type	Number	Vehicle	Axle Load	Axle Type	Number
	2.00	Single	10		0.00	Single	0
	0.00	Single			0.00	Single	
	4.00	Single			0.00	Single	
	18.30	Single	4		0.00	Single	0
	0.00	Single			0.00	Single	
	18.30	Single			0.00	Single	
	29.00	Single	1		0.00	Single	0
	0.00	Single			0.00	Single	
	29.00	Single			0.00	Single	
					0.00	Single	0
					0.00	Single	
<b>Total Rigid ESALs</b>			<b>181,404</b>	<b>Total Flexible ESALs</b>			<b>160,662</b>

# WinPAS

Pavement Thickness Design According to  
**1993 AASHTO Guide for Design of Pavements Structures**  
American Concrete Pavement Association

## Flexible Design Inputs

Project Name: Southwest GA Area Taxilane Extension - Phase II  
Route: Perimeter Maintenance Road  
Location: East Texas Regional Airport  
Owner/Agency: Gregg County, Texas  
Design Engineer:

## Flexible Pavement Design/Evaluation

<b>Structural Number</b>	3.28	<b>Subgrade Resilient Modulus</b>	4,118.20 psi
<b>Total Flexible ESALs</b>	160,662	<b>Initial Serviceability</b>	4.20
<b>Reliability</b>	85.00 percent	<b>Terminal Serviceability</b>	2.50
<b>Overall Standard Deviation</b>	0.45		

## Layer Pavement Design/Evaluation

Layer Material	Layer Coefficient	Drainage Coefficient	Layer Thickness	Layer SN
Asphalt Cement Concrete	0.40	1.00	3.00	1.20
Asphalt Cement Concrete	0.34	1.00	4.00	1.36
Treated Subgrade/Subbase	0.09	1.00	8.00	0.72
			$\Sigma$ SN	3.28

# WinPAS

Pavement Thickness Design According to  
**1993 AASHTO Guide for Design of Pavements Structures**  
 American Concrete Pavement Association

## Flexible Design Inputs

Project Name: Southwest GA Area Taxilane Extension - Phase II  
 Route: Perimeter Maintenance Road  
 Location: East Texas Regional Airport  
 Owner/Agency: Gregg County, Texas  
 Design Engineer:

## Flexible Pavement Design/Evaluation

<b>Structural Number</b>	3.16	<b>Subgrade Resilient Modulus</b>	4,118.20 psi
<b>Total Flexible ESALs</b>	160,662	<b>Initial Serviceability</b>	4.20
<b>Reliability</b>	85.00 percent	<b>Terminal Serviceability</b>	2.50
<b>Overall Standard Deviation</b>	0.45		

## Layer Pavement Design/Evaluation

Layer Material	Layer Coefficient	Drainage Coefficient	Layer Thickness	Layer SN
Asphalt Cement Concrete	0.40	1.00	4.00	1.60
Crushed Stone Base	0.14	1.00	6.00	0.84
Treated Subgrade/Subbase	0.09	1.00	8.00	0.72
			$\Sigma$ SN	3.16

## ATTACHMENT 3

Construction Safety and Phasing Plan  
for the  
Southwest GA Area Taxilane - Phase 2

**EAST TEXAS REGIONAL AIRPORT  
LONGVIEW, TEXAS**

**CONSTRUCTION SAFETY AND PHASING PLAN  
FOR THE  
SOUTHWEST GA AREA TAXILANE – PHASE 2**

AIP No. 3-48-0137-47-2019  
Bid No. 2019-914  
KSA Project No. GC.113

JULY 2019

Prepared by:



**140 East Tyler Street  
Longview, Texas 75601  
Phone 903.236.7700  
[www.ksaeng.com](http://www.ksaeng.com)**

**TBPE Firm Registration No. 1356**

**EAST TEXAS REGIONAL AIRPORT  
SOUTHWEST GA AREA TAXILANE – PHASE 2  
CONSTRUCTION SAFETY AND PHASING PLAN**

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**ATTACHMENTS**

- A. CONSTRUCTION PHASING, SAFETY PLAN AND DETAILS
- B. CONSTRUCTION PROJECT DAILY SAFETY INSPECTION CHECKLIST

## I. COORDINATION

### A. Meetings

#### 1. Pre-Design Meeting

A pre-design meeting was held on February 21, 2019. The purpose of the meeting was to determine a project scope and discuss design requirements for the proposed project. Attendees included the Airport staff and the Consulting Engineer.

#### 2. Pre-Bid Meeting

A pre-bid meeting in accordance with FAA AC 150/5300-9 will be held during the bidding phase. During the Pre-Bid Meeting, the Consulting Engineer will summarize key features for this design. Contractors will also be given an opportunity to ask project related questions.

#### 3. Pre-Construction Meeting

A pre-construction meeting in accordance with FAA AC 150/5300-9 will be held prior to the issuance of the Notice to Proceed. The Airport Manager, Consulting Engineer, Resident Project Representative (RPR), Prime Contractor and all Sub-Contractors will be required to attend the meeting.

#### 4. Construction Progress Meetings

Construction progress meetings will be held throughout the duration of the project on an as needed basis. The Airport Manager, the Prime Contractor, and the Resident Project Representative are required to attend every construction progress meeting. The Consultant Engineer and ATCT Manager will attend meetings as they see fit or as requested by the Airport. The Contractor will be responsible for discussing the following subject matters during each meeting:

- Updated Project Schedule
- Explanation for any delays
- Safety/Security
- Project Coordination
- Construction Issues
- Review of Submittals
- Review of Request for Information (RFI)
- Review of Change Orders
- Environmental Issues
- Erosion Control
- Quality Assurance Test Results and Concerns
- Pertinent Information for Record Drawings
- Review of Pay Application
- Other General Discussions

Additional meetings will be held prior to the completion of the following construction tasks. The Airport Manager, Consultant Engineer, Resident Project Representative, Prime Contractor, and any Sub-Contractor associated with performing said work will be required to attend said meeting.

- Pre-Pave meeting for PCC and HMA paving operations.

**B. Scope**

This project involves construction of a new taxilane. Included in the project are the following items:

1. Construction of taxilane
2. Perimeter road extension
3. Sanitary sewer extension
4. Waterline relocation
5. Security fencing

**C. FAA ATCT Coordination**

1. The Contractor shall coordinate all project-related correspondence with FAA ATCT through the Consulting Engineer and Owner.

**D. Any changes to the Construction Safety and Phasing Plan (CSPP) shall be sent to the FAA.**

**II. PHASING**

Attachment A provides proposed limits of each construction phase. The following information summarizes the construction activity for each phase.

**A. Phase 1**

1. Duration: 10 days
2. Estimated Start Date: September 16, 2019
3. Estimated Completion Date: September 26, 2019
4. Tasks
  - Mobilization
  - Establish Staging and Stockpile Areas
  - Establish Contractor's Access Route
  - Install Rock Construction Entrance/Exit

**B. Phase 2**

1. Duration: 140 days
2. Estimated Start Date: September 26, 2019
3. Estimated Completion Date: January 24, 2020
4. Tasks
  - Stake work area at 50' intervals
  - Install/maintain barricades
  - Remove permanent security fence and install temporary security fence
  - Perform utility locates
  - Install appropriate erosion control devices prior to soil disturbing activities
  - Strip and stockpile the existing topsoil within the phasing limits
  - Establish rough grades for the taxilane, perimeter road, and hangar areas
  - Perform subgrade stabilization for the taxilane and perimeter road
  - Perform HMA paving operations for the taxilane and perimeter road
  - Install taxiway markings
  - Reinstall the stockpiled topsoil within the limits of this phase
  - Install vegetative cover in all disturbed area during this phase
  - Clean all paved surface to remove FOD
  - Install permanent security fence
  - Remove low profile barricades
  - Remove work area stakes
  - Remove all equipment, materials, and personnel from work area



**SEQUENCE OF WORK**

<b>Total Project:</b>	<b>150 Calendar Days</b>		
Phase 1	10 Days		
Phase 2		140 Days	

**III. AREAS AND OPERATIONS AFFECTED BY CONSTRUCTION ACTIVITY**

- Phase 1 – See Attachment A
- Phase 2 – See Attachment A

<b>Operational Requirements</b>	<b>Normal Operations</b>	<b>Phase 1</b>	<b>Phase 2</b>
Runway 13-31	10,000' x 150', RDC C-III-2400	Open	Open
Runway 18-36	6,109' x 150', RDC C-II-4000	Open	Open
Taxiway A		Open	Open
Taxiway B		Open	Open
Taxiway C		Open	Open
Taxiway D		Open	Open
Taxiway E		Open	Open
Taxiway G		Open	Open
Taxiway L		Open	Open
Taxiway M		Open	Open
Taxiway N		Open	Open
Taxiway K		Open	Open
Southwest GA Taxilane, Phase I		Open	Partial Closure

**A. Mitigation of Effects**

1. Airport Operations will be notified of construction activities and any pavement that will be closed during construction.
2. There are no anticipated disruptions to essential utilities. The Contractor will be required to locate all utilities prior to construction.

3. Coordination with the Air Traffic Control Tower (ATCT) will be conducted throughout the construction project duration to ensure that the ATCT is up-to-date on relocated thresholds and/or closed pavements.

#### **IV. PROTECTION OF NAVIGATIONAL AIDS (NAVAIDS)**

- A. All NAVAIDs supporting Runways 13-31 and 18-36 will be operable during Phases 1 and 2 of the construction project.
- B. No NAVAIDs are located within the project area
- C. The FAA ATCT will be notified by the Airport Operations director of any construction impact at least 45 days prior to a scheduled shutdown, if required.

#### **V. CONTRACTOR ACCESS**

##### **A. General**

Airport security is a vital part of the Contractor's responsibilities during the course of this project to ensure that all parties remain safe and the airport remains secure throughout the project. The following security guidelines, rules, and regulations of the Airport's operation department and the Transportation Security Administration (TSA) shall be followed by the Contractor and the Contractor's Employees, subcontractors, suppliers, and all representatives at all times throughout the project duration. The Contractor shall be directly responsible for any and all fines or penalties levied against the Airport as a result of any breach of security or safety caused by the Contractor or previously stated representatives.

##### **B. Airport Operations Area**

The Airport Operations Area (AOA) is defined as any portion of the Airport property normally secured against unauthorized entry. The AOA includes all areas specifically reserved for the operations of aircraft and aircraft support equipment and personnel. Generally, the AOA is defined as all paved and unpaved areas inside the airport perimeter fence and includes but is not limited to Aprons, Taxiways, Runways, and Runway and Taxiway Safety Areas. The Contractor shall not leave openings in the perimeter security fence at any time. No vehicle or equipment shall move within the AOA unless the vehicle is lighted/ flagged for Day time activity, lighted for night time activity, and operator has had (passed) airport driver training or is escorted by an operator who has had (passed) airport driver training.

##### **C. Security Badges**

The Contractor shall be responsible for his/her employees obtaining a photo-identification security badge issued by the Airport Security (ARFF) for each supervisor or foreman of each crew working within the AOA. There must ALWAYS be a badge holder with non-badged employees at all times. Badge holder must be in sight and hearing distance of unbadged employees. Under no circumstance shall a group of workers be without at least one representative who has obtained a photo-identification security badge. It will be the Contractors sole responsibility to complete all necessary paper work, pay all associated fees, and comply with all associated safety requirements in association with obtaining security badges.

The Contractor shall keep a master list of all employees who have security badges. At the end of the project each employee will be required to return the security badge to the Airport. The Airport also has the right to remove an employee's security clearance as the Airport sees fit. The Airport will charge a one hundred dollar (\$100.00) fee for each lost or destroyed security badge. Failure to account for or provide all security badges may constitute grounds for withholding retainage from the final pay estimate.

**D. Contractor's Entrance Gate**

The Contractor shall provide parking outside the AOA for the Contractor's employee's personal automobiles. At the completion of this project, any damage by the Contractor shall be repaired to the satisfaction of the Engineer at no additional cost to the Owner. Repairs shall include, but are not limited to, regrading, reseeding, or repaving any damaged areas.

The Contractor shall be responsible for all movement through the Contractor's entrance gate. Only authorized personnel and vehicles shall be allowed to enter the AOA through the Contractor's entrance gate. Pedestrian walkthroughs are not allowed through the vehicular gate. The Contractor shall ensure that the gate is closed after each authorized personnel. The gate may not be left open and unattended at any point during the construction duration. Contractor will be allowed to place his/her own **combination** lock on construction entrance gate. Contractor must give the Airport Security (ARFF) the combination and a list of all persons that have the combination. The only persons to have the combination should be properly badged persons. If at any time, a person that was given the combination to this gate is no longer needed on the project, the combination **MUST** be changed and a new list given to ARFF along with the changed combination.

If construction activities dictate that the Contractor's entrance gate is to remain open, a full-time BADGED watch guard may be used to secure the gate at all times.

**E. Contractor's Plant Site, Storage, and Office Area**

The Contractor will be held responsible for any damage or deterioration in areas allowed for Contractor's use. The Contractor will also be responsible for maintenance and dust control of the areas for the duration of the project.

Any areas occupied by the Contractor and his forces will be required to be completely resorted by the Contractor at his expense. All restoration shall be to the satisfaction of the Airport. Restoration activities shall be completed in accordance with applicable technical specifications.

**F. Vehicle Escort**

Any escort vehicle driver must receive and pass Airport Movement Area (AMA) driver training.

All vehicles responsible to the Contractor entering the AOA shall be escorted by an approved Contractor escort vehicle from the point of AOA entry to the construction site. The escort vehicle must be clearly identified with placards on both sides of the vehicle.

The escort driver shall be familiar with airport security and safety procedures. The escort vehicle shall be equipped with a radio for communication with the FAA Air Traffic Control Tower, as specified in "Two way radio communications".

**G. Challenging Unauthorized Personnel or Vehicles**

The Contractor and Contractor's employees who have been issued a security badge are responsible for challenging any person or vehicle found on the AOA or other non-public area who is not displaying a valid security badge, who cannot produce a valid security badge, or who is not under escort of someone under the direct supervision of a person possessing a valid security badge. The challenge shall consist of notifying the person that he is within a restricted area, and informing the person of an appropriate exit route. Should the unauthorized person refuse to exit the restricted area, the Airport shall be immediately notified for further action.

**H. Two-Way Radio Communications**

The Contractor shall be required to equip vehicles used by his project superintendent and project foreman on the project with radio receiver/transmitters for maintaining direct communication with

the FAA Air Traffic Control Tower. The Contractor will provide a minimum of two (2) radios, as specified below. The radios to be provided shall consist of the following : Two (2) Icom America, Model IC-A5 (or latest equivalent model), with AC charger, DC charger, carrying case, flexible antenna, headset adapter cable, headset desk charger, multi-charger, and two (2) 760 mAH heavy rechargeable battery packs.

Communication will be required at a frequency of 121.6 MHz for ground control. Radio contact shall be required when construction operations are in the vicinity of, or when crossing any active runway, taxiway, apron, or as directed by the Airport. The Contractor shall be required to provide sufficient number of radios to maintain communication in all areas of work.

**I. Contractor's Safety Plan**

Contractor will be required to submit a Construction Safety Plan as part of the submittal process before starting construction. The Construction Safety Plan shall be adhered to at all times. The airport reserves the right to amend the Construction Safety Plan at any time if concerns arise.

**VI. WILDLIFE MANAGEMENT**

**A. Trash**

1. All waste or spoil materials shall be disposed of off the airport property in a licensed landfill.
2. The Contractor shall maintain a clean and safe construction work area. Clean-up operations shall be completed daily.

**B. Standing Water**

1. Each construction area shall be shaped to allow drainage of surface water during each work operation.
2. If necessary, surface water shall be pumped immediately from each construction area.
3. The Contractor shall submit a Storm Water Pollution Prevention Plan to the TCEQ for compliance with applicable laws and regulations, including TPDES General Permit No. TXR150000.

**C. Tall Grass and Seed**

1. The Airport will mow and maintain all areas outside of the construction work limits. The Contractor shall mow areas within the construction work limits. Grass will be kept to a maximum height of 12 inches.

**D. Fencing and Gating**

1. The Contractor shall equip temporary gates with combination locks (Combination and list of persons with combination to be given to ARFF) to prevent access by animals and unauthorized people and maintain security during construction.

**E. Wildlife Sightings**

1. The Construction Manager will immediately notify the Airport if any wildlife is sited on the airfield.

**VII. FOREIGN OBJECT DEBRIS (FOD) MANAGEMENT**

**A.** The Contractor shall provide a FOD plan prior to beginning work and is subject to the approval of the Construction Manager and Airport.

**B.** The Contractor shall provide a motorized mechanical sweeper at the beginning of the project and shall sweep all active pavements adjacent to construction activities on a routine basis and as directed by the Resident Project Representative.

- C. All excavated material, debris, etc. shall be cleaned from the site at least on a daily basis and more often if required by the Construction Manager or Engineer. No material may be left in any area used by the Contractor in such a way that the mater can be blown onto the movement area and cause a FOD hazard.
- D. To control dust and/or blowing debris, any soil, debris or loose material shall immediately be swept up and removed.

**VIII. HAZARDOUS MATERIALS (HAZMAT) MANAGEMENT**

- A. At the preconstruction meeting, the Contractor shall discuss the fueling operations and precautions for all equipment on site. Potential hazardous wastes include fuel, paints, solvents, asphalts, and other items needed for construction.
- B. Any spills that occur on site shall be brought to the attention of the Construction Manager and the Airport staff immediately. The Contractor shall also notify the Construction Manager and Airport staff of any and all required remedial work required and follow appropriate methods for cleaning up the contaminate site. The Contractor shall also make sure the Airport staff are in attendance to witness the clean up and provide written documentation to the Airport stating the remedial work is complete per EPA and TCEQ regulations, the Airport's SWPPP and AC 150/5320-15A(12.2.4) verifying state and local requirements are met. AC 150/5320-15A(12.19) also states that spill prevention and response procedures for airport owned facilities including regular visual inspections, adopting good housekeeping practices, and reducing and reusing process materials to minimize waste generation on site.
- C. The Contractor should provide the Construction Manager with a list of all materials being delivered to the construction area and maintain MSDS sheets for such materials on the airport site. Materials shall be stored on site for a minimal period of time prior to their use on the project.

**IX. NOTIFICATION OF CONSTRUCTION ACTIVITIES**

**A. Airports Contact List:**

East Texas Regional Airport

269 Terminal Cir.  
 Longview, Texas 75603  
 Phone: (903) 643-3031

- Roy H. Miller, Jr., AAE  
 Email: [Roy.Miller@co.gregg.tx.us](mailto:Roy.Miller@co.gregg.tx.us)
- Brad Kranzman  
 Email: [Brad.Kranzman@co.gregg.tx.us](mailto:Brad.Kranzman@co.gregg.tx.us)
- Virginia Hunt  
 Email: [Virginia.Hunt@co.gregg.tx.us](mailto:Virginia.Hunt@co.gregg.tx.us)
- Juan Rojas  
 Email: [Juan.Rojas@co.gregg.tx.us](mailto:Juan.Rojas@co.gregg.tx.us)

**B. Consultants Contact List:**

KSA Engineers, Inc.

140 East Tyler Street  
 Longview, Texas 75601  
 Phone: (903) 236-7700

- Brittney Smith, P.E. – Project Manager  
 Mobile: (903) 235-7291  
 Email: [bsmith@ksaeng.com](mailto:bsmith@ksaeng.com)

**C. Quality Assurance Testing Contact List:**

Alliance Geotechnical Group, Inc.

317 W. Harrison Road  
 Longview, Texas 75604  
 Phone: (903) 759-5395

- Terry Oswald, P.E. – CMT  
 Mobile: (903) 738-8552  
 Email: [TOswald@aggenr.com](mailto:TOswald@aggenr.com)

**D. Contractors Contact List:**

The Contractor shall list the names of individuals that will be responsible for specific items on the construction site. The names that are listed shall be given to the Sponsor as well as posted on a bulletin board on the project. There is 911 emergency service at the Airport and shall be posted on the bulletin board. The following are contacts and names that need to be identified:

Contractor's Contact Information:

Name \_\_\_\_\_  
Address \_\_\_\_\_  
\_\_\_\_\_  
Phone \_\_\_\_\_  
Fax \_\_\_\_\_

Project Superintendent: \_\_\_\_\_ Cell Phone: \_\_\_\_\_  
Superintendent: \_\_\_\_\_ Cell Phone: \_\_\_\_\_  
24-Hour Contact: \_\_\_\_\_ Cell Phone: \_\_\_\_\_  
Gate Guard: \_\_\_\_\_ Cell Phone: \_\_\_\_\_  
Lab/Field Supervisor: \_\_\_\_\_ Cell Phone: \_\_\_\_\_  
Paving Supervisor: \_\_\_\_\_ Cell Phone: \_\_\_\_\_  
Safety Officer: \_\_\_\_\_ Cell Phone: \_\_\_\_\_  
Quality Control Officer: \_\_\_\_\_ Cell Phone: \_\_\_\_\_  
Job Site Environmental Officer: \_\_\_\_\_ Cell Phone: \_\_\_\_\_

Subcontractor information shall be available to the Airport, ATCT and Construction Manager as well.

**E. NOTAMs**

1. Airport management will issue all NOTAMs.
2. The Construction Manager will verify that all NOTAMs are published prior to permitting initiation of construction activities, including equipment and personnel access to the affected areas.

**F. Emergency Notification Procedures**

1. In the event of an emergency, the Contractor shall immediately contact 911 and then Airport Operations Director at (318)512-9122. If Airport Operations Director is unavailable the sheriff's office may be contacted at 903-738-7606.

**G. Aircraft Rescue and Firefighting (ARFF) Notification**

1. During Airport Emergencies, all ARFF vehicles shall have the immediate right of way at all times and may traverse any and all of the known roadways thorough the airfield. The Contractor and his Sub-contractors shall immediately yield right-of-way to any and all Airport ARFF personnel and equipment.
2. The Owner and Engineer shall be notified in writing at least ninety-six (96) hours in advance of any emergency route, water line, or fire hydrant that will be out of service.

**H. FAA Notification**

1. The Contractor will notify the Consulting Engineer, ninety-six hours (96) in advance of any work around NAVAIDS or shutdowns affecting NAVAIDS.
2. All communication with the FAA Air Traffic Control Tower (ATCT) shall be directed through the Airport.

**X. INSPECTION REQUIREMENTS**

- A. Daily Inspection**
  - 1. The Contractor, Resident Project Representative, Construction Manager, and Airport staff will perform onsite inspection throughout the project, with immediate remedy of any deficiencies, whether caused by negligence, oversight, or project scope change.
  - 2. The Contractor will identify a Safety Officer that will be required to inspect on a daily basis, all barricades, flashers, and closed runway lighting and markings prior to work commencing and prior to leaving the work site. The Contractor will notify the Resident Project Representative that all inspections have been completed.
  - 3. The Resident Project Representative will conduct a Daily Safety Inspection in accordance with the checklist AC 150/5370-2G and found attached in Attachment B of this document.
- B. Periodic Inspections**
  - 1. The Airport staff, Construction Manager, Resident Project Representative, and Contractor will inspect all closed paved surface prior to opening to air traffic operations.
  - 2. Prior to a final inspection, the FAA will inspect the site to ensure conformance with Federal design and construction requirements.
  - 3. Airport staff, the Construction Manager, the Resident Project Representative, and the Contractor will participate in a project final inspection. During this inspection, the project site shall be clean and free of all debris related to the project construction.

## **XI. UNDERGROUND UTILITIES**

The locations of known underground utilities are shown in the construction plan set and are approximate in location.

- A.** The Contractor must perform utility locates before construction begins to ensure uninterrupted operation of navigation aids and provide to the Construction Manager and Airport staff documentation demonstrating the performance of the locates.
- B.** The Contractor shall notify all utility companies involved to have their utilities located and marked in the field. All underground utilities shall then be uncovered to verify location and elevation before construction begins. The Contractor shall coordinate with the utility owner if the utility inspector must be on site when locating or excavating near utilities.
- C.** Any damaged facilities shall be replaced or repaired in accordance with FAA Specifications or as directed by the Construction Manager.

## **XII. PENALTIES**

- A. Construction Suspension**

The Airport staff will immediately suspend all construction if and when a Contractor or Subcontractor employee enters the Air Operations Area outside of the designated work area or if any unescorted construction vehicle operates on any active Air Operations Areas surface. Construction may resume only when the discrepancy is corrected and additional training is completed to the satisfaction of the Airport staff.
- B. Expulsion of Non-Compliant Employees**

The Airport staff may permanently prohibit any consultant or contract employee acting in violation with airport rules and regulation from entering or working on airport property.

### **XIII. SPECIAL CONDITIONS**

#### **A. Airport Emergencies**

1. Contractor shall monitor any weather conditions, aircraft emergencies, unexpected emergencies and other elements that may cause safety on the project to be jeopardized.
2. Airport staff will immediately clear all construction personnel off all runways and approach areas upon monitoring a distress call.
3. If an aircraft accident occurs, all construction personnel will immediately vacate the Air Operations Area until Airport Staff provide permission to resume access to the work area.

#### **B. On-Site Burning and Blasting**

On-Site burning and blasting is prohibited.

### **XIV. RUNWAY AND TAXIWAY VISUAL AIDS**

No temporary markings or lighting are required. Low profile barricades will be used to delineate the construction site.

### **XV. MARKING AND SIGNS FOR ACCESS ROUTES**

No temporary roadway markings will be required. Haul routes and other activities on the airport by the Contractor and Subcontractors shall be coordinated with and approved in advance by the Airport staff. Temporary traffic signs to delineate the haul route shall meet the MUTCD standards, including but not limited to the frangible and height requirements.

### **XVI. HAZARD MARKING AND LIGHTING**

#### **A. Barricades**

Low profile water filled barricades with the MUTCD standard reflective orange and white marking with the 20" min x 20" min flags mounted on the center of the barricade will be used to delineate the construction site. The barricades shall also be required to have the flashing red caution lights. The barricades shall be spaced no more than 20 feet apart where shown on the safety plan. The barricades shall be weighed against propwash and capable of withstanding up to 100 MPH wind forces. Flashing red caution lights shall be battery operated and shall maintain such intensity so as to be readily identified from distances of at least 200 feet during darkness.

### **XVII. PROTECTION OF RUNWAY AND TAXIWAY SAFETY AREAS**

#### **A. Runway Safety Area (RSA)**

No construction activities or material stockpile shall occur within an active RSA. The Contractor will be required to mark the RSA prior to construction.

#### **B. Runway Object Free Area (ROFA)**

No material stockpile shall occur within an active ROFA.

#### **C. Taxiway Safety Area (TSA)**

No construction activities or material stockpile shall occur within an active TSA. The width of the TSA



varies taxiway to taxiway.

**D. Taxiway Object Free Area (TOFA)**

No material stockpile shall occur within an active TOFA. The width of the TOFA varies taxiway to taxiway.

**E. Object Free Zone (OFZ)**

No construction activities or material stockpile shall penetrate the OFZ.

**F. Runway approach/departure surface**

No construction activities or material stockpile shall penetrate the approach/departure surface.

**G. Open Trenches**

No open trenches will be permitted within an open RSA or TSA. The Contractor shall prominently mark any open trench or excavation at the construction site with lighted barricades.

**H. Safety Information**

Refer to the Attachment A for safety details.

**I. Electrical Lock Out/Tag Requirements**

The Contractor is to prepare lockout/tag out plan and communicate the procedures to all staff.

**XVIII. OTHER LIMITATIONS ON CONSTRUCTION**

**A. Construction Phasing**

1. In order to maintain air traffic to the greatest extent possible, the Contractor shall construct the area of improvements according to the phases as described in the construction plan set.
2. Normal construction hours are 7:00 AM to 8:00 PM. Work performed beyond these hours requires approval by the Airport staff.

**B. Prohibitions**

1. The use of equipment over 40-feet in height is prohibited unless the Contractor submits a 7460-1 determination letter.
2. The use of flare pots is prohibited.
3. The use of open flame welding or torches is prohibited.
4. The use of electrical blasting caps is prohibited.

**C. Restrictions**

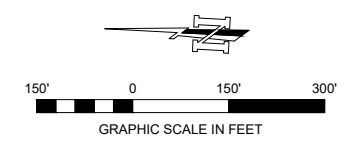
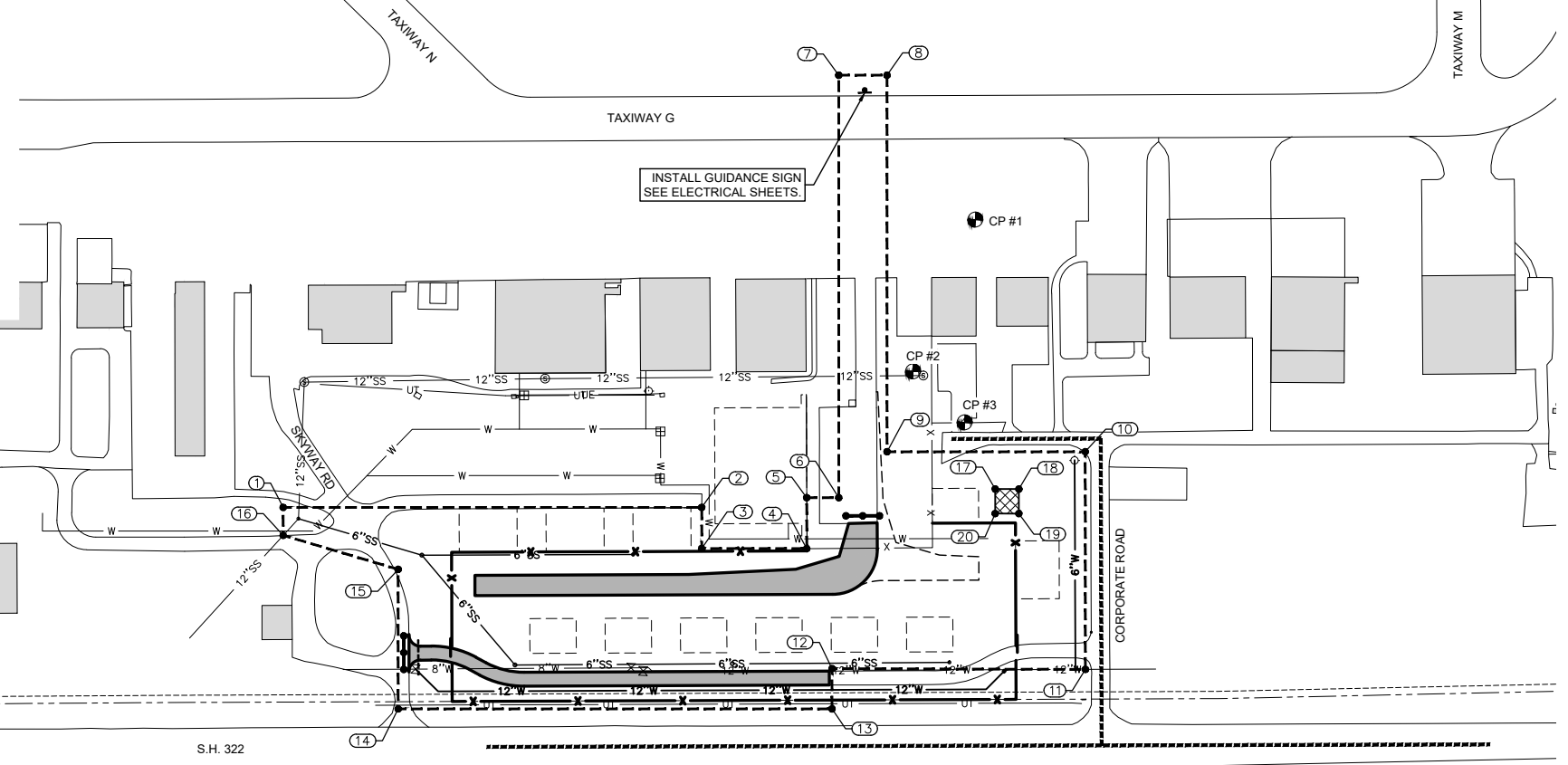
1. Any construction suspension required during specific airport operations will be coordinated by the Engineer, Owner, and Contractor during construction.
2. Seasonal construction restrictions will be coordinated by the Engineer, Owner, and the Contractor during construction.
3. The Contractor shall move equipment a minimum of 500 feet from active runway when visibility minimums are below  $\frac{3}{4}$  mile as determined by ATCT personnel.

## ATTACHMENTS

**ATTACHMENT A**

**CONSTRUCTION PHASING, SAFETY PLAN AND DETAILS**

LEGEND	
	PROPOSED PAVEMENT
	PHASE LIMITS
	FUTURE HANGARS
	STAGING AREA
	CONSTRUCTION ACCESS ROUTE
	EXISTING BUILDING
	BARRICADE LOCATION



Point Table						
Point #	Latitude	Longitude	Northing	Easting	Elevation	Raw Description
1	N32° 23' 00.50"	W94° 43' 12.79"	6843440.7538	3135068.6605	362.00	PHASE LIMITS
2	N32° 22' 53.35"	W94° 43' 12.65"	6842719.4390	3135106.4630	367.69	PHASE LIMITS
3	N32° 22' 53.34"	W94° 43' 13.48"	6842715.7200	3135035.5010	370.05	PHASE LIMITS
4	N32° 22' 51.55"	W94° 43' 13.44"	6842534.7233	3135044.9867	371.43	PHASE LIMITS
5	N32° 22' 51.56"	W94° 43' 12.42"	6842539.3184	3135132.6667	369.17	PHASE LIMITS
6	N32° 22' 51.01"	W94° 43' 12.41"	6842484.1132	3135135.5599	369.17	PHASE LIMITS
7	N32° 22' 51.13"	W94° 43' 03.91"	6842522.2670	3135863.5768	361.00	PHASE LIMITS
8	N32° 22' 50.31"	W94° 43' 03.89"	6842438.9745	3135867.9420	361.00	PHASE LIMITS
9	N32° 22' 50.20"	W94° 43' 11.47"	6842404.9702	3135219.1015	368.14	PHASE LIMITS
10	N32° 22' 46.82"	W94° 43' 11.40"	6842063.4388	3135237.0004	365.80	PHASE LIMITS
11	N32° 22' 46.75"	W94° 43' 15.78"	6842043.4824	3134862.0138	361.91	PHASE LIMITS
12	N32° 22' 51.08"	W94° 43' 15.85"	6842480.2552	3134840.3543	369.38	PHASE LIMITS
13	N32° 22' 51.07"	W94° 43' 16.66"	6842476.6241	3134771.0680	364.83	PHASE LIMITS
14	N32° 22' 58.48"	W94° 43' 16.80"	6843224.2956	3134731.8842	364.00	PHASE LIMITS
15	N32° 22' 58.52"	W94° 43' 14.00"	6843236.8940	3134972.2766	367.20	PHASE LIMITS
16	N32° 23' 00.49"	W94° 43' 13.35"	6843438.2302	3135020.5073	362.06	PHASE LIMITS
17	N32° 22' 48.34"	W94° 43' 12.18"	6842215.1661	3135164.6492	370.84	PHASE LIMITS
18	N32° 22' 47.94"	W94° 43' 12.18"	6842174.3958	3135166.7556	370.21	PHASE LIMITS
19	N32° 22' 47.93"	W94° 43' 12.67"	6842172.2524	3135124.4835	371.07	PHASE LIMITS
20	N32° 22' 48.34"	W94° 43' 12.68"	6842213.0227	3135122.3771	371.40	PHASE LIMITS

CONTROL POINTS				
POINT #	DESCRIPTION	NORTHING	EASTING	ELEV
1	1/2" IR	6842273.7590	3135627.0550	366.94
2	1/2" IR WITH CAP	6842367.4430	3135360.0230	368.87
3	1/2" IR	6842273.9150	3135276.6540	369.32

**AIRPORT SAFETY AND SECURITY:**

- AIRPORT SECURITY IS OF THE UTMOST IMPORTANCE. THE CONTRACTOR SHALL STRICTLY ADHERE TO ALL SECURITY POLICIES OF THE OWNER, INCLUDING ESCORTING PERSONNEL, BADGING, AND ACCESS WITHIN THE SECURED AREAS OF THE AIRPORT. ACCESS OUTSIDE OF THE DEFINED CONSTRUCTION AREA IS STRICTLY PROHIBITED.
- THE CONTRACTOR SHALL SUPPLY HIS OWN LOCK FOR ACCESS GATES, AND SHALL KEEP THE GATES LOCKED OR GUARDED AT ALL TIMES, EXCEPT FOR THE BRIEF PERIOD REQUIRED FOR PASSAGE OF AUTHORIZED VEHICLES AND EQUIPMENT. THE CONTRACTOR MUST IMPLEMENT PROCEDURES TO ENSURE THAT ONLY AUTHORIZED PERSONS AND VEHICLES HAVE ACCESS TO THE AIR OPERATIONS AREA (AOA) AND TO PROHIBIT "PIGGYBACKING" BEHIND AUTHORIZED VEHICLES. THIS SHALL BE CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS OF THE PROJECT.
- CONSTRUCTION ACTIVITY WITHIN TAXIWAY SAFETY AREAS / OBSTACLE FREE AREAS IS PERMISSIBLE WHEN THE TAXIWAY IS OPEN TO AIRCRAFT TRAFFIC IF:
  - ADEQUATE WINGTIP / EMPENNAGE CLEARANCE EXISTS BETWEEN THE AIRCRAFT AND EQUIPMENT / MATERIAL;
  - EXCAVATIONS, TRENCHES, OR OTHER CONDITIONS ARE CONSPICUOUSLY MARKED AND LIGHTED; AND
  - NOTICES TO AIRMEN ARE IN EFFECT CONCERNING THE ACTIVITY, USUALLY "PERSONNEL AND EQUIPMENT ADJACENT TO TAXIWAY".
- WORK CANNOT COMMENCE IN EACH PHASE UNTIL:
  - SUFFICIENT BARRICADES ARE IN PLACE TO CONFINE THE WORK AREA AND CREATE A BARRIER BETWEEN AIRCRAFT AND VEHICLE MOVEMENT AREAS AND THE CONSTRUCTION AREA. THE CONTRACTOR SHALL ENSURE THAT AREAS OF AIRCRAFT OPERATION ARE CLEARLY AND VISIBLY SEPARATED FROM CONSTRUCTION AREAS;
  - ALL SAFETY EQUIPMENT FOR PERSONNEL AND CONSTRUCTION EQUIPMENT IS IN PLACE AND OPERABLE;
  - TAXIWAY SAFETY AREAS HAVE BEEN MARKED AND STAKED. STAKES SHALL BE LOCATED EVERY 100' ON BOTH SIDES OF THE RUNWAYS AND TAXIWAYS AND MAINTAINED FOR THE ENTIRE COURSE OF THE PROJECT BY THE CONTRACTOR; AND
  - A NOTICE TO PROCEED HAS BEEN ISSUED TO THE CONTRACTOR.
- REFERENCE FEDERAL AVIATION ADMINISTRATION (FAA) ADVISORY CIRCULAR (AC) 150/5370-2G, LATEST EDITION, "OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION", FOR ADDITIONAL SAFETY INFORMATION AND REQUIREMENTS.
- BARRICADES SHALL BE PROVIDED AS SHOWN OR AS DIRECTED BY THE ENGINEER AS WORK PROGRESSES. REQUIRED LOW PROFILE LIGHTED BARRICADES SHALL BE PLACED AROUND AREAS UNDER CONSTRUCTION WHERE PLANES WILL TRAVEL. BARRICADES SHALL BE PROPERLY ANCHORED WITH SAND BAGS OR OTHER MEANS TO ENSURE THAT BARRICADES STAY IN PLACE. LIGHTED BARRICADES SHALL BE CHECKED DAILY. IF THE LIGHTS ARE NOT OPERATING PROPERLY THEY SHALL BE REPAIRED OR REPLACED IMMEDIATELY. BARRICADES SHALL BE UTILIZED UNTIL THE AREA UNDER CONSTRUCTION IS READY FOR OPERATION AS DETERMINED BY THE ENGINEER AND THE AIRPORT MANAGER. SEE SPECIFICATION, GENERAL PROVISIONS SECTION 40, 70 AND 80.
- CONTRACTOR SHALL INSTALL A TEMPORARY FENCE (AT NO DIRECT PAY) TO SECURE THE AIRFIELD PRIOR TO REMOVAL OF THE EXISTING FENCE. NEW FENCE MUST BE INSPECTED BY TSA PRIOR TO REMOVAL OF EXISTING. THE CONTRACTOR MAY ELECT TO LEAVE THE EXISTING FENCE IN PLACE UNTIL THE END OF THE PROJECT OR UNTIL THE NEW FENCE IS COMPLETED AND ACCEPTED.

**COMMUNICATIONS:**

- THE CONTRACTOR SHALL SUPPLY AVIATION BAND RADIOS, SET TO A PREDETERMINED FREQUENCY ESTABLISHED BY THE AIRPORT, FOR ALL VEHICLES AND EQUIPMENT AND TO EACH FLAGMAN, SUPERVISORY INDIVIDUAL, AND RESIDENT PROJECT REPRESENTATIVE (RPR) SO THAT THEY MAY KEEP IN CONTACT AT ALL TIMES WITH THE AIRPORT. THIS SHALL BE CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS OF THE PROJECT.
  - THE CONTRACTOR SHALL MONITOR EAST TEXAS REGIONAL AIRPORT GROUND CONTROL ON CTAF 119.2.
  - PORTABLE HAND-HELD RADIOS SHOULD BE PROVIDED TO ANY EMPLOYEES THAT MAY BE OPERATING OUTSIDE OF THEIR VEHICLES OR EQUIPMENT, MEANING AWAY FROM HARD-WIRED RADIO SYSTEMS.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ALL RADIOS AT ALL TIMES FOR THE DURATION OF THE PROJECT. SHOULD THE CONTRACTOR FAIL TO PROVIDE WORKING RADIOS AT ANY POINT DURING CONSTRUCTION OPERATIONS, THE OWNER MAY CHOOSE TO CEASE ALL CONSTRUCTION ACTIVITY

- UNTIL WORKING RADIOS ARE PROVIDED. SUCH STOPPAGES OF WORK SHALL NOT AFFECT THE OVERALL CONTRACT TIME.
- THE CONTRACTOR SHALL NOTIFY THE RPR AT LEAST 1 WEEK BEFORE ANY NOTICE TO AIRMEN (NOTAM) IS REQUIRED. THE RPR WILL THEN COORDINATE WITH THE OWNER TO ENSURE NOTAMS ARE PUBLISHED APPROPRIATELY. ALL OPENINGS AND CLOSURES OF PORTIONS OF THE AOA OR RESTRICTIONS ON AIRPORT OPERATIONS SHALL BE INITIATED AND CANCELED BY THE OWNER.
  - IN THE EVENT OF AN EMERGENCY, THE CONTRACTOR WILL CALL 911.
  - THE CONTRACTOR SHALL PROVIDE THE NAME AND TELEPHONE NUMBER OF THE PERSON TO ACT AS THE CONTRACTOR'S REPRESENTATIVE, AVAILABLE 24 HOURS PER DAY, SHOULD PROBLEMS PERTAINING TO THE CONSTRUCTION WORK ARISE WHICH WOULD REQUIRE THE CONTRACTOR'S IMMEDIATE ATTENTION.

**COORDINATION:**

- PROGRESS MEETINGS WILL BE HELD AS NEEDED DURING CONSTRUCTION WITH THE OWNER, RPR, AND THE CONTRACTOR PRESENT AS NECESSARY. SAFETY AND SECURITY WILL BE A STANDING AGENDA ITEM IN SUCH MEETINGS.
- CHANGES IN THE SCOPE OR SCHEDULE OF THE PROJECT MAY NECESSITATE REVISIONS TO THE CONSTRUCTION SAFETY PHASING PLAN (CSPP). REVISIONS TO THE CSPP MAY REQUIRE REVIEW AND APPROVAL BY THE OWNER, ENGINEER, FAA, AND/OR TXDOT AVIATION DIVISION.
- COORDINATION WITH THE FAA AIR TRAFFIC ORGANIZATION WILL BE DIRECTED THROUGH THE ENGINEER. COORDINATION WILL BE MADE WHEN SCHEDULING AIRWAY FACILITY SHUTDOWNS AND/OR RESTARTS. THE CONTRACTOR WILL COORDINATE WITH THE ENGINEER REGARDING SPECIFIC REQUIREMENTS RELATED TO SHUTDOWNS AND/OR RESTARTS.

**CONSTRUCTION / OPERATIONAL SAFETY:**

- CONSTRUCTION PERSONNEL AND EQUIPMENT WILL NOT BE ALLOWED WITHIN THE AOA UNTIL THE AREA HAS BEEN CLOSED TO AIRCRAFT AND THE APPROPRIATE NOTAMS HAVE BEEN ISSUED.
- CONTRACTOR ACCESS AND MOVEMENT:
  - ACCESS TO THE JOB SITE SHALL BE THROUGH DESIGNATED ROUTES AS SHOWN ON THE PLANS. CONSTRUCTION ACCESS ROUTE AND STAGING AREAS TO BE USED DURING CONSTRUCTION ARE TO BE LEFT IN A CONDITION EQUAL TO OR BETTER THAN CURRENT CONDITION.
  - NO VEHICLE OR EQUIPMENT SHALL MOVE WITHIN THE AOA UNLESS IDENTIFIED AS DESCRIBED HEREIN AND IS MONITORING THE APPROPRIATE RADIO FREQUENCY OR UNDER THE ESCORT OF A VEHICLE MONITORING THE APPROPRIATE RADIO FREQUENCY.
  - IT IS THE INTENT OF THESE PLANS TO MINIMIZE INTERFERENCE TO AIRCRAFT MOVEMENT. IN ACTIVE PORTIONS OF THE AOA, AIRCRAFT SHALL HAVE THE RIGHT-OF-WAY. THE CONTRACTOR MAY BE REQUIRED TO SUSPEND ALL CONSTRUCTION ACTIVITY IF REQUIRED FOR AIRCRAFT OPERATIONS. THIS WILL REQUIRE THE CONTRACTOR TO MOVE PERSONNEL, EQUIPMENT AND MATERIALS TO A SAFE LOCATION AND STAND BY UNTIL AIRCRAFT USE IS COMPLETED.
  - DURING PERFORMANCE OF THIS CONTRACT, THE AIRPORT RUNWAYS, TAXIWAYS, TAXILANES, AND AIRCRAFT PARKING APRONS SHALL REMAIN IN USE BY AIRCRAFT TO THE MAXIMUM EXTENT POSSIBLE. AIRCRAFT USE OF AREAS NEAR THE CONTRACTOR'S WORK WILL BE CONTROLLED TO MINIMIZE DISTURBANCE TO THE CONTRACTOR'S OPERATIONS.
  - CONSTRUCTION EQUIPMENT AND VEHICLES SHALL NOT EXCEED 15 MPH WITHIN THE AOA.
- THE CONTRACTOR SHALL NOT ALLOW EMPLOYEES, SUBCONTRACTORS, SUPPLIERS, OR ANY PERSON UNDER CONTRACTOR CONTROL TO ENTER OR REMAIN IN ANY PART OF THE AIRPORT WHICH WOULD BE HAZARDOUS TO PERSONS OR TO AIRCRAFT OPERATIONS. WHENEVER AIRCRAFT OPERATIONS REQUIRE, THE OWNER MAY ORDER THE CONTRACTOR TO SUSPEND OPERATIONS, MOVE PERSONNEL, EQUIPMENT, AND MATERIALS TO A SAFE LOCATION AND STAND BY UNTIL AIRCRAFT USE IS COMPLETED.
- ALL CONTRACTOR VEHICLES AND EQUIPMENT SHALL BE PARKED IN THE STAGING / STORAGE AREAS WHEN NOT IN USE.
- ALL CONSTRUCTION SITE PERSONNEL SHALL WEAR HIGH-VISIBILITY WARNING GARMENTS AT ALL TIMES WHEN WORKING IN THE PROJECT AREA.
- THE CONTRACTOR SHALL PROVIDE, INSTALL AND MAINTAIN ALL SAFETY DEVICES AS INDICATED ON THE PLANS OR AS DIRECTED BY THE OWNER OR ENGINEER.

- THE CONTRACTOR SHALL INSTALL SHEETING AND BRACING AS NECESSARY TO SUPPORT THE SIDES OF TRENCHES AND OTHER EXCAVATIONS WITH VERTICAL SIDES, AS REQUIRED BY CURRENT OSHA REGULATIONS.
- NO TRENCHES IN OR DIRECTLY ADJACENT TO OPERATIONAL PAVEMENT SHALL REMAIN OPEN OVERNIGHT OR WHEN THE CONTRACTOR FINISHES WORK FOR THE DAY IN THE AREA.
- THE CONTRACTOR SHALL KEEP WORK FREE FROM GROUND OR SURFACE WATER AT ALL TIMES. PROVIDE PUMPS OF ADEQUATE CAPACITY OR OTHER APPROVED METHOD TO REMOVE WATER FROM OPEN EXCAVATIONS IN SUCH A MANNER THAT IT WILL NOT INTERFERE WITH THE PROGRESS OF THE WORK OR THE PROPER PLACING OF OTHER WORK. THE COST OF DEWATERING EXCAVATIONS SHALL BE CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS OF THE PROJECT.
- THE CONTRACTOR SHALL SWEEP/VACUUM PAVEMENTS ADJACENT TO WORK AND ACCESS AREAS FREQUENTLY TO KEEP PAVEMENT FREE OF LOOSE DEBRIS AT ALL TIMES, IN ACCORDANCE WITH THE CONTRACTOR'S FOD PLAN.

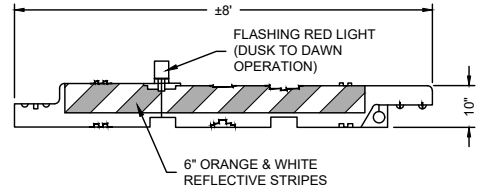
**PHASING:**

**PHASE 1: MOBILIZATION (DURATION OF 10 CALENDAR DAYS),**

- PRIOR TO BEGINNING WORK IN PHASE, THE AIRPORT SHALL ISSUE THE APPROPRIATE NOTAM THAT MEN AND MATERIALS WILL BE IN SPECIFIC STAGING AREAS OUTSIDE OF RSA FOR THE DURATION OF THE PROJECT. NO NOTAMS ARE REQUIRED WHEN OUTSIDE OF THE RSA UNLESS TRANSITIONAL SURFACES ARE ENCLOSED.
- ESTABLISH STAGING AREAS, STOCKPILE AREAS, AND ACCESS ROUTE.
- INSTALL CONSTRUCTION ENTRANCE / EXIT.

**PHASE 2: CONSTRUCTION OF TAXILANE AND PERIMETER ROAD (DURATION OF 140 CALENDAR DAYS),**

- INSTALL BARRICADES AT LOCATIONS SHOWN.
- INSTALL TEMPORARY SECURITY FENCE.
- PERFORM UTILITY LOCATES.
- INSTALL EROSION CONTROL DEVICES.
- WORK ACTIVITIES WITHIN LIMITS OF WORK AREA FOR THIS PHASE INCLUDE:
  - STRIP AND STOCKPILE EXISTING TOPSOIL.
  - ESTABLISH ROUGH GRADES FOR THE TAXILANE, PERIMETER ROAD, AND HANGAR AREAS.
  - PERFORM SUBGRADE STABILIZATION FOR THE TAXILANE AND PERIMETER ROAD.
  - PERFORM HMA PAVING OPERATIONS.
  - INSTALL TAXIWAY MARKINGS.
  - INSTALL TOPSOIL AND VEGETATIVE COVER ON ALL DISTURBED AREAS.
  - WATER LINE RELOCATION AND SANITARY SEWER INSTALLATION.
  - INSTALL GUIDANCE SIGN.
- AT THE COMPLETION OF THE ITEMS ABOVE, COORDINATE WITH THE CONSTRUCTION MANAGER TO OPEN WORK AREA AND ACCESS ROUTES.
  - CLEAR ALL PAVED SURFACES TO REMOVE FOD.
  - INSTALL PERMANENT FENCING.
  - REMOVE BARRICADES AND TEMPORARY FENCING.
  - REMOVE ALL EQUIPMENT, MATERIAL, AND PERSONNEL FROM WORK AREA.
- COORDINATE WITH AIRPORT TO CANCEL ALL NOTAMS THE AIRPORT ISSUED.



**NOTES:**

- LIGHTED BARRICADES SHALL BE PROVIDED, INSTALLED, AND MAINTAINED BY CONTRACTOR.
- BARRICADE LIGHTING SHALL BE SPACED NOT TO EXCEED 20' ON CENTER AND SPACING BETWEEN BARRICADES NOT EXCEEDING 10'.
- BARRICADES SHALL BE REQUIRED AROUND ALL EXCAVATIONS WHICH EXCEED 3" IN DEPTH BELOW ADJACENT PAVEMENT AND IN LOCATIONS SHOWN.
- CONTRACTOR SHALL CHECK LAYOUT AND LIGHTS EACH DAY TO ENSURE BARRICADES ARE FUNCTIONING CORRECTLY.
- OTHER METHODS FOR PROVIDING PAVEMENT BARRICADES MAY BE ACCEPTABLE, IF APPROVED BY ENGINEER. ALTERNATE METHODS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL PRIOR TO USE.

**TEMPORARY WATER FILLED LOW-PROFILE BARRICADE**

N.T.S.

MARK	REVISION	DATE

**PROJECT LAYOUT AND SAFETY CONSTRUCTION PHASING PLAN**

**EAST TEXAS REGIONAL AIRPORT SOUTHWEST GA AREA TAXILANE - PHASE 2 LONGVIEW, TEXAS**

DRAWN BY:	JKP
DESIGNED BY:	BNS
LATEST REVISION:	6/27/2019
KSA JOB NO.:	GC-113



This document is released for the purpose of interim review under the authority of Britney N. Smith P.E., Lic. # 122003, on June 27, 2019. It is not to be used for construction, bidding, or permit purposes.

SEAL: TBPE Firm Registration No. F-1356 SHEET NO.

LAST SAVED BY: JPENNINGTON

**ATTACHMENT B**

**CONSTRUCTION PROJECT DAILY SAFETY INSPECTION CHECKLIST**

**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**

<b>Item</b>	<b>Action Required (Describe)</b>	<b>No Action Required (Check)</b>
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		

<b>Item</b>	<b>Action Required (Describe)</b>	<b>No Action Required (Check)</b>
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.		

<b>Item</b>	<b>Action Required (Describe)</b>	<b>No Action Required (Check)</b>
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).		



<b>Item</b>	<b>Action Required (Describe)</b>	<b>No Action Required (Check)</b>
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.		