

BID DOCUMENTS & PROJECT MANUAL

for

TRANSIENT APRON PHASE 1 EXTENSION

at



NORTHWEST FLORIDA
BEACHES INTERNATIONAL AIRPORT

NORTHWEST FLORIDA BEACHES INTERNATIONAL AIRPORT

Prepared for:

ZHA

**601 N. Magnolia Avenue
Suite 100
Orlando, FL 32801
407.422.7487**

Prepared by:



AVCON, INC.

320 Bayshore Dr, Ste A
Niceville, Florida 32578
Phone: 850.678.0050

November 2020

AVCON Project Number: 2020.0073.02

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CONTRACT DRAWINGS – TRANSIENT APRON EXPANSION PHASE 1

CONTRACT

ADDENDA

FRONT END DOCUMENTS

REQUEST FOR BIDS

TRANSIENT APRON PHASE 1 EXTENSION

at the

Northwest Florida Beaches International Airport
6300 West Bay Parkway
Panama City, Florida 32409
Phone: 850-763-6751

November 9, 2020

Bid Submittal

Sealed bids, subject to the conditions herein, will be ***received until 10:00am, Central Standard Time, on December 10, 2020 at the Board Room for the Northwest Florida Beaches International Airport***, 6300 West Bay Parkway, 2nd Floor, Airport Terminal, Panama City, Florida 32409, (850) 763-6751, at which time bids will be publicly opened and read, for furnishing all labor and materials and performing all work connected with the Transient Apron Phase 1 Extension.

General Scope of Work

The work includes construction of a new Transient Apron Phase 1 Extension west of and connected to the new Transient Apron, as follows:

1. The apron parking will support transient aircraft at the airport and will be 225 feet x 210 feet, designed to accommodate all classifications of aircraft.
2. The work will include paving, drainage, stormwater management system modifications, security, potential relocation of some existing utilities, apron edge lighting modifications, apron markings, final grading, grassing, and other components related to the project.

Bidding and Project Documents

Official copies of the Bidding and Project Documents and Bid Package are available for download from the Airport's website and may be inspected at:

Administration Offices

**Northwest Florida Beaches International Airport
2nd Floor Airport Terminal
6300 West Bay Parkway,
Panama City, Florida 32409
(850) 763-6751**

Neither the Owner nor its Representative shall assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bid and Project Documents.

A non-mandatory Pre-bid meeting will be held on November 18, 2020 at 1:00 pm CST in the downstairs conference room at the Airport Terminal Building.

Questions

Questions may be submitted in written form to the Owner's Representative at the following address during the bid period between 8:00am and 5:00pm CST via email or fax or mail up and until 4:00pm CST, November 25, 2020, after which time no questions or clarifications will be received.

David Scruggs
Transient Apron Phase 1 Extension
Northwest Florida Beaches International Airport
6300 West Bay Parkway, Box A
Panama City, Florida 32409
(850) 541-6188

Or by email: David.Scruggs@zhaintl.com

It is preferred that all communications with the airport's contact be in written form. However, if verbal communications are utilized, written confirmation of any verbal response shall dictate. All contact shall be documented and any response given shared with all potential bidders by addendum.

Addendum

Should revisions to the bidding and project documents become necessary, addenda information will be provided to those interested bidders who have requested an official copy of the Contract Documents and Bid Package. The last date for issuance of a final addendum will be on or before December 3, 2020 at 4:00pm CST.

Bid Proposal Documents

The bid proposal must be made on the forms provided with the contract documents and submitted in the number of copies indicated in the bid forms. All blank spaces shall be filled in and no interlineations, alterations, or erasures of the text shall be made. Bidders must supply all required information prior to the time of bid openings.

Partial or incomplete bid proposals will not be considered. Each bid proposal shall show the full legal name and business address of the Bidder, including its street address if it differs from its mailing address and shall be signed with the usual signature of the person or persons authorized to bind the Bidder and shall be dated.

The preparation of a bid proposal shall be by and at the expense of the Bidder.

Bid proposals shall be publicly opened and read. If a Bidder's proposal contains a discrepancy between bid prices written in words and bid prices written in numbers, the price written in words shall govern.

Bid Security

Guarantee will be required with each bid as a certified check on a solvent bank or a bid bond in the amount of five (5) percent of the total amount of the bid, made payable to the Panama City–Bay County Airport and Industrial District.

Bonding Requirements

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

Performance and Payment Securities

The successful Bidder shall deliver to the Owner or the Owner's Authorized Representative no later than ten (10) calendar days after contract award and prior to commencing the Work or entering the Project Site, a Performance and Payment Bond in the form supplied in the bid and project documents and executed, as surety, by a corporation acceptable to the Owner and authorized to issue such bonds in the jurisdiction of Bay County, Florida. Such Performance Bond and Payment Bond shall each be for one hundred percent (100%) of the total as set forth in Bidder's proposal. The cost of such Performance Bond and Payment Bond shall be included in the Guaranteed Price submitted in the Bidder's Proposal.

Insurance Certificates

The successful Bidder shall deliver to the Owner or the Owner's Authorized Representative no later than ten (10) calendar days after contract award and prior to commencing the Work or entering the Project Site, certificates of insurance, in the form supplied in the bid and project documents and executed, attesting to the fact that the policies of insurance required by the Bid and Project Documents have been obtained.

Sales and Use Taxes

Work under this contract is subject to the provisions of Chapter 212, Florida Statutes, Tax on State, Use and Other Transactions. Other state, local or federal taxes may be applicable. The Bidder is responsible to remit to the appropriate governmental entity all applicable taxes. Any applicable tax shall be included in the total bid price by Bidder. Owner is a public body and eligible for certain sales tax exemptions and intends to implement a Sales Tax Savings Program and the successful Bidder shall be obligated to comply with such a program.

The successful Bidder shall coordinate with the Owner relative to the direct purchase of major material items by the Owner when applicable.

Award of Contract

After consideration of price and other factors, the contract will be awarded to the Bidder whose bid proposal is determined to be the lowest responsive and responsible Bidder as determined by the Owner.

Owner reserves the right, as the interest of the Owner may require, to reject any or all bid proposals and to waive any informality in Bid Proposals received.

If the Owner intends to accept the successful Bidder's Proposal and enter into the Contract with them, Bidder acknowledges and agrees that unless and until the Owner executes the contract and returns the executed copy to the Bidder, no contract or agreement between the Owner and the Bidder shall exist. If the Owner fails to execute the contract within thirty (30) calendar days of the bid opening, the contract will be deemed withdrawn and Bidder shall be released from its Bid Proposal. The Owner shall issue a Notice to Proceed (NTP), in accordance with Florida law, within thirty (30) calendar days of the Owner's execution of the contract.

Bidder's Return of Documents

All bid and project documents which are the property of the Owner shall be returned by the unsuccessful Bidders to the address shown in the bid proposal invitation to which the bid proposals were submitted or destroyed.

ATTACHMENTS

Attachment 1: Bid Document Forms

1. Bid Schedule
2. Bid Bond Form
3. Public Entity Crimes Statement
4. DBE Program
5. Davis Bacon Certification
6. Drug Free Workplace Certification
7. Non-Segregated Facilities Certification
8. Buy American Clause
9. Trench Safety Act Certification
10. Form of Non-Collusion Affidavit
11. E-Verify Compliance Certification
12. Construction Contract
13. Payment & Performance Bond Forms

14. Certification of Attorney
15. Release of Liens
16. Advertisement of Completion

Attachment 2: Insurance Certificate

PROJECT DOCUMENTS

General Conditions

General Provisions

ECP General Conditions

ECP Special Conditions

Technical Specifications

Geotechnical Report

Contract Drawings

BID DOCUMENTS

**NORTHWEST FLORIDA BEACHES INTERNATIONAL AIRPORT
PANAMA CITY–BAY COUNTY AIRPORT AND INDUSTRIAL DISTRICT**

Transient Apron Phase 1 Extension

In response to the Bid and Project Documents dated 9th day of **November 2020**, and in accordance with the “Notice and Instructions to Bidders”, the undersigned hereby proposes to furnish all plant, labor, technical and professional services, supervision, materials and equipment, and to perform all operations necessary and required to construct the **Transient Apron Phase 1 Extension** at Northwest Florida Beaches International Airport located in Bay County, Florida, in accordance with provisions of the Request for Bid and Project Documents and any addenda thereto, and at the prices stated opposite the respective items set forth in the Schedule of Prices attached hereto.

The undersigned agrees that this Bid Proposal constitutes a firm offer to Owner which cannot be withdrawn for **120** calendar days from and after the due date or until a contract for the Work is executed by the undersigned and Owner, whichever is earlier. The undersigned’s execution of the Bid Affidavit (copy attached), the Non-Collusion Affidavit (copy attached), the Sworn Statement under Section 287.133 (3)(A), Florida Statutes, on Public Entity Crimes (copy attached), must be witnessed and notarized by a Notary and returned with this Bid Proposal in order that the Bid Proposal be considered. Further, the Drug Free Workplace Certification (copy attached), Certification of Non-Segregated Facilities (copy attached), and Buy America Certification (copy attached) must also be completed and returned as part of the Bid Proposal.

The undersigned certifies that it has examined and is fully familiar with all of the provisions of the Bid and Project Documents and any addenda thereto; that it has carefully checked all the words and figures shown in its Schedule of Prices, if any required; that it has carefully reviewed the accuracy of all statements in this Bid Proposal and attachments hereto; and that it has by careful examination of the Bid and Project Documents and any addenda thereto and by examination of the actual site conditions, satisfied itself as to the nature and location of all work, the general and local conditions to be encountered in the performance of any work, the requirements of the Contract and all other matters which can in any way affect the Work or the cost thereof. The undersigned hereby agrees Owner shall not be responsible for any errors or omissions on the part of the undersigned in preparing this Bid Proposal.

If awarded a Contract, the undersigned agrees to execute the Contract and deliver it to Owner within ten (10) calendar days after contract award with the Certificates of Insurance and Payment Securities as required.

The undersigned hereby acknowledges that any contract resulting from this Bid Proposal will represent the entire agreement and that any exceptions taken in this Bid Proposal, may be a basis for Owner rejecting such Bid Proposal.

The undersigned also acknowledges receipt, understanding and full consideration of the following addenda to the Bid and Project Documents. (Contractor shall enter Addenda number and initial next to addenda received.)

Addendum No. _____ Signature _____

Addendum No. _____ Signature _____

Addendum No. _____ Signature _____

Addendum No. _____ Signature _____

Bidder: _____

Signed by: _____

Typed Name: _____

Title: _____

Bidder's Address: _____

State/Country of Incorporation (if applicable): _____

Bidder's Contractor License No. _____

License Expiration Date: _____

Bid Proposal Date: _____

If Bidder is a corporation, enter State/Country of Incorporation in addition to Business Address. Evidence of the authority of the person signing on behalf of the bidding entity shall be attached to the Bid Proposal. If a joint venture, consortia or partnership attach evidence of the signatory's authority signed by and listing the full names of all partners or joint venture(s) that shall be jointly and severally liable.

BID AFFIDAVIT

The following affidavit must be executed in order that your Bid Proposal may be considered.

State of _____, County of _____
of lawful age, being first duly sworn, upon his oath deposes and says: That he executed the accompanying Bid Proposal on behalf of the Contractor therein named, and that he had lawful authority so to do, and said Contractor has not directly or indirectly, entered into any agreement, expressed or implied, with any Contractor or Contractors, having to its object the controlling of the price or amount of such quotation or any quotations, the limiting of the Bid Proposal or Contractors, the parceling or farming out to any Contractor or Contractors, to other persons of any part of the contract or any of the subject matter or the Bid Proposals, or of the profits thereof, and that he has not and will not divulge the sealed Bid Proposal to any person whomsoever, except those having a partnership or other financial interest with him in said Bid Proposal or Proposals, until after the sealed Bid Proposal or Proposals are opened.

Signature: _____

Date: _____

State of _____ County of _____

PERSONALLY APPEARED BEFORE ME, the undersigned authority,

_____ (name of individual signing)

Who, after first being sworn by me, affixed his/her signature in the space provided above on this

_____ day of _____, 2020.

Subscribed and sworn to before me this _____ day of _____, 2020.

My Commission Expires: _____

Notary Public

BID SCHEDULE - UNIT PRICES

CONTRACTOR: _____ **DATE:** _____

AIRPORT NAME: Northwest Florida Beaches International Airport
PROJECT DESCRIPTION: Transient Apron Phase 1 Extension

BID SCHEDULE

Base Bid: Transient Apron Phase 1 Extension

Bid Item No.	Pay Item No.	Item Description & Unit Price In Words	Unit	Estimated Quantity	Unit Price	Total Amt./ Item
1	C-102-1	Erosion & Pollution Control _____ dollars and _____ cents	LS	1		
2	C-102-2	10'x10' Rip Rap _____ dollars and _____ cents	EA	1		
3	C-105-1	Mobilization _____ dollars and _____ cents	LS	1		
4	C-105-2	Maintenance of Traffic _____ dollars and _____ cents	LS	1		
5	P-151-1	Stripping & Stockpiling, 6" _____ dollars and _____ cents	AC	3		
6	P-152-1	Excavation & Embankment – Fill _____ dollars and _____ cents	CY	3,000		

Bid Item No.	Pay Item No.	Item Description & Unit Price In Words	Unit	Estimated Quantity	Unit Price	Total Amt./ Item
7	P-152-2	Subgrade Preparation _____dollars and_____cents	SY	6,825		
8	P-154-1	Stabilized Subbase Course (6") _____dollars and_____cents	SY	6,300		
9	P-403-1	5" Bituminous Base Course _____dollars and_____cents	TN	1,590		
10	P-501-1	14" Portland Cement Concrete _____dollars and_____cents	SY	5,250		
11	D-701-1	30" x 19" ERCP, Class V _____dollars and_____cents	LF	155		
12	D-701-2	24" ADS, N-12 _____dollars and_____cents	LF	64		
13	D-751-1	Type F DBI, Aircraft rated (50,000lb Point Load) _____dollars and_____cents	EA	1		
13	D-751-2	Type G DBI, Aircraft rated (50,000lb Point Load) _____dollars and_____cents	EA	1		

Bid Item No.	Pay Item No.	Item Description & Unit Price In Words	Unit	Estimated Quantity	Unit Price	Total Amt./ Item
15	D-751-3	Type C DBI _____dollars and_____cents	EA	1		
16	F-162-1	AOA Fence Installation (Owner to Provide Fabric) _____dollars and_____cents	LF	435		
17	F-162-2	AOA Fence Removal _____dollars and_____cents	LF	335		
18	D-752-1	Gate Relocation _____dollars and_____cents	EA	1		
19	L-110-1	1-Way 2" Schedule 40 PVC Direct Earth Buried Duct _____dollars and_____cents	LF	250		
20	L-125-1	Taxiway Edge Light (Can only w/caps) _____dollars and_____cents	EA	3		
21	T-904-1	Sodding, Bahia Argentina _____dollars and_____cents	SY	6,000		
22	T-904-1	Pyramat w/Sod _____dollars and_____cents	SY	1,900		

FOR ALL WORK REQUIRED IN ACCORDANCE WITH THE CONSTRUCTION DRAWINGS, SPECIFICATIONS AND OTHER CONTRACT DOCUMENTS, INCLUDING ALL COSTS RELATED TO THE WORK, AND ANY REQUIRED PERMITS, TAXES, BONDS AND INSURANCE, THE UNDERSIGNED SUBMITS A TOTAL BASE BID: TRANSIENT APRON PHASE 1 EXTENSION BID AMOUNT OF:

TOTAL BASE BID: TRANSIENT APRON PHASE 1 EXTENSION BID (amount in words):

_____dollars and

_____cents

(\$_____)

amount in numbers

Note: Total Base Bid: Transient Apron Phase 1 Extension Bid amount shall equal the sum of the totals for Bid Items No. 1 through 18.

Work To Be Performed: The Work to be performed by Contractor comprises the furnishing of all professional and technical services, labor, equipment, materials, and all other functions and operations including, but not limited to, temporary construction facilities, equipment, materials and supplies and related services, and surveying as necessary and required to accomplish the Transient Apron Phase 1 Extension work all strictly in accordance with all requirements of the Bid and Project Documents.

BID SUMMARY:

A. Total Bid Amount

_____ (\$ _____)

The Bidder represents that it has examined the site of the Work and informed itself fully in regard to all conditions pertaining to the place where the work is to be done; that it has examined the plans and specifications for the work and other Contract Documents relative thereto and has read all of the Addenda furnished prior to the opening of the Bids, as acknowledged below; and that it has otherwise fully informed itself regarding the nature, extent, scope and details of the Work to be performed.

Unit Prices, if any:

Unit prices for changes shall be full and complete compensation for the work or changes to the work. Prices will be inclusive of all costs including, but not limited to, labor, materials, services, overhead, and profit.

Unit Pricing: (written pricing for areas noted per unit) Adjustments:

All prices are fixed for the duration of the Contract and are not subject to escalation for any cause. Payment of the Total Contract Price shall constitute full payment for performance of the Work and covers all costs of whatever nature incurred by Contractor in accomplishing the Work in accordance with the provisions of the Contract.

Contractor shall maintain all work in progress until it is accepted. Contractor shall repair, rework, or replace as necessary any work damaged or lost due to normal wear and tear, anticipated events, or conditions within its control. No separate payment shall be made for such maintenance costs which are deemed included in the original contract price. Any failure to maintain the Work shall be considered a defect in accordance with the General Conditions.

If provided with a Notice of Intent to Award the Contract by the Owner, the Bidder shall execute and deliver to the Owner all of the documents required by the Contract Documents, including but not limited to, the Addendum to the Agreement and the Performance and Payment Bonds in the form contained in the Contract Documents, furnish the required evidence of the specified insurance coverages, furnish all necessary permits, license, materials, equipment, machinery, maintenance, tools, apparatus, means of transportation and labor necessary to complete the Work.

Required Submittals: The following submittals are a prerequisite to the initial payment:

1. Contract Schedule,
2. Payment Securities,
3. Insurance Certificates,
4. Schedule of Values,

5. Maintenance Plan.

Bidders' Representations: The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bid and Project Documents; to complete all Work as specified or indicated in the Project Documents for the Contract Price and within the Contract Time indicated in the Agreement and in accordance with the Project Documents.

SIGNATURE/EXECUTION

Dated and signed at _____, this ____ day of _____, 2020.

(Name of Bidder)

(Authorized Signature)

(Title)

(Mailing Address)

(City, State, Zip)

(Federal ID No. or SS No.)

State of _____ County of _____

PERSONALLY APPEARED BEFORE ME, the undersigned authority,

_____ (name of individual signing)

Who, after first being sworn by me, affixed his/her signature in the space provided above on this

_____ day of _____, 2020.

Subscribed and sworn to before me this ____ day of _____, 2020.

My Commission Expires: _____

Notary Public

ATTACH BID FORMS

BID BOND

CONTRACTOR (Name and Address):

SURETY (Name and Address of Principal Place of Business):

OWNER (Name and Address):

Owner: Panama City – Bay County Airport and Industrial District
Address: 6300 West Bay Parkway
Panama City Beach, FL 32409

BID:

BID DUE DATE: December 9, 2020 at 10:00am CST
PROJECT (Brief Description Including Location): The Work to be performed by Contractor
comprises the furnishing of all professional and technical services, labor, equipment, materials,
and all other functions and operations including, but not limited to, temporary construction
facilities, equipment, safety, materials and supplies and related services, and surveying as
necessary and required to accomplish the **Transient Apron Phase 1 Extension** strictly in
accordance with all requirements of the Bid Package and Contract Documents.
Northwest Florida Beaches International Airport, Panama City, Florida

BOND:

BOND NUMBER: _____
DATE: (Not later than Bid Due Date): _____
PENAL SUM: _____

IN WITNESS WHEREOF, Surety and Contractor, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Bid Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

CONTRACTOR

_____(Seal)
Contractor's Name and Corporate Seal

By: _____
Signature and Title

Attest: _____
Signature and Title

SURETY

_____(Seal)
Surety's Name and Corporate Seal

By: _____
Signature and Title
(Attach Power of Attorney)

Attest: _____
Signature and Title

- Note:
- (1) Above addresses are to be used for giving required notice.
 - (2) Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

EJCDC NO. 1910-28-C (1990 Edition)

1. Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to pay to OWNER upon default of Contractor the penal sum set forth on the face of this Bond.
2. Default of Contractor shall occur upon the failure of Contractor to deliver within the time required by the Project Documents the executed Agreement required by the Project Documents and any performance and payment bonds required by the Project Documents and Contract Documents.
3. This obligation shall be null and void if:
 - 3.1. OWNER accepts Contractor's Bid and Contractor delivers within the time required by the Project Documents (or any extension thereof agreed to in writing by OWNER) the executed Agreement required by the Project Documents and any performance and payment bonds required by the Project Documents and Contract Documents, or
 - 3.2. All Bids are rejected by OWNER, or
 - 3.3. OWNER fails to issue a notice of award to Contractor within the time specified in the Project Documents (or any extension thereof agreed to in writing by Contractor and, if applicable, consented to by Surety when required by paragraph 5 hereof).
4. Payment under this Bond will be due and payable upon default of Contractor and within 30 calendar days after receipt by Contractor and Surety of written notice of default from OWNER, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.
5. Surety waives notice of and any and all defenses based on or arising out of any time extension to issue notice of award agreed to in writing by OWNER and Contractor, provided that the time for issuing notice of award including extensions shall not in the aggregate exceed 120 days from Bid Due Date without Surety's written consent.
6. No suit or action shall commence under this Bond prior to 30 calendar days after the notice of default required in paragraph 4 above is received by Contractor and Surety, and in no case later than one year after Bid Due Date.
7. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.
8. Notice required hereunder shall be in writing and sent to Contractor and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal deliver, commercial courier or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.
9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent or representative who executed this Bond on behalf of Surety to execute, seal and deliver such Bond and bind the Surety thereby.
10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of any Bond conflicts with any applicable provision of any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.
11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

**SWORN STATEMENT UNDER SECTION 287.133 (3)(a)
FLORIDA STATUTES ON PUBLIC ENTITY CRIMES**

THIS FORM MUST BE SIGNED AND SWORN IN THE PRESENCE OF A NOTARY PUBLIC OR OTHER OFFICIAL AUTHORIZED TO ADMINISTER OATH.

1. This sworn statement is submitted to Panama City – Bay County Airport and Industrial

District by _____ (print individuals name and title)

for _____ (print name

of entity submitting sworn statement) whose business is _____

_____ and (if applicable) its Federal Employer Identification No. (FEIN) is _____ (if entity has no FEIN, include the Social Security No. of the individual signing this sworn statement).

2. I understand that a “public entity crime” as defined in Paragraph 287.133(1)(g), Florida Statutes, means a violation of any state or federal law by a person with respect to and directly related to the transaction of business with any public entity or with an agency or political subdivision of any other state or of the United States, including, but not limited to, any bid or contract for goods or services to be provided to any public entity or an agency or political subdivision of any other state or of the United States and involving antitrust, fraud, theft, bribery, collusion, racketeering, conspiracy, or material misrepresentation.

3. I understand that “convicted” or “conviction” as defined in Paragraph 287.133(1)(b), Florida Statutes, means a finding of guilt or a conviction of a public entity crime, with or without an adjudication of guilt, in any federal or state trial court of record relating to charges brought by indictment or information after July 1, 1989, as a result of a jury verdict, non-jury trial, or entry of a plea of guilty or nolo contendere.

4. I understand that an “affiliate” as defined in Paragraph 287.133(1)(a), Florida Statutes, means:

A. A predecessor or successor of a person convicted of a public entity crime; or

B. An entity under the control of any natural person, who is active in the management of the entity and who has been convicted of a public entity crime. The “affiliate” includes those officers, directors, executives, partners, shareholders, employees, members and agents who are active in the management of an affiliate. The ownership by one person of shares constituting a controlling interest in another person, or a pooling of equipment or income among persons when not for fair market value under an arm’s length agreement, shall be a prima facie case that one person controls another person. A person who knowingly enters into a joint venture with a person who has been convicted of a public entity crime in Florida during the preceding 36 months shall be considered an affiliate.

5. I understand that a "person" as defined in Paragraph 287.133 (1)(e), Florida Statutes, means any natural person or entity organized under the laws of any state or of the United States with the legal power to enter into a binding contract and which bids or applies to bid on contracts for the provision of goods or services let by a public entity, or which otherwise transacts or applies to transact business with a public entity. The term "person" includes those officers, directors, executives, partners, shareholders, and employees, members, and agents who are active in management or an entity.

6. Based on information and belief, the statement which I have marked below is true and in relation to the entity submitting this sworn statement. **(Indicate which statement applies.)**

____ Neither the entity submitting this sworn statement, nor any of its officers, directors, executives, partners, shareholders, employees, members or agents who are active in the management of the entity, nor any affiliate of the entity has been charged with and convicted of a public entity crime subsequent to July 1, 1989.

____ The entity submitting this sworn statement, or one or more of its officers, directors, executives, partners, shareholders, employees, members or agents who are active in the management of the entity, or any affiliate of the entity has been charged with and convicted of a public entity crime subsequent to July 1, 1989.

____ The entity submitting this sworn statement, or one or more of its officers, directors, executives, partners, shareholders, employees, members or agents who are active in the management of the entity, or any affiliate of the entity has been charged with and convicted of a public entity crime subsequent to July 1, 1989. However, there has been a subsequent proceeding before a Hearing Officer of the State of Florida, Division of Administrative Hearings and the Final Order entered by the Hearing Officer determined that it was not in the public interest to place the submitting this sworn statement on the convicted vendor list. **(Attach a copy of the final order).**

I UNDERSTAND THAT THE SUBMISSION OF THIS FORM TO THE CONTRACTING OFFICER FOR THE PUBLIC ENTITY IDENTIFIED IN PARAGRAPH 1 (ONE) ABOVE IS FOR THAT PUBLIC ENTITY ONLY AND, THAT HIS FORM IS VALID THROUGH DECEMBER 31 OF THE CALENDAR YEAR IN WHICH IT IS FILED. I ALSO UNDERSTAND THAT I AM REQUIRED TO INFORM THE PUBLIC ENTITY PRIOR TO ENTERING INTO A CONTRACT IN EXCESS OF THE THRESHOLD AMOUNT PROVIDED IN SECTION 287.107, FLORIDA STATUTES FOR CATEGORY TWO ON ANY CHANGE IN THE INFORMATION CONTAINED IN THIS FORM.

(Signature)

(Date)

STATE OF _____ COUNTY OF _____

PERSONALLY APPEARED BEFORE ME, the undersigned authority,

(Name of individual signing)

Who, after first being sworn by me, affixed his/her signature in the space provided above on this _____ day of _____, 20____.

Subscribed and sworn to before me this _____ day of _____, 20____.

My Commission Expires:

Notary Public

DISADVANTAGED BUSINESS ENTERPRISE PROGRAM

The following bid condition applies to this U.S. 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 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 maximum 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. **OBLIGATION** - The contractor agrees to ensure that DBE's as defined in 49 CFR Part 26 have the maximum 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. **CONTRACT 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 the DBE subcontract goal or making an acceptable good faith effort to meet said goal are conditions of being awarded this DOT assigned contract.

The owner proposes to award the contract to the lowest responsive and responsible bidder submitting a reasonable bid provided he has met the goal for DBE participation or, if failing to meet the goal, he has made an acceptable good faith effort to meet the established goal for 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 the goal established for this contract is to be measured as a percentage of the total dollar value of the contract. The DBE goal established for this contract is **7.81%**.
8. **AVAILABLE DBE'S** - The owner has on file a DBE program pending approved by the Federal Aviation Administration. This program contains a listing of DBE's (certified and uncertified). Bidders are encouraged to inspect this list to assist in locating DBE's for the work. Other DBE's may be added to the list in accordance with the owner's approved DBE program. Credit toward the DBE goal will not be counted unless the DBE to be used can be certified by the owner.
9. **CONTRACTOR'S REQUIRED SUBMISSION** - The owner requires the submission of the following information with the bid:

DISADVANTAGED BUSINESS ENTERPRISE PROGRAM

MBEs

MBE Subcontractors <u>Names/Addresses/ Identity</u>	<u>Subcontract Work Item</u>	Dollar Value of <u>Subcontract Work</u>

WBEs

Women Subcontractors <u>Names/Addresses/ Identity</u>	<u>Subcontract Work Item</u>	Dollar Value of <u>Subcontract Work</u>

OSEs

Other Socially and Economically Disadvantaged Subcontractors within the DBE Group <u>Names/Addresses/ Identity</u>	<u>Subcontract Work Item</u>	Dollar Value of <u>Subcontract Work</u>

Total Dollar Value of Subcontract Work

Total Dollar Value of Basic Bid

Total DBE Percent

%

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

If the Contractor fails to meet the contract goal established in Section 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 Section 9 above.

Suggested guidance for use in determining if good faith efforts were made by a contractor are included in 49 CFR Part 26.

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 49 CFR Part 26 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 contacting 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 bidder hereby assures that he will meet one of the following as appropriate:

- a. The DBE participation goal as established in the General Conditions.
- b. The DBE participation percentage as shown in Section 9, which was submitted as a condition of contract award.

Agreements between bidder/proposer and a DBE in which the DBE promises not to provide subcontracting quotations to other bidders/proposers are prohibited. The bidder shall make a good faith effort to replace a DBE subcontract that is unable to perform successfully with another DBE subcontractor. Substitution must be coordinated and approved by the owner.

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.

- 11. PROMPT PAYMENT** - The prime contractor agrees to pay each subcontractor under this prime contract for satisfactory performance of its contract no later than **10** days from the receipt of each payment the prime contractor receives from the owner. The prime contractor agrees further to return retainage payments to each subcontractor within **10** 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 owner. This clause applies to both DBE and non-DBE subcontractors.

DAVIS-BACON CERTIFICATION

This is to certify that I have reviewed the minimum rate wages contained in Special Provision No. 9, which were predetermined for this project by the Secretary of Labor, and I have used these rates in the preparation of this proposal. Furthermore, I agree to abide by these wages and all other provisions of the Davis-Bacon Act as it associates to this project.

Bidder's Signature

Date

Title

Notary Public

DRUG-FREE WORKPLACE CERTIFICATION

THE BELOW SIGNED BIDDER CERTIFIES that it has implemented a drug-free workplace program. In order to have a drug-free workplace program, a business shall:

1. Publish a statement notifying employees that the unlawful manufacture, distributing, dispensing, possession, or use of a controlled substance is prohibited in the workplace and specifying the actions that will be taken against employees for violations of such prohibition.
2. Inform employees about the dangers of drug abuse in the workplace, the business's policy of maintaining a drug-free workplace, any available drug counseling, rehabilitation and employee assistance programs, and the penalties that may be imposed upon employees for drug abuse violations.
3. Give each employee engaged in providing the commodities or contractual services that are under bid a copy of the statement specified in subsection 1.
4. In the statement specified in subsection 1, notify the employees that, as a condition of working on the commodities or contractual services that are under bid, the employee will abide by the terms of the statement and will notify the employer of any conviction of, or plea of guilty or nolo contendere to, to any violation of Chapter 893 or of any controlled substance law of the United States or any state, for a violation occurring in the workplace no later than five (5) days after such conviction.
5. Impose a sanction on or require the satisfactory participation in drug abuse assistance or rehabilitation program if such is available in the employee's community, by any employee who is convicted.
6. Make a good faith effort to continue to maintain a drug-free workplace through implementation of this section.

As the person authorized to sign this statement, I certify that this firm complies fully with the above requirements.

DATE: _____

COMPANY: _____

SIGNATURE: _____

ADDRESS: _____

NAME: _____
(Typed or Printed)

_____ TITLE: _____

PHONE #: _____

CERTIFICATION OF NON-SEGREGATED FACILITIES

(Must be completed and submitted with the Bid)

The Bidder certifies that it does not maintain or provide for its employee any segregated facilities at any segregated facilities at any of its establishments, and that it does not permit its employees to perform their services at any location under its control where segregated facilities are maintained. The Bidder certifies further that it will not maintain or provide for its employees segregated facilities at any of its establishments, and that it will not permit its employees to perform their services at any location under its control where segregated facilities are maintained. The Bidder 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 room, work areas, restrooms and washrooms, restaurants and other eating 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 basis of race, color, religion, or national origin, because of habit, local customs, or any other reason. The Bidder agrees that (except where it has obtained identical certification from proposed subcontractors for the specific time period) it 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 it will retain such certification in its files.

(Name of Bidder)

(Signature)

(Title)

(Dated)

BUY AMERICAN CERTIFICATION

Except for those items listed by the Bidder below or on a separate and clearly identified attachment to this Bid, the Bidder hereby certifies that steel and each manufactured product, is produced in the United States (as defined in the Special Provisions under this section entitle Buy American-Steel and Manufactured Products) and that components of unknown origin are considered to have been produced or manufactured outside the United States.

PRODUCT

COUNTY OF ORIGIN

_____	_____
_____	_____
_____	_____
_____	_____

(Name of Bidder)

By: _____

Title: _____

Dated: _____

TRENCH SAFETY ACT CERTIFICATION
(Under Chapter 553, Florida Statutes)

Bidder recognizes that this Contract includes work for trench excavation in excess of five feet deep. Bidder acknowledges the requirement set forth in Section 553.63 of the Florida Statutes titled Trench Safety Act. Bidder certifies that the required trench safety standards will be in effect during the period of construction of the Project and Bidder agrees to comply with all such required trench safety standards.

The amount of _____ dollars (\$) has been separately identified for the cost of compliance with the required trench safety standards; said amount is included within the Contract Price.

FORM OF NON-COLLUSION AFFIDAVIT

State of _____

County of _____

_____ being first duly

sworn, deposes and says that he/she is _____

(Sole owner, a partner, president, secretary, etc.) of _____, the party making the foregoing Bid, that such Bid is genuine and not collusive or sham; that said Bidder has not colluded, conspired, connived, or agreed, directly or indirectly, with any Bidder or person, to put in a sham Bid, or that such other person shall refrain from bidding, and has not in any manner, directly or indirectly sought by agreement or collusion, or communications or conference, with any person, to fix the Bid Price, or of that of any other Bidder, or to secure any advantage against Owner any person interested in the proposed Contract; and that all statements in said Bid Proposal or Bid are true; and further, that such Bidder has not, directly or indirectly submitted this Bid, or the contents thereof, or divulged information or data relative thereto to any association or to any member or agent thereof.

_____(Bidder)

Sworn to and subscribed before me this [_____] day of _____, 20____.

Notary Public – State of _____

(NOTARY SEAL)

(Name typed, printed or stamped)

My Commission Expires: _____

E-VERIFY COMPLIANCE CERTIFICATION

In accordance with Executive Order Number 11-116 from the office of the Governor of the State of Florida, Bidder hereby certifies that the U.S. Department of Homeland Security's E-Verify system will be used to verify the employment eligibility of all new employees hired by the contractor during the contract term, and shall expressly require any subcontractors performing work or providing services pursuant to the contract to likewise utilize the U.S. Department of Homeland Security's E-Verify system to verify the employment eligibility of all new employees hired by the subcontractor during the contract term; and shall provide documentation of such verification to the OWNER upon request.

As the person authorized to sign this statement, I certify that this company complies/will comply fully with the above requirements.

DATE: _____

SIGNATURE: _____

COMPANY: _____

NAME: _____
(Typed or Printed)

ADDRESS: _____

TITLE: _____

E-MAIL: _____

PHONE NO.: _____

**NORTHWEST FLORIDA BEACHES INTERNATIONAL AIRPORT
PANAMA CITY – BAY COUNTY AIRPORT AND INDUSTRIAL DISTRICT
CONSTRUCTION CONTRACT**

Contractor: (TBD)
Address: (TBD)
Contact: (TBD)
Telephone: (TBD)
Facsimile: (TBD)

Contract Title: Transient Apron Phase 1 Extension
Work Location: Northwest Florida Beaches International Airport
Owner: Panama City – Bay County Airport and Industrial District
Address: 6300 West Bay Parkway
Panama City Beach, FL 32409
Telephone: (850) 763-6751

This construction contract (hereinafter the “Contract”) is effective as of the [] day of [], 20[] between Owner and the above named Contractor who hereby agree that all Work specified below shall be performed by the Contractor in accordance with all provisions of this Contract, consisting of the following Project Documents:

1. Contract Form of Agreement, along with all addenda issued prior to execution of this Contract and modifications issued after execution of this Contract, including but not limited to duly issued Change Notices/Orders (as such term is defined in the General Conditions) and Amendments.
2. Exhibit “A” – Bid Proposal dated _____, General Conditions, Special Conditions
3. Exhibit “B” – Scope of Work
4. Exhibit “C” – Drawings and Technical Specifications

Contractor shall commence the Work within ten (10) calendar days after the Notice to Proceed is issued by the Owner, which shall be issued within ninety (30) calendar days (or such longer period of time the Owner and Contractor may mutually agree to in writing) of the execution of this Contract, Owner shall issue a Notice to Proceed to Contractor.

The Owner’s issuance of the Notice to Proceed is expressly conditioned upon the satisfaction of the following condition precedents:

1. The Performance Bond has been delivered and is acceptable to the Owner,
2. The Payment Bond has been delivered and is acceptable to the Owner,
3. The Insurance Certificate has been delivered and is acceptable to the Owner,
4. A Project Schedule for the Work has been delivered and is acceptable to the Owner, and
5. A Schedule of Values for the Work has been delivered and is acceptable to the Owner.

Owner shall determine, in its sole discretion, whether these condition precedents have been satisfied, shall be final and binding on the Contractor. Should Owner determine that all such condition precedents have not been satisfied (or otherwise waived in writing by Owner, in its sole discretion), then Owner may send Contractor written notice that Owner has elected to terminate this Contract, in which event this Contract shall automatically be terminated and neither party shall have any further liability or obligation hereunder whatsoever to the other party. In the event of any such termination prior to issuance of the Notice to Proceed, Contractor acknowledges and agrees that it shall not be entitled to and Owner shall not be liable for any payments to Contractor arising out of or relating to this Contract.

Work to Be Performed: Except as specified elsewhere in the contract, Contractor shall furnish all plant; labor; materials; tools; supplies; equipment; transportation; supervision; safety; technical; professional; and other services; and shall perform all operations necessary and required to satisfactorily accomplish the Work all strictly in accordance with all requirements of the Bid and Project Documents.

Security: If awarded a Contract, undersigned may be required to obtain security clearance and SIDA badges for all workers on site.

Schedule: If awarded a Contract, undersigned must have in possession all material and equipment by _____, 20__; start Work on site after _____, 20__; complete the Work and turnover completed Work by _____, 20__.

Compensation: As full consideration for the satisfactory performance by Contractor of this Contract, Owner shall pay to Contractor compensation in accordance with the prices set forth in the "Bid Proposal" included in Exhibit 'A' and the payment provisions of the Project Documents.

Payment Procedures

The successful Bidder shall be required as a pre-requisite of the Notice to Proceed to provide the Owner a "Schedule of Values", a statement allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing "Contractor's Application for Payment". Only a Contractor's Application for Payment that corresponds directly with the "Schedule of Values" approved by the Owner or its representative will be acceptable for payment consideration.

The Contractor shall submit three (3) signed and notarized original copies of each Application of Payment (AIA Document G702 and G703) on a monthly basis for Work completed and/or stored to date along with waivers of lien, schedule updates and other pertinent information. The Owner's Representative will review the Application for Payment, evaluate the status of the Work and recommend the amount to be authorized for payment less 10% retained by the Owner until the project is complete.

The amount authorized for payment will be made to the Contractor by the Owner within forty-five (45) days of the date of the Application of Payment. Retained amounts shall be

released to the Contractor within thirty (30) calendar days of final acceptance of the Work by the Owner or its representative.

Insurance: The Contractor shall procure and maintain the following described insurance, except for coverage(s) specifically waived by Owner, on policies and with insurers acceptable to Owner. These insurance requirements shall not limit the liability of Contractor.

The insurance coverage(s) and limits required of Contractor under this Contract are designed to meet the minimum requirements of Owner and the Owner does not represent these types or amounts of insurance to be sufficient or adequate to protect the Contractor's interests or liabilities. Contractor alone shall be responsible to the sufficiency of its own insurance program.

The Contractor and the Contractor's subcontractors and sub-subcontractors shall be solely responsible for all of their property, including but not limited to any materials, temporary facilities, equipment and vehicles, and for obtaining adequate and appropriate insurance covering any damage or loss to such property. The Contractor and the Contractor's subcontractors and sub-subcontractors shall expressly waive any claim against the Owner arising out of or relating to any damage or loss of such property, even if such damage or loss is due to the fault or neglect of the Owner or anyone for whom the Owner is responsible. The Contractor is obligated to include, or cause to be included, provisions similar to this paragraph in all of the Contractor's subcontracts and its subcontractor's contracts with their sub-subcontractors.

The Contractor's deductibles/self insurance retention's must be disclosed to Owner and are subject to Owner's approval. The Contractor is responsible of the amount of any deductible or self-insured retention. Any deductible or retention applicable to any claim or loss shall be the responsibility of Contractor and shall not be greater than \$25,000, unless otherwise agreed to, in writing, by Owner.

Insurance required of the Contractor or any other insurance of the Contractor shall be considered primary, and insurance of Owner shall be considered excess, as may be applicable to claims or losses which arise out of or relate to the Work or this Project.

- A. Workers' Compensation and Employers' Liability Insurance Coverage: The Contractor shall purchase and maintain workers' compensation and employers' liability insurance for all employees engaged in the Work, in accordance with the laws of the State of Florida. Limits of coverage shall not be less than:

\$500,000	Limit Each Accident
\$500,000	Limit Disease Aggregate
\$250,000	Limit Disease Each Employee

- B. Commercial General Liability Coverage: Contractor shall purchase and maintain commercial general liability insurance on a full occurrence form. Coverage shall include, but not be limited to, Premises and Operations, Personal Injury, Contractual for this Contract, Independent Contractors, Broad Form Property

Damage, Products and Completed Operation Liability Coverage(s) and shall not exclude coverage for the "X" (Explosion), "C" (Collapse) and "U" (Underground) Property Damage Liability exposures. Limits of coverage shall not be less than:

\$1,000,000	Combined Single Limit Each Occurrence
\$2,000,000	Aggregate Limit

Contractor shall add Owner as an additional insured through the use of Insurance Service Office Endorsements No. CG 20.20.22.85 wording or equivalent, or broader, an executed copy of which shall be attached to or incorporated by reference on the Certificate of Insurance to be provided by Contractor pursuant to the requirements of the Project Documents.

- C. Business Automobile Liability Coverage: The Contractor shall purchase and maintain Business Automobile Liability Insurance as to ownership, maintenance, use, loading and unloading of all of Contractor's owned, non-owned, leased, rented or hired vehicles with limits not less than:

\$1,000,000	Combined Single Limit Each Accident

- D. Excess or Umbrella Liability Coverage: Contractor shall purchase and maintain Excess Umbrella Liability Insurance or Excess Liability Insurance on a full occurrence form providing the same continuous coverage(s) as required for the underlying Commercial General, Business Automobile and Employers' Liability Coverage(s) with no gaps in continuity of coverage(s) or limits with Owner added by endorsement to the policy as an additional insured in the same manner as is required under the primary policies, and shall not be less than:

\$4,000,000	Each Occurrence/Accident

This Contract embodies the entire agreement between Owner and Contractor and supersedes all other writings. The parties shall not be bound by or be liable for any statement, representation, promise, inducement, or understanding not set forth herein.

OWNER
Panama City – Bay County Airport
and Industrial District

CONTRACTOR
(TBD)

By:

By:

Authorized
Signature: _____

Authorized
Signature: _____

Print Name: _____

Print Name: _____

ATTACHMENT 1

BOND NO. _____

PUBLIC PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS: That _____ as Principal, and _____, as Surety, located at _____ (Business Address) are held and firmly bound to _____, as Obligee in the sum of (\$_____) for the payment whereof we bind ourselves, our heirs, executors, personal representatives, successors and assigns, jointly and severally.

WHEREAS, Principal has entered into a contract dated as of the ____ day of _____, 20__, with Obligee for _____, which contract is incorporated by reference and made a part hereof, and is referred to herein as the Contract.

THE CONDITION OF THIS BOND is that if Principal:

1. Promptly makes payment to all claimants as defined in Section 255.05(1), Florida Statutes, supplying Principal with labor, services, materials or supplies, used directly or indirectly by Principal in the prosecution of the Work provided for in the Contract, then this bond is void; otherwise it remains in full force; and

2. Any changes in or under the Contract and compliance or noncompliance with any formalities connected with the Contract or the changes do not affect Surety's obligation under this Bond. The Surety and the Principal further agree that any modifications, additions or alterations which may be made in the terms of the Contract or in the work to be done thereunder, or any extensions of the Contract, or other forbearance on the part of either Obligee or the Principal to the other, shall not in any way release the Principal and the Surety or either of them, their heirs, assigns, executors, administrators and successors, from their liability hereunder, notice to Surety of any such modifications, additions, extensions or forbearance being hereby expressly waived; and

3. Any action instituted by a claimant under this Payment Bond for payment must be in accordance with the notice and time limitation provisions in Section 255.05(2), Florida Statutes; and

4. The penal sum of this Payment Bond is in addition to the penal sum of the Performance Bond being executed concurrently herewith.

IN WITNESS WHEREOF, the above parties have executed this instrument this ____ day of _____, 20__, the name of each party being affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

Signed, sealed and delivered

PRINCIPAL:

Witnessed as to Principal

By: _____

Name: _____

Its: _____

STATE OF _____

COUNTY OF _____

This foregoing instrument was acknowledged before me this ____ day of _____,
20__, by _____, as _____ of
_____, a _____ corporation, on behalf
of the corporation. He/she is personally known to me OR has produced
_____ as identification.

My Commission Expires:

Notary Public (Signature)

(AFFIX NOTARY SEAL)

(Printed Name)

(Title or Rank)

(Serial Number, if any)

ATTEST:

(Witnessed as to Surety)

Witnesses

SURETY:

(Printed Name)

(Business Address)

(Authorized Signature)

(Printed Name)

OR

As Attorney in Fact
(Attach Power of Attorney)

As Attorney in Fact
(Attach Power of Attorney)

(Business Address)

(Printed Name)

(Telephone Number)

STATE OF _____
COUNTY OF _____

This foregoing instrument was acknowledged before me this ____ day of _____,
20__, by _____, as _____ of
_____, a _____ corporation, on behalf
of the corporation. He/she is personally known to me OR has produced
_____ as identification.

My Commission Expires:

Notary Public (Signature)

(AFFIX NOTARY SEAL)

(Printed Name)

(Title or Rank)

(Serial Number, if any)

ATTACHMENT 2

BOND NO. _____

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS: That _____ as Principal, and _____, as Surety, located at _____ (Business Address) are held and firmly bound to _____, as Obligee in the sum of (\$_____) for the payment whereof we bind ourselves, our heirs, executors, personal representatives, successors and assigns, jointly and severally.

WHEREAS, Principal has entered into a contract dated as of the ____ day of _____, 20__, with Obligee for _____, which contract is incorporated by reference and made a part hereof, and is referred to herein as the Contract.

THE CONDITION OF THIS BOND is that if Principal:

1. Performs the Contract at the times and in the manner prescribed in the Contract; and
2. Pays Obligee any and all losses, damages, expenses, costs and attorneys' fees, including appellate proceedings, that Obligee sustains because of any default by Principal under the Contract, including, but not limited to, all delay damages, whether liquidated or actual, incurred by Obligee; and
3. Performs the guarantee of all work and materials furnished under this Contract for the time specified in the Contract, then this bond is void; otherwise it remains in full force.

Any changes in or under the Contract and compliance or noncompliance with any formalities connected with the Contract or the changes do not affect Surety's obligation under this Bond.

The Surety further agrees that whenever the Principal shall be, and is declared by Obligee to be, in default under the Contract and said default shall be construed to be any breach of any of the provisions of the Contract on the part of the Principal, as directed by Obligee, the Surety shall promptly remedy the default and will complete the Contract in accordance with its terms and conditions and shall fully indemnify and hold harmless Obligee from all costs, damages, and expenses which may arise thereafter (including reasonable attorneys' fees) and which the Obligee may suffer by reason of Surety's failure to so do.

The Surety and the Principal further agree that any modifications, additions, or alternations which may be made in the terms of the Contract or in the work to be performed thereunder, or any extensions of the Contract, or other forbearance on the part of either Obligee or the Principal to the other, shall not in any way release the Principal and the Surety, or either of them, their heirs, assigns, executors, administrators and successors, from their liability hereunder, notice to the Surety of any such modifications, additions, extensions or forbearance being hereby expressly waived.

The penal sum of this Performance Bond is in addition to the penal sum of the Payment Bond being executed concurrently herewith.

This instrument shall be construed in all respects as a common law bond. It is expressly understood that the time provisions and statute of limitations under Section 255.05, Florida Statutes, shall not apply to this bond.

IN WITNESS WHEREOF, the above parties have executed this instrument this ____ day of _____, 20__, the name of each party being affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

Signed, sealed and delivered

PRINCIPAL:

Witnessed as to Principal

By: _____
Name: _____
Its: _____

STATE OF _____
COUNTY OF _____

This foregoing instrument was acknowledged before me this ____ day of _____, 20__, by _____, as _____ of _____, a _____ corporation, on behalf of the corporation. He/she is personally known to me OR has produced _____ as identification.

My Commission Expires:

Notary Public (Signature)

(AFFIX NOTARY SEAL)

(Printed Name)

(Title or Rank)

(Serial Number, if any)

ATTEST:

SURETY:

(Printed Name)

(Business Address)

(Authorized Signature)

(Printed Name)

(Witnessed as to Surety)

OR

As Attorney in Fact
(Attach Power of Attorney)

As Attorney in Fact
(Attach Power of Attorney)

(Business Address)

(Printed Name)

(Telephone Number)

Witnesses

STATE OF _____
COUNTY OF _____

This foregoing instrument was acknowledged before me this ____ day of _____,
20__, by _____, as _____ of
_____, a _____ corporation, on behalf
of the corporation. He/she is personally known to me OR has produced
_____ as identification.

My Commission Expires:

Notary Public (Signature)

(AFFIX NOTARY SEAL)

(Printed Name)

(Title or Rank)

(Serial Number, if any)

CERTIFICATE OF ATTORNEY – OWNER

I, the undersigned,

the duly authorized and acting legal representative of

PANAMA CITY-BAY COUNTY AIRPORT AND INDUSTRIAL DISTRICT

do hereby certify that I have examined the foregoing contract and the Surety Bond attached thereto and the manner of execution thereof, and that I am of the opinion that each of the aforesaid agreements has been executed by the proper representatives, and that said representatives have respectively the full power and authority to execute said agreements on behalf of the respective parties named therein, and that the foregoing agreements constitute valid and legally binding obligations upon the parties executing the same in accordance with the terms, conditions and provisions thereof.

Signed: _____

Title: _____

Date: _____

RELEASE OF LIENS

STATE OF: _____

COUNTY OF: _____

Before me, the undersigned Notary Public in and for the said County and State personally appeared _____, representing the Contractor _____, who being duly sworn according to law deposes and says that all labor, materials, and outstanding claims and indebtedness of whatever nature arising out of the performance of the Contract with _____ (Owner) for _____ (Contract No.) have been paid in full and that for the final payment in the amount of \$ _____, the Contractor releases and discharges the Owner and his authorized representatives from any liens or claims or any nature because of or arising from this Contract and/or its performance, which it has had, has or may have in the future.

By: _____

Sworn to and subscribed before me this ____ day of _____, 20____.

Notary Public – State of _____

(NOTARY SEAL)

(Name typed, printed or stamped)

My Commission Expires: _____

ADVERTISEMENT OF COMPLETION

_____ (Contractor)
_____ (Address)
gives notice of completion of _____ (Project)
and sets _____ as the date of final settlement.

All persons and firms should file all claims for payment to the below address prior to the settlement date:

**Northwest Florida Beaches International Airport
Panama City – Bay County Airport and Industrial District (Owner)
6300 West Bay Parkway
Panama City Beach, FL 32409**

By: _____ (Name)
_____ (Title)
Leg: _____ (Publication Dates)

ECP GENERAL AND SPECIAL CONDITIONS



NORTHWEST FLORIDA BEACHES INTERNATIONAL AIRPORT

NORTHWEST FLORIDA BEACHES INTERNATIONAL AIRPORT

GENERAL CONDITIONS

GC-1 Independent Contractor

Contractor represents that it is fully experienced, properly qualified, registered, licensed, equipped, organized, and financed to perform the Work under this contract. Contractor shall act as an independent contractor and is not an agent of the Owner in performing this contract, maintaining complete control over its employees and all its suppliers and subcontractors of any tier. Nothing contained in this contract or any lower-tier purchase orders or subcontracts awarded by the Contractor shall create any contractual relationship with the Owner and/or its representative. Contractor shall perform the Work hereunder in accordance with its own methods subject to compliance with the Contract.

GC-2 Authorized Representatives

Before starting the Work, Contractor shall designate in writing an authorized representative acceptable to the Owner or its representative to represent and act for Contractor and shall specify any and all limitations of such representative's authority.

GC-3 Notices

Any notices required hereunder shall be in writing and may be served either personally on the authorized representative of the receiving party at the Jobsite, by facsimile, by courier or express delivery, or by certified mail to the facsimile number or address of that party, or at such facsimile number or address as may have been directed by written notice.

GC-4 Contract Interpretations

All questions concerning interpretation or clarification of this Contract or applicable standards and codes, including the discovery of conflicts, discrepancies, errors or omissions, or the acceptable performance thereof by contractor, shall be immediately submitted in writing to the Owner or its representative for resolution. At all times Contractor shall proceed with the Work in accordance with the determinations, instructions, and clarifications of the Owner or its representative. Contractor shall be solely responsible for requesting instructions, interpretations or clarifications and shall be solely liable for any costs and expense arising from its failure to do so.

GC-5 Order of Precedence

All Project Documents and subsequently issued Change Orders and Amendments are essential parts of this Contract and a requirement occurring in one is binding as though occurring in all. In resolving conflicts, discrepancies, errors or omissions the following order of precedence shall be used:

1. Invitation to Bid
2. Special Conditions
3. General Conditions
4. Scope of Work
5. Specifications

GC-6 Standards and Codes

Wherever references are made in this contract to standards or codes in accordance with which the Work under this Contract is to be performed, the edition or revision of the standards or codes current on the effective date of this contract shall apply unless otherwise expressly stated. In case of conflict between any referenced standards and codes and any Project Documents, the Project Documents shall govern.

GC-7 Laws and Regulations

All applicable laws, ordinances, statutes, rules, regulations, orders or decrees, including Owner's Airport Security Program and other formally adopted rules and regulations, in effect at the time the Work under this Contract is performed shall apply to Contractor and its employees, representative, its subcontractors, sub-subcontractors, material suppliers and others under Contractor's Contract for the Work.

GC-8 Permits

Except as otherwise specified, Contractor shall procure and pay for all permits, licenses, certifications and other applicable governing authority requirements and inspections, other than inspection performed by the Owner or its representative and shall furnish any documentation, bonds, security, or deposits required to permit performance of the Work. Owner shall submit drawings and specifications to Bay County Builder Services on January 5, 2015 to initiate review and expedite review process. Contractor, upon award, shall immediately follow up, submit, secure, procure and pay for required permits with agencies.

GC-9 Taxes

Contractor shall pay all taxes, levies, duties and assessments of every nature due in connection with the Work under this Contract and shall make any and all payroll deductions and withholdings required by law, and hereby indemnifies and holds harmless the Owner and its representative from any liability on account of any and all such taxes, levies, duties, assessments, and deductions.

GC-10 Labor, Personnel and Work Rules

Contractor shall employ only competent and skilled personnel to perform the Work and shall remove from the Jobsite any Contractor personnel determined to be unfit or to be acting in violation of any provision of this Contract. Contractor is responsible for maintaining labor relations in such manner that there is harmony among workers and shall comply with and enforce Project and Jobsite procedures, regulations, work rules, and work hours established by the Owner or its representative.

The Owner may, at its sole discretion, directly or through its representative deny access to the Jobsite to any individual by written notice to Contractor and Contractor shall promptly replace such individual with another who is fully competent and skilled to perform the Work.

Contractor shall, to the extent permissible under applicable law, comply with the provisions of all labor agreement(s) which apply to the Work performed under this Contract. Unless other methods are established by Owner, the rules, regulations, and procedures of the Plan for Settlement of Jurisdictional Disputes in the Construction Industry, or any successor agreement thereto, shall be used to determine work assignments and to resolve jurisdictional disputes on work covered by this Contract.

GC-11 Commercial Activities

Neither Contractor nor its employees shall establish any commercial activity or issue concessions or permits of any kind to third parties for establishing commercial activities on the Jobsite or any other lands owned or controlled by Owner.

GC-12 Publicity and Advertising

Contractor shall not make any announcement, take any photographs, or release any information concerning this Contract, or Project, or any part thereof to any member of the public, press, business entity, or any official body unless prior written consent is obtained from the Owner.

GC-13 Safety and Health

Contractor shall be solely responsible for conducting operations under this Contract to avoid risk of harm to the health and safety of persons and property and for inspecting and monitoring all its equipment, materials and work practices to ensure compliance with its obligations under this contract. Contractor shall assume all responsibility and liability with respect to all matters regarding safety and health of its employees and the employees of Contractor's suppliers and subcontractors of any tier, with respect to the risks under this Contract.

GC-14 Environmental Requirements

Throughout performance of the Work, Contractor shall conduct all operations in such a way as to minimize impact upon the natural environment and prevent any spread or release of contaminated or hazardous substances and comply with all applicable laws, regulations, ordinances, statutes, rules, and codes governing environmental requirements and conduct the Work based on the requirements of this Contract including compliance with permit requirements and Project plans and approvals. Contractor shall indemnify Owner for any penalties, fines, and costs incurred, including costs for environmental studies and remediation, that arise due to Contractor's improper performance of the Work or Contractor's negligence.

GC-15 Site Conditions and Natural Resources

Contractor shall have the sole responsibility for satisfying itself concerning the nature and location of the Work and the general and local conditions, including but not limited to, transportation, access, disposal, handling/storage materials, labor availability, water, electrical power, road conditions, climatic conditions, soil conditions, seasons, hydrology, physical site condition, project area, topography, ground surface conditions, equipment and facilities needed preliminary to and during the performance of the Work. The failure of Contractor to acquaint itself with any applicable conditions will not relieve Contractor of the responsibility for properly estimating the difficulties, time or cost of successfully performing Contractor's obligations under this Contract.

GC-16 Differing Site Conditions

Where the Owner or its representative has made investigations of subsurface, surface and soil conditions in areas where work is to be performed under this Contract, such investigations are made by Owner or its representative for the purpose of study and design. If such records of such investigations are included in the Project Documents, the interpretation of such records shall be the sole responsibility of Contractor and the Owner or its representative assumes any responsibility whatsoever in respect to the sufficiency or accuracy of such investigations, the records thereof, or the interpretations set forth and there is no warranty or guarantee, either express or implied, that the conditions indicated by such investigations or records thereof are representative of those existing throughout such areas, or any part thereof, or that unforeseen developments may not occur, or that materials other than or in proportions different from those indicated may not be encountered.

GC-17 Contractor's Work Area

Contractor shall confine its operations to the areas designated in the plans as the areas of Work or access to the Work or areas designated for storage. Contractor shall coordinate with Owner any planned disruption of operations at, or adjacent to, Worksite. Contractor shall, at all times, keep its work areas in neat, clean and safe conditions. Upon completion of any portion of the Work, Contractor shall promptly remove from the work area all its equipment, storage, temporary structures, surplus materials not to be used at or near the same location during later stages of the Work. Upon completion of the Work and prior to final payment, Contractor shall at its expense satisfactorily dispose of all rubbish, remove all plant, equipment, and materials and leave the premises in a neat, clean and safe condition. If Contractor fails to comply with these foregoing requirements, Owner may accomplish same at Contractor's expense.

GC-18 Cooperation with Others

The Owner may have its employees, representatives, other contractors and other subcontractors working at the Jobsite during the performance of this Contract and Contractor's work or use of certain facilities may be interfered with as a result of such concurrent activities. Owner reserves the right to require Contractor to schedule the order of performance of the Work in such a manner as will minimize the interference with work of any of the parties involved.

GC-19 Responsibility for Work, Security and Property

Contractor shall be responsible for and shall bear any and all risk of loss or damage to work in progress and, pursuant to the Special Condition titled "Title and Risk of Loss," to equipment and materials. Contractor shall be responsible for all receiving and unloading of materials for the Work, storing of materials and equipment subject to degradation by the elements and secure same from other damage or loss. Contractor shall at all times conduct all operations under this Contract in a manner to avoid the risk of loss, theft, or damage by vandalism, sabotage or any other means to any equipment, materials, work or other property at the Jobsite. Contractor shall plan and conduct its operations so as not to enter into lands in their natural state unless pre-authorized by the Owner, damage, close, obstruct or otherwise interfere with any utility installation, ditch, highway, road, structure or other property, and if necessary to do so, receive the Owner's pre-permission prior to such obstruction or interference.

GC-20 Cleaning Up

Contractor shall, at all times, keep its work areas in a neat, clean and safe condition. Upon completion of any portion of the Work, Contractor shall promptly remove from the work area all its equipment, construction plant, temporary structures and surplus materials not to be used at or near the same location during later stages of the Work.

Upon completion of the Work and prior to final payment, Contractor shall at its expense satisfactorily dispose of all rubbish, remove all plant, buildings, equipment and materials belonging to Contractor and return to Owner's warehouse or Jobsite storage area all salvageable Owner supplied materials. Contractor shall leave the premises in a neat, clean and safe condition.

In event of Contractor's failure to comply with the foregoing requirements, Owner may accomplish same at Contractor's expense.

GC-21 Contractor's Plant, Equipment and Facilities

Contractor shall provide and use for the Work only such construction plant and equipment as are capable of producing the quality and quantity of work and materials required by this contract and within the time or times specified in the Contract Documents.

Before proceeding with the Work, Contractor shall furnish Owner's Representative and Owner with information and drawings relative to such equipment, plant and facilities as Owner's Representative or Owner may request. Upon written order of Owner or Owner's Representative, Contractor shall discontinue operation of unsatisfactory plant, equipment or facilities and shall either modify the unsatisfactory items or remove such items from the Jobsite.

GC-22 Use of Completed Portions of Work

Whenever, as determined by Owner, any portion of the Work performed by Contractor is suitable for use, Owner may, upon written notice, occupy and use such portion. Use shall not constitute acceptance, relieve Contractor of its responsibilities, or act as a waiver by Owner of any terms of this contract.

Contractor shall not be liable for normal wear and tear or for repair of damage caused by any misuse during such occupancy or use by Owner. If such use increases the cost or time of performance of remaining portions of the Work, Contractor shall, pursuant to the General Condition titled "Changes," be entitled to an equitable adjustment in its compensation or schedule under this contract.

If, as a result of Contractor's failure to comply with the provisions of this contract, such use proves to be unsatisfactory to Owner, Owner shall have the right to continue such use until such portion of the Work can, without injury to Owner, be taken out of service for correction of defects, errors, omissions or replacement of unsatisfactory materials or equipment as necessary for such portion of the Work to comply with the contract; provided that the period of such operation or use pending completion of appropriate remedial action shall not exceed twelve (12) months unless otherwise mutually agreed in writing between the parties.

Contractor shall not use any permanently installed equipment until such use is approved in writing by Owner. When such use is approved, Contractor shall, at Contractor's expense properly use and maintain and, upon completion of such use, recondition such equipment as required to meet specifications.

If Owner's Representative or Owner furnishes an operator for such permanently installed equipment, all services performed shall be under the complete direction and control of Contractor, and such operator shall be considered Contractor's employee for all purposes other than payment of such operator's wages, Worker's Compensation Insurance or other benefits.

GC-23 Inspection, Quality Surveillance, Rejection of Materials and Workmanship

All material and equipment furnished and work performed shall be properly inspected by Contractor at its expense, and shall at all times be subject to quality surveillance and quality audit by Owner's Representative, Owner or their authorized representatives who, upon reasonable notice, shall be afforded full and free access to the shops, factories or other places of business of Contractor and its suppliers and subcontractors of any tier for such quality surveillance or audit. Contractor shall provide safe and adequate facilities, drawings, documents and samples as requested, and shall provide assistance and cooperation including stoppage of work to perform such examination as may be necessary to determine compliance with the requirements of this contract. Any work covered prior to any quality surveillance or test by Owner's Representative or Owner shall be uncovered and replaced at the expense of contractor if such covering interferes with or obstructs such inspection or test. Failure of Owner's Representative or Owner to make such quality surveillance or to discover defective design, equipment, materials or workmanship shall not relieve Contractor of its obligations under this contract nor prejudice the rights of Owner thereafter to reject or require the correction of defective work in accordance with the provisions of this contract.

If any work is determined by Owner's Representative or Owner to be defective or not in conformance with this contract the provisions of the General Condition titled "Warranty" shall apply.

GC-24 Testing

Unless otherwise provided in the Contract, testing of soils, equipment, materials or work shall be performed by Contractor at its expense and in accordance with the Project Documents. Should tests in addition to those required by this Contract be desired by the Owner or its representative, Contractor will be given reasonable notice by the Owner or its representative for such testing and at the Owner's expense.

GC-25 Expediting

The equipment and materials furnished and work performed under this contract shall be subject to expediting by Owner's Representative and/or Owner or their representative who shall be afforded full and free access to the shops, factories, and other places of business of Contractor and its suppliers and subcontractors of any tier for expediting purposes. As required by Owner's Representative or Owner, Contractor shall provide detailed schedules and progress reports for use in expediting and shall cooperate with Owner's Representative and/or Owner in expediting activities.

GC-26 Excusable Delays

If Contractor's performance of this Contract is prevented or delayed by any unforeseeable cause, existing or future, which is beyond the reasonable control of the parties and without the fault or negligence of Contractor, Contractor shall, within twenty-four (24) hours of the commencement of any such delay, give the Owner or its representative written notice thereof and within seven (7) calendar days of commencement of the delay, a written description of the anticipated impact of the delay on performance of the Work. Delays attributable to within the control of Contractor's suppliers or subcontractors of any tier shall be deemed delays within the control of Contractor. Contractor expressly acknowledges and agrees that it shall receive no damages for delay and Contractor's sole remedy, if any, against Owner will be the right to seek an extension of time.

GC-27 Changes

Owner may at any time, without notice to the sureties if any, by written Change Order unilaterally make any change in the Work within the general scope of this Contract, including but not limited to changes in the method, manner

and sequence of Contractor work, in Owner furnished facilities, equipment, materials services or site(s) and directing acceleration or deceleration in performance of the Work and modifying the Contract Schedule or the Contract Milestones.

If the Owner and Contractor are unable to agree on a Change Order for the requested change, Contractor shall, nevertheless, promptly perform the change as directed by the Owner in a written Construction Change Directive. In that event, the Contract Price and Contract Time shall be adjusted in the Construction Change Directive as determined by the Owner. If Contractor disagrees with the Owner's adjustment determination, Contractor must make a claim strictly in accordance with the terms of this General Condition or else be deemed to have waived any claim it might otherwise have had on that matter.

In addition, in the event of an emergency which Owner determines endangers life or property, Owner may use oral orders to Contractor for any work required by reason of such emergency. Contractor shall commence and complete such emergency work as directed by the Owner or its representative and such orders will be confirmed by written Change Order.

If at any time Contractor believes that acts or omissions of Owner or its representative constitute a change to the Work not covered by a Change Order or requirements of the Project Documents, Contractor shall within seven (7) calendar days of discovery of such act or omission submit a written Change Order Request explaining in detail the basis for the request. The Owner will either issue a Change Order or deny the request in writing.

If Contractor intends to assert a claim for an equitable adjustment under this clause it must, within ten (10) calendar days after receipt of a Change Order or denial of same provide written notification of such intent and within a further twenty (20) calendar days, submit to Owner or its representative a written proposal setting forth the nature, schedule, impact and monetary extent of such claim in sufficient detail to permit thorough analysis and negotiations.

Change Order Requests from the Contractor shall be presented to the Owner in sufficient detail to allow for evaluation. Minimum information shall include Contractor, Sub-contractor and Sub-sub-contractor itemization of Labor, Materials and Equipment costs included in the Change Order. Labor shall include labor-hours and hourly rates. Hourly rates will be the direct hourly rate of the personnel performing the work plus an allowable labor burden. The labor burden shall either be an audited labor burden or 0.5%, if an audited rate is not available. Material and Equipment shall be included at their direct costs, which shall be supported by itemized invoices for billing. If equipment is rented thru a related company, the rental rate shall be no greater than the average rental rate for similar equipment in Bay County. Related company shall mean a company owned or controlled by any owner or officer of the Contractor and Subcontractor.

Subcontractor's and Sub-sub-contractor's allowable mark-up for overhead and profit on Labor, Material and Equipment in the Change Order shall be individually no greater than 10% and in aggregate no greater than 15%.

Contractor's allowable mark-up for overhead and profit on Labor, Material and Equipment in the Change Order shall be 10%.

Additional General Conditions shall not be included in a Change Order unless the Change Order changes affect the project's schedule critical path and changes the Time of Completion. Any change order request affecting the critical path shall include a detailed update to the Project Schedule and show the change effect on the critical path.

Any delay by Contractor in giving notice or presenting a proposal for adjustment under this clause shall be grounds for rejection and waiver of the claim and in no case shall a claim by Contractor be considered if asserted after final payment under this Contract.

Contractor shall proceed diligently with performance of the Work, pending final resolution of any request for relief, dispute, claim, appeal, or action arising under the Contract, and comply with any direction from the Owner or its representative.

GC-28 Disputes

Contractor shall not be entitled to claim and neither Owner nor its representative shall be liable to Contractor or its suppliers or subcontractors of any tier in tort (including negligence), or contract except as specifically provided in this Contract. Any claim arising out of or attributable to the interpretation or performance of this Contract which cannot be resolved by negotiation shall be considered a dispute within the meaning of this clause. If for any reason Owner and Contractor are unable to resolve a claim for an adjustment, Contractor shall notify Owner or its representative in writing that a dispute exists and request a final determination by Owner. Owner shall, within thirty (30) calendar days of its receipt of any written request by Contractor, provide a written final determination setting for the contractual basis for its decision and defining what contract adjustments it considers equitable. Upon Contractor's written acceptance of Owner's determination the Contract will be modified and the determination implemented accordingly or, failing agreement, the dispute resolution procedures as set forth in the Special Conditions titled "Dispute Resolution" shall be complied with.

GC-29 Records and Audit

The Contractor shall maintain an acceptable cost accounting system. The Contractor agrees to provide the Sponsor, the Federal Aviation Administration and the Comptroller General of the United States or any of their duly authorized representatives' access to any books, documents, papers, and records of the contractor which are directly pertinent to the specific contract for the purpose of making audit, examination, excerpts and transcriptions. The Contractor agrees to maintain all books, records and reports required under this contract for a period of not less than three years after final payment is made and all pending matters are closed.

Contractor shall maintain records and accounts in connection with the performance of this Contract which will accurately document incurred costs, both direct and indirect, of whatever nature for a period of three (3) years from the Final Acceptance of the Work unless a longer period of time is otherwise specified by applicable law. Owner or its representative shall have the right to examine and copy, at all reasonable times and with advance notification, such records and accounts for the purpose of verifying payments or requests for payment when costs are the basis of such payment and to evaluate the reasonableness of proposed contract price adjustments and claims.

GC-30 Warranty

Contractor warrants to Owner that materials furnished under this contract shall be of clear title and of the most suitable grade of their respective kinds for their intended uses, unless otherwise specified and shall also conform to the requirements of this Contract. All workmanship shall be first class and performed in accordance with sound construction practices acceptable to Owner or its representative.

If at any time prior to Final Acceptance or after Final Acceptance in cases of latent defects, fraud or such gross mistakes as amount to fraud, Owner, Owner's Representative, or Contractor discover any defect in the equipment, materials, workmanship, or Contractor-provided design, immediate written notice shall be given to the other parties. Contractor shall within a reasonable time propose corrective actions to cure such defects.

Owner may at its sole discretion, or through Owner's Representative, direct Contractor in writing and Contractor agrees to:

1. Rework, repair, or remove and replace defective equipment and materials or re-perform defective workmanship to acceptable quality at a time and in a manner acceptable to Owner;
2. Cooperate with others assigned by Owner to correct such defects and pay to Owner all actual costs reasonably incurred by Owner in performing or in having performed corrective actions; or
3. Propose and negotiate in good faith an equitable reduction in the Contract price in lieu of corrective action.

The warranty described by this General Condition is in addition to any more specific warranty required by the Invitation to Bid, the Scope of Work, the Specifications, or provided by the Contractor as part of its bid or as a separate document.

GC-31 Backcharges

Owner may, in addition to any other amounts to be retained as defined in the Contract, retain from any sums otherwise owing to Contractor amounts sufficient to cover the full costs of any Contractor failure to comply with provisions of this Contract or Contractor acts or omissions in the performance of any part of this Contract, including but not limited to, violation of any applicable law, order, rule, or regulation, including those regarding safety, hazardous materials or environmental requirements; correction of defective or nonconforming work by repair, rework, replacement or other appropriate means when Contractor states, or by its actions indicates, that it is unable or unwilling to proceed with corrective action in a reasonable time; and/or the Owner is required to take action or perform work for Contractor, such as cleanup, off-loading or completion of incomplete work.

Owner may also backcharge against Contractor for work done or cost incurred to remedy these or any other Contractor defaults, errors, omissions or failures to perform or observe any part of this Contract. Owner may, but shall not be required to, give Contractor written notice before performing such actions or work or incurring such cost. Cost of backcharge work shall include labor costs including payroll additives, incurred net delivered material costs, incurred lower-tier supplier and subcontractor costs directly related to performing the corrective action, equipment and tool rentals are prevailing rates in the Jobsite area and a factor, determined by the Owner, but not greater than sixty percent (60%), shall be applied to the total of these items for Owner's overhead, supervision, administrative and other related costs.

Owner shall separately invoice or deduct and retain from payments otherwise due to Contractor the cost as provided herein. Owner's right to backcharge is in addition to any and all other rights and remedies provided in this Contract or by law. The performance of backcharge work by Owner shall not relieve Contractor of any of its responsibilities under this Contract including but not limited to express or implied warranties, specified standards for quality, contractual liabilities an indemnifications, and meeting the milestones of the Special Condition titled "Commencement, Progress and Completion of the Work."

GC-32 Indemnity

To the maximum extent permitted by Florida law, Contractor shall indemnify and hold harmless Owner and its officers and employees and its representatives from any and all liabilities, claims, damages, penalties, demands, judgments, actions, proceedings, losses or costs, including, but not limited to, reasonable attorneys' fees and paralegals' fees, whether resulting from (1) any claimed breach of this Contract by Contractor or (2) from personal injury, property damage, direct or consequential damages, or economic loss, to the extent caused by the negligence, recklessness, or intentional wrongful misconduct of Contractor or anyone employed or utilized by the Contractor in the performance of this Contract.

GC-33 Consequential Damages

Except as expressly provided below in the second paragraph of this Section GC-33, Contractor and Owner shall waive all claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes damages incurred by Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work. This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with the requirements herein.

Notwithstanding anything in this Section GC-33 or any other term of the Project Documents to the contrary, it is acknowledged and agreed by Contractor that expressly excluded from the above referenced waiver of consequential damages provisions are any consequential damages arising out of or relating to this Contract suffered by Owner for which Contractor otherwise would be liable as provided in the following three (3) sentences. Consequential damages are not waived by Owner to the extent such consequential damages would be covered and paid for by any applicable insurance. Further, with respect to such consequential damages incurred by Owner that are not paid by any applicable insurance, Owner does not waive and Contractor shall be liable to Owner for such consequential damages up to the total cumulative amount of those reasonable amounts expected by Contractor as

profit. Further still, with respect to any consequential damages incurred by Owner that are due to the gross negligence or intentional wrongful acts or omissions of Contractor or anyone for whom Contractor is responsible, Owner does not waive and Contractor shall be liable to Owner for all such consequential damages. Nothing herein shall be construed as a cap or limitation on any liquidated damages Contractor may owe Owner pursuant to the terms of the Project Documents.

GC-34 Assignments and Subcontracts

Any assignment of this Contract or rights hereunder, in whole or part, without the prior written consent of Owner shall be void, except that upon ten (10) calendar days written notice to Owner or its representative, Contractor may assign monies due or to become due under this Contract, provided that any assignment of monies shall be subject to proper set-offs in favor of Owner and any deductions provided for in this Contract. Purchase orders and subcontracts of any tier must include provisions to secure all rights and remedies of Owner provided under this Contract, and must impose upon the lower-tier supplier and subcontractor all of the duties and obligations required to fulfill this Contract. No assignment or subcontract shall relieve Contractor or its sureties of the responsibilities under this Contract.

GC-35 Suspension

Owner or its representative may by written notice to Contractor suspend at any time the performance of all or any portion of the Work to be performed under the Contract. After receipt of such notice, Contractor shall immediately discontinue work on the date and to the extent specified in the notice, place no further orders or subcontracts for material, services, or facilities with respect to the suspended work other than to the extent required in the notice, continue to protect and maintain the Work including those portions on which work has been suspended, and take any other reasonable steps to minimize cost associated with such suspension.

Upon receipt of notice to resume suspended work, Contractor shall immediately resume performance under this Contract to the extent required in the notice.

GC-36 Termination for Default

Notwithstanding any other provisions of this contract, Contractor shall be considered in default of its contractual obligations under this Contract if it performs work which fails to conform to the requirements of this Contract; fails to make progress so as to endanger performance of this contract within the required time periods; abandons or refuses to proceed with any of the Work, including modifications or changes directed pursuant to the General Conditions titled "Changes;" fails to fulfill or comply with any of the terms of this Contract; engages in behavior that is dishonest, fraudulent or constitutes a conflict of interest with Contractor's obligations under this Contract; or Contractor becomes insolvent or makes a general assignment for the benefit of creditors or reasonable grounds for insecurity arise with respect to Contractor's performance.

Upon the occurrence of any of the foregoing, Owner shall notify Contractor in writing of the nature of the failure and of Owner's intention to terminate the Contract for default. If Contractor does not cure such failure within seven (7) calendar days from receipt of notification, or sooner if safety is involved, or fails to provide satisfactory evidence that such default will be corrected within a reasonable time, Owner may, by written notice to Contractor, and without notice to Contractor's sureties, if any, terminate in whole or in part Contractor's right to proceed with the Work and Owner may prosecute the Work to completion by contract or by any other method deemed expedient. Owner may take possession of and utilize any data, designs, licenses, equipment, materials, plant, tools, and property to any kind furnished by Contractor and necessary to complete the Work.

Contractor and its sureties, if any, shall be liable for all costs in excess of the Contract price for such terminated work incurred by Owner in the completion of the Work, including cost of administration of any purchase order or subcontract awarded to others for completion.

Upon termination for default, Contractor shall immediately discontinue work on the date and to the extent specified in the notice and place no further purchase orders or subcontracts to the extent that they relate to the performance of the terminated work; inventory, maintain and turn over to Owner all data, designs, licenses, equipment, materials, plant, tools, and property furnished by Contractor or provided by Owner for performance of the terminated work;

promptly obtain cancellation upon terms satisfactory to Owner of all purchase orders, subcontracts, rentals, or any other agreements existing for performance of the terminated work or assign those agreements as directed by Owner or its representative; cooperate with Owner or its representative in the transfer of data, designs, licenses, and information and disposition of work in progress so as to mitigate damages; comply with other reasonable requests from Owner or its representative regarding the terminated work; and continue to perform in accordance with all of the terms and conditions of this Contract such portion of the Work that is not terminated.

If, after termination pursuant to this clause, it is determined for any reason that Contractor was not in default, the rights and obligations of the parties shall be the same as if the notice of termination had been issued pursuant to the General Condition entitled Optional Termination.

GC-37 Optional Termination

Owner may, at its option, terminate for convenience any of the Work under this Contract in whole or, from time to time, in part, at any time by written notice to Contractor. Such notice shall specify the extent to which the performance of the Work is terminated and the effective date of such termination.

Upon receipt of such notice Contractor shall immediately discontinue the Work on the date and to the extent specified in the notice and place no further purchase orders or subcontracts for materials, services, or facilities, other than as may be required for completion of such portion of the Work that is not terminated; promptly obtain assignment or cancellation upon terms satisfactory to Owner of all purchase orders, subcontracts, rentals, or any other agreements existing for the performance of the terminated work or assign those agreements as directed by Owner or its representative; assist Owner or its representative in the maintenance, protection and disposition of work in progress, plant, tools, equipment, property and materials acquired by Contractor or furnished by Owner or its representative under this Contract; and complete performance of such portion of the Work which is not terminated.

Upon any such termination, Contractor shall waive any claims for damages including loss of anticipated profits; on account thereof, but as the sole right and remedy of Contractor, Owner shall pay in accordance with (1) the Contract price corresponding to the work performed in accordance with this Contract prior to such notice of termination; (2) all reasonable costs for work thereafter performed as specified in such notice; (3) reasonable administrative costs of settling and paying claims arising out of the termination of work under purchase orders or subcontracts; (4) reasonable increased costs incurred in demobilization and the disposition of residual material, plant, and equipment; and (5) reasonable overhead and profit on items 2 through 4.

Contractor shall submit with thirty (30) calendar days after receipt of notice of termination, a written statement setting forth its proposal for an adjustment to the Contract price to include only the incurred costs described in this clause. Owner and its representative shall review, analyze, and verify such proposal, and negotiate an equitable adjustment, and the Contract shall be modified accordingly.

GC-38 Final Inspection and Acceptance

When Contractor considers the Work, or any Owner identified independent portion of the Work under this Contract to be complete and ready for acceptance, Contractor shall notify Owner or its representative in writing. Owner and its representative, with Contractor's cooperation, will conduct such reviews, inspections and tests as may be reasonably required to satisfy the Owner and its representative that the Work, or identified portion of the Work, conforms to all requirements of the Contract. If all or any part of the Work covered by Contractor's notice does not conform to contract requirements, Owner or its representative shall notify Contractor of such nonconformance and Contractor shall take corrective action and then have the nonconforming work re-inspected until all contract requirements are satisfied.

Owner's written Certification of Final Acceptance of the Work under this Contract shall be final and conclusive except with regard to latent defects, fraud or such gross mistake as amount to fraud, or with regard to Owner's rights under the General Conditions titled "Warranty".

GC-39 Non-Waiver

Failure by Owner to insist upon strict performance of any terms or conditions of this contract, or failure or delay to exercise any rights or remedies herein or by law, or failure to properly notify Contractor in the event of breach, or the acceptance of or payment for any goods or services, hereunder, or the review or failure to review designs shall not release Contractor from any of the warranties or obligations of this Contract and shall not be deemed a waiver of any right of Owner to insist upon strict performance hereof or any of its rights or remedies as to any prior or subsequent default hereunder nor shall any termination of work under this contract by Owner operate as a waiver of any of the terms hereof.

GC-40 Government Restricted Parties and Commodities

Contractor acknowledges that all applicable export rules and regulations of the origin countries shall apply to the exports of commodities, software and technology (technical data and assistance) under this contract. Contractor also acknowledges that other rules and regulations may restrict the use of certain parties under this contract. Such rules and regulations are generally described below.

1. Restricted Parties Lists

Country governments and international organizations such as the United Nations and European Union publish Restricted Parties List (“Lists”) that identify parties (such as known or suspected terrorists, money launderers and drug traffickers) restricted from certain or all types of transactions. Contractor shall review all applicable Lists prior to initiating transactions with any third party for the performance of all or any portion of the Work to ensure such third party is not identified on any applicable Lists. Contractor shall not enter into any transactions with any third party identified on any applicable Lists.

2. Licensing Requirements

(a) **General:** Each country has export regulations that control commodities, software and technology for various reasons, such as national security, foreign policy, anti-terrorism, and to avoid the proliferation of weapons and potential weapons, e.g. certain nuclear, chemical or biological agents. Numerous countries have export regulations that specifically address dual-use items, meaning commercial items with the potential to be applied to military and/or weapon proliferation uses. Contractor shall ensure that all necessary export licenses are obtained, or license exceptions confirmed, prior to the export of any commodity, software, or technology.

(b) **United States of America (USA) Export Licensing Requirements:** Contractor is solely responsible for obtaining any required USA export licenses for all commodities, software, and technology being supplied in the performance of the Work, except for any commodity, software or technology supplied by Owner. A copy of the export license, or rationale as to why a license is not required, shall be provided to Owner’s Representative or Owner upon request.

Contractor shall be responsible for any delay resulting from Contractor’s failure to comply fully and timely with any such rule or regulation described above.

Contractor hereby agrees to indemnify, defend and hold Owner’s Representative, Owner, each of their respective affiliates and the respective directors, officers, employees and representatives of each harmless from and against any and all claims, legal or regulatory actions, final judgments, reasonable attorneys’ fees, civil fines and any other losses which any of them may incur as a result of Contractor’s failure to comply with its obligations under this clause.

GC-41 Equal Employment Opportunity

Contractor is aware of and is fully informed of Contractor’s obligation under Executive Order 11246 and, where applicable, shall comply with the requirements of such Order and all orders, rules, and regulations promulgated thereunder unless exempted therefrom.

Without limitation of the foregoing, Contractor's attention is directed to 41 Code of Federal Regulations (CFR), Section 60-1.4, and the clause titled "Equal Opportunity Clause" which, by this reference, is incorporated herein.

Contractor is aware of and is fully informed of Contractor's responsibilities under Executive Order No. 11701 "List of Job Openings for Veterans" and, where applicable, shall comply with the requirements of such Order and all orders, rules and regulations promulgated thereunder unless exempted therefrom.

Without limitation of the foregoing, Contractor's attention is directed to 41 CFR section 60-250 et seq. and the clause therein titled "Affirmative Action Obligations of Contractors and Subcontractors for Disabled Veterans and Veterans of the Vietnam Era," which by this reference, is incorporated herein.

Contractor certifies that segregated facilities, including but not limited to washrooms, work areas and locker rooms, are not and will not be maintained or provided for Contractor's employees. Where applicable, Contractor shall obtain a similar certification from any of its subcontractors, vendors, or suppliers performing the Work under this contract.

Contractor is aware of and is fully informed of Contractor's responsibilities under the Rehabilitation Act of 1973 and the Americans with Disabilities Act and, where applicable, shall comply with the provisions of each Act and the regulations promulgated thereunder unless exempted therefrom.

Without limitation of the foregoing, Contractor's attention is directed to 41 CFR Section 60-741 and the clause therein titled "Affirmative Action Obligations of Contractors and Subcontractors for Handicapped Workers," which by this reference, is incorporated herein.

GC-42 Disadvantaged Business Enterprises Program

Contractor shall support Owner's policy and commitment to maximizing, where practical, business opportunities for Disadvantaged Business Enterprises (as identified in the Special Conditions item SC-21) by actively identifying, encouraging and assisting in their participation and otherwise making a good faith effort to achieve the DBE goals established for this project.

GC-43 Authority of Owner's Representative

The Owner's Representative shall decide any and all questions which may arise as to the quality and acceptability of materials furnished, work performed, and as to the manner of performance and rate of progress of the Work. The Owner's Representative also shall decide all questions that may arise as to the interpretation of the specifications or plans relating to the Work. The Owner's Representative shall determine the amount and quality of the several kinds of Work performed and materials furnished which are to be paid for under the contract.

GC-44 Conformity with Plans and Specifications

All Work and all materials furnished shall be in conformity with the dimensions, quality, quantity, material, and testing requirements that are specified (including specified tolerances) in the Contract Documents.

If the Owner's Representative finds the materials furnished, Work performed, match or the finished product not within conformity with the Contract Documents but that the portion of the Work affected will, in its opinion, result in a finished project having a level of safety, economy, durability, and workmanship acceptable to the Owner, it will advise the Owner of its recommendation that the affected Work be accepted and remain in place. In this event, the Owner's Representative will document its determination and recommend to the Owner a basis of acceptance that will provide for an adjustment in the contract price for the affected portion of the Work. The Owner's Representative determination and recommended contract price adjustments will be based on the Owner's Representative's reasonable judgment and such test or retests of the affected Work as are, in its opinion, needed. Owner may accept or reject the Owner's Representative's recommendation (including any price adjustment recommendation) in its sole discretion. Changes in the contract price shall be covered by Change Order or supplemental agreement, as applicable.

If the Owner's Representative finds the materials furnished, Work performed, or the finished product are not in conformity with the Contract Documents and which Owner has not decided to accept with a price adjustment as provided above, the affected Work or materials shall be removed and replaced or otherwise corrected by and at the expense of Contractor in accordance with the Owner's Representative's written orders.

For the purpose of this subsection, nothing herein shall be construed as waiving Contractor's responsibility to complete the Work in accordance with the Invitation to Bid or Bid Specifications.

Neither Owner's Representative nor Owner will be responsible for the Contractor's means, methods, techniques, sequences, or procedures of construction or the safety precautions incident thereto.

GC-45 Authority and Duties of Inspectors

Inspectors employed by the Owner or Owner's Representative shall be authorized to inspect all Work done and all materials furnished. Such inspection may extend to all or any part of the Work and to the preparation, fabrication, or manufacture of the materials used. Inspectors are not authorized to revoke, alter, or waive any provision of the contract. Inspectors are not authorized to issue instructions contrary to the plans and specifications or to act as foreman for the Contractor.

Inspectors employed by the Owner or Owner's Representative are authorized to notify the Contractor or its 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 Owner's Representative for its initial decision.

GC-46 Source of Supply and Quality Requirements

The materials used in the Work shall conform to the requirements of the Contract Documents. 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, Contractor shall furnish complete statements to the Owner's Representative as to the origin, composition, and manufacture of all materials to be used in the Work. Such statements shall be furnished promptly after execution of the contract but, in all cases, prior to delivery of such materials.

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

GC-47 Samples, Tests, and Cited Specifications

Except for those tests to be performed by Contractor pursuant to the Contract Documents, all materials used in the Work may be inspected, tested, and approved or denied by the Owner's Representative at any time before incorporation in the Work, its decision. Any Work in which untested materials are used at the Contractor's risk. Any untested materials used in the Work and are found to not comply with requirements of the Contract Documents, such materials shall be removed and replaced with materials tested and approved by the Owner's Representative at the Contractor's expense. Materials found to be unacceptable will not be paid for.

Unless otherwise designated in the Contract Documents, tests in accordance with the cited standard methods of ASTM, AASHTO, Federal Specifications, Commercial Item Descriptions, and all other cited methods, which are current on the date of advertisement of the bids, will be made by the Owner's Representative or Owner at the Owner's expense. The testing organizations performing on site field tests shall have copies of all referenced standards on the construction site for use by all technicians and other personnel including the Contractor's representative at its request. Unless otherwise designated, samples will be taken by a qualified representative of the Owner's Representative. All materials being used are subject to inspection, test, or rejection at any time prior to or after incorporation into the Work. Copies of all tests will be furnished to the Contractor's representative at its request.

The Contractor shall employ a testing organization to perform all Contractor required tests. The Contractor shall submit to the Owner's Representative resumes on all testing organizations and individual persons who will be performing the tests. The Owner's Representative shall have the right, following review of such credentials, to reject any organization or individual persons performing the tests at its decision and require the Contractor to find alternative organizations or individuals acceptable to the Owner's Representative. All the test data shall be reported to the Owner's Representative after the results are known. Legible, printed reports of all test data shall be given to the Owner's Representative within five (5) business days of such tests. After completion of the Work, and prior to final payment, Contractor shall submit a final report to the Owner's Representative showing all test data reports, plus an analysis of all results showing ranges, averages, and corrective action taken on all failing tests.

GC-48 Certification of Compliance

The Owner's Representative may permit the use, prior to sampling and testing, of certain materials or assemblies when accompanied by manufacturer's certificates of compliance stating that such materials or assemblies fully comply with the requirements of the contract. The certificate shall be signed by the manufacturer. Each lot of such materials or assemblies delivered to the work must be accompanied by a certificate of compliance in which the lot is clearly identified.

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

The form and distribution of certificates of compliance shall be as approved by the Owner's Representative.

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

Should the Contractor propose to furnish an "or equal" material or assembly, it shall furnish the manufacturer's certificates of compliance as hereinbefore described for the specified brand name material or assembly prior to and be approved by the Owner's Representative prior to its order and delivery to the Work. Any material or assembly furnished "or equal" not prior approved shall be removed from the Work at the Contractor's cost and shall not be paid for.

GC-49 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 Documents 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 Owner's Representative or Owner at or on an Owner approved site,
- b. The Contractor has furnished the Owner's Representative with acceptable evidence of the quantity and quality of such stored or stockpiled materials,
- c. The Contractor has furnished the Owner's Representative with satisfactory evidence that the material and transportation costs have been paid,
- d. The Contractor has furnished the Owner legal title (free of liens or encumbrances of any kind) to the material so stored or stockpiled,
- e. The Contractor has furnished the Owner evidence that the material so stored or stockpiled is insured against loss by damage to or disappearance of such materials at any time prior to use in the Work,

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

In no case will the amount of partial payments for materials on hand exceed the allocated portion of the contract price for such materials or the contract price for the contract item in which the material is intended to be used, less any applicable retained portions. The Contractor shall bear all costs associated with the partial payment of stored or stockpiled materials in accordance with the provisions of this subsection.

GC-50 Bid Security

Guarantee will be required with each bid as a certified check on a solvent bank or a bid bond in the amount of five (5) percent of the total amount of the bid, made payable to the Panama City–Bay County Airport and Industrial District.

GC-51 Bonding Requirements

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

GC-52 Performance and Payment Securities

The successful Bidder shall deliver to the Owner or the Owner's Authorized Representative no later than ten (10) calendar days after contract award and prior to commencing the Work or entering the Project Site, a Performance and Payment Bond in the form supplied in the bid and project documents and executed, as surety, by a corporation acceptable to the Owner and authorized to issue such bonds in the jurisdiction of Bay County, Florida. Such Performance Bond and Payment Bond shall each be for one hundred percent (100%) of the total as set forth in Bidder's proposal. The cost of such Performance Bond and Payment Bond shall be included in the Guaranteed Maximum Price submitted in the Bidder's Proposal

END OF GENERAL CONDITIONS



NORTHWEST FLORIDA BEACHES INTERNATIONAL AIRPORT

NORTHWEST FLORIDA BEACHES INTERNATIONAL AIRPORT

SPECIAL CONDITIONS

SC-1 Definitions

Whenever the following terms are used, the intent and meaning shall be interpreted as follows:

AIR OPERATIONS AREA (AOA) means any area of the airport used or intended to be used for the landing, takeoff, or surface maneuvering of aircraft including paved and unpaved areas that are used or intended to be used for the unobstructed movement of aircraft in addition to its associated runway, taxiways and/or aprons.

AIRPORT TICKET OFFICE (ATO) means any area of the airport terminal used or intended to be used for the ticketing and baggage check for passengers. This area includes staff work and break areas.

CALENDAR DAY means every day shown on the calendar.

CHANGE ORDER means a written order to the Contactor signed by Owner and its representative covering changes in the plans, specifications, or proposed quantities and establishing a basis of payment and contract time adjustment, if any, for the work affected by such changes.

CONTRACT DOCUMENTS mean all the written and drawn documents comprising the Contract for the Project.

CONTACT SCHEDULE means the Work execution schedule developed by Contactor and approved by Owner for implementation of the Work.

CONTRACTOR means the individual, partnership, Limited Liability Company or corporation, its authorized representatives, successors, and permitted assigns as identified in the Contract.

FAA means the Federal Aviation Administration of the U.S. Dept. of Transportation.

INSPECTOR means authorized representative of Owner assigned to make all necessary inspections and/or tests of the work performed or being performed, or the materials furnished or being furnished by Contractor.

JOBSITE means the designated site for the Project where the Work will be performed by the Contractor.

NOTICE TO PROCEED (NTP) means a written notice to Contractor to begin the actual work for the designated portion thereof by a specified date and date on which the Contract begins.

OWNER means Panama City–Bay County Airport and Industrial District dba Northwest Florida Beaches International Airport.

OWNER'S REPRESENTATIVE means the designated agent of the Owner to administer this Contract for the Owner, which shall be the Owner, unless a change is provided by written notice from Owner to Contractor.

PROJECT means the scope of work (Work) under this **Transient Apron Phase 1 Extension** at Northwest Florida Beaches International Airport (ECP), Panama City Beach, Florida.

SPECIFICATIONS mean a part of the Invitation to Bid containing the written directions and requirements for completing the Contract Work.

WORK means all the stated or implied activities to be performed by Contractor as required by the Project Documents.

SC-2 Insurance

The Contractor shall procure and maintain the following described insurance, except for coverage(s) specifically waived by Owner, on policies and with insurers acceptable to Owner. These insurance requirements shall not limit the liability of Contractor.

The insurance coverage(s) and limits required of Contractor under this Invitation to Bid are designed to meet the minimum requirements of Owner and the Owner does not represent these types or amounts of insurance to be sufficient or adequate to protect the Contractor's interests or liabilities. Contractor alone shall be responsible to the sufficiency of its own insurance program.

The Contractor and the Contractor's subcontractors and sub-subcontractors shall be solely responsible for all of their property, including but not limited to any materials, temporary facilities, equipment and vehicles, and for obtaining adequate and appropriate insurance covering any damage or loss to such property. The Contractor and the Contractor's subcontractors and sub-subcontractors shall expressly waive any claim against the Owner arising out of or relating to any damage or loss of such property, even if such damage or loss is due to the fault or neglect of the Owner or anyone for whom the Owner is responsible. The Contractor is obligated to include, or cause to be included, provisions similar to this paragraph in all of the Contractor's subcontracts and its subcontractor's contracts with their sub-subcontractors.

The Contractor's deductibles/self-insurance retention's must be disclosed to Owner and are subject to Owner's approval. The Contractor is responsible of the amount of any deductible or self-insured retention. Any deductible or retention applicable to any claim or loss shall be the responsibility of Contractor and shall not be greater than \$25,000, unless otherwise agreed to, in writing, by Owner.

Insurance required of the Contractor or any other insurance of the Contractor shall be considered primary, and insurance of Owner shall be considered excess, as may be applicable to claims or losses which arise out of or relate to the Work or this Project.

A. Workers' Compensation and Employers' Liability Insurance Coverage: The Contractor shall purchase and maintain workers' compensation and employers' liability insurance for all employees engaged in the Work, in accordance with the laws of the State of Florida. Limits of coverage shall not be less than:

\$500,000 Limit Each Accident
\$500,000 Limit Disease Aggregate
\$250,000 Limit Disease Each Employee

B. Commercial General Liability Coverage: Contractor shall purchase and maintain commercial general liability insurance on a full occurrence form. Coverage shall include, but not be limited to, Premises and Operations, Personal Injury, Contractual for this Contract, Independent Contractors, Broad Form Property Damage, Products and Completed Operation Liability Coverage(s) and shall not exclude coverage for the "X" (Explosion), "C" (Collapse) and "U" (Underground) Property Damage Liability exposures. Limits of coverage shall not be less than:

\$1,000,000 Combined Single Limit Each Occurrence
\$2,000,000 Aggregate Limit

Contractor shall add Owner as an additional insured through the use of Insurance Service Office Endorsements No. CG 20.20.22.85 wording or equivalent, or broader, an executed copy of which shall be attached to or incorporated by reference on the Certificate of Insurance to be provided by Contractor pursuant to the requirements of the Project Documents.

C. Business Automobile Liability Coverage: The Contractor shall purchase and maintain Business Automobile Liability Insurance as to ownership, maintenance, use, loading and unloading of all of Contractor's owned, non-owned, leased, rented or hired vehicles with limits not less than:

\$1,000,000 Combined Single Limit Each Accident

D. Excess or Umbrella Liability Coverage: Contractor shall purchase and maintain Excess Umbrella Liability Insurance or Excess Liability Insurance on a full occurrence form providing the same continuous coverage(s) as required for the underlying Commercial General, Business Automobile and Employers' Liability Coverage(s) with no gaps in continuity of coverage(s) or limits with Owner added by endorsement to the policy as an additional insured in the same manner as is required under the primary policies, and shall not be less than:

\$4,000,000 Each Occurrence/Accident

SC-3 Owner Furnished Drawings and Specifications

Owner's Representative will furnish specifications and/or design drawings of the Project for each part of the Work under this contract. Such drawings and specifications will give the information required for the preparation of shop detail drawings by Contractor.

Contractor shall, upon receipt thereof, check promptly all specifications and/or drawings furnished and shall notify Owner's Representative and Owner of any omissions or discrepancies in such specifications or drawings found.

All specifications and/or drawings for the Work are identified as the Passenger Boarding Bridges (PBB). Should any addenda be issued or other modifications to the specifications and/or drawings occur prior to NTP of the contract, Owner's Representative will prepare a consolidated and conformed set of specifications and/or drawings marked "Issued for Bid" and issued by Owner's Representative. Contractor shall perform the Work in accordance with the "Issued for Bid" specifications and/or drawings. Contractor shall immediately review the "Issued for Construction" specifications and/or drawings and promptly notify the Owner's Representative and Owner in writing if Contractor believes anything in the "Issued for Bid" specifications and/or drawings represents a material change from what was reflected in the bid documents, addenda, and changes/modifications thereafter accepted by the Contractor with the Contract and prior to the NTP and identify any effects on cost and schedule.

SC-4 Owner Furnished Utilities, Facilities, Materials and Equipment

Owner will not furnish to Contractor any utilities, facilities, materials and/or equipment. Owner shall designate in the Project Documents or in written form to Contractor's request for such designation the location where Contractor facilities for storage may be temporarily placed.

SC-5 Permits

Any required permits shall be provided by Contractor. Except as otherwise specified, Contractor shall procure and pay for all permits, licenses, certifications and other applicable governing authority requirements and inspections, other than inspection performed by the Owner or its representative and shall furnish any documentation, bonds, security, or deposits required to permit performance of the Work. Owner shall submit drawings and specifications to Bay County Builder Services to initiate review and expedite review process. Contractor, upon award, shall immediately follow up, submit, secure, procure and pay for required permits.

SC-6 Contractor Furnished Drawings, Data and Samples

Owner's Representative and Owner's permission to proceed with the Work does not constitute acceptance or approval of submittals including, but not limited to, design details, calculations, analyses, test methods, construction methods, certificates or materials developed or selected by Contractor and does not relieve Contractor from full compliance with the Contract Documents. Drawings required of the Contractor if not specifically identified in the specifications shall include drawings for fabrication of Contractor furnished equipment or materials, installation of Contractor furnished equipment or materials, planning and performance of the Work under this contract, material samples, material certificates and other appropriate data.

DRAWINGS: All drawings required to be submitted by Contractor shall be certified by Contractor to be correct, shall show the contract number and shall be furnished in accordance with the contract drawings and data requirements and forms. The Owner's Representative or its representative shall review Contractor's drawings and a reproducible drawing marked with one of the following codes will be returned to Contractor:

- a. Reviewed, No Comments,
- b. Reviewed, Comments as Noted (Work May Proceed),
- c. Rejected, Revise and Resubmit,
- d. No Review Required.

All drawings submitted by Contractor shall be submitted to the Owner's Representative for review at least thirty (30) calendar days before fabrication, installation, or performance is commenced and at Contractor's expense.

SAMPLES: All samples required to be submitted by Contractor shall be certified by Contractor to be representative of materials to be incorporated in the Work, shall show the contract number and shall be furnished in accordance with the contract drawings and data requirements and forms. All samples submitted by Contractor shall be submitted to the Owner's Representative for review at least fifteen (15) calendar days before materials are incorporated into the Work and at Contractor's expense. The Owner's Representative or its representative shall review the sample and return the Contractor's submittal form marked as noted for drawings.

CERTIFICATES AND DATA: Where certificates are required, one (1) copy of each certificate and one (1) computer file of same shall be submitted by and at the expense of Contractor. Such submittal shall be made not less than thirty (30) calendar days prior to the time that the materials represented by such certificates are needed for incorporation into the Work. Certificates shall be subject to review and material represented by such certificates shall not be fabricated, delivered to the Jobsite or incorporated into the Work without such review.

Certificates shall clearly identify the material being certified and shall include, but not be limited to, providing the following information: Contractor's name, project name, contract number, name of item, manufacturer's name, and reference to the appropriate drawing, technical specification section and paragraph number, all as applicable.

AS-BUILT DRAWINGS AND SPECIFICATIONS: During construction, Contractor shall keep a current marked-up controlled set of as-built drawings on the Jobsite as an accurate record of all deviations between work as shown on the drawings and work as installed. These drawings shall be available to the Owner's Representative, Owner or their representatives for inspection at any time during regular business hours. Contractor shall at its expense and no later than thirty (30) calendar days after final acceptance and before final payment furnish to the Owner's Representative a complete set of signed marked-up as-built reproducible (bond paper) drawings with "As-Built" clearly printed on each sheet and a PDF electronic copy of same. Contractor will keep a current marked-up controlled set of as-built specifications on the Jobsite annotated to clearly indicate all substitutions that are incorporated into the Work. Where the selection of more than one product is specified, annotation shall show which product was installed.

SC-7 Commencement, Progress, Completion of the Work and Project Schedule

Contractor shall complete the Work under this Invitation to Bid within five (5) months of Notice to Proceed unless otherwise negotiated, and approved, by the Owner.

Contractor will provide, in a form acceptable to Owner and/or its representative, a project schedule in sufficient detail to clearly outline the Work to be performed under this Contract and milestone dates for major work events such as the start and completion of major components of the Project. The Project Schedule will include the project's critical path identifying the sequence and duration of events that determine the project completion date. The project schedule is one of the prerequisites to issuance of the Notice to Proceed after the execution of the Contract. The Owner's Representative shall review the Project Schedule and shall accept, accept with comment, or reject with comment. Contractor shall revise the schedule as required by the Owner's Representative and resubmit until accepted.

Contractor shall periodically update the Project Schedule as required and no less than monthly to support the pay-application to promptly reflect the progress of the Work. Should any of the work not be performed as indicated and be later than originally planned to perform, a recovery plan shall be presented to the Owner or its representative for approval.

Contractor shall provide weekly a three week look ahead schedule of items to be ongoing in the next three weeks.

SC-8 Temporary Access and Haul Roads

Access to Secured Areas will be granted in accordance with the Owner's TSA-approved Airport Security Program. Haul roads and routes will be identified during a scheduled pre-construction meeting with the Contractor.

SC-9 Safety, Health and Security Requirements

Contractor will comply with all applicable federal, state and local laws, ordinances, statutes, rules, regulations, orders or decrees, including the Airport Safety Program and other rules and regulations adopted by Owner, in effect at the time the Work under this Contract is performed shall apply to Contractor and its employees, representative, its subcontractors, sub-subcontractors, material suppliers and others under Contractor's Contract for the Work.

SC-10 Applicable Law

This contract shall be governed by and construed in accordance with the laws of State of Florida excluding its conflict of law rules which may apply the laws of any other jurisdiction, and each party hereto agrees not to assert as a defense in any proceeding that it is not subject to the laws of State of Florida.

SC-11 Invoicing and Payment

Contractor shall prepare and submit invoices monthly or at some other pre-approved interval with estimates submitted for review by Owner and its representative at least ten (10) calendar days prior to formal submittal period for review and field inspection to verify estimated payment amounts requested. Following review and Owner's and its representative's approvals, Contractor will submit invoice (form as specified in the Project Documents) for payment. Owner pays Contractor undisputed amounts submitted and approved, in accordance with the terms of the Project Documents, within forty-five (45) days of the date of submission of the submitted invoice.

Contractor shall certify in each invoice that no known outstanding mechanic's or material-men liens and all due and payable bills have been paid or are included in the application for payment.

Each invoice shall be accompanied by a submission of information regarding Disadvantaged Business Enterprise (DBE) goals and accomplishments during the period covered by the payment application in a format acceptable to OWNER (reference **Exhibit A – Monthly DBE Report and Instructions**). CONTRACTOR'S payment application shall include the amounts authorized for payment to each DBE firm and its certification number. Failure to submit DBE-related information with the request for payment will result in the payment application being returned to the CONTRACTOR for correction.

Owner shall retain ten percent (10%) of that portion of the gross amount of each payment request submitted to Owner for payment, until fifty percent (50%) completion of the Work. Owner reserves the right, at its sole discretion, to further release any portion of such retainage prior to final payment and prior to such release, require

Contractor to submit for itself, its subcontractors of all tiers, and all material suppliers, vendors, laborers and other parties acting through or under it, complete waivers and releases of all claims against Owner or its representative arising under or by virtue of this Contract to the extent of payments made and Contractor, upon request by Owner or its representative, shall in addition furnish acceptable evidence that all such claims have been satisfied.

Any amounts otherwise payable under this Contract may be withheld, in whole or in part, to the extent reasonably necessary to protect Owner's interest, if any claims are filed against Owner for which Contractor is or may become liable, Contractor is in material default of any Contract condition including, but not limited to, the schedule, quality assurance and health and safety requirements, Contractor has not submitted a Project Schedule or required updates or proper insurance certificates and continuous coverage(s) as required by the Project Documents and proof thereof of any required Performance and Payment Bonds, any adjustments that are due from previous overpayment or audit results, or offsets in favor of Owner in other transactions are asserted. Owner will pay such withheld payments if Contractor pays, satisfies or discharges any claim of Owner against Contractor under or by virtue of this Contract or cures all defaults in the performance of this Contract.

Contractor agrees to pay each of its subcontractors under this contract for satisfactory performance of its subcontract no later than ten (10) days from the receipt of each payment Contractor receives from Owner except any applicable retainage required by Owner of Contractor.

Owner shall make final payment to Contractor in accordance with Section 218.735, Fla. Stat. following Final Acceptance of the Work and after submittal of such final invoice, provided that Contractor shall have furnished Owner or its representative for itself, its subcontractors of all tiers, and all material suppliers, vendors, laborers and other parties acting through or under it, waivers and releases of all claims against Owner arising under or by virtue of this Contract, except such claims, if any, as may with the consent of Owner be specifically excepted by Contractor from the operation of the release in stated amounts to be set forth therein.

SC-12 Owner's Representative

Owner has designated a Representative to act for and on behalf of Owner for carrying out certain contract activities as expressly designated herein and may, by contract change order, modify its representative authority, replace the representative or dispense with the representative's services without relieving Contractor of any of its obligations under this Contract. Contractor acknowledges and agrees that the Owner's Representative has no authority to authorize or approve changes to the Contract.

Owner, after consultation with the Owner's Representative, shall decide any and all questions which may arise as to the quality and acceptability of materials furnished, work performed, and as to the matter of performance and rate of progress of the Work. Owner, after consultation with the Owner's Representative shall decide all questions which may arise as to the interpretation of the specifications and drawings relating to the Work, the fulfillment of the contract on the part of Contractor, and the rights of different contractors on the Project. Owner, after consultation with the Owner's Representative shall determine the amount and quality of the several kinds of work performed and materials furnished which are to be paid for under this contract.

SC-13 Nondisclosure

Contractor agrees not to divulge to third parties, without the written consent of Owner, any information obtained from or through Owner or its representative in connection with the performance of this Contract unless the information is (1) known to Contractor prior to obtaining the same from Owner or its representative, (2) disclosed to Contractor in the public domain, or (3) obtained by Contractor from a third party who did not receive same, directly or indirectly from Owner or its representative and who has no obligation of secrecy with respect thereto.

SC-14 Dispute Resolution

In the event of a dispute between the parties arising out of or relating to their responsibilities under this Contract, the party claiming the dispute shall provide the other party promptly written notice of such dispute, as required by the terms of the Contract. The parties hereby agree that they shall first negotiate dispute to resolve the dispute

in good faith in an attempt to prevent the need for mediation or litigation. Accordingly, within seven (7) calendar days of receipt of the initial written dispute notice, the parties shall commence discussions between the on-site project managers. In the event the parties are unable to reach a resolution of the dispute within seven (7) calendar days after such commencement of the discussions between the on-site managers, the parties shall commence discussions between Contractor's President and the Owner's Executive Director. In the event that such parties are unable to reach a resolution of the dispute within fourteen (14) calendar days after such commencement of the discussions between the President and Executive Director, the parties shall submit the dispute to non-binding mediation before a mutually agreed mediator who shall conduct such mediation proceedings. All costs of mediation shall be shared equally by the parties, except that each party shall be responsible for its own attorney's fees.

If the parties are unable to resolve the dispute through mediation and litigation proves necessary, either party may initiate such litigation. In the event of any such litigation, the prevailing party shall be entitled to recover its reasonable attorneys' fees and costs through all trial and appellate levels of such litigation. Any litigation between Owner and Contractor (which term for the purposes of this subparagraph shall include Contractor's surety), whether arising out of any claim or arising out of the Contract or any breach thereof, shall be brought, maintained and pursued only in the appropriate State of Florida Courts for Bay County, Florida, and Owner and Contractor each hereby waive and renounce any and all rights and options which they, or either of them, have or might have to bring or maintain any such litigation or action in the Federal Court system of the United States or in any United States Federal District Court. Owner and Contractor expressly waive all rights to trial by jury regarding any such litigation.

In the event of a dispute between the parties arising out of or relating to their responsibilities under this Contract, the party claiming the dispute shall provide the other party promptly written notice of such dispute, as required by the terms of the Contract. The parties hereby agree that they shall first negotiate dispute to resolve the dispute in good faith in an attempt to prevent the need for mediation or litigation. Accordingly, within seven (7) calendar days of receipt of the initial written dispute notice, the parties shall commence discussions between the on-site project managers. In the event the parties are unable to reach a resolution of the dispute within seven (7) calendar days after such commencement of the discussions between the on-site managers, the parties shall commence discussions between Contractor's President and the Owner's Executive Director. In the event that such parties are unable to reach a resolution of the dispute within fourteen (14) calendar days after such commencement of the discussions between the President and Executive Director, either party may initiate such litigation. In the event of any such litigation, the prevailing party shall be entitled to recover its reasonable attorneys' fees and costs through all trial and appellate levels of such litigation, including the fees and costs incurred to litigate the amount of attorney's fees and costs due under said action. Any litigation between Owner and Contractor (which term for the purposes of this subparagraph shall include Contractor's surety), whether arising out of any claim or arising out of the Contract or any breach thereof, shall be brought, maintained and pursued only in the appropriate State of Florida Courts for Bay County, Florida, and Owner and Contractor each hereby waive and renounce any and all rights and options which they, or either of them, have or might have to bring or maintain any such litigation or action in the Federal Court system of the United States or in any United States Federal District Court. Owner and Contractor expressly waive all rights to trial by jury regarding any such litigation.

A company that, at the time of bidding or submitting a proposal for a new contract or renewal of an existing contract, is on the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List, created pursuant to s. 215.473, or is engaged in business operations in Cuba or Syria, is ineligible for, and may not bid on, submit a proposal for, or enter into or renew a contract with an agency or local governmental entity for goods or services of \$1 million or more.

SC-15 Liquidated Damages

The parties hereby agree that the damages which Owner will sustain as a result of Contractor's failure to meet the Project Schedule are difficult or impossible to determine with certainty and therefore, have in good faith estimated as fair compensation (and not as a penalty) the liquidated damages of Two Thousand dollars (\$2,000.00) per calendar day. If the Contractor fails to deliver the Work within the time specified in the Contract, or any extensions evidenced by Change Order or duly executed contract Amendment, Contractor shall pay Owner as fixed, agreed and liquidated damages for each calendar day of delay. If the Project is not yet complete, Owner shall offset such

liquidated damages from subsequent payment to Contractor. Nothing in this clause operates to restrict any other rights and remedies available to Owner at law or under this Contract.

SC-16 Drugs, Alcohol and Weapons

Contractor's personnel, subcontractor's personnel at any tier, material supplier's personnel or any other's personnel at any time shall not bring onto the Jobsite, or any other location where the provisions of this Contract apply any firearm of whatsoever nature or any other object which in the judgment of the Owner or its representative is determined to be a potential weapon, or alcoholic beverages of any nature, illegal or Owner prohibited non-prescription drugs of any nature without exception.

SC-17 Owner Directed Purchase (ODP)

Contractor agrees that Owner at its sole election **may** have Contractor assign some or all of its purchase orders and subcontracts directly to Owner in accordance with the provisions set forth herein.

Material suppliers shall be selected by Contractor using competitive bidding/proposals. Supply contracts shall be awarded by Contractor to the supplier whose bid/proposal is most advantageous to Owner, price and other factors considered. Contractor shall include the price of all materials in his bid and shall include all Florida State sales and other taxes normally applicable to such material and equipment. Owner may consider purchasing any item but does not expect to issue purchase orders to less than five thousand dollars (\$5,000.00). Owner purchase of selected materials and equipment will be administered on a deductive Change Order basis.

Contractor shall provide Owner a list of all intended suppliers, vendors and material men for consideration as ODP. Contractor shall submit price quotes from the vendors, as well as a description of the materials to be supplied, estimated quantities and prices.

Upon request from Owner, and in a timely manner, Contractor shall prepare Purchasing Requisition Request Form which shall, in form and detail acceptable to Owner, specifically identify the materials which Owner may, in its discretion, elect to purchase directly. The Purchasing Requisition Request Form shall include:

- a. the name, address, telephone number and contact person for the material supplier,
- b. manufacturer or brand, model or specification number of the item,
- c. quantity needed as estimated by Contractor,
- d. the price quoted by the supplier for the materials identified therein,
- e. any sales tax associated with such quote,
- f. delivery dates as established by Contractor,
- g. any reduction in Contractor's cost for both the Payment Bond and Performance Bond,
- h. shipping, handling and insurance costs,
- i. detail concerning bonds or letters of credit provided by the supplier if included in his/her proposal,
- j. special terms and conditions which have been negotiated with the supplier relative to payment terms, discounts, rebates, warranty, credits or other terms and conditions which revert to Owner.

Contractor shall include copies of vendors' quotations and specifically reference any terms and conditions, which have been negotiated with the vendors concerning letters of credit, terms, discounts or special payments.

After receipt of the Purchasing Requisition Request Form, Owner shall prepare a Purchase Order for all items of material, which Owner chooses to purchase directly. The purchase order shall be sent to the vendor with a copy sent to Contractor. Pursuant to the Purchase Order, the vendor will provide the required quantities of material at the price established in the vendor's quote to Contractor, excluding any sales tax associated with such price. The Purchase Order shall also require the delivery of the ODP on the delivery dates provided by Contractor in the Purchasing Requisition Request Form.

In conjunction with the execution of the Purchase orders by the suppliers, Contractor shall execute and deliver to Owner one or more deductive Change Orders, referencing the full value of all ODP to be provided by each supplier

from whom Owner elected to purchase material directly, plus all sales taxes associated with such materials in Contractor's bid to Owner, plus any savings to Contractor in the cost of Payment and Performance Bonds associated with such ODP. To compensate Contractor for the warranty enforcement obligation Contractor's overhead and profit associated with ODP shall not be deducted from the Contract.

Contractor shall be fully responsible for all matters relating to the procurement of materials furnished by and incorporated into the Project in accordance with these Supplementary Conditions including, but not limited to, assuring the correct quantities, placing the order in a timely manner, and assuring coordination of purchases, providing and obtaining all warranties and guarantees required by the Project Documents, inspection and acceptance of the goods at the time of delivery. Contractor shall coordinate delivery schedules, sequence of delivery, loading orientation, and other arrangements normally required by Contractor for the particular materials furnished. Contractor shall provide all services required for the unloading, handling and storage of materials through installation.

Owner assumes the risk of loss of materials through their incorporation into the installation.

As ODP are delivered to the Jobsite, Contractor shall visually inspect all shipments from the suppliers, and sign off on the receiving reports for material delivered. Contractor shall assure that each delivery of ODP is accompanied by documentation adequate to identify the Purchase Order against which the purchase is made. This documentation may consist of a delivery ticket and an invoice from the supplier conforming to the Purchase Order together with such additional information as Owner may require. Contractor will then forward the receiving report to Owner to match up with invoice for payment.

Contractor shall insure that ODP conform to the Specifications, and determine prior to incorporation in to the Work if such materials are patently defective, and whether such materials are identical to the materials ordered and match the description on the bill of lading. If Contractor discovers defective or non-conformities in ODP upon such visual inspection, Contractor shall not utilize such nonconforming or defective materials in the Work and instead shall promptly notify Owner of the defective or nonconforming condition so that repair or replacement of those materials can occur without any undue delay or interruption to the Project. If Contractor fails to perform such inspection and otherwise incorporates into the work such defective or nonconforming ODP, the condition of which it either knew or should have known by performance of an inspection, Contractor shall be responsible for all damages to Owner resulting from Contractor's incorporation of such materials into the Project including liquidated or delay damages.

Contractor shall maintain records of all ODP it incorporates into the Work from the stock of ODP in its possession. Contractor shall account monthly to Owner for any ODP delivered into Contractor's possession, indicating portions of all such materials which have been incorporated into the Work.

Contractor shall be responsible for obtaining and managing all warranties and guarantees for all materials and products as required by the Project Documents. All repair, maintenance or damage-repair calls shall be forwarded to Contractor for resolution with the appropriate supplier, vendor, or subcontractor. Additionally, ODP items shall be warranted by Contractor as part of Contractor's warranty. Contractor agrees and understands that it shall undertake all warranty enforcement and other related duties of Owner for its ODP equipment and materials. To that end, Contractor expressly agrees it shall make no distinction in discharging such warranty duties between ODP equipment and materials and equipment and materials otherwise supplied by Contractor.

Notwithstanding the transfer of ODP by Owner to Contractor's possession, Owner shall retain legal and equitable title to any and all ODP.

The transfer of possession of ODP from Owner to Contractor shall constitute a bailment for the mutual benefit of Owner and Contractor. Owner shall be considered the bailor and Contractor the bailee of the ODP. ODP shall be considered returned to Owner for purposes of their bailment at such time as they are incorporated into the Project.

Owner shall purchase and maintain builder's risk insurance sufficient to protect against any loss of or damage to ODP. Such insurance shall cover the full value of any ODP not yet incorporated into the Project during the period between the time the Owner first takes title to any of such ODP and the time when the last of such is incorporated into the Project. Contractor shall purchase and maintain builder's risk, all risk, insurance based on the completed value of Project, less the Owner's ODP values. Contractor must name Owner as additional insured on its policy.

Owner shall in no way be liable for any interruption or delay in the Project, for any defects or other problems with the Project, or for any extra costs resulting from any delay in the delivery of, or defects in, ODP. Contractor's sole or exclusive remedy shall be an extension of the Contract Time for such reasonable time as determined by Owner or its representative.

Contractor shall be required to review invoices submitted by all suppliers of ODP delivered to the project site and either concur or object to Owner's issuance of payment to the suppliers, based upon Contractor's records of materials delivered to the site and any defects detected in such materials.

In order to arrange for the prompt payment to the supplier, prompt submittal of a copy of the applicable Purchase Order as receiving report, invoices, delivery tickets, written acceptance of the delivered items, and such other documentation as may be reasonably required by Owner. Upon receipt of the appropriate documentation, Owner shall prepare a check drawn to the supplier based upon the data provided. This check will be released and remitted directly to the supplier. Contractor agrees to assist Owner to immediately obtain partial or final release of waivers as appropriate.

At the end of the Project, Contractor will be provided with a deductive Change Order for the costs incurred by Owner to provide all ODP, not covered by previous change orders. Salvage materials shall be stored or removed from the site at Owner or its representative's direction, or may be turned over to Contractor by Owner for salvage or disposal at Owner's option.

SC-18 Risk of Loss

Contractor shall be responsible for risk of loss or damage in progress and all goods furnished until Final Acceptance, including any losses resulting from inclement weather or erosion.

SC-19 Component Warranties

In addition to the General Condition title "WARRANTY," Contractor shall obtain and provide, for the benefit of owner and its successors in interest, warranties or guarantees for the equipment, materials, and work furnished by suppliers and subcontractors of any tier for the period customarily provided by the supplier. Contractor shall use its best efforts to enforce such lower-tier warranties or guarantees on its own behalf or, if requested by Owner or Owner's Representative, on behalf of Owner. Contractor shall provide warranty documentation by Final Acceptance or as otherwise required by this contract.

SC-20 Procedures to Minimize Risk to Stormwater System and Environment

Contractor acknowledges GC-14 Environmental Requirements and will have no significant impact on the stormwater system or environment while completing the Work.

SC-21 Miscellaneous Federal Provisions

The work performed under this Contract shall be governed by the following Federal provisions, statutes and regulations:

Disadvantaged Business Enterprise – 49 CFR Part 26: Contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of this FDOT-assisted contract. In accordance with 49 CFR Part 26.45, the sponsor has established a contract goal of **7.81%** participation for small business concerns owned and controlled by certified socially and economically disadvantaged enterprise (DBE). Contractor shall make and document good

faith efforts, as defined in Appendix A of 19 CFR Part 26, to meet his established goal. Reporting DBE participation shall be performed as referenced in section SC-11 using the owner-provided format.

Davis-Bacon Act, as amended – 29 CFR Part 5: Contractor is required to comply with wage and labor provisions and to pay minimum wages in accordance with the current schedule of wage rates established by the United States Department of Labor.

Debarment, Suspension, Ineligibility and Voluntary Exclusion – 49 CFT Part 29: Contractor certifies, by submission of a proposal or acceptance of a contract, that neither it nor its principals are presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency. Individuals or companies listed in the General Services Administration’s “Excluded Parties Listing System” will not be considered for award of contract.

Certification Regarding Debarment and Suspension (Non-Procurement) – Title 2 CFR Part 180 & Title 2 CFR Part 1200: This Agreement is a “covered transaction” as defined by Title 2 CFR Part 180. Contractor has agreed that at the time it submitted its proposal and throughout the duration of this Agreement that neither it nor its principals are presently debarred or suspended by any Federal department or agency from participation in this transaction. Contractor further agrees to comply with Title 2 CFR Part 1200 and Title 2 CFR Part 180, Subpart C by administering each lower tier subcontract that exceeds \$25,000 as a “covered transaction”.

Certification Regarding Debarment and Suspension (Non-Procurement) – Title 2 CFR Part 1200 and Title 2 CFR Part 180, Subpart C: Contractor by administering each lower tier subcontract that exceeds \$25,000 as a “covered transaction” must verify each lower tier participant of a “covered transaction” under the project is not presently debarred or otherwise disqualified from participation in this federally assisted project. Contractor shall accomplish this by:

- i. Checking the System for Award Management at website: <http://www.sam.gov>
- ii. Collecting a certification statement similar to paragraph a.
- iii. Inserting a clause or condition in the covered transaction with the lower tier contract

If the FAA later determines that an individual failed to tell a higher tier that they were excluded or disqualified at the time they entered the covered transaction with that person, the FAA may pursue any available remedy, including suspension and debarment

Foreign Trade Restrictions – 49 CFR Part 30: Contractor and its subcontractors shall not be owned or controlled by one or more citizens of a foreign country included in the list of countries that discriminate against U.S. firms published by the Office of the United States Representative (USTR)’ shall not knowingly entered into any contract or subcontract for this project with a person 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; and shall not procure any product nor subcontract for the supply of any product for use on the project that is produced in a foreign country on said list.

Buy American Certificate – Aviation Safety and Capacity Act of 1990: This contract is subject to the “Buy American Preferences” of the Aviation Safety and Capacity Act of 1990.

SC-22 Certifications

Contractor shall execute, in the presence of a Notary Public (where required), and return the certifications noted below:

1. Bid Affidavit
2. Non-Collusion Affidavit
3. Sworn Statement under Section 287.133(3)(A), Florida Statutes, on Public Entity Crimes
4. DBE Certificate of Compliance Affidavit

5. Davis Bacon Certification
6. Drug Free Workplace Certification
7. Certification of Non-Segregated Facilities
8. Buy American Certification
9. Trench Safety Act Certification under Chapter 553, Florida Statutes

SC-23 Clean Air and Water Pollution Control

Contractors and subcontractors agree:

- a. That any facility to be used in the performance of the contract or subcontract 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.

SC-24 Airport and Airway Improvement Act of 1982, Section 520 - 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 obligates the tenant/concessionaire/lessee or its transferee for the period during which Federal assistance is extended to the airport a program, except where Federal assistance is to provide, or is in the form of personal property or real property or interest therein or structures or improvements thereon. In these cases the provision obligates the party or any transferee for the longer of the following periods:

- (a) The period during which the property is used by the airport sponsor or any transferee for a purpose for which Federal assistance is extended, or for another purpose involving the provision of similar services or benefits or
- (b) The period during which the airport sponsor or any transferee retains ownership or possession of the property. In the case of contractors, this provision binds the contractors from the bid solicitation period through the completion of the contract. This provision is in addition to that required of Title VI of the Civil Rights Act of 1964.

SC-25 Lobbying and Influencing Federal Employees

- (1) No Federal appropriated funds shall be paid, by or on behalf of the contractor, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the making of any Federal grant and the amendment or modification of any Federal grant.
- (2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with any Federal grant, the contractor shall complete and submit Standard Form-LLL, "Disclosure of Lobby Activities," in accordance with its instructions.

SC-26 Energy Conservation Requirements

The contractor agrees to comply with mandatory standards and policies relating to energy efficiency that are contained in the state energy conservation plan issued in compliance with the Energy Policy and Conservation Act (Public Law 94-163).

SC-27 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.

SC-28 Trade Restriction Clause

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 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 person 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 on 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 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.

END OF SPECIAL CONDITIONS



PANAMA CITY-BAY COUNTY AIRPORT & INDUSTRIAL DISTRICT MONTHLY REPORT OF SUBCONTRACTOR PARTICIPATION

Name of Prime Contractor _____ Contract Name/Number/Description _____
 Original Contract Amount _____ Payments Received _____
 Current Contract Amount _____ Retainage Withheld _____
 Original Contract DBE Participation _____ Invoice Period From: _____ To: _____
 Actual DBE Participation to Date _____ Percentage Original Contracted DBE 0.00%
 Current Scheduled DBE Participation _____ Participation Date Report Submitted _____

PLEASE COMPLETE INFORMATION BELOW. ATTACH ADDITIONAL SHEETS IF NECESSARY.

#	SUBCONTRACTOR NAME & ADDRESS	BRIEF DESCRIPTION OF WORK	NAICS CODE	DBE *	M	S	W	O	ORIGINAL SUBCONTRACT AMOUNT	CURRENT SUBCONTRACT AMOUNT	TOTAL PAYMENTS TO DATE	AMOUNT INVOICES THIS MONTH	TOTAL INVOICED TO DATE THIS PROJECT	PERCENT COMPLETE	PERCENT OF PAYMENTS TO DBE	
DBEs SUBCONTRACTORS ONLY																
1				☐	☐	☐	☐	☐							0.00%	0.00%
Comments: _____																
2				☐	☐	☐	☐	☐							0.00%	0.00%
Comments: _____																
3				☐	☐	☐	☐	☐							0.00%	0.00%
Comments: _____																
4				☐	☐	☐	☐	☐							0.00%	0.00%
Comments: _____																
5				☐	☐	☐	☐	☐							0.00%	0.00%
Comments: _____																
SUBTOTAL - DBEs									\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00			
NON-DBE SUBCONTRACTORS																
1				☐	☐	☐	☐	☐							0.00%	0.00%
Comments: _____																
2				☐	☐	☐	☐	☐							0.00%	0.00%
Comments: _____																
3				☐	☐	☐	☐	☐							0.00%	0.00%
Comments: _____																
4				☐	☐	☐	☐	☐							0.00%	0.00%
Comments: _____																
5				☐	☐	☐	☐	☐							0.00%	0.00%
Comments: _____																
SUBTOTAL - NON-DBEs									\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00			
ALL SUBCONTRACTOR TOTALS									\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00			

* CHECK THIS COLUMN ONLY IF SUBCONTRACTOR IS A CERTIFIED DBE UNDER FEDERAL REGULATIONS, 49 CFR PART 26.

I certify that the information furnished above is correct to the best of my knowledge and represents the current status of the firm's (Prime Contractor) subcontract(s) with the listed firms (Subcontracts) for the designated period covered by this report.

Signed: _____ Title: _____
 Print Name: _____ Date: _____



**PANAMA CITY-BAY COUNTY AIRPORT & INDUSTRIAL DISTRICT
INSTRUCTIONS AND FORM FOR COMPLETING THE
MONTHLY REPORT OF SUBCONTRACTOR PARTICIPATION**

I. USE AUTHORIZED FORMS

These instructions and the approved form "Monthly Report of Subcontractor Participation" are to be used to file monthly reports of subcontractor participation. Do not change or amend the instructions or form in any manner. These documents are available in hard copy or electronically from the Commission's DBELO, Darlene Nelson.

II. TOP PORTION OF FORM

Original Contract Amount. Enter the original amount of the Prime's Contract.

Current Contract Amount. Enter the current amount of the Prime's Contract. If this amount is the same as the entry in "Original Contract Amount", enter it. If this amount is different than the amount entered in "Original Contract Amount", enter the new contract amount.

Invoice Period. Enter the monthly period being reported (e.g., January 1, 20xx to January 31, 20xx). Each report must cover a full month.

Actual DBE Participation to Date. Enter the sum of "Total Payments to Date" made to DBEs as of the date of the report.

Current Scheduled DBE Participation. Enter the sum of "Current Subcontract Amounts" reported for **DBEs only**, i.e, do NOT include current subcontract amounts for non-DBEs even though they appear in the ledger portion of the report.

Total Original Contracted DBE Participation. Enter the original dollar amount of DBE participation. This must be the same dollar amount submitted on the Original Letter of Intent and approved by the District, and that is reported in the ledger portion of the report under "Original Subcontract Amount".

Payments Received. Enter the sum of total of payments received by the Prime Contractor as of the date of the report.

Retainage Withheld. Enter the amount of retainage withheld as of the date of the report. If none, enter 0.

Date Submitted. Enter the date the report is submitted to the District.

Percentage Original Contracted Participation. Enter the original percentage of DBE participation for this contract. This must be the same percentage committed to in the Prime Contractor's proposal and approved by the District.

IMPORTANT NOTE: The Monthly Report of Subcontractor Participation must be attached to each invoice submitted by the Prime Contractor. If an invoice is not being submitted in a particular month, the Monthly Report of Subcontractor Participation must still be submitted each month. The due date of the monthly report is the 15th day of the following month.

III. LEDGER PORTION

Report all subcontractors every month and complete all required information. Please note that some entries

apply only to the sum of DBE contracts. To facilitate accuracy in reporting, the DBE subcontractors section is listed first along with a subtotal and the Non-DBE contracts appear in the second section of the report. If there is no invoice activity for a DBE in any given month, enter "0" in the column, "Amount This Invoice". All other information must be entered, and must be current and correct.

Subcontractor Name and Address. For all subcontractors, enter the subcontractor's name and business address (street address, city, state and zip code). For DBEs, these entries must be the same as comparable information appearing on the original Letter of Intent and the Contract Participation Form/DBE Program Form submitted with the prime contractor's proposal.

Description of Work and NAICS Code. Enter a brief description (e.g., painting, electrical, survey, etc.) of the work each subcontractor is performing and the associated NAICS Code for that work. For DBEs, these entries must be the same as comparable information appearing on the Letter of Intent and the Contract Participation Form/DBE Program Form submitted with the prime contractor's proposal.

Classification of Subcontractor(s). Assign classifications as follows:

DBE-Place an "X" in this column only if the subcontractor has been DBE certified by the Florida Department of Transportation ("FDOT"). Only those subcontractors who have meet the DBE eligibility requirements of 49 CFR Part 26 may be classified as DBEs.

MBE-Place an "X" in this column if the subcontractor is also an FDOT certified minority-owned company. This classification should also be used for subcontractors who have submitted a DBE certification application but have not yet been certified as a DBE. Once DBE certification has been achieved, such firms should be classified as both MBE and DBE.

SBE-Place an "X" in this column if the subcontractor is an FDOT certified small business that has 250 or fewer employees and meets the definition of the Small Business Administration regulations (13 CFR Part 121). This classification should also be used for subcontractors who have submitted a SBE certification application but have not yet been SBE certified. Once certification has been achieved, such firms should be classified only as SBE.

WBE-Place an "X" in this column if the subcontractor is an FDOT certified woman-owned company. This classification should also be used for subcontractors who have submitted a DBE certification application but have not yet been certified as a DBE. Once DBE certification has been achieved, such firms should be classified as both WBE and DBE.

OTHER-Place an "X" in this column for all subcontractors who cannot be classified as either DBE, MBE, WBE or SBE.

Original Subcontract Amount. Enter the original subcontract amount for each subcontractor. For DBEs, this must be the **amount listed on the Original Letter of Intent or the Contract Participation Form/DBE Program Form** submitted for DBEs with the prime contractor's proposal, or the amount listed on the proposal in the Disadvantaged Business Enterprise Program, and approved by the District.

Current Subcontract Amount. Enter the current subcontract amount. If this amount is the same as the entry in "Original Subcontract Amount", enter it. For DBEs, **if this amount is different** than the amount entered in "Original Subcontract Amount", a **Revised Letter of Intent must be on file with and approved by the District.** It is recommended that Revised Letters of Intent be submitted with the Monthly Report of Subcontractor Participation that initially reports the new contract amount.

Total Payments to Date. Enter the sum of payments that have been made to each subcontractor as of the date of the report. This column should not contain diminishing amounts, i.e., a succeeding month's entry lower than the preceding month's entry. If this occurs, the District may request an examination of additional records to verify the correct amount.

Amount of This Invoice. Enter the amount of the subcontractor's invoice being submitted with this report.

Total Invoiced to Date. Enter the total amount invoiced as of the date of the report. This column should not contain diminishing amounts, i.e., a succeeding month's entry lower than the preceding month's entry. If this occurs, the District may request an examination of additional records to verify the correct amount.

Percentage Complete. Enter the percentage that equals the progress of that subcontractor's work.

Percent DBE. This entry depends upon the type of contract and terms stated in the solicitation. The **percentage for non-DBEs is always "0"**. Thus, if the subcontractor does not meet the requirements stated above to be classified as a DBE, the percentage entered in this column **must be "0"**.

GENERAL CONDITIONS

GENERAL CONDITIONS

ARTICLE 1 – DEFINITIONS

Wherever used in these General Conditions or in the other Contract Documents the following terms have the meanings indicated which are applicable to both the singular and plural thereof:

- 1.0.1 **AASHTO** – The American Association of State Highway and Transportation Officials, the successor association AASHTO.
- 1.0.2 **Access Road** – The right-of-way, the roadway and all improvements constructed thereon connecting the airport to a public highway.
- 1.1. **Addenda** – Written or graphic instruments issued prior to the opening of Bids which clarify, correct or change the Bidding Requirements or the Contract Documents.
 - 1.1.1 **Advertisement** – A public announcement, as required by local law, inviting bids for work to be performed and materials to be furnished.
- 1.2. **Agreement** – The written contract between Owner and Contractor covering the Work to be performed; other Contract Documents are attached to the Agreement and made a part thereof as provided therein.
 - 1.2.1 **AIP** – The Airport Improvement Program, a grant-in-aid program, administered by the Federal Aviation Administration.
 - 1.2.2 **Air Operations Area** – For the purpose of these specifications, the term air operations area shall mean any area of the airport used or intended to be used for the landing, takeoff, or surface maneuvering of aircraft. An air operation area shall include such paved or unpaved areas that are used or intended to be used for the unobstructed movement of aircraft in addition to its associated runway, taxiway, or apron.
 - 1.2.3 **Airport** – Airport means the area of land or water which is used or intended to be used for the landing and takeoff of aircraft, and includes its buildings and facilities, if any.
- 1.3. **Application for Payment** – The form accepted by Engineer which is to be used by Contractor in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.
- 1.4. **Asbestos** – Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.
 - 1.4.1 **ASTM** – The American Society for Testing and Materials.
- 1.4.2 **Award** – The acceptance, by the Owner, of the successful bidder's proposal.

- 1.5. **Bid** – The offer or proposal of the bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
- 1.5.1 **Bidder** – Any individual, partnership, firm, or corporation, acting directly or through a duly authorized representative, who submits a proposal for the work contemplated.
- 1.6. **Bidding Documents** – The advertisement or invitation to Bid, instructions to bidders, the Bid form, and the proposed Contract Documents (including all Addenda issued prior to receipt of Bids).
- 1.7. **Bidding Requirements** – The advertisement or invitation to Bid, instructions to bidders, and the Bid form.
- 1.7.1 **Building Area** – An area on the airport to be used, considered, or intended to be used for airport buildings, or other facilities or rights-of-way together with all airport buildings and facilities located thereon.
- 1.8. **Bonds** – Performance and Payment bonds and other instruments of security.
- 1.8.1 **Calendar Day** – Every day shown on the calendar.
- 1.8.2 **Certificates Of Compliances** – Written statements by the manufacturer stating the material furnished is in conformance with the Specifications.
- 1.9. **Change Order** – A document recommended by Engineer, which is signed by Contractor and Owner and authorizes an addition, deletion or revision in the Work, or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement. *The work covered by a change order shall be within the scope of the contract.*
- 1.10. **Contract Documents** – The Agreement, Addenda (which pertain to the Contract Documents), Contractor's Bid (including documentation accompanying the Bid and any post Bid documentation submitted prior to the Notice of Award) when attached as an exhibit to the Agreement, the Notice to Proceed, the Bonds, these General Conditions, the Supplementary Conditions, the Specifications and the Drawings as the same are more specifically identified in the Agreement, together with all Written Amendments, Change Orders, Work Change Directives, Field Orders and Engineer's written interpretations and clarifications issued pursuant to paragraphs 3.5, 3.6.1, and 3.6.3 on or after the Effective Date of the Agreement. Shop Drawing submittals approved pursuant to paragraphs 6.26 and 6.27 and the reports and drawings referred to in paragraphs 4.2.1.1 and 4.2.2.2 are not Contract Documents.
- 1.11. **Contract Price** – The money payable by Owner to Contractor for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of paragraph 11.9.1 in the case of Unit Price Work).
- 1.12. **Contract Times** – The numbers of days or the dates stated in the Agreement: (i) to achieve Substantial Completion, and (ii) to complete the Work so that it is ready for final payment as evidenced by Engineer's written recommendation of final payment in accordance with paragraph 14.13.
- 1.12.1 **Contract Item (Pay Item)** – A specific unit of work for which a price is provided in the Contract.

- 1.13. **Contractor** – The person, firm or corporation with whom Owner has entered into the Agreement.
- 1.14. **Defective** – An adjective which when modifying the word Work refers to Work that is unsatisfactory, faulty or deficient, in that it does not conform to the Contract Documents, or does not meet the requirements of any inspection, reference standard, test or approval referred to in the Contract Documents, or has been damaged prior to Engineer's recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with paragraph 14.8 or 14.10).
- 1.14.1 **Drainage System** – The system of pipes, ditches, and structures by which surface or subsurface waters are collected and conducted from the airport area.
- 1.15. **Drawings** – The drawings which show the scope, extent, and character of the Work to be furnished and performed by Contractor and which have been prepared or approved by Engineer and are referred to in the Contract Documents. Shop drawings are not Drawings as so defined.
- 1.16. **Effective Date of the Agreement** – The date indicated in the Agreement on which it becomes effective, but if no such date is indicated it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.
- 1.17. **Engineer** – The person, firm, or corporation named as such in the Agreement.
- 1.18. **Engineer's Consultant** – A person, firm, or corporation having a contract with Engineer to furnish services as Engineer's independent professional associate or consultant with respect to the Project and who is identified as such in the Supplementary Conditions. *The following list of independent professional associates and consultants are considered the Engineer's consultant for this Construction Contract: ZHA International, Inc.*
- 1.18.1 **Equipment** – All machinery, together with the necessary supplies for upkeep and maintenance, and also all tools and apparatus necessary for the proper construction and acceptable completion of the work.
- 1.18.2 **Extra Work** – An item of work not provided for in the awarded contract as previously modified by change order or supplemental agreement, but which if found by the Engineer to be necessary to complete the work within the intended scope of the contract as previously modified.
- 1.18.3 **FAA** – The Federal Aviation Administration of the U.S. Department of Transportation. When used to designate a person, FAA shall mean the Administrator or his duly authorized representative.
- 1.18.4 **Federal Specifications** – The Federal Specifications and Standards, and supplements, amendments, and indices thereto are prepared and issued by the General Services Administration of the Federal Government. They may be obtained from the Specifications Activity, Printed Materials Supply Division, Building 197, Naval Weapons Plant, Washington, D.C. 20407.

- 1.19. **Field Order** – A written order issued by Engineer which orders minor changes in the Work in accordance with paragraph 9.5 but which does not involve a change in the Contract Price or the Contract Times.
- 1.20. **General Requirements** – Sections of Division 1 of the Specifications.
- 1.21. **Hazardous Waste** – The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.
- 1.22. **Inspector** – An authorized representative of the Engineer assigned to make all necessary inspections and/or tests of the work performed or being performed, or of the materials furnished or being furnished by the Contractor.
- 1.21.2 **Intention Of Terms** – Whenever, in these specifications or on the plans, the words, "directed," "required," "permitted," "ordered," "designated," "prescribed," or words of the like import are used, it shall be understood that the direction, requirement, permission, order, designation, or prescription of the Engineer is intended; and similarly, the words "approved," "acceptable," "Satisfactory," or words of like import, shall mean approved by, or acceptable to, or satisfactory to the Engineer, subject in each case to the final determination of the Owner.
- 1.21.3 **Laboratory** – The official testing laboratories of the Owner or such other laboratories as may be designated by the Engineer.
- 1.22. **Laws and Regulations; Laws or Regulations** – Any and all applicable laws, rules, regulations, ordinances, codes and orders of any and all governmental bodies, agencies, authorities and courts having jurisdiction.
- 1.23. **Liens** – Liens, charges, security interests, or encumbrances upon real property or personal property.
- 1.23.1 **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.
- 1.23.2 **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 25 percent of the total amount of the award contract. All other items shall be considered minor contract items.
- 1.23.3 **Materials** – Any substance specified for use in the construction of the Contract work.
- 1.23.4 **Mil Specifications** – The Military Specifications and Standard, and indices thereto, that are prepared and issued by the Department of Defense.
- 1.24. **Milestone** – A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.
- 1.25. **Notice of Award** – The written notice by Owner to the apparent successful bidder stating that upon compliance by the apparent successful bidder with the conditions precedent enumerated therein, within the time specified, Owner will sign and deliver the Agreement.

- 1.26. **Notice to Proceed** – A written notice given by Owner to Contractor (with a copy to Engineer) fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform Contractor's obligations under the Contract Documents.
- 1.26.1 **FDOT** – The Florida State Department of Transportation. When used to designate a person, FDOT shall mean the commissioner or his duly authorized representative.
- 1.27. **Owner** – The public body or authority, corporation, association, firm, or person with whom Contractor has entered into the Agreement and for whom the Work is to be provided.
- 1.28. **Partial Utilization** – Use by Owner of a substantially completed part of the Work for the purpose for which it is intended (or a related purpose) prior to Substantial Completion of all the Work.
- 1.28.1 **Pavement** – The combined surface course, base course, and subbase course, if any, considered as a single unit.
- 1.28.2 **Payment Bond** – The approved form of security furnished by the Contractor and his/her surety as a guaranty that he will pay in full all bills and accounts for materials and labor used in the construction of the work.
- 1.29. **PCB's** – Polychlorinated biphenyls.
- 1.29.1 **Performance Bond** – The approved form of security furnished by the Contractor and his/her surety as a guaranty that the Contractor will complete the work in accordance with the terms of the contract.
- 1.30. **Petroleum** – Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Wastes and crude oils.
- 1.30.1 **Plans** – The official drawings or exact reproductions which show the location, character, dimensions, and details of the airport and the work to be done and which are to be considered as a part of the contract, supplementary to the specifications.
- 1.31. **Project** – The total construction of which the Work to be provided under the Contract Documents may be the whole, or a part as indicated elsewhere in the Contract Documents.
- 1.31.1 **Proposal** – (See Bid).
- 1.32. **Radioactive Material** – Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.
- 1.33. **Resident Project Representative** - The authorized representative of Engineer who may be assigned to the site or any part thereof.
- 1.33.1 **Runway** – The area on the airport prepared for the landing and takeoff of aircraft.

- 1.34. **Samples** – Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.
- 1.35. **Shop Drawings** – All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.
- 1.36. **Special Provisions** – The specific clauses setting forth conditions or requirements peculiar to the project under consideration, covering work or materials involved in the proposal and estimate, which are not thoroughly or satisfactorily stipulated in these specifications.
- 1.37. **Specifications** – Those portions of the Contract Documents consisting of written technical descriptions of materials, equipment, construction systems, standards, and workmanship as applied to the Work and certain administrative details applicable thereto.
- 1.3. **Sponsor** – For AIP Contracts, the term Sponsor shall have the meaning as the term Owner.
- 1.36.2 **Structures** – Airport facilities such as bridges; culverts; catch basins; inlets; retaining walls; cribbing; storm and sanitary sewer lines; water lines; underdrains; electrical ducts, manholes, handholes, lighting fixtures and bases; transformers; flexible and rigid pavements; navigational aids; buildings; vaults; and, other manmade features of the airport that may be encountered in the work and not otherwise classified herein.
- 1.37. **Subcontractor** – An individual, firm, or corporation having a direct contract with Contractor or with any other Subcontractor for performance of a part of the Work at the site.
- 1.37.1 **Subgrade** – The soil which forms the pavement foundation.
- 1.37.2 **Superintendent** – The Contractor's executive representative who is present on the work during progress, authorized to receive and fulfill instruction from the Engineer, and who shall supervise and direct the construction.
- 1.38. **Substantial Completion** – The Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer as evidenced by Engineer's definitive certificate of Substantial Completion, it is sufficiently complete, in accordance with the Contract Documents, so that the Work (or specified part) can be utilized for the purposes for which it is intended; or if no such certificate is issued, when the Work is complete and ready for final payment as evidenced by Engineer's written recommendation of final payment in accordance with paragraph 14.13. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.
- 1.38.1 **Supplemental Agreement** – A written agreement between the Contractor and the Owner covering: (1) work that would increase or decrease the total amount of the awarded contract, or any major contract item, by more than 25 percent, such increased or decreased work being within the scope of the originally awarded contract; or (2) work that is not within the scope of the originally awarded contract.

- 1.39. **Supplementary Conditions** – The part of the Contract Documents which amends or supplements these General Conditions.
- 1.40. **Supplier** – A manufacturer, fabricator, supplier, distributor, materialman, or vendor having direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or any Subcontractor.
- 1.40.1 **Surety** – The corporation, partnership, or individual, other than the Contractor, executing payment or performance bonds which are furnished to the Owner by the Contractor.
- 1.40.2 **Taxiway** – For the purpose of this document, the term taxiway means the portion of the air operations area of an airport that has been designated by competent airport authority for movement of aircraft to and from the airport's runways or aircraft parking areas.
- 1.41. **Underground Facilities** – All pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities which have been installed underground to furnish any of the following services or materials: electricity, gases, steam, liquid petroleum products, telephone, or other communications, cable television, sewage and drainage removal, traffic or other control systems or water.
- 1.42. **Unit Price Work** – Work to be paid for on the basis of unit prices.
- 1.43. **Work** – The entire completed construction or the various separately identifiable parts thereof required to be furnished under the Contract Documents. Work includes and is the result of performing or furnishing labor and furnishings and incorporating materials and equipment into the construction, and performing or furnishing services and furnishing documents, all as required by the Contract Documents.
- 1.44. **Work Change Directive** - A written directive to Contractor, issued on or after the Effective Date of the Agreement and signed by Owner and recommended by Engineer, ordering an addition, deletion, or revision in the Work, or responding to differing or unforeseen physical conditions under which the Work is to be performed as provided in paragraph 4.2 or 4.3 or to emergencies under paragraph 6.23. A Work Change Directive will not change the Contract Price or the Contract Times, but is evidence that the parties expect that the change directed or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times as provided in paragraph 10.2.
- 1.44.1 **Working Day** – A working day shall be any day other than a legal holiday, Saturday, or Sunday on which the normal working forces of the Contractor may proceed with regular work for at least 6 hours toward completion of the Contract. Unless work is suspended for causes beyond the Contractor's control, Saturdays, Sundays and holidays on which the Contractor's forces engage in regular work, requiring the presence of an inspector, will be considered as working days.
- 1.44.2 **Work Period** – A work period shall consist of any designated block of time on which the normal working forces of the Contractor may proceed with regular work for at least 5 hours toward completion of the contract. Unless work is suspended for causes beyond the Contractor's control, work occurring on any day, regardless of it being a weekend or holiday, which requires an Inspector, will be considered a work period. Work periods are limited to between 7:00 a.m. and 5:00 p.m. local

time Monday through Friday. Weekend work will not be permitted unless contractor obtains written permission from Owner.

- 1.45. **Written Amendment** – A written amendment of the Contract Documents, signed by Owner and Contractor on or after the Effective Date of the Agreement and normally dealing with the nonengineering or nontechnical rather than strictly construction-related aspects of the Contract Documents.

ARTICLE 2 – PRELIMINARY MATTERS

Delivery of Bonds:

- 2.1. When Contractor delivers the executed Agreements to Owner, Contractor shall also deliver to Owner such Bonds as Contractor may be required to furnish in accordance with paragraph 5.1.

Copies of Documents:

- 2.2. Owner shall furnish to Contractor up to five copies (unless otherwise specified in the Supplementary Conditions) of the Contract Documents as are reasonably necessary for the execution of the Work. Additional copies will be furnished, upon request, at the cost of reproduction.

Commencement of Contract Times; Notice to Proceed:

- 2.3. The Contract Times will commence to run on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within ninety days after the Effective Date of the Agreement. In no event will the Contract Time commence to run later than the *one hundred twentieth (120th)* day after the day of Bid opening or the *ninetieth (90th)* day after the Effective Date of the Agreement, whichever date is earlier.

Starting the Work:

- 2.4. Contractor shall start to perform the Work on the date when the Contract Times commence to run, but no Work shall be done at the site prior to the date on which the Contract Times commence to run.

Before Starting Construction:

- 2.5. Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures shown thereon and all applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity or discrepancy which Contractor may discover and shall obtain a written interpretation or clarification from Engineer before proceeding with any Work affected thereby; however, Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity or discrepancy in the Contract Documents, unless Contractor knew or reasonably should have known thereof.

- 2.6. Within ten days after the Construction Notice to Proceed contractor shall submit to Engineer for review:

- 2.6.1. a preliminary progress schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract Documents;

2.6.2. a preliminary schedule of Shop Drawings and Sample submittals which will list each required submittal and the times for submitting, reviewing and processing such submittal; and

2.6.3. a preliminary schedule of values for all of the Work which will include quantities and prices of items aggregating the Contract Price and will subdivide the Work into component parts in sufficient detail to serve as the basis for progress payments during construction. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.7. Before any Work at the site is started, Contractor and Owner shall each deliver to the other, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which Contractor and Owner respectively are required to purchase and maintain in accordance with paragraphs 5.4, 5.6, and 5.7.

Preconstruction Conference:

2.8. Before any Work at the site is started, a conference attended by Contractor, Engineer and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in paragraph 2.6, procedures for handling Shop Drawings, and other submittals, processing Applications for Payment and maintaining required records.

Initially Acceptable Schedules:

2.9. Unless otherwise provided in the Contract Documents, at least ten days before submission of the first Application for Payment a conference attended by Contractor, Engineer, and others as appropriate will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with paragraph 2.6. Contractor shall have an additional ten days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until the schedules are submitted to and acceptable to Engineer as provided below. The progress schedule will be acceptable to Engineer as providing an orderly progression of the Work to completion within any specified Milestones and the Contract Times, but such acceptance will neither impose on Engineer responsibility for the sequencing, scheduling, or progress of Work nor interfere with or relieve Contractor from Contractor's full responsibility therefore, Contractor's schedule of Shop Drawing and Sample submissions will be acceptable to Engineer as providing a workable arrangement for reviewing and processing the required submittals. Contractor's schedule of values will be acceptable to Engineer as to form and substance.

ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

Intent:

3.1. The Contract Documents comprise the entire agreement between Owner and Contractor concerning the Work. The Contract Documents are complementary: what is called for by one is as binding as if called for by all. The Contract Documents will be construed in accordance with the law of the place of the Project.

3.2. It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents. Any Work, materials, or equipment that may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended result will be furnished and performed whether or not specifically called for. When words or phrases, which have a well-known technical or construction industry or trade meaning

are used to describe Work, materials, or equipment, such words or phrases shall be interpreted in accordance with the meaning. Clarifications and interpretations of the Contract Documents shall be issued by Engineer as provided in paragraph 9.4.

3.3. Reference to Standards and Specifications of Technical Societies: Reporting and Resolving Discrepancies:

3.3.1. Reference to standards, specifications, manuals or codes of any technical society, organization, or association, or to the Laws or Regulations of any governmental authority, whether such reference be specific or by implication, shall mean the latest standard, specification, manual, code or Laws or Regulations in effect at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.

3.3.2. If, during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents or between the Contract Documents and any provision of any such Law or Regulation applicable to the performance of the Work or of any such standard, specification, manual, or code or of any instruction of any Supplier referred to in paragraph 6.5., Contractor shall report it to Engineer in writing at once, and, Contractor shall not proceed with the Work affected thereby (except in an emergency as authorized by paragraph 6.23) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in paragraph 3.5 or 3.6; provide, however, that Contractor shall not be liable to Owner or Engineer for failure to report any such conflict, error, ambiguity or discrepancy unless Contractor knew or reasonably should have known thereof.

3.3.3. Except as otherwise specifically stated in the Contract Documents or as may be provided by amendment or supplement thereto issued by one of the methods indicated in paragraph 3.5 or 3.6, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:

3.3.3.1. the provisions of any such standard, specification, manual, code, or instruction (whether or not specifically incorporated by reference in the Contract Documents): or

3.3.3.2. the provisions of any such Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

No provision of any such standard, specification, manual, code, or instruction shall be effective to change the duties and responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees from those set forth in the Contract Documents, nor shall it be effective to assign to Owner, Engineer, or any of Engineer's Consultants, agents, or employees any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of paragraph 9.13 or any other provision of the Contract Documents.

3.3.4. Whenever the plans or specifications are in conflict, resolution of such conflict shall be in the following order of precedence subject to agreement by Engineer:

Contract Agreement

Addenda, with those of later date having precedence over those of earlier dates

Bidding Documents

Supplementary Conditions

General Conditions
Construction Drawings
Technical Specifications
FAA General Provisions
Florida DOT Standard Specifications

In case of our inconsistency within the Contract Drawings, the order of procedure is as follows:

Schedules
Specific Details
Typical Details
Construction Drawings

3.4. Whenever in the Contract Documents the terms "as ordered," "as directed," "as required," "as allowed," "as approved" or terms of like effect or import are used, or the adjectives "reasonable," "suitable," "acceptable," "proper," or "satisfactory" or adjectives of like effect or import are used to describe a requirement, direction, review or judgment of Engineer as to the Work, it is intended that such requirement, direction, review, or judgment will be solely to evaluate, in general, the completed Work for compliance with the requirements of and information in the Contract Documents and conformance with the design concept of the completed Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective shall not be effective to assign to Engineer any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of paragraph 9.13 or any other provision of the Contract Documents.

Amending and Supplementing Contract Documents:

3.5. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof in one or more of the following ways:

- 3.5.1. a formal Written Amendment.
- 3.5.2. a Change Order (pursuant to paragraph 10.4) or
- 3.5.3. a Work Change Directive (pursuant to paragraph 10.1).

3.6. In addition, the requirements of the Contract Documents may be supplemented, and minor variations, and deviations of the Work may be authorized, in one or more of the following ways:

- 3.6.1. a Field Order (pursuant to paragraph 9.5).
- 3.6.2. Engineer's approval of a Shop Drawing or Sample (pursuant to paragraphs 6.26 and 6.27), or
- 3.6.3. Engineer's written interpretation or clarification (pursuant to paragraph 9.4).

Reuse of Documents:

3.7. Contractor and any Subcontractor or Supplier or other person or organization performing or furnishing any of the Work under a direct or indirect contract with Owner (i) shall not have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or Engineer's Consultant, and (ii) shall not reuse any of

such Drawings, Specifications, other documents, or copies on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaption by Engineer.

ARTICLE 4 – AVAILABILITY OF LANDS: SUBSURFACE AND PHYSICAL CONDITIONS; REFERENCE POINTS

Availability of Lands:

4.1. Owner shall furnish, as indicated in the Contract Documents, the lands upon which the Work is to be performed, rights-of-way and easements for access thereto, and such other lands which are designated for the use of Contractor. Upon reasonable written request, Owner shall furnish Contractor with a correct statement of record legal title and legal description of the lands upon which the Work is to be performed and Owner's interest therein as necessary for giving notice of or filing a mechanic's lien against such lands in accordance with applicable Laws and Regulations. Owner shall identify any encumbrances or restrictions not of general application but specifically related to use of lands so furnished with which Contractor will have to comply in performing the Work. Easements for permanent structures or permanent in existing facilities will be obtained and paid for by Owner, unless otherwise provided in the Contract Documents. If Contractor and Owner are unable to agree on entitlement to or the amount or extent of any adjustments in the Contract Price or the Contract Times as a result of any delay in Owner's furnishing these lands, rights-of-way or easements. Contractor may make a claim therefore as provided in Articles 11 and 12. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

4.2. SubSurface and Physical Conditions:

4.2.1. **Reports and Drawings:** Reference is made to the *Information Available to Bidders* for identification of:

4.2.1.1. **Subsurface Conditions:** Those reports of explorations and tests of subsurface conditions at or contiguous to the site that have been utilized by Engineer in preparing the Contract Documents; and

4.2.1.2. **Physical Conditions:** Those drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the site (except Underground Facilities) that have been utilized by Engineer in preparing the Contract Documents.

4.2.2. **Limited Reliance by Contractor Authorized; Technical Data:** Contractor may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the *Information Available to Bidders*. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner, Engineer, or any of Engineer's Consultants with respect to:

4.2.2.1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto, or

4.2.2.2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings, or

4.2.2.3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such data, interpretations, opinions, or information.

4.2.3. **Notice of Differing Subsurface or Physical Conditions:** If Contractor believes that any subsurface or physical condition at or contiguous to the site that is uncovered or revealed either:

4.2.3.1. is of such a nature as to establish that any "technical data" on which Contractor is entitled to rely as provided in paragraphs 4.2.1 and 4.2.2 is materially inaccurate, or

4.2.3.2. is of such a nature as to require a change in the Contract Documents, or

4.2.3.3. differs materially from that shown or indicated in the Contract Documents, or

4.2.3.4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents; then Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as permitted by paragraph 6.23), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such conditions or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

4.2.4. **Engineer's Review:** Engineer will promptly review the pertinent conditions, determine the necessity of Owner's obtaining additional exploration or tests with respect thereto and advise Owner in writing (with a copy to Contractor) of Engineer's findings and conclusions.

4.2.5. **Possible Contract Documents Change:** If Engineer concludes that a change in the Contract Documents is required as a result of a condition that meets one or more of the categories in paragraph 4.2.3., a Work Change Directive or a Change Order will be issued as provided in Article 10 to reflect and document the consequences of such change.

4.2.6. **Possible Price and Times Adjustments:** An equitable adjustment in the Contract Price or in the Contract Times, or both, will be allowed to the extent that the existence of such uncovered or revealed condition causes an increase or decrease in Contractor's cost of, or time required for performance of the Work; subject, however, to the following:

4.2.6.1. such condition must meet any one or more of the categories described in paragraphs 4.2.3.1 through 4.2.3.4. inclusive;

4.2.6.2. a change in the Contract Documents pursuant to paragraph 4.2.5 will not be an automatic authorization of nor a condition precedent to entitlement to any such adjustment:

4.2.6.3. with respect to Work that is paid for on a Unit Price Basis, any adjustment in Contract price will be subject to the provisions of paragraphs 9.10 and 11.9; and

4.2.6.4. Contractor shall not be entitled to any adjustment in the Contract Price or Times if;

4.2.6.4.1. Contractor knew of the existence of such conditions at the time Contractor made a final commitment to Owner in respect of Contract Price and Contract Times by the submission of a bid or becoming bound under a contract: or

4.2.6.4.2. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such final commitment; or

4.2.6.4.3. Contractor failed to give the written notice within the time and as required by paragraph 4.2.3.

If Owner and Contractor are unable to agree on entitlement to or as to the amount or length of any such equitable adjustment in the Contract Price or Contract Times, a claim may be made therefore as provided in Articles 11 and 12. However, Owner, Engineer, and Engineer's Consultants shall not be liable to Contractor for any claims, costs, losses, or damages sustained by Contractor on or in connection with any other project or anticipated project.

4.3. Physical Conditions – Underground Facilities:

4.3.1. **Shown or Indicated:** The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities or by others. Unless it is otherwise expressly provided in the *Information Available to Bidders*:

4.3.1.1. Owner and Engineer shall not be responsible for the accuracy or completeness of any such information or data; and

4.3.1.2. The cost of all of the following will be included in the Contract Price and Contractor shall have full responsibility for: (i) reviewing and checking all such information and data, (ii) locating all Underground Facilities shown or indicated in the Contract Documents, (iii) coordination of the Work with the owners of such Underground Facilities during construction, and (iv) the safety and protection of all such Underground Facilities as provided in paragraph 6.20 and repairing any damage thereto resulting from the Work.

4.3.2. **Not Shown or Indicated:** If an Underground Facility is uncovered or revealed at or contiguous to the site which was not shown or indicated in the Contract Documents. Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by paragraph 6.23), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer. Engineer will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence of the Underground Facility. If Engineer concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued as provided in Article 10 to reflect and document such consequences. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility as provided in paragraph 6.20. Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, to the extent that they are attributable to the existence of any Underground Facility that was not shown or indicated in the Contract Documents and that Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated. If Owner and Contractor are unable to agree on entitlement to or the amount or length of any such adjustment in Contract Price or Contract Times, Contractor may make a claim, therefore, as provided in Articles 11 and 12. However, Owner, Engineer, and Engineer's Consultants shall not be liable

to Contractor for any claims, costs, losses or damages incurred or sustained by Contractor on or in connection with any other project or anticipated project.

Reference Points:

4.4. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and shall make no changes or relocations without the prior written approval of Owner, Contractor shall report to Engineer whenever any reference point is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points by professionally qualified personnel.

4.5. Asbestos, PCBs, Petroleum, Hazardous Waste or Radioactive Material:

4.5.1. Owner shall be responsible for any Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material uncovered or revealed at the site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work and which may present a substantial danger to persons or property exposed thereto in connection with the Work at the site. Owner shall not be responsible for any such materials brought to the site by Contractor, Subcontractor, Suppliers, or anyone else for whom Contractor is responsible.

4.5.2. Contractor shall immediately: (i) stop all Work in connection with such hazardous condition and in any area affected thereby (except in an emergency as required by paragraph 6.23), and (ii) notify Owner and Engineer (and thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such hazardous condition to take corrective action, if any. Contractor shall not be required to resume Work in connection with such hazardous condition or in any such affected area until after Owner has obtained any required permits related thereto and delivered to Contractor special written notice: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (ii) specifying any special conditions under which such Work may be resumed safely. If Owner and Contractor cannot agree as to entitlement to or the amount or extent of an adjustment, if any, in Contract Price or Contract Times as a result of such Work stoppage or such special conditions under which Work is agreed by Contractor to be resumed, either party may make a claim therefore as provided in Articles 11 and 12.

4.5.3. If after receipt of such special written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order such portion of the Work that is in connection with such hazardous condition or in such affected area to be deleted from the Work. If Owner and Contractor cannot agree as to entitlement to or the amount or extent of an adjustment, if any, in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a claim therefore as provided in Articles 11 and 12. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 7.

4.5.4. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, Engineer, Engineer's Consultants and the officers, directors, employees, agents, other consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages arising out of or resulting from such hazardous condition, provided that: (i) any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom,

and (ii) nothing in this subparagraph 4.5.4. shall obligate Owner to indemnify any person or entity from and against the consequences of that person's or entity's own negligence.

4.5.5. The provisions of paragraphs 4.2 and 4.3 are not intended to apply to Asbestos, PCBs, Petroleum, Hazardous Waste or Radioactive Material uncovered or revealed at the site.

ARTICLE 5 – BONDS AND INSURANCE

Performance, Payment, and Other Bonds:

5.1. Contractor shall furnish Performance and Payment Bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all Contractor's obligations under the Contract Documents. These Bonds shall remain in effect at least until one year after the date when final payment becomes due, except as provided otherwise by Laws or Regulations or by the Contract Documents. Contractor shall also furnish such other Bonds as are required by the Supplementary Conditions. All Bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Audit Staff. Bureau of Government Financial Operations, U.S. Treasury Department. All Bonds signed by an agent must be accompanied by a certified copy of such agent's authority to act.

5.2. If the surety on any Bond furnished by Contractor is declared a bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of paragraph 5.1. Contractor shall within ten days thereafter substitute another bond and surety, both of which must be acceptable to Owner.

5.3. Licensed Sureties and Insurers; Certificates of Insurance:

5.3.1. All Bonds and insurance required by the Contract Documents to be purchased and maintained by Owner or Contractor shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue Bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary Conditions.

5.3.2. Contractor shall deliver to Owner, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Owner or any other additional insured) which Contractor is required to purchase and maintain in accordance with paragraph 5.4.

Contractor's Liability Insurance:

5.4. Contractor shall purchase and maintain such liability and other insurance as is appropriate for the Work being performed and furnished and as will provide protection from claims set forth below which may arise out of or result from Contractor's performance and furnishing of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed or furnished by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform or furnish any of the Work, or by anyone for whose acts any of them may be liable:

5.4.1. claims under workers' compensation, disability benefits and other similar employee benefit acts;

5.4.2. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;

5.4.3. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;

5.4.4. claims for damages insured by customary personal injury liability coverage which are sustained: (i) by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or by any other person for any other reason;

5.4.5. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom; and

5.4.6. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.

The policies of insurance so required by this paragraph 5.4 to be purchased and maintained shall:

5.4.7. with respect to insurance required by paragraphs 5.4.3 through 5.4.6 inclusive, include as additional insureds Owner, Engineer, Engineer's Consultants and any other persons or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and include coverage for the respective officers and employees of all such additional insureds;

5.4.8. include the specific coverages and be written for not less than the limits of liability provided in the Supplementary Conditions or required by Laws or Regulations, whichever is greater;

5.4.9. *be provided in not less than the amounts established in the Insurance Requirements section of the bidding documents (pages INS-1 to INS-3);*

5.4.10. include contractual liability insurance covering Contractor's indemnity obligations under paragraphs 6.12, 6.16, and 6.31 through 6.33;

5.4.11. contain a provision or endorsement that the coverage afforded will not be cancelled, materially changed or renewal refused until at least thirty days prior written notice has been given to Owner and Contractor and to each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the Contractor pursuant to paragraph 5.3.2 will so provide);

5.4.12. remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing or replacing **defective** Work in accordance with paragraph 13.12; and

5.4.13. with respect to completed operations insurance, and any insurance coverage written on an occurrence basis, remain in effect for at least two years after final payment (and Contractor shall furnish Owner and each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued evidence satisfactory to Owner and any such additional insured of continuation of such insurance at final payment and one year thereafter).

Owner's Liability Insurance:

5.5. In addition to the insurance required to be provided by Contractor under paragraph 5.4, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents. Any liability insurance carried by Owner is excess and non-contributory to any and all other coverage whether collectable or not.

Property Insurance:

5.6 Contractor shall purchase and maintain property insurance upon the Work at the site in amount of the full replacement cost thereof (subject to such deductible amounts as may be provided in these Supplementary Conditions or required by Laws and Regulations). This insurance shall:

5.6.1 include the interests of Owner, Contractor, Subcontractors, Engineer, Engineer's Consultants and any other persons or entities identified in the Supplementary Conditions each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured;

5.6.2 include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);

5.6.3 Cover materials and equipment in transit for incorporation in the Work or stored at the site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by Engineer; and

5.6.4 be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor, and Engineer with thirty days written notice to each other additional insured to whom a certificate of insurance has been issued.

5.7. NOT USED

5.8. NOT USED

5.9. Owner shall not be responsible for purchasing and maintaining any property insurance to protect the interests of Contractor, Subcontractors or others in the Work to the extent of any deductible amounts that are identified in the Supplementary Conditions. The risk of loss within such identified deductible amount, will be borne by Contractor, Subcontractor, or others suffering any such loss and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

5.10. NOT USED

5.11. NOT USED

Receipt and Application of Insurance Proceeds:

5.12. Any insureds loss under the policies of insurance required by paragraphs 5.6 and 5.7 will be adjusted with Owner and made payable to Owner as fiduciary for the insureds, as their interests may appear, subject to the requirements of any applicable mortgage clause and of paragraph 5.13. Owner shall deposit in a

separate account any money so received, and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof and the Work and the cost thereof covered by an appropriate Change Order or Written Amendment.

5.13. Owner as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within fifteen days after the occurrence of loss to Owner's exercise of this power. If such objection be made, Owner as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, Owner as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, Owner as fiduciary shall give bond for the proper performance of such duties.

Acceptance of Bonds and Insurance; Option to Replace:

5.14. If either party (Owner or Contractor) has any objection to the coverage afforded by or other provisions of the Bonds or insurance required to be purchased and maintained by the other party in accordance with Article 5 on the basis of non-conformance with the Contract Documents, the objecting party shall so notify the other party in writing within ten days after receipt of the certificates (or other evidence requested) required by paragraph 2.7. Owner and Contractor shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the Bonds and insurance required of such party by the Contract Documents, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent Bonds or insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

Partial Utilization – Property Insurance:

5.15. If Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work, such use or occupancy may be accomplished in accordance with paragraph 14.10; provided that no such use or occupancy shall commence before the insurers providing the property insurance have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be cancelled or permitted to lapse on account of any such partial use or occupancy.

ARTICLE 6 – CONTRACTOR'S RESPONSIBILITIES

Supervision and Superintendence:

6.1. Contractor shall supervise, inspect and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences and procedures of construction, but Contractor shall not be responsible for the negligence of others in the design or specification of a specific means, method, technique, sequence or procedure of construction which is shown or indicated in and expressly required by the Contract Documents. Contractor shall be responsible to see that the completed Work complies accurately with the Contract Documents.

6.2. Contractor shall keep on the Work at all times during its progress a competent resident superintendent, who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances. The superintendent will be Contractor's representative at the site and shall have authority to act on behalf of Contractor. All communications to the superintendent shall be as binding as if given to CONTRACTOR.

Labor, Materials and Equipment:

6.3. Contractor shall provide competent, suitably qualified personnel to survey, lay out and construct the Work as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the site. Except as otherwise required for the safety or protection of persons or the Work or property at the site or adjacent thereto, and except as otherwise indicated in the Contract Documents, all Work at the site shall be performed during regular working hours and Contractor will not permit overtime work or the performance of Work on Saturday, Sunday or any legal holiday without Owner's written consent given after prior written notice to Engineer.

6.4. Unless otherwise specified in the General Requirements, Contractor shall furnish and assume full responsibility for all materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities and all other facilities and incidentals necessary for the furnishing, performance, testing, start-up and completion of the Work.

6.5. All materials and equipment shall be of good quality and new, except as otherwise provided in the Contract Documents. All warranties and guarantees specifically called for by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the kind and quality of materials and equipment. All materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with instructions of the applicable Supplier, except as otherwise provided in the Contract Documents.

Progress Schedule:

6.6. Contractor shall adhere to the progress schedule established in accordance with paragraph 2.9 as it may be adjusted from time to time as provided below:

6.6.1. Contractor shall submit to Engineer for acceptance (to the extent indicated in paragraph 2.9) proposed adjustments in the progress schedule that will not change the Contract Times (or Milestones). Such adjustments will conform generally to the progress schedule then in effect and additionally will comply with any provisions of the General Requirements applicable thereto.

6.6.2. Proposed adjustments in the progress schedule that will change the Contract Times (or Milestones) shall be submitted in accordance with the requirements of paragraph 12.1. Such adjustments may only be made by a Change Order or Written Amendment in accordance with Article 12.

6.7. Substitutes and "Or-Equal" Items:

6.7.1. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent or "or-equal" item or no

substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be accepted by Engineer under the following circumstances:

6.7.1.1. "Or-Equal": If in Engineer's sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by Engineer as an "or-equal" item, in which case review and approval of the proposed item may, in Engineer's sole discretion, be accomplished without compliance with some or all of the requirements for acceptance of proposed substitute items.

6.7.1.2. Substitute Items: If in Engineer's sole discretion an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item under subparagraph 6.7.1.1, it will be considered a proposed substitute item. Contractor shall submit sufficient information as provided below to allow Engineer to determine that the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefore. The procedure for review by the Engineer will include the following as supplemented in the General Requirements and as Engineer may decide is appropriate under the circumstances. Requests for review of proposed substitute items of material or equipment will not be accepted by Engineer from anyone other than Contractor. If Contractor wishes to furnish or use a substitute item of material or equipment, Contractor shall first make written application to Engineer for acceptance thereof, certifying that the proposed substitute will perform adequately the functions and achieve the results called for by the general design, be similar in substance to that specified and be suited to the same use as that specified. The application will state the extent, if any, to which the evaluation and acceptance of the proposed substitute will prejudice Contractor's achievement of Substantial Completion on time, whether or not acceptance of the substitute for use in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for work on the Project) to adapt the design to the proposed substitute and whether or not incorporation or use of the substitute in connection with the Work is subject to payment of any license fee or royalty. All variations of the proposed substitute from that specified will be identified in the application and available maintenance, repair and replacement service will be indicated. The application will also contain an itemized estimate of all costs or credits that will result directly or indirectly from acceptance of such substitute, including costs of redesign and claims of other contractors affected by the resulting change, all of which will be considered by Engineer in evaluating the proposed substitute. Engineer may require Contractor to furnish additional data about the proposed substitute.

6.7.1.3. Contractor's Expense: All data to be provided by Contractor in support of any proposed "or-equal" or substitute item will be at Contractor's expense.

6.7.2. Substitute Construction Methods or Procedures: If a specific means, method, technique, sequence or procedure of construction is shown or indicated in an expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence or procedure of construction acceptable to Engineer. Contractor shall submit sufficient information to allow Engineer, in Engineer's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The procedure for review by Engineer will be similar to that provided in subparagraph 6.7.1.2.

6.7.3. Engineer's Evaluation: Engineer will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to paragraphs 6.7.1.2 and 6.7.2. Engineer will be the sole judge of acceptability. No "or-equal" or substitute will be ordered, installed or utilized without Engineer's prior written acceptance which will be evidenced by either a Change Order or an approved Shop Drawing.

Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any "or-equal" or substitute. Engineer will record time required by Engineer and Engineer's Consultants in evaluating substitutes proposed or submitted by Contractor pursuant to paragraphs 6.7.1.2 and 6.7.2 and in making changes in the Contract Documents (or in the provisions of any other direct contract with Owner for work on the Project) occasioned thereby. Whether or not Engineer accepts a substitute item so proposed or submitted by Contractor, Contractor shall reimburse Owner for the changes of Engineer and Engineer's Consultants for evaluating each such proposed substitute item.

6.8. Concerning Subcontractors, Suppliers and Others:

The Contractor shall submit a list of Subcontractors and major Material Suppliers for the Owner's approval within (24) hours after Bid Opening. Such list shall be accompanied by an experience statement with pertinent information as to similar projects and other evidence of qualifications from each such Subcontractor, person and organization requested by Owner. If Owner, after due investigation has reasonable objections to any proposed Subcontractor, other person or organization, the Owner may before giving the Notice of Award request the apparent successful Bidder to submit an acceptable Subcontractor without an increase in Bid Price. If the apparent successful Bidder declines to make any such substitution, the Contract shall not be awarded to such Bidder, but his declining to make any such substitution will not constitute grounds for sacrificing his Bid Security. Any Subcontractor, other person or organization so listed and to whom Owner does not make written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner.

6.8.1. Contractor shall not employ any Subcontractor, Supplier or other person or organization (including those acceptable to Owner and Engineer as indicated in paragraph 6.8.2), whether initially or as a substitute, against whom Owner or Engineer may have reasonable objection. Contractor shall not be required to employ any subcontractor, Supplier or other person or organization to furnish or perform any of the Work against whom Contractor has reasonable objection.

6.8.2. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers or other persons or organizations (including those who are to furnish the principal items of materials or equipment) to be submitted to Owner in advance of the specified date prior to the Effective Date of the Agreement for acceptance by Owner and Engineer, and if Contractor has submitted a list thereof in accordance with the Supplementary Conditions, Owner's or Engineer's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the bidding documents or the Contract Documents) of any such Subcontractor, Supplier or other person or organization so identified may be revoked on the basis of reasonable objection after due investigation, in which case Contractor shall submit an acceptable substitute, the Contract Price will be adjusted by the difference in the cost occasioned by such substitution and an appropriate Change Order will be issued or Written Amendment signed. No acceptance by Owner or Engineer of any such Subcontractor, Supplier or other person or organization shall constitute a waiver of any right of Owner or Engineer to reject **defective** Work.

6.9.1. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers and other persons and organizations performing or furnishing any of the Work under a direct or indirect contract with Contractor just as Contractor is responsible for Contractor's own acts and omissions. Nothing in the Contract Documents shall create for the benefit of any such Subcontractor, Supplier, or other person or organization any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier or other person or organization, nor shall it create any obligation on the part of Owner or Engineer to pay or to see to the payment of any moneys due any such

Subcontractor, Supplier or other person or organization except as may otherwise be required by Laws and Regulations.

6.9.2. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers and other persons and organizations performing or furnishing any of the Work under a direct or indirect contract with Contractor. Contractor shall require all Subcontractors, Suppliers and such other persons and organizations performing or furnishing any of the Work to communicate with the Engineer through Contractor.

6.10. The divisions and sections of the Specifications and the identifications of any drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.

6.11. All Work performed by Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer. Whenever any such agreement is with a Subcontractor or Supplier who is listed as an additional insured on the property insurance provided in paragraph 5.6. or 5.7. the agreement between the Contractor and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against Owner, Contractor, Engineer, Engineer's Consultants and all other additional insureds for all losses and damages caused by, arising out of or resulting from any of the perils covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, Contractor will obtain the same.

Patent Fees and Royalties:

6.12. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product or device is specified in the Contract Documents for use in the performance of the Work and if to the actual knowledge of Owner or Engineer its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner, Engineer, Engineer's Consultants and the officers, directors, employees, agents and other consultants of each and any of them from and against all claims, costs, losses and damages arising out of or resulting from any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product or device not specified in the Contract Documents.

Permits:

6.13. Unless otherwise provided in the Supplementary Conditions, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work, which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. Contractor shall pay all charges of utility owners for connections to the Work, and Owner shall pay all charges of such utility owners for capital costs related thereto such as plant investment fees.

6.14 Laws and Regulations:

6.14.1. Contractor shall give all notices and comply with all Laws and Regulations applicable to furnishing and performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.

6.14.2. If Contractor performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all claims, costs, losses and damages caused by, arising out of or resulting therefrom: however, it shall not be Contractor's primary responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve Contractor or Contractor's obligations under paragraph 3.3.2.

Taxes:

6.15. Contractor shall pay all sales, consumer, use and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

Use of Premises:

6.16. Contractor shall confine construction equipment, the storage of materials and equipment and the operations of workers to the site and land and areas identified in and permitted by the Contract Documents, rights-of-way, permits and easements, and shall not unreasonably encumber the premises with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof or of any adjacent land or areas, resulting from the performance of the Work. Should any claim be made by any such owner or occupant because of the performance of the Work, Contractor shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law. Contractor shall, to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner, Engineer, Engineer's Consultant and anyone directly or indirectly employed by any of them from and against all claims costs, losses and damages arising out of or resulting from any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer or any other party indemnified hereunder to the extent caused by or based upon Contractor's performance of the Work.

6.17. During the progress of the Work, Contractor shall keep the premises free from accumulations of waste materials, rubbish and other debris resulting from the Work. At the completion of the Work Contractor shall remove all waste materials, rubbish and debris from and about the premises as well as all tools, appliances, construction equipment and machinery and surplus materials. Contractor shall leave the site clean and ready for occupancy by Owner at Substantial Completion of the Work. Contractor shall restore to original condition all property not designated for alteration by the Contract Documents.

6.18. Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

Record Documents:

6.19. Contractor shall maintain in a safe place at the site one record copy of all Drawings, Specifications, Addenda, Written Amendments, Change Orders, Work Change Directives, Field Orders and written interpretations and clarifications (issued pursuant to paragraph 9.4) in good order and annotated to show all

changes made during construction. These record documents together with all approved Samples and a counterpart of all approved Shop Drawings will be available to Engineer for reference. Upon completion of the Work, these record documents, Samples and Shop Drawings will be delivered to Engineer for Owner.

Safety and Protection:

6.20. Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

6.20.1. all persons on the Work site or who may be affected by the Work;

6.20.2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the site; and

6.20.3. other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities and Underground Facilities not designated for removal, relocation or replacement in the course of construction.

Contractor shall comply with all applicable Laws and Regulations of any public body having jurisdiction for safety of persons or property or to protect them from damage, injury or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of Underground Facilities and utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation and replacement of their property. All damage, injury or loss to any property referred to in paragraph 6.20.2. or 6.20.3. caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier or any other person or organization directly or indirectly employed by any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable, shall be remedied by Contractor (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or Engineer's Consultant or anyone employed by any of them or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier or other person or organization directly or indirectly employed by any of them). Contractor's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with paragraph 14.13. that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

Safety Representative:

6.21. Contractor shall designate a qualified and experienced safety representative at the site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

Hazard Communication Programs:

6.22. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the site in accordance with Laws or Regulations.

Emergencies:

6.23. In emergencies affecting the safety or protection of persons or the Work or property at the site or adjacent thereto, Contractor, without special instruction or authorization from Owner or Engineer, is obligated to act to prevent threatened damage, injury or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby. If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued to document the consequences of such action.

6.24. Shop Drawings and Samples:

6.24.1. Contractor shall submit Shop Drawings to Engineer for review and approval in accordance with the accepted schedule of Shop Drawings and Sample submittals (see paragraph 2.9.). All submittals will be identified as Engineer may require and in the number of copies specified in the General Requirements. The data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials and similar data to shown Engineer the materials and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by paragraph 6.26.

6.24.2. Contractor shall also submit Samples to Engineer for review and approval in accordance with said accepted schedule of Shop Drawings and Sample submittals. Each Sample will be identified clearly as to material, Supplier, pertinent data such as catalog numbers and the use for which intended and otherwise as Engineer may require to enable Engineer to review the submittal for the limited purposes required by paragraph 6.26. The numbers of each Sample to be submitted will be as specified in the Specifications.

6.25. Submittal Procedures:

6.25.1. Before submitting each Shop Drawing or Sample, Contractor shall have determined and verified:

6.25.1.1 all field measurements, quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers and similar information with respect thereto,

6.25.1.2. all materials with respect to intended use, fabrication, shipping, handling storage, assembly and installation pertaining to the performance of the Work, and

6.25.1.3. all information relative to Contractor's sole responsibilities in respect of means, methods, techniques, sequences and procedures of construction and safety precautions and programs incident thereto.

Contractor shall also have reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents.

6.25.2 Each submittal will bear a stamp or specific written indication that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review and approval of that submittal.

6.25.3. At the time of each submission, Contractor shall give Engineer specific written notice of such variations, if any, that the Shop Drawing or Sample submitted may have from the requirements of the

Contract Documents, such notice to be in a written communication separate from the submittal; and, in addition, shall cause a specific notation to be made on each Shop Drawing and Sample submitted to Engineer for review and approval of each such variation.

6.26. Engineer will review and approve Shop Drawings and Samples in accordance with the schedule of Shop Drawings and Sample submittals accepted by Engineer as required by paragraph 2.9. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Engineer's review and approval will not extend to means, methods, techniques, sequences or procedures of construction (except where a particular means, method, technique, sequence or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions. Contractor shall make corrections required by Engineer, and shall return the required number of corrected copies of Shop Drawings and submit as required new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.

6.27. Engineer's review and approval of Shop Drawings or Samples shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has in writing called Engineer's attention to each such variation at the time of submission as required by paragraph 6.25.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying Shop Drawing or Sample approval; nor will any approval by Engineer relieve Contractor from responsibility for complying with the requirements of paragraph 6.25.1.

6.28. Where a Shop Drawing or Sample is required by the Contract Documents or the schedule of Shop Drawings and Sample submissions accepted by Engineer as required by paragraph 2.9, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

Continuing the Work:

6.29. Contractor shall carry on the Work and adhere to the progress schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by paragraph 15.5 or as Owner and Contractor may otherwise agree in writing.

6.30. Contractor's General Warranty and Guarantee:

6.30.1. Contractor warrants and guarantees to Owner, Engineer and Engineer's Consultants that all Work will be in accordance with the Contract Documents and will not be defective. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:

6.30.1.1. abuse, modification or improper maintenance or operation by persons other than Contractor, Subcontractors or Suppliers; or

6.30.1.2. normal wear and tear under normal usage.

6.30.2. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in

accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:

- 6.30.2.1. observations by Engineer;
- 6.30.2.2. recommendation of any progress or final payment by Engineer;
- 6.30.2.3. the issuance of a certificate of Substantial Completion or any payment by Owner to Contractor under the Contract Documents;
- 6.30.2.4. use or occupancy of the Work or any part thereof by Owner;
- 6.30.2.5. any acceptance by Owner or any failure to do so;
- 6.30.2.6. any review and approval of Shop Drawing or Sample submittal or the issuance of a notice of acceptability by Engineer pursuant to paragraph 14.13;
- 6.30.2.7. any inspection, test or approval by others; or
- 6.30.2.8. any correction of **defective** Work by Owner.

Indemnification:

6.31. To the fullest extent permitted by Laws and Regulations. Contractor shall indemnify and hold harmless Owner, Engineer, Engineer's Consultants and the officers, directors, employees, agents and other consultants of each and any of them from and against all claims, costs, losses and damages (including but not limited to all fees and charges of engineers, architects, attorneys and other professionals and all court or arbitration or other dispute resolution costs) caused by, arising out of or resulting from the performance of the Work, provided that any such claim, cost, loss or damage: (i) is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom, and (ii) is caused in whole or in part by any negligent act or omission of Contractor, any Subcontractor, any Supplier, any person or organization directly or indirectly employed by any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable, regardless of whether or not caused in part by any negligence or omission of a person or entity indemnified hereunder or whether liability is imposed upon such indemnified party by Laws and Regulations regardless of the negligence of any such person or entity.

6.32. In any and all claims against Owner or Engineer or any of their respective consultants, agents, officers, directors or employees by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, any person or organization directly or indirectly employed by any of them to perform or furnish any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under paragraph 6.31 shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for Contractor or any such Subcontractor, Supplier or other person or organization under workers' compensation acts, disability benefit acts or other employee benefit acts.

6.33. The indemnification obligations of Contractor under paragraph 6.31 shall not extend to the liability of Engineer and Engineer's Consultants, officers, directors, employees or agents caused by the professional negligence, errors or omissions of any of them.

Survival of Obligations:

6.34. All representations, indemnifications, warranties and guarantees made in, required by or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion and acceptance of the Work and termination or completion of the Agreement.

ARTICLE 7 – OTHER WORK

Related Work at Site:

7.1. Owner may perform other work related to the Project at the site by Owner's own forces, or let other direct contracts therefore which shall contain General Conditions similar to these, or have other work performed by utility owners. If the fact that such other work is to be performed was not noted in the Contract Documents, then; (i) written notice thereof will be given to Contractor prior to starting any such other work, and (ii) Contractor may make a claim therefore as provided in Articles 11 and 12 if Contractor believes that such performance will involve additional expense to Contractor or requires additional time and the parties are unable to agree as to the amount or extent thereof.

7.2. Contractor shall afford each other contractor who is a party to such a direct contract and each utility owner (and Owner if Owner is performing the additional work with Owner's employees) proper and safe access to the site and a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work and shall properly connect and coordinate the Work with theirs. Unless otherwise provided in the Contract Documents. Contractor shall do all cutting, fitting, and patching of the Work that may be required to make its several parts come together properly and integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating or otherwise altering their work and will only cut or alter their work with the written consent of Engineer and the others whose work will be affected. The duties and responsibilities of Contractor under this paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between Owner and such utility owners and other contractors.

7.3. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 7. Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure so to report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent or non-apparent defects and deficiencies in such other work.

Coordination:

7.4. If Owner contracts with others for the performance of other work on the Project at the site, the following will be set forth in Supplementary Conditions:

7.4.1. the person, firm or corporation who will have authority and responsibility for coordination of the activities among the various prime contractors will be identified;

7.4.2. the specific matters to be covered by such authority and responsibility will be itemized: and

7.4.3. the extent of such authority and responsibilities will be provided.

Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility in respect of such coordination.

ARTICLE 8 – OWNER'S RESPONSIBILITIES

8.1. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

8.2. In case of termination of the employment of Engineer, Owner shall appoint an engineer, whose status under the Contract Documents shall be that of the former Engineer.

8.3. Owner shall furnish the data required of Owner under the Contract Documents promptly and shall make payments to Contractor promptly when they are due as provided in paragraphs 14.4 and 14.13.

8.4. Owner's duties in respect of providing lands and easements and providing engineering surveys to establish reference points are set forth in paragraphs 4.1 and 4.4. Paragraph 4.2 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of subsurface conditions at the site and drawings of physical conditions in existing structures at or contiguous to the site that have been utilized by Engineer in preparing the Contract Documents.

8.5. Owner's responsibilities in respect of purchasing and maintaining liability and property insurance are set forth in paragraphs 5.5 through 5.10.

8.6. Owner is obligated to execute Change Orders as indicated in paragraph 10.4.

8.7. Owner's responsibility in respect of certain inspections, tests and approvals is set forth in paragraph 13.4.

8.8. In connection with Owner's right to stop Work or suspend Work, see paragraphs 13.10 and 15.1. Paragraph 15.2 deals with Owner's right to terminate services of Contractor under certain circumstances.

8.9. The Owner shall not supervise, direct or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences or procedures of construction or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the furnishing or performance of the Work. Owner will not be responsible for Contractor's failure to perform or furnish the Work in accordance with the Contract Documents.

8.10. Owner's responsibility in respect of undisclosed Asbestos, PCBs, Petroleum, Hazardous Waste or Radioactive Materials uncovered or revealed at the site is set forth in paragraph 4.5.

8.11. If and to the extent Owner has agreed to furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents, Owner's responsibility in respect thereof will be as set forth in the Supplementary Conditions.

ARTICLE 9 – ENGINEER'S STATUS DURING CONSTRUCTION

Owner's Representative:

9.1. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract Documents and shall not be extended without written consent of Owner and Engineer.

Visits to Site:

9.2. Engineer will make visits to the site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer will endeavor for the benefit of Owner to determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and on-site observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work. Engineer's visits and on-site observations are subject to all the limitations on Engineer's authority and responsibility set forth in paragraph 9.13, and particularly, but without limitation, during or as a result of Engineer's on-site visits or observations of Contractor's Work Engineer will not supervise, direct, control or have authority over or be responsible for Contractor's means, methods, techniques, sequences or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the furnishing or performance of the Work.

Project Representative:

9.3. If Owner and Engineer agree, Engineer will furnish a Resident Project Representative to assist Engineer in providing more continuous observation of the Work. The responsibilities and authority and limitations thereon of any such Resident Project Representative and assistants will be as provided in paragraph 9.13 and in the Supplementary Conditions. If Owner designates another representative or agent to represent Owner at the site who is not Engineer's Consultant, agent or employee, the responsibilities and authority and limitations thereon of such other person will be as provided in the Supplementary Conditions.

9.3.1 Engineer may furnish a Resident Project Representative, assistants and other field staff as needed, to assist Owner in observing performance of the Work. The Resident Project Representative is to observe and inspect, in the Owner's interest, the materials furnished and the work done as the work progresses in order to insure full and complete compliance with the contract and to verify quantities of work completed.

9.3.2 Owner may also designate one of its employees to represent Owner for these purposes.

9.3.3 Engineer, Resident Project Representative, Owner and all such other persons referred to shall have unrestricted access to all parts of the Work. Contractor shall cooperate by supplying necessary facilities and assistance required by above persons to carry out their work of observation and inspection.

9.3.4 It is not the function of the Engineer, Resident Project Representative or Owner to supervise or direct the manner in which the work to be done under this Contract is carried on or conducted. The Engineer, Resident Project Representative or Owner is not responsible for construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the work, and they will not be responsible for the Contractor's failure to carry out the work in accordance with the Contract Documents. Nevertheless, Contractor agrees that any method or procedure, which in the opinion of the Engineer or Owner does not achieve the required results or quality of the work specified, shall be discontinued immediately upon the order of the Engineer.

9.3.5 All communications between Contractor and Engineer or Contractor and Owner are to be through the Owner's Project Representative (RPR).

9.3.6 Duties and Responsibilities of Resident Project Representative (RPR):

- 1) RPR will act as directed by and under the supervision of Engineer and/or Owner, and will confer with Engineer and Owner regarding RPR's actions. RPR's dealings in matters pertaining to the on-site work shall in general be with Engineer and Contractor keeping Owner advised as necessary. RPR's dealings with subcontractors shall only be through or with the full knowledge and approval of Contractor.
- 2) Review progress schedule, schedule of Shop Drawing submittals and schedule of values prepared by Contractor and consult with Engineer and Owner concerning acceptability.
- 3) Attend meetings with Contractor, such as pre-construction conferences, progress meetings, job conferences and other project-related meetings, and prepare and circulate copies of minutes thereof.
- 4) Serve as Engineer's and Owner's liaison with Contractor, working principally through Contractor's superintendent and assist in understanding the intent of the Contract Documents.
- 5) Advise Engineer, Owner and Contractor of the commencement of any Work requiring a Shop Drawing or sample if the submittal has not been approved by Engineer.
- 6) Conduct on-site observations of the Work in progress to assist Engineer and Owner in determining if the Work is in general proceeding in accordance with the Contract Documents. Report to Engineer and Owner whenever RPR believes that any Work is unsatisfactory, faulty or defective or does not conform to the Contract Documents, or has been damaged, or does not meet the requirements of any inspection, test or approval required to be made; and advise Engineer and Owner of Work that RPR believes should be corrected or rejected or should be uncovered for observation, or requires special testing, inspection or approval.
- 7) Report to Engineer and Owner when clarifications and interpretations of the Contract Documents are needed and transmit to Contractor clarifications and interpretations as issued by Engineer.
- 8) Consider and evaluate Contractor's suggestions for modifications in Drawings or Specifications and report with RPR's recommendations to Engineer and Owner. Transmit to Contractor decisions as issued by Engineer and/or Owner.

9) *Maintain orderly files for correspondence, reports of job conferences, Shop Drawings and samples, reproductions of original Contract Documents including all Work Directive Changes, Addenda, Change Orders, Field Orders, additional Drawings issued subsequent to the execution of the Contract, Engineer's clarifications and interpretations of the Contract Documents, progress reports, and other Project related documents.*

10) ***Keep a diary or log book, recording Contractor hours on the job site, weather conditions, data relative to questions of Work Directive Changes, Change Orders or Changed conditions, list of job site visitors, daily activities, decisions, observations in general, and specific observations in more detail as in the case of observing test procedures; and send copies to Engineer and Owner.***

11) ***Record names, addresses and telephone numbers of all Contractors, subcontractors and major suppliers of materials and equipment.***

12) *Furnish Engineer and Owner periodic reports as required of progress of the Work and of Contractor's compliance with the progress schedule and schedule of Shop Drawing and sample submittals.*

13) *Draft proposed Change Orders and Work Directive Changes, obtaining backup material from Contractor and recommend to Engineer and Owner Change Orders, Work Directive Changes, and Field Orders.*

14) *Report immediately to Engineer and Owner upon the occurrence of any accident.*

15) *Review applications for payment with Contractor for compliance with the established procedure for their submission and forward with recommendations to Engineer, noting particularly the relationship of the payment requested to the schedule of values, Work completed and materials and equipment delivered at the site but not incorporated in the Work.*

16) *During the course of the Work, verify that certificates, maintenance and operation manuals and other data required to be assembled and furnished by Contractor are applicable to the items actually installed and in accordance with the Contract Documents, and have this material delivered to Engineer for review and forwarding to Owner prior to final payment for the work.*

17) *Before Engineer issues a Certificate of Substantial Completion, submit to Contractor a list of observed items requiring completion or correction.*

18) *Conduct final inspection in the company of Engineer, Owner and Contractor and prepare a final list of items to be completed or corrected.*

19) *Observe that all items on final list have been completed or corrected and make recommendations to Engineer and Owner concerning acceptance.*

9.3.7 Limitations of Authority of Resident Project Representative (RPR):

1) *Shall not authorize any deviation from the Contract Documents or substitution of materials or equipment, unless authorized by Engineer or Owner.*

2) *Shall not exceed limitations of Engineer's authority as set forth in the Contract Documents.*

- 3) *Shall not undertake any of the responsibilities of Contractor, subcontractors or Contractor's superintendent.*
- 4) *Shall not advise on, issue directions relative to or assume control over any aspect of the means, methods, techniques, sequences or procedures of construction unless such advice or directions are specifically required by the Contract Documents.*
- 5) *Shall not advise on, issue directions regarding or assume control over safety precautions and programs in connection with the Work.*
- 6) *Shall not accept Shop Drawing or sample submittals from anyone other than Contractor.*

9.3.8 The Engineer and or Owner shall have the authority to reject any work, or materials, or any part thereof, which does not in his opinion conform to the plans, drawings, specifications and contract, and it shall be permissible for him to do so at any time during the progress of the work and until its acceptance.

No material of any kind shall be used upon the work until it has been inspected and accepted by the Engineer. All materials rejected shall be removed immediately from the work and not again offered for inspection. Any materials or workmanship found at any time to be defective or not of the quality or character required by the plans and specifications shall be remedied at once regardless of previous inspection.

Such inspection shall not relieve the Contractor from any obligation to perform said work strictly in accordance with the plans and specifications and work not so constructed shall be removed and made good by the Contractor at his own expense, and free from all expense to the Owner whenever so ordered by the Owner without reference to any previous oversight or error in inspection.

Clarifications and Interpretations:

9.4. Engineer will issue with reasonable promptness such written clarifications or interpretations of the requirements of the Contract Documents (in the form of Drawings or otherwise) as Engineer may determine necessary, which shall be consistent with the intent of and reasonably inferable from Contract Documents. Such written clarifications and interpretations will be binding on Owner and Contractor. If Owner or Contractor believes that a written clarification or interpretation justifies an adjustment in the Contract Price or the Contract Times and the parties are unable to agree to the amount or extent thereof, if any, Owner or Contractor may make a written claim therefore as provided in Article 11 or Article 12.

Authorized Variations in Work:

9.5. Engineer may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on Owner and also on Contractor who shall perform the Work involved promptly. If Owner or Contractor believes that a Field Order justifies an adjustment in the Contract Price or the Contract Times and the parties are unable to agree as to the amount or extent thereof, Owner or Contractor may make a written claim therefore as provided in Article 11 or 12.

Rejecting Defective Work:

9.6. Engineer will have authority to disapprove or reject Work which Engineer believes to be defective, or that Engineer believes will not produce a complete Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Engineer will also have authority to require special inspection or testing of the Work as provided in paragraph 13.9, whether or not the Work is fabricated, installed or completed.

Shop Drawings, Change Orders and Payments:

9.7. In connection with Engineer's authority as to Shop Drawings and Samples, see paragraphs 6.24 through 6.28 inclusive.

9.8. In connection with Engineer's authority as to Change Orders, see Articles 10,11, and 12.

9.9. In connection with Engineer's authority as to Applications for Payment, see Article 14.

Determinations for Unit Prices:

9.10. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding upon Owner and Contractor, unless, within ten days after the date of any such decision, either Owner or Contractor delivers to the other and to Engineer written notice of intention to appeal from Engineer's decision and, a formal proceeding is instituted by the appealing party in a forum of competent jurisdiction to exercise such rights or remedies as the appealing party may have with respect to Engineer's decision, unless otherwise agreed in writing by Owner and Contractor. Such appeal will not be subject to procedures of paragraph 9.11.

Decisions on Disputes:

9.11. Engineer will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work there under. Claims, disputes and other matters relating to the acceptability of the Work or the interpretation of the requirements of the Contract Documents pertaining to the performance and furnishing of the Work and Claims under Articles 11 and 12 in respect of changes in the Contract Price or Contract Times will be referred initially to Engineer in writing with a request for a formal decision in accordance with this paragraph. Written notice of each such claim, dispute or other matter will be delivered by the claimant to Engineer and the other party to the Agreement promptly (but in no event later than thirty days) after the start of the occurrence or event giving rise thereto, and written supporting data will be submitted to Engineer and the other party within sixty days after the start of such occurrence or event unless Engineer allows an additional period of time for the submission of additional or more accurate data in support of such claim, dispute or other matter. The opposing party shall submit any response to Engineer and the claimant within thirty days after receipt of the claimant's last submittal (unless Engineer allows additional time). Engineer will render a formal decision in writing within thirty days after receipt of the opposing party's submittal, if any, in accordance with this paragraph. Engineer's written decision on such claim, dispute or other matter will be final and binding upon Owner and Contractor unless: a written notice of intention to appeal from Engineer's written decision is delivered by Owner or Contractor to the other and to Engineer within thirty days after the date of such decision and a formal proceeding is instituted by the appealing party in a forum of competent jurisdiction to exercise such rights or remedies as the

appealing party may have with respect to such claim, dispute or other matter in accordance with applicable Laws and Regulations within sixty days of the date of such decision, unless otherwise agreed in writing by Owner and Contractor.

9.12. When functioning as interpreter and judge under paragraphs 9.10 and 9.11, Engineer will not show partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity. The rendering of a decision by Engineer pursuant to paragraphs 9.10 or 9.11 with respect to any such claim, dispute or other matter (except any which have been waived by the making or acceptance of final payment as provided in paragraph 14.15) will be a condition precedent to any exercise by Owner or Contractor of such rights or remedies as either may otherwise have under the Contract Documents or by Laws or Regulations in respect of any such claim, dispute or other matter.

9.13. Limitations on Engineer's Authority and Responsibilities:

9.13.1. Neither Engineer's authority or responsibility under this Article 9 or under any other provision of the Contract Documents nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise or performance of any authority or responsibility by Engineer shall create, impose or give rise to any duty owed by Engineer to Contractor, any Subcontractor, and Supplier, any other person or organization, or to any surety for employee or agent of any of them.

9.13.2. Engineer will not supervise, direct, control or have authority over or be responsible for Contractor's means, methods, techniques, sequences or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the furnishing or performance of the Work. Engineer will not be responsible for Contractor's failure to perform or furnish the Work in accordance with the Contract Documents.

9.13.3. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other person or organization performing or furnishing any of the Work.

9.13.4. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds and certificates of inspection, tests, and approvals and Other documentation required to be delivered by paragraph 4.12 will only be to determine generally that their content complies with the requirements of, and in the case of, certificates of inspections, tests and approvals that the results certified indicate compliance with the Contract Documents.

9.13.5. the limitations upon authority and responsibility set forth in this paragraph 9.13 shall also apply to Engineer's Consultants, Resident Project Representative and assistants.

ARTICLE 10 – CHANGES IN THE WORK

10.1. Without invalidating the Agreement and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions or revisions in the Work. Such additions, deletions or revisions will be authorized by a Written Amendment, a Change Order, or a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).

10.2. If Owner and Contractor are unable to agree as to the extent, if any, of an adjustment in the Contract Price or an adjustment of the Contract Times that should be allowed as a result of a Work Change Directive, a claim may be made therefore as provided in Article 11 or Article 12.

10.3. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any Work performed that is not required by the Contract Documents as amended, modified and supplemented as provided in paragraphs 3.5 and 3.6 except in the case of an emergency as provided in paragraph 6.23 or in the case of uncovering Work as provided in paragraph 13.9.

10.4. Owner and Contractor shall execute appropriate Change Orders recommended by Engineer covering:

10.4.1. changes in the Work which are (i) ordered by Owner pursuant to paragraph 10.1, (ii) required because of acceptance of defective Work under paragraph 13.13 or correcting defective Work under paragraph 13.14, or (iii) agreed to by the parties;

10.4.2. changes in the Contract Price or Contract Times which are agreed to by the parties; and

10.4.3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by Engineer pursuant to paragraph 9.11;

Provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the progress schedule as provided in paragraph 6.29.

10.5. If notice of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times) is required by the provisions of any Bond to be given to a surety, the giving of any such notice will be Contractor's responsibility, and the amount of each applicable Bond will be adjusted accordingly.

ARTICLE 11 – CHANGE OF CONTRACT PRICE

11.1. The Contract Price constitutes the total compensation (subject to authorized adjustments) payable to Contractor for performing the Work. All duties, responsibilities and obligations assigned to or undertaken by Contractor shall be at Contractor's expense without change in the Contract Price.

11.2. The Contract Price may only be changed by a Change Order. Any claim for an adjustment in the Contract Price shall be based on written notice delivered by the party making the claim to the other party and to Engineer promptly (but in no event later than ten days) after the start of the occurrence or event giving rise to the claim and stating the general nature of the claim. Notice of the amount of the claim with supporting data shall be delivered within thirty days after the start of such occurrence or event (unless Engineer allows additional time for claimant to submit additional or more accurate data in support of the claim) and shall be accompanied by claimant's written statement that the adjustment claimed covers all known amounts to which the claimant is entitled as a result of said occurrence or event. All claims for adjustment in the Contract Price shall be determined by Engineer in accordance with paragraph 9.11 if Owner and Contractor cannot otherwise agree on the amount involved. No claim for an adjustment in the Contract Price will be valid if not submitted in accordance with this paragraph 11.2.

11.3 The value of any Work covered by a Change Order or of any claim for an adjustment in the Contract Price will be determined as follows:

11.3.1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of paragraphs 11.9.1. through 11.9.3. inclusive);

11.3.2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with paragraph 11.6.2):

11.3.3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under paragraph 11.3.2, on the basis of the Cost of the Work (determined as provided in paragraphs 11.4 and 11.5) plus a Contractor's fee for overhead and profit (determined as provided in paragraph 11.6).

Cost of the Work Covered by a Change Order:

11.4. The term Cost of the Work means the sum of all costs necessarily incurred and paid by Contractor in the proper performance of the Work. Except as otherwise may be agreed to in writing by Owner, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall include only the following items and shall not include any of the costs itemized in paragraph 11.5.

11.4.1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include without limitation superintendents, foremen and other personnel employed full-time at the site. Payroll costs for employees not employed full-time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits which shall include social security contributions, unemployment, excise and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work after regular working hours, on Saturday, Sunday or legal holidays, shall be included in the above to the extent authorized by Owner.

11.4.2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.

11.4.3. Payments made by Contractor to the Subcontractors for Work performed or furnished by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner who will then determine, with the advice of Engineer, which bids, if any, will be accepted. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work Plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in paragraphs 11.4, 11.5, 11.6 and 11.7. All subcontracts shall be subject to the other provisions of the Contract Documents insofar as applicable.

11.4.4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys and accountants) employed for services specifically related to the Work.

11.4.5. Supplemental costs including the following:

11.4.5.1. The proportion of necessary transportation, travel and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.

11.4.5.2. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office and temporary facilities at the site and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost less market value of such items used but not consumed which remain the property of Contractor.

11.4.5.3. Rentals of all construction equipment and machinery and the parts thereof whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, installation, dismantling and removal thereof – all in accordance with the terms of said rental agreements. The rental of any such equipment, machinery or parts shall cease when the use thereof is no longer necessary for the Work.

11.4.5.4. Sales, consumer, use or similar taxes related to the work, and for which Contractor is liable, imposed by Laws and Regulations.

11.4.5.5. Deposits lost for causes other than negligence of Contractor, any Subcontractor or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

11.4.5.6. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance and furnishing of the Work (except losses and damages within the deductible amounts of property insurance established by Owner in accordance with paragraph 5.9), provided they have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee. If, however, any such loss or damage requires reconstruction and Contractor is placed in charge thereof, Contractor is placed in charge thereof, Contractor shall be paid for services a fee proportionate to that stated in paragraph 11.6.2.

11.4.5.7. The cost of utilities, fuel and sanitary facilities at the site.

11.4.5.8. Minor expenses such as telegrams, long distance telephone calls, telephone service at the site, expressage and similar petty cash items in connection with the Work.

11.4.5.9. Cost of premiums for additional Bonds and insurance required because of changes in the Work.

11.5. The term Cost of the Work Covered by a Change Order shall not include any of the following:

11.5.1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnership and sole proprietorships), general managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks and other personnel employed by Contractor whether at the site or in Contractor's principal or a branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in paragraph 11.4.1 or specifically covered by paragraph 11.4.4 – all of which are to be considered administrative costs covered by the Contractor's fee.

11.5.2. Expenses of Contractor's principal and branch offices other than Contractor's office at the site.

11.5.3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.

11.5.4. Cost of premiums for all Bonds and for all insurance whether or not Contractor is required by the Contract Documents to purchase and maintain the same (except for the cost of premiums covered by subparagraph 11.4.5.9 above).

11.5.5. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of **defective** Work, disposal of materials or equipment wrongly supplied and making good any damage to property.

Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in paragraph 11.4.

11.6. The Contractor's fee allowed to Contractor for overhead and profit shall be determined as follows:

11.6.1. a mutually acceptable fixed fee; or

11.6.2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:

11.6.2.1. for costs incurred under paragraphs 11.4.1 and 11.4.2, the Contractor's fee shall be ten percent;

11.6.2.2. for costs incurred under paragraph 11.4.3, the Contractor's fee shall be five percent.

11.6.2.3. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of paragraphs 11.4.1, 11.4.2, 11.4.3 and 11.6.2 is that the Subcontractor who actually performs or furnishes the Work, at whatever tier, will be paid a fee of ten percent of the costs incurred by such Subcontractor under paragraphs 11.4.1 and 11.4.2 and that any higher tier Subcontractor and Contractor will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor:

11.6.2.4. no fee shall be payable on the basis of costs itemized under paragraphs 11.4.4, 11.4.5 and 11.5;

11.6.2.5. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and

11.6.2.6. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with paragraphs 11.6.2.1 through 11.6.2.5, inclusive.

11.7. Whenever the cost of any work is to be determined pursuant to paragraphs 11.4 and 11.5, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in form acceptable to Engineer an itemized cost breakdown together with supporting data.

Cash Allowances:

11.8. NOT USED

11.9. Unit Price Work:

11.9.1. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the established unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by Contractor will be made by Engineer in accordance with paragraph 9.10.

11.9.2. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.

11.9.3. Owner or Contractor may make a claim for an adjustment in the Contract Price in accordance with Article 11 if:

11.9.3.1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and

11.9.3.2. there is no corresponding adjustment with respect to any other item of Work; and

11.9.3.3. if Contractor believes that Contractor is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.

ARTICLE 12 – CHANGE OF CONTRACT TIMES

12.1. The Contract Times (or Milestones) may only be changed by a Change Order or a Written Amendment. Any claim for an adjustment of the Contract Times (or Milestones) shall be based on written notice delivered by the party making the claim to the other party and to Engineer promptly (but in no event later than thirty days) after the occurrence of the event giving rise to the claim and stating the general nature of the claim. Notice of the extent of the claim with supporting data shall be delivered within sixty

days after such occurrence (unless Engineer allows an additional period of time to ascertain more accurate data in support of the claim) and shall be accompanied by the claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant has reason to believe it is entitled as a result of the occurrence of said event. All claims for adjustment in the Contract Times (or Milestones) shall be determined by Engineer in accordance with paragraph 9.11 if Owner and Contractor cannot otherwise agree. No claim for an adjustment in the Contract Times (or Milestones) will be valid if not submitted in accordance with the requirements of this paragraph 12.1.

12.2. All time limits stated in the Contract Documents are of the essence of the Agreement.

12.3. Where Contractor is prevented from completing any part of the Work within the Contract Times (or Milestones) due to delay beyond the control of Contractor, the Contract Times (or Milestones) will be extended in an amount equal to the time lost due to such delay if a claim is made therefore as provided in paragraph 12.1. Delays beyond the control of Contractor shall include, but not be limited to, acts or neglect by Owner, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions or acts of God. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of Contractor.

12.4. Where Contractor is prevented from completing any part of the Work within the Contract Times (or Milestones) due to delay beyond the control of both Owner and Contractor, an extension of the Contract Times (or Milestones) in an amount equal to the time lost due to such delay shall be Contractor's sole and exclusive remedy for such delay. In no event shall Owner be liable to Contractor, any Subcontractor, any Supplier, any other person or organization, or to any surety for or employee or agent of any of them, for damages arising out of or resulting from (i) delays caused by or within the control of Contractor, or (ii) delays beyond the control of both parties including but not limited to fires, floods, epidemics, abnormal weather conditions, acts of God or acts or neglect by utility owners or other contractors performing other work as contemplated by Article 7.

12.5. Extensions of contract time for delays caused by the effects of inclement weather are justified only when rain or other inclement weather conditions or related adverse soil or base conditions resulting from inclement weather prevent the Contractor from productively performing controlling items of work resulting in:

12.5.1. The Contractor being unable to work at least 50% of the normal work day on predetermined controlling work items; or

12.5.2. The Contractor must make major repairs to work damaged by weather, providing the damage was not attributable to a failure to preform or neglect by the Contractor.

The Construction Inspector or Engineer shall continually monitor the effects of weather and when found justified, recommend to the Owner time extensions on a monthly basis. At the beginning of each week, the Contractor shall submit a weekly construction schedule to the Engineer which identifies the intended work for that week, thus determining the scheduled work days and the controlling items of work. The Engineer and Contractor's representative must agree ahead of time as to the controlling items of work and the number of days of the week to be worked. Weather days will be granted only during the authorized contract time period.

If it is reasonable to conclude, based on the weather forecast, that there is little likelihood of productive work being accomplished on a controlling work item for 50% of that day, a time extension shall be granted and the Contractor shall not be expected to mobilize labor and equipment that day.

Time extensions shall be granted by adding to the contract time additional work days equal to the number of days delayed by inclement weather.

ARTICLE 13 – TESTS AND INSPECTION: CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

13.1. **Notice of Defects:** Prompt notice of all defective Work of which Owner or Engineer have actual knowledge will be given to Contractor. All defective Work may be rejected, corrected or accepted as provided in this Article 13.

Access to Work:

13.2. Owner, Engineer, Engineer's Consultants, other representatives and personnel of Owner, independent testing laboratories and governmental agencies with jurisdictional interests will have access to the Work at reasonable times for their observation, inspecting and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's site safety procedures and programs so that they may comply therewith as applicable.

Tests and Inspections:

13.3. Contractor shall give Engineer timely notice of readiness of the Work for all required inspections, tests or approvals, and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.

13.4. Contractor shall employ and pay for services of an independent testing laboratory to perform all Quality Control inspections, test or approvals required by the contract documents. Contractor shall allow the Engineer access to all work done in the project for Acceptance Testing by the owner. This testing will be in addition to Quality Control Testing required by the Contractor. Owner shall arrange and pay all costs associated with Acceptance Testing done by an independent testing laboratory of the Owners choosing except:

13.4.1. for inspections, tests or approvals covered by paragraph 13.5 below.

13.4.2. that costs incurred in connection with tests or inspections conducted pursuant to paragraph 13.9 below shall be paid as provided in said paragraph 13.9; and

13.4.3. as otherwise specifically provided in the Contract Documents.

13.4.4 Owner shall perform the following test as part of quality assurance / acceptance testing:

<u>Specification</u>	<u>Testing</u>
02210	In-place field density – ASTM D 1556, ASTM D 1557, ASTM D 2167
02240	In place field density – ASTM D 1556, LBR testing
02232	In place field density – ASTM D 1556 or ASTM D 2167
02514	Making and Curing Concrete Test Specimens – ASTM C 31, Test for Flexural Strength of Concrete – ASTM C 78

All other required testing is to be completed by the contractor as part of the contractor's quality control procedures and submittals. This section shall take precedence over all other sections that describe testing requirements.

13.5. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection, or approval. Contractor shall also be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests or approvals required for Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work, or of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Quality Control Testing of materials and equipment shall be the responsibility of the Contractor who shall pay all costs associated with the required testing. Contractor shall provide the Engineer adequate advance notice of intended tests to allow the Engineer to be present during the Testing.

13.6. If any Work (or the work of others) that is to be inspected, tested or approved is covered by Contractor without written concurrence of Engineer, it must, if requested by Engineer, be uncovered for observation.

13.7. Uncovering Work as provided in paragraph 13.6 shall be at Contractor's expense unless Contractor has given Engineer timely notice of Contractor's intention to cover the same and Engineer has not acted with reasonable promptness in response to such notice.

Uncovering Work:

13.8. If any Work is covered contrary to the written request of Engineer, it must, if requested by Engineer, be uncovered for Engineer's observation and replaced at Contractor's expense.

13.9. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, Contractor, at Engineer's request, shall uncover, expose or otherwise make available for observation, inspection or testing as Engineer may require that portion of the Work in question, furnishing all necessary labor, material and equipment. If it is found that such Work is defective, Contractor shall pay all claims, costs, losses and damages caused by, arising out of or resulting from such uncovering, exposure, observation, inspection and testing and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others; and Owner shall be entitled to an appropriate decrease in the Contract Price, and, if the parties are unable to agree as to the amount thereof, may make a claim therefore as provided in Article 11. If, however, such Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times (or Milestones), or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement and reconstruction; and, if the parties are unable to agree as to the amount or extent therefore, Contractor may make a claim therefore as provided in Articles 11 and 12.

Owner May Stop the Work:

13.10. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to furnish or perform the Work in such a way that the completed Work will conform to the Contract Documents, Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise

to any duty on the part of Owner to exercise this right for the benefit of Contractor or any surety or other party.

Correction or Removal of Defective Work:

13.11. If required by Engineer, Contractor shall promptly, as directed, either correct all defective Work, whether or not fabricated, installed or completed, or, if the Work has been rejected by Engineer, remove it from the site and replace it with Work that is not defective. Contractor shall pay all claims, costs, losses and damages caused by or resulting from such correction or removal (including but not limited to all costs of repair or replacement of work of others).

13.12. Correction Period:

13.12.1. If within one year after the date of Substantial Completion or such longer period of time as may be prescribed by Laws or Regulations or by the terms of any applicable special guarantee required by the Contract Documents or by any specific provision of the Contract Documents, any Work is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instruction: (i) correct such defective Work, or, if it has been rejected by Owner, remove it from the site and replace it with Work that is not defective, and (ii) satisfactorily correct or remove and replace any damage to other Work or the work of others resulting therefrom. If Contractor does not promptly comply with the terms of such instructions, or in any emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or the rejected Work removed and replaced, and all claims, costs, losses and damages caused by or resulting from such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by Contractor.

13.12.2. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications or by Written Amendment.

13.12.3. Where defective Work (and damage to other Work resulting therefrom) has been corrected, removed or replaced under this paragraph 13.12, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

Acceptance of Defective Work:

13.13. If, instead of requiring correction or removal and replacement of defective Work, Owner (and, prior to Engineer's recommendation of final payment, also Engineer) prefers to accept it, Owner may do so. Contractor shall pay all claims, costs, losses and damages attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness). If any such acceptance occurs prior to Engineer's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and Owner shall be entitled to an appropriate decrease in the Contract Price, and, if the parties are unable to agree as to the amount thereof, Owner may make a claim therefore as provided in Article 11. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to Owner.

Owner May Correct Defective Work:

13.14. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work or to remove and replace rejected Work as required by Engineer in accordance with paragraph 13.11,

or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, Owner may, after seven days' written notice to Contractor, correct and remedy any such deficiency. In exercising the rights and remedies under this paragraph Owner shall proceed expeditiously. In connection with such corrective and remedial action, Owner may exclude Contractor from all or part of the site, take possession of all or part of the Work, and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the site and incorporate in the Work all materials and equipment stored at the site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representative, agents and employees, Owner's other contractors and Engineer and Engineer's Consultants access to the site to enable Owner to exercise the rights and remedies under this paragraph. All claims, costs, losses and damages incurred or sustained by Owner in exercising such rights and remedies will be charged against Contractor and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and Owner shall be entitled to an appropriate decrease in the Contract Price, and, if the parties are unable to agree as to the amount thereof, Owner may make a claim therefore as provided in Article 11. Such claims, costs, losses and damages will include but not be limited to all costs of repair or replacement of work of others destroyed or damaged by correction, removal or replacement of Contractor's defective Work. Contractor shall not be allowed an extension of the Contract Times (or Milestones) because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies hereunder.

ARTICLE 14 – PAYMENTS TO CONTRACTOR AND COMPLETION

Schedule of Values:

14.1. The schedule of values established as provided in paragraph 2.9 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed.

Application for Progress Payment:

14.2. At least ten days before the date established for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance and other arrangements to protect Owner's interest therein, all of which will be satisfactory to Owner. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

Contractor's Warranty of Title:

14.3. Contractor warrants and guarantees that title to all Work, materials and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to Owner no later than the time of payment free and clear of all Liens.

Review of Applications for Progress Payment:

14.4. Engineer will, within *fifteen (15)* days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to Owner, or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application. *Thirty (30)* days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended will (subject to the provisions of the last sentence of paragraph 14.7) become due and when due will be paid by Owner to Contractor.

14.5. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's on-site observations of the executed Work as an experienced and qualified design professional and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:

14.5.1. the Work has progressed to the point indicated.

14.5.2. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, to the results of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for Unit Price Work under paragraph 9.10, and to any other qualifications stated in the recommendation), and

14.5.3. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.

However, by recommending any such payment Engineer will not thereby be deemed to have represented that: (i) exhaustive or continuous on-site inspections have been made to check the quality or the quantity of the Work beyond the responsibilities specifically assigned to Engineer in the Contract Documents or (ii) that there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

14.6. Engineer's recommendation of any payment, including final payment, shall not mean that Engineer is responsible for Contractor's means, methods, techniques, sequences or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the furnishing or performance of Work, or for any failure of Contractor to perform or furnish Work in accordance with the Contract Documents.

14.7. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner referred to in paragraph 14.5. Engineer may also refuse to recommend any such payment, or, because of subsequently discovered evidence or the results of subsequent inspections or tests, nullify any such payment previously recommended, to such extent as may be necessary in Engineer's opinion to protect Owner from loss because:

14.7.1. The Work is defective, or completed Work has been damaged requiring correction or replacement.

14.7.2. The Contract Price has been reduced by Written Amendment or Change Order.

14.7.3. Owner has been required to correct defective Work or complete Work in accordance with paragraph 13.14. or

14.7.4. Engineer has actual knowledge of the occurrence of any of the events enumerated in paragraphs 15.2.1 through 15.2.4 inclusive.

Owner may refuse to make payment of the full amount recommended by Engineer because:

14.7.5. Claims have been made against Owner on account of Contractors performance or furnishing of the Work.

14.7.6. Liens have been filed in connection with the Work, except where Contractor has delivered a specific Bond satisfactory to Owner to secure the satisfaction and discharge of such Liens,

14.7.7. There are other items entitling Owner to a set-off against the amount recommended, or

14.7.8. Owner has actual knowledge of the occurrence of any of the events enumerated in paragraphs 14.7.1 through 14.7.3 or paragraphs 15.2.1 through 15.2.4 inclusive;

But Owner must give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, when Contractor corrects to Owner's satisfaction the reasons for such action.

Substantial Completion:

14.8. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete (except for items specifically listed by Contractor as incomplete) and request that Engineer issue a certificate of Substantial Completion. Within a reasonable time thereafter, Owner, Contractor and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefore. If Engineer considers the Work substantially complete, Engineer will prepare and deliver to Owner a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the tentative certificate during which to make written objection to Engineer as to any provisions of the certificate or attached list. If, after considering such objections, Engineer concludes that the Work is not substantially complete, Engineer will within fourteen days after submission of the tentative certificate to Owner notify Contractor in writing, stating the reasons therefore. If, after consideration of Owner's objections, Engineer considers the Work substantially complete, Engineer will within said fourteen days execute and deliver to Owner and Contractor a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as Engineer believes justified after consideration of any objections from Owner. At the time of delivery of the tentative certificate of Substantial Completion Engineer will deliver to Owner and Contractor a written recommendation as to division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, maintenance, heat, utilities, insurance and warranties and guarantees. Unless Owner and Contractor agree otherwise in writing and so inform Engineer in writing prior to Engineer's issuing the definitive certificate of Substantial Completion, Engineer's aforesaid recommendation will be binding on Owner and Contractor until final payment.

14.9. Owner shall have the right to exclude Contractor from the Work after the date of Substantial Completion, but Owner shall allow Contractor reasonable access to complete or correct items on the tentative list.

Partial Utilization:

14.10. Use by Owner at Owner's option of any substantially completed part of the Work which: (i) has specifically been identified in the Contract Documents, or (ii) Owner, Engineer and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, may be accomplished prior to Substantial Completion of all the Work subject to the following:

14.10.1. Owner at any time may request Contractor in writing to permit Owner to use any such part of the Work which Owner believes to be ready for its intended use and substantially complete. If Contractor agrees that such part of the Work is substantially complete, Contractor will certify to Owner and Engineer that such part of the Work is substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work. Contractor at any time may notify Owner and Engineer in writing that Contractor considers any such part of the Work ready for its intended use and substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work. Within a reasonable time after either such request, Owner, Contractor and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefore. If Engineer considers that part of the Work to be substantially complete, the provisions of paragraphs 14.8 and 14.9 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

14.10.2. No occupancy or separate operation of part of the Work will be accomplished prior to compliance with the requirements of paragraph 5.15 in respect of property insurance.

Owner may at any time request Contractor in writing to permit Owner to take over operation of any such part of the work although it is not substantially complete. A copy of such request will be sent to Engineer and within a reasonable time thereafter Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion and will prepare a list of the items remaining to be completed or corrected thereon before final payment. If Contractor does not object in writing to Owner and Engineer that such part of the Work is not ready for separate operation by Owner, Engineer will finalize the list of items to be completed or corrected and will deliver such lists to Owner and Contractor together with a written recommendation as to the division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, maintenance, utilities, insurance, warranties and guarantees for that part of the Work which will become binding upon Owner and Contractor at the time when Owner takes over such operation (unless they shall have otherwise agreed in writing and so informed Engineer). During such operation and prior to Substantial Completion of such part of the Work, Owner shall allow Contractor reasonable access to complete or correct items on said list and to complete other related Work.

Final Inspection:

14.11. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work is incomplete or **defective**. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

Final Application for Payment:

14.12. After Contractor has completed all such corrections to the satisfaction of Engineer and delivered in accordance with the Contract Documents all maintenance and operating instructions, schedules, guarantees, Bonds, certificates or other evidence of insurance required by paragraph 5.4, certificates of inspection, marked-up record documents (as provided in paragraph 6.19) and other documents, Contractor may make application for final payment following the procedure for progress payments. The final Application for Payment shall be accompanied (except as previously delivered) by:

- (i) consent of the surety, if any, to final payment.
- (ii) complete and legally effective releases or waivers (satisfactory to Owner) of all Liens arising out of or filed in connection with the Work. In lieu of such releases or waivers of Liens and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (i) the releases and receipts include all labor, services, material and equipment for which a Lien could be filed, and (ii) all payrolls, material and equipment bills and other indebtedness connected with the Work for which Owner or Owner's property might in any way be responsible have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a Bond or other collateral satisfactory to Owner to indemnify Owner against any Lien.
- (iii) certification from surety that payment and performance bond shall remain in effect one (1) year following final payment.
- (iv) contractor's advertisement of completion – advertisement for a period of four (4) successive weeks in the newspaper or largest circulation published within the county where the work is performed.
- (v) certification from insurance company that any insurance coverage written on a claims-made basis, remain in effect for at least two (2) years following final payment.

Final Payment and Acceptance:

14.13. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract Documents have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of payment and present the Application to Owner for payment. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable subject to the provisions of paragraph 14.15. Otherwise, Engineer will return the Application to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application. Thirty days after the presentation to Owner of the Application and accompanying documentation, in appropriate form and substance and with Engineer's recommendation and notice of acceptability, the amount recommended by Engineer will become due and will be paid by Owner to Contractor.

14.14. If, through no fault of Contractor, final completion of the Work is significantly delayed and if Engineer so confirms, Owner shall, upon receipt of Contractor's final Application for Payment and recommendation of Engineer, and without terminating the Agreement, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if Bonds have

been furnished as required in paragraph 5.1, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by Contractor to Engineer with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

Waiver of Claims:

14.15. The making and acceptance of final payment will constitute:

14.15.1. A waiver of all claims by Owner against Contractor, except claims arising from unsettled Liens, from **defective** Work appearing after final inspection pursuant to paragraph 14.11, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from Contractor's continuing obligations under the Contract Documents; and

14.15.2. A waiver of all claims by Contractor against Owner other than those previously made in writing and still unsettled.

ARTICLE 15 – SUSPENSION OF WORK AND TERMINATION

Owner May Suspend Work:

15.1. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than ninety days by notice in writing to Contractor and Engineer which will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be allowed an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if Contractor makes an approved claim therefore as provided in Articles 11 and 12.

Owner May Terminate:

15.2. Upon the occurrence of any one or more of the following events:

15.2.1. if Contractor persistently fails to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the progress schedule established under paragraph 2.9 as adjusted from time to time pursuant to paragraph 6.6);

15.2.2. if Contractor disregards Laws or Regulations of any public body having jurisdiction;

15.2.3. if Contractor disregards the authority of Engineer; or

15.2.4. if Contractor otherwise violates in any substantial way any provisions of the Contract Documents;

15.2.5. if Contractor commences a voluntary case under any chapter of the Bankruptcy Code (Title 11, United States Code), as now or hereafter in effect, or if Contractor takes any equivalent or similar action by filing a petition or otherwise under any other federal or state law in effect at such time relating to the bankruptcy or insolvency;

15.2.6. if a petition is filed against Contractor under any chapter of the Bankruptcy Code (Title 11, United States Code), as now or hereafter in effect at the time of filing, or if a petition is filed seeking any such

equivalent or similar relief against Contractor under any other federal or state law in effect at the time relating to bankruptcy or insolvency;

15.2.7 if Contractor makes a general assignment for the benefit of creditors;

15.2.8 if a trustee, receiver, custodian, or agent of Contractor is appointed under applicable law or under contract, whose appointment or authority to take charge of property of Contractor is for the purpose of enforcing a Lien against such property or for the purpose of general administration of such property for the benefit of Contractor's creditors;

15.2.9 if Contractor admits in writing an inability to pay its debts generally as they become due.

Owner may, after giving Contractor (and the surety, if any,) seven days' written notice and to the extent permitted by Laws and Regulations, terminate the services of Contractor, exclude Contractor from the site and take possession of the Work and of all Contractor's tools, appliances, construction equipment and machinery at the site and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion), incorporate in the Work all materials and equipment stored at the site or for which Owner has paid Contractor but which are stored elsewhere, and finish the Work as Owner may deem expedient. In such case Contractor shall not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Price exceeds all claims, costs, losses and damages sustained by Owner arising out of or resulting from completing the Work such excess will be paid to Contractor. If such claims, costs, losses and damages exceed such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and when so approved by Engineer incorporated in a Change Order, provided that when exercising any rights or remedies under this paragraph Owner shall not be required to obtain the lowest price for the Work performed.

15.3. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue. Any retention or payment of moneys due Contractor by Owner will not release Contractor from liability.

15.4. Upon seven days' written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, elect to terminate the Agreement. In such case, Contractor shall be paid (without duplication of any items):

15.4.1. for completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

15.4.2. for expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;

15.4.3. for all claims, costs, losses and damages incurred in settlement of terminated contracts with Subcontractors, Suppliers and other; and

15.4.4. for reasonable expenses directly attributable to termination.

Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss

arising out of or resulting from such termination.

Contractor May Stop Work or Terminate:

15.5. If, through no act or fault of Contractor, the Work is suspended for a period of more than ninety days by Owner or under an order of court or other public authority, or Engineer fails to act on any Application for Payment within thirty days after it is submitted or Owner fails for thirty days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days' written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the Agreement and recover from Owner payment on the same terms as provided in paragraph 15.4. In lieu of terminating the Agreement and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within thirty days after it is submitted, or Owner has failed for thirty days to pay Contractor any sum finally determined to be due, Contractor may upon seven day's written notice to Owner and Engineer stop the Work until payment of all such amounts due Contractor, including interest thereon. The provisions of this paragraph 15.5 are not intended to preclude Contractor from making claim under Articles 11 and 12 for an increase in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping Work as permitted by this paragraph.

ARTICLE 17 – MISCELLANEOUS

Giving Notice:

17.1. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or if delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

17.2 Computation of Times:

17.2.1. When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

17.2.2. A calendar day of twenty-four (24) hours measured from midnight to the next midnight will constitute a day.

Notice of Claim:

17.3. Should Owner or Contractor suffer injury or damage to person or property because of any error, omission or act of the other part or of any of the other party's employees or agents or others for whose acts the other party is legally liable, claim will be made in writing to the other party within a reasonable time of the first observance of such injury or damage. The provisions of this paragraph 17.3 shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitations or repose.

Cumulative Remedies:

17.4. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto, and, in particular but without limitation, the warranties, guarantees and obligations imposed upon Contractor by paragraphs 6.12, 6.16, 6.30, 6.31, 6.32, 13.1, 13.12,

13.14, 14.3 and 15.2 and all of the rights and remedies available to Owner and Engineer thereunder, are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee or by other provisions of the Contract Documents, and the provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right and remedy to which they apply.

Professional Fees and Court Costs Included:

17.5. Whenever reference is made to "claims, costs, losses and damages," it shall include in each case, but not be limited to, all fees and charges of engineers, architects, attorneys and other professionals and all court or other dispute resolution costs.

Labor Records and Schedules:

17.6 The Department of Jurisdiction on such public work shall require all Contractors and Subcontractors to keep the following records on the site of the public work project on which such Contractors, and Subcontractors are engaged:

17.6.1 Record of hours worked by each worker, laborer, and mechanic on each day.

17.6.2 Record of days worked each week by each worker, laborer, and mechanic.

17.6.3 Schedule of occupation or occupations at which each worker, laborer, and mechanic on the project is employed during each workday and week.

17.6.4 Schedule of hourly wage rates and supplements paid to each worker, laborer, and mechanic for each occupation.

Wage Schedules:

17.7 Pursuant to Sections 220.3 and 220-d of the Labor Law, each laborer, worker, or mechanic employed by the Contractor, Subcontractor, or other person shall be paid not less than the prevailing rate of wages for a legal day's work and shall be provided supplements not less than the prevailing supplements as determined by the Industrial Commissioner.

The Contractor and every Subcontractor shall post in a prominent and accessible place on the site of the work a legible statement of all wage rates and supplements as specified in the Contract to be paid or provided, as the case may be, for the various classes of mechanics, workers, and laborers employed on the work.

The Owner does not represent or warrant that the accompanying schedule of wage rates and supplements with the classification of workers, mechanics, and laborers, as required by Section 220 of the Labor Law, is complete, and it reserves the right to revise such schedule when required. If any occupation is not mentioned in the schedule of wage rates and supplements it shall be requested from the Industrial Commissioner, by the Contractor through the Engineer and such schedules, shall, upon notice to the Contractor, become and be a part of the wage and supplement schedules embodied in the Contract.

Also included is the Federal Wage Rate Determination. Laborers, workmen, and mechanics employed on the work done in performance of said Contract shall be paid not less than the rate of wages listed thereon for the trade or occupation of such laborer, etc.

GENERAL PROVISIONS

GENERAL PROVISIONS

Section 10 Definition of Terms

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

10-01 AASHTO. The American Association of State Highway and Transportation Officials, the successor association to AASHO.

10-02 Access Road. The right-of-way, the roadway and all improvements constructed thereon connecting the airport to a public highway.

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 Improvement Program (AIP). A grant-in-aid program, administered by the Federal Aviation Administration (FAA).

10-05 Air Operations Area (AOA). For the purpose of these specifications, 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.

10-06 Airport. Airport means an area of land or water which is used or intended to be used for the landing and takeoff of aircraft; an appurtenant area used or intended to be used for airport buildings or other airport facilities or rights of way; and airport buildings and facilities located in any of these areas, and includes a heliport.

10-07 ASTM International (ASTM). Formerly known as the American Society for Testing and Materials (ASTM).

10-08 Award. The Owner's notice to the successful bidder of the acceptance of the submitted bid.

10-09 Bidder. Any individual, partnership, firm, or corporation, acting directly or through a duly authorized representative, who submits a proposal for the work contemplated.

10-10 Building Area. An area on the airport to be used, considered, or intended to be used for airport buildings or other airport facilities or rights-of-way together with all airport buildings and facilities located thereon.

10-11 Calendar Day. Every day shown on the calendar.

10-12 Change Order. A written order to the Contractor covering changes in the plans, specifications, or proposal quantities and establishing the basis of payment and contract time adjustment, if any, for the work affected by such changes. The work, covered by a change order, must be within the scope of the contract.

10-13 Contract. The written agreement covering the work to be performed. The awarded contract shall include, but is not limited to: Advertisement, Contract Form, Proposal, Performance Bond, Payment Bond, any required insurance certificates, Specifications, Plans, and any addenda issued to bidders.

10-14 Contract Item (pay item). A specific unit of work for which a price is provided in the contract.

10-15 Contract Time. The number of calendar days or working days, stated in the proposal, allowed for completion of the contract, including authorized time extensions. If a calendar date of completion is stated in the proposal, in lieu of a number of calendar or working days, the contract shall be completed by that date.

10-16 Contractor. The individual, partnership, firm, or corporation primarily liable for the acceptable performance of the work contracted and for the payment of all legal debts pertaining to the work who acts directly or through lawful agents or employees to complete the contract work.

10-17 Contractor's Laboratory. The Contractor's quality control organization in accordance with the Contractor Quality Control Program.

10-18 Construction Safety and Phasing Plan (CSPP). The overall plan for safety and phasing of a construction project developed by the airport operator or developed by the airport operator's consultant and approved by the airport operator. It is included in the invitation for bids and becomes part of the project specifications.

10-19 Drainage System. The system of pipes, ditches, and structures by which surface or subsurface waters are collected and conducted from the airport area.

10-20 Engineer. The individual, partnership, firm, or corporation duly authorized by the Owner to be responsible for engineering of the contract work and acting directly or through an authorized representative.

10-21 Equipment. All machinery, together with the necessary supplies for upkeep and maintenance, and also all tools and apparatus necessary for the proper construction and acceptable completion of the work.

10-22 Extra Work. An item of work not provided for in the awarded contract as previously modified by change order or supplemental agreement, but which is found by the Engineer to be necessary to complete the work within the intended scope of the contract as previously modified.

10-23 FAA. The Federal Aviation Administration of the U.S. Department of Transportation. When used to designate a person, FAA shall mean the Administrator or his or her duly authorized representative.

10-24 Federal Specifications. The Federal Specifications and Standards, Commercial Item Descriptions, and supplements, amendments, and indices thereto are prepared and issued by the General Services Administration of the Federal Government.

10-25 Force Account. Force account work is planning, engineering, or construction work done by the Sponsor's employees.

10-26 Inspector. An authorized representative of the Engineer assigned to make all necessary inspections and observation of tests of the work performed or being performed, or of the materials furnished or being

furnished by the Contractor.

10-27 Intention of Terms. Whenever, in these specifications or on the plans, the words “directed,” “required,” “permitted,” “ordered,” “designated,” “prescribed,” or words of like import are used, it shall be understood that the direction, requirement, permission, order, designation, or prescription of the Engineer is intended; and similarly, the words “approved,” “acceptable,” “satisfactory,” or words of like import, shall mean approved by, or acceptable to, or satisfactory to the Engineer, subject in each case to the final determination of the Owner.

Any reference to a specific requirement of a numbered paragraph of the contract specifications or a cited standard shall be interpreted to include all general requirements of the entire section, specification item, or cited standard that may be pertinent to such specific reference.

10-28 Laboratory. The official testing laboratories of the Owner or such other laboratories as may be designated by the Engineer. Also referred to as “Engineer’s Laboratory” or “quality assurance laboratory.”

10-29 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.

10-30 Major and Minor Contract Items. A major contract item shall be any item that is listed in the proposal, the total cost of which is equal to or greater than 20% of the total amount of the award contract. All other items shall be considered minor contract items.

10-31 Materials. Any substance specified for use in the construction of the contract work.

10-32 Notice to Proceed (NTP). A written notice to the Contractor to begin the actual contract work on a previously agreed to date. If applicable, the Notice to Proceed shall state the date on which the contract time begins.

10-33 Owner. The term “Owner” shall mean the party of the first part or the contracting agency signatory to the contract. Where the term “Owner” is capitalized in this document, it shall mean airport Sponsor only.

10-34 Passenger Facility Charge (PFC). Per 14 CFR Part 158 and 49 USC § 40117, a PFC is a charge imposed by a public agency on passengers enplaned at a commercial service airport it controls.”

10-35 Pavement. The combined surface course, base course, and subbase course, if any, considered as a single unit.

10-36 Payment Bond. The approved form of security furnished by the Contractor and his or her 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.

10-37 Performance Bond. The approved form of security furnished by the Contractor and his or her surety as a guaranty that the Contractor will complete the work in accordance with the terms of the contract.

10-38 Plans. The official drawings or exact reproductions which show the location, character, dimensions

and details of the airport and the work to be done and which are to be considered as a part of the contract, supplementary to the specifications.

10-39 Project. The agreed scope of work for accomplishing specific airport development with respect to a particular airport.

10-40 Proposal. The written offer of the bidder (when submitted on the approved proposal form) to perform the contemplated work and furnish the necessary materials in accordance with the provisions of the plans and specifications.

10-41 Proposal Guaranty. The security furnished with a proposal to guarantee that the bidder will enter into a contract if his or her proposal is accepted by the Owner.

10-42 Runway. The area on the airport prepared for the landing and takeoff of aircraft.

10-43 Specifications. A part of the contract containing the written directions and requirements for completing the contract work. Standards for specifying materials or testing which are cited in the contract specifications by reference shall have the same force and effect as if included in the contract physically.

10-44 Sponsor. A Sponsor is defined in 49 USC § 47102(24) as a public agency that submits to the FAA for an AIP grant; or a private Owner of a public-use airport that submits to the FAA an application for an AIP grant for the airport.

10-45 Structures. Airport facilities such as bridges; culverts; catch basins, inlets, retaining walls, cribbing; storm and sanitary sewer lines; water lines; underdrains; electrical ducts, manholes, handholes, lighting fixtures and bases; transformers; flexible and rigid pavements; navigational aids; buildings; vaults; and, other manmade features of the airport that may be encountered in the work and not otherwise classified herein.

10-46 Subgrade. The soil that forms the pavement foundation.

10-47 Superintendent. The Contractor's executive representative who is present on the work during progress, authorized to receive and fulfill instructions from the Engineer, and who shall supervise and direct the construction.

10-48 Supplemental Agreement. A written agreement between the Contractor and the Owner covering (1) work that would increase or decrease the total amount of the awarded contract, or any major contract item, by more than 25%, such increased or decreased work being within the scope of the originally awarded contract; or (2) work that is not within the scope of the originally awarded contract.

10-49 Surety. The corporation, partnership, or individual, other than the Contractor, executing payment or performance bonds that are furnished to the Owner by the Contractor.

10-50 Taxiway. For the purpose of this document, the term taxiway means the portion of the air operations area of an airport that has been designated by competent airport authority for movement of aircraft to and from the airport's runways, aircraft parking areas, and terminal areas.

10-51 Work. The furnishing of all labor, materials, tools, equipment, and incidentals necessary or convenient to the Contractor's performance of all duties and obligations imposed by the contract, plans,

and specifications.

10-52 Working day. A working day shall be any day other than a legal holiday, Saturday, or Sunday on which the normal working forces of the Contractor may proceed with regular work for at least six (6) hours toward completion of the contract. When work is suspended for causes beyond the Contractor's control, it will not be counted as a working day. Saturdays, Sundays and holidays on which the Contractor's forces engage in regular work will be considered as working days.

END OF SECTION 10

GENERAL PROVISIONS (AIP)

Section 20 Proposal Requirements and Conditions

20-01 Advertisement (Notice to Bidders).

The Panama City Bay County Airport and Industrial District dba Northwest Florida Beaches International Airport is seeking sealed bids from qualified firms for all work and materials necessary to complete the Aircraft Apron Parking Project detailed in the Bid Package and Project Manual (Contract Documents) dated November 9, 2020. Interested Bidders may obtain the Contract Documents from the Business Opportunities section of the Airport's website.

The work consists of construction of a new Aircraft Apron Parking Ramp west of and connected to the new Transient Apron and will include paving, drainage, stormwater management system modifications, security, potential relocation of some existing utilities, apron edge lighting modifications, apron markings, final grading, grassing, and other components related to the project. The apron will be 225 feet x 210 feet and designed to accommodate and support parking of all classifications of transient aircraft at the airport.

A non-mandatory Pre-Bid meeting will be held on November 18, 2020 at 1:00 pm CST at the north conference room, 1st floor of Terminal, Northwest Florida Beaches International Airport, 6300 West Bay Parkway. Call-in number for this non-mandatory meeting is (712) 432-0900, access code 225872. Sealed Bids must be submitted to the Airport Authority no later than December 10, 2020 at 10:00 am (CST). Bids shall be made on the Bid Proposal Forms furnished in the Contract Documents.

20-02 Qualification of bidders. Each bidder shall furnish the Owner satisfactory evidence of his or her competency to perform the proposed work. Such evidence of competency, unless otherwise specified, shall consist of statements covering the bidder's past experience on similar work, a list of equipment that would be available for the work, and a list of key personnel that would be available. In addition, each bidder shall furnish the Owner satisfactory evidence of his or her financial responsibility. Such evidence of financial responsibility, unless otherwise specified, shall consist of a confidential statement or report of the bidder's financial resources and liabilities as of the last calendar year or the 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 his or her financial responsibility is approximately the same as stated or reported by the public accountant. If the bidder's financial responsibility has changed, the bidder shall qualify the public accountant's statement or report to reflect 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 he or she is prequalified with the State Highway Division and is on the current "bidder's list" of the state in which the proposed work is located. Such evidence of State Highway Division prequalification may be submitted as evidence of financial responsibility in lieu of the certified statements or reports specified above.

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 shall furnish bidders with proposal forms. All papers bound with or attached to the proposal forms are necessary parts and must not be detached.

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

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

- a. Failure to comply with any prequalification regulations of the Owner, if such regulations are cited, or otherwise included, in the proposal as a requirement for bidding.
- b. Failure to pay, or satisfactorily settle, all bills due for labor and materials on former contracts in force with the Owner at the time the Owner issues the proposal to a prospective bidder.
- c. 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 hereinafter provided in the subsection 40-02 titled ALTERATION OF WORK AND QUANTITIES of Section 40 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 as to the character, quality, and quantities of work to be performed, materials to be furnished, and as to the requirements of the proposed contract. The submission of a proposal shall be prima facie evidence that the bidder has made such examination and is satisfied as to the conditions to be encountered in performing the work and as to the requirements of the proposed contract, plans, and specifications.

See the Project Manual, Miscellaneous Documents for the Nova Geotechnical Report.

20-07 Preparation of proposal. The bidder shall submit his or her proposal on the forms furnished by the Owner. All blank spaces in the proposal forms must be correctly filled in where indicated for each and every item for which a quantity is given. The bidder shall state the price (written in ink or typed) both in words and numerals for which they propose to do 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 sign the proposal correctly and in ink. If the proposal is made by an individual, his or her name and post office address must be shown. If made by a partnership, the name and post office address of each member of the partnership must be shown. If made by a corporation, the person signing the proposal shall give the name of the state under the laws of which the corporation was chartered and the

name, titles, and business address of the president, secretary, and the treasurer. Anyone signing a proposal as an agent shall file evidence of his or her 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 Sponsor's invitation for bid. It is the Sponsor'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 49 CFR § 18.36(b)(8). 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.

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 certified check, or other specified acceptable collateral, in the amount specified in the proposal form. Such check, or collateral, shall be made payable to the Owner.

20-11 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 the subsection 20-04 titled ISSUANCE OF PROPOSAL FORMS of this section.

END OF SECTION 20

GENERAL PROVISIONS

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 price written in words shall govern.

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

- a. If the proposal is irregular as specified in the subsection 20-09 titled IRREGULAR PROPOSALS of Section 20.
- b. If the bidder is disqualified for any of the reasons specified in the subsection 20-14 titled DISQUALIFICATION OF BIDDERS of Section 20.

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

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

Award of the contract shall be made by the Owner to the lowest, qualified bidder whose proposal conforms to the cited requirements of the Owner.

30-03 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 the subsection 30-07 titled APPROVAL OF CONTRACT of this section.

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 subsection 30-01 titled CONSIDERATION OF PROPOSALS of this section. Proposal guaranties of the two lowest bidders will be retained by the Owner until such time as an award is made, at which time, the unsuccessful bidder's proposal guaranty will be returned. The successful bidder's proposal guaranty will be returned as soon as the Owner receives the contract bonds as specified in the subsection 30-05 titled REQUIREMENTS OF CONTRACT BONDS of this section.

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 the subsection 30-05 titled 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 15 calendar day period specified in the subsection 30-06 titled 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 liquidation of damages to the Owner.

END OF SECTION 30

GENERAL PROVISIONS

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 and shall have the right to make such alterations in the work as may be necessary or desirable to complete the work originally intended in an acceptable manner. Unless otherwise specified herein, the Engineer shall be and is hereby authorized to make such alterations in the work as may increase or decrease the originally awarded contract quantities, provided that the aggregate of such alterations does not change the total contract cost or the total cost of any major contract item by more than 25% (total cost being based on the unit prices and estimated quantities in the awarded contract). Alterations that do not exceed the 25% limitation shall not invalidate the contract nor release the surety, and the Contractor agrees to accept payment for such alterations as if the altered work had been a part of the original contract. These alterations that are for work within the general scope of the contract shall be covered by "Change Orders" issued by the Engineer. Change orders for altered work shall include extensions of contract time where, in the Engineer's opinion, such extensions are commensurate with the amount and difficulty of added work.

Should the aggregate amount of altered work exceed the 25% limitation hereinbefore specified, such excess altered work shall be covered by supplemental agreement. If the Owner and the Contractor are unable to agree on a unit adjustment for any contract item that requires a supplemental agreement, the Owner reserves the right to terminate the contract with respect to the item and make other arrangements for its completion.

Supplemental agreements shall be approved by the FAA and shall include all applicable Federal contract provisions for procurement and contracting required under AIP. Supplemental agreements shall also require consent of the Contractor's surety and separate performance and payment bonds.

40-03 Omitted items. The Engineer may, in the Owner's best interest, omit from the work any contract item, except major contract items. Major contract items may be omitted by a supplemental agreement. Such omission of contract items shall not invalidate any other contract provision or requirement.

Should a contract item be omitted or otherwise ordered to be 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 the subsection 90-04 titled PAYMENT FOR OMITTED ITEMS of Section 90.

40-04 Extra work. Should acceptable completion of the contract require the Contractor to perform an item of work for which no basis of payment has been provided in the original contract or previously issued change orders or supplemental agreements, the same shall be called "Extra Work." Extra Work that is within the general scope of the contract shall be covered by written change order. Change orders for such Extra Work shall contain agreed unit prices for performing the change order work in accordance with the requirements specified in the order, and shall contain any adjustment to the contract time that, in the Engineer's opinion, is necessary for completion of such Extra Work.

When determined by the Engineer to be in the Owner's best interest, the Engineer may order the Contractor to proceed with Extra Work as provided in the subsection 90-05 titled PAYMENT FOR EXTRA WORK of Section 90. Extra Work that is necessary for acceptable completion of the project, but is not within the general scope of the work covered by the original contract shall be covered by a Supplemental Agreement as defined in the subsection 10-48 titled SUPPLEMENTAL AGREEMENT of Section 10.

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

40-05 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.

- 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 his or her own operations and the operations of all subcontractors as specified in the subsection 80-04 titled LIMITATION OF OPERATIONS of Section 80. It is further understood and agreed that the Contractor shall provide for the uninterrupted operation of visual and electronic signals (including power supplies thereto) used in the guidance of aircraft while operating to, from, and upon the airport as specified in the subsection 70-15 titled CONTRACTOR'S RESPONSIBILITY FOR UTILITY SERVICE AND FACILITIES OF OTHERS in Section 70.
- b. With respect to his or her 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.
- c. When the contract requires the maintenance of vehicular traffic on an existing road, street, or highway during the Contractor's performance of work that is otherwise provided for in the contract, plans, and specifications, the Contractor shall keep such road, street, or highway open to all traffic and shall provide such maintenance as may be required to accommodate traffic. The Contractor shall be responsible for the repair 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 shall be notified prior to disturbing such structure. The disposition of existing structures so encountered shall be immediately determined by the Engineer in accordance with the provisions of the contract.

Except as provided in the subsection 40-07 titled RIGHTS IN AND USE OF MATERIALS FOUND IN THE WORK of this section, it is intended that all existing materials or structures that may be encountered (within the lines, grades, or grading sections established for completion of the work) shall be 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 either embankment or waste, the Contractor may at his or her option either:

- a. Use such material in another contract item, providing such use is approved by the Engineer and is in conformance with the contract specifications applicable to such use; or,
- b. Remove such material from the site, upon written approval of the Engineer; or
- c. Use such material for 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 approval in advance of such use.

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

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

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

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

40-08 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 such property Owner.

END OF SECTION 40

GENERAL PROVISIONS

Section 50 Control of Work

50-01 Authority of the Engineer. The Engineer shall decide any and all questions which may arise as to the quality and acceptability of materials furnished, work performed, and as to the manner of performance and rate of progress of the work. The Engineer shall decide all questions that may arise as to the interpretation of the specifications or plans relating to the work. The Engineer shall determine the amount and quality of the several kinds of work performed and materials furnished which are to be paid for the under contract.

The Engineer does not have the authority to accept pavements that do not conform to FAA specification requirements.

50-02 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 finds the materials furnished, work performed, or the finished product not within reasonably close conformity with the plans and specifications but that the portion of the work affected will, in his or her opinion, result in a finished product having a level of safety, economy, durability, and workmanship acceptable to the Owner, the Engineer will advise the Owner of his or her determination that the affected work be accepted and remain in place. In this event, the Engineer 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. The Engineer's determination and recommended contract price adjustments will be based on sound engineering judgment and such tests or retests of the affected work as are, in the Engineer's opinion, needed. Changes in the contract price shall be covered by contract change order or supplemental agreement as applicable.

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

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

For the purpose of this subsection, the term "reasonably close conformity" is also intended to provide the Engineer with the authority, after consultation with the FAA, to use sound engineering judgment in his or her determinations as to acceptance of work that is not in strict conformity, but will provide a finished product equal to or better than that intended by the requirements of the contract, plans and specifications.

The Engineer will not be responsible for the Contractor's means, methods, techniques, sequences, or

procedures of construction or the safety precautions incident thereto.

50-03 Coordination of contract, plans, and specifications. The contract, plans, specifications, and all referenced standards cited are essential parts of the contract requirements. A requirement occurring in one is as binding as though occurring in all. They are intended to be complementary and to describe and provide for a complete work. In case of discrepancy, calculated dimensions will govern over scaled dimensions; contract technical specifications shall govern over contract general provisions, plans, cited standards for materials or testing, and cited 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 for an interpretation and decision, and such decision shall be final.

LIST OF SPECIAL PROVISIONS

Special Provision No. 1: Utilities
Special Provision No. 2: Airport Safety and Security Requirements
Special Provision No. 3: Protection of Airport Cables, NAVAIDS and Other Facilities
Special Provision No. 4: Staging and Phasing Provisions for Contractor Operations
Special Provision No. 5: Visible Warning Markers for Taxiways and Aircraft Operations Areas
Special Provision No. 6: Time of Completion
Special Provision No. 7: Airport Project Procedures
Special Provision No. 8: Vehicle Operation on the AOA
Special Provision No. 9: Federal Labor and EEO Provisions
Special Provision No. 10: General Provisions and Requirements for Electrical Work
Special Provision No. 11: General Electrical Safety Requirements and Temporary Airfield Lighting
Special Provision No. 12: Alterations, Removal and Demolition
Special Provision No. 13: Submittals, Recoed Documents and Maintenance Manuals
Special Provision No. 14: Airfield Electrical Installation Testing

50-04 Cooperation of Contractor. The Contractor will be supplied with five copies each of the plans and specifications. The Contractor shall have available on the work at all times one copy each of the plans and specifications. Additional copies of plans and specifications may be obtained by the Contractor for the cost of reproduction.

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

50-05 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 so as not to interfere with or hinder the progress of completion of the work being performed by other Contractors. Contractors working on the same project shall cooperate with each other as directed. Each Contractor involved shall assume all liability, financial or otherwise, in connection with his or her contract and shall protect and save harmless the Owner from any and all damages or claims that may arise because of inconvenience, delays, or loss experienced because of the presence and operations of other Contractors working within the limits of the same project.

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

50-06 Construction layout and stakes. The Engineer shall establish horizontal and vertical control only. The Contractor must establish all layout required for the construction of the work. Such stakes and markings as the Engineer may set for either their own or the Contractor's guidance shall be preserved by the Contractor. In case of negligence on the part of the Contractor, or their employees, resulting in the destruction of such stakes or markings, an amount equal to the cost of replacing the same may be deducted from subsequent estimates due the Contractor at the discretion of the Engineer.

The Contractor will be required to furnish all lines, grades and measurements from the control points necessary for the proper execution and control of the work contracted for under these specifications.

The Contractor must give copies of survey notes to the Engineer for each area of construction and for each placement of material as specified to allow the Engineer to make periodic checks for conformance with plan grades, alignments and grade tolerances required by the applicable material specifications. All surveys must be provided to the Engineer prior to commencing work items that will cover or disturb the survey staking as set by the Contractor's surveyor. Survey(s) and notes shall be provided in the following format(s): DWG and PDF. 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.

Construction Staking and Layout includes but is not limited to:

- a. Clearing and Grubbing perimeter staking
- b. Rough Grade slope stakes at 100-foot (30-m) stations
- c. Drainage Swales slope stakes and flow line blue tops at 50-foot (15-m) stations

Subgrade blue tops at 25-foot (7.5-m) stations and 25-foot (7.5-m) offset distance (maximum) for the following section locations:

- a. Runway – minimum five (5) per station

- b.** Taxiways – minimum three (3) per station
- c.** Holding apron areas – minimum three (3) per station
- d.** Roadways – minimum three (3) per stationBase Course blue tops at 25-foot (7.5-m) stations and 25-foot (7.5-m) offset distance (maximum) for the following section locations:
- e.** Runway – minimum five (5) per station
- f.** Taxiways – minimum three (3) per station
- g.** Holding apron areas – minimum three (3) per station

Pavement areas:

- a.** Edge of Pavement hubs and tacks (for stringline by Contractor) at 100-foot (30-m) stations.
- b.** Between Lifts at 25-foot (7.5-m) stations for the following section locations:
 - 1)** Runways – each paving lane width
 - 2)** Taxiways – each paving lane width
 - 3)** Holding areas – each paving lane width
- c.** After finish paving operations at 50-foot (15-m) stations:
 - 1)** All paved areas – Edge of each paving lane prior to next paving lot
- d.** Shoulder and safety area blue tops at 50-foot (15-m) stations and at all break points with maximum of 50-foot (15-m) offsets.
- e.** Fence lines at 100-foot (30-m) stations minimum.
- f.** Electrical and Communications System locations, lines and grades including but not limited to duct runs, connections, fixtures, signs, lights, Visual Approach Slope Indicators (VASIs), Precision Approach Path Indicators (PAPIs), Runway End Identifier Lighting (REIL), Wind Cones, Distance Markers (signs), pull boxes and manholes.
- g.** Drain lines, cut stakes and alignment on 25-foot (7.5-m) stations, inlet and manholes.
- h.** Painting and Striping layout (pinned with 1.5 inch PK nails) marked for paint Contractor. (All nails shall be removed after painting).
- i.** Laser, or other automatic control devices, shall be checked with temporary control point or grade hub at a minimum of once per 400 feet (120 m) per pass (that is, paving lane).

The establishment of Survey Control and/or reestablishment of survey control shall be by a State Licensed Land Surveyor.

Controls and stakes disturbed or suspect of having been disturbed shall be checked and/or reset as directed by the Engineer without additional cost to the Owner.

50-07 Automatically controlled equipment. Whenever batching or mixing plant equipment is required to be operated automatically under the contract and a breakdown or malfunction of the automatic controls occurs, the equipment may be operated manually or by other methods for a period 48 hours following the breakdown or malfunction, provided this method of operations will produce results which conform to all other requirements of the contract.

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

Inspectors are authorized to notify the Contractor or his or her representatives of any failure of the work or materials to conform to the requirements of the contract, plans, or specifications and to reject such nonconforming materials in question until such issues can be referred to the Engineer for 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 shall be allowed access to all parts of the work and shall be furnished with such information and assistance by the Contractor as is required to make a complete and detailed inspection. If the Engineer requests it, the Contractor, at any time before acceptance of the work, shall remove or uncover such portions of the finished work as may be directed. After examination, the Contractor shall restore said portions of the work to the standard required by the specifications. Should the work thus exposed or examined prove acceptable, the uncovering, or removing, and the replacing of the covering or making good of the parts removed will be paid for as extra work; but should the work so exposed or examined prove unacceptable, the uncovering, or removing, and the replacing of the covering or making good of the parts removed will be at the Contractor's expense.

Any work done or materials used without supervision or inspection by an authorized representative of the Owner may be ordered removed and replaced at the Contractor's expense unless the Owner's representative failed to inspect after having been given reasonable notice in writing that the work was to be performed.

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

50-10 Removal of unacceptable and unauthorized work. All work that does not conform to the requirements of the contract, plans, and specifications will be considered unacceptable, unless otherwise determined acceptable by the Engineer as provided in the subsection 50-02 titled CONFORMITY WITH PLANS AND SPECIFICATIONS of this section.

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

No removal work made under provision of this subsection shall be done without lines and grades having been established by the Engineer. Work done contrary to the instructions of the Engineer, work done beyond the lines shown on the plans or as established by the Engineer, 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 made under the provisions of this subsection, the Engineer will have authority to cause unacceptable work to be remedied or removed and replaced and unauthorized work to be removed and to deduct the costs incurred by the Owner from any monies due or to become due the Contractor.

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

The operation of equipment of such weight or so loaded as to cause damage to structures or to any other type of construction will not be permitted. Hauling of materials over the base course or surface course under construction shall be limited as directed. No loads will be permitted on a concrete pavement, base, or structure before the expiration of the curing period. The Contractor shall be responsible for all damage done by his or her hauling equipment and shall correct such damage at his or her own expense.

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 the subsection 50-12 titled MAINTENANCE DURING CONSTRUCTION of this section, the Engineer shall immediately notify the Contractor of such noncompliance. Such notification shall specify a reasonable time within which the Contractor shall be required to remedy such unsatisfactory maintenance condition. The time specified will give due consideration to the exigency that exists.

Should the Contractor fail to respond to the Engineer's notification, the Owner may suspend any work necessary for the Owner to correct such unsatisfactory maintenance condition, depending on the exigency that exists. Any maintenance cost incurred by the Owner, shall be deducted from monies due or to become due the Contractor.

50-14 Partial acceptance. If at any time during the 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 to make final inspection of that unit. If the Engineer finds upon inspection that the unit has been satisfactorily completed in compliance with the contract, the Engineer

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 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 shall notify the Contractor in writing of final acceptance as of the date of the final inspection.

If, however, the inspection discloses any work, in whole or in part, as being unsatisfactory, the Engineer will give the Contractor the necessary instructions for correction of same and the Contractor shall immediately comply with and execute such instructions. Upon correction of the work, another inspection will be made which shall constitute the final inspection, provided the work has been satisfactorily completed. In such event, the Engineer will make the final acceptance and notify the Contractor in writing of this acceptance as of the date of final inspection.

50-16 Claims for adjustment and disputes. If for any reason the Contractor deems that additional compensation is due 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 in writing of his or her 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 is not afforded proper opportunity by the Contractor for keeping strict account of actual cost as required, then the Contractor hereby agrees to waive any claim for such additional compensation. Such notice by the Contractor and the fact that the Engineer has kept account of the cost of the work shall not in any way be construed as proving or substantiating the validity of the claim. When the work on which the claim for additional compensation is based has been completed, the Contractor shall, within 10 calendar days, submit a written claim to the Engineer who will present it to the Owner for consideration in accordance with local laws or ordinances.

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

50-17 Cost reduction incentive. NOT USED.

END OF SECTION 50

GENERAL PROVISIONS

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 complete statements to the Engineer as to the origin, composition, and manufacture of all materials to be used in the work. Such statements shall be furnished promptly after execution of the contract but, in all cases, prior to delivery of such materials.

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

The Contractor shall furnish airport lighting equipment that conforms to the requirements of cited materials specifications. In addition, where an FAA specification for airport lighting equipment is cited in the plans or specifications, the Contractor shall furnish such equipment that is:

- a. Listed in advisory circular (AC) 150/5345-53, Airport Lighting Equipment Certification Program, and Addendum that is in effect on the date of advertisement; and,
- b. Produced by the manufacturer as listed in the Addendum cited above for the certified equipment part number.

The following airport lighting equipment is required for this contract and is to be furnished by the Contractor in accordance with the requirements of this subsection:

L-110-1	1 Way 2" Schedule 40 PVC Direct Earth Buried Duct
L-125-1	TAXIWAY EDGE LIGHT (CAN ONLY W/ CAPS)

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

Unless otherwise designated, quality assurance tests 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, will be made by and at the expense of the Engineer.

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, including the Contractor's representative at his or her request. Unless otherwise designated, samples for quality assurance will be taken by a qualified representative of the Engineer. All materials being used are subject to inspection, test, or rejection at any time prior to or during incorporation into the work. Copies of all tests will be furnished to the Contractor's representative at their request after review and approval of the Engineer.

The Contractor shall employ a testing organization to perform all Contractor required Quality Control tests. The Contractor shall submit to the Engineer resumes on all testing organizations and individual persons who will be performing the tests. The Engineer will determine if such persons are qualified. All the test data shall be reported to the Engineer after the results are known. A legible, handwritten copy of all test data shall be given to the Engineer daily, along with printed reports, in an approved format, on a weekly basis. After completion of the project, and prior to final payment, the Contractor shall submit a final report to the Engineer showing all test data reports, plus an analysis of all results showing ranges, averages, and corrective action taken on all failing tests.

60-03 Certification of compliance. The Engineer may permit the use, prior to sampling and testing, of certain materials or assemblies when accompanied by manufacturer's certificates of compliance stating that such materials or assemblies fully comply with the requirements of the contract. The certificate shall be signed by the manufacturer. Each lot of such materials or assemblies delivered to the work must be accompanied by a certificate of compliance in which the lot is clearly identified.

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

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

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

Should the Contractor propose to furnish an "or equal" material or assembly, the Contractor shall furnish the manufacturer's certificates of compliance as hereinbefore described for the specified brand name material or assembly. However, the Engineer shall be the sole judge as to whether the proposed "or equal" is suitable for use in the work.

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

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

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

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

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

60-05 Engineer's field office. NOT USED.

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

All storage sites on private or airport property shall be restored to their original condition by the Contractor at his or her entire 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.

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

GENERAL PROVISIONS

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 his or her officers, agents, or servants against any claim or liability arising from or based on the violation of any such law, ordinance, regulation, order, or decree, whether by 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) 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.

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, 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 aid participation. For Airport Improvement Program (AIP) contracts, the United States Government has agreed to reimburse the Owner for some portion of the contract costs. Such reimbursement is made from time to time upon the Owner's request to the FAA. In consideration of the United States Government's (FAA's) agreement with the Owner, the Owner has included provisions in this

contract pursuant to the requirements of Title 49 of the USC and the Rules and Regulations of the FAA that pertain to the work.

As required by the USC, the contract work is subject to the inspection and approval of duly authorized representatives of the FAA Administrator, and is further subject to those provisions of the rules and regulations that are cited in the contract, plans, or specifications.

No requirement of the USC, the rules and regulations implementing the USC, or this contract shall be construed as making the Federal Government a party to the contract nor will any such requirement interfere, in any way, with the rights of either party to the contract.

70-06 Sanitary, health, and safety provisions. The Contractor shall provide and maintain in a neat, sanitary condition such accommodations for the use of his or her employees as may be necessary to comply with the requirements of the state and local Board of Health, or of other bodies or tribunals having jurisdiction.

Attention is directed to Federal, state, and local laws, rules and regulations concerning construction safety and health standards. The Contractor shall not require any worker to work in surroundings or under conditions that are unsanitary, hazardous, or dangerous to his or her health or safety.

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

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

70-08 Barricades, warning signs, and hazard markings. The Contractor shall furnish, erect, and maintain all barricades, warning signs, and markings for hazards necessary to protect the public and the work. When used during periods of darkness, such barricades, warning signs, and hazard markings shall be suitably illuminated. Unless otherwise specified, barricades, warning signs, and markings for hazards that are in the air operations area (AOAs) shall be a maximum of 18 inches (0.5 m) high. Unless otherwise specified, barricades shall be spaced not more than 4 feet (1.2 m) apart. Barricades, warning signs, and markings shall be paid for under subsection 40-05.

For vehicular and pedestrian traffic, the Contractor shall furnish, erect, and maintain barricades, warning signs, lights and other traffic control devices in reasonable conformity with the Manual on Uniform Traffic Control Devices.

When the work requires closing an air operations area of the airport or portion of such area, the Contractor shall furnish, erect, and maintain temporary markings and associated lighting conforming to the requirements of advisory circular (AC) 150/5340-1, Standards for Airport Markings.

The Contractor shall furnish, erect, and maintain markings and associated lighting of open trenches, excavations, temporary stock piles, and the Contractor's parked construction equipment that may be hazardous to the operation of emergency fire-rescue or maintenance vehicles on the airport in reasonable

conformance to AC 150/5370-2G, Operational Safety on Airports During Construction.

The Contractor shall identify each motorized vehicle or piece of construction equipment in reasonable conformance to AC 150/5370-2G.

The Contractor shall furnish and erect all barricades, warning signs, and markings for hazards prior to commencing work that requires such erection and shall maintain the barricades, warning signs, and markings for hazards until their removal is directed by the Engineer.

Open-flame type lights shall not be permitted.

70-09 Use of explosives. When the use of explosives is necessary for the execution of the work, the Contractor shall exercise the utmost care not to endanger life or property, including new work. The Contractor shall be responsible for all damage resulting from the use of explosives.

All explosives shall be stored in a secure manner in compliance with all laws and ordinances, and all such storage places shall be clearly marked. Where no local laws or ordinances apply, storage shall be provided satisfactory to the Engineer and, in general, not closer than 1,000 feet (300 m) from the work or from any building, road, or other place of human occupancy.

The Contractor shall notify each property Owner and public utility company having structures or facilities in proximity to the site of the work of his or her intention to use explosives. Such notice shall be given sufficiently in advance to enable them to take such steps as they may deem necessary to protect their property from injury.

The use of electrical blasting caps shall not be permitted on or within 1,000 feet (300 m) of the airport property.

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

The Contractor shall be responsible for all damage or injury to property of any character, during the 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 his or her own expense, such property to a condition similar or equal to that existing before such damage or injury was done, by repairing, or otherwise restoring as may be directed, or the Contractor shall make good such damage or injury in an acceptable manner.

70-11 Responsibility for damage claims. The Contractor shall indemnify and save harmless the Engineer and the Owner and their officers, and employees from all suits, actions, or claims, of any character, brought because of any injuries or damage received or sustained by any person, persons, or property on account of the operations of the Contractor; or on account of or in consequence of any neglect in

safeguarding the work; or through use of unacceptable materials in constructing the work; or because of any act or omission, neglect, or misconduct of said Contractor; or because of any claims or amounts recovered from any infringements of patent, trademark, or copyright; or from any claims or amounts arising or recovered under the "Workmen's Compensation Act," or any other law, ordinance, order, or decree. Money due the Contractor under and by virtue of his or her 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, his or her 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. Should it be necessary for the Contractor to complete portions of the contract work for the beneficial occupancy of the Owner prior to completion of the entire contract, such "phasing" of the work shall be specified herein and indicated on the plans. When so specified, the Contractor shall complete such portions of the work on or before the date specified or as otherwise specified. The Contractor shall make his or her own estimate of the difficulties involved in arranging the work to permit such beneficial occupancy by the Owner as described below:

Per the phasing plan in the contract documents.

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

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

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

Contractor shall be required to conform to safety standards contained AC 150/5370-2G (see Special Provisions).

Contractor shall refer to the approved Construction Safety Phasing Plan (CSPP) to identify barricade requirements and other safety requirements prior to opening up sections of work to traffic.

70-14 Contractor's responsibility for work. Until the Engineer's final written acceptance of the entire completed work, excepting only those portions of the work accepted in accordance with the subsection

50-14 titled PARTIAL ACCEPTANCE of Section 50, the Contractor shall have the charge and care thereof and shall take every precaution against injury or damage to any part due to the action of the elements or from any other cause, whether arising from the execution or from the non-execution of the work. The Contractor shall rebuild, repair, restore, and make good all injuries or damages to any portion of the work occasioned by any of the above causes before final acceptance and shall bear the expense thereof except damage to the work due to unforeseeable causes beyond the control of and without the fault or negligence of the Contractor, including but not restricted to acts of God such as earthquake, tidal wave, tornado, hurricane or other cataclysmic phenomenon of nature, or acts of the public enemy or of government authorities.

If the work is suspended for any cause whatever, the Contractor shall be responsible for the work and shall take such precautions necessary to prevent damage to the work. The Contractor shall provide for normal drainage and shall erect necessary temporary structures, signs, or other facilities at his or her expense. During such period of suspension of work, the Contractor shall properly and continuously maintain in an acceptable growing condition all living material in newly established planting, 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 the subsection 70-04 titled RESTORATION OF SURFACES DISTURBED BY OTHERS of this section, the Contractor shall cooperate with the Owner of any public or private utility service, FAA or NOAA, or a utility service of another government agency that may be authorized by the Owner to construct, reconstruct or maintain such utility services or facilities during the progress of the work. In addition, the Contractor shall control 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 the Owners are indicated as follows: NONE.

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 his or her plan of operations. Such notification shall be in writing addressed to THE PERSON TO CONTACT as provided in this subsection and subsection 70-04 titled RESTORATION OF SURFACES DISTURBED BY OTHERS of this section. A copy of each notification shall be given to the Engineer.

In addition to the general written notification 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.

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 shall take all reasonable measures to prevent further damage or interruption of service. The Contractor, in such events, shall cooperate with the utility service or facility owner and the Engineer continuously until such damage has been repaired and service restored to the satisfaction of the utility or facility owner.

The Contractor shall bear all costs of damage and restoration of service to any utility service or facility due to 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 his or her surety.

70-15.1 FAA facilities and cable runs. NOT USED.

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, his or her authorized representatives, or any officials of the Owner either personally or as an official of the Owner. It is understood that in such matters they act solely as agents and representatives of the Owner.

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

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

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

70-20 Archaeological and historical findings. Unless otherwise specified in this subsection, the Contractor is advised that the site of the work is not within any property, district, or site, and does not contain any

building, structure, or object listed in the current National Register of Historic Places published by the United States Department of Interior.

Should the Contractor encounter, during his or her 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. The Engineer 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 the subsection 40-04 titled EXTRA WORK of Section 40 and the subsection 90-05 titled PAYMENT FOR EXTRA WORK of Section 90. If appropriate, the contract change order or supplemental agreement shall include an extension of contract time in accordance with the subsection 80-07 titled DETERMINATION AND EXTENSION OF CONTRACT TIME of Section 80.

END OF SECTION 70

GENERAL PROVISIONS

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.

The Contractor shall provide copies of all subcontracts to the Engineer. 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 his or her contract, said assignment shall be concurred in by the surety, shall be presented for the consideration and approval of the Owner, and shall be consummated only on the written approval of the Owner.

80-02 Notice to proceed. The notice to proceed shall state the date on which it is expected the Contractor will begin the construction and from which date contract time will be charged. The Contractor shall begin the work to be performed under the contract within 10 days of the date set by the Engineer in the written notice to proceed, but in any event, the Contractor shall notify the Engineer at least 24 hours in advance of the time actual construction operations will begin. The Contractor shall not commence any actual construction 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 progress schedule for the Engineer's approval within 10 days after the effective date of the notice to proceed. The Contractor's progress schedule, when approved by the Engineer, may be used to establish major construction operations and to check on the progress of the work. The Contractor shall provide sufficient materials, equipment, and labor to guarantee the completion of the project in accordance with the plans and specifications within the time set forth in the proposal.

If the Contractor falls significantly behind the submitted schedule, the Contractor shall, upon the Engineer's request, submit a revised schedule for completion of the work within the contract time and modify 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 at least 24 hours in advance of resuming operations.

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

80-04 Limitation of operations. The Contractor shall control his or her operations and the operations of his or her 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 his or her operations within an AOA of the airport, the work shall be coordinated with airport operations (through the Engineer) at least 48 hours prior to commencement of such work. The Contractor shall not close an AOA until so authorized by the Engineer and until the necessary temporary marking and associated lighting is in place as provided in the subsection 70-08 titled BARRICADES, WARNING SIGNS, AND HAZARD MARKINGS of Section 70.

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; 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 the satisfactory conditions are provided. The following AOA 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:

Per phasing plan in contract documents.

Contractor shall be required to conform to safety standards contained in AC 150/5370-2, Operational Safety on Airports During Construction (see Special Provisions).

80-04.1 Operational safety on airport during construction. All Contractors' operations shall be conducted in accordance with the project Construction Safety and Phasing Plan (CSPP) and the provisions set forth within the current version of AC 150/5370-2. 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 Safety Plan Compliance Document 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 that they implement and maintain all necessary measures.

No deviation or modifications may be made to the approved CSPP unless approved in writing by the Owner or Engineer.

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, does not perform his work in a proper and skillful manner or is intemperate or disorderly shall, at the written request of the Engineer, be removed forthwith by the Contractor or subcontractor employing such person, and shall not be employed again in any portion of the work without approval of the Engineer.

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

All equipment that is proposed to be used on the work shall be of sufficient size and in such mechanical condition as to meet requirements of the work and to produce a satisfactory quality of work. Equipment

used on any portion of the work shall be such that no injury to previously completed work, adjacent property, or existing airport facilities will result from its use.

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

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

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

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

If it should become necessary to suspend work for an indefinite period, the Contractor shall store all materials in such manner that they will not become an obstruction nor become damaged in any way. 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 or working days allowed for completion of the work shall be stated in the proposal and contract and shall be known as the CONTRACT TIME.

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

- a. CONTRACT TIME based on WORKING DAYS shall be calculated weekly by the Engineer. The Engineer will furnish the Contractor a copy of his or her weekly statement of the number of working days charged against the contract time during the week and the number of working days currently specified for completion of the contract (the original contract time plus the number of working days, if any, that have been included in approved CHANGE ORDERS or SUPPLEMENTAL AGREEMENTS covering EXTRA WORK).

The Engineer shall base his or her weekly statement of contract time charged on the following considerations:

- 1) No time shall be charged for days on which the Contractor is unable to proceed with the principal item of work under construction at the time for at least six (6) hours with the normal work force employed on such principal item. Should the normal work force be on a double-shift, 12 hours shall be used. Should the normal work force be on a triple-shift, 18 hours shall apply. Conditions beyond the Contractor's control such as strikes, lockouts, unusual delays in transportation, temporary suspension of the principal item of work under construction or temporary suspension of the entire work which have been ordered by the Owner for reasons not the fault of the Contractor, shall not be charged against the contract time.
 - 2) The Engineer will not make charges against the contract time prior to the effective date of the notice to proceed.
 - 3) The Engineer will begin charges against the contract time on the first working day after the effective date of the notice to proceed.
 - 4) The Engineer will not make charges against the contract time after the date of final acceptance as defined in the subsection 50-15 titled FINAL ACCEPTANCE of Section 50.
 - 5) The Contractor will be allowed one (1) week in which to file a written protest setting forth his or her objections to the Engineer's weekly statement. If no objection is filed within such specified time, the weekly statement shall be considered as acceptable to the Contractor. The contract time (stated in the proposal) is based on the originally estimated quantities as described in the subsection 20-05 titled INTERPRETATION OF ESTIMATED PROPOSAL QUANTITIES of Section 20. Should the satisfactory completion of the contract require performance of work in greater quantities than those estimated in the proposal, the contract time shall be increased in the same proportion as the cost of the actually completed quantities bears to the cost of the originally estimated quantities in the proposal. Such increase in contract time shall not consider either the cost of work or the extension of contract time that has been covered by change order or supplemental agreement and shall be made at the time of final payment.
- b. Contract Time based on calendar days shall consist of the number of calendar days stated in the contract counting from the effective date of the notice to proceed and including all Saturdays, Sundays, holidays, and 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.

- c. When the contract time is a specified completion date, it shall be the date on which all contract work shall be substantially complete.

If the Contractor finds it impossible for reasons beyond his or her control to complete the work within the contract time as specified, or as extended in accordance with the provisions of this subsection, the Contractor may, at any time prior to the expiration of the contract time as extended, make a written request to the Owner for an extension of time setting forth the reasons which the Contractor believes will justify the granting of his or her request. Requests for extension of time on calendar day projects, caused by inclement weather, shall be supported with National Weather Bureau data showing the actual amount of inclement weather exceeded what could normally be expected during the contract period. The Contractor's plea that insufficient time was specified is not a valid reason for extension of time. If the supporting documentation justify the work was delayed because of conditions beyond the control and without the fault of the Contractor, the Owner may extend the time for completion by a change order that adjusts the contract time or completion date. The extended time for completion shall then be in full force and effect, the same as though it were the original time for completion.

80-08 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 the subsection 80-07 titled DETERMINATION AND EXTENSION OF CONTRACT TIME of this Section) the sum specified in the contract and proposal as liquidated damages will be deducted from any money due or to become due the Contractor or his or her surety. Such deducted sums shall not be deducted as a penalty but shall be considered as liquidation of a reasonable portion of damages including but not limited to additional engineering services that will be incurred by the Owner should the Contractor fail to complete the work in the time provided in their contract.

Schedule	Liquidated Damages Cost	Allowed Construction Time

The maximum construction time allowed for the Schedule will be 120 days. Permitting the Contractor to continue and finish the work or any part of it after the time fixed for its completion, or after the date to which the time for completion may have been extended, will in no way operate as a wavier on the part of the Owner of any of its rights under the contract.

80-09 Default and termination of contract. The Contractor shall be considered in default of his or her contract and such default will be considered as cause for the Owner to terminate the contract for any of the following reasons if the Contractor:

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

- b. Fails to perform the work or fails to provide sufficient workers, equipment 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 Engineer consider the Contractor in default of the contract for any reason above, the Engineer shall immediately give written notice to the Contractor and the Contractor's surety as to the reasons for considering the Contractor in default and the Owner's intentions to terminate the contract.

If the Contractor or surety, within a period of 10 days after such notice, does not proceed in accordance therewith, then the Owner will, upon written notification from the Engineer of the facts of such delay, neglect, or default and the Contractor's failure to comply with such notice, have full power and authority without violating the contract, to take the 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 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.

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

80-11 Work area, storage area and sequence of operations. The Contractor shall obtain approval from the Engineer prior to beginning any work in all areas of the airport. No operating runway, taxiway, or air operations area (AOA) shall be crossed, entered, or obstructed while it is operational. The Contractor shall plan and coordinate his or her work in such a manner as to ensure safety and a minimum of hindrance to flight operations. All Contractor equipment and material stockpiles shall be stored a minimum of **1000** feet from the centerline of an active runway. No equipment will be allowed to park within the approach area of an active runway at any time. No equipment shall be within **1000** feet of an active runway at any time.

END OF SECTION 80

GENERAL PROVISIONS

Section 90 Measurement and Payment

90-01 Measurement of quantities. All work completed under the contract will be measured by the Engineer, or his or her authorized representatives, using United States Customary Units of Measurement or the International System of Units.

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

Unless otherwise specified, longitudinal measurements for area computations will be made horizontally, and no deductions will be made for individual fixtures (or leave-outs) having an area of 9 square feet (0.8 square 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.

Structures will be measured according to neat lines shown on the plans or as altered to fit field conditions.

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

In computing volumes of excavation the average end area method or other acceptable methods will be used.

The thickness of plates and galvanized sheet used in the manufacture of corrugated metal pipe, metal plate pipe culverts and arches, and metal cribbing will be specified and measured in decimal fraction of inch.

The term "ton" will mean the short ton consisting of 2,000 lb (907 kg) avoirdupois. All materials that are measured or proportioned by weights shall be weighed on accurate, approved scales by competent, qualified personnel at locations designed by the Engineer. If material is shipped by rail, the car weight may be accepted provided that only the actual weight of material is paid for. However, car weights will not be acceptable for material to be passed through mixing plants. Trucks used to haul material being paid for by weight shall be weighed empty daily at such times as the Engineer directs, and each truck shall bear a plainly legible identification mark.

Materials to be measured by volume in the hauling vehicle shall be hauled in approved vehicles and measured therein at the point of delivery. Vehicles for this purpose may be of any size or type acceptable 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.

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

Bituminous materials will be measured by the gallon (liter) or ton (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 or ASTM D633 for tars.

Net certified scale weights or weights based on certified volumes in the case of rail shipments will be used as a basis of measurement, subject to correction when bituminous material has been lost from the car or the distributor, wasted, or otherwise not incorporated in the work.

When bituminous materials are shipped by truck or transport, net certified weights by volume, subject to correction for loss or foaming, may be used for computing quantities.

Cement will be measured by the ton (kg) or hundredweight (km).

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.

The term "lump sum" when used as an item of payment will mean complete payment for the work described in the contract.

When a complete structure or structural unit (in effect, "lump sum" work) is specified as the unit of measurement, the unit will be construed to include all necessary fittings and accessories.

Rental of equipment will be measured by time in hours of actual working time and necessary traveling time of the equipment within the limits of the work. Special equipment ordered by the Engineer in connection with force account work will be measured as agreed in the change order or supplemental agreement authorizing such force account work as provided in the subsection 90-05 titled PAYMENT FOR EXTRA WORK of this section.

When standard manufactured items are specified such as fence, wire, plates, rolled shapes, pipe conduit, etc., and these items are identified by gauge, unit weight, section dimensions, etc., such identification will be considered to be nominal weights or dimensions. Unless more stringently controlled by tolerances in cited specifications, manufacturing tolerances established by the industries involved will be accepted.

Scales for weighing materials which are required to be proportioned or measured and paid for by weight shall be furnished, erected, and maintained by the Contractor, or be certified permanently installed commercial scales.

Scales shall be accurate within 1/2% of the correct weight throughout the range of use. The Contractor shall have the scales checked under the observation of the inspector before beginning work and at such other times as requested. The intervals shall be uniform in spacing throughout the graduated or marked length of the beam or dial and shall not exceed one-tenth of 1% of the nominal rated capacity of the scale, but not less than 1 pound (454 grams). The use of spring balances will not be permitted.

Beams, dials, platforms, and other scale equipment shall be so arranged that the operator and the inspector can safely and conveniently view them.

Scale installations shall have available ten standard 50-pound (2.3 km) weights for testing the weighing equipment or suitable weights and devices for other approved equipment.

Scales must be tested for accuracy and serviced before use at a new site. Platform scales shall be installed and maintained with the platform level and rigid bulkheads at each end.

Scales "overweighing" (indicating more than correct weight) will not be permitted to operate, and all materials received subsequent to the last previous correct weighting-accuracy test will be reduced by the percentage of error in excess of one-half of 1%.

In the event inspection reveals the scales have been underweighing (indicating less than correct weight), they shall be adjusted, and no additional payment to the Contractor will be allowed for materials previously weighed and recorded.

All costs in connection with furnishing, installing, certifying, testing, and maintaining scales; for furnishing check weights and scale house; and for all other items specified in this subsection, for the weighing of materials for proportioning or payment, shall be included in the unit contract prices for the various items of the project.

When the estimated quantities for a specific portion of the work are designated as the pay quantities in the contract, they shall be the final quantities for which payment for such specific portion of the work will be made, unless the dimensions of said portions of the work shown on the plans are revised by the Engineer. If revised dimensions result in an increase or decrease in the quantities of such work, the final quantities for payment will be revised in the amount represented by the authorized changes in the dimensions.

90-02 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 the subsection 70-18 titled NO WAIVER OF LEGAL RIGHTS of Section 70.

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

90-03 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 the subsection 40-02 titled ALTERATION OF WORK AND QUANTITIES of Section 40 will be made for any increased expense, loss of expected reimbursement, or loss of anticipated profits suffered or claimed by the Contractor which results directly from such alterations or indirectly from his or her unbalanced allocation of overhead and profit among the contract items, or from any other cause.

90-04 Payment for omitted items. As specified in the subsection 40-03 titled OMITTED ITEMS of Section 40, the Engineer shall have the right to omit from the work (order nonperformance) any contract item, except major contract items, in the best interest of the Owner.

Should the Engineer omit or order nonperformance of a contract item or portion of such item from the work, the Contractor shall accept payment in full at the contract prices for any work actually completed

and acceptable prior to the Engineer's order to omit or non-perform such contract item.

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

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

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

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, 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 the subsection 90-07 titled PAYMENT FOR MATERIALS ON HAND of this section. No partial payment will be made when the amount due to the Contractor since the last estimate amounts to less than five hundred dollars.

The 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. The Owner must ensure prompt and full payment of retainage from 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.

From the total of the amount determined to be payable on a partial payment, 10% percent of such total amount will be deducted and retained by the Owner until the final payment is made, except as may be provided (at the Contractor's option) in the subsection 90-08 titled PAYMENT OF WITHHELD FUNDS of this section. The balance of the amount payable, less all previous payments, shall be certified for payment. Should the Contractor exercise his or her option, as provided in the subsection 90-08 titled PAYMENT OF WITHHELD FUNDS of this section, no such percent retainage shall be deducted.

When at least 95% of the work has been completed, the Engineer 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 to be a part of the final quantity for the item of work in question.

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

The Contractor shall deliver to the Owner a complete release of all claims for labor and material arising out of this contract before the final 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 at or on an approved site.
- b. The Contractor has furnished the Engineer with acceptable evidence of the quantity and quality of such stored or stockpiled materials.
- c. The Contractor has furnished the Engineer with satisfactory evidence that the material and transportation costs have been paid.
- d. The Contractor has furnished the Owner legal title (free of liens or encumbrances of any kind) to the material so stored or stockpiled.
- e. The Contractor has furnished the Owner evidence that the material so stored or stockpiled is insured against loss by damage to or disappearance of such materials at any time prior to use in the work.

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

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

No partial payment will be made for stored or stockpiled living or perishable plant materials.

The Contractor shall bear all costs associated with the partial payment of stored or stockpiled materials in accordance with the provisions of this subsection.

90-08 Payment of withheld funds. At the Contractor's option, if an Owner withholds retainage in accordance with the methods described in subsection 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 the subsection 50-15 titled FINAL ACCEPTANCE of Section 50, the Engineer will prepare the final estimate of the items of work actually performed. The Contractor shall approve the Engineer's final estimate or advise the Engineer of 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 shall resolve all disputes (if any) in the measurement and computation of final quantities to be paid within 30 calendar days of the Contractor's receipt of the Engineer's final estimate. If, after such 30-day period, a dispute still exists, the Contractor may approve the Engineer's estimate under protest of the quantities in dispute, and such disputed quantities shall be considered by the Owner as a claim in accordance with the subsection 50-16 titled CLAIMS FOR ADJUSTMENT AND DISPUTES of Section 50.

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

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

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. If the Owner takes possession of any part of the work before final acceptance, this warranty shall continue for a period of one year from the date the Owner takes possession. However, this

will not relieve the Contractor from corrective items required by the final acceptance of the project work.

- 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:
 - 1) The Contractor's failure to conform to contract requirements; or
 - 2) 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 Project closeout. 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 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 subsection 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.
- k.** Security for Construction Warranty.
- l.** Equipment commissioning documentation submitted, if required.

END OF SECTION 90

GENERAL PROVISIONS

Section 100 Contractor Quality Control Program

100-01 General. When the specification requires a Contractor Quality Control Program, the Contractor shall establish, provide, and maintain an effective Quality Control Program 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 intent of this section is to enable the Contractor to establish a necessary level of control that will:

- a. Adequately provide for the production of acceptable quality materials.
- b. Provide sufficient information to assure both the Contractor and the Engineer that the specification requirements can be met.
- c. Allow the Contractor as much latitude as possible to develop his or her own standard of control.

The Contractor shall be prepared to discuss and present, at the preconstruction conference, their understanding of the quality control requirements. The Contractor shall not begin any construction or production of materials to be incorporated into the completed work until the Quality Control Program has been reviewed and accepted by the Engineer. No partial payment will be made for materials subject to specific quality control requirements until the Quality Control Program has been reviewed.

The quality control requirements contained in this section and elsewhere in the contract technical specifications are in addition to and separate from the acceptance testing requirements. Acceptance testing requirements are the responsibility of the Engineer.

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

100-02 Description of program.

- a. **General description.** The Contractor shall establish a Quality Control Program to perform quality control inspection and testing of all items of work required by the technical specifications, including those performed by subcontractors. This Quality Control Program shall ensure conformance to applicable specifications and plans with respect to materials, workmanship, construction, finish, and functional performance. The Quality Control Program 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 quality control.
- b. **Quality Control Program.** The Contractor shall describe the Quality Control Program in a written document that shall be reviewed and approved by the Engineer prior to the start of any

production, construction, or off-site fabrication. The written Quality Control Program shall be submitted to the Engineer for review and approval at least 5 calendar days before the Pre-Construction Conference. The Contractor's Quality Control Plan and Quality Control testing laboratory must be approved in writing by the Engineer prior to the Notice to Proceed (NTP).

The Quality Control Program shall be organized to address, as a minimum, the following items:

- a. Quality control organization
- b. Project progress schedule
- c. Submittals schedule
- d. Inspection requirements
- e. Quality control testing plan
- f. Documentation of quality control activities
- g. Requirements for corrective action when quality control and/or acceptance criteria are not met

The Contractor is encouraged to add any additional elements to the Quality Control Program that is deemed necessary to adequately control all production and/or construction processes required by this contract.

100-03 Quality control organization. The Contractor Quality Control Program shall be implemented by the establishment of a separate quality control organization. An organizational chart shall be developed to show all quality control personnel and how these personnel integrate with other management/production and construction functions and personnel.

The organizational chart shall identify all quality control staff by name and function, and shall indicate the total staff required to implement all elements of the Quality Control Program, 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 Quality Control Program, the personnel assigned shall be subject to the qualification requirements of paragraph 100-03a and 100-03b. The organizational chart shall indicate which personnel are Contractor employees and which are provided by an outside organization.

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

- a. **Program Administrator.** The Program Administrator shall be a full-time on-site employee of the Contractor, or a consultant engaged by the Contractor. The Program Administrator shall have a minimum of five (5) years of experience in airport and/or highway construction and shall have had prior quality control experience on a project of comparable size and scope as the contract.

Additional qualifications for the Program Administrator shall include 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) An individual with three (3) years of highway and/or airport paving experience, with a Bachelor of Science Degree in Civil Engineering, Civil Engineering Technology or Construction.
- 4) Construction materials technician certified at Level III by the National Institute for Certification in Engineering Technologies (NICET).
- 5) Highway materials technician certified at Level III by NICET.
- 6) Highway construction technician certified at Level III by NICET.
- 7) A NICET certified engineering technician in Civil Engineering Technology with five (5) years of highway and/or airport paving experience.

The Program Administrator shall have full authority to institute any and all actions necessary for the successful implementation of the Quality Control Program to ensure compliance with the contract plans and technical specifications. The Program Administrator shall report directly to a responsible officer of the construction firm. The Program Administrator 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. Quality control technicians.** A sufficient number of quality control technicians necessary to adequately implement the Quality Control Program shall be provided. These personnel shall be either Engineers, engineering technicians, or experienced craftsman with qualifications in the appropriate field equivalent to NICET Level II or higher construction materials technician or highway construction technician and shall have a minimum of two (2) years of experience in their area of expertise.

The quality control technicians shall report directly to the Program Administrator 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 subsection 100-06.
- 2) Performance of all quality control tests as required by the technical specifications and subsection 100-07.
- 3) Performance of density tests for the Engineer when required by the technical specifications.

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

- c. Staffing levels.** The Contractor shall provide sufficient qualified quality control 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 Quality Control Program shall state where different technicians will be required for different work elements.

100-04 Project progress schedule. The Contractor shall submit a coordinated construction schedule for all work activities. The 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 in the contract. As a minimum, it shall provide information on the sequence of work activities, milestone dates, and activity duration.

The Contractor shall maintain the work schedule and provide an update and analysis of the progress schedule on a twice 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.

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

- a. Specification item number
- b. Item description
- c. Description of submittal
- d. Specification paragraph requiring submittal
- e. Scheduled date of submittal

100-06 Inspection requirements. Quality control 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 subsection 100-07.

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

- a. During plant operation for material production, quality control 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 Quality Control Program shall detail how these and other quality control functions will be accomplished and used.
- b. During field operations, quality control 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 Program shall document how these and other quality control functions will be accomplished and used.

100-07 Quality control testing plan. As a part of the overall Quality Control Program, the Contractor shall implement a quality control 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 quality control tests that the Contractor deems necessary to adequately control production and/or construction processes.

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

- a. Specification item number (for example, P-401)
- b. Item description (for example, Plant Mix Bituminous Pavements)
- c. Test type (for example, gradation, grade, asphalt content)
- d. Test standard (for example, ASTM or American Association of State Highway and Transportation Officials (AASHTO) test number, as applicable)
- e. Test frequency (for example, as required by technical specifications or minimum frequency when requirements are not stated)
- f. Responsibility (for example, plant technician)
- g. Control requirements (for example, target, permissible deviations)

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

All quality control test results shall be documented by the Contractor as required by subsection 100-08.

100-08 Documentation. The Contractor shall maintain current quality control records of all inspections and tests performed. These records shall include factual evidence that the required 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 Engineer daily. The records shall cover all work placed subsequent to the previously furnished records and shall be verified and signed by the Contractor's Program Administrator.

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

- a. **Daily inspection reports.** Each Contractor quality control 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 quality control 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) Review of quality control tests
- 7) Safety inspection.

The daily inspection reports shall identify inspections 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 quality control technician and the Program Administrator. The Engineer shall be provided at least one copy of each daily inspection report on the work day following the day of record.

- b. Daily test reports.** The Contractor shall be responsible for establishing a system that will record all quality control 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 Engineer prior to the start of the next day's work period. When required by the technical specifications, the Contractor shall maintain statistical quality control charts. The daily test reports shall be signed by the responsible quality control technician and the Program Administrator.

100-09 Corrective action requirements. The Quality Control Program 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 Quality Control Program as a whole, and for individual items of work contained in the technical specifications.

The Quality Control Program shall detail how the results of quality control inspections and tests will be used for determining the need for corrective action and shall contain clear sets of 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 quality control charts for individual quality control tests. The requirements for corrective action shall be linked to the control charts.

100-10 Surveillance by the Engineer. All items of material and equipment shall be subject to surveillance by the Engineer at the point of production, manufacture or shipment to determine if the Contractor, producer, manufacturer or shipper maintains an adequate quality control 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 surveillance by the Engineer at the site for the same purpose.

Surveillance by the Engineer does not relieve the Contractor of performing quality control inspections of either on-site or off-site Contractor's or subcontractor's work.

100-11 Noncompliance.

- a. The Engineer will notify the Contractor of any noncompliance with any of the foregoing requirements. The Contractor shall, after receipt of such notice, immediately take corrective action. Any notice, when delivered by the Engineer or his or her authorized representative to the Contractor or his or her authorized representative at the site of the work, shall be considered sufficient notice.
- b. In cases where quality control activities do not comply with either the Contractor Quality Control Program or the contract provisions, or where the Contractor fails to properly operate and maintain an effective Quality Control Program, as determined by the Engineer, the Engineer may:
 - 1) Order the Contractor to replace ineffective or unqualified quality control personnel or subcontractors.
 - 2) Order the Contractor to stop operations until appropriate corrective actions are taken.

END OF SECTION 100

GENERAL PROVISIONS

Section 105 Mobilization

105-1 Description. This item shall consist of work and operations, 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.

105-1.1 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.

105-2 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 90-11, the final 10%.

END OF SECTION 105

GENERAL PROVISIONS

Section 110 Method of Estimating Percentage of Material Within Specification Limits (PWL)

110-01 General. When the specifications provide for acceptance of material based on the method of estimating percentage of material within specification limits (PWL), the PWL will be determined in accordance with this section. All test results for a lot will be analyzed statistically to determine the total estimated percent of the lot that is within specification limits. The PWL is computed using the sample average ($\bar{X}$) 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.

110-02 Method for computing PWL. The computational sequence for computing PWL is as follows:

- a. Divide the lot into n sublots in accordance with the acceptance requirements of the specification.
- b. Locate the random sampling position within the 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 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 values within a lot

x_1, x_2 = Individual subplot values

n = Number of sublots

- 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 values in the set
 d_1, d_2 = Deviations of the individual subplot values $x_1, x_2, \dots$ from the average value $\bar{X}$
that is: $d_1 = (x_1 - \bar{X}), d_2 = (x_2 - \bar{X}) \dots d_n = (x_n - \bar{X})$
 n = Number of sublots

- f. For single sided specification limits (that is, L only), compute the Lower Quality Index Q_L by use of the following formula:

$$Q_L = (\bar{X} - L) / S_n$$

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 (that is, L and U), compute the Quality Indexes Q_L and Q_U by use of the following formulas:

$$Q_L = (\bar{X} - L) / S_n \text{ and } Q_U = (U - \bar{X}) / S_n$$

Where: L and U = specification lower and upper tolerance limits

Estimate the percentage of material between the lower (L) and upper (U) tolerance limits (PWL) by entering Table 1 separately with Q_L and Q_U , using the column appropriate to the total number (n) of measurements, and determining the percent of material above P_L and percent of material below P_U for each tolerance limit. If the values of Q_L fall between values shown on the table, use the next higher value of P_L or P_U . Determine the PWL by use of the following formula:

$$PWL = (P_U + P_L) - 100$$

Where: P_L = percent within lower specification limit
 P_U = percent within upper specification limit

EXAMPLE OF PWL CALCULATION

Project: Example Project

Test Item: Item P-401, Lot A.

A. PWL Determination for Mat Density.

- 1) Density of four random cores taken from Lot A.

A-1 = 96.60

A-2 = 97.55

A-3 = 99.30

A-4 = 98.35

$$n = 4$$

- 2) Calculate average density for the lot.

$$X = (x_1 + x_2 + x_3 + \dots + x_n) / n$$

$$X = (96.60 + 97.55 + 99.30 + 98.35) / 4$$

$$X = 97.95\% \text{ density}$$

- 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 $n = 4$.

$$\text{PWL} = 98$$

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) Use $n=4$ and upper 5% significance level of to find 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 $(\text{measurement} - \text{average}) / (\text{standard deviation})$ 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 $(\text{average} - \text{measurement}) / (\text{standard deviation})$ 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
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

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
57	0.2519	0.2100	0.1971	0.1911	0.1877	0.1855	0.1840	0.1829
56	0.2164	0.1800	0.1688	0.1636	0.1607	0.1588	0.1575	0.1566
55	0.1806	0.1500	0.1406	0.1363	0.1338	0.1322	0.1312	0.1304
54	0.1447	0.1200	0.1125	0.1090	0.1070	0.1057	0.1049	0.1042
53	0.1087	0.0900	0.0843	0.0817	0.0802	0.0793	0.0786	0.0781
52	0.0725	0.0600	0.0562	0.0544	0.0534	0.0528	0.0524	0.0521
51	0.0363	0.0300	0.0281	0.0272	0.0267	0.0264	0.0262	0.0260
50	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Percent Within Limits (P _L and P _U)	Negative Values of Q (Q _L and Q _U)							
	n=3	n=4	n=5	n=6	n=7	n=8	n=9	n=10
49	-0.0363	-0.0300	-0.0281	-0.0272	-0.0267	-0.0264	-0.0262	-0.0260
48	-0.0725	-0.0600	-0.0562	-0.0544	-0.0534	-0.0528	-0.0524	-0.0521
47	-0.1087	-0.0900	-0.0843	-0.0817	-0.0802	-0.0793	-0.0786	-0.0781
46	-0.1447	-0.1200	-0.1125	-0.1090	-0.1070	-0.1057	-0.1049	-0.1042
45	-0.1806	-0.1500	-0.1406	-0.1363	-0.1338	-0.1322	-0.1312	-0.1304
44	-0.2164	-0.1800	-0.1688	-0.1636	-0.1607	-0.1588	-0.1575	-0.1566
43	-0.2519	-0.2100	-0.1971	-0.1911	-0.1877	-0.1855	-0.1840	-0.1829
42	-0.2872	-0.2400	-0.2254	-0.2186	-0.2147	-0.2122	-0.2105	-0.2093
41	-0.3222	-0.2700	-0.2537	-0.2461	-0.2418	-0.2391	-0.2372	-0.2358
40	-0.3568	-0.3000	-0.2822	-0.2738	-0.2691	-0.2660	-0.2639	-0.2624
39	-0.3911	-0.3300	-0.3107	-0.3016	-0.2964	-0.2931	-0.2908	-0.2892
38	-0.4251	-0.3600	-0.3392	-0.3295	-0.3239	-0.3203	-0.3179	-0.3161
37	-0.4586	-0.3900	-0.3679	-0.3575	-0.3515	-0.3477	-0.3451	-0.3432
36	-0.4916	-0.4200	-0.3967	-0.3856	-0.3793	-0.3753	-0.3725	-0.3705
35	-0.5242	-0.4500	-0.4255	-0.4139	-0.4073	-0.4030	-0.4001	-0.3980
34	-0.5563	-0.4800	-0.4545	-0.4424	-0.4355	-0.4310	-0.4280	-0.4257
33	-0.5878	-0.5100	-0.4836	-0.4710	-0.4638	-0.4592	-0.4560	-0.4537
32	-0.6187	-0.5400	-0.5129	-0.4999	-0.4924	-0.4877	-0.4844	-0.4820
31	-0.6490	-0.5700	-0.5423	-0.5290	-0.5213	-0.5164	-0.5130	-0.5105
30	-0.6787	-0.6000	-0.5719	-0.5582	-0.5504	-0.5454	-0.5419	-0.5394
29	-0.7077	-0.6300	-0.6016	-0.5878	-0.5798	-0.5747	-0.5712	-0.5686
28	-0.7360	-0.6600	-0.6316	-0.6176	-0.6095	-0.6044	-0.6008	-0.5982
27	-0.7636	-0.6900	-0.6617	-0.6477	-0.6396	-0.6344	-0.6308	-0.6282
26	-0.7904	-0.7200	-0.6921	-0.6781	-0.6701	-0.6649	-0.6613	-0.6587
25	-0.8165	-0.7500	-0.7226	-0.7089	-0.7009	-0.6958	-0.6922	-0.6896
24	-0.8417	-0.7800	-0.7535	-0.7401	-0.7322	-0.7271	-0.7236	-0.7211
23	-0.8662	-0.8100	-0.7846	-0.7716	-0.7640	-0.7590	-0.7556	-0.7531
22	-0.8897	-0.8400	-0.8160	-0.8036	-0.7962	-0.7915	-0.7882	-0.7858
21	-0.9124	-0.8700	-0.8478	-0.8360	-0.8291	-0.8245	-0.8214	-0.8192
20	-0.9342	-0.9000	-0.8799	-0.8690	-0.8625	-0.8583	-0.8554	-0.8533
19	-0.9550	-0.9300	-0.9123	-0.9025	-0.8966	-0.8928	-0.8901	-0.8882
18	-0.9749	-0.9600	-0.9452	-0.9367	-0.9315	-0.9281	-0.9258	-0.9241
17	-0.9939	-0.9900	-0.9785	-0.9715	-0.9671	-0.9643	-0.9624	-0.9610
16	-1.0119	-1.0200	-1.0124	-1.0071	-1.0037	-1.0015	-1.0000	-0.9990
15	-1.0288	-1.0500	-1.0467	-1.0435	-1.0413	-1.0399	-1.0389	-1.0382
14	-1.0448	-1.0800	-1.0817	-1.0808	-1.0800	-1.0794	-1.0791	-1.0789
13	-1.0597	-1.1100	-1.1173	-1.1192	-1.1199	-1.1204	-1.1208	-1.1212
12	-1.0736	-1.1400	-1.1537	-1.1587	-1.1613	-1.1630	-1.1643	-1.1653
11	-1.0864	-1.1700	-1.1909	-1.1995	-1.2043	-1.2075	-1.2098	-1.2115
10	-1.0982	-1.2000	-1.2290	-1.2419	-1.2492	-1.2541	-1.2576	-1.2602
9	-1.1089	-1.2300	-1.2683	-1.2860	-1.2964	-1.3032	-1.3081	-1.3118
8	-1.1184	-1.2600	-1.3088	-1.3323	-1.3461	-1.3554	-1.3620	-1.3670
7	-1.1269	-1.2900	-1.3508	-1.3810	-1.3991	-1.4112	-1.4199	-1.4265

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
6	-1.1342	-1.3200	-1.3946	-1.4329	-1.4561	-1.4717	-1.4829	-1.4914
5	-1.1405	-1.3500	-1.4407	-1.4887	-1.5181	-1.5381	-1.5525	-1.5635
4	-1.1456	-1.3800	-1.4897	-1.5497	-1.5871	-1.6127	-1.6313	-1.6454
3	-1.1496	-1.4100	-1.5427	-1.6181	-1.6661	-1.6993	-1.7235	-1.7420
2	-1.1524	-1.4400	-1.6016	-1.6982	-1.7612	-1.8053	-1.8379	-1.8630
1	-1.1541	-1.4700	-1.6714	-1.8008	-1.8888	-1.9520	-1.9994	-2.0362

END OF SECTION 110

SPECIAL PROVISIONS

SPECIAL PROVISION NO. 1
UTILITIES

A. Description

The Contractor shall be responsible for the coordination and associated costs to protect existing facilities, utilities and features that may be impacted by the project.

B. General

Existing facilities, utilities and features depicted on the construction plans are not guaranteed to be accurate with respect to location, depth, condition or characteristics. Also, there may be additional facilities and features existing that could affect the construction of this project, which are not depicted or described in the construction plans. Prior to bidding, the Contractor shall make a thorough investigation of the project area to satisfy himself/herself as to the location, condition and characteristics of any and all facilities and features, which may affect the work. No additional compensation will be made for any extra expense relating to an existing facility or feature. The Contractor hereby agrees to make no claims against the Owner, the Engineer, and their representatives relating to the existence or lack thereof, location, condition and/or characteristics of any existing facilities or features

C. Protection of Existing Utilities

Airfield lighting cables; electric power lines; telephone lines; computer cables; airport power and control cables; transmission and distribution water lines; and sanitary force mains may be located in the areas of construction. Disruption of these utilities could seriously disrupt the operation of the airport. Actual locations are uncertain, and the Contractor is required to verify all locations.

Power and control cables leading to and from any Nav aids and other facilities shall be protected from any possible damage, including crossing with unauthorized equipment, etc. No grading will be permitted over the cables under any conditions unless shown on the drawings or approved by the Engineer. These provisions intend to make perfectly clear the need for protection of Nav aids and other facility cables by the Contractor at all times.

If damage occurs to any utilities, the Contractor may be assessed a fee of \$2,000 liquidated damages per cut, which shall only represent the expense incurred by the Owner in coordinating the repair, and which shall not prevent the Owner or others from recovering from the Contractor costs or expenses of any other nature due to damages to utilities. The Contractor will also reimburse the appropriate utility owner for all material and labor costs to repair damaged utilities.

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 exhibits or encountered in the work. Any inaccuracy or omission in such information will not relieve Contractor of his 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 Owner of all utility services or other facilities of his plan of operations. Such notification shall be in writing addressed to the appropriate point-of-contact as provided herein. A copy of each notification shall be given to the Engineer.

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 his plan of operation that would affect such Owners.

Prior to commencing the work in the general vicinity of an existing utility service or facility, the Contractor shall again notify each such Owner in writing, through the Project Manager, of the plan of operations. 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 written notification. Such notification shall be given through the Project Manager by the most expeditious means to reach the utility Owners point-of-contact no later than two normal business days prior to the Contractor's commencement of operations in such general vicinity. The Contractor's failure to give two (2) days notice shall be cause for the Project Manager to suspend construction operations in the general vicinity of a utility service or facility.

Where the outside limits of an underground utility service have been located and staked on the ground, the Contractor shall be required to use excavation methods acceptable to the Project Manager within three (3) feet of the outside limits, at such points as may be required to insure protection from damage due to the Contractor's operations. Excavation methods could include the use of hand digging tools, the use of non-ferrous hand tools and could exclude the use of long-handled metal spades.

Should the Contractor damage or interrupt the operation of a utility service or facility by accident or otherwise, he shall immediately notify the proper utility company and the Project Manager 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 Project Manager continuously until such damage has been repaired and service restored to the satisfaction of the utility or facility Owner.

The Contractor shall bear all direct and indirect costs of damage and restoration of service to any utility service or facility due to his operations, whether or not due to negligence or accident. The Owner reserves the right to deduct such costs from any monies due or which may become due the Contractor or his surety.

Airport owned facilities and properties and privately owned facilities located on airport property, including underground cables, pavements, piping, buildings, turfed areas, vehicles and other facilities/improvements, that are damaged by the Contractor shall, at the election of the Owner, (1) be replaced/repared by the Contractor to the satisfaction of the Owner or (2) be replaced/repared by the Owner at the Contractor's expense.

All utilities not shown in the plans and found by the Contractor shall be recorded by the Contractor and submitted to the Airport Manager or Project Manager as Record Drawings. Refer to Special Provision No. 7 for additional requirements for Record Drawings.

END OF SP-1

SPECIAL PROVISION NO. 2
AIRPORT SAFETY AND SECURITY REQUIREMENTS

A. General

The provisions of this safety and security plan and associated procedures are applicable within the boundaries of Northwest Florida Beaches International Airport. A complete understanding of all procedures and requirements contained herein is required to ensure safety and security during construction. Satisfying these safety and security requirements is a part of this contract and deviations from the requirements established herein will be sufficient cause for contract termination.

Required reference material associated with this safety plan includes:

FAA AC 150/5200-18C (or latest edition), Airport Safety Self Inspection
FAA AC 150/5370-2G (or latest edition), Operational Safety on Airport During Construction
FAA AC 150/5210-5D (or latest edition), Painting, Marking, and Lighting of Vehicles Used on an Airport

Copies of each of these documents may be examined through coordination with the Engineer.

B. Airport Safety and Security Coordinator

A qualified individual shall act as the duly authorized representative of the Contractor to coordinate safety and security issues for the duration of the contract. This individual will be responsible for the overall coordination of safety and security matters during construction and ensuring that all procedures and requirements are followed. The individual shall be physically present on the airport at all times during the period of construction when activity related to fulfilling the Contractor's responsibilities is taking place.

The individual shall be the Owner's point of contact and is also responsible for coordinating all construction activity with any organizations prior to the start of construction at any location within the Project Area, at any time the construction schedule or procedure that would affect safety or security is altered and upon completion of work. In addition the Owner's point of contact shall maintain a file of all advisories issued; periodically review advisories issued to assure currency and appropriately cancel portions of previously issued advisories when construction covered by that advisory is completed or otherwise terminated.

C. Contractor Safety and Security Coordinator

The Contractor shall appoint a qualified individual as its duly authorized representative to coordinate safety and security issues for the duration of the contract. The Contractor's point of contact shall thoroughly understand the safety and security requirements of the contract and shall have sufficient authority to implement its provisions without significant deviation.

The Contractor shall be accountable for safety and security requirement compliance. The Contractor's point of contact for safety and security shall be especially knowledgeable regarding the requirements of FAA AC's 150/5200-18C and 150/5370-2F, Airport Self Inspection Guide and

Operational Safety on Airports During Construction, respectively. The Contractor shall be thoroughly familiar with all contract requirements relevant to the handling of hazardous materials and all applicable trade practices related to maintain safety and security during construction.

D. Construction Sequence

The construction sequence defined in the plans and specifications has been developed to minimize possible adverse safety and security impacts. The Contractor may deviate from this sequence provided the Engineer authorizes the deviation in writing.

E. Traffic Control

1. Vehicle Identification - The Contractor shall establish and maintain a list of the minimum number of vehicles believed to be necessary for completing the work required in each area of construction. This list shall be submitted to the Owner for permission to operate each vehicle on the list. To be authorized to operate on Northwest Florida Beaches International Airport each vehicle shall:

- a. be marked/flagged for high daytime visibility and lighted for nighttime operations. These vehicles shall display in full view above the vehicle a 3'x3' or larger orange and white checkerboard flag, each check being 1' square, for daytime identification. For nighttime identification each vehicle shall be equipped with a flashing amber (yellow) dome light, mounted on top of the vehicle and have an intensity that conforms to the requirement for maintenance or emergency vehicles. Vehicles that are not marked and/or lighted shall be escorted by a vehicle appropriately marked and/or lighted.

In addition, vehicles authorized to operate on any portion of the airport operations area other than the approved haul route for this contract shall also be equipped with a two-way radio capable of communicating on the Airport frequency.

All marking, lighting, installation of radios and similar safety and/or security measures including providing escort vehicles and properly trained radio operators shall be provided by the Contractor.

- b. be identified with the name and/or logo of the Contractor and be of sufficient size to be identified at a distance. Vehicles needing intermittent identification could be marked with tape or with commercially available magnetically attached markers. Vehicles that are not appropriately identified shall be escorted by a vehicle that conforms to this requirement. Vehicles requiring an escort shall be identified on the list.
- c. be operated in a manner that does not compromise the safety of either landside or airside airport operations. If, in the opinion of Airport staff or the Engineer, any vehicle is operated in a manner not fully consistent with these requirements, the Owner has the right to restrict operation of the vehicle or prohibit its use on the airport.

2. Access to the Site of Construction

- a. General Construction - the Contractor's access to the airport, employee parking and marshalling area(s) and route across the airport to the construction sites shall be as designated by the Owner. No other airport access point or cross-airport route shall be permitted unless approved in advance by the Owner. In addition, the following requirements are applicable:
 - (1) All Contractor traffic authorized to travel on the airport shall have been briefed as part of the Contractor's construction safety and security orientation program, be thoroughly familiar with the access procedures and route for travel or be escorted by personnel authorized by the Owner.
 - (2) The Contractor shall install work site identification signs at the authorized access point(s) if required by the Owner. If in the opinion of the Owner, directional signs are needed for clarity they shall be installed along the route authorized for access to each construction site.
 - (3) Under no circumstance will Contractor personnel be permitted to drive their individually owned vehicles to any construction on the airport. All vehicles must be parked in the area designated for employee parking; transportation to the work site shall be provided by the Contractor for those employees that are not otherwise occupying authorized vehicles.
 - (4) In addition to the periodic cleanup of the site, the Contractor is responsible for the immediate cleanup of any debris generated along the construction site access route(s) as a result of construction related traffic or operations whether or not created by Contractor personnel.
 - (5) There shall be no travel by foot within an active aircraft operational area. The Contractor shall arrange transportation for all employees between the designated marshalling area and each construction site, as necessary.
3. Material Suppliers, Subcontractors and Visitors - All material suppliers, subcontractors and visitors to the work site are obligated to follow the same safety and security operating procedures as the prime contractor. All material suppliers shall make their deliveries using the same access points and routes as the Contractor and shall be advised of the appropriate delivery procedures at the time the materials order is placed. If it is not practical to conform to the vehicle identification and/or safety and security orientation program requirements, the Contractor shall be prepared to escort all suppliers, subcontractors and visitors while they are on the work site or within a secured area.

F. Basis of Payment

No separate payment shall be made for airport safety and security measures or personnel or materials related to this item and incidentally required to satisfy the specified objective(s). Adequate compensation shall be included by the Contractor in the lump sum price for Mobilization. This compensation shall be full compensation for furnishing all materials and for all labor, equipment, tools, and incidentals necessary to complete the item. This compensation shall also be

full compensation for adhering to Northwest Florida Beaches International Airport access requirements which include application for badges, time to procure a badge, and time required to badge subcontractors.

END OF SP-2

SPECIAL PROVISION NO. 3
PROTECTION OF AIRPORT CABLES, NAVAIDS AND OTHER FACILITIES

- A. The Contractor is hereby informed that there are FAA NAVAID facilities installed on the Airport including, without limitation, ASR, UHF and VHF and VHF receivers and transmitters; U.S. Weather Bureau facilities; airfield lighting systems; electric cables and controls relating to such NAVAIDS and facilities. Such NAVAIDS, weather bureau and other facilities, and electric and control cables must be fully protected during the entire construction time. Work under this contract can be accomplished in the vicinity of these facilities and cables only at pre-approved periods of time.

Approval is subject to withdrawal at any time because of changes in the weather, emergency conditions on the airfield areas, anticipation of emergency conditions, and for any other reason determined by the Engineer acting under the orders and instructions of the airport management and the designated FAA representative. Any instruction to the Contractor to clear any given area, at any time, by the Engineer, the Airport Management or the FAA (by radio or other means) shall be immediately executed. Construction work will be commenced in the cleared area only when additional instructions are issued by the Engineer.

- B. Power and control cables leading to and from any FAA NAVAIDS, Weather Bureau and other facilities, will be marked in the field by the local FAA Airway Facilities Sector personnel for the information of the Contractor, before starting any work in their general vicinity. Thereafter, through the entire time of this construction, the Contractor shall not allow any construction equipment to cross these cables without first protecting the cable with steel boiler plate, or similar structural devices, for three feet (3') either side of the marked cable route. All excavation within three feet (3') of existing cables shall be accomplished by hand digging only.
- C. This Special Provision is included to make perfectly clear the need for protection of FAA NAVAIDS, Weather Bureau and other facilities and cables by the Contractor at all times.
- D. At the option of the FAA, the Contractor shall either immediately repair, with identical material by skilled workmen, and at his own expense, any underground multi-conductor control cables serving FAA NAVAIDS, weather reporting equipment and other airport facilities which are damaged by its workmen or equipment. The FAA may repair the cable at the expense of the Contractor as verified by time and material expense records provided by FAA.
- E. Prior approval from the Engineer and the FAA must be obtained for the materials, workmen, time of day or night and method of repairs for any temporary or permanent repairs the Contractor proposes to make to any FAA NAVAID or facility damaged by the Contractor. This also applies to any other airport facilities and/or cables damaged by the Contractor.
- F. Should the repair require splicing, it shall be the discretion of the local FAA Airway Facilities Sector Manager as to who shall perform the work. Where the FAA performs the work, it shall be at the Contractor's expense.
- G. No repair or splice work shall be backfilled or covered prior to final operational approval by the Airway Facilities Sector Manager.

END OF SP-3

**SPECIAL PROVISION NO. 4
STAGING AND PHASING PROVISIONS FOR CONTRACTOR OPERATIONS**

The Contractor shall prepare a written plan for his staging and phasing procedures in conformance with the Contract Drawings for all work. It shall be understood that the outline requirements presented are the minimum requirements. The Contractor is expected to provide added detailing as appropriate to fully inform the Project Manager of his/her intended method of operations and his/her schedules for proposed work.

The Engineer reserves the right to make changes to this plan to facilitate changes to the airport operations, which are in the best interest of the airport.

All costs associated with preparing the storage and staging area site shall be borne by the Contractor. This includes, but is not limited to, clearing and grading of the site, desired stabilization of the work yard surface, construction of any temporary utilities, access roads, all security fencing, etc.

END OF SP-4

**SPECIAL PROVISION NO. 5
VISIBLE WARNING MARKERS FOR TAXIWAYS
AND AIRCRAFT OPERATIONS AREAS**

The Contractor shall furnish and maintain visible warning markers whenever any aircraft operations area (AOA) is closed to air traffic.

The Contractor shall place or remove the markers, at such times as the Engineer may direct, to allow the maximum use of the aircraft operations area by air traffic.

Contractor is responsible for maintaining markers in good condition at all times. Contractor shall repair and/or repaint markers as necessary or as directed by the Engineer.

Closed taxiways may be marked by appropriately placed barricades of the type shown on the contract drawings and as directed by the Engineer. Barricade lighting shall be red and shall be capable of being powered by battery or by connection to the runway, apron or taxiway edge light circuit.

Cost of markers and barricades shall be incidental to construction costs for the project. Contractor shall provide his method and plan for markings to the Project Manager, in writing, for approval prior to mobilizing.

END OF SP-5

**SPECIAL PROVISION NO. 6
TIME OF COMPLETION**

A. General

This project consists of several project elements, which are defined throughout the contract documents. The specific details pertaining to contract sequence and time are an important aspect of the project for planning of the various operational requirements of the airport. The Contractor shall be required to comply with the general intent of the phasing, scheduling and duration of the project as outlined in the contract documents or as otherwise approved by submittals allowed by the documents.

B. Construction Time

1. The construction plans and specifications set forth the time allocated to each of the elements of work required as part of this contract. The work shall be completed within the times established or as otherwise approved or liquidated damages in the amounts specified hereafter shall be assessed.
2. The Contractor must request and receive written approval from the Project Manager for acceptance of the work included in each of the phases or work prior to satisfying the requirements of being "complete."
3. The specified times for each of the project phases shall be outlined in these specifications or as otherwise agreed to in writing among the Owner, Project Manager and Contractor based upon the actual contract work awarded.

Substantial Completion contract time = **120 Calendar Days** (This is a calendar day contract);
Total contract time = **150 Calendar Days**

C. Construction Schedule

1. The Contractor shall prepare and submit a detailed schedule for his operations within the general limits and phasing restrictions included in the contract documents. This schedule shall be based upon the actual work ultimately awarded. This schedule shall be reviewed with the County, Project Manager and Contractor in order to establish the final approved schedule as it relates to this Special Provision.

END OF SP-6

SPECIAL PROVISION NO. 7
AIRPORT PROJECT PROCEDURES

A. Permits

Contractor shall be required to procure and pay for all construction permits if required, and arrange for all inspections and similar procedural items as required by the code enforcement authorities having jurisdiction.

B. Airport Operations

Airport operations shall be maintained throughout this Contract. The Contractor shall in no way curtail or handicap normal operational characteristics of the airport facility except as specifically indicated and specified in these Contract Documents.

C. Limits of Construction

Any surface graded or disturbed outside the construction limits as shown on the plans will be restored and sodded or seeded and mulched as directed by the Engineer at the Contractor's expense.

D. Construction Layout and Stakes

Contractor shall furnish all lines, grades and measurements necessary for the proper prosecution and control of the work and contracted for under these specifications. The Contractor will establish horizontal and vertical control points only. Contractor is thereafter responsible to maintain these control points for use by subsequent contractors.

E. Verification of Existing Conditions

Prior to bidding and commencing with construction, the Contractor shall familiarize himself as to the existing conditions. Should the Contractor discover any inaccuracies, errors or omissions between the actual existing conditions and the Contract Documents, he shall within seven (7) calendar days prior to Bid Opening, notify the Engineer in writing. Submission of Bid by the Contractor shall be held as an acceptance of the existing conditions by the Contractor.

F. Safety and Protection

1. Safety: Inasmuch as each work area will be accessible to and used by the public, the Owner and other companies doing business at the Airport during the construction period, it is the Contractor's responsibility to maintain each work area in a safe, hazard free condition at all times. Should the Owner find the area unsafe at any time, they will notify the Contractor, and the Contractor shall take whatever steps necessary to remedy the unsafe condition. Should the Contractor not be immediately available for corrective action, the Owner will remedy the problem and the Contractor shall reimburse the Owner for the expense of such correction.
2. Protection of Property: Fixed structures, equipment, paving, landscaping and vehicles (automobiles, trucks, etc.) shall be protected with drop cloths, shielding and other appropriate measures to ensure maximum protection of all property and vehicles.

G. Pre-Construction Conference

Before beginning work at the site, the Contractor shall attend a pre-construction conference and bring with him the superintendent employed for this project. In the event the Contractor is unable to attend, he shall send a letter of introduction with the superintendent in which he advises the superintendent's full name and states that he is assigned to the project and will be in full responsible charge. This conference will be called by the Engineer, who will arrange for the Owner's representative and other interested parties to be present. At this time, all parties will discuss the project under contract and prepare a program of procedure in keeping with requirements of the drawings and specifications. The superintendent will henceforth make every effort to expeditiously coordinate all phases of the work, including the required reporting procedure, to obtain the end result within the full purpose and intent of the drawings and specifications for the project.

H. Coordination and Progress Meetings

1. Weekly Coordination and Progress Meetings: The Contractor / Engineer will hold weekly general project coordination and progress meetings at regularly scheduled times convenient for all parties involved. These meetings are in addition to specific meetings held for other purposes, such as special project meetings and special pre-installation meetings. The Engineer will require representation at each meeting by every party currently involved in coordination or planning for the work of the entire project. Meetings will be conducted in a manner which will resolve coordination problems.
2. The Engineer will record results of the meeting and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

I. Administrative/Supervisory Personnel

The Contractor shall provide a full-time Project Management Team consisting of a Contractor's Engineer, Project Superintendent and other supervisory personnel for the duration of the Project. The names and qualifications of this team for this work shall be submitted to the Owner as part of the Bidder Qualification Form. They shall have a minimum of five (5) years of experience on suitable projects of equal difficulty. Either the Contractor's Engineer or the Project Superintendent shall be at the construction site at all periods when work is in progress. This person shall have full authority to act in the Contractor's behalf. It is agreed and understood that, if requested in writing by the Owner, the Contractor shall replace any member of the team with another meeting the required qualifications within three (3) days of the receipt of the request.

J. Special Reports

1. Reporting Unusual Events: When an event of an unusual and significant nature occurs at the site, the Contractor shall prepare and submit a special report to the Engineer. List chain of events, persons participating, response by the Contractor's personnel, an evaluation of the results or effects and similar pertinent information. Advise the Owner and Engineer as soon as possible when such events are known.
2. Submit special reports directly to the Owner within one day of occurrence. Submit a copy of the report to the Engineer and other entities that are affected by the occurrence within one day of the occurrence.

K. Schedule of Work

1. Prepare and submit, in triplicate, for the Engineer's information, progress schedules for the work.
2. Progress schedules shall relate to the entire project to the extent required by the Contract Documents and shall provide for expeditious and practicable execution of the work.
3. Progress schedules shall be updated monthly.
4. Percent complete shall be based on actual construction in place or dollar volume of the work. If dollar volume of the work reflects the greater percent complete, the maximum percent complete shall in no case exceed 5 percent of the value of the in-place construction.

L. Progress Schedule

1. Preliminary Schedule: Within 15 days after date of Notice of Award and Acceptance or at the Pre-Construction Conference, whichever is earlier, the Contractor shall submit his preliminary network phasing diagram (Preliminary Schedule) indicating a comprehensive overview of the Project including an activity line for each of the work segments to be performed at the site.
 - a. Arrange the schedule to indicate required sequencing of work and to show time allowances for submittals, inspections, and similar time margins.
 - b. The submitted schedule will be reviewed by the Engineer and Owner for conformance to Critical Dates and overall project completion time criteria. Lack of this information will be cause for rejection of the schedule.
 - c. Following initial submittal of the schedule to and response by the Engineer, print and distribute the Progress Schedule to entities with a need-to-know responsibility, including three (3) copies to the Engineer. Revise at intervals matching payment requests, and redistribute and repost. Provide the copies required with payment requests.

M. Maintenance of Schedule

The Contractor's Progress Schedule must be updated on a monthly basis, and a copy thereof submitted with each of the Contractor's Applications for Payment. The updated Progress Schedule shall not only indicate revisions to the Schedule for upcoming work but show "as-built" schedule progress data. The Engineer will not recommend for payment by the Owner an Application for Payment without the Contractor's submission of a Monthly Schedule Update.

1. If the Contractor's Monthly Schedule Update reflects, or the Engineer determines, that the Contractor is at least ten percent (10%) behind the original Progress Schedule or fourteen (14) or more calendar days behind the original Progress Schedule for:

- a. the work as a whole;
 - b. a major Contract item;
 - c. an item of work which is on the critical path; or
 - d. an item of work not on the original critical path that, because of the delay or anticipated delay became a critical path item; then the Contractor must submit with the Monthly Schedule Update his proposed plan for bringing the work back on schedule and completing the Work within the Contract time.
2. The Progress Schedule shall be coordinated by the Owner's Project Administrator with the overall schedule for the Airport Projects. The Contractor is required to revise the Progress Schedule promptly in accordance with the conditions of the work, subject to approval by the Owner's Project Coordinator and the Engineer.
3. The Contractor shall comply fully with all time and other requirements of the Contract Documents. Recommendation of an Application of Payment by the Engineer and payment thereon by the Owner, without the submission of a Monthly Schedule Update, shall not constitute a waiver of the requirements of such updates, nor shall it relieve the Contractor from the obligation to complete the Work within the Contract Time.
4. Should a review of work indicate a critical path (milestone) item has fallen behind the approved schedule, at the option of the Engineer, funds equal to the established liquidated damages for the number of calendar days behind schedule will be withheld until that critical path item is brought back on schedule.

N. Changes in the Schedule

1. Minor Changes: Each week, prior to the weekly coordination meeting during the time of the contract, the Contractor shall notify the Engineer and Engineer of any minor changes that are anticipated in the schedule for the following week.
2. Major Changes: If for any reason a major change in the approved schedule is anticipated, the Contractor shall make the necessary changes to the schedule and resubmit the revised schedule for approval.

Copies of the approved schedule shall be posted in the Contractor's field office with completed work identified in colored pencil.

O. Maintenance of Traffic

1. The Contractor shall not obstruct nor create a hazard to any traffic during the prosecution of the work and shall be responsible for repair of all damage to existing pavement or facilities caused by his operations.
2. Beginning date of Contractor's Responsibility: The Contractor's responsibility for maintenance of traffic shall begin on the day he starts the work and continue until Final Completion and Acceptance of the Project.

3. Sections Not Requiring Traffic Maintenance: The Contractor will not be required to maintain traffic over those portions of the Project where no work is to be accomplished or where construction operations will not affect aircraft operations. The Contractor, however, shall not obstruct nor create a hazard to any traffic during the prosecution of the work and shall be responsible for repair of any damage to existing pavement or facilities caused by his operations.
4. Traffic During Construction: All construction vehicles are required to use existing traffic routes. Normal traffic lanes are not to be used as staging areas for arriving delivery vehicles. The Contractor's employees shall utilize the designated Contractor employee parking area.
5. Contractor Signing: The Contractor may furnish and install construction traffic directional signs along the existing traffic route. The signs shall depict Contractor's logo or name, directional arrows and "deliveries". Signs shall be of sufficient size to have 6" high message and shall be located at each decision point. All signs and their locations shall be approved by the Engineer. NO OTHER SIGNS ARE PERMITTED.
6. Material Deliveries: The Contractor shall make his own material and equipment deliveries. No deliveries shall be made by vendors or suppliers without escort by a representative of the Contractor.
7. Notification: On days when construction traffic is expected to be extra heavy or when oversized pieces of equipment are to be delivered, give minimum forty-eight (48) hours notice to the Engineer.
8. All Contractor material orders for the work site shall be delivered to the areas designated as the Contractor's receiving area. All deliveries shall be made only during the Contractor's working hours.
9. Interference Request:
 - a. The Contractor shall be responsible for notifying the Owner in writing and securing approval for any and all interruptions or interference with traffic (pedestrian, automobile or other necessary function of the Airport).
 - b. The request shall include a traffic control plan indicating barricades, lighting and flagger where required.
 - c. Such notification shall be made as soon as possible but in no case less than 48 hours prior to interference.
 - d. It is suggested that the Contractor utilize a standard form addressed to the Owner with a blank space for a description of the interference, the exact area affected, the exact times and dates the interference will take place and blanks for the Owner's approval. The forms shall be submitted in duplicate. No interference will be

allowed until the Contractor has received back a copy of the approved interference request form.

10. Personnel Traffic:

- a. General: All construction personnel shall be restricted to construction areas. They shall wear shirts with sleeves and long pants at all times.
- b. Use of Public Areas: The Contractor's workmen shall not utilize public areas for taking their "work breaks" or "lunch breaks." Areas for this purpose can be designated by the Owner upon request. No Public Toilets shall be used by any workmen at any time.

P. Daily Clean-Up and Trash Removal

1. Debris from this work shall be promptly removed from the site at least daily. It shall not be allowed to become a hazard to the safety of the public.
2. The Contractor shall be responsible for clean-up and trash removal. Accumulation of trash and debris will not be allowed and the Engineer may at any time direct the Contractor to immediately remove his trash and debris from the site of the work when in the opinion of the Owner such trash constitutes a nuisance or in any way hinders the work or the Airports operations. If the Contractor should fail to remove his trash and debris from the site of the work in a timely manner, the Owner may have this work performed and deduct the cost of such from Contractor's payment.

Q. Cleaning and Protection

1. General: During handling and installation of work at the project site, clean and protect work in progress and adjoining work on the basis of continuous daily maintenance. Apply protective covering on installed work to ensure freedom from damage or deterioration.
2. Clean and perform maintenance on installed work as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
3. Limiting Exposures of Work: To the extent possible through appropriate control and protection methods, supervise performance of the work in such a manner and by such means which will ensure that none of the work, whether completed or in progress, will be subjected to harmful, dangerous, damaging or otherwise deleterious exposure during the construction period. Such exposures include, where applicable, but not by way of limitation the following:
 - a. Excessive static or dynamic loading
 - b. Excessive internal or external pressures
 - c. Solvents
 - d. Chemicals
 - e. Light
 - f. Puncture
 - g. Abrasion
 - h. Heavy Traffic
 - i. Soiling
 - j. Combustion
 - k. High speed operation, improper lubrication, unusual wear
 - l. Improper shipping or handling
 - m. Theft
 - n. Vandalism
4. Protection at Openings: The Contractor shall provide protection at all openings in structures and finishes to maintain the building weather and dust tight. All protection shall be of solid

material and substantial so that it will not be disturbed by wind and weather normal to the area and season, and also tight fitting to prevent noise infiltration.

5. Protection of Improvements:

- a. Damage to Existing Facilities: Existing surfaces and materials of the Owner's property not requiring work by the Contract Documents that is damaged by the Contractor's operations shall be immediately repaired. Repaired surfaces and materials shall match existing adjacent undamaged surfaces and materials. Repair work shall be coordinated with the Engineer and Owner with regard to time and method.
- b. Accidental Demolition: All structures or parts thereof that may become damaged due to accident or Contractor's error shall be restored to their original condition at no cost to the Owner. Materials and equipment being used in the repair or replacement resulting from damage shall be new and shall perform at the manufacturer's published capacities. If the existing equipment or materials cannot be identified, or if unavailable, the selection of the replacement will be subject to approval by the Engineer in writing.

6. Overhead Protection

- a. No cranes or other construction equipment shall cross over non-construction personnel, their travel ways or ride systems.
- b. The plan of operation of cranes and other hoisting equipment shall be established in writing by the Contractor. This plan of operation shall be subject to approval by the Engineer.

R. Conservation and Salvage

1. General: It is a requirement for supervision and administration of the Work that construction operations be carried out with the maximum possible consideration given to conservation of energy, water and materials. In addition, maximum consideration shall be given to salvaging materials and equipment involved in performance of the work but not incorporated therein. Refer to other sections for required disposition of salvaged materials which are the Owner's property.

S. Testing Cost Borne by Owner

Unless otherwise specified herein, all initial construction "Quality Assurance" testing costs shall be borne by the Owner. An independent testing laboratory selected and responsible to the Engineer shall perform all "Quality Assurance" testing required by the technical specifications or as directed by the Owner and/or the Engineer.

T. Testing Cost Borne by Contractor

The Contractor shall bear the cost of all "Quality Control" testing to include the following conditions:

1. If substitute materials or equipment are proposed by the Contractor, he shall pay the cost of all tests which may be necessary to satisfy the Engineer that specification requirements are satisfied. The Contractor shall pay for the Engineer's time spent in review and administrating such proposed substitution.
2. If materials or workmanship are used which fail to meet specification requirements, the Contractor shall pay the cost of all re-testing, including laboratory costs, deemed necessary by the Engineer to determine the safety or suitability of the material or element. The Contractor shall make arrangements with the Owner's Testing Laboratory to have all re-testing costs billed directly to the Contractor, or deducted from amounts due to the Contractor unless otherwise directed by the Engineer in writing. The Contractor shall take prompt action to insure that all re-testing costs are paid in a reasonable time period.
3. The Contractor shall pay for all testing costs including, but not limited to, power, fuel, and equipment cost, which may be required for complete testing of all equipment and systems for proper operation.
4. The Contractor shall pay for all testing required for materials, job mix designs, equipment, structures and related items included in all shop drawings and other submittals as required by the Technical Specifications to be submitted and approved by the Engineer prior to construction.
5. The Contractor shall bear all costs necessary for the Quality Control testing as stipulated in General Provisions Section 100.

U. Project Documentation

1. Project Drawings: The successful Contractor will be furnished, at no charge, four (4) copies of drawings and specifications. Additional copies may be purchased at actual cost of reproduction.

A field set of drawings and specifications shall remain on the job site at all times and shall be available at all times to the Engineer. The field set shall be continuously updated to reflect the "as-built" condition of all work included in this Contract.

The Contractor shall immediately include plainly and conspicuously on the field set of drawings, and at appropriate paragraphs in the specifications, all changes or corrections made by addenda and change orders as they are issued.

Approved copies of all shop drawings and other submittals are to be kept on the job site at all times and shall be available at all times to the Engineer.

Changes and deviations from the existing conditions shall be submitted in writing for approval prior to installation. In no case shall any unspecified equipment or materials be installed without prior approval by the Engineer.

2. Record Documents:

- a. Definition: Record copies are defined to include those documents or copies relating directly to performance of the work, which the Contractor is required to prepare or maintain for the Owner's records, recording the work as actually performed. In particular, record copies show changes in the work in relation to the way in which work was shown and specified by the original contract documents and show additional information of value to the Owner's records but not indicated by the original Contract Documents.

Record copies include newly-prepared drawings (if any are specified), marked-up copies of contract drawings, shop drawings, specifications, addenda and change orders, marked-up product data submittals, record samples, field records for variable and concealed conditions such as excavations and foundations, and miscellaneous record information on work which is otherwise recorded only schematically or not at all.

- b. Record Drawings: The Contractor shall maintain a set of Record Drawings at the job site. These shall be kept legible and current and shall be available for inspection at all times by the Engineer. Show all changes or work added on these Record Drawings in a contrasting color.

- (1) Mark-up Procedure: During progress of the work, maintain a white-print set (blue-line or black-line) of contract drawings and shop drawings, with mark-up of actual installations which vary substantially from the work as originally shown. Mark whatever drawing is most capable of showing actual physical condition, fully and accurately. Where shop drawings are marked up, mark cross-reference on contract drawings at corresponding location. Mark with erasable colored pencil, using separate colors where feasible to distinguish between changes for different categories of work at the same general location. Mark-up important additional information, which was either shown schematically or omitted from original drawings. Give particular attention to information on work concealed, which would be difficult to identify or measure and record at a later date. Note alternate numbers, change order numbers and similar identification. Require each person preparing the mark-up to initial and date the mark-up and indicate the name of the firm. Label each sheet "PROJECT RECORD" in 1-1/2 inch high letters.

In showing changes in the work, use the same legends as used on the original drawings. Indicate exact locations by dimensions and exact elevations by job datum. Give dimensions from a permanent point.

- (2) Preparation of Transparencies: In preparation for certification of substantial completion on the last major portion of the work, review the completed mark-up of record drawings and shop drawings with the Engineer. The Engineer will then proceed with preparation of a full set of corrected transparencies for contract drawings. The Engineer will date each updated drawing and label each sheet "PROJECT RECORD" in 1-1/2 inch high letters. Printing as required herein is the responsibility of the Engineer.
 - (3) Copies, Distribution: Upon completion of transparency record drawings, the Engineer shall prepare three blueline or blackline prints of each drawing, regardless of whether changes and additional information were recorded thereon. The Engineer shall then organize each of the three copies into manageable sets, bind with durable paper cover sheets, and print suitable titles and dates. The mark-up set of prints maintained during the construction period shall be bound in the same manner. The Engineer will retain one copy set. At the completion of the project, the Engineer shall submit one set of mylars and one set of prints with changes noted thereon to the Owner.
 - c. Record Drawings shall contain the names, addresses and phone numbers of the General Contractor and the major subcontractors.
 - d. The Engineer shall be the sole judge of the acceptability of the Record Drawings. Receipt and acceptance of the As-Built drawings is a pre-requisite for Final Payment.
3. Record Specifications
 - a. During the progress of the work, maintain one copy of specifications, including addenda, change orders and similar modifications issued in printed form during construction. Mark-up variations (of substance) in actual work in comparison with text of specifications and modifications as issued. Give particular attention to substitutions, selection of options, and similar information on work where it is concealed or cannot otherwise be readily discerned at a later date by direct observation. Note related record drawing information and product data where applicable. Upon completion of the mark-up, submit to the Engineer for the Owner's records. Label the front cover "PROJECT RECORD" in 1-1/2 inch high letters.
 - b. Where the manual is printed on one side of the page only, mark variations on the blank left-hand pages of the Project Manual, facing printed right-hand pages containing original text affected by variation.
4. Record Product Data

During progress of the work, maintain one copy of each product data submittal and mark up significant variations in the actual work in comparison with submitted information.

Include both variations in product as delivered to site and variations from the manufacturer's instructions and recommendations for installation. Give particular attention to concealed products and portions of the work which cannot otherwise be readily discerned at a later date by direct observation. Note related change orders and mark-ups of record drawings and specifications. Upon completion of the mark-up, submit a complete set of product data submittals to the Engineer for the Owner's records. Label each data submittal "PROJECT RECORD" in 1-1/2 inch high letters.

5. Record Sample Submittal

Immediately prior to the date(s) of substantial completion, the Engineer and Owner's personnel will meet with the Contractor on site and will determine if any of the submitted samples maintained by the Contractor during progress of the work are to be transmitted to the Owner for record purposes. Comply with the Engineer's instructions for packaging, identification marking and delivery to the Owner's sample storage space. Dispose of other samples in the manner specified for disposal of surplus and waste materials, unless otherwise indicated by the Engineer.

6. Miscellaneous Record Submittals

Refer to other sections of these specifications for requirements of miscellaneous record-keeping and submittals in connection with actual performance of the work. Immediately prior to the date(s) of substantial completion, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for continued use and reference. Submit to the Engineer for the Owner's records. Categories of requirements resulting in miscellaneous work records are recognized to include, but are not limited to, the following:

- a. Required field records on excavations, foundations, underground construction, wells and similar work.
- b. Accurate survey showing locations and elevations of underground lines, including invert elevations of drainage piping, valves, tanks and manholes.
- c. Surveys by a Registered Land Surveyor establishing lines and levels of finished construction.
- d. Soil treatment certification.
- e. Inspection and Test Reports: Where not processed as shop drawings or product data.
- f. Asphalt or PCC concrete pavement or structural mix design record.
- g. Concrete block certification.

7. Project Closeout

Closeout is hereby defined to include general requirements near end of Contract Time, in preparation for final acceptance, final payment, normal termination of contract, occupancy by the Owner and similar actions evidencing completion of the work. Specific requirements

for individual units of work are specified in other sections. Time of closeout is directly related to substantial completion, and therefore may be a single time period for the entire work or a series of time periods for individual parts of the work which have been certified as substantially complete at different dates. The time variation, if any, shall be applicable to other provisions of this section.

8. Prerequisites to Substantial Completion

- a. Prior to requesting the Engineer's inspection for certification of substantial completion, for either the entire work or portions thereof, complete the following and list known exceptions in request:
 - (1) In the progress payment request coincident with or first following the date claimed, show 100% completion for the portion of work claimed as "substantially completed", or list incomplete items, value of incompleteness, and reasons for being incomplete.
 - (2) Include supporting documentation for completion as indicated in the Contract Documents.
 - (3) Submit statement showing accounting of changes to the Contract Sum.
 - (4) Advise the Owner of pending insurance change-over requirements.
 - (5) Obtain and submit releases enabling the Owner's full and unrestricted use of the work and access to services and utilities, including, where required, occupancy permits, operating certificates, and similar releases.
 - (6) Deliver tools, spare parts, extra stocks of materials, and similar physical items to the Owner.
 - (7) Make the final change-over of locks and transmit keys to the Owner and advise Owner's personnel of change-over in security provisions.
 - (8) Complete start-up testing of systems and instructions of Owner's operating-maintenance personnel. Discontinue or change over and remove from the project site, temporary facilities and services, along with construction tools and facilities, mock-ups and similar elements.
- b. Inspection Procedures: Upon receipt of the Contractor's request, the Engineer will proceed with inspection or advise the Contractor of prerequisites not fulfilled. Following initial inspection, the Engineer will prepare a Certificate of Substantial Completion or advise the Contractor of the work which must be performed prior to issuance of the Certificate and will perform a repeat inspection when requested and assured by the Contractor that the work has been substantially completed. Results of the completed inspection will form the initial "punchlist" for final acceptance.

9. Prerequisites to Final Acceptance

- a. Prior to requesting the Engineer's final inspection for certification of final acceptance as required by the General Provisions, the Contractor shall complete the following and list known exceptions in the request:
 - (1) Submit a certified copy of the Engineer's final punchlist of itemized work to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance, endorsed and dated by the Engineer.
 - (2) Submit final meter readings for utilities, measured record of stored fuel, and similar data as of time of substantial completion or when the Owner took possession of and responsibility for corresponding elements of the work.
 - (3) Complete final cleaning up requirements, including touch-up of marred surfaces.
 - (4) Touch up and otherwise repair and restore marred exposed finishes.
- b. Re-inspection Procedures: Following Substantial Completion, the Contractor shall correct or remedy all Punchlist items to the satisfaction of the Engineer and Owner within a two (2) week period after the Date of Substantial Completion. If subsequent inspections are necessary after the two week period in order to eliminate all deficiencies, the cost of all subsequent inspections with respect to the Owner and Engineer's time shall be paid by the Contractor. When ready, the Contractor shall request in writing a final inspection of the work. Upon completion of re-inspection, the Engineer will prepare a Certificate of Final Acceptance or advise the Contractor of work not completed or obligations not fulfilled as required for Final Acceptance. If necessary, the procedures will be repeated.

10. Prerequisites to Final Payment

- a. Final Payment: Final Payment will be made after final acceptance of the project by the Engineer and Owner upon request by the Contractor on condition that the Contractor:
 - (1) Furnish properly executed complete releases of lien from all materialmen and subcontractors who have furnished materials or labor for the Work and submit supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.
 - (2) Furnish the Contractor's Affidavit of Release of Liens (2 copies) that all materialmen and subcontractors have been paid in full. In the event they have not been paid in full, the Owner shall retain a sufficient sum to pay

them in full and at his option may make direct payment as provided in Chapter 84, Florida Statutes, as amended, to obtain complete releases of lien.

- (3) Furnish Contractor's Affidavit of Debts and Claims (2 copies).
- (4) Furnish required sets of record drawings and maintenance and operating instructions of new mechanical equipment.
- (5) Furnish guarantees signed by subcontractors, material suppliers, and countersigned by the Contractor for operating equipment.
- (6) Submit specific warranties, workmanship-maintenance bonds, maintenance agreements, final certifications and similar documents.
- (7) Furnish a signed guarantee, in form acceptable to the Engineer and Owner agreeing to repair or replace as decided by the Engineer, all work and materials that prove defective within one (1) year (or more) from the date of final acceptance, including restoration of all other work damaged in making such repairs or replacements.
- (8) Furnish Consent of Surety to final payment.
- (9) Submit updated final statement, accounting for final changes to Contract Sum.
- (10) Submit evidence of final, continuing insurance coverage complying with insurance requirements.
- (11) Certify that all Social Security, Unemployment and all other taxes (City, State, Federal Government) have been paid.
- (12) Provide receipt, as applicable, of affidavits certifying all labor standards of local, State, or Federal requirements have been complied with by the Contractor.
- (13) Submit actual DBE participation percentages.

11. Record Document Submittals

Specific requirements for record documents are shown in the section, PROJECT RECORD DOCUMENTS. Other requirements are indicated in the General Provisions. General submittal requirements are indicated in "Submittals" sections. Do not use record documents for construction purposes; protect from deterioration and loss in a secure, fire-resistive location; provide access to record documents for the Engineer's reference during normal working hours.

- a. Record Drawings: The Engineer shall organize record drawing sheets into manageable sets, bind with durable paper cover sheets and print suitable titles, dates and other identification on the cover of each set.
 - b. Record Specifications: Upon completion of mark-ups, submit to the Engineer for the Owner's records.
 - c. Record Product Data: Upon completion of mark-ups, submit complete sets to the Engineer for the Owner's records.
 - d. Record Sample Submittal: Comply with the Engineer's instructions for packaging, identification, marking and delivery to the Owner's sample storage space.
 - e. Miscellaneous Record Submittals: Complete miscellaneous records and place in good order, properly identified and bound or filed, ready for continued use and reference. Submit to the Engineer for the Owner's records.
 - f. Maintenance Manuals: Complete, place in order, properly identify and submit to the Engineer for the Owner's records.
12. Closeout Procedures
- General Operating and Maintenance Instructions: Arrange for each installer of work requiring continuing maintenance or operation, to meet with the Owner's personnel at the project site to provide basic instructions needed for proper operation and maintenance of the entire work. Include instructions by manufacturer's representatives where installers are not expert in the required procedures. Review maintenance manuals, record documentation, tools, spare parts and materials, lubricants, fuel, identification system, control sequences, hazards, cleaning and similar procedures and facilities. For operational equipment, demonstrate start-up, shut-down, emergency operations, noise and vibration adjustments, safety, economy, efficiency adjustments, and similar operations. Review maintenance and operations in relation with applicable warranties, agreements to maintain bonds, and similar continuing commitments.

V. Final Cleaning

1. Provide final cleaning of the work, at the time indicated, consisting of cleaning each surface or unit of work to normal "clean" condition in a manner acceptable to the Engineer and Owner.
2. Removal of Protection: Remove temporary protection devices and facilities which were installed during the course of the work to protect previous completed work during the remainder of the construction period.
3. Compliances: Comply with safety standards and governing regulations for cleaning operations. Do not burn waste materials at site, bury debris or excess materials on the Owner's property. Do not discharge volatile or other harmful or dangerous materials into drainage systems. Remove waste materials from site and dispose of in a lawful manner.

Where extra materials of value remaining after the completion of the associated work have become the Owner's property, dispose of these as directed by the Owner.

END OF SP-7

SPECIAL PROVISION NO. 8
VEHICLE OPERATION ON THE AOA

A. Authorization of Vehicles/Equipment

All vehicles that enter the Air Operations Area of Northwest Florida Beaches International Airport shall comply with the following:

1. All vehicles shall be limited to designated access routes and/or construction areas unless specifically authorized by the Owner.
3. All construction vehicles/mechanized equipment authorized within the construction area, the Movement Area, or related safety areas shall be marked with a 3' x 3' orange and white checkered flag with each box being 1' square, located on the upper most portion of the vehicle/motorized equipment, or be escorted by a vehicle so equipped.
4. All vehicles authorized to operate on the Movement Area or associated object free areas are required to announce their intentions on the Unicom frequency before entering those areas and to monitor the frequency.
5. During nighttime hours, all equipment operating or parked on the Airport exceeding 20 feet in height shall be lit with a red obstruction light in accordance with Advisory Circular 70/7460-1. This light is to be located on the uppermost portion of the equipment.

B: Vehicle/Equipment Restrictions

1. Bicycles, motorcycles and two-wheel scooters are prohibited on the AOA.
2. All vehicles/equipment must be appropriately secured such that neither aircraft nor wind blast will result in their movement.

C. Right-of-Way

Vehicles/equipment shall be operated in a manner that does not interfere with aircraft operations. All vehicles/equipment shall yield right of way to all aircraft and emergency vehicles.

D. Vehicle/Equipment Operating Rules

The Contractor shall be responsible for ensuring compliance with the following rules by all individuals authorized to drive outside the construction area:

1. Vehicle/mechanized equipment operators shall obey all traffic signs.
2. The established speed limit within the AOA -10 m.p.h.
3. At no time shall the operator of a vehicle/mechanized equipment drive under any portion of an aircraft.
4. A vehicle/equipment shall not stop or be parked:

- a. so as to block a driveway, AOA access gate, fire lane, or aircraft;
 - b. in areas other than those prearranged and approved by the Owner;
 - c. within 15 feet of a fire hydrant, unless authorized by the Owner.
5. Vehicles/mechanized equipment shall not be operated in a careless or negligent manner within the AOA.
 6. Vehicles/equipment shall not be operated by individuals under the influence of any substance which impairs the ability to do so in a safe manner.

E. Night or Low Visibility Operation

1. Vehicle/mechanized equipment operators are not permitted to move about the airport, outside the designated construction area at night unless the vehicle has operating headlights, taillights, brake lights or under the escort of a properly lighted vehicle. Headlights shall be set on dim when moving about the airport at night.
2. Vehicle/mechanized equipment authorized on the Movement Area and/or associated safety areas shall be equipped with an electrically powered, amber color, 360-degree omni-direction, rotating light, mounted on the vehicle such that it is conspicuous from any direction.

F. Runway/Taxiway Access

At no time shall a vehicle enter the Movement Area and/or associated safety areas unless it is authorized by the Owner.

G. Vehicle/Equipment Accidents

All accidents which involve bodily injury or property damage must be reported immediately to the Owner at 850-763-6751. Emergency 911 should be called where applicable.

H. Removal of Vehicle/Equipment

The Owner may remove or impound, at the owner's expense, any vehicle/equipment which is disabled, abandoned, improperly parked, or represents an operational hazard.

I. Insurance

All vehicles authorized driving privileges on the Airport are required to maintain vehicle liability coverage as established by the contract.

END OF SP-8

SPECIAL PROVISION NO. 9
FEDERAL LABOR AND EEO PROVISIONS
LABOR PROVISIONS FOR CONTRACTS

1.1 Minimum Wages:

1.1.1 All laborers and mechanics employed or working upon the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project), 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 regulations issued 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 equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the Contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics, are considered wages paid to such laborers and mechanics, subject to the provisions of Paragraph A.(4) 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 Paragraph 1.1.4 of this Special Provision. 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 Contractor'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 Paragraph 1.1.2 of this Special Provision) 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 be easily seen by the workers. (29CFR5.5(a)(1)(i))

1.1.2 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:

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

1.1.3 If the Contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and

wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, D.C. 30320. 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.

- 1.1.4 In the event the Contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

The wage rate (including fringe benefits where appropriate) determined pursuant to Paragraphs 1.1.3 and 1.1.4 of this Special Provision, 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. (29CFR5.5(a)(1)(ii))

- 1.1.5 Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the Contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof. (29CFR5.5(a)(1)(iii))
- 1.1.6 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. (29CFR5.5(a)(1)(iv))

1.2 Withholding:

- 1.2.1 The Federal Aviation Administration (FAA) shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the Contractor under this contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contractor subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the Contractor or any Subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentices, trainees and helpers, employed by the Contractor or any Subcontractor the full amount of wages required by the Contract, or in the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper employed or working on the site of the Work (or under the United States Housing Act of 1937 or under the Housing Act of 1949) on the construction or development of the

Project), all or part of the wages required by the Contract, the FAA 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. (29CFR5.5(a)(2))

1.3 Payroll and Basic Records:

1.3.1 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 (or under the United States Housing Act of 1937 or under the Housing Act of 1949, in the construction or development of the project). Such records shall contain the name, address and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in Section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section 1(b)(2)(B) of the Davis-Bacon Act, the Contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs. (29CFR5.5(a)(3)(i))

1.3.2 The Contractor shall submit weekly for each week in which any Contract Work is performed a copy of all payrolls to the FAA if the FAA is a party to the Contract. The Contractor will submit the payrolls to the applicant, sponsor, or owner, as the case may be, for transmission to the FAA. The payrolls submitted shall set out accurately and completely all of the information required to be contract, but if the agency is not such a party, then maintained under Paragraph 5.5(a)(3)(i) of Regulations 29 CFR Part 5. 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.

Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or its agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

- (a) That the payroll for the payroll period contains the information required to be maintained under Paragraph 5.5(a)(3)(i) of the Regulations, 29 CFR Part 5 and that such information is correct and complete.
- (b) That each laborer or 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.

- (c) 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.

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 C.(2)(b) of this section.

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. (29CFR5.5(a)(3)(ii))

- 1.3.3 The contractor or subcontractor shall make the records required under Paragraph 1.3.1 of this section available for inspection, copying, or transcription by authorized representatives of the FAA 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. (29CFR5.5(a)(3)(iii))

1.4 Apprentices and Trainees:

- 1.4.1 Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State Apprenticeship Agency recognized by the Bureau, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program

for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringe benefits 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 acceptable program is approved. (29CFR5.5(a)(4)(i))

1.4.2 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 in full benefits in accordance with the provisions of the trainee program. If the trainee program does not mention 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 employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved. (29CFR5.5(a)(4)(ii))

1.4.3 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. (29CFR5.5(a)(4)(iii))

1.5 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. (29CFR5.5(a)(5))

1.6 Subcontractors: The contractor or subcontractor shall insert in any subcontracts the clauses contained in Paragraphs 1.1 through 1.10 of this Special Provision [29CFR5.5(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 5.5. (29CFR5.5(a)(6))

1.7 Contract Termination: Debarment: A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12. (29CFR5.5(a)(7))

1.8 Compliance with Davis-Bacon and Related Act Requirements: All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR Parts 1,3 and 5 are herein incorporated by reference in this contract. (29CFR5.5(a)(8))

1.9 Disputes Concerning Labor Standards: Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR Parts 5, 6 and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U. S. Department of Labor, or the employees or their representatives. (29CFR5.5(a)(9))

1.10 Certification of Eligibility:

1.10.1 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).

1.10.2 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 CFR 5.12(a)(1).

1.10.3 The penalty for making false statements is prescribed in the U. S. Criminal Code, 18 U.S.C. 1001. (29CFR5.5(a)(10))

1.11 Contract Work Hours and Safety Standards Act: (29CFR5.5(b))

1.11.1 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 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.

1.11.2 Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in Paragraph 1.11.1 of this Special Provision, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in subparagraph (1) of this paragraph, 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 1.11.1 of this Special Provision.

1.11.3 Withholding for unpaid wages and liquidated damages. The Federal Aviation Administration shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clauses set forth in Paragraph 1.11.2 of this Special Provision.

1.11.4 Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in Paragraphs 1.11.1 through 1.11.4 of this Special Provision and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in Paragraphs 1.11.1 through 1.11.4 of this Special Provision.

VETERANS PREFERENCE

2.1 ~~In the employment of labor (except in executive, administrative and supervisory positions), the Contractor shall give preference to veterans of the Vietnam era and disabled veterans as defined in Section 515(c)(1) and (2) of the Airport and Airway Improvement Act of 1982.~~

Veteran's Preference shall be included in all contracts for work on any project funded under this grant agreement which involves labor. Such provisions are necessary to insure that, in the employment of labor (except in executive, administrative, and supervisory positions), preference shall be given to Vietnam era veterans, Persian Gulf veterans, Afghanistan-Iraq war veterans, disabled veterans, and small business concerns owned and controlled by disabled veterans as defined in Title 49 United States Code, Section 47112. However, this preference shall apply only where the individuals are available and qualified to perform the work to which the employment relates.

GENERAL WAGE DECISION

3.1 A copy of the current Davis-Bacon Wage Determination applicable to the Project is provided as follows:

Davis-Bacon Wage Rates (General Decision County Index 1/4/13)

General Decision Number: FL130206 01/04/2013 FL206

Superseded General Decision Number: FL20120206

State: Florida

Construction Type: Highway

County: Bay County in Florida.

HIGHWAY CONSTRUCTION PROJECTS

Modification Number Publication Date
0 01/04/2013

SUFL2009-202 08/05/2009

	Rates	Fringes
CARPENTER.....	\$ 13.03	1.05
CEMENT MASON/CONCRETE FINISHER...	\$ 10.06	0.00
ELECTRICIAN.....	\$ 17.12	0.00
FORM WORKER.....	\$ 12.29	0.00
HIGHWAY/PARKING LOT STRIPING: Operator (Striping Machine).....	\$ 11.97	2.23
HIGHWAY/PARKING LOT STRIPING: Painter.....	\$ 13.31	0.00
IRONWORKER, REINFORCING.....	\$ 14.50	1.37
IRONWORKER, STRUCTURAL.....	\$ 16.75	3.88
LABORER: Asphalt Shoveler.....	\$ 10.70	0.00
LABORER: Common or General.....	\$ 8.30	0.00
LABORER: Flagger.....	\$ 10.10	3.37
LABORER: Grade Checker.....	\$ 10.50	0.55
LABORER: Landscape and Irrigation.....	\$ 8.77	0.00
LABORER: Luteman.....	\$ 10.32	0.00
LABORER: Mason Tender - Cement/Concrete.....	\$ 12.00	1.80
LABORER: Pipelayer.....	\$ 12.13	2.59

LABORER: Power Tool Operator (Hand Held Drills/Saws, Jackhammer and Power Saws.....	\$ 11.23	1.96
OPERATOR: Asphalt Plant.....	\$ 12.20	0.00
OPERATOR: Asphalt Spreader.....	\$ 10.76	0.00
OPERATOR: Auger.....	\$ 19.40	0.44
OPERATOR: Backhoe Loader Combo.....	\$ 15.33	0.97
OPERATOR: Backhoe/Excavator.....	\$ 10.70	0.00
OPERATOR: Boom.....	\$ 16.61	0.00
OPERATOR: Bulldozer.....	\$ 14.18	2.56
OPERATOR: Crane.....	\$ 15.50	1.86
OPERATOR: Distributor.....	\$ 11.47	0.00
OPERATOR: Drill.....	\$ 13.00	1.59
OPERATOR: Grader/Blade.....	\$ 15.41	3.60
OPERATOR: Loader.....	\$ 9.66	0.00
OPERATOR: Mechanic.....	\$ 16.20	3.25
OPERATOR: Milling Machine.....	\$ 11.91	1.96
OPERATOR: Oiler.....	\$ 13.08	2.27
OPERATOR: Paver.....	\$ 9.78	0.00
OPERATOR: Piledriver.....	\$ 15.59	4.00
OPERATOR: Roller.....	\$ 8.82	0.00
OPERATOR: Scraper.....	\$ 10.70	1.60
OPERATOR: Screed.....	\$ 11.59	0.00
OPERATOR: Tractor.....	\$ 9.05	0.00
OPERATOR: Trencher.....	\$ 13.41	0.49

PAINTER: Spray and Steel.....\$ 16.62	0.00
TRUCK DRIVER: Distributor.....\$ 11.30	2.26
TRUCK DRIVER: Dump Truck.....\$ 8.66	0.00
TRUCK DRIVER: Lowboy Truck.....\$ 12.19	0.00
TRUCK DRIVER: Material Truck....\$ 12.76	9.80
TRUCK DRIVER: Tractor Haul Truck.....\$ 10.64	0.00
TRUCK DRIVER: Water Truck.....\$ 10.50	0.00
TRUCK DRIVER: 10 Yard Haul Away.....\$ 12.50	0.00

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is union or non-union.

Union Identifiers

An identifier enclosed in dotted lines beginning with characters other than "SU" denotes that the union classification and rate have found to be prevailing for that classification. Example: PLUM0198-005 07/01/2011. The first four letters , PLUM, indicate the international union and the four-digit number, 0198, that follows 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. The date, 07/01/2011, following these characters is the effective date of the most current negotiated rate/collective bargaining agreement which would be July 1, 2011 in the above example.

Union prevailing wage rates will be updated to reflect any changes in the collective bargaining agreements governing the rates.

0000/9999: weighted union wage rates will be published annually each January.

Non-Union Identifiers

Classifications listed under an "SU" identifier were derived from survey data by computing average rates and are not union rates; however, the data used in computing these rates may include both union and non-union data. Example: SULA2004-007 5/13/2010. SU indicates the rates are not union majority rates, LA indicates the State of Louisiana; 2004 is the year of the survey; and 007 is an internal number used in producing the wage determination. A 1993 or later date, 5/13/2010, indicates the classifications and rates under that identifier were issued as a General Wage Determination on that date.

Survey wage rates will remain in effect and will not change until a new survey is conducted.

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

EQUAL EMPLOYMENT REQUIREMENTS

4.1 Requirement for Certification of Nonsegregated Facilities:

4.1.1 Notice to Prospective Construction Contractors:

- (a) The Certification of Non-segregated Facilities contained in the Bid Documents must be submitted with the Bid for a construction contract exceeding Ten Thousand Dollars (\$10,000.00) which is not exempt from the provisions of the Equal Opportunity Clause.
- (b) Contractors receiving contract awards exceeding Ten Thousand Dollars (\$10,000.00) which are not exempt from the provisions of the forwarding of this notice to prospective subcontractors for supplies and construction contracts where the subcontracts exceed Ten Thousand Dollars (\$10,000.00) and are not exempt from the provisions of the Equal Opportunity Clause.

4.1.2 Notice to Prospective Subcontractors of Requirement for Certification of Non-segregated Facilities:

- (a) A Certification of Non-segregated Facilities must be submitted prior to the award of a subcontract exceeding Ten Thousand Dollars (\$10,000.00) which is not exempt from the provisions of the Equal Opportunity Clause.
- (b) The Certification of Non-segregated Facilities Form is located in the Bid Package of the Contract Documents.

4.2.1 Standard Federal Equal Employment Construction Contract Specifications (Executive Order 11246, as amended):

.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 Programs (OFCCP), U.S. Department of Labor, or any person to whom the Director delegates authority;
- (c) "Employer identification number" means the federal social security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941;
- (d) "Minorities" 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).

4.2.2 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 Ten Thousand Dollars (\$10,000.00) the provisions of these specifications and the notice which contains the applicable goals for minority and women participation and which is set forth in the solicitations from which this contract resulted.

4.2.3 If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the plan area (including goals and timetables) shall be in accordance with that plan for those trades which have unions participating in the plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each contractor or subcontractor participating in an approved plan is individually required to comply with its obligations under the EEO clause and to make a good faith effort to achieve each goal under the plan in each trade which it has employees. The overall good faith performance by other contractors or subcontractors toward a goal in an approved plan does not excuse any covered contractor's or subcontractor's failure to take good faith efforts to achieve the plan goals and timetables.

4.2.4 The Contractor shall implement the specific affirmative action standards provided in Paragraphs 4.2.7.1 through 4.2.7.16 of this Special Provision. 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 women 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 geographical areas where they do not have a federal or federally assisted construction contract shall apply the minority and women 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 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.

4.2.5 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, as amended, or the regulations promulgated pursuant thereto.

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

4.2.7 The Contractor shall take specific affirmative actions to ensure EEO. The evaluation of the Contractor's compliance with these specifications shall be based upon its efforts 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:

1. 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 on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minorities or women individuals working at such sites or in such facilities.
2. Establish and maintain a current list of minority and women recruitment sources, provide written notification to minority and women recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organization's responses.
3. Maintain a current file of the names, addresses and telephone numbers of each minority and women off-the-street applicant and minority or women referral from a union, a recruitment source, a 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.

4. 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 woman 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.
5. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly includes 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 Paragraph 4.2.7.2 of this Special Provision.
6. 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 women employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.
7. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with on-site supervisory personnel such as superintendents, general foremen, etc., prior to the initiation of construction work at any jobsite. 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.
8. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and women 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.
9. Direct its recruitment efforts, both oral and written, to minority, women and community organizations, to schools with minority and women students; and to minority and women recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one (1) 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.
10. 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 women youth, both on the site and in other areas of a contractor's work force.

11. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.
12. Conduct, at least annually, an inventory and evaluation, at least of all minority and women personnel, for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.
13. 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.
14. Ensure that all facilities and company activities are non-segregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.
15. Document and maintain a record of all solicitations of offers for subcontractors from minority and women construction contractors and suppliers, including circulation of solicitations to minority and women contractor associations and other business associations.
16. Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.

4.2.8 Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (Paragraphs 4.2.7 through 4.2.7.16 of this Special Provision). The efforts of a contractor association, joint contractor-union, contractor-community, or other similar groups of which the Contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under Paragraphs 4.2.7 through 4.2.7.16 of this Special Provision 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 work force 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--failure of such a group to fulfill an obligation shall not be a defense for the Contractor's non-compliance.

4.2.9 A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide EEO and to make affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor

- has achieved its goal for women generally, the Contractor may be in violation of the Executive Order if a specific minority group of women is under-utilized).
- 4.2.10 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.
- 4.2.11 The Contractor shall not enter into any subcontract with any person or firm debarred from government contracts pursuant to Executive Order 11246, as amended.
- 4.2.12 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 subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the OFCCP. Any contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.
- 4.2.13 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 4.2.7 of this Special Provision, 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.
- 4.2.14 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.
- 4.2.15 Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Grant Program).

4.3 Contractor Contractual Requirements:

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

- 4.3.1 Compliance with Regulations: The Contractor shall comply with the Regulations relative to non-discrimination 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.

- 4.3.2 Non-discrimination: 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 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.
- 4.3.3 Solicitations for Subcontracts, including Procurement 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 obligation under this Contract and the Regulations relative to non-discrimination on the grounds of race, color or national origin.
- 4.3.4 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.
- 4.3.5 Sanctions for Non-compliance: In the event of the Contractor's non-compliance with the non-discrimination 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:
- .1 Withholding of payments to the Contractor under the Contract until the Contractor complies, and/or
 - .2 Cancellation, termination or suspension of the Contract, in whole or in part.
- 4.3.6 Incorporation of Provisions: The Contractor shall include the provisions of Paragraphs 4.2 through 4.7 of this Special Provision 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 non-compliance. 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 interests of the sponsor and, in addition, the Contractor may request the United States to enter into such litigation to protect the interests of the United States.

4.4 Equal Employment Opportunity Clause:

During the performance of this Contract the Contractor agrees as follows:

- 4.4.1 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 (see Paragraph 15.4) setting forth the provisions of this nondiscrimination clause.
- 4.4.2 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 consideration for employment without regard to race, color, religion, sex, or national origin.
- 4.4.3 The contractor will send, to each labor union or representative of workers with which he had a collective bargaining agreement or other contract or understanding, a notice (see Section 4.5) advising that 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.
- 4.4.4 The contractor will comply with all provisions of Executive Order 11246, as amended, of September 24, 1965, and of the rules, regulations and relevant orders of the Secretary of Labor.
- 4.4.5. The contractor will furnish all information and reports required by Executive Order 11246, as amended, 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 FAA and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations and orders.**
- 4.4.6. 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 procedures authorized in Executive Order 11246, as amended, of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246, as amended, of September 24, 1965, or by rule, regulation, or order of the Secretary of State, or as otherwise provided by law.
- 4.4.7. The contractor will include the portion of the sentence immediately preceding paragraph 1 and the provisions of paragraphs 1 through 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, as amended, 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 subcontractor or purchase order as 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 vendor as a result of such direction by the FAA, the contractor may

request the United States to enter into such litigation to protect the interests 'of the United States.

4.5 Notices to be Posted:

The "Equal Employment Opportunity is the Law" poster is to be posted by the Contractor in a conspicuous place available to employees and applicants for employment as required by Paragraphs 4.2 and 4.4 of this Special Provision of the EEO Clause. Copies of this poster will be furnished to contractors at the pre-construction conference.

4.6 Notice of Requirement for Affirmative Action to Ensure Equal Employment Opportunity (Executive Order 11246), as Amended:

4.6.1 The Contractor's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth herein.

4.6.2 The goals and timetables for minority and women 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:

Timetables:

**Goal for DBE
Participation**
7.81%

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

The Contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3(a), and its efforts to meet the goals. The hours of minority and women 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.

4.6.3 The Contractor shall provide written notification to the Director, OFCCP, within ten (10) working days of award of any construction subcontract in excess of Ten Thousand Dollars (\$10,000.00) at any tier of construction work under the Contract resulting from this solicitation. The notification shall list the name, address, telephone number of the Subcontractor; employer identification number of the Subcontractor; estimated dollar

amount of the subcontracts; estimated starting and completion dates of the subcontract; and the geographical area in which the subcontract is to be performed.

4.7 Required Reports:

4.7.1 **Annual EEO-1 Report:** Contractors/Subcontractors working on federally assisted airport construction projects are required to file annually, on or before March 31st, complete and accurate reports on Standard Form 100 (Employee Information Report, EEO-1). The first such report is required within thirty (30) days after award unless the Contractor/Subcontractor has submitted such a report within twelve (12) months preceding the date of award (the FAA or Department of Labor OFCCP can designate other intervals). This form is normally furnished based on a mailing list, but can be obtained from the Joint Reporting Committee, 1800 G Street, N.W., Washington, D.C. 20506. This report is required if a contractor or subcontractor meets all of the following conditions:

- .1 Non-exempt: Contractors/subcontractors are not exempt based on 41 CFR 60-1.5, and
- .2 Number of Employees: Has fifty (50) or more employees, and
- .3 Contractor/Subcontractor: Is a prime contractor or first tier subcontractor, and
- .4 Dollar Level: There is a contract, subcontract or purchase order amounting to Fifty Thousand Dollars (\$50,000.00) or more, or serves as a depository of government funds in any amount, or is a financial institution which is an issuing and paying agent for U.S. savings bonds and savings notes. Some subcontractors below the first tier who work at the site are required to file if they meet the requirements of 41 CFR 60-1.7.

4.7.2 **Records:** The FAA or Department of Labor OFCCP may require a contractor to keep employment or other records and to furnish, in the form requested within reasonable limits, such information as necessary.

4.8 MBE Required Statements

4.8.1 **Policy.** It is the policy of the Department of Transportation that minority 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 under this agreement. Consequently, the MBE requirements of 49 CFR Part 26 apply to this agreement.

4.8.2 **MBE Obligation.** The recipient or its contractor agrees to ensure that minority business enterprises as defined in 49 CFR Part 26 have the maximum opportunity to participate in the performance of contracts financed in whole or in part with Federal funds provided under this agreement. In this regard all recipients or contractors shall take all necessary and reasonable steps in accordance with 49 CFR Part 26 to ensure that minority business enterprises have the maximum opportunity to compete for and perform contracts. Recipients and their contractors shall not discriminate on the basis of race, color, national origin, or sex in the award and performance of DOT-assisted contracts.

5. Contract Assurance Required by 49 CFR Part 26

The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of 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 owner deems appropriate.

END OF SPECIAL PROVISION NO. 9

SPECIAL PROVISION NO. 10
GENERAL PROVISIONS AND REQUIREMENTS FOR ELECTRICAL WORK
GENERAL

1.1 Special Requirements for Electrical Work.

- a. This item shall apply to all electrical work contained within the Contract Documents. Where the contract general conditions, special provisions or other parts of the Contract Documents also apply, the stricter of the documents shall govern.

1.2 AUXILIARIES AND ACCESSORIES.

- a. Include all auxiliaries and accessories for a complete, fully functional and properly operating system in accordance with the Contract Documents.
- b. Provide and install all electrical systems and any necessary appurtenances as per National Electrical Code (NEC), federal, state and local codes whether specified or shown in the Contract Documents or not. The content of the Contract Documents in general only refers to work required above and beyond the requirements of the NEC and applicable federal, state and local codes.

1.3 PROJECT PAY ITEMS.

- a. The project pay items are provided to be inclusive of all work to be performed as shown in the Contract Documents. All work not identified with a specific pay item shall be considered required work to complete the project and shall be considered subsidiary to the cost of the project pay items provided.

1.4 CONTRACTOR EXPERIENCE.

- a. All Contractors used to perform work of this contract shall be licensed to perform electrical work in the state in which the project is located at the time bids are submitted. At least one member of the electrical contracting firm shall hold a state certified electrical contractor's license.

1.5 EXPERIENCE AND SUPERVISION OF CONTRACTOR PERSONNEL.

- a. Provide a resident on-site supervisor to manage work at the job site whenever electrical work is being performed or affected. Electrical work is defined as any work described, included, depicted or contained within the Construction Specifications Institute (CSI) Division 26 or 27, specifications, L-XXX specification series, SP-XXX specification series, E- series drawings, ED-series drawings, V- series drawings, VD-series drawings, and all other work within the Contract Documents dealing with the distribution of electrical power/light, electrical/electronic/light monitoring, communication and control.
- b. When work is being performed within the Aircraft Operations Area, the on-site supervisor shall also be within the Aircraft Operations Area, except for incidental absences. Incidental absences shall not exceed 45 minutes in length. The Contractor is encouraged to keep the same on-site supervisor(s) from commencement to completion of work.
- c. Each on-site supervisor shall have a minimum of 5 years of successful experience either constructing or maintaining airfield lighting systems. At least 3 of these years of experience shall

have occurred in the last 5 years on projects of comparable size and complexity. On-site supervisor shall have passed a proctored H.H. Block Journeyman Electrician's exam with 75% grade or better and be a licensed Journeyman Electrician, by the City in which the project is located. Equivalent experience and training may be considered by the Engineer. Records of on-site supervisor's experience demonstrating compliance with these requirements shall be submitted to the Engineer for verification and review before starting work. Experience records shall include references (personnel and phone number) from airports where the electrical system installations have performed in a satisfactory manner. Only on-site supervisors whose experience records have been confirmed by the Engineer shall supervise work.

- d. If at any time the Engineer believes that work is being performed without the presence of an on-site supervisor, the Engineer will request that the workman in question demonstrate that the on-site supervisor is present. If the on-site supervisor's presence cannot be verified within 45 minutes the Engineer may direct the Contractor to suspend work until proper supervision is made available. The Contractor shall not be remunerated for costs associated with suspension of work under these conditions.
- e. It is agreed and understood that, if requested in writing by the Engineer, the Contractor shall replace any on-site supervisor with another meeting the required qualifications within seven (7) days of receipt of request.
- f. Electrical workman performing work shall have a Journeyman license and shall be a "Qualified Person" as defined in NFPA 70E. A copy of each Journeyman's license shall be submitted to the Engineer. Electricians installing raceways and fittings; pulling, splicing and terminating wire/cable; installing light bases, light fixtures; connecting signs; performing electrical testing or other work contained in the documents described in 1.5(A) above shall be Journeyman with a minimum record of 6000 hours of experience. An apprentice/helper/laborer may assist the Journeyman with the above tasks as directed by the on-site supervisor. A licensed Journeyman may supervise a maximum of three apprentices/helpers/laborers. At the request of the Engineer the Contractor shall submit the experience record of any electrician. Any workman who does not have the required experience or who demonstrates a lack of knowledge appropriate for the task they are performing shall be dismissed from the project for remainder of the contract.

SUMMARY OF WORK

2.1 GENERAL.

- a. In support of this project this contract includes installation of airfield lighting, counterpoise, signage, and other electrical work as shown in the Contract Documents. The above is not intended to be all inclusive but is provided as an aid to the Contractor. It is the intent of the Contract Documents that the Contractor is to furnish and install all materials and provide the necessary supervision, transportation, preparation, assembly, survey and installation of these materials, and for all labor, equipment, tools, incidentals, and appurtenances necessary to provide a fully functional and operational system as described by these Contract Documents. All items are new and unused unless specifically noted otherwise.

2.2 RECORD DOCUMENTS.

- a. The Contractor shall maintain the Contract Documents, Shop Drawings and samples at the site, in good order and annotated daily to show all changes made during the construction process per

Item SP-106. These shall be available to the Engineer for examination.

2.3 ENGINEERING OBSERVATIONS.

- a. Items noted by Engineer during construction and before final acceptance, which does not comply with the Contract, will be listed in accordance with the general conditions. These items will be sent to the Contractor for action. The Contractor shall have these items corrected.
- b. The Contractor shall check items noted after acceptance during the warranty/guarantee period in the same manner as above.

2.4 EXISTING CONDITIONS.

- a. Investigate site thoroughly and reroute all conduit/duct and wiring in area of new construction in order to maintain continuity of existing circuitry. Existing conduit/duct shown in the Contract Documents show approximate locations only. Contractor must verify and coordinate existing site conduit/ducts, wiring and piping. The bids shall include hand digging and all required rerouting in areas of existing conduit/ducts and/or pipes.
- b. Check site and existing conditions thoroughly before bidding. Advise Engineer of discrepancies or questions noted. If any difference is discovered between the existing conditions and the Contract Documents, the Engineer shall be notified in writing immediately.
- c. The Electrical Contractor shall investigate all existing systems within the construction limits and complete the performance verification prior to the beginning of any work, which could affect these existing systems.
- d. Advise Engineer in writing of all deficiencies in existing system(s) prior to work. All systems will be assumed to be fully operational if written notification is not received by Engineer prior to work on system.
- e. The work involved is in connection with existing systems/facilities, which must remain in operation while work is being performed. Work must be done in accordance with the schedule specified in the Contract Documents. Schedule all work to minimize the period when systems are inoperable. Request written permission and receive written approval from Engineer a minimum of 2 weeks in advance of any shutdown of existing systems. (FAA requires 45 days minimum notice.) Perform work required at other than standard working hours where outages cannot be accepted during regular working hours. Protect existing buildings and equipment during construction as required.
- f. There may be piping, fixtures or other items, which must be removed or relocated in order to perform the alteration work. All conduit/duct, wiring, boxes, etc. that do not comply with the Contract Documents shall be removed or corrected to comply with the Contract Documents. All unused conduit/duct not removed shall be identified and a pull line shall be installed. Bid shall include all removal and relocation required for completion of the alterations and the new construction.
- g. Special attention is directed to relocation of the existing power conduits and duct bank and communication systems. Cable counts, location, and function must be field verified before starting work.

- h.** The Contractor shall verify the areas, conditions, and features necessary to tie into existing construction. This verification shall be done prior to submittal of shop drawings, fabrication or erection, construction or installation. The Contractor shall be responsible for the accurate tie-in of the new work to existing facilities. This requirement assumes that existing items comply with current codes and standards.

2.5 SYSTEMS WARRANTY.

- a.** The work required under this division shall include a one (1) year warranty from the date of final acceptance unless required otherwise by the Contract Documents. This warranty shall be by the Contractor/Manufacturer to the Owner for any defective workmanship or material, which has been furnished under this contract. The Contractor/Manufacturer at no cost to the Owner shall perform replacement of defective workmanship or material for a period of one (1) year from the date of final acceptance of the system. This warranty shall not include light bulbs in service after one (1) month from date of substantial completion of the system. Explain the provisions of the warranty to the Owner during project close out.
- b.** In accordance with EB-67D, Light Sources Other Than Incandescent and Xenon for Airport and Obstruction Lighting Fixtures; all LED light fixtures with the exception of obstruction lighting (AC 150/5345-43) shall be warranted by the manufacturer for a minimum of four (4) years after date of installation inclusive of all electronics. This warranty shall be by the Contractor/Manufacturer to the Owner for any defective workmanship or material, which has been furnished under this contract. The Contractor/Manufacturer at no cost to the Owner shall perform replacement of defective LED fixture workmanship or material for a period of four (4) years after date of installation.

2.6 SUBSTANTIAL COMPLETION.

- a.** All specified work shall be complete prior to final observation of work, and all forms and other information requested, including Operation and Maintenance Manuals, shall be submitted to the Engineer for approval one (1) week before the request for substantial completion of the work.

2.7 CONTRACTORS RESPONSIBILITIES.

- a.** Provide necessary layout, labor, material, equipment, tools, transportation, full time supervision and services required for the satisfactory and timely completion of the work in accordance with the Contract Documents.
- b.** Unload, store, protect and re-handle the materials required for this Contract until such time that material is in place. Provide protection of materials required of this contract after installation.
- c.** Provide all required transportation, erection, maintenance, dismantling and removal of temporary facilities and equipment required by this contract.
- d.** Provide all transportation, unloading, distribution, hoisting, rigging, material handling and scaffolding required installing the work of this contract.
- e.** Provide all engineering and layout required to perform the work from established base lines and

benchmarks.

- f.** Provide temporary electrical power and temporary water and sanitary sewer for this Contractor's field office, if required. Pay all utility company charges. Provide temporary power required for this Contractor's work.
- g.** Prior to start of his work this Contractor is to inspect work performed by others on which this work is to be placed on or adjacent to, and report in writing to the Engineer, any condition found to be unacceptable. Failure to make said report shall constitute acceptance of the conditions found and any claims made thereafter due the unacceptable conditions will not be considered by the Engineer.
- h.** Provide all required coordination and supervision where work connects to or is affected by work of others and comply with all requirements affecting this work. Work required under other items of the Contract Documents to be performed by this Item SP-106 shall be coordinated with the respective Contractor, and such work performed at no additional cost to the Owner including but not limited to electrical work in support of other trades as shown in the Contract Documents.
- i.** It is the responsibility of the Contractor to coordinate the exact required location of any electrical or electronic equipment, system, or cabinets to be installed or relocated. No existing equipment may be relocated without prior coordination and with approval of the Engineer.
- j.** Provide and pay for all permits, licenses, fees and inspections required for the performance of the work. The Contractor shall pay all sales, consumer, use and other taxes required in accordance with the law of the place of the project.
- k.** Provide all tests as required, per the Contract Documents and submit all test reports to the Engineer.
- l.** Provide all excavation, backfill, compaction, shoring and dewatering required for performance of the work.
- m.** Provide sleeves for all conduit/duct required as specified.
- n.** Protect all work of this Contract from damage and intrusion of dirt and foreign objects. Close off open ends of conduit/duct and sleeves on work, which is to be completed at a later date. Remove closure material prior to continuance of work.
- o.** Prior to Final Inspection, submit to the Engineer, all Record Drawings and Operation and Maintenance Manuals as specified. Instruct Owner's maintenance personnel in the operation and maintenance of the systems as required by the Contract Documents.
- p.** The above is not all inclusive of the work described by the Contract Documents, which form the basis for this Contract, but is presented for the Contractor's convenience.

2.8 EXISTING UTILITIES.

- a.** The Contractor is solely responsible for the location of all existing utilities within the project limits. Please refer to SP-104 for additional requirements.
- b.** The Contractor is solely responsible for the protection of all existing utilities within the project limits. All manholes, hand holes, light bases, conduits and ducts shall be kept tightly closed and sealed during all phases of construction. The items may be opened in support of the work but shall be resealed or closed or covered immediately upon completion of the specific task that required them to be opened.

BASIC MATERIAL & METHODS

3.1 REQUIREMENTS OF BASIC MATERIALS AND METHODS.

- a.** The work shall include the furnishing of the systems, equipment and material specified in this Division and as called for in the Contract Documents, to include supervision, operations, methods and labor for the fabrication, installation, start-up and tests for the complete electrical installation. Provide the necessary inter-trade/Contractor coordination for the installation to be in a neat and work person like manner.
- b.** Drawings for the work are diagrammatic, intended to convey the Scope of the Work and to indicate the general arrangement and locations of the work. The drawings shall not be scaled for exact sizes or locations. Because of the scale of the drawings, certain basic items such as: conduit/duct fittings, access panels, sleeves, pull and junction boxes may not be shown. Where such items are required by Code or by other items or where they are required for proper installation of the work, such items shall be included. Coordinate final equipment locations with governing architectural, civil and structural drawings as applicable. Layout equipment before installation so that all trades may install equipment in the space available.
- c.** Equipment Specifications may not deal with minute items such as components, parts, controls and devices, which may be required to produce the equipment performance specified, or as required to meet the equipment warranties. Where such items are required, the Contractor/Supplier of the equipment shall include them, whether specifically called for or not.
- d.** Conduit/duct routed through the building/structure that interferes with other equipment and construction shall not constitute a reason for an extra charge. Equipment, conduit/duct, and fixtures shall fit into available spaces in the building/structure; do not introduce these into the building/structure at such times or in such manner as to cause damage to the structure. Equipment that requires servicing shall be readily accessible.
- e.** Locate all openings required for work performed under this item. Provide sleeves, guards or other acceptable methods to allow passage of items installed under this item.
- f.** Keep cutting and patching to a minimum. Insofar as possible, determine in advance the proper chase size and openings necessary for the work.

- g.** Where cutting and patching are required due to an error of the Contractor, or where the Contractor has not given enough advance notice of the need for holes, recesses, and chases, patching shall be performed by those trades skilled in the use of the materials involved and shall be done at the Contractor's expense.
- h.** Any cutting of work in place shall be patched and decorated by such mechanics and in such a manner that the quality of workmanship and finish shall be compatible with that of adjacent construction.
- i.** The location of electrical work is indicated on the drawings. The Engineer may adjust exact locations of new work as work progresses. Before any item is installed, the indicated location may be changed by twenty-five (25) feet in any direction without additional cost.
- j.** All penetrations through roof, wall or floor shall maintain structure fire rating and environmental barriers.
- k.** Surface mounted fixtures, outlets, cabinets, conduit/duct, panels, etc., shall have finish or shall be painted as directed by Engineer. Paint shall be in accordance with other applicable items of the Contract Documents.
- l.** All materials utilized shall be suitable for the environment encountered. No combination of materials shall be used that forms an electrolytic coupling of such nature that in the presence of moisture corrosion is accelerated.
- m.** In general, all relays, contactors, panelboards, dry type transformers, disconnect switches, and circuit breakers are to be supplied and manufactured by the same manufacturer and shall be submitted and accepted equivalent to that specified.
- n.** Where the requirements of another division, item, or part of these Contract Documents exceed the requirements of this division, those requirements shall govern.
- o.** Make electrical connections to regulators, transformers, instruments, mechanical equipment, controls and at other locations as required with approximately 3 feet (12" minimum) of liquid tight flexible metal conduit. Grounding type liquid tight flexible metallic conduit connectors shall be used. Determine the requirements from the Contract Documents and the accepted manufacturer drawings.
- p.** Provide inserts, hangers, supports, braces, and anchor bolts as necessary for all work called for under the Contract Documents.
- q.** Provide equipment grounding conductor in all conduit/ducts, for all circuits, except series airfield lighting.
- r.** All galvanized materials shall be hot-dip galvanized after fabrication, conforming to ASTM A-386 and/or A-153, unless noted otherwise (UNO).
- s.** Unless noted otherwise, all panelboards, junction boxes, wire ways, etc., shall be spaced off the

concrete structure by using a Unistrut P-1060 series square washer or accepted equivalent between the mounting surface and the equipment at each mounting point. Equipment as listed above, mounted on Unistrut or accepted equivalent shall have Unistrut P-1060 series square washer, Unistrut P-28XX flat plate fitting or accepted equivalent installed between the Unistrut channel or accepted equivalent and the equipment at each mounting point.

- t.** All bolted connections and equipment mountings shall utilize two flat washers, lock washer and hex head bolting hardware, unless noted otherwise.
 - u.** Unless noted otherwise, all wire sizes are based on a 90 Deg. 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.
 - v.** 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 conductor 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.
 - w.** All equipment enclosures, junction boxes, wire ways, pull boxes, etc. utilized in damp, wet or exterior locations shall be NEMA 4X stainless steel. All mounting channel, hardware, nuts, bolts, lock washers, etc. utilized in damp, wet or exterior locations shall be stainless steel.
 - x.** All electrical conductors, windings, bus bars, etc. shall be high conductivity (98% conductivity) copper.
 - y.** This Contractor shall furnish and install all required overcurrent protection required by the NEC and the Contract Documents. The overcurrent protection shall be sized according to the equipment nameplate data.
 - z.** Powder-actuated fasteners will not be allowed without express written approval of the Engineer. No fasteners shall pierce the structure until accepted by the Engineer.
 - aa.** Use Ideal NOALOX antioxidant compound or accepted equivalent on all aluminum to aluminum mechanical or electrical connections. Use Thomas and Betts KOPR-SHIELD or accepted equivalent on all rigid galvanized steel conduit connections and all copper grounding connections using mechanical lugs. Use an approved anti-seize compound on all bolted connections.
- 3.2 ELECTRICAL REFERENCE SYMBOLS.**
- a.** Symbols used in the Contract Documents are defined in the Electrical Legend. Not necessarily will all symbols defined be applicable to the project.

3.3 ACTIVE SERVICES.

- a. Existing active services; water, gas, sewer, electric, communication, jet fuel, etc. when encountered, shall be protected against damage. Do not prevent or disturb operation of active services, which are to remain. If active services are encountered which require relocation, make request to Authorities Having Jurisdiction (AHJ) for determination of procedures. Where existing services are to be abandoned, they shall be terminated in conformance with requirements of the AHJ, Utility or Municipality having jurisdiction.

3.4 CODES AND FEES.

- a. Install in accordance with latest edition of the National Electrical Code and the regulations of governing Federal, State, County, local and other applicable codes, including the Utility Companies. Where a conflict in code requirements occurs the most stringent requirement shall govern. The Contractor shall be responsible to obtain and pay for all required licenses, fees and inspections including meter installation fee. The cost for such shall be included in the bid price.

- b. The work shall meet the requirements and recommendations of applicable portions of the latest editions of these standards:

- (1) NFPA 70, National Electrical Code
- (2) NFPA 70E, Standard for Electrical Safety in the Workplace
- (3) NFPA 101, Life Safety Code
- (4) NFPA 409, Standard on Aircraft Hangars
- (5) NFPA 780, Standard for the Installation of Lightning Protection Systems (UL 96, UL 96A)
- (6) FAA Advisory Circulars
- (7) Applicable local building code
- (8) Florida Building Code
- (9) ANSI C2, National Electrical Safety Code
- (10) NEMA Standards (NEMA)
- (11) Underwriter's Laboratories (UL)
- (12) Institute of Electrical and Electronics Engineers (IEEE)
- (13) FDOT - Standard Specifications for Road and Bridge Construction
- (14) FDOT – Design Standards Index
- (15) AWS D1.1, Structural Welding Code - Steel

The above is not all inclusive of applicable codes and standards, but is presented for the Contractors convenience.

The advisory circulars are available on line at:

http://www.faa.gov/airports_airtraffic/airports/resources/advisory_circulars/index.cfm?template=Document_Listing.

3.5 STANDARDS.

- a. All materials shall be new and free of defects and shall be U.L. listed, bear the U.L. label or be labeled or listed with an accepted, nationally recognized Electrical Testing Agency. Where no labeling or listing service is available for certain types of equipment, test data shall be submitted to prove to the Engineer that equipment meets or exceeds available standards. All U.L. listed material shall be used only for the intended purpose.

3.6 UTILITY COMPANY FEES, CHARGES, AND COSTS.

- a. It is the Contractor's responsibility to contact the applicable Utility Company(s) to determine if any fees, charges or costs will be due the Utility Company(s) as required by the Utility Company(s) for temporary power, installations, hook-ups, etc. This fee, charge or cost shall be included in this Contractor's price.

3.7 TESTING – QUALITY CONTROL.

- a. Systems shall be tested by the Contractor, in the presence of the RPR, and placed in proper working order prior to demonstrating systems to the Owner. Refer to the requirements in each item for other applicable standards.
- b. Provide all tests as required, per the Contract Documents and submit all test reports to the Engineer. Costs of all testing shall be borne by the Contractor and shall be considered incidental to the respective pay item of the tested item. The Contractor shall perform all Quality Control in accordance with the Contract Documents and the Contractor's Quality Control Plan General Conditions, Part 20. The Owner will perform Quality Assurance/Acceptance.
- c. After work is completed a load balance test shall be made to demonstrate that with full lighting and mechanical load the balance between phases is within 5%. Unbalance beyond this limit shall be corrected.
- d. Perform such tests as required by AHJ over the site.
- e. Testing methods shall be acceptable to the Engineer and shall be submitted to the Engineer for review, a minimum of thirty (30) days prior to the scheduled test.

3.8 LAMINATED PHENOLIC PLASTIC NAMEPLATES.

- a. Contractor shall provide nameplates for wiring systems and equipment as called for herein. All nameplates shall have beveled edges and one-half inch (1/2") lettering. If equipment is smaller than ten inches by six inches (10"x 6"), one-quarter inch (1/4") lettering may be used. Smaller lettering may be used with permission of the Engineer.
- b. Nameplates shall be laminated phenolic plastic, black front and back with white core, with

lettering etched through the outer covering. White engraved letters on black background. Emergency systems shall use red front and back with white core for nameplates. Attach nameplates with stainless steel pop rivets, sealed with clear silicon caulk. Adhesive may be used only on panelboard interiors. Where conditions do not warrant piercing the enclosure "LOCTITE" brand adhesive or accepted equivalent may be used with permission of the Engineer.

- c. Coordinate nameplates with Contract Documents and submit 1 to 1 scale detail of all nameplates to Engineer for review.
- d. All electrical equipment, enclosures, pull boxes and all similar items in the sole opinion of the Engineer shall be equipped with nameplates. Examples are; all constant current regulators, motors, pushbutton stations, hand holes, pull boxes, junction boxes, manholes, control panels, system cabinets, terminal cabinets, time switches, disconnect switches, panelboards, circuit breakers, contactors, relays, high voltage boxes and cabinets. Special electrical systems shall be identified at junction and pull boxes, terminal cabinets and equipment racks.
- e. Nameplates shall adequately describe the function of the particular equipment involved. Where nameplates are detailed in the Contract Documents, inscription and size of letters shall be as shown. Nameplates for panelboards and switchboards shall include the panel designation, panel name, source(s) of power and voltage and phase of the supply. For example, "Equip YY, Panel A, fed from Panel XYZ, 480/277V, 3-phase, 4-wire." The unique name of a particular piece of equipment shall be used consistently on all nameplates referencing that particular piece of equipment. Equipment name/numbers utilized shall be consistent throughout the entire system. When equipment has multiple sources of power, all sources of power shall appear on the nameplate. Power source descriptions shall contain as a minimum the information listed above. Nameplates shall include as a minimum the following.
 - (1) Equipment Number
 - (2) Equipment Name
 - (3) Power Source(s)
 - (4) Voltage Level and number of phases (for each power source)
- f. Panelboard and distribution panels shall have the breaker positions identified with phenolic labels.
- g. All major pull and junction boxes in service areas, tunnels, above accessible ceilings and in accessible chases shall have nameplates identifying the feeder or system. This shall include the access cover on lighting pole bases.
- h. Systems with conductors exceeding 100 volts to ground shall have voltage identification nameplates with one-half inch (1/2") high letters on all panels, switches, pull boxes and junction boxes.

3.9 ADHESIVE BACKED CLOTH MARKERS.

- a. All raceways containing conductors exceeding 150 volts to ground shall have adhesive backed cloth/vinyl markers installed at each end and every thirty feet (30') in between identifying the voltage level (Example: "480 VOLTS"). If the conduit/duct is less than ten feet (10') in length, one marker is acceptable. The markers shall be installed so they are visible from floors and walkways. Normal power system shall use black letters; emergency systems shall use red letters.
- b. The markers shall be "Brady" brand or accepted equivalent with one-half inch (1/2") letters.
- c. The markers shall be suitable for the environmental conditions encountered.

3.10 CONCRETE WORK.

- a. Concrete bases and pads for all equipment furnished by Contractor shall be the responsibility of Contractor unless noted otherwise.
- b. Furnish and install reinforced concrete pads for transformers, switchgear, and motor control centers, etc. of size as shown in the Contract Documents. Chamfer the top edges 1". Trowel all surfaces smooth, provide broom finish where noted. Reinforce the pads as shown in the Contract Documents.
- c. Concrete equipment pads shall be installed by tradespersons skilled in concrete work. Equipment pads shall be level within one-eighth inch (1/8") in 10 feet (10'). Equipment pads not meeting the previous requirements shall be removed and replaced at the Contractor's expense.
- d. The Contractor shall furnish all equipment anchor bolts and shall be responsible for their proper installation and accurate location.

3.11 EXCAVATING, TRENCHING AND BACKFILLING.

- a. This Contractor shall do excavating necessary for light bases, underground wiring, conduit, duct banks and other underground work and shall backfill trenches and excavations after work has been inspected. Care shall be taken in excavating that walls and footings and adjacent load bearing soils are not disturbed in any way, except where lines must cross under a footing, pad or other structural item. Where a line must pass under a footing, pad or other structural item the crossing shall be made by the smallest possible trench to accommodate the conduit/duct. Excavations shall be kept free from water. No greater length of trench shall be left open in advance of conduit/duct installation than that, which is authorized or directed by the Engineer.
- b. Roots shall be removed to a level of eighteen (18") below finished grades and deeper as required for conduit/duct runs, manholes and light pole bases. No roots shall be allowed to remain under the work.
- c. Backfill about the work shall be placed, where practical, as the work of construction progresses. Backfilling on or against concrete work shall be done only when directed. Backfilling of conduit/duct lines shall progress as rapidly as the testing and acceptance of the finished items of the work will permit and shall be carried to a crown approximately six inches (6") above the existing grades. In backfilling around conduit/duct lines, selected material shall be compacted firmly around the conduit/duct. Fill and backfill shall be clean and free from vegetable matter

and refuse.

- d. All loose materials shall be removed from all excavations for electrical items. The bottom of the excavation shall be compacted to the following criteria:

SOIL TYPE	DESIGN AIRCRAFT GROSS WEIGHT	TEST STANDARD	UNDER PAVEMENT	IN TURF
<30% RETAINED ON ¾" SIEVE	>60,000 LBS	ASTM D1557	100%	95%
<30% RETAINED ON ¾" SIEVE	≤60,000 LBS	ASTM D698	100%	98%
>30% RETAINED ON ¾" SIEVE	>60,000 LBS	AASHTO T-180	100%	95%
>30% RETAINED ON ¾" SIEVE	≤60,000 LBS	AASHTO T-99	100%	95%

Backfill shall comply with the same compaction requirements.

- e. All trenches and other excavation left open by necessity shall be barricaded and guarded as required by OSHA or applicable codes and regulations.

3.12 WELDING.

- a. All welding and weld procedures shall be in accordance with AWS D1.1, Latest Edition. Qualifications of welders and welding operators shall be in accordance with AWS D1.1, Latest Edition. The welder qualification test shall be performed on a 1" A-36 Test Coupon in the 3G and 4G positions. The welder qualification shall be current within 12 months of the work being performed. Weld inspections shall be per the criteria set forth in AWS D1.1 for visual weld inspection.

DESIGNATION OF MATERIALS

4.1 DESIGNATION OF MATERIALS.

- a. Where equipment or materials are specified using the name and catalog number of one manufacturer, that equipment or material specified shall set the quality and functionality of the item. Equivalents accepted by the Engineer will be acceptable.
- b. Where equipment or materials are specified using the name and catalog number of more than one manufacturer, that equipment or material shall be one of those specified. No alternative will be acceptable.
- c. Where no brand name is specified, the source and quality shall be subject to the Engineer's review and acceptance.
- d. When a product is specified to be in accordance with a trade association or government standard, at the request of Engineer, Contractor shall furnish a certificate that the product complies with the referenced standard. Upon request of the Engineer, the Contractor shall

submit supporting test data to substantiate compliance.

- e. The Engineer shall be the sole judge of whether the proposed "equivalent" is suitable for use in the work.
- f. The Engineer reserves the right to reject any and all equipment, materials or procedures, which, in the Engineer's opinion, does not meet the system design and the standards and codes, shown in the Contract Documents.
- g. Each Bidder represents their bid is based upon the materials and equipment described in the Contract Documents.

PROTECTION OF MATERIALS, EQUIPMENT AND WORK

5.1 PROTECTION OF MATERIALS, EQUIPMENT AND WORK.

- a. Materials shall be stored to assure the preservation of their quality and fitness for the work. Stored materials, even though accepted before storage, shall be subject to reinspection prior to their use in the work. The Contractor shall coordinate the storage of all materials with the Engineer.
- b. The Contractor shall protect electrical raceway, cable, lighting fixtures, associated support systems, and all other electrical items against damage from movement of equipment and material, welding, flame cutting, and other construction damage. Raceways and supporting structures for raceway and lighting fixtures shall not be used as access scaffolding at any time. Whenever welding or flame cutting operations occur above or near raceways, cables lighting fixtures, etc not shielded from such operations by concrete floor or other protective covers, the Contractor shall protect the items from damage by means of fireproof boards or blankets. Damaged materials shall be repaired or replaced, by and at the Contractor's expense, subject to the Engineer's direction and acceptance.
- c. Surfaces of most equipment, such as panels, switchgear, transformers, constant current regulators (CCR) and circuit breakers, are finished at the factory. Great care shall be exercised to prevent damage to this original finish during installation of the equipment and during construction work.
- d. If the factory finish is damaged during construction, the entire surface of the damaged component shall be refinished by and at the expense of the Contractor.
- e. The refinished surface shall be equivalent in every respect to the original surface, including color, texture and smoothness. Refinishing paint, if furnished with the equipment, may be used; otherwise, the paint shall be obtained from the equipment manufacturer.
- f. All cut edges of galvanized materials and marred or scratched galvanized surfaces shall be repaired using LPS-1G cold galvanizing compound or accepted equivalent.

GENERAL CONSTRUCTION REQUIREMENTS

6.1 GENERAL CONSTRUCTION REQUIREMENTS.

- a.** Provide the bracing, shoring, rails, guards, and covers necessary to prevent damage or injury. Do not leave energized electrical items unnecessarily exposed or unprotected. Protect personnel from exposure to contact with electricity. Deliver equipment and materials to the job site in their original, unopened, labeled containers. Store ferrous materials to prevent rusting. Store finished materials and equipment to prevent staining and discoloring.
- b.** Maintain separation between stainless steel items and carbon steel items to prevent contamination of stainless-steel item and subsequent rust stains on stainless steel item.
- c.** All sheeting, shoring, dewatering and cleaning necessary to keep trenches and their grades in proper condition for the work to be continued, including the removal of water by mechanical means, shall be the Contractor's responsibility.

METHOD OF MEASUREMENT

7.1 METHOD OF MEASUREMENT.

- a.** The items described in Special Provision No. 10 are incidental to other pay items and shall not be measured for payment.

BASIS OF PAYMENT

8.1 BASIS OF PAYMENT

- a.** No direct payment shall be made for the work described in Special Provision No. 10. The work described in Special Provision No. 10 is incidental to other items and shall be paid for in the respective bid item of which it is a component part.

END OF SP-10

SPECIAL PROVISION NO. 11
GENERAL ELECTRICAL SAFETY REQUIREMENTS AND TEMPORARY AIRFIELD LIGHTING
DESCRIPTION

1.1 PURPOSE.

- a. The purpose of this item is to assist in establishing the proper safety guidelines necessary to protect aircraft, passengers, crews, the general public, Owner, Engineer, all workers and vehicles involved in their daily tasks.
- b. **The Contractor is solely responsible for all issues related to the safety program and guidelines and implementation of such programs and guidelines necessary to protect aircraft, passengers, crews, the general public, Owner, Engineer, all workers and vehicles involved in their daily tasks.**
- c. The Contractor shall comply with FAA Advisory Circulars, specific airport requirements, OSHA 29CFR1910, OSHA 29CFR1926 and NFPA 70E as minimum requirements.

1.2 FAA ADVISORY CIRCULARS.

- a. All applicable requirements of the below listed advisory circulars, standards and related reading, as a minimum, shall be compiled with:

- (1) AC 150/5200-18, Airport Safety Self-Inspection
- (2) AC 150/5210-5, Painting, Marking and Lighting of Vehicles
- (3) AC 150/5340-1, Standards for Airport Markings
- (4) AC 150/5340-18, Standards for Airport Sign Systems
- (5) AC 150/5340-26, Maintenance of Airport Visual Aid Facilities
- (6) AC 150/5340-30, Design and Installation Details for Airport Visual Aids
- (7) AC 150/5370-2, Operational Safety On Airports During Construction
- (8) 29 CFR Part 1926/1910, Occupational Safety and Health Standards
- (9) NFPA 70, National Electrical Code
- (10) NFPA 70E, Standard for Electrical Safety in the Workplace
- (11) ANSI C2, National Electrical Safety Code

The Contractor is responsible for obtaining and using the latest edition of the referenced documents. This list is not all inclusive but is offered as a convenience to the Contractor. The advisory circulars are available on line at:

http://www.faa.gov/airports_airtraffic/airports/resources/advisory_circulars/index.cfm?template=Document_Listing.

1.3 GENERAL SAFETY PROVISIONS.

- a.** Contractor shall take safety and health measures in performing work under this contract. Contractor shall meet with the Engineer and Owner to develop a mutual understanding relative to administration of the safety plan. The Contractor is subject to and shall comply with all applicable federal, state and local laws, regulations, ordinances, codes and orders relating to safety and health in effect on the date of this contract. Where the contract general conditions, special provisions or other parts of the Contract Documents also apply, the stricter of the documents shall govern.
- b.** As a minimum work place safety shall comply with NFPA 70E, Standard for Electrical Safety in the Workplace, OSHA, federal, state and local requirements. Where a conflict in code requirements occurs the most stringent requirement shall govern.
- c.** During the performance of work under this contract, the Contractor shall comply with procedures prescribed for control and safety of persons visiting the project site.
- d.** Contractor is responsible for the Contractor's personnel and for familiarizing each of the Subcontractors with safety requirements.
- e.** Contractor shall advise the Engineer of any special safety restrictions established so that Owner and Engineer personnel can be notified of these restrictions.
- f.** The Contractor shall be solely and completely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the work. The Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:
 - (1)** All employees on the work and all other persons (including but not limited to the general public) who may be affected thereby,
 - (2)** All the work and all materials or equipment to be incorporated therein, whether in storage on or off the site,
 - (3)** Other property at the site, adjacent thereto, or utilized by the Contractor including but not limited to trees, shrubs, lawns, walks, pavements, structures, underground facilities, and other utilities not designated for removal, relocation or replacement in the course of construction regardless of whether or not such other property is indicated in the Contract Documents.
- g.** The installation and/or removal of lighting equipment may be critical to airport operations; therefore, the Contractor shall follow work schedules established in the Contract Documents or as directed by the Engineer. The system shall be installed in accordance with the Contract Documents, FAA criteria, the National Electrical Code and/or federal, state, or local code requirements.
- h.** The Contractor shall generate and submit for approval A Maintenance of Power Plan for all electrical services impacted by this project. The Contractor shall maintain power (permanent or

temporary) to all FAA and airport owned facilities at all times during this project. Power outages may be scheduled at the FAA and Owners convenience. Scheduling and duration of any power outage is at the sole discretion of the power system owner. Cost of maintenance of power and all necessary materials, labor transportation, supervision, coordination and all appurtenances shall be considered incidental to the SP-104-1 pay item.

- i. The Contractor shall provide temporary wiring as required to reconnect existing circuits to provide guidance for aircraft to pass through the construction areas on those taxiways/runways, which must remain open. The Contractor, in conjunction with the Owner's Maintenance Department, shall perform a visual lighting check of all lighting circuits within the Contractor's area of responsibility before dark each day (or at additional times as designated by the Engineer) to assure that they are fully functional. In the event of failure, the Contractor shall immediately take steps to restore operation.

1.4 FIRE PREVENTION AND PROTECTION.

- a. All tools producing sparks or heat, open-flame heating devices, operations utilizing such devices, etc. shall be in accordance with the airport fire department and airport "Burn Permit Procedures". Work shall not start until all requirements of the burn permit procedures are met
- b. Open fires, salamanders and open-flame heating devices will not be permitted except by special approval in writing. Such permission will not be granted unless the Contractor has taken reasonable precautions to make such devices safe. Burning trash, brush or wood on the project site will not be permitted. Approval for open fires and open-flame heating devices will in no way relieve the Contractor from the responsibility for any damage incurred because of fires.
- c. Flammable liquids shall be stored and handled in accordance with NFPA and OSHA requirements.
- d. Smoking shall not be permitted within the AOA or in areas such as paint storage, fuel storage, and posted no smoking areas.
- e. Welding, flame cutting, melting and other such operations in all operating areas, shall not be permitted until approved at the beginning of each work day by the Engineer. The Engineer may approve longer periods of time for welding and burning in some operating areas if the detailed safety procedures are established beforehand. Operating open flame devices shall not be left unattended in any area.
- f. Contractor shall provide the necessary fire fighting equipment, fire prevention methods and fire watch.
- g. A Contractor's employee shall be assigned as fire watch for every welding and burning operation. The fire watch shall be properly trained in fire fighting techniques and the operation of the fire extinguishers. The fire watch shall be equipped with 2 full 15 pound Class A, B & C fire extinguishers and shall check all areas around and below the welding or burning operation for fires. The fire watch shall continue this check for at least 60 minutes after the completion of the welding or burning operation.
- h. Contractor shall discontinue all burning, welding, or cutting operations, one hour prior to the end of the normal work day. Contractor shall provide a fire watch to remain at the site for one hour

after discontinuing these operations. This fire watch shall make a thorough inspection of the area for possible sources of latent combustion. Any unsafe conditions shall be corrected.

- i. During operations involving possible fire hazard, the Contractor shall notify the Engineer and not proceed until clearance is obtained in writing. The Engineer may request a standby from the Fire Station. However, this does not relieve the Contractor of responsibility for welding and cutting safety.
- j. Clean up of scrap materials and waste of this Contractor shall be completed as a minimum daily or more often as required to maintain airport operations.

1.5 TEMPORARY EXITS AND ENTRANCES.

- a. Such passageways shall provide adequate fire protection and safety of Owner personnel and representatives.

1.6 SWITCHING.

- a. Electrical switching required for clearance to work on equipment operating from electrical circuits will be performed only by Owner personnel authorized as safety operators for the specific equipment.

1.7 REMOVAL OF EQUIPMENT.

- a. When permanently removing equipment, the electrical wiring, conduit/duct and control boxes shall be removed to the source of feed, unless otherwise specified or indicated.
- b. After equipment has been removed, the electrical wiring diagrams, schematics, etc., shall be marked to show the change.
- c. Conduit/duct not removed shall have a pull string installed.

1.8 OTHER SAFETY REQUIREMENTS.

- a. Temporary wiring shall comply with NEC. Indiscriminate use of extension cords, portable cable or junction boxes creating tripping hazards as well as overloaded circuits will not be permitted.
- b. Unplug or disconnect energy source of power tools when not in use.
- c. Before maintaining or repairing any electrical equipment, it shall be disconnected from the power source.
- d. Do not use any equipment that has frayed cords or three-wire plugs that have had the grounding prongs removed. Faulty equipment and tools shall be repaired by qualified electrical personnel.
- e. Do not use metal ladders when working on electrical equipment.

1.9 EXISTING UTILITIES.

- a. The Contractor is solely responsible for the location of all existing utilities within the project limits. Prior to initiation of any construction in the field, the Contractor shall provide a written notice (return receipt requested) to each of the utility companies listed on sheet [ISO.0.1], along with the various airport departments and Florida Sunshine One Call as prescribed by state law. The Contractor shall provide the Owner and Engineer with a copy of the receipt of said written notification to each of the utility companies or airport departments. This requirement is in addition to any other state laws regarding public notification prior to excavation.

EXCAVATION

2.1 EXCAVATION OPERATIONS.

- a. Prior to any excavation or demolition, the Contractor shall obtain an "Airport Dig Permit".
- b. Methods of excavation, means of earth support, and manner of backfill shall be conducted with consideration for the safety of persons and work, and prevention of damage to adjacent pavement, utilities, structures and other facilities, due to settlement, lateral movement, undermining and washout. Minimum requirements for trench shoring and bracing shall be in accordance with OSHA, State and local requirements. Excavation shall be performed in a manner to prevent surface water and subsurface or groundwater from flowing into excavations, and to prevent water from flooding conduit/duct trench and adjacent or surrounding area.
- c. The Contractor and all Subcontractors shall comply with the Florida Trench Safety Act and OSHA trench/excavation safety standards.

PROTECTION OF WORK

3.1 PROTECTION OF WORK.

- a. Provide adequate stand-by mechanical equipment for emergency use.
- b. Excavations shall have substantial barricades and be posted with warning signs for the safety of persons. Warning lights shall be provided during hours of darkness.
- c. Barricades shall be erected immediately around manhole openings when covers are opened/removed.
- d. Prior to performing any excavation work or any surface penetrations 6 inches or deeper (such as driving stakes more than 6 inches in the ground) on any ground surface, for personnel safety and to prevent possible interruption of major utility services encountered during excavation, the following procedures shall be followed:
 - (1) Refer to 104-1.9.
 - (2) The Contractor shall obtain from the Engineer, local utilities, etc., the current up-to-date subsurface utility drawing of the particular area to be worked on.

- (3)** All agencies/utilities, etc. that may be affected by the excavating shall be contacted by the Contractor so that all lines, pipes, etc. can be marked/staked. The Contractor shall be responsible to maintain the utility locate markings.
- (4)** The Contractor shall stake out subsurface high voltage cables, communication cables, pipe lines, all subsurface utilities, etc, indicated within the scope of the work contemplated. All subsurface utilities shall be located by hand digging; hand digging shall extend for 5 feet on both sides of the subsurface utility. Hand digging and protection of existing systems shall not be paid for separately, but shall be considered incidental to the item being installed.
- (5)** After hand exposure of cable or pipe lines, the Contractor shall obtain agreement from the Engineer, AHJ, Agency/Utility on how much closer to cable or pipe the excavations can be permitted.
- (6)** Detectable printed mylar foil warning tape, color coded, printed with the words "CAUTION ELECTRIC LINE BELOW," red, "CAUTION COMMUNICATION LINE BELOW," orange, "CAUTION WATER LINE BELOW," blue, "CAUTION FUEL LINE BELOW," yellow, etc., shall be installed over the buried utilities. Material and installation of detectable tape shall be in accordance with L-110.
- (7)** Contractor shall notify the Engineer, 72 hours prior to the start of excavation work or surface penetration, to enable the Engineer to review measures being taken to prevent hazard to employees and to prevent possible damage to subsurface utilities. Where emergency conditions preclude the 72 hours advance notification, Contractor shall nevertheless inform the Engineer of the Contractor's intention to initiate work prior to actual start of activity.
- (8)** After all underground utilities have been located and staked, the Contractor shall proceed with excavating work, or other surface penetration work. The Contractor however, shall temporarily halt any machine excavation work or other surface penetration when approaching within 5 feet of the staked out cable or pipe line, until Contractor has hand excavated down to expose the underground utility to exactly fix its location.
- (9)** No digging, dirt moving or other heavy equipment shall enter physically any construction area before all FAA utilities, airport utilities and all other underground utilities have been located and properly staked out. It is the Contractor's responsibility to locate all utilities before digging, sawing, coring, boring, etc. Any damage caused by digging, sawing, boring coring, etc., is the Contractor's responsibility for repair. Any damage must be reported immediately to the Engineer. No repair shall be attempted without approval.
- (10)** All electrical cables shall be disconnected before excavation is attempted.
- (11)** Provide minimum of 48" undisturbed earth cover or 1" thick steel plate over electrical conduit/duct, cables or other utilities when heavy equipment is being used in the area to protect underground systems/utilities. In addition, protect utilities in accordance with AHJ requirements.

- (12) The requirements listed above shall be considered incidental to the item for which the excavation is required.
- (13) A written description of the utility protection measures shall be submitted to the Engineer for review by the Owner, FAA and AHJ.

SAFETY TAGGING AND LOCKOUT

4.1 SAFETY WITH ELECTRICAL CIRCUITS AND EQUIPMENT.

- a. No one may work on an energized circuit without written permission from the Contractor's Superintendent. The Contractor's Superintendent shall review the circumstances and the necessary safety precautions with the Engineer prior to giving permission for the "hot" work. The Contractor assumes all liability in connection with any work on energized circuits.
- b. No one may disconnect or cause to be disconnected any electrical circuit before permission is requested from and granted by the Electrical Maintenance Manager or authorized representative through the Engineer.
- c. Identification markings on light and power circuits shall not be relied on for established safe work conditions. Always verify the proper safe "deenergized" conditions with properly operating test equipment.
- d. Before any circuit supplying radar, ILS, weather, VORTAC, airport beacon, runway/taxiway lighting equipment or any other equipment is disconnected, permission must first be granted by Electrical Maintenance Manager or authorized representative, and, if applicable, FAA Sector Field Office and the Airport's Air Traffic Control Tower. After permission is granted, the following requirements must be complied with. THE FAA REQUIRES 45 DAY NOTICE PRIOR TO WORKING ON OR DISTURBING FAA CABLES OR EQUIPMENT.
- e. As a minimum the LOCK OUT/TAG OUT (LOTO) procedure shall comply with the Owner's requirements and NFPA 70E.
- f. Work shall not commence on any circuit until:
 - (1) The circuit is correctly identified in the presence of the Electrical Contractor's Superintendent or Foreman and Airport Electrical Maintenance Manager, or authorized representative.
 - (2) After identity of the circuit is established, Electrical Maintenance Manager or authorized representative shall be notified, and the circuit disconnected. The time and date shall be recorded by the Electrical Maintenance Manager.
 - (3) The switch shall be locked in the open position or opened in a manner, which will prevent accidental restoration.
 - (4) The circuit shall be tagged and locked by the Electrical Contractor's Superintendent. The tag shall state, the Company's name, the Electricians name responsible for the disconnection, date and time and the project name and bid package number.

(5) Verify required safety grounding equipment has been installed.

- g. Restoration shall be accomplished in a safe manner and locks/tags removed only by the Electrical Contractor's Superintendent in the presence of the Electrical Maintenance Manager, or authorized representative.
- h. The Electrical Maintenance Manager shall record time, date and operational status of circuit after restoration.
- i. Electrical circuits and apparatus shall be operated at these facilities only by qualified and authorized personnel.
- j. No circuit shall be disconnected or unplugged before color code identification by taping.
- k. No circuit shall be disconnected at power source before proper safety precautions are taken to prevent accidental restoration
- l. When possible, circuits shall be restored by the same person who disconnected the circuit. When not possible, the Electrical Maintenance Manager or authorized representative shall perform restoration.
- m. The Contractor shall provide LOTO support on a 24 hour a day, seven days a week basis for the duration of the project. The Engineer shall be provided contact names and phone numbers for two persons (one as primary, one as backup) to provide for removal or addition of any Contractor LOTO work during off hours. The designated person(s) shall respond onsite within one hour of initial contact.

4.2 TEMPORARY AIRFIELD LIGHTING AND SIGNAGE.

- a. Temporary airfield electrical fixtures and conductors are allowable when necessary, but shall be installed as follows:
 - (1) Temporary lights shall be bolted to the pavement in a manner rendering the light stationery and allowing space for conductors to enter or exit and to be spliced.
 - (2) When the above is not practical, lights shall be fastened to a weighted object adaptable for the purpose and of sufficient weight to inhibit movement by jet engine blast.
 - (3) Temporary conductors supplying temporary lights shall be installed in a rigid galvanized steel conduit system and secured every five feet to prevent movement by jet engine blast.
 - (4) All joints or splices in temporary conductors shall have heat shrink tubing with integral sealant or tape applied in accordance with the Contract Documents to secure mechanical and electrical connection and prevent water entry.
 - (5) All plug-in connections shall have tape or heat shrink tubing with integral sealant applied to prevent accidental disconnection and shall be color code taped to expedite quick, efficient disconnection and restoration.

- (6) Temporary lights and signage shall conform as closely as possible to permanent locations normally on the taxiway but shall guide aircraft in a safe path. Please refer to the temporary airfield lighting details provided in the Contract Documents for additional requirements.
- b. Closed taxiways shall be blacked out in a manner acceptable to FAA, Engineer and Airport Operations and said black/out/marking/lighting shall be kept in acceptable condition.

 - (1) The required method of temporarily bypassing a fixture is to unplug and bypass the primary side of the L-830 isolation transformer.
 - (2) Alternately, pipe sleeves may be used to obscure the elevated edge lights. Pipe sleeve length shall be of sufficient length to block all light output and to prevent any light leakage.
 - (3) In extreme circumstances and with written permission of the Engineer, no more than 5% of the fixtures in each airfield lighting circuit may be unplugged from the L-830 isolation transformer secondary or have the lamp removed. If at anytime a larger number of fixtures are required to be bypassed (or have the lamp removed); the L-830 isolation transformer secondary shall have a shorting device installed.
 - (4) Airfield signs providing directions to closed areas shall be covered (black out). No stray light may be emitted from the covered portions of the sign. The signs shall be covered with 3/8" thick exterior plywood panels. The plywood panels shall be painted black and shall be banded to the sign. Please refer to the temporary airfield lighting details provided in the Contract Documents for additional requirements.
 - (5) Areas closed to aircraft shall not be lighted (black out). The Contractor shall ensure that lighting in the closed areas cannot be inadvertently energized.
 - (6) Adequate lighting in the opinion of the Engineer or Airport Operations shall be provided to delineate the active and closed areas of the AOA.
- c. CAUTION: The series lighting circuit must always be complete before a regulator is energized. Normal circuit voltage is less than 5,000 volts; open circuit voltage can be more than 10,000 volts. All personnel shall be instructed to protect the integrity of the lighting circuit. Turn off and lock out/tag out the regulator at the vault before opening the circuit. Continuity of the circuit shall be checked before the regulator is reconnected and reenergized.
- d. The installation and/or removal of lighting equipment is critical to airport operations; therefore, the Contractor shall follow work schedules established in the Contract Documents or as directed by the Engineer. The Contractor shall attend weekly coordination meetings with Airport Operations for the duration of the contract. The system shall be installed in accordance with applicable FAA Advisory Circulars, the National Electrical Code and/or local code requirements.
- e. The Contractor shall provide temporary wiring as required to reconnect existing circuits to provide guidance for aircraft to pass through the construction areas on those taxiways, which must remain open. The Contractor shall bypass or otherwise render inoperative those portions of the taxiway lighting circuits in closed areas of the airfield.

- f.** All taxiways not closed for construction shall have fully operable airfield lighting systems using the airport airfield lighting control system. The Contractor shall coordinate the temporary airfield lighting requirements for each phase with the Engineer. The Contractor shall submit a temporary airfield lighting plan to the Engineer two weeks prior to the need for the temporary airfield lighting. The Engineer will coordinate the plan with the airport and FAA. The Contractor shall make revisions/corrections to the temporary airfield lighting plan as required by the Engineer.
- g.** It shall be the Contractor's responsibility to determine that all airfield lighting circuits, except those that are serving closed taxiways or runways, are fully functional, using tower controls, at the end of each work shift and shall so certify to the Engineer at the end of each shift. The Contractor shall not leave the work area until the Engineer has confirmed circuit operation. The certification shall be provided to the Engineer at 4:00 PM and one hour before sunset. Second shift report shall report one hour before sunset. Any other shift shall report one hour prior to the need for airfield lighting or as determined by the Engineer. Should bad weather cause poor visibility the Engineer may require additional status reports of system operability and may call for the operation of the airfield lighting system at any time. In the event of airfield lighting system failure, the Contractor shall immediately take the necessary steps to restore proper operation of the airfield lighting system.
- h.** It shall be the Contractor's responsibility to determine that all airfield lighting and signage circuits serving closed taxiways are turned off, bypassed as previously described or completely obscured at the end of each work shift and shall so certify to the Engineer at the end of each shift. The Contractor shall not leave the work area until the Engineer has confirmed the closed area is properly blacked out.
- i.** The Contractor shall check the status of the temporary airfield lighting/signage and black out equipment on a daily basis. The Contractor shall provide temporary airfield lighting/signage and black out maintenance and support on a 24 hour a day, seven days a week basis for the duration of the project. The Engineer shall be provided contact names and phone numbers for two persons (one as primary, one as backup) to provide maintenance or to meet temporary airfield lighting/signage and black out needs during off hours. The designated person shall respond onsite within one hour of initial contact.
- j.** Whenever the scope of work requires connection to an existing circuit, or should the scope of work involve working adjacent to or near an existing circuit, and the work could have any impact on the existing circuit, the circuit's insulation resistance shall be tested, in the presence of the Engineer. The test shall be performed in accordance with Item SP-111 and prior to any activity affecting or impacting the respective circuit. The Contractor shall record the results on forms included in SP-111. When the work affecting the circuit is complete (or at end of shift prior to energization), the circuit's insulation resistance shall be checked again, in the presence of the Engineer. The Contractor shall record the results on forms included in SP-111. The second reading shall be equal to or greater than the first reading or the Contractor shall make the necessary repairs to the 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. The Contractor shall measure and record the insulation resistance of ALL airfield lighting circuits prior to starting any work. All test results shall be submitted in the Operation and Maintenance (O&M) Manual.

- k. Should the Contractor fail to perform the tests prior to starting work, the Contractor shall be responsible to bring the impacted circuits to a minimum 50 megohm insulation resistance value or higher value in conformance with any previous airport test records.
- l. Provide temporary wiring to permit operation of lighting circuits associated with each phase of construction. Temporary cable connections shall be made in airfield lighting circuits when permanent wiring cannot be completed during daylight hours.
- m. The Contractor shall furnish, install and maintain hazard marking and lighting to identify closure areas, open manholes, small areas under repair, stockpiles, and other construction related areas hazardous to aircraft or personnel.
- n. The Contractor is responsible for operating all temporary circuits within their rated capacity.
- o. The cost of temporary and reconnected airfield lighting/power shall be considered incidental to the pay items provided within the Contract Documents.

4.3 TEMPORARY ELECTRICAL AND LIGHTING INSTALLATION.

- a. Temporary electrical and/or lighting fixtures shall be provided in operational areas of buildings where required to maintain public safety and continued airport operations.
- b. Provide temporary roadway lighting on airport roads and detours during construction. Design installation and removal of temporary systems shall be the responsibility of the contractor. Light levels shall be 1.0 maintained foot-candles on the traveled part of the roadway. Lighting under the bridges during construction shall have a metal halide or other white light source, providing a maintained light level of 2.0 foot-candles. Maximum to minimum uniformity ratios shall be 10:1.
- c. Temporary lighting must be installed to ANSI/OSHA standards for impacted area. Light levels shall also meet the requirements of the Illuminating Engineering Society for the type of task being performed.
- d. Temporary installations shall be approved by Electrical Maintenance Manager or authorized representative.
- e. The cost of temporary and reconnected area/building lighting/power shall be considered incidental to the pay items provided within the Contract Documents.

4.4 MISCELLANEOUS REGULATIONS.

- a. Electrical main distribution panels, branch circuits panels, control panels, etc., may have their front covers removed for access to live parts. Access to live parts shall be guarded/barricaded in accordance with NFPA 70E.
- b. Draw-out type breakers, regardless of operating voltage must be drawn completely out to open position and tagged and locked out per 104-4.1.
- c. In hazardous locations, regardless of class, all electrical tools and extension cords shall be of a type accepted for use in such areas.

- d. No counterpoise/grounding conductors may be joined, connected, or affixed to any terminal, grounding electrode, or other point of attachment by any method except exothermic welding, or accepted equivalent. See Item L-108.
- e. All counterpoise or grounding systems, when damaged, shall be immediately reported to the Engineer. Once the repair/replace procedure has been accepted by the Engineer the Contractor shall immediately repair/replace the counterpoise or grounding components.
- f. No high voltage switch shall be engaged or disengaged under load.
- g. All backhoes, cranes, etc., shall be enclosed by safety pylon or other markers and rope festooned by accepted safety tapes.
- h. All security gates in use by Contractors are the responsibility of the Contractor, and must be used in a fully secure manner. Any damage to a security gate shall be reported immediately to the Engineer.

4.5 TEMPORARY COMMUNICATIONS/CONTROL.

- a. Temporary communication and control systems shall be provided in operational areas of buildings where required to maintain public safety and continued airport operations. Temporary communication and control systems shall be as described in the Contract Documents.
- b. The cost of temporary and reconnected communication and control shall be considered incidental to the pay items provided within the Contract Documents.

METHOD OF MEASUREMENT

5.1 METHOD OF MEASUREMENT.

- a. With the exception of Temporary Power and Temporary Airfield Lighting/Signage/Navigational Facilities the items described in this item are incidental to other items and shall be included with its applicable system.
- b. Temporary Power & Temporary Airfield Lighting/Signage/Navigational Facilities shall be measured as a lump sum item.

BASIS OF PAYMENT

6.1 BASIS OF PAYMENT.

- a. With the exception of Temporary Power & Temporary Airfield Lighting/Signage/Navigational Facilities, as described below, no direct payment shall be made for the work described in this section. The work described in this section is incidental to other items and shall be paid for the respective bid item of which it is a component part.
- b. Temporary Power & Temporary Airfield Lighting/Signage/Navigational Facilities payment shall be made at the contract lump sum price for the required work. This item shall include all testing, troubleshooting, maintenance and other consequential work required to maintain the temporary power, temporary emergency standby power via rental generator and temporary airfield lighting,

signage, and Navigational Facilities as impacted by this Contract and within the limits of work area. This price shall be full compensation for furnishing all material, labor, transportation, services, equipment, utility company fees and for all preparation, removal of the temporary materials and equipment and for all labor, equipment, tools and all incidentals required to furnish and install Temporary Power and Temporary Airfield Lighting, Signage, and Navigational Facilities in accordance with the Contract Documents. This item includes all excavation, backfill and other materials and appurtenances necessary to complete these items.

Payment will be made under:

No separate payment will be made for temporary power or airfield lighting/signage.

END OF ITEM SP-11

**SPECIAL PROVISION NO. 12
ALTERATIONS, REMOVAL AND DEMOLITION
GENERAL**

1.1 GENERAL.

- a. This item shall apply to all electrical work contained within the Contract Documents. Where the contract general conditions, special provisions or other parts of the Contract Documents also apply, the stricter of the documents shall govern.
- b. Alterations shall mean any change or rearrangement in the component parts, including structural, mechanical, and electrical systems, or internal or external arrangements of an existing item, component, system or structure.
- c. Removal shall mean the dismantling and disposal of existing materials, components, equipment, and utilities. Removed items shall be handled, prepared for storage, transported to storage areas, or disposed of as specified.
- d. Demolition shall mean abandonment, removal and disposal, or salvage and delivery to the Owner as required by the Contract Documents.
- e. The installation and/or removal of lighting equipment may be critical to airport operations; therefore, the Contractor shall follow work schedule established in the Contract Documents or as directed by the Engineer.
- f. Temporary power and lighting shall be accomplished in accordance with the Contract Documents.

1.2 CONDITION OF EXISTING FACILITIES.

- a. The Contractor shall verify the areas, conditions, and features necessary to tie into existing construction. This verification shall be done prior to submittal of shop drawings, fabrication or erection, construction or installation. The Contractor shall be responsible for the accurate tie-in of the new work to existing facilities.
- b. The Contractor shall protect all existing utilities from damage resulting from alteration, removal and demolition activities.
- c. **Any hazardous waste issue shall be immediately reported to the Engineer.**
- d. Whenever the scope of work requires, connection to an existing circuit, or should the scope of work involve working adjacent or near to an existing circuit and the work could have an adverse impact on the existing circuit, the circuit's insulation resistance shall be tested, in the presence of the Engineer. The test shall be performed in accordance with Item SP-111 and prior to any activity affecting or impacting the respective circuit. The Contractor shall record the results on forms included in Item SP-111. When the work affecting the circuit is complete (or at end of shift prior to energization), the circuit's insulation resistance shall be checked again, in the presence of the Engineer. The Contractor shall record the results on forms included in Item SP-

13. The second reading shall be equal to or greater than the first reading or the Contractor shall make the necessary repairs to the 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. The Contractor shall measure and record the insulation resistance of **ALL** airfield lighting circuits prior to starting any work. All test results shall be submitted in the Operation and Maintenance (O&M) Manual.

- e. Should the Contractor fail to perform the insulation resistance tests prior to starting work, the Contractor shall be responsible to bring the impacted circuits to a minimum 50 megohm earth resistance value or higher value in conformance with any previous airport test records.

1.3 OCCUPANCY AND USE OF EXISTING FACILITIES.

- a. The Owner will occupy and use the facilities within the areas of work during the entire construction period. The Contractor shall be required to plan and coordinate the Contractor's activities in order to provide all necessary controls for the abatement of dust, noise, and inconvenience to Owner personnel during all phases of the work.

1.4 VACATING OCCUPIED AREAS.

- a. The Owner will remove all portable items of furniture, equipment, and fixtures prior to the start of work.

1.5 SAFETY REQUIREMENTS.

- a. The Contractor shall conduct all operations in a manner that will ensure the safety of persons and property in accordance with the OSHA requirements of CFR 29 Part 1926/1910.
- b. The Contractor shall comply with the Airport Maintenance Department's LOCK OUT/TAG OUT (LOTO) procedure and NFPA 70E.

1.6 CLASSIFICATION OF REMOVED ITEMS.

- a. Existing materials and equipment indicated to be removed will be classified as "salvageable" and shall remain the property of the Owner or will be classified as "demolition or debris" and shall be legally disposed.
- b. **Salvageable Items:**
 - (1) Salvaged materials and equipment shall be reused in the work only in construction of temporary electrical facilities, unless noted otherwise.
 - (2) Properly box, protect and ready for transport salvageable items. Retained salvaged items shall be stored on Owner property.
 - (3) Salvaged materials and equipment to be retained by the Owner but not reused in the work shall be turned over to the Owner at a site at the facility to be determined by the Owner.
 - (4) Airfield lighting fixtures, signs and isolation transformers designated to be removed and reinstalled by the Contractor shall be stored indoors in a conditioned space. The indoor conditioned space shall be provided by the Contractor and considered incidental to the pay items provided. As each item designated for removal and reinstallation is removed the

Contractor and Engineer shall immediately inspect the item for appropriateness for reinstallation. Any damage not reported in writing to the Engineer within two hours of removal shall become the Contractor's responsibility for replacement/repair of the material as directed by the Engineer. The Contractor is asked to pay special attention to the protection of the semiflush fixture leads. The semiflush fixture lead insulation is easily damaged which results in water infiltration into the fixture.

c. Demolition or Debris:

- (1)** Items classified as demolition or debris shall be legally disposed of off the Owner's property. The cost of such disposal shall be included in the bid price.

1.7 TEMPORARY PROTECTION.

- a.** Contractor shall protect persons and property throughout the progress of the work in accordance with the Contract Documents.

1.8 DEMOLITION TASK PLAN AND SCHEDULE.

- a.** The Contractor shall submit to the Engineer a Demolition Task Plan and Schedule for all existing utility relocation(s) and demolition work. The task plan shall be submitted within 30 days of notice to proceed but no later than 30 days prior to the start of the relocation/demolition work.
- b.** The task plan and schedule shall detail the phasing of the utility relocation(s) and demolition activities with the balance of the project phasing plan. The task plan and schedule shall detail the Contractor's plan for protection of the existing utilities.
- c.** The task plan and schedule shall demonstrate preliminary coordination has taken place with the FAA, Airport, communications and power utilities and demonstrates compliance with the Contract Documents.
- d.** No work shall be initiated until the task plan and schedule has been submitted to the Engineer and accepted by the utilities. No demolition, alteration or relocation work shall be started until the permanent work replacing the demolition, alteration or relocation is complete, in place, accepted and ready for operation; or until other temporary means have been approved and accepted by the Engineer.

EXECUTION

2.1 DISCONNECTING UTILITIES.

- a.** Prior to the start of work, the Contractor shall coordinate with the Owner and effected utility companies to have each utility placed in a safe work condition.
- b.** Each utility effected shall be locked out and tagged by the Contractor. Proper safety grounds or equivalent shall be placed for personnel protection.

2.2 TEMPORARY UTILITY SERVICES.

- a. Contractor shall install temporary utility services in satisfactory operating condition before disconnecting existing utilities. Such temporary services shall be maintained during the period of construction and removed only after new permanent services have been tested and are in operation. Please refer to Item SP-104.

2.3 REMOVAL WORK.

- a. The Contractor shall not disturb the existing construction beyond that indicated or necessary for installation of new work. Temporary shoring and bracing for support of building components to prevent settlement or other movement shall be as required to protect the work and existing facilities.
- b. The Contractor shall provide protective measures to control accumulation and migration of dust and dirt in all areas of work, particularly those adjacent to occupied areas. The Contractor shall remove dust, dirt, and debris from the areas of work daily.

2.4 SALVAGEABLE MATERIALS AND EQUIPMENT.

- a. The Contractor shall remove all salvageable materials and equipment in a manner that will cause the least possible damage thereto. Salvageable items, which are to be retained by the Owner, shall be carefully handled, stored, and protected.
- b. The Contractor shall provide identification tags on all salvageable items boxed or placed in containers, indicating the type, size, and quantity of materials.
- c. The Contractor shall exercise extreme care when removing airfield lighting bolting hardware. The existing bolting hardware may have been installed in excess of twenty-five years. The Contractor shall be responsible for the proper removal/repair/replacement of all stripped/broken/damaged fixture bolts or light base bolts or tapped holes in light bases and/or appurtenances encountered during construction. Contractor shall use drilling/tapping/inserts fixture/jigs/tooling and methods approved by the light base manufacturer or an accepted equivalent. Payment for this work shall be considered incidental to the respective fixture and light base pay items provided in the Contract Documents.

2.5 BUILDINGS AND STRUCTURES.

- a. The Contractor shall perform removal operations in existing areas/buildings/structures as indicated and as otherwise required to complete the work.
- b. Existing concrete shall be demolished, removed, and disposed. Square, straight edges shall be provided where existing concrete adjoins new work and at other locations where indicated. Existing steel reinforcement shall be protected where indicated; otherwise, it shall be cut off flush with face of concrete.
- c. The Contractor shall dismantle structural steel components at field connections and in a manner that will prevent bending or damage.
- d. The use of flame-cutting torches will be permitted only when other methods of dismantling are not practical, and when approved in writing by the Engineer.

2.6 ELECTRICAL EQUIPMENT AND FIXTURES.

- a. Wiring systems and components shall be salvaged. Loose items shall be boxed and tagged for identification.
- b. Primary, secondary, control, communication, and signal circuits shall be disconnected at the point of attachment to their distribution system.
- c. The Contractor shall remove and salvage electrical fixtures. Incandescent lamps, mercury-vapor lamps, and fluorescent lamps shall be salvaged, boxed and tagged for identification, and protected from breakage. The fixtures shall be turned over to the Owners Maintenance Department. This Contractor shall legally dispose of concrete bases, etc. off the Airport property.
- d. The Contractor shall remove and salvage switches, receptacles, fixtures, transformers, regulators, meters, instruments, cover plates, circuit breakers, panelboards, outlet boxes, and similar items; these items shall be boxed, and tagged for identification according to type and size.
- e. The Contractor shall remove and salvage cable tray, wiring ducts and troughs.
- f. The Contractor shall remove and dispose of conductors, including insulated wire, nonmetallic sheathed and flexible armored cable.
- g. All removed or demolished items not identified for reuse in the work or to be turned over to the Owner, unless noted otherwise, shall be properly and legally disposed of off the airport site.

2.7 DEMOLITION OPERATIONS.

- a. Demolition operations shall be conducted to ensure the safe passage of persons to and from facilities occupied and used by the Owner.
- b. The sequence of operations shall be such that maximum protection from inclement weather will be provided for materials and equipment in partially dismantled state.

2.8 MAINTAINING TRAFFIC.

- a. Demolition operations and removal of debris to disposal areas shall be conducted to ensure minimum interference with roads, streets, walks, and other facilities occupied and used by the Owner.
- b. Streets, walks, runways, taxiways and other facilities occupied and used by the Owner shall not be closed or obstructed without written permission.

2.9 UTILITY ADJUSTMENTS.

- a. The Contractor shall adjust utility elevations and or locations as described in the Contract Documents.

DISPOSAL OF REMOVED/DEMOLISHED MATERIALS

3.1 GENERAL.

- a. The Contractor shall dispose of debris, rubbish, scrap, and other non-salvageable materials resulting from demolition/removal operations. Removed/demolished materials shall not be stored or disposed of on the project site.
- b. Removed/demolished materials shall be properly and legally disposed of off airport property.
- c. Removed/demolished debris shall be transported from Owner property and legally disposed at no additional cost to the Owner. The Contractor shall pay permits and fees for disposal.

3.2 RACEWAY DEMOLITION.

- a. Pull wire out of existing raceways. Underground conduit/duct may be abandoned in place when not in an area of excavation. When abandoned in place install waterproof caps/plugs and concrete end of duct markers.
- b. Raceways that interfere with new work shall be completely removed.
- c. Install 200-pound test pull rope in all conduits/ducts to remain in place. Conduit/duct banks may be abandoned in place if they are not within 24" of any new subgrade material.
- d. Dispose of raceway as debris.

3.3 AIRFIELD LIGHTING AND SIGNS.

- a. Carefully remove existing airfield lighting, signs, etc. as noted in the Contract Documents. Properly store all signs, fixtures, base plates and spacer rings for reinstallation or turn over to Owner as noted in the Contract Documents.
- b. There may be concrete foundations (anchors) around light bases that extend into the existing asphalt surface as well as concrete backfilled trenches, conduits and duct banks within the asphalt paved areas that may be encountered during the required milling process. To the extent known, these duct banks and conduits are shown on the Contract Documents under/within the paved areas. The milling of any such concrete around the light bases, or over trenches, ducts and conduits shall be considered incidental to the milling pay item.
- c. Existing concrete sign pads, light bases, and raceways shall be demolished, transported from Owner property and legally disposed.
- d. If required by the Contract Documents reinstall signs and fixtures.
- e. Turn over to the Owner all signs, fixtures, base plates and spacer rings not reinstalled as a part of this contract.
- f. Remove existing light bases, L-824 cable, L-830 isolation transformers and associated foundations and legally dispose.

3.4 MANHOLE/HAND HOLE DEMOLITION.

- a. Manholes, hand holes, pull boxes, etc. shall be removed and disposed of as demolition debris.
- b. Demolished manholes, hand holes, pull boxes, etc. below the new full strength pavement shall be completely removed.
- c. Demolished manholes, hand holes, pull boxes, etc. below shoulder pavement or in turfed areas shall be cut down to a depth of 48" min. below finished grade, filled and compacted in accordance with the Contract Documents.

3.5 GENERAL – CUTTING AND PATCHING.

- a. Cutting, patching, repairing, and other alteration work shall be done by mechanics skilled in the particular trade or work required.
- b. Salvaged items for reuse shall be as accepted by the Engineer.
- c. Where required to patch or extend existing construction, or both, such alteration work shall match existing exposed surface materials in finish, color, texture, and pattern.

3.6 REQUIRED DEMOLITION OF UNFORESEEN CONDITIONS.

- a. During the course of construction, unforeseen or unanticipated abandoned electrical bases, structures or components (items) remaining from previous construction and for which no record was available or for which no field observation can confirm, may be uncovered. The items may be constructed of reinforced concrete, steel or other durable materials. These items may be under the ground surface or may be discovered during the milling process. An example of such a structure would be an old military concrete light base remaining from a previous project, located under shoulder pavement that requires full depth removal. These items are over and above the items shown on the Existing Condition and Demolition drawings which denote demolition. This work shall provide for the removal of the item, backfill and restoration of the surrounding excavation or disturbed areas caused by the removal of the item. The Engineer shall make the final determination if the item in question is unforeseen or unanticipated. The Engineer may adjust the Contract Documents to relocate the new design element to avoid the conflict with the unforeseen or unanticipated item.

METHOD OF MEASUREMENT

4.1 METHOD OF MEASUREMENT.

- a. All Electrical Demolition covered by this item will be paid for at the contract lump sum price, as set forth below, for demolition, alteration and removal complete and in accordance with the Contract Documents.
- b. L-867 and L-868 light bases, not currently designated for demolition/removal, but required to be removed to support paving operations shall be measured by each unit removed, completed and accepted. No separate measurement will be made for the various types and sizes. The Engineer shall designate, as construction progresses which additional light bases are required to be removed to support milling/paving operations.

- c. Demolition of unforeseen or unanticipated items shall be measured by the entire item removal, backfill, and restoration, completed, and accepted. Separate measurement will be made for the various types and sizes. Items 250 cubic feet and larger in size shall be paid for in multiples of the two pay items provided. The multiples selected for the oversized unforeseen or unanticipated items shall be those most advantageous to the Owner.

BASIS OF PAYMENT

5.1 BASIS OF PAYMENT.

No separate payment shall be made for Special Provision No. 12.

SPECIAL PROVISION NO. 13
SUBMITTALS, RECORD DOCUMENTS AND MAINTENANCE MANUALS
DESCRIPTION

1.1 GENERAL

- a. The items described in this item are applicable to all electrical work. Electrical work is defined as any work described, included, depicted or contained within the Construction Specifications Institute (CSI) Division 16, 26, 27, 28, 33 or 34 specifications, L- specification series, SP- specification series, L- series drawings, E- series drawings, ED- series drawings and all other work within the Contract Documents dealing with the distribution of electrical power/light, electrical/electronic/light monitoring, communication and control.
- b. Only Third-Party Certified manufacturers, listed in AC 150/5345-53, Appendix 3 Addendum (as required) and meeting the BUY AMERICAN preference requirements can provide equipment and materials specified in the Contract Documents. Documentation certifying compliance with the BUY AMERICAN preference rules for AIP (in accordance with Title 49, United State Code [USC], 1990; later designated as 49 USC §50101) shall be included with each equipment and material submittal.
- c. The requirements for submittals, record drawings and Operation and Maintenance (O&M) Manuals supplement the requirements and are in addition to the requirements of the general conditions, special provisions or other parts of the Contract Documents. Where the contract general conditions, special provisions or other parts of the Contract Documents also apply, the stricter of the documents shall govern.

1.2 SCOPE

- a. This item includes the requirements for submittals, record documents and operation and maintenance (O&M) manuals. All submittals and O & M Manuals shall be submitted in book form as described by this item.

REQUIREMENTS FOR SUBMITTALS

2.1 DATA, SHOP DRAWINGS AND SAMPLES

- a. Shop drawings are drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are prepared by the Contractor or any subcontractor, manufacturer, supplier or distributor, and which illustrate some portion of the work.
- b. Submittal data for electrical materials and equipment shall consist of shop drawings and/or catalog cuts showing technical data as necessary to evaluate the material or equipment, to include dimensions, wiring diagrams, performance curves, ratings, control sequence and other descriptive data necessary to describe fully the item proposed and its operating characteristics.
- c. Prior to the installation of any material or equipment and **within 30 days of notice to proceed**, the Contractor shall provide to the Engineer all submittals as required by the Contract Documents. The submittals shall be complete and made in **ONE** submission in the format required by this item. Partial submission will only be considered under special circumstances.

- d. The Contractor shall perform no portion of the work, nor purchase any materials, requiring submission until the Engineer has accepted the relevant submittal/shop drawing/sample. Should the Contractor commence any work or install any materials prior to the receipt of an accepted submittal/shop drawing/sample the Contractor is deemed to be proceeding at the Contractor's own risk.
- e. Samples are physical examples furnished by the Contractor to illustrate materials, equipment or workmanship, and to establish standards by which the work will be judged. Each sample shall be accompanied by the manufacturer's instructions regarding installation, operation and maintenance and shall be identified by item number, and specification.
- f. By approving and submitting Shop Drawings and Samples, the Contractor thereby represents that the Contractor has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data and that the Contractor, has checked and coordinated each Shop Drawing and Sample with the requirements of the work of the Contract Documents.
- g. Unless otherwise stated in the Contract Documents the Engineer will review Data, Shop Drawings and Samples within thirty (30) days after receipt, but only for general conformance with the design concept of the project and general compliance with the information given in the Contract Documents. The Engineer's review of a separate item shall not indicate approval of an assembly in which the item functions.
- h. The Engineer reserves the right to reject any and all equipment, materials and procedures, which, in the Engineer's opinion, does not comply with the system design and the standards and codes specified herein.
- i. The Engineer shall be the sole judge of whether the proposed "acceptable equivalent" is suitable for use in the work.
- j. The Contractor shall make any corrections required by the Engineer and shall resubmit the required number of corrected shop drawings or new samples until accepted. The Contractor shall direct specific attention in writing on resubmitted shop drawings to revisions other than the corrections requested by the Engineer on previous submissions.
- k. If the Contractor desires to substitute materials or deviate from the requirements of the Contract Documents, the Contractor shall separately submit all substitute materials and deviations to the Contract Documents. Such submittals shall be clearly and boldly marked "**SUBSTITUTION**" or "**DEVIATION TO CONTRACT DOCUMENTS**". If the substitution or deviation is accepted, the Contractor will not be excused from producing work in conformity with the Contract Documents. If a trial use establishes the work does not comply with the Contract Documents, the Contractor shall take such action as the Engineer determines necessary.
- l. The Engineer's approval of shop drawings or samples shall not relieve the Contractor of responsibility for any deviation from the requirements of the Contract Documents unless the Contractor has informed the Engineer in writing of such deviation at the time of submission and the Engineer has provided written acceptance to the specific deviation. The Engineer's approval

shall not relieve the Contractor from responsibility for errors or omissions in the shop drawings or samples.

- m.** The submittals will be checked only for general conformance with the design concept of the project and general compliance with the information given in the Contract Documents. Any action noted by the Engineer on the submittal is subject to the requirements of the Contract Documents.
- n.** The Contractor is responsible for dimensions, quantities, fabrication processes and methods of construction, coordination of the Contractors work with that of all trades. The Contractor shall be responsible for satisfactory performance of the Contractor's work and supplying a complete and fully functional system. The Contractor shall confirm and correlate dimensions at the jobsite.
- o.** Samples shall be submitted upon request or as required by the Contract Documents.
- p.** The Contractor shall maintain an accurate updated "SUBMITTAL REGISTER" containing the status of all submittals. The log shall be updated on a weekly basis. The Contractor shall bring the submittal register to each progress meeting. The submittal register shall contain the following information:
 - (1)** Submittal description and number assigned.
 - (2)** Contract Document required submittal date.
 - (3)** Submittal electrical system type; airfield lighting or airfield lighting control or airfield lighting vault power system.
 - (4)** Reference Item # (L-108, 26 05 33.13, etc.).
 - (5)** Date sent to Engineer.
 - (6)** Date returned to Contractor from Engineer.
 - (7)** Submittal status.
 - (8)** Date of resubmittal and return – as applicable.
 - (9)** Date material released for fabrication.
 - (10)** Projected date of fabrication.
 - (11)** Projected date of delivery to site.

2.2 ELECTRONIC SUBMITTAL

- a. Electronic submittal shall consist of a single PDF document separated and book marked per each electrical system, per specification section as described in section 2.2.d. containing all materials for each item to be installed in the project.
- b. Electronic submittals larger than 10 megabyte shall be separated into smaller PDF files for transmission to make up a single PDF document. Each separate PDF shall be book marked per specification section containing all materials for each item to be installed in the project.
- c. Each PDF for electronic transmission shall be clearly labeled as transmittal X of Y per submittal section.
- d. Provide separate submittal PDF's for each of the following electrical system types:
 - (1) One PDF submittal set for the Airfield Lighting System. All components to be included in the contract for lighting, conduit, grounding and miscellaneous systems shall be included.
 - (2) One PDF submittal set for the Airfield Lighting Control System.
 - (3) One PDF submittal set for the Airfield Lighting Vault Modifications,

2.3 SUBMITTAL CONTENTS

- a. First sheet(s) in shall be a cover sheet containing the project information and location. See appendix A at the end of SP-106 specification.
- b. The second sheet shall be a table of contents identifying the specification section(s) being submitted.
- c. Third sheet shall be prepared and filled out by Contractor and shall list project address of airport, Engineer, Contractor & subcontractor(s).
- d. Fourth sheet shall also be filled out by Contractor and list project schedule information.
- e. Submittals consisting of marked catalog sheets or shop drawings shall be inserted in the PDF in specification number/section order. Submittal data shall be presented in a clear and thorough manner. **Original PDF catalog sheets are preferred. Scans of catalog sheets are acceptable provided they are equivalent in quality to the original document.**
- f. Clearly and boldly mark each page to identify pertinent products or models applicable to this project. Indicate all optional equipment and delete non-pertinent data. **Markings shall be boldly and clearly made with arrows or circles (highlighting is not acceptable).**
- g. All sheets within the submittal shall be oriented in a portrait setting. Mixing of portrait and landscape oriented standard 8.5 X 11 sheets shall not be permitted.

- h.** All sheets contained within the PDF shall be straight. Sheets scanned on a drastic angle making the submittal page difficult to read shall not be permitted and shall result in the submittal being rejected.
- i.** Some catalog sheets have colored backgrounds or colored text. When scanned these items appear black and obscure the printed text and markings by the contractor. For this reason all scans of sheets with colored backgrounds or text shall be made in color. Sheets that are not readable due to obscured information shall be rejected.
- j.** Submittals for components of electrical equipment and systems shall identify the equipment for which they are a component part on each submittal sheet.
- k.** Shop Drawings: Drawings to include identification of project and names of Engineer(s), General Contractor, subcontractor and supplier, data, number sequentially and indicate the following:

 - (1)** Fabrication and erection dimensions.
 - (2)** Arrangements and sectional views.
 - (3)** Necessary details, including complete information for making connections with other work.
 - (4)** Kinds of materials and finishes.
 - (5)** Descriptive names of equipment.
 - (6)** Modifications and options to standard equipment required by the work.
 - (7)** Leave blank area, size approximately 5 x 5 inches, near title block for the Engineer's stamp imprint.
 - (8)** Point-to-point wiring diagrams.
 - (9)** Conduit/duct/raceway rough-in drawings.
 - (10)** See specific items of the Contract Documents for further requirements.
- l.** Submittal Product Data - Technical data is required for all items as called for in the Contract Documents regardless if item furnished is as specified.

 - (1)** Submit technical data verifying that the item submitted complies with the requirements of the Contract Documents. Technical data shall include manufacturer's name and model number, dimensions, weights, electrical characteristics, and clearances required. Indicate all optional equipment and changes from the standard item as called for in the Contract Documents. Furnish drawings, or diagrams, dimensioned and in correct scale, covering equipment, showing arrangement of components and overall coordination.

(2) In order to facilitate review of product data, insofar as practicable, they shall be noted, indicating by cross reference the Contract Documents, note, drawing number and/or specification number and item paragraph numbers where item(s) occur in the Contract Documents.

(3) See specific items in Contract Documents for further requirements.

2.4 PROCESSING SUBMITTALS

- a. Submit the PDF submittal and shop drawings per Specification section
- b. The Contractor shall review, stamp with the Contractor's approval and submit to the Engineer, eight (8) prints of shop drawings, eight (8) copies of submittal books and three (3) sets of samples where required, as described in this item,
- c. The General Contractor shall review the submittal books before submitting to the Engineer. No request for payment will be considered until the submittal book has been reviewed and submitted for review by the Engineer.
- d. Product Data: For standard manufactured materials, products and items, submit one (1) copy or sets of data (per book).
- e. Shop Drawings for custom fabricated items and systems:
 - (1) Initially submit a transparency (suitable for reproduction) together with four (4) prints made the transparency.
 - (2) When submittal is acceptable, furnish one (1) print per book made from the accepted transparency.
- f. Acceptance: When returned to Contractor, the front of each submittal will be marked with the Engineer's stamp. If box marked "Submit Specified Item", or "Rejected" or "Revise and Resubmit" is checked, submittal is not accepted and Contractor is to correct and resubmit as noted. If submittal is marked "Make Correction Noted" Contractor may begin construction utilizing the submitted item with corrections made. **However, the corrected submittal must be resubmitted for record keeping purposes.** Contractor is to comply with notation making necessary corrections on submittal and resubmit for final record.
- g. If the submittal is marked "No Exception Taken" the Engineer took no exceptions to the submitted items.
- h. Corrections or comments made on the shop drawings during this review do not relieve Contractor from compliance with requirements of the Contract Documents. This check is only for review of the general conformance with the design concept of the project and general compliance with the information given in the Contract Documents. The Contractor is responsible for; confirming and correlating all quantities and dimensions; selecting fabrication processes and techniques of construction; coordinating the Contractor's work with that of all other trades and performing all work in a safe and satisfactory manner.

- i. Note that the acceptance of shop drawings or other information submitted in accordance with the requirements contained in this item, does not assure that the Engineer or any other Owner's Representative attests:
 - (1) To the dimensional accuracy or dimensional suitability of the material or equipment involved.
 - (2) The ability of the material or equipment involved to perform as designed.
 - (3) The mechanical or electrical performance of equipment.
- j. Approval of shop drawings does not invalidate the Contract Documents if in conflict; unless a letter requesting such a change is submitted and accepted on the Engineer's letterhead.

2.5 DELAYS

- a. Contractor is responsible for delays in job progress accruing directly or indirectly from late submissions or resubmissions of shop drawings, or product data.

2.6 RE-SUBMITTALS

- a. The Engineer shall be reimbursed for engineering costs to review resubmittals subsequent to the second submittal.

RECORD DOCUMENTS

3.1 PROGRESS AND RECORD DRAWINGS

- a. Keep two sets of blue line prints on the job and neatly mark up design drawings each day as components are installed. **Red pencil shall be used for additions and green pencil for deletions. Use of "white out" or similar products is not permitted.**
- b. All items on record drawings shall be shown in actual location installed. Drawings shall be inspected weekly, by the Engineer, for compliance and accuracy. Project payments shall be withheld if the marked-up drawings are not current.
- c. Change the equipment schedules to agree with items actually furnished.
- d. All hand holes, pull boxes, junction can plazas, manholes, underground ducts, conduits, force mains, drains, ground grids, etc. (all underground utilities) installed by this Contractor or located by this Contractor during the construction of this project shall be surveyed and recorded on the record documents. Record utility locations in state plane grid coordinates. Provide north-south, east-west coordinate and elevation.
- e. At the end of the project, all changes shall be reviewed by the Electrical Contractor. The drawings shall be marked "As Built" and dated and signed by the Electrical Contractor's Superintendent.
- f. Prior to request for final payment, furnish a set of "As Built" prints to the Engineer for review. The final prints shall be professionally drafted to indicate "As Built" conditions to the Engineer. The prints shall be stamped "As Built" signed and dated by the Contractor. The Contractor's signature shall certify to the Engineer that the "As Built" drawings are accurate and complete.

- g.** The Contractor's failure to produce representative "As Built" drawings in accordance with requirements of this item, shall be cause for the Engineer to produce such "As-built" drawings and the Contractor shall reimburse Engineer for all costs to produce a representative set of "As Built" drawings.

OPERATION AND MAINTENANCE MANUALS

4.1 REQUIREMENTS FOR OPERATION AND MAINTENANCE MANUALS

- a.** Two (2) CD's shall be provided with all O & M Manual information included in PDF format. The Operation and Maintenance Manual shall be submitted as a PDF document. As a minimum, the Operation and Maintenance Manual shall contain the following:

- (1)** Safety precautions used while maintaining the equipment.
- (2)** Theory of circuit and system operation.
- (3)** Complete schematic and interconnecting wiring diagrams.
- (4)** Complete parts list with each circuit component keyed to designations assigned on schematics and wiring diagrams. Complete information shall be given for each part to permit ordering for replacement purposes. This information shall include the components rating, name of manufacturer and the manufacturer's part number.
- (5)** Recommended preventative maintenance, including care, cleaning lubrication, service intervals, etc.
- (6)** Troubleshooting procedures.
- (7)** Physical characteristics (weight, size, mounting dimensions, etc.).
- (8)** Installation instructions.
- (9)** Operating instruction.
- (10)** Recommended spare parts and usage for a one (1) year period.
- (11)** Submit for checking purposes a specific set of written operating instructions on each item, which requires instructions to operate. After acceptance, provide one copy for insertion in each Operation and Maintenance Manual.
- (12)** Submit for acceptance maintenance information consisting of manufacturer's printed instructions and parts list for each major item of equipment. After acceptance, insert information in each Operations and Maintenance Manual. Detailed schematic diagrams shall be furnished for all electrical/electronic equipment.
- (13)** Bill of materials.

(14) Physical layout plans.

(15) Equipment supplier list.

(16) Panel schedules shall be submitted with the respective panel data.

(17) Special instructions

(18) Service maintenance contracts including the name, address and 24 hour phone number and contact of manufacturer's authorized Repair Company.

There shall be no "Black Boxes" for which there are no schematic/wiring diagrams.

4.2 OPERATION AND MAINTENANCE MANUALS

- a. O & M Manuals shall consist of a PDF document. The manual shall be bookmarked into sections by Table of Contents, Project Contacts, and each technical specification section. Shop drawings, product data and/or catalog sheets shall be inserted into the O & M PDF by technical specification.
- b. Provide correct designation of project on first page of each technical specification submittal section. Description sheet shall be white with black letters, minimum of 11" high and full width of page. Description shall describe project and match project Contract Document description. Description to include submittal type.
- c. All documents inserted into the O & M Manual PDF, including but not limited to catalog cut sheets, theory of operation, and all other related product data, shall be the original documentation from the manufacturer.
- d. Any scanned documentation shall be legible, and have the correct orientation in the pdf so the document can be read horizontally, from left to right, in line with all other pages in the O & M Manual. Failure to meet these requirements will result in the O & M Manual's rejection. Upon rejection any errata shall be fixed and resubmitted to the engineer for approval.
- e. Provide one O & M Manual for the following electrical system required by the contract documents:

(1) System Descriptions

4.3 OPERATION AND MAINTENANCE MANUAL CONTENTS

- a. Operation & Maintenance Manuals shall include:

(1) First sheet in PDF shall be the cover sheet.

(2) The second sheet shall be a table of contents.

(3) The third sheet shall be filled out by Contractor and shall list project address of airport, Engineer, Contractor & subcontractor(s).

- (4) The fourth sheet shall also be filled out by Contractor and list project schedule information showing project "as completed".
- (5) Shop Drawings: Shop drawings shall be a copy of the final and accepted shop drawings submitted as required in Item SP-13-2. These shall be inserted into the PDF in specification number/section order. Each catalog sheet shall clearly identify where the product is used and the Contract Document identification for equipment.
- (6) Product data and/or catalog sheets shall be a copy of the final and accepted submittal submitted as required in Item SP-13-2. These shall be inserted into the PDF in specification number/section order. Each catalog sheet shall clearly identify where the product is used and the Contract Document identification for equipment.
- (7) Warranty/Guarantee: Provide copy of warranty/guarantee and letters of certification, in respective location in O & M Manual PDF. Original warranty/guarantee shall be incorporated into separate project warranty PDF with warranty/guarantees provided for other items and submitted for Engineer review.

4.4 PROCESSING OPERATION AND MAINTENANCE MANUALS

- a. The General Contractor shall review the manuals before submitting to the Engineer. Submit one CD containing the PDF set of O& M Manuals to the owner and one CD containing the PDF set to the Engineer.

4.5 DELAYS

- a. Contractor is responsible for delays in job progress accruing directly or indirectly from late submissions or resubmissions of the Operation and Maintenance Manuals.

4.6 RE-SUBMITTALS

- a. The Engineer shall be reimbursed the cost to review Operation and Maintenance Manual re-submittals subsequent to the second submittal.

METHOD OF MEASUREMENT

5.1 METHOD OF MEASUREMENT

- a. The items described in Item SP-13 are incidental to other pay items and shall not be measured for payment.

BASIS OF PAYMENT

6.1 BASIS OF PAYMENT

- a. No direct payment shall be made for the work described in Item SP-13. The work described in Item SP-13 is incidental to other items and shall be paid for in the respective bid item of which it is a component part.

SUBMITTAL LIST

7.1 SUBMITTAL LIST

- a. The following is a list of materials expected by the Engineer to be incorporated within the project. This list is not all inclusive as the Contractor's chosen means and methods will have a direct impact on the materials used.
- b. It is the intent of this item that all materials used or incorporated into this project is submitted to the Engineer for review.
- c. The Contractor shall maintain a submittal register in accordance with Part 2 of this item. The Submittal register shall include all items used or incorporated into the project.

LIST TO FOLLOW:

Drawing/ Specification #	Paragraph Number	Subject
P-605	2	P-605, DOW 888 JOINT SEALANT
P-605	2	DOW 890- SL LEVELING JOINT SEALANT
P-606	3.8	UNITEX PRO-POXY P606
P-606	3.8	MAGNOLIA PLASTICS - MAGNOBOND 6504 & MAGNOBOND 6507
L-108	2.2	L-824, #8, 5KV CABLE
L-108	2.4b	L-823, AIRFIELD SECONDARY CONNECTOR AND CHORD SET
L-108	2.4b	L-823, AIRFIELD PRIMARY CONNECTOR KIT
L-108	2.3	#2 BARE SOLID COPPER
L-108	2.3	4/0 BARE COPPER STRANDED CONDUCTOR - GROUND GRID WIRE
L-108	2.3	1/0 BARE COPPER STRANDED CONDUCTOR - GUARD WIRE
L-108	2.3	3/4" COPPER CLAD SECTIONAL GROUND ROD
L-108	2.3	3/4" COPPER CLAD SECTIONAL GROUND ROD COUPLER
L-108	2.3	3/4" COPPER CLAD SECTIONAL GROUND ROD DRIVE STUD
L-108	2.3	CADWELD 3/4" GROUND ROD - #1, #2 AWG SOLID CONDUCTOR (GT1-181V)
L-108	2.3	CADWELD 3/4" GROUND ROD - 1/0 SOLID CONDUCTOR (GT1-182C)
L-108	2.3	#6 XHHW, GREEN INSULATED STRANDED COPPER CONDUCTOR
L-108	2.3	GROUND ROD INSPECTION PIT (L-867 TELESCOPING CAN)
L-108	2.12	3" RED DETECTABLE WARNING TAPE
L-108	2.8	316 STAINLESS STEEL - 18 GAUGE - 2" BLACK FILLED CABLE ID
L-108	2.8	TY-RAP TY525MX - CABLE TIE
L-108	2.9	SCOTCH SUPER 88
L-108	2.9	130C LINERLESS TAPE (2" WIDE)
L-108	2.10	SCOTCHCOAT ELECTRICAL COATING
L-108	3.5d	PENCILLING TOOL

Drawing/ Specification #	Paragraph Number	Subject
L-110	3.9	CONDUIT PITTING LUBRICANT
L-110	3.1	POLY PULL ROPE
L-110	2.3	2" & 4" PVC, SCHEDULE 40 CONDUIT W/ INTEGRAL END BELL
L-110	2.3	PVC CONDUIT FITTING - END BELL
L-110	2.3	PVC CONDUIT FITTING - COUPLING
L-110	2.3	PVC CONDUIT FITTING - 90 DEGREE SWEEP
L-110	2.3	PVC CEMENT
L-110	2.4	4" SPLIT DUCT
L-110	2.5	2" & 4" CONDUIT SPACERS
L-110	2.9	HDPE (DIRECTIONAL BORE) CONDUIT 2", 4"
L-110	2.10	GLASPAVE 25
SP-111	2.1	AIRFIELD LIGHTING CIRCUIT DATA SHEET - CCR
SP-111	2.1	EARTH RESISTANCE TEST
SP-111	2.1	AIRFIELD LIGHTING CIRCUIT CONTINUITY & INSULATION RESISTANCE TESTING
L-125	3.1	ANTI-SEIZE COMPOUND - KOPR-KOTE
L-125	2.8	L-867D LIGHT BASE 16" DIA - 24" DEEP W/ 1 HUB, 3 GROMMETS - SIGN BASE
L-125	2.8	L-858 AIRFIELD GUIDANCE SIGNS LED - MANUFACTURER CUT SHEET
L-125	2.12	L-867D LIGHT BASE CAN - SIGN - 1 HUB, 3 GROMMETS
L-125		L-858 SIGN PANELS
L-125	45-48	L-867D LIGHT BASE CAN 16" DIA X 24" DP - 6 HUBS
L-125	45-48	L-867 GASKET FOR BASE PLATES AND/OR BLANK COVERS - VARIOUS
L-125	45-48	L-867 D/E GALV STEEL BLANK COVERS - 1/2" THK
L-125	45-48	L-867D LIGHT BASE CAN 16" DIA X 24" DP - JUNCTION CAN
L-125	45-48	JUNCTION CANS/STEEL COVERS
L-125	45-48	L-867B and L-868B GALV STEEL BLANK COVERS - 1/2" & 3/4" THICK
E-15	DETAIL	FIELD LIGHTNING ARRESTOR CONNECTION THOMPSON 561T BONDING LUG
E-15	DETAIL	EXTERNAL GROUND STRAP
E-15	DETAIL	#6 THWN-2, STRANDED COPPER CONDUCTOR - GREEN INSUL. FIXTURE JUMPER
E-15	DETAIL	#2 STRANDED COPPER - GREEN (THWN-2) FIELD LIGHTNING ARRESTOR & SIGN JUMPER
L-125	2.7	L-861T(L) LED ELEVATED TAXIWAY EDGE LIGHT
L-125	2.7	L-852T(L) LED IN-PAVEMENT TAXIWAY EDGE LIGHT
E-15	DETAIL	FIELD LIGHTNING ARRESTOR
L-125	2.12	L-867B - 12" ADJUSTABLE LIGHT BASE 19"-24", WITH GROMMETS
L-125	2.12	L-867 PLYWOOD COVER- 12" DIA X 1/2" THK
L-125	2.12	L-867 MUD PLATE

Drawing/ Specification #	Paragraph Number	Subject
L-125	2.12	L-867B - 1-1/2" BASE PLATE WITH STUD GROUND BOLT
L-125	2.12	L-868 BOTTOM SECTION 12" DIA X 16" DEEP WITH GROMMETS
L-125	2.12	L-868 MUDPLATE
L-125	2.12	L-868 TOP SECTION 12" DIA
L-125	2.12	L-868 PLYWOOD COVER- 12" DIA X 5/8" THK
L-125	2.12	L-868 12" DIA SPACER RING 3/4" W/ PAVEMENT RING
L-125	2.12	12" HEAVY BASE PLATE, EXTENDED HUB - 10.25" BC
L-125	2.12	COPPER GROUND LUG
L-125	2.12	3/8" CEC LOCKWASHER - 316 STAINLESS STEEL
L-125	2.13	L-830, ISOLATION TRANSFORMER
P-102	1.10	L-893 RUNWAY CLOSURE MARKER
P-306		SW9C5R10 1200 ECONOCRETE
P-401	3.2	12.5MM BITUMINOUS PAVEMENT DESIGN LAB NO. 9244 DATED 1/13/14
P-401	3.2	P-401SP-RM-WM 12.5MM BITUMINOUS PAVEMENT DESIGN (WARM MIX)
P-401	3.2	P-401SP-RM-WM 12.5MM BITUMINOUS PAVEMENT DESIGN (WARM MIX)
QCP		QUALITY CONTROL PLAN
QCP Final		QUALITY CONTROL PLAN REVISED
P-306	2.2, 2.3, 3.2	MIX CODE = SW9C5R10 - 1200 ECONOCRETE - P-306
P-610	2.1	P-610, CONCRETE MIX DESIGN ELECTRICAL - 3000 PSI IN 2 DAYS
P-610	2.1	P-610, CONCRETE MIX DESIGN ELECTRICAL - 4000 PSI IN 28 DAYS
P-501	2.3	MIX CODE = PA6B4R10 - 700 FLEX #467 BLEND - P-501
P-501	2.7	
P-501	2.9	MATERIAL SAFETY DATA SHEET VEXCON NO. CC101
P-501		SUPPLEMENTAL INFORMATION: AMERICAN AGGREGATES ASTM57 AGRECASA SPEC SHEETS
P-501		SUPPLEMENTAL INFORMATION: TITAN CEMENT & AMERICAN AGGREGATES ASTM C1260
L-125		PRE-CAST CONSTRUCTION OF JUNCTION CAN PLAZA W/4E CAN'S
P-620-3		PREFORMED PAVEMENT MARKINGS 1 AND 2
D-430		LAYNE INLINER
D-755-1		FABRIFORM CONCRETE
D-755-1		FABRIFORM FABRIC
D-755-1		FABRIFORM FABRIC (ADD'L DATA?)
P-605-1		DOW 888 SEALANT
		BACKER ROD JOINT SEAL
P-501		Additional Information for #253
P-501		Supplemental Information for #253 & #253A

Drawing/ Specification #	Paragraph Number	Subject
P-502	502-2.1	PaveSaver Epoxy Based Elastomeric Concrete Partial Depth Spall Repair Material
P-502	502-2.1	Silspec (Alternate) Flexpatch
P-502	502-2	Existing PCC Pavement Surface Repair
	P-605-4	JOINT SEALANT 890 SL
	P-605-4	ROADSAVER CRACK SEAL
	P-605-4	RIGHT POINTE 3405 REG HOT POUR
D-756	D-756-2	CENTRIFUGALLY CAST PL 8,000
D-756	D-756-2	CENTRIFUGALLY CAST PL 8,000
P-335	P-335-1	MICROSURFACING
D-430	D-430-3.1, 430-3.3	PIPE PRE REPAIR VIDEO LOG (PIPE JOINT AND CRACK SEALING - CHEMICAL GROUT)
D-430		PIPE VIDEOS
D-430	D-430-3.1, D-430- 3.3	PIPE VIDEOS
D-430	D-430-3.1, D-430- 3.2	18" AND 24" RCP VIDEO & LOG
		CCC PIPE MATERIAL
D-756	D-756-1	INVERT REPAIR MORTAR
D-756	D-756-3*	PIPE LINER
		DYNALINER 18" DESIGN
		DYNALINER 24" DESIGN
		PIPE LINER - LAYNE INLINER - 18" AND 24" (POST CONSTRUCTION SUBMITTALS)
P-620	P-620-3	PREFORMED THERMOPLASTIC MARKINGS FINAL
D-430	D-430-4.3	PIPE JOINT SEALANT
P-501	P-501	SIKA GROUT 212_PDS DATA AND SIKA GROUT 212-E MSDS
P-605	P-605-3.9	PAVEMENT CONTRACTING-888 TEST STRIP AND PULL TESTS 4-23-2014
P-620	P-620-1 & 2	Hi-Lite Airfield Services Pavement Markings
D-430	D-430-3	42" RCP Post Construction Video & Log
Safety Plan		HEALTH AND SAFETY PROGRAM AND SAFETY PLAN COMPLIANCE DOCUMENT FOR MIDDLESEX AND SUBCONTRACTORS
Safety Plan		SAFETY PLAN COMPLIANCE DOCUMENT
QCP		
P-610		HIGH EARLY MIX AND TEST DATA
		INLINER PRODUCT SUBMITTAL

**APPENDIX 1
"EXAMPLE OF COVER SHEET"**

**NORTHWEST FLORIDA BEACHES INTERNATIONAL AIRPORT (ECP)
TRANSIENT APRON PHASE 1 EXTENSION**

**AIP#
DOT#**

**AIRFIELD LIGHTING SYSTEM
OPERATION AND MAINTENANCE MANUAL**

OWNER MANUAL #1

Note:
Submittal books and spline information similar.

END OF ITEM SP-13

**SPECIAL PROVISION NO.14
AIRFIELD ELECTRICAL INSTALLATION TESTING
DESCRIPTION**

1.1 GENERAL

- a. This item shall consist of performing all tasks necessary to prove proper performance of electrical and airfield lighting systems. Airfield lighting systems include airfield signage systems, approach lighting systems and other associated NAVAIDS.
- b. Drawings, general provisions and special provisions of the Contract Documents, including Contractual Conditions and Division 1 Specification sections apply to this Item.
- c. This section describes the electrical quality control testing furnished by the Contractor. The Contractor shall provide all testing as required by this item, including retesting of failed items. All items furnished and/or installed by the Contractor shall be tested in accordance with this item.
- d. The Contractor shall provide for all electrical testing to confirm that the installations associated with this project comply with the Contract Documents. Contractor shall engage an independent organization to perform the short circuit/coordination/device evaluation/arc flash analysis with the Contractor providing all testing assistance.
- e. The Contractor shall furnish all equipment, labor, supervision, transportation, materials and appliances necessary or required for testing the airport lighting systems before and after installation. The Contractor shall perform all tests in the presence of the Engineer. The Contractor shall demonstrate the electrical characteristics to the satisfaction of the Engineer. All costs for testing are incidental to the pay item for the respective item being tested.
- f. Any system installation errors or discrepancies of installation not in conformance with the Contract Documents shall be corrected at no additional cost to the Owner. Equipment, cables and other components which do not satisfy the test requirements of this Item shall be removed and replaced with new equipment, cables and other components which do satisfy the requirements of this item with no additional cost to the Owner. Any necessary retesting shall be performed at no additional cost to the Owner.
- g. There are no approved "repair" procedures for items that have failed testing other than complete replacement. The Contractor shall replace all items that may be damaged during testing at no additional cost to the Owner.
- h. Weather information necessary to complete the testing forms may be obtained from the listed website http://www.faa.gov/air_traffic/weather/asos/ by double clicking on the respective state and airport ID.

EQUIPMENT AND MATERIALS

2.1 SUBMITTALS

- a.** Materials and equipment covered by this item shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification when requested by the Engineer. All equipment, materials, methods and record keeping procedures shall be submitted to the Engineer for review.
- b.** The submittal shall include a list of the proposed test and measurement equipment to be used, the test and measurement equipment serial number, the current calibration certificate for each piece of equipment and a written description of the proposed test. A copy of the test and measurement equipment manufacturer's recommended test procedure is acceptable as a written description of the proposed test.
- c.** Submit a proposed field test plan, 60 days prior to testing the installed system. No field test shall be performed until the test plan is approved. The test plan shall consist of complete field test procedures including tests to be performed, test equipment required, and tolerance limits. The Contractor shall submit a complete list of required tests and a proposed schedule and duration of the tests. The schedule shall be integrated with the overall project schedule. The Contractor shall update the testing schedule on a monthly basis for the duration of the project.
- d.** All test results shall be submitted in the Operation and Maintenance (O&M) Manual. See Item SP-No. 13 for submittal requirements.
- e.** The Engineer reserves the right to reject any and all equipment, materials or procedures, which, in the Engineer's opinion, does not meet the system design and the standards and codes, specified herein.

2.2 SAFETY

- a.** Dangerous voltages are present during the system testing. The Contractor is solely responsible for the safety of all personnel involved in the testing activities and shall ensure that all testing areas are secured to prevent the entry of unqualified personnel.
- b.** Observe all safety instructions or precautions recommended by testing equipment manufacturer.
- c.** The Contractor shall perform a "Hazard/Risk Evaluation" of each test site and procedure. The Contractor shall provide a job briefing and install the necessary barriers and barricades at the respective approach boundaries prior to starting the testing.
- d.** The Contractor shall provide and use safety devices such as rubber gloves, protective barriers, and danger signs to protect and warn personnel in the test vicinity. The Contractor shall replace any device or equipment which is damaged due to improper test procedures or handling.
- e.** In addition to compliance with the Contractors safety program, the Contractor shall comply with the following documents/programs:

(1) OSHA, 29CFR1910 Occupational Safety and Health Standards

- (2) OSHA 29CFR1926 Safety and Health regulations for Construction
- (3) NFPA 70B Recommended Practice for Electrical Equipment Maintenance
- (4) NFPA 70E Standard for Electrical Safety in the Workplace
- (5) AC 150/5340-26 Maintenance of Airport Visual Aid Facilities
- (6) Owner's safety program.

2.3 QUALIFICATIONS

- a. Each person performing testing shall have a minimum of 5 years of successful experience on similar projects. At least 3 of these years of experience shall have occurred in the last 5 years on projects of comparable size and complexity. Persons performing the testing shall have passed a proctored H.H. Block Journeyman Electrician's exam with 75% grade or better and be a licensed Journeyman Electrician, by the City in which the project is located. Equivalent training and experience may be considered by the Engineer. Documentation demonstrating compliance with these requirements shall be submitted to the Engineer for verification and review before starting the testing. Experience records shall include references (names and phone numbers) from airports where the test procedures have been performed in a satisfactory manner. Only persons whose experience records have been confirmed by the Engineer shall perform testing.
- b. The person performing the tests shall be a "qualified person" as defined in NFPA 70E and OSHA 29 CFR 1926.32(l).
- c. The person performing the tests shall be thoroughly familiar with the test equipment used in the test performed and shall be sufficiently experienced to detect equipment abnormalities or questionable data obtained during the test procedure.
- d. Each piece of test and measurement equipment utilized to demonstrate compliance with the Contract Documents shall be calibrated. The level of calibration shall be "NIST traceable, Z540 Calibration with Data". The test and measurement equipment calibration shall be valid for one year. At any time the Engineer may require the Contractor to have a piece of test and measurement equipment recalibrated. Should the Engineer have any reason to doubt the accuracy of a piece of test and measurement equipment, even within current calibration, the test and measurement equipment shall be removed from the project. The Engineer shall determine which tests shall be redone due to the malfunctioning equipment.
- e. The test and measurement equipment calibration lab as a minimum shall meet the requirements of ANSI/NCSS Z-540 and shall be A2LA accredited.

2.4 TESTING COORDINATION

- a. After installation of all required components and before final acceptance, in accordance with project phasing and schedule make required tests to determine proper function of all circuits.

- b. Ten days prior to any testing the Contractor shall notify the Engineer of the need to perform testing. A mutually agreed upon time and date for each test will be set. All requirements under this item shall be coordinated with the Engineer.
- c. The Contractor shall perform the necessary inspection and tests for some items concurrently with the installation because of subsequent inaccessibility of some components.
- d. The Contractor shall ensure that all test and measurement equipment, accessories and qualified personnel are available prior to scheduling tests.
- e. Forty-eight (48) hours prior to each test the Contractor shall send the Engineer a written confirmation that the scheduled test will occur at the proposed date and time. Any rescheduling of the test shall be coordinated with the Engineer.
- f. The Engineer shall be provided reasonable opportunity to observe all tests. Testing shall not proceed until the Engineer or designated representative is present to observe the testing, or until the Engineer has provided written instruction to proceed with the testing in the Engineer's absence.
- g. All test results shall be recorded by the Contractor and witnessed by the Engineer. Test results shall be submitted in the O&M Manuals in accordance with Item SP-106.

2.5 TEST AND MEASUREMENT EQUIPMENT

- a. Electrical test and measurement equipment shall be an off the shelf item, not a one of a kind prototype. The test and measurement equipment shall be manufactured by a firm regularly engaged in the manufacture of precision electrical test and measurement equipment for the industrial, commercial and utility marketplace. Typical accuracy for test equipment shall be $\pm 2\%$ of instrument reading and shall be TRUE RMS.
- b. The Engineer shall confirm that the test and measurement equipment proposed for use by the Contractor is suitable for the intended use. The Engineer shall have sole discretion to determine if the test and measurement equipment is suitable for the intended use.
- c. The ground point for the cable test equipment shall be the vault ground bus. The vault ground bus, vault ground system, airport ground grid and counterpoise system shall be complete prior to cable testing.

CONSTRUCTION METHODS

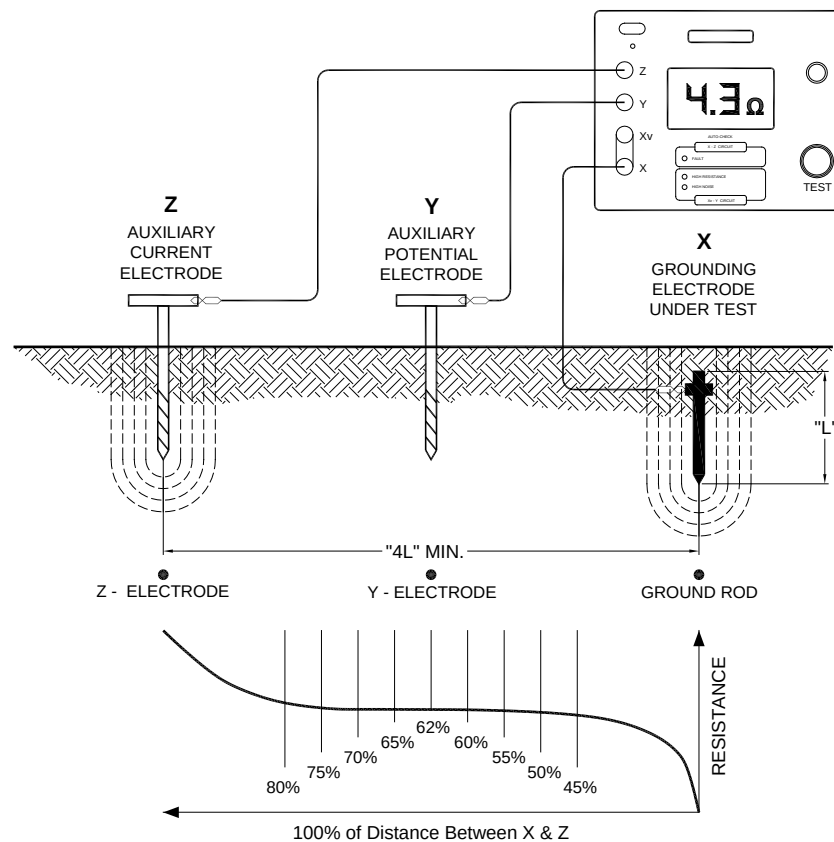
3.1 COUNTERPOISE TESTING

- a. Continuity of counterpoise system shall be checked by visual inspection as construction progresses, prior to work being covered up.
- b. Verification of counterpoise system continuity shall be checked by visual inspection at accessible locations during normal inspections.
- c. Verification of counterpoise system continuity to the vault grounding system shall be tested with a micro-ohmmeter. Micro-Ohmmeter shall be Megger Ductor DLRO-10 or accepted equivalent. Resistance readings shall be corrected to standard temperature.

- d. Should the counterpoise or ground grid conductors be damaged or are suspected to be damaged by construction activities (in the opinion of the Engineer) the Contractor shall test the conductors for continuity with a micro-ohmmeter. The conductors shall be isolated such that there is no parallel path. Alternatively, the Contractor may conduct tests and through mathematical computations prove the continuity of the conductors.
- e. Investigate unsatisfactory results and make necessary corrections or replacements as required by the Contract Documents.
- f. Record test results on the record drawing set indicating point to point readings.

3.2 GROUND ROD TESTING

- a. Contractor shall provide equipment and personnel to measure the resistance to earth of each ground rod installed. Earth resistance measurement tests shall adhere to recommendations of IEEE Standard 142, latest edition.
- b. Earth resistance measurements shall be made in normally dry conditions not less than 48 hours after the last rainfall.
- c. Initially the Contractor shall test each ground rod in accordance with the following instructions. The horizontal distance between the Ground Electrode Under Test (Electrode **X**) and the Auxiliary Current Electrode (Electrode **Z**) shall be 4 times the depth (length) of the ground electrode under test.



- d. The three electrodes shall be installed in a straight line in a direction away from other underground metallic items. The test leads shall be separated.
- e. The first test shall be conducted with the Auxiliary Potential Electrode (Electrode Y) at 45% of the distance between the X and Z electrodes. The earth resistance shall be measured and recorded at the 45% position. The Y electrode will then be moved 5% closer to the Z electrode to the 50% position and the earth resistance shall be measured and recorded. The previous steps will be repeated at 5% distance intervals through the 80% position. Graph the resultant points on the form provided at the end of this item.
- f. The above test method shall be utilized at each new ground rod installation until otherwise determined by the Engineer. The Engineer will use the acquired data to establish a revised distance ratio between the X and Z electrode.
- g. Once the new electrode distance ratio is set by the Engineer, the Contractor may perform the tests with a single test position for electrode Y.
- h. Earth resistance tests shall be performed as each ground rod is installed. Earth resistance tests shall be conducted prior to the connection of any grounded, grounding or counterpoise conductors.

Ground rods not in compliance with the not to exceed maximum earth resistance shall have an additional 10' section(s) added until the required earth resistance is achieved.

- i. Should the Contractor install 100 feet of sectional ground rod (ten rods) at a single location and not achieve the required earth resistance, the Contractor shall stop installing rods at this specific location and contact the Engineer for resolution.

3.3 FIELD LIGHTNING ARRESTOR ASSEMBLY TESTING

- a. Each field lightning arrestor assembly (FLA) shall receive an inspection upon receipt by the Contractor.
- b. The Contractor shall group the FLAs by circuit. Mark each FLA with circuit designation and unique number.
- c. Each FLA shall be tested for continuity between the airfield lighting series circuit L-823 connectors. A reading of 200 milliohms or less is acceptable.
- d. Each FLA shall have its internal resistance tested between the airfield lighting series circuit L-823 connector and the grounding screw. A reading of less than 10 gigohms is cause for rejection. Any FLA testing less than 10 gigohms shall be rejected.
- e. The FLA internal resistance test shall be performed with a megohmmeter providing a test voltage of 1,000 volts DC. The output of the megohmmeter shall be direct reading in megohms and shall have an upper range limit in excess of 10 gigohms.
- f. The Contractor shall then interconnect each FLA within that circuit to the other. The Contractor shall interconnect the ground screws on each unit with a #12AWG bare copper conductor. The Contractor shall then megger test the FLA circuit assembly and record the reading.
- g. The Contractor shall repackage the FLA units, maintaining the circuit designations. The FLA shall be stored in a clean dry location until installation in the base cans.
- h. Record data on insulation resistance test form provided at the end of this item.

3.4 EXISTING AIRFIELD LIGHTING CIRCUIT INSULATION RESISTANCE TESTING

- a. Whenever the scope of work requires connection to an existing circuit, or should the scope of work involve working adjacent to or near an existing circuit, and the work could have any impact on the existing circuit, the existing circuit's insulation resistance shall be tested. The Contractor shall measure and record the insulation resistance of ALL airfield lighting circuits prior to starting any work. The test shall be performed prior to any activity which could possibly effect or impact the respective circuit. The Contractor shall record the results on forms included at the end of this item.
- b. The existing airfield lighting circuit insulation resistance test shall be performed with a megohmmeter providing a test voltage of 1,000 volts DC. The output of the megohmmeter shall be direct reading in megohms and shall have an upper range limit in excess of 10 gigohms.
- c. Observe required safety precautions.

- d. Connect the test instrument in accordance with the manufacturer's recommendations. The insulation resistance test shall be conducted for two (2) minutes). Record data at 30 second intervals on the form provided at the end of this Item. The insulation resistance measurement results shall be corrected to 20^o Centigrade (68^o Fahrenheit).
- e. When the work effecting the circuit is complete (or at end of shift prior to energization), the circuit's insulation resistance shall be checked again, in the presence of the Engineer. The Contractor shall record the results on forms included at the end of this item. The second reading shall be equal to or greater than the first reading or the Contractor shall make the necessary repairs to the circuit to bring the second reading above the first reading.
- f. 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.
- g. Should the Contractor fail to perform the tests prior to starting work, the Contractor shall be responsible to bring the impacted circuits to a minimum 50 megohm insulation resistance value or higher value in conformance with any previous airport test records.

3.5 NEW AIRFIELD LIGHTING CIRCUIT CONTINUITY TESTING

- a. After new cable installation and before the operating test or connection to an existing system, the airfield lighting series circuit cable system shall be given a circuit internal resistance (continuity) test.
- b. This test shall be conducted at the proposed point of connection to the Constant Current Regulator and shall be used to prove continuity of the entire circuit. The Contract Documents shall be reviewed to confirm proper circuit routing, connection and installation of necessary components prior to testing.
- c. No Field Lighting Arrestor Assemblies shall be installed in the circuit during the internal resistance (continuity) test. No airfield lighting fixtures or signs shall be connected to the secondary of the L-830 isolation transformers internal resistance (continuity) test.
- d. The L-824C series circuit cable, complete with all L-823 connectors and L-830 isolation transformers installed, shall be tested for continuity.
- e. Observe required safety precautions.
- f. The circuit's internal resistance (continuity) test shall be performed using an ohmmeter with sufficient output to measure the circuit's internal resistance. The expected internal circuit resistance should be between 20 ohms and 70 ohms.
- g. Investigate unsatisfactory results and make necessary corrections or replacements as required by the Contract Documents.
- h. Upon successful completion of circuit's internal resistance (continuity) test, record the measured circuits internal resistance on the cable test form included at the end of this item.

3.6 NEW AIRFIELD LIGHTING CIRCUIT INSULATION RESISTANCE TESTING

- a. Upon successful completion of the airfield lighting circuit's internal resistance (continuity) test perform an airfield lighting circuit insulation resistance test.
- b. In addition to successfully completing the airfield lighting circuit internal resistance (continuity) test, all prerequisite conditions required prior to performing the airfield lighting circuit internal resistance (continuity) test shall be performed prior to starting the airfield lighting circuit insulation resistance test.
- c. Airfield lighting circuit insulation resistance tests shall be made in normally dry conditions not less than 48 hours after the last rainfall.
- d. The airfield lighting circuit insulation resistance test shall be performed with a megohmmeter providing a test voltage of 1,000 volts DC. The output of the megohmmeter shall be direct reading in megohms and shall have an upper range limit in excess of 10 gigohms.
- e. Observe required safety precautions.
- f. Ground all other conductors within the conduits or ducts containing the conductor under test.
- g. Connect the test instrument in accordance with the manufacturer's recommendations. The insulation resistance test shall be conducted for ten (10) minutes). Record data at the required intervals on the form provided at the end of this Item. The insulation resistance measurement results shall be corrected to 20° Centigrade (68° Fahrenheit).
- h. The expected insulation resistance for the completed circuit should be in excess of 500 megohms.
- i. Investigate unsatisfactory results and make necessary corrections or replacements as required by the Contract Documents.
- j. Upon successful completion of circuit's insulation resistance test, record the measured circuits internal resistance on the cable test form included at the end of this item.

3.7 CONCLUDING AIRFIELD LIGHTING CIRCUIT TESTS

- a. Airfield lighting circuit insulation resistance tests shall be made in normally dry conditions not less than 48 hours after the last rainfall.
- b. The airfield lighting circuit insulation resistance test shall be performed with a megohmmeter providing a test voltage of 1,000 volts DC. The output of the megohmmeter shall be direct reading in megohms and shall have an upper range limit in excess of 10 gigohms.
- c. Observe required safety precautions.
- d. Ground all other conductors within the conduits or ducts containing the conductor under test.

- e. Connect the test instrument in accordance with the manufacturer's recommendations. The insulation resistance test shall be conducted for ten (10) minutes). Record data at the required intervals on the form provided at the end of this Item. The insulation resistance measurement results shall be corrected to 20^o Centigrade (68^o Fahrenheit).
- f. The expected insulation resistance for the completed circuit should be in excess of 500 megohms.
- g. Investigate unsatisfactory results and make necessary corrections or replacements as required by the Contract Documents.
- h. Upon successful completion of circuit's insulation resistance test, record the measured circuits internal resistance on the cable test form included at the end of this item.
- i. Install respective circuit designated FLA assemblies. Use the sum of reciprocals rule to calculate the final circuit insulation resistance. Perform insulation resistance test on completed circuit in accordance with above criteria. Record final circuit insulation resistance value on form provided at the end of this Item.

3.8 CONTROL SYSTEM TESTS

- a. The equipment shall be demonstrated to operate in accordance with the requirements of the Contract Documents. Each applicable control device in the air traffic control tower (ATCT) airfield lighting control panel and other control locations shall be operated so that each control device position is engaged at least ten times. During this process, all lights and associated equipment shall be observed to determine that each control device/switch/indicator properly operates the corresponding component. Radio communication between the operator and the observers shall be provided by the Contractor.
- b. The above tests shall be repeated for each individual circuit from the local control switches on the regulators. Each installed or revised lighting circuit shall be tested by operating the lamps throughout the range of applicable steps and shall be operated separately at step 3 or step 5 as appropriate for full intensity for not less than 4 hours. Visual examination shall be made at the beginning and at the end of this test to determine that the installed airfield light fixtures are illuminating at full intensity.
- c. Investigate unsatisfactory results and make necessary corrections or replacements as required by the Contract Documents.
- d. Systems tests shall confirm by demonstration that all airfield lighting circuits are in required operating condition in accordance with the Contract Documents.

3.9 FIXTURE WIRING SEQUENCE TEST

- a. The fixture wiring sequence testing shall be performed at night with minimum interference to airport operations.
- b. The Contract Documents require all edge lights shall be wired in numerical sequence without zig-zagging back and forth across the taxiway.

- c. The 5 kV L-824 airfield lighting series circuit cables shall be supplied with factory imprinted numbers.

(1) Odd numbered circuits shall utilize:

- Wire #1 Routed from the constant current regulator (CCR) output terminal S1 to the lowest numbered fixture in the circuit.
- Wire #3 Routed from the lowest numbered fixture to the highest numbered fixture in the circuit. The fixtures shall be connected in numerical sequence. When the series circuit loops back in the same raceway, all fixtures shall be connected into the same leg of the circuit conductor. The return portion of the loop shall not have any fixtures installed into that portion of the conductor.
- Wire #5 Routed from the highest numbered fixture in the circuit to the CCR output terminal S2.

(2) Even numbered circuits shall use numbers 2, 4 and 6.

- d. To verify proper wiring sequence from fixture to fixture temporary intentional grounds shall be inserted into the 5 kV airfield lighting series circuits. The temporary intentional grounds shall be inserted in sequence, one location at a time, at each PC, PT or PI where the cable returns (loops in the same conduit) with the fixture conductor. The Engineer shall designate each point as circuiting is completed.
- e. The Contractor is solely responsible for the safety of all personnel, materials and equipment within the construction area. In addition to the Contractor's requirements each temporary intentional ground location shall be barricaded. The barricade shall extend a minimum of twenty-five (25) feet in all directions around the temporary intentional ground. No one shall be allowed within the barricaded area during the test.
- f. All wiring for the 5 kV airfield lighting series circuits shall be complete prior to the sequence testing. The test circuit shall consist of the #1 conductor connected between the constant current regulator (CCR) output terminal S1 and the lowest numbered airfield lighting fixture. The #3 conductor connected from fixture to fixture to the first test point noted in the Contract Documents. A temporary intentional ground shall be inserted at this point. The constant current regulator (CCR) output terminal S2 shall be connected to a temporary intentional ground. Each temporary intentional ground shall be barricaded. All personnel shall be outside the barricade. The CCR shall be energized remotely. A visual inspection of the airfield lighting fixtures shall be made to determine proper wiring sequence.
- g. The temporary intentional ground shall be moved to the next test point and this procedure shall be repeated for each temporary intentional ground.
- h. The final temporary intentional ground for each circuit shall test proper routing of the #1 wire from the CCR output terminal S1 to the lowest numbered fixture. The temporary intentional grounds shall be placed at the output terminal S1 of the CCR and on the #1 wire side of the lowest numbered

fixture. Each temporary intentional ground shall be barricaded. All personnel shall be outside the barricade. The CCR shall be energized remotely. A visual inspection of the airfield lighting fixtures shall be made to determine proper wiring sequence.

- i. Investigate unsatisfactory results and make necessary corrections or replacements as required by the Contract Documents and retest.
- j. Once proper wiring sequence has been verified remove all intentional temporary grounds and place 5 kV airfield lighting series circuits in proper working order.
- k. Systems tests shall confirm by demonstration that all airfield lighting circuits are in required operating condition in accordance with the Contract Documents.

3.10 SHORT CIRCUIT / COORDINATION / DEVICE EVALUATION / ARC FLASH ANALYSIS

- a. The Owner has an existing Short Circuit/Coordination/Device Evaluation/Arc Flash Analysis for the 18L Airfield Lighting Vault. As a result of this project, a second updated analysis is necessary.
- b. A Short Circuit, Coordination, Device Evaluation and Arc Flash analysis shall consist of the tasks listed below:
 - 1. This analysis will include: One Line Diagrams, Short Circuit Analysis, Coordination Analysis and Arc Flash Analysis and labels.
 - 2. The selected firm's field service engineer will perform data gathering for analysis completion and device settings, perform device setting as recommended by the analysis and will provide Arc Flash labels with the Arc Flash Analysis. The components worst case value will be considered the available arc flash energy at that point in the system. The Arc Flash Labels will be similar to the example below. The Contractor shall install the new Arc Flash labels and remove all old Arc Flash labels being updated.

ARC FLASH HAZARD LABEL

 WARNING	
#11 Arc Flash and Shock Hazard Appropriate PPE Required	
ARC FLASH HAZARD PROTECTION Incident Energy: 11 cal/cm² Arc Flash Boundary: 71 in PPE: ■ Cotton Underwear ■ FR Shirt and Pants (or Coverall) ■ Full Flash Suit and Hard Hat Liner ■ Hard Hat / Hood / Face Shield ■ Safety Glasses or Goggles ■ Hearing Protection ■ Arc-Rated Gloves and Leather Shoes □ Non-Melting Shirt and Pants	SHOCK PROTECTION BOUNDARIES Shock Hazard when cover is removed: 480 VAC Limited Approach: 42 in Restricted Approach: 12 in Warning: Changes in equipment settings or system configuration will invalidate the calculated values and PPE requirements. Arc Flash Hazard Analysis shall be reviewed periodically, not to exceed 5 years. See NFPA 70E 130.5. Contact AVCON INC. 407-589-1122.
Bus: PANEL MP Prot: 1000A GENERATOR BREAKER	

3. This work will NOT include analysis of any future equipment, or repair or replacement of any electrical equipment found to be damaged or broken.
4. Seven copies of the written analysis and drawings shall be provided at the conclusion of the project. Two copies shall be assigned to the Owner, one copy assigned to the Engineer and one copy shall be inserted in each O&M Manual

c. Two possible vendors/firms to perform the analysis are:

- (1) Eaton Electrical Services and Systems, Wayne Thompson, 863-287-3985, waynethompson@eaton.com
- (2) Easy Power, ESA Incorporated, (503) 655-5059 (ask for Engineering Services) services@EasyPower.com or <http://www.easypower.com/services/engineering.php>

Additional firms may be determined as an accepted equivalent to the firms listed above.

METHOD OF MEASUREMENT

4.1 METHOD OF MEASUREMENT

- a. With the exception of the Short Circuit/Coordination/Device Evaluation/Arc Flash Analysis, the items described in this section are incidental to other items and shall not be measured for payment.
- b. A pay item has been established to provide for payment for the Short Circuit/Coordination/Device Evaluation/Arc Flash Analysis described above in Section 3.14. Each Short Circuit/Coordination/Device Evaluation/Arc Flash Analysis shall be measured by the completed unit installed, in place, completed, and accepted.

BASIS OF PAYMENT

5.1 BASIS OF PAYMENT

- a.** No direct payment shall be made for the work described in this item, except for the Short Circuit/Coordination/Device Evaluation/Arc Flash Analysis. The work described in this item is incidental to other pay items and shall be paid for in the respective bid item of which it is a component part.

Payment will be made under:

- a.** No direct payment shall be made for the work described in this item.

END OF ITEM SP-14

AIRFIELD LIGHTING CIRCUIT DATA SHEET

Circuit Designation:

Date:

Circuit Description:

Ph. Wire Size/Type:

Source Panel/Ckt

GND. Wire Size/Type:

Panel /E/ CB Size:

Conduit Size/Type:

CCR Size:

CCR Output Amps:

CCR Manufacturer:

Yr. Manufactured:

CCR Type No.:

Part No.:

Output Amp Steps: / / / /

Input Volts: Ph.: Hz.:

Input Amps:

Control Voltage:

Serial Number:

Oil Capacity: **Gal.** Oil Test Date:

Weight: **lbs.**

CCR Insp./Calib.: Date:

Circuit Age: **Years**

Insul. Resist. at 1 min.: **W @ 1000 V**

Weather:

Lamps in Ckt.: Lamp Watts:

Lamps Out:

Manufacturer's Set up and Calibration Completed by: _____

	Calibration	LOAD TEST							
Step	Output Amps	Output Amps	Output Voltage	Output KVA	Output PF	Input Amps	Input Volts	Input KVA	Input PF
B1/B10									
B2/B30									
B3/B100									
B4									
B5									

Comments:

**Airfield Lighting Circuit Continuity and Insulation
Resistance Testing**

Date: _____

Start Time: _____ / Stop Time _____

Circuit Designation: _____		Circuit Description _____	Circuit Length _____
Circuit Operating Voltage _____		Circuit Isolation Transformers Qty/Size: _____	
Hazard Risk Evaluation Performed? Yes No		Ambient Temperature: _____ Sky Conditions.: _____	Relative Humidity: _____ Rain last 48hrs: _____
Test Equipment: _____	Manufacturer _____	Model # _____	Serial# _____ Upper Range Limit: _____
Associated Equipment included in test: _____			
Circuit Continuity: _____		Test Voltage: _____	Cable Manufacturer: _____
Tested by: _____		Witness: _____	

Minutes	0.25	0.5	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0
Reading												
Correction												
Megohms	Infinity											
	10,000											
	5,000											
	3,000											
	2,000											
	1,000											
	800											
	600											
	400											
	300											
	200											
	150											
	100											
	80											
	60											
	40											
	30											
	20											
	15											
	10											
	6											
	4											
	2											
	1											
	0.6											
	0.2											
	0.1											
	0.06											
	0.02											
	Zero											

Comments:

TECHNICAL SPECIFICATIONS

ITEM C-100
CONTRACTOR QUALITY CONTROL PROGRAM (CQCP)

ITEM C-100, "CONTRACTOR QUALITY CONTROL PROGRAM (CQCP)" is a technical specification contained in Federal Aviation Administration Advisory Circular – 150/5370-10H, "Standard Specifications for Construction of Airports."

This item has been modified to make allowances for local materials, methods and requirements. This item has been updated and modified to comply with the latest editions of other applicable codes, from knowledge gained on other airport construction projects and valuable lessons learned from airport maintenance staffs.

Deletions are noted by the ~~striketrough~~ method.

Changes and additions are noted by the ***bold italic*** method.

ITEM C-100
CONTRACTOR QUALITY CONTROL PROGRAM (CQCP)

100-1 General. Quality is more than test results. Quality is the combination of proper materials, testing, workmanship, equipment, inspection, and documentation of the project. Establishing and maintaining a culture of quality is key to achieving a quality project. The Contractor shall establish, provide, and maintain an effective Contractor Quality Control Program (CQCP) that details the methods and procedures that will be taken to assure that all materials and completed construction required by this contract conform to contract plans, technical specifications and other requirements, whether manufactured by the Contractor, or procured from subcontractors or vendors. Although guidelines are established and certain minimum requirements are specified here and elsewhere in the contract technical specifications, the Contractor shall assume full responsibility for accomplishing the stated purpose.

The Contractor shall establish a CQCP that will:

- a.** Provide qualified personnel to develop and implement the CQCP.
- b.** Provide for the production of acceptable quality materials.
- c.** Provide sufficient information to assure that the specification requirements can be met.
- d.** Document the CQCP process.

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

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

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

- a.** Review of the CQCP including submittals, QC Testing, Action & Suspension Limits for Production, Corrective Action Plans, Distribution of QC reports, and Control Charts.
- b.** Discussion of the QA program.
- c.** Discussion of the QC and QA Organization and authority including coordination and information exchange between QC and QA.
- d.** Establish regular meetings to discuss control of materials, methods and testing.
- e.** Establishment of the overall QC culture.

100-2 Description of program.

- a. General description.** The Contractor shall establish a CQCP to perform QC inspection and testing of all items of work required by the technical specifications, including those performed by subcontractors. The CQCP shall ensure conformance to applicable specifications and plans with respect to materials, off-site fabrication, workmanship, construction, finish, and functional performance. The CQCP shall be effective for control of all construction work performed under this Contract and shall specifically include surveillance and tests required by the technical specifications, in addition to other requirements of this section and any other activities deemed necessary by the Contractor to establish an effective level of QC.
- b. Contractor Quality Control Program (CQCP).** The Contractor shall describe the CQCP in a written document that shall be reviewed and approved by the RPR prior to the start of any production, construction, or off-site fabrication. The written CQCP shall be submitted to the RPR for review and approval at least 10 calendar days before the CQCP Workshop. The Contractor's CQCP and QC testing laboratory must be approved in writing by the RPR prior to the Notice to Proceed (NTP).

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

1. QC organization and resumes of key staff
2. Project progress schedule
3. Submittals schedule
4. Inspection requirements
5. QC testing plan
6. Documentation of QC activities and distribution of QC reports
7. Requirements for corrective action when QC and/or QA acceptance criteria are not met
8. Material quality and construction means and methods. Address all elements applicable to the project that affect the quality of the pavement structure including subgrade, subbase, base, 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.
- (8) [Photographs and/or video]

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

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

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

- (1) Technical specification item number and description
- (2) Test designation

- (3) Location
- (4) Date of test
- (5) Control requirements
- (6) Test results
- (7) Causes for rejection
- (8) Recommended remedial actions
- (9) Retests

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

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

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

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

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

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

100-12 Noncompliance.

- a. The Resident Project Representative (RPR) will provide written notice to the Contractor of any noncompliance with their CQCP. After receipt of such notice, the Contractor must take corrective action.
- b. When QC activities do not comply with either the CQCP or the contract provisions or when the Contractor fails to properly operate and maintain an effective CQCP, and no effective corrective

actions have been taken after notification of non-compliance, the RPR will recommend the Owner take the following actions:

- (1) Order the Contractor to replace ineffective or unqualified QC personnel or subcontractors and/or
- (2) Order the Contractor to stop operations until appropriate corrective actions are taken.

METHOD OF MEASUREMENT

100-13 Basis of measurement and payment. Not Used

BASIS OF PAYMENT

100-14 Payment will be made under:

There is no separate payment for this item. This shall be incidental to the cost of Pay Item C-105-1 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.

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

ITEM C-102, "TEMPORARY AIR AND WATER POLLUTION SOIL EROSION, AND SILTATION CONTROL" is a technical specification contained in Federal Aviation Administration Advisory Circular – 150/5370-10H, "Standard Specifications for Construction of Airports."

This item has been modified to make allowances for local materials, methods and requirements. This item has been updated and modified to comply with the latest editions of other applicable codes, from knowledge gained on other airport construction projects and valuable lessons learned from airport maintenance staffs.

Deletions are noted by the ~~striketrough~~ method.

Changes and additions are noted by the ***bold italic*** method.

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

DESCRIPTION

102-1.1 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 150/5370-2G, *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 Lump sum.~~

Temporary erosion control shall be a lump sum item and measured based on percentage of completion of the project.

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~~	~~-lump sum~~
C-102-1	Erosion & Pollution Control	-per Lump Sum (LS)
C-102-2	10'x10' Rip Rap	-per Each (EA)

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 150/5370-2G *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

ITEM C-105, "MOBILIZATION" is a technical specification contained in Federal Aviation Administration Advisory Circular – 150/5370-10H, "Standard Specifications for Construction of Airports."

This item has been modified to make allowances for local materials, methods and requirements. This item has been updated and modified to comply with the latest editions of other applicable codes, from knowledge gained on other airport construction projects and valuable lessons learned from airport maintenance staffs.

Deletions are noted by the ~~striketrough~~ method.

Changes and additions are noted by the ***bold italic*** method.

**ITEM C-105
MOBILIZATION**

DESCRIPTION

105-1.1 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.

MOBILIZATION LIMIT

105-2.1 Mobilization shall be limited to 10 percent of the total project cost.

POSTED NOTICES

105-3.1 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.

ENGINEER/RPR FIELD OFFICE

105-4.1 An Engineer/RPR field office is not required.

MEATHOD OF MEASUREMENT

105-5.1 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

101-6.1 Payment will be made under:

Item C-105-1	Mobilization	-per Lump Sum (LS)
Item C-105-2	Maintenance of Traffic	-per Lump Sum (LS)

REFERENCES

101-7.1 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

END OF SECTION C-105

ITEM P-101
PREPARATION/REMOVAL OF EXISTING PAVEMENTS

ITEM P-101, "PREPARATION/REMOVAL OF EXISTING PAVEMENTS" is a technical specification contained in Federal Aviation Administration Advisory Circular – 150/5370-10H, "Standard Specifications for Construction of Airports."

This item has been modified to make allowances for local materials, methods and requirements. This item has been updated and modified to comply with the latest editions of other applicable codes, from knowledge gained on other airport construction projects and valuable lessons learned from airport maintenance staffs.

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Changes and additions are noted by the ***bold italic*** method.

ITEM P-101
PREPARATION/REMOVAL OF EXISTING PAVEMENTS

DESCRIPTION

101-1.1 This item shall consist of preparation of existing pavement surfaces for overlay, surface treatments, removal of existing pavement, and other miscellaneous items. The work shall be accomplished in accordance with these specifications and the applicable plans.

EQUIPMENT AND MATERIALS

101-2.1 All equipment and materials shall be specified here and in the following paragraphs or approved by the Resident Project Representative (RPR). The equipment shall not cause damage to the pavement to remain in place.

CONSTRUCTION

101-3.1 Removal of existing pavement. The Contractor's removal operation shall be controlled to not damage adjacent pavement structure, and base material, cables, utility ducts, pipelines, or drainage structures which are to remain under the pavement.

- a. Concrete pavement removal.** 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. If the material is to be wasted on the airport site, it shall be reduced to a maximum size of. 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 recompact 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. If the material is to be incorporated into embankment, it shall be broken to a maximum size of 1 inches (25 mm).
- 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. 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 prior remarking. Removal of foreign substances/contaminates from existing pavement that will affect the bond of the new treatment shall consist of removal of rubber, fuel spills, oil, crack sealer, at least 90% of paint, and other foreign substances from the surface of the pavement. Areas that require removal are designated on the plans and as directed by the RPR in the field during construction.

High-pressure water or rotary grinding may be used. If chemicals are used, they shall comply with the state's environmental protection regulations. Removal methods used shall not cause major damage to the pavement, or to any structure or utility within or adjacent to the work area. Major damage is defined as changing the properties of the pavement, removal of asphalt causing the aggregate to ravel, or removing pavement over 1/8 inch (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 (2 m) and it shall be equipped with electronic grade control devices that will cut the surface to the grade specified. The tolerances shall be maintained within +0 inch and -1/4 inch (+0 mm and -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-604.

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 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 random crack saw. Following sawing 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. Not used.
- c. **Removal of Runway Lights and PAPIs.** Remove the existing runway threshold lights and PAPIs as indicated on the plans. The PAPIs and lights shall be protected from damage as to allow for reuse as indicated on the plans.

METHOD OF MEASUREMENT

101-4.1 Lump Sum. 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.

BASIS OF PAYMENT

101-5.1 Payment The work covered by this section shall be considered as a subsidiary obligation of the Contractor covered under the other contract items. No separate payment will be made. This 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-101-5.7~~	~~Removal of Pipe and other Buried Structures~~	~~—Lump sum~~
~~Item P-101-1~~	~~Miscellaneous Demolition~~	~~— per Lump Sum (LS)~~

REFERENCES

101-6.1 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

ITEM P-151, "CLEARING AND GRUBBING" is a technical specification contained in Federal Aviation Administration Advisory Circular – 150/5370-10H, "Standard Specifications for Construction of Airports."

This item has been modified to make allowances for local materials, methods and requirements. This item has been updated and modified to comply with the latest editions of other applicable codes, from knowledge gained on other airport construction projects and valuable lessons learned from airport maintenance staffs.

Deletions are noted by the ~~striketrough~~ method.

Changes and additions are noted by the ***bold italic*** method.

**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 Engineer.

- 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 Engineer 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 or 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) or fraction thereof 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 fraction 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 acres (square meters) or fraction thereof of land specifically cleared.

BASIS OF PAYMENT

151-4.1 Payment shall be made at the contract unit price per acre (square meter) or fraction 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) or fraction thereof 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

151-4.3 Payment shall be made at the contract unit price per acre (square meter) 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 (AC)~~
~~Item P-151-4.2~~	~~Clearing and grubbing~~	~~--Per Acre (AC)~~
~~Item P-152-4.3~~	~~Tree Removal~~	~~--per Acre (AC)~~
Item P-151-1	Stripping & Stockpiling, 6"	--per Acre (AC)

END OF ITEM P-151

ITEM P-152
EXCAVATION, SUBGRADE, AND EMBANKMENT

ITEM P-152, "EXCAVATION, SUBGRADE, AND EMBANKMENT" is a technical specification contained in Federal Aviation Administration Advisory Circular – 150/5370-10H, "Standard Specifications for Construction of Airports."

This item has been modified to make allowances for local materials, methods and requirements. This item has been updated and modified to comply with the latest editions of other applicable codes, from knowledge gained on other airport construction projects and valuable lessons learned from airport maintenance staffs.

Deletions are noted by the ~~strike through~~ method.

Changes and additions are noted by the ***bold italic*** method.

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, which is not otherwise classified and paid for under the following items.
- b. Rock Excavation.** Rock excavation shall include all solid rock in ledges, in bedded deposits, in unstratified masses, and conglomerate deposits which are so firmly cemented they cannot be removed without blasting or using rippers. All boulders containing a volume of more than 1/2 cubic yard (0.4 cubic meter) will be classified as "rock excavation".
- c. Muck Excavation:** Muck excavation shall consist of the removal and disposal of deposits or mixtures of soils and organic matter not suitable for foundation material. Muck shall include materials that will decay or produce subsidence in the embankment. It may be made up of decaying stumps, roots, logs, humus, or other material not satisfactory for incorporation in the embankment.
- d. Drainage Excavation:** Drainage excavation shall consist of all the excavation made for the primary purpose of drainage and includes drainage ditches, such as intercepting, inlet or outlet, temporary levee construction, or any other type as shown on the plans.
- e. Borrow Excavation.** Borrow excavation shall consist of approved material required for the construction of embankment or for other portions of the work in excess of the quantity of usable material available from required excavations. Borrow material shall be obtained from areas within the limits of the airport property but outside the normal limits of necessary grading, or from areas outside the airport.

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.

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) for Excavation, Subgrade and Embankment. 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 within the airport property are indicated on the plans. Borrow excavation shall be made only at these designated locations and within the horizontal and vertical limits as staked or as directed by the RPR. All unsuitable material shall be disposed of by the Contractor as shown on the plans. All borrow pits shall be opened to expose the various strata of acceptable material to allow obtaining a uniform product. Borrow areas shall be drained and left in a neat, presentable condition with all slopes dressed uniformly. Borrow areas shall not create a hazardous wildlife attractant.

152-2.4 Drainage excavation. Drainage excavation shall consist of excavating drainage ditches including intercepting, inlet, or outlet ditches; or other types as shown on the plans. The work shall be performed in sequence with the other construction. Ditches shall be constructed prior to starting adjacent excavation operations. All satisfactory material shall be placed in embankment fills; unsuitable material shall be placed in designated waste areas or as directed by the RPR. All necessary work shall be performed true to final line, elevation, and cross-section. The Contractor shall maintain ditches constructed on the project to the required cross-section and shall keep them free of debris or obstructions until the project is accepted.

152-2.5 Preparation of cut areas or areas where existing pavement has been removed. In those areas on which a subbase or base course is to be placed, the top 12 inches (300 mm) of subgrade shall be compacted to not less than ~~100-%~~ **95%** of maximum density for non-cohesive soils, and ~~95%~~ **90%** of maximum density for cohesive soils as determined by ASTM D1557. As used in this specification, "non-cohesive" shall mean those soils having a plasticity index (PI) of less than 3 as determined by ASTM D4318.

152-2.6 Preparation of embankment area. All sod and vegetative matter shall be removed from the surface upon which the embankment is to be placed. The cleared surface shall be broken up by plowing

or scarifying to a minimum depth of 6 inches (150 mm) and shall then be compacted per paragraph 152-2.10.

Sloped surfaces steeper than one (1) vertical to four (4) horizontal shall be plowed, stepped, benched, or broken up so that the fill material will bond with the existing material. When the subgrade is part fill and part excavation or natural ground, the excavated or natural ground portion shall be scarified to a depth of 12 inches (300 mm) and compacted as specified for the adjacent fill.

No direct payment shall be made for the work performed under this section. 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 and develop a Moisture-Density Relations of Soils Report (Proctor) in accordance with ASTM D1557. A new Proctor shall be developed for each soil type based on visual classification.

Density tests will be taken by the RPR for every 3,000 square yards of compacted embankment for each lift which is required to be compacted, or other appropriate frequencies as determined by the RPR.

If the material has greater than 30% retained on the 3/4-inch (19.0 mm) sieve, follow AASHTO T-180 Annex Correction of maximum dry density and optimum moisture for oversized particles.

Rolling operations shall be continued until the embankment is compacted to not less than ~~100%~~ **95%** of maximum density for non-cohesive soils, and ~~95%~~ **90%** of maximum density for cohesive soils as determined by ASTM D1557. Under all areas to be paved, the embankments shall be compacted to a depth of and to a density of ~~not less than percent of the maximum density~~ **as specified on the plans** as determined by ASTM D1557. As used in this specification, "non-cohesive" shall mean those soils having a plasticity index (PI) of less than 3 as determined by ASTM D4318.

On all areas outside of the pavement areas, no compaction will be required on the top 4 inches (100 mm) which shall be prepared for a seedbed in accordance with Item T-901.

The in-place field density shall be determined in accordance with ASTM D1556. The RPR shall perform all density tests. 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. After compaction is completed, the subgrade area shall be proof rolled with a 15 ton (18.1 metric ton) Tandem axle Dual Wheel Dump Truck loaded to the legal limit with tires inflated to 125 psi (/0.862 MPa) in the presence of the RPR. Apply a minimum of 2,000 square yards 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 and to a density of not less than ~~percent of the maximum dry density~~ **those specified in the plans and the approved foundation design**, as determined by ASTM D1557. The subgrade in areas outside the limits of the pavement areas shall be compacted to a depth of 12 inches (300 mm) and to a density of not less than 90 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 D1557. Tests for moisture content and compaction will be taken at a minimum of 3,000 S.Y. of subgrade. All quality assurance testing shall be done by the RPR.

The in-place field density shall be determined in accordance with ASTM D1556 or ASTM D6938 using Procedure A, the direct transmission method, and ASTM D6938 shall be used to determine the moisture content of the material. The machine shall be calibrated in accordance with ASTM D6938 within 12 months prior to its use on this contract. The gage shall be field standardized daily.

Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

If the specified density is not attained, the entire lot shall be reworked and/or re-compacted and additional random tests made. This procedure shall be followed until the specified density is reached.

All cut-and-fill slopes shall be uniformly dressed to the slope, cross-section, and alignment shown on the plans or as directed by the RPR and the finished subgrade shall be maintained.

152-2.11 Finishing and protection of subgrade. Finishing and protection of the subgrade is incidental to this item. Grading and compacting of the subgrade shall be performed so that it will drain readily. All low areas, holes or depressions in the subgrade shall be brought to grade. Scarifying, blading, rolling and other methods shall be performed to provide a thoroughly compacted subgrade shaped to the lines and grades shown on the plans. All ruts or rough places that develop in the completed subgrade shall be graded, re-

compacted, and retested. The Contractor shall protect the subgrade from damage and limit hauling over the finished subgrade to only traffic essential for construction purposes.

The Contractor shall maintain the completed course in satisfactory condition throughout placement of subsequent layers. No subbase, base, or surface course shall be placed on the subgrade until the subgrade has been accepted by the RPR.

152-2.12 Haul. All hauling will be considered a necessary and incidental part of the work. The Contractor shall include the cost in the contract unit price for the pay of items of work involved. No payment will be made separately or directly for hauling on any part of the work.

The Contractor's equipment shall not cause damage to any excavated surface, compacted lift or to the subgrade as a result of hauling operations. Any damage caused as a result of the Contractor's hauling operations shall be repaired at the Contractor's expense.

The Contractor shall be responsible for providing, maintaining and removing any haul roads or routes within or outside of the work area, and shall return the affected areas to their former condition, unless otherwise authorized in writing by the Owner. No separate payment will be made for any work or materials associated with providing, maintaining and removing haul roads or routes.

152-2.13 Surface Tolerances. In those areas on which a subbase or base course is to be placed, the surface shall be tested for smoothness and accuracy of grade and crown. Any portion lacking the required smoothness or failing in accuracy of grade or crown shall be scarified to a depth of at least 3 inches (75 mm), reshaped and re-compacted to grade until the required smoothness and accuracy are obtained and approved by the RPR. The Contractor shall perform all final smoothness and grade checks in the presence of the RPR. Any deviation in surface tolerances shall be corrected by the Contractor at the Contractor's expense.

- a. **Smoothness.** The finished surface shall not vary more than $\pm 1/2$ 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 The quantity of 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 Borrow material shall be paid for on the basis of the number of cubic yards (cubic meters) measured in its original position at the borrow pit.

152-3.3 Stockpiled material shall be paid for on the basis of the number of cubic yards (cubic meters) measured in the stockpiled position.

152-3.5 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 *Excavation, Subgrade, and Embankment* 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:

<i>Item P-152-1</i>	<i>Excavation & Embankment - Fill</i>	<i>--per Cubic Yard (CY)</i>
<i>Item P-152-2</i>	<i>Subgrade Preparation</i>	<i>-per Square Yard (SY)</i>

REFERENCES

152-5.1 The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

American Association of State Highway and Transportation Officials (AASHTO)

AASHTO T-180 Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop

ASTM International (ASTM)

ASTM D698 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³)

ASTM D6938 Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

Advisory Circulars (AC)

AC 150/5370-2 Operational Safety on Airports During Construction Software

Software

FAARFIELD – FAA Rigid and Flexible Iterative Elastic Layered Design

U.S. Department of Transportation

FAA RD-76-66 Design and Construction of Airport Pavements on Expansive Soils

END OF ITEM P-152

Item P-154
SUBBASE COURSE

ITEM P-154, "SUBBASE COURSE" is a technical specification contained in Federal Aviation Administration Advisory Circular – 150/5370-10H, "Standard Specifications for Construction of Airports."

This item has been modified to make allowances for local materials, methods and requirements. This item has been updated and modified to comply with the latest editions of other applicable codes, from knowledge gained on other airport construction projects and valuable lessons learned from airport maintenance staffs.

Deletions are noted by the ~~striketrough~~ method.

Changes and additions are noted by the ***bold italic*** method.

**Item P-154
SUBBASE COURSE**

DESCRIPTION

154-1.1 This item shall consist of a subbase course composed of granular materials constructed on a prepared subgrade or underlying course in accordance with these specifications, and in conformity with the dimensions and typical cross-section shown on the plans.

MATERIALS

154-2.1 Materials. The subbase material shall consist of hard durable particles or fragments of granular aggregates. The material may be obtained from gravel pits, stockpiles, or may be produced from a crushing and screening plant with proper blending. The materials from these sources shall meet the requirements for gradation, quality, and consistency. The material shall be free from vegetative matter, excessive amounts of clay, and other objectionable substances; uniformly blended; and be capable of being compacted into a dense, stable subbase.

The subbase material shall exhibit a California Bearing Ratio (CBR) value of at least 20 when tested in accordance with ASTM D1883. The subbase material shall meet the gradation specified in the table below.

Subbase Gradation Requirements

Sieve designation	Percentage by weight passing sieves	Job Control Grading Band Tolerances¹ (Percent)
3 inch (75 mm)	100	0
3/4 inch (19.0 mm)	70-100	±10
No. 10 (2.00 mm)	20-100	±10
No. 40 (425 µm)	5-60	±5
No. 200 (75 µm)	0-15	±5

¹ The "Job Control Grading Band Tolerances" shall be applied to "Contractor's Final Gradation" to establish the job control grading band.

The portion of the material passing the No. 40 (425 µm) sieve shall have a liquid limit of not more than 25 and a plasticity index of not more than six (6) when tested in accordance with ASTM D4318.

154-2.2 Sampling and testing.

- a. Aggregate base materials.** Samples shall be taken by the Contractor per ASTM D75 for initial aggregate subbase requirements and gradation. Material shall meet the requirements in paragraphs 154-2.1. The Contractor shall submit to the Resident Project Representative (RPR) certified test results showing that the aggregate meets the Material requirements of this section. Tests shall be representative of the material to be used for the project.
- b. Gradation requirements.** The Contractor shall take at least one aggregate subbase sample per day in the presence of the RPR to check the final gradation. Samples shall be taken from the in-place, un-compacted material at sampling locations determined by the RPR on a random basis per ASTM D3665. Sampling shall be per ASTM D75 and tested per ASTM C136 and ASTM C117. Results shall be furnished to the RPR by the Contractor each day during construction. Material shall meet the requirements in paragraph 154-2.1.

154-2.3 Separation Geotextile. Not used.

154-2.4 Geogrid. Not used.

CONSTRUCTION METHODS

154-3.1 General. The subbase course shall be placed where designated on the plans or as directed by the Engineer. The material shall be shaped and thoroughly compacted within the tolerances specified.

Granular subbases which, due to grain sizes or shapes, are not sufficiently stable to support the construction equipment without movement, shall be mechanically modified to the depth necessary to provide stability as directed by the RPR. The mechanical modification shall include the addition of a fine-grained medium to bind the particles of the subbase material sufficiently to furnish a bearing strength, so the course will not deform under construction equipment traffic.

154-3.2 Preparing underlying course. Prior to constructing the subbase course, clean the underlying course or subgrade of all foreign substances. The surface of the underlying course or subgrade shall meet specified compaction and surface tolerances in accordance with Item P-152. Correct ruts, soft yielding spots in the underlying courses, and subgrade areas having inadequate compaction and/or deviations of the surface from the specified requirements, by loosening and removing soft or unsatisfactory material, adding approved material, reshaping to line and grade, and recompacting to specified density requirements. For cohesionless underlying courses or subgrades containing sands or gravels, as defined in ASTM D2487, the surface shall be stabilized prior to placement of the overlying course by mixing the overlying course material into the underlying course and compacting by approved methods. The stabilized material shall be considered as part of the underlying course and shall meet all requirements for the underlying course. The finished underlying course shall not be disturbed by traffic or other operations and shall be maintained in a satisfactory condition until the overlying course is placed. The underlying course shall be checked and accepted by the RPR before placing and spreading operations are started.

To protect the subgrade and to ensure proper drainage, spreading of the subbase shall begin along the centerline of the pavement on a crowned section or on the high side of pavements with a one-way slope.

154-3.3 Control Strip. The first half-day of subbase construction 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.

154-3.4 Placement. The material shall be placed and spread on the prepared underlying layer by spreader boxes or other devices as approved by the RPR, to a uniform thickness and width. The equipment shall have positive thickness controls to minimize the need for additional manipulation of the material.

Dumping from vehicles that require re-handling shall not be permitted. Hauling over the uncompacted base course shall not be permitted. The material shall not be placed when the underlying course is soft or yielding.

The material shall meet gradation and moisture requirements prior to compaction. Material may be free-draining and the minimum moisture content shall be established for placement and compaction of the material.

The material shall be constructed in lifts as established in the control strip, but not less than 4 inches (100 mm) nor more than 12 inches (300 mm) of compacted thickness.

When more than one lift is required to establish the layer thickness shown on the plans, the construction procedure described here shall apply to each lift. No lift shall be covered by subsequent lifts until tests verify that compaction requirements have been met. The Contractor shall rework, re-compact and retest any material placed which does not meet the specifications.

154-3.5 Compaction. The subbase material shall be compacted, adjusting moisture as necessary, to be within $\pm 2\%$ of optimum moisture. The field density of the compacted material shall be at least 95% of the maximum density as specified in paragraph 154-3.9a. If the specified density is not attained, the area of the lift represented by the test shall be reworked and/or re-compact and additional random tests made. This procedure shall be followed until the specified density is reached. Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

154-3.6 Weather limitation. Material shall not be placed unless the ambient air temperature is at least 40°F (4°C) and rising. Work on subbase course shall not be conducted when the subgrade is wet or frozen or the subbase material contains frozen material.

154-3.7 Maintenance. No base or surface course shall be placed on the subbase until the subbase has been accepted by the RPR. The Contractor shall maintain the completed course in satisfactory condition throughout placement of subsequent layers. When material has been exposed to excessive rain, snow, or freeze-thaw conditions, the Contractor shall verify that materials still meet all specification requirements before placement of additional material. Equipment may be routed over completed sections of subbase course, provided the equipment does not damage the subbase course and the equipment is routed over the full width of the completed subbase course. Any damage to the subbase course from routing equipment over the subbase course shall be repaired by the Contractor at their expense.

154-3.8 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-compact 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 $\pm \frac{1}{2}$ 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.

154-3.9 Acceptance sampling and testing. The aggregate base course shall be accepted for density and thickness on an area basis. Two test shall be made for density and thickness for each 1200 square yards (1000 square meters). Sampling locations will be determined on a random basis per ASTM D3665.

- a. **Density.** The RPR shall perform all density tests.

Each area shall be accepted for density when the field density is at least 95% of the maximum density of laboratory specimens compacted and tested per ASTM D698. The in-place field density shall be determined per ASTM D1556 or ASTM D6938 using Procedure A, the direct transmission method, and ASTM D6938 shall be used to determine the moisture content of the material. The machine shall be calibrated in accordance with ASTM D6938. If the specified density is not attained, the area represented by the failed test shall be reworked and/or recompacted and two additional random tests made. This procedure shall be followed until the specified density is reached. Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

When the material has greater than 30 percent retained on the $\frac{3}{4}$ inch (19.0 mm) sieve, use methods in ASTM D698 and the procedures in AASHTO T180 Annex for correction of maximum dry density and optimum moisture for oversized particles.

- b. **Thickness.** The thickness of the base 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 by scarifying to a depth of at least 3 inches (75 mm), adding new material of proper gradation, and the material shall be blended and recompacted to grade. The Contractor shall replace, at his expense, base material where depth tests have been taken.

METHOD OF MEASUREMENT

154-4.1 Subbase course shall be measured by the number of square yards (square meters) of subbase course material placed and compacted to specified density and plan thickness requirements in the completed course. The quantity of subbase course material shall be measured in final position based upon On individual depth measurements, thicknesses more than 1/2 inch (12 mm) in excess of that shown on the plans shall be considered as the specified thickness plus 1/2 inch (12 mm) in computing the yardage for payment. Subbase materials shall not be included in any other excavation quantities.

BASIS OF PAYMENT

154-5.1 Payment shall be made at the contract unit price per square yard (square meter) for subbase course. This price shall be full compensation for furnishing all materials; for all preparation, hauling, 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-154-5.1	Subbase Course	Per Square Yard (Square Meter)

Item P-154-1

Stabilized Subbase Course (6")

-per Square Yard (SY)

REFERENCES

154-6.1 The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM C117 Standard Test Method for Materials Finer than 75-

ITEM P-209
CRUSHED AGGREGATE BASE COURSE

ITEM P-209, "CRUSHED AGGREGATE BASE COURSE" is a technical specification contained in Federal Aviation Administration Advisory Circular – 150/5370-10H, "Standard Specifications for Construction of Airports."

This item has been modified to make allowances for local materials, methods and requirements. This item has been updated and modified to comply with the latest editions of other applicable codes, from knowledge gained on other airport construction projects and valuable lessons learned from airport maintenance staffs.

Deletions are noted by the ~~striketrough~~ method.

Changes and additions are noted by the ***bold italic*** method.

ITEM P-209
CRUSHED AGGREGATE BASE COURSE

DESCRIPTION

209-1.1 This item consists of a base course composed of crushed aggregate base constructed on a prepared course in accordance with these specifications and in conformity to the dimensions and typical cross-sections shown on the plans.

MATERIALS

209-2.1 Crushed Aggregate Base. Crushed aggregate shall consist of clean, sound, durable particles of crushed stone, crushed gravel, or crushed slag and shall be free from coatings of clay, silt, organic material, clay lumps or balls or other deleterious materials or coatings. The method used to produce the crushed gravel shall result in the fractured particles in the finished product as consistent and uniform as practicable. Fine aggregate portion, defined as the portion passing the No. 4 (4.75 mm) sieve shall consist of fines from the coarse aggregate crushing operation. The fine aggregate shall be produced by crushing stone, gravel, or slag that meet the coarse aggregate requirements for wear and soundness. Aggregate base material requirements are listed in the following table.

Crushed Aggregate Base Material Requirements

Material Test	Requirement	Standard
Coarse Aggregate		
Resistance to Degradation	Loss: 45% maximum	ASTM C131
Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate	Loss after 5 cycles: 12% maximum using Sodium sulfate - or - 18% maximum using magnesium sulfate	ASTM C88
Percentage of Fractured Particles	Minimum 90% by weight of particles with at least two fractured faces and 100% with at least one fractured face ¹	ASTM D5821
Flat Particles, Elongated Particles, or Flat and Elongated Particles	10% maximum, by weight, of flat, elongated, or flat and elongated particles ²	ASTM D4791
Bulk density of slag	Weigh not less than 70 pounds per cubic foot (1.12 Mg/cubic meter)	ASTM C29
Clay lumps and friable particles	Less than or equal to 3 percent	ASTM C142
Fine Aggregate		
Liquid limit	Less than or equal to 25	ASTM D4318
Plasticity Index	Not more than five (5)	ASTM D4318

¹ The area of each face shall be equal to at least 75% of the smallest mid-sectional area of the piece. When two fractured faces are contiguous, the angle between the planes of fractures shall be at least 30 degrees to count as two fractured faces.

² A flat particle is one having a ratio of width to thickness greater than five (5); an elongated particle is one having a ratio of length to width greater than five (5).

209-2.2 Gradation Requirements. The gradation of the aggregate base material shall meet the requirements of the gradation given in the following table when tested per ASTM C117 and ASTM C136.

The gradation shall be well graded from coarse to fine and shall not vary from the lower limit on one sieve to the high limit on an adjacent sieve or vice versa.

Gradation of Aggregate Base

Sieve Size	Design Range Percentage by Weight passing	Contractor's Final Gradation	Job Control Grading Band Tolerances¹ (Percent)
2 inch (50 mm)	100		0
1-1/2 inch (37.5 mm)	95-100		±5
1 inch (25.0 mm)	70-95		±8
3/4 inch (19.0 mm)	55-85		±8
No. 4 (4.75 mm)	30-60		±8
No. 40 ² (425 µm)	10-30		±5
No. 200 ² (75 µm)	0-10		±3

¹ The "Job Control Grading Band Tolerances for Contractor's Final Gradation" in the table shall be applied to "Contractor's Final Gradation" to establish a job control grading band. The full tolerance still applies if application of the tolerances results in a job control grading band outside the design range.

² The fraction of material passing the No 200 (75 µm) sieve shall not exceed two-thirds the fraction passing the No 40 (425 µm) sieve.

209-2.3 Sampling and Testing.

- a. Aggregate base materials.** The Contractor shall take samples of the aggregate base in accordance with ASTM D75 to verify initial aggregate base requirements and gradation. Material shall meet the requirements in paragraph 209-2.1. This sampling and testing will be the basis for approval of the aggregate base quality requirements.
- b. Gradation Requirements.** The Contractor shall take at least two aggregate base samples per day in the presence of the Resident Project Representative (RPR) to check the final gradation. Sampling shall be per ASTM D75. Material shall meet the requirements in paragraph 209-2.2. The samples shall be taken from the in-place, un-compacted material at sampling points and intervals designated by the RPR.

209-2.4 Separation Geotextile. Not used

CONSTRUCTION METHODS

209-3.1 Control strip. The first half-day of construction shall be considered the control strip. The Contractor shall demonstrate, in the presence of the RPR, that the materials, equipment, and construction processes meet the requirements of the specification. The sequence and manner of rolling necessary to obtain specified density requirements shall be determined. The maximum compacted thickness may be increased to a maximum of 12 inches (300 mm) upon the Contractor's demonstration that approved equipment and operations will uniformly compact the lift to the specified density. The RPR must witness this demonstration and approve the lift thickness prior to full production.

Control strips that do not meet specification requirements shall be reworked, re-compacted or removed and replaced at the Contractor's expense. Full operations shall not continue until the control strip has been accepted by the RPR. The Contractor shall use the same equipment, materials, and construction

methods for the remainder of construction, unless adjustments made by the Contractor are approved by the RPR.

209-3.2 Preparing Underlying Subgrade and/or Subbase. The underlying subgrade and/or subbase shall be checked and accepted by the RPR before base course placing and spreading operations begin. Re-proof rolling of the subgrade or proof rolling of the subbase in accordance with Item P-152, at the Contractor's expense, may be required by the RPR if the Contractor fails to ensure proper drainage or protect the subgrade and/or subbase. Any ruts or soft, yielding areas due to improper drainage conditions, hauling, or any other cause, shall be corrected before the base course is placed. To ensure proper drainage, the spreading of the base shall begin along the centerline of the pavement on a crowned section or on the high side of the pavement with a one-way slope.

209-3.3 Production. The aggregate shall be uniformly blended and, when at a satisfactory moisture content per paragraph 209-3.5, the approved material may be transported directly to the placement.

209-3.4 Placement. The aggregate shall be placed and spread on the prepared underlying layer by spreader boxes or other devices as approved by the RPR, to a uniform thickness and width. The equipment shall have positive thickness controls to minimize the need for additional manipulation of the material. Dumping from vehicles that require re-handling shall not be permitted. Hauling over the uncompacted base course shall not be permitted.

The aggregate shall meet gradation and moisture requirements prior to compaction. The base course shall be constructed in lifts as established in the control strip, but not less than 4 inches (100 mm) nor more than 12 inches (300 mm) of compacted thickness.

When more than one lift is required to establish the layer thickness shown on the plans, the construction procedure described here shall apply to each lift. No lift shall be covered by subsequent lifts until tests verify that compaction requirements have been met. The Contractor shall rework, re-compact and retest any material placed which does not meet the specifications at the Contractor's expense.

209-3.5 Compaction. Immediately after completion of the spreading operations, compact each layer of the base course, as specified, with approved compaction equipment. The number, type, and weight of rollers shall be sufficient to compact the material to the required density within the same day that the aggregate is placed on the subgrade.

The field density of each compacted lift of material shall be at least 100% of the maximum density of laboratory specimens prepared from samples of the subbase material delivered to the jobsite. The laboratory specimens shall be compacted and tested in accordance with ASTM D1557. The moisture content of the material during placing operations shall be within ± 2 percentage points of the optimum moisture content as determined by ASTM D1557. Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

209-3.6 Weather Limitations. Material shall not be placed unless the ambient air temperature is at least 40°F (4°C) and rising. Work on base course shall not be conducted when the subgrade or subbase is wet or frozen or the base material contains frozen material.

209-3.7 Maintenance. The base course shall be maintained in a condition that will meet all specification requirements. When material has been exposed to excessive rain, snow, or freeze-thaw conditions, prior

to placement of additional material, the Contractor shall verify that materials still meet all specification requirements. Equipment may be routed over completed sections of base course, provided that no damage results and the equipment is routed over the full width of the completed base course. Any damage resulting to the base course from routing equipment over the base course shall be repaired by the Contractor at the Contractor's expense.

209-3.8 Surface Tolerances. After the course has been compacted, the surface shall be tested for smoothness and accuracy of grade and crown. Any portion lacking the required smoothness or failing in accuracy of grade or crown shall be scarified to a depth of at least 3 inches (75 mm), reshaped and recompact to grade until the required smoothness and accuracy are obtained and approved by the RPR. Any deviation in surface tolerances shall be corrected by the Contractor at the Contractor's expense. The smoothness and accuracy requirements specified here apply only to the top layer when base course is constructed in more than one layer.

- a. **Smoothness.** The finished surface shall not vary more than 3/8-inch (9 mm) when tested with a 12-foot (3.7-m) straightedge applied parallel with and at right angles to the centerline. The straightedge shall be moved continuously forward at half the length of the 12-foot (3.7-m) straightedge for the full length of each line on a 50-foot (15-m) grid.
- b. **Grade.** The grade and crown shall be measured on a 50-foot (15-m) grid and shall be within +0 and -1/2 inch (12 mm) of the specified grade.

209-3.9 Acceptance Sampling and Testing. Crushed aggregate base course shall be accepted for density and thickness on an area basis. Two tests shall be made for density and thickness for each [1200 square yds (1000 m²)]. Sampling locations will be determined on a random basis per ASTM D3665

- a. **Density.** The Contractor's laboratory shall perform all density tests in the RPR's presence and provide the test results upon completion to the RPR for acceptance.

Each area shall be accepted for density when the field density is at least 100% of the maximum density of laboratory specimens compacted and tested per ASTM 1557. The in-place field density shall be determined per ASTM D1556 or ASTM D6938 using Procedure A, the direct transmission method, and ASTM D6938 shall be used to determine the moisture content of the material. The machine shall be calibrated in accordance with ASTM D6938. If the specified density is not attained, the area represented by the failed test must be reworked and/or recompact and two additional random tests made. This procedure shall be followed until the specified density is reached. Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

- b. **Thickness.** Depth tests shall be made by test holes at least 3 inches (75 mm) in diameter that extend through the base. The thickness of the base 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 by scarifying to a depth of at least 3 inches (75 mm), adding new material of proper gradation, and the material shall be blended and recompact to grade. The Contractor shall replace, at his expense, base material where depth tests have been taken.

METHOD OF MEASUREMENT

209-4.1 The quantity of crushed aggregate base course will be determined by measurement of the number of square yards (square meters) of material actually constructed and accepted by the RPR as complying with the plans and specifications. Base materials shall not be included in any other excavation quantities.

BASIS OF PAYMENT

209-5.1 Payment shall be made at the contract unit price per square yard (square meter) for crushed aggregate base course. This price shall be full compensation for furnishing all materials, for preparing and placing these materials, and for all labor, equipment tools, and incidentals necessary to complete the item.

Payment will be made under:

~~Item P-209-5.1~~	~~Crushed Aggregate Base Course~~	~~per square yard (square meter)~~
~~Item P-209-1~~	~~Crushed Aggregate Base Course, 6" (Road)~~	~~per Square Yard (SY)~~
~~Item P-209-2~~	~~Crushed Aggregate Base Course, 8" (Taxiway)~~	~~per Square Yard (SY)~~

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-

ASTM D1556	Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D1557	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft ³ (2700 kN-m/m ³))
ASTM D2167	Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method
ASTM D2419	Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate
ASTM D3665	Standard Practice for Random Sampling of Construction Materials
ASTM D4318	Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D4491	Standard Test Methods for Water Permeability of Geotextiles by Permittivity
ASTM D4643	Standard Test Method for Determination of Water Content of Soil and Rock by Microwave Oven Heating
ASTM D4751	Standard Test Methods for Determining Apparent Opening Size of a Geotextile
ASTM D4791	Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate
ASTM D5821	Standard Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate
ASTM D6938	Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
ASTM D7928	Standard Test Method for Particle-Size Distribution (Gradation) of Fine-Grained Soils Using the Sedimentation (Hydrometer) Analysis

American Association of State Highway and Transportation Officials (AASHTO)
M288 Standard Specification for Geosynthetic Specification for Highway Applications

END OF ITEM P-209

ITEM P-211
LIME ROCK BASE COURSE

ITEM P-211, "LIME ROCK BASE COURSE" is a technical specification contained in Federal Aviation Administration Advisory Circular – 150/5370-10H, "Standard Specifications for Construction of Airports."

This item has been modified to make allowances for local materials, methods and requirements. This item has been updated and modified to comply with the latest editions of other applicable codes, from knowledge gained on other airport construction projects and valuable lessons learned from airport maintenance staffs.

Deletions are noted by the ~~strike through~~ method.

Changes and additions are noted by the ***bold italic*** method.

**ITEM P-211
LIME ROCK BASE COURSE**

DESCRIPTION

211-1.1 This item shall consist of a base course composed of lime rock constructed on the prepared underlying course per these specifications and shall conform to the dimensions and typical cross-section shown on the plans.

MATERIALS

211-2.1 Materials. The lime rock base course material shall consist of fossiliferous limestone of uniform quality. The material shall not contain hard or flinty pieces that will cause a rough surface containing pits and pockets. The rock shall show no tendency to “air slake” or undergo chemical change when exposed to the weather. The material when watered and rolled shall be capable of compacting to a dense and well-bonded base.

Lime Rock Base Course Material Properties²

	Lime Rock	Oolitic	Non-Oolitic
Carbonates of calcium and magnesium ¹	95% minimum	70% minimum	75% minimum
Oxides of iron and aluminum ¹	Less than or equal to 2%	Less than or equal to 2%	Less than or equal to 2%
Liquid limit	Not greater than 35	NA	Not greater than 35
Plastic Index	Not greater than 6	NA	Not greater than 6
Organic or foreign matter	Not more than 0.5%	Not more than 0.5%	Not more than 0.5%
Lime Bearing Ratio (LBR) ³ at 0 to +1.5% optimum	125	125	125

¹ The combined amount of carbonates, oxides, and silica shall be at least 97%. The material shall be non-plastic.

² The chemical analysis of lime rock shall consist of determining the insoluble silica, iron oxide, and alumina by solution of the sample in hydrochloric (HCl) acid, evaporating, dehydrating, re-dissolving the residue, and neutralizing with ammonium hydroxide, filtering, washing, and igniting the residue lime rock. The difference between the percentage of insoluble matter and 100% is reported as carbonates of calcium and magnesium.

³ FM 5-515, Florida Method of Test for Lime Rock Bearing Ratio

Lime Rock Base Course Gradation

Sieve Designation (square openings)	Percentage by Weight Passing Sieves
3-1/2 inch (87.5 mm)	100
3/4 inch (19.0 mm)	50-100

All fine material shall consist entirely of dust of fracture (fine portion passing the No. 10 (2.00 mm) sieve).

211-2.2 Sampling and Testing.

- a. **Aggregate Base Materials.** The Contractor shall take samples of the aggregate base in accordance with ASTM D75 to verify initial aggregate base requirements and gradation. Material shall meet the requirements in paragraph 211-2.1. This sampling and testing will be the basis for approval of the aggregate base quality requirements.
- b. **Gradation Requirements.** The Contractor shall take at least two aggregate base samples per day in the presence of the Resident Project Representative (RPR) to check the final gradation.

Sampling shall be per ASTM D75. Material shall meet the requirements in paragraph 209-2.1. The lot will be consistent with the lot size used for density. The samples shall be taken from the in-place, un-compacted material at sampling points and intervals designated by the RPR.

211-2.3 Separation Geotextile. Not used.

CONSTRUCTION METHODS

211-3.1 Control Strip. The first half-day of construction shall be considered the control strip. The Contractor shall demonstrate, in the presence of the RPR, that the materials, equipment, and construction processes meet the requirements of the specification. The sequence and manner of rolling necessary to obtain specified density requirements shall be determined. Control strips that do not meet specification requirements shall be 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.

211-3.2 Preparing Underlying Course. The RPR shall check and accept the underlying course before placing and spreading operations are started. Any ruts or soft yielding places caused by improper drainage conditions, hauling, or any other cause shall be corrected at the Contractor's expense before the base course is placed. Material shall not be placed on frozen subgrade.

211-3.3 Placement. The material shall be placed and spread on the prepared underlying layer by spreader boxes or other devices as approved by the RPR, to a uniform thickness and width. The equipment shall have positive thickness controls to minimize the need for additional manipulation of the material. Dumping from vehicles that require re-handling shall not be permitted. Hauling over the uncompacted base course shall not be permitted.

The material shall meet gradation and moisture requirements prior to compaction. The layer shall be constructed in lifts as established in the control strip, but not less than 4 inches (100 mm) nor more than 12 inches (300 mm) of compacted thickness.

When more than one lift is required to establish the layer thickness shown on the plans, the construction procedure described here shall apply to each lift. No lift shall be covered by subsequent lifts until tests verify that compaction requirements have been met. The Contractor shall rework, re-compact and retest any material placed which does not meet the specifications.

211-3.4 Compaction. Immediately upon completion of the spreading operations, compact each layer of the base course, as specified, with approved compaction equipment. The number, type, and weight of rollers shall be sufficient to compact the material to the required density within the same day that the aggregate is placed on the subgrade. The field density of each compacted lift of material shall be at least 100% of the maximum density of laboratory specimens prepared from samples of the subbase material delivered to the jobsite. The moisture content of the material during placing operations shall be within ± 2 percentage points of the optimum moisture content as determined by ASTM D1557. Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

211-3.5 Finishing. After the watering and rolling of the base course, the entire surface shall be scarified to a depth of at least 3 inches (75 mm) and shaped to the exact crown and cross-section with a blade

grader. The scarified material shall be rewetted and thoroughly rolled. Rolling shall continue until the base is bonded and compacted to a dense, unyielding mass, true to grade and cross-section. Scarifying and rolling of the surface of the base shall follow the initial rolling of the lime rock by not more than four (4) days. When the lime rock base is constructed in two layers, the scarifying of the surface shall be to a depth of 2 inches (50 mm).

If cracks or checks appear in the base before the surface course is laid, the Contractor shall re-scarifying, reshaping, watering, add lime rock where necessary, and recompact. If the underlying material becomes mixed with the base course material, the Contractor shall, without additional compensation, remove, reshape, and recompact the mixture.

211-3.6 Weather Limitations. Material shall not be placed unless the ambient air temperature is at least 40°F (4°C) and rising. Work on base course shall not be conducted when the subgrade or subbase is wet or frozen or the base material contains frozen material.

211-3.7 Maintenance. The base course shall be maintained in a condition that will meet all specification requirements until the work is accepted by the RPR. When material has been exposed to excessive rain, snow, or freeze-thaw conditions, prior to placement of additional material, the Contractor shall verify that materials still meet all specification requirements. Equipment may be routed over completed sections of base course, provided that no damage results and the equipment is routed over the full width of the completed base course. Any damage resulting to the base course from routing equipment over the base course shall be repaired by the Contractor at the Contractor's expense.

211-3.8 Surface Tolerance. After the course has been compacted, the surface shall be tested for smoothness and accuracy of grade and crown. Any portion lacking the required smoothness or failing in accuracy of grade or crown shall be scarified to a depth of at least 3 inches (75 mm), reshaped and recompact to grade. until the required smoothness and accuracy are obtained and approved by the RPR. Any deviation in surface tolerances shall be corrected by the Contractor at the Contractor's expense. The smoothness and accuracy requirements specified here apply only to the top layer when base course is constructed in more than one layer.

- a. **Smoothness.** The finished surface shall not vary more than 3/8-inch (9 mm) when tested with a 12-foot (3.7-m) straightedge applied parallel with and at right angles to the centerline. The straightedge shall be moved continuously 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 and -1/2 inch (12 mm) of the specified grade.

211-3.9 Acceptance Sampling and Testing. Lime rock base course shall be accepted for density on an area basis. Two tests shall be made for density and thickness for each 1200 square yds (1000 m²). Sampling locations will be determined on a random basis per ASTM D3665.

- a. **Density.** Contractor's laboratory shall perform all density tests in the RPR's presence and provide the test results upon completion to the RPR for acceptance.
Each area shall be accepted for density when the field density is at least 100% of the maximum density of laboratory specimens compacted and tested per ASTM D1557. The in-place field density shall be determined per ASTM D1556 **or** ASTM D6938 using Procedure A, the direct

transmission method, and ASTM D6938 shall be used to determine the moisture content of the material. The machine shall be calibrated in accordance with ASTM D6938. If the specified density is not attained, the entire area shall be reworked and/or recompact and two additional random tests made. This procedure shall be followed until the specified density is reached. Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

- b. Thickness.** Depth tests shall be made by test holes or cores at least 3 inches (75 mm) in diameter that extend through the base. The thickness of the base 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 by scarifying to a depth of at least 3 inches (75 mm), adding new material of proper gradation, and the material shall be blended and recompact to grade. The Contractor shall replace, at his expense, base material where depth tests have been taken.

METHOD OF MEASUREMENT

211-4.1 The quantity of lime rock base course shall be the number of square yards (square meters) of base material placed, bonded, and accepted in the completed base course. The quantity of base course material shall be measured in final position based upon depth tests taken as directed by the RPR. On individual depth measurements, thicknesses more than 1/2 inch (12 mm) in excess of that shown on the plans shall be considered as the specified thickness plus 1/2 inch (12 mm) in computing the yardage for payment.

BASIS OF PAYMENT

211-5.1 Payment shall be made at the contract unit price per square yards (square meters) for lime rock base course. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

The cost of removing cracks and checks including the labor, and the additional lime rock necessary for crack elimination, will not be paid for separately but shall be included in the contract price per square yard (square meter) for lime rock base course.

Payment will be made under:

Item P-211-5.1	Lime rock base course	--per square yard (square meter)
Item P-211-1	Lime Rock Base Course (6")	--per Square Yard (SY)
Item P-211-2	Lime Rock Base Course (8")	--per Square Yard (SY)

REFERENCES

211-6.1 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 C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM D75	Standard Practice for Sampling Aggregates
ASTM D1557	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft ³)

ITEM P-403
PLANT MIX BITUMINOUS PAVEMENTS BASE, LEVELING OR SURFACE COURSE

ITEM P-403, "PLANT MIX BITUMINOUS PAVEMENTS BASE, LEVELING OR SURFACE COURSE" is a technical specification contained in Federal Aviation Administration Advisory Circular – 150/5370-10H, "Standard Specifications for Construction of Airports."

This item has been modified to make allowances for local materials, methods and requirements. This item has been updated and modified to comply with the latest editions of other applicable codes, from knowledge gained on other airport construction projects and valuable lessons learned from airport maintenance staffs.

Deletions are noted by the ~~strike through~~ method.

Changes and additions are noted by the ***bold italics*** method.

ITEM P-403
PLANT MIX BITUMINOUS PAVEMENTS BASE, LEVELING OR SURFACE 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 ¹	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 ¹	
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 ²	ASTM D4791
Bulk density of slag ³	Weigh not less than 70 pounds per cubic foot (1.12 Mg/cubic meter)	ASTM C29.

¹ The area of each face shall be equal to at least 75% of the smallest mid-sectional area of the piece. When two fractured faces are contiguous, the angle between the planes of fractures shall be at least 30 degrees to count as two fractured faces.

² A flat particle is one having a ratio of width to thickness greater than five (5); an elongated particle is one having a ratio of length to width greater than five (5).

³ Only required if slag is specified.

- b. Fine aggregate.** Fine aggregate shall consist of clean, sound, tough, durable, angular shaped particles produced by crushing stone, slag, or gravel and shall be free from coatings of clay, silt, or other objectionable matter. Natural (non-manufactured) sand may be used to obtain the gradation of the 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 cement binder. Asphalt binder shall conform to ASTM D6373 Performance Grade (PG) 67-22.

Asphalt Binder PG Plus Test Requirements		
Material Test	Requirement	Standard
Elastic Recovery	75% minimum	ASTM D6084

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.

403-2.5 Bond Breaker. Choke stone shall be an ASTM C33 Number 89 stone.

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.
- Percentage and properties (asphalt content, asphalt binder properties, and aggregate properties) of reclaimed asphalt pavement (RAP) in accordance with paragraph 403-3.4, Reclaimed Hot-Mix Asphalt, if RAP is used.

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 ¹	not less than 75 at a saturation of 70-80%	ASTM D4867
Asphalt Pavement Analyzer (APA) ²	Less than 10 mm @ 4000 passes	AASHTO T340 at 250 psi hose pressure at 64°C test temperature

¹ Test specimens for TSR shall be compacted at 7 ± 1.0 % air voids. In areas subject to freeze-thaw, use freeze-thaw conditioning in lieu of moisture conditioning per ASTM D4867.

² AASHTO T340 at 100 psi hose pressure at 64°C test temperature may be used in the interim. If this method is used the required Value shall be less than 5 mm @ 8000 passes

The mineral aggregate shall be of such size that the percentage composition by weight, as determined by laboratory sieves, will conform to the gradation or gradations specified in Table 2 when tested in accordance with ASTM C136 and ASTM C117.

The gradations in Table 2 represent the limits that shall determine the suitability of aggregate for use from the sources of supply, be well graded from coarse to fine and shall not vary from the low limit on one sieve to the high limit on the adjacent sieve, or vice versa.

Table 2. Aggregate - Asphalt Pavements

Sieve Size	Percentage by Weight Passing Sieve
1 inch (25.0 mm)	100
3/4 inch (19.0 mm)	76-98
1/2 inch (12.5 mm)	66-86
3/8 inch (9.5 mm)	57-77
No. 4 (4.75 mm)	40-60
No. 8 (2.36 mm)	26-46
No. 16 (1.18 mm)	17-37
No. 30 (600 µm)	11-27
No. 50 (300 µm)	7-19
No. 100 (150 µm)	6-16
No. 200 (75 µm)	3-6
Voids in Mineral Aggregate (VMA)¹	14
Asphalt Percent:	
Stone or gravel	4.5-7.0
Slag	5.0-7.5
Recommended Minimum Construction Lift Thickness	3 inch

¹ To achieve minimum VMA during production, the mix design needs to account for material breakdown during production.

The aggregate gradations shown are based on aggregates of uniform specific gravity. The percentages passing the various sieves shall be corrected when aggregates of varying specific gravities are used, as indicated in the Asphalt Institute MS-2 Mix Design Manual, 7th Edition.

403-3.4 Reclaimed asphalt concrete (RAP). Reclaimed Asphalt Pavement (RAP). Reclaimed asphalt pavement shall consist of reclaimed asphalt pavement (RAP), coarse aggregate, fine aggregate, mineral filler, and asphalt. Recycled asphalt shingles (RAS) shall not be allowed. The RAP shall be of a consistent gradation and asphalt content and properties. When RAP is fed into the plant, the maximum RAP chunk size shall not exceed 1-1/2 inches (38 mm). The reclaimed asphalt mix shall be designed using procedures contained in the Asphalt Institute MS-2 Mix Design Manual, 7th Edition. The percentage of asphalt in the RAP shall be established for the mixture design according to ASTM D2172 using the appropriate dust correction procedure. The JMF shall meet the requirements of paragraph 403-3.3. RAP should only be used for shoulder surface course mixes and for any intermediate courses. The use of RAP containing Coal Tar shall not be allowed. Coal Tar surface treatments must be removed prior to recycling underlying asphalt material. The amount of RAP shall be limited to 30 percent.

In addition to the requirements of paragraph 403-3.3, the JMF shall indicate the percent of reclaimed asphalt pavement and the percent and grade of new asphalt binder.

For the PG graded asphalt binder selected in paragraph 403-2.3, adjust as follows:

- a. For 0-20% RAP, there is no change in virgin asphalt binder content.
- b. For >20 to 30% RAP, select asphalt binder one grade softer, i.e., PG 64-22 would soften to PG 58-28.

403-3.5 Control strip. Full production shall not begin until an acceptable control strip has been constructed and accepted in writing by the RPR. The Contractor shall prepare and place a quantity of asphalt according to the JMF. The underlying grade or pavement structure upon which the control strip is to be constructed shall be the same as the remainder of the course represented by the control strip.

The Contractor will not be allowed to place the control strip until the Contractor quality control program (CQCP), showing conformance with the requirements of paragraph 403-5.1, has been accepted, in writing, by the RPR.

The control strip will consist of at least 250 tons (227 metric tons) or 1/2 subplot, whichever is greater. The control strip shall be placed in two lanes of the same width and depth to be used in production with a longitudinal cold joint. The cold joint must be cut back in accordance with paragraph 403-4.13 using the same procedure that will be used during production. The cold joint for the control strip will be an exposed construction joint at least four (4) hours old or when the mat has cooled to less than 160°F (71°C). The equipment used in construction of the control strip shall be the same type, configuration and weight to be used on the project.

The control strip shall be evaluated for acceptance as a single lot in accordance with the acceptance criteria in paragraph 403-6.1 and 403-6.2. The control strip shall be divided into equal sublots. As a minimum, the control strip shall consist of three (3) sublots.

The control strip will be considered acceptable by the RPR if the gradation, asphalt content, and VMA are within the action limits specified in paragraph 403-5.5a; and Mat density, air voids, and joint density meet the requirements specified in paragraphs 403-6.2.

If the control strip is unacceptable, necessary adjustments to the JMF, plant operation, placing procedures, and/or rolling procedures shall be made and another control strip shall be placed. Unacceptable control strips shall be removed at the Contractor's expense.

Payment will only be made for an acceptable control strip in accordance with paragraph 403-8.1.

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 8 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 $\frac{1}{4}$ inch in 12 feet, identifying areas that may pond water which could lead to hydroplaning of aircraft. If the smoothness criteria is not met, appropriate changes and corrections to the construction process shall be made by the Contractor before construction continues

The Contractor may use a 12-foot (3.7 m) "straightedge, a rolling inclinometer meeting the requirements of ASTM E2133 or rolling external reference device that can simulate a 12-foot (3.7m) straightedge approved by the RPR. Straight-edge testing shall start with one-half the length of the straightedge at the edge of pavement section being tested and then moved ahead one-half the length of the straightedge for each successive measurement. Testing shall be continuous across all joints. The surface irregularity shall be determined by placing the freestanding (unleveled) straightedge on the pavement surface and allowing it to rest upon the two highest spots covered by its length, and measuring the maximum gap between the straightedge and the pavement surface in the area between the two high points. If the rolling inclinometer or external reference device is used, the data may be evaluated using 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). 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, **and** grade.
- 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, ± 10 feet of centerline, and edge of 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%.

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 Mixture Base Course	per ton (kg)

Item P-403-1

5" Bituminous Base 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-

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 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 E2133	Standard Test Method for Using a Rolling Inclinator 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

ITEM P-501
CEMENT CONCRETE PAVEMENT

ITEM P-603, "CEMENT CONCRETE PAVEMENT" is a technical specification contained in Federal Aviation Administration Advisory Circular – 150/5370-10H, "Standard Specifications for Construction of Airports."

This item has been modified to make allowances for local materials, methods and requirements. This item has been updated and modified to comply with the latest editions of other applicable codes, from knowledge gained on other airport construction projects and valuable lessons learned from airport maintenance staffs.

Deletions are noted by the ~~striketrough~~ method.

Changes and additions are noted by the ***bold italic*** method.

ITEM P-501
CEMENT CONCRETE PAVEMENT

DESCRIPTION

501-1.1 This work shall consist of pavement composed of cement concrete with reinforcement constructed on a prepared underlying surface in accordance with these specifications and shall conform to the lines, grades, thickness, and typical cross-sections shown on the plans. The terms cement concrete, hydraulic cement concrete, and concrete are interchangeable in this specification.

MATERIALS

501-2.1 Aggregates.

- a. Reactivity.** Fine and Coarse aggregates to be used in PCC on this project shall be tested and evaluated by the Contractor for alkali-aggregate reactivity in accordance with both ASTM C1260 and ASTM C1567. Tests must be representative of aggregate sources which will be providing material for production. ASTM C1260 and ASTM C1567 tests may be run concurrently.
 - (1)** Coarse aggregate and fine aggregate shall be tested separately in accordance with ASTM C1260, however, the length of test shall be extended to 28 days (30 days from casting). Tests must have been completed within 6 months of the date of the concrete mix submittal.
 - (2)** The combined coarse and fine aggregate shall be tested in accordance with ASTM C1567, modified for combined aggregates, using the proposed mixture design proportions of aggregates, cementitious materials, and/or specific reactivity reducing chemicals. If the expansion does not exceed 0.10% at 28 days, the proposed combined materials will be accepted. If the expansion is greater than 0.10% at 28 days, the aggregates will not be accepted unless adjustments to the combined materials mixture can reduce the expansion to less than 0.10% at 28 days, or new aggregates shall be evaluated and tested.
 - (3)** If lithium nitrate is proposed for use with or without supplementary cementitious materials, the aggregates shall be tested in accordance with Corps of Engineers (COE) Concrete Research Division (CRD) C662 in lieu of ASTM C1567. If lithium nitrate admixture is used, it shall be nominal 30% $\pm$ 0.5% weight lithium nitrate in water. If the expansion does not exceed 0.10% at 28 days, the proposed combined materials will be accepted. If the expansion is greater than 0.10% at 28 days, the aggregates will not be accepted unless adjustments to the combined materials mixture can reduce the expansion to less than 0.10% at 28 days, or new aggregates shall be evaluated and tested.
- b. Fine aggregate.** Grading of the fine aggregate, as delivered to the mixer, shall conform to the requirements of ASTM C33 and the parameters identified in the fine aggregate material requirements below. Fine aggregate material requirements and deleterious limits are shown in the table below.

Fine Aggregate Material Requirements

Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate	Loss after 5 cycles: 10% maximum using Sodium sulfate - or - 15% maximum using magnesium sulfate	ASTM C88
Sand Equivalent Fineness Modulus (FM)	45 minimum	ASTM D2419

Limits for Deleterious Substances in Coarse Aggregate

Deleterious material	ASTM	Percentage by Mass
Clay Lumps and friable particles	ASTM C142	1.0
Material finer than No. 200 sieve (75 µm)	ASTM C117	1.0 ¹
Lightweight particles	ASTM C123 using a medium with a density of Sp. Gr. of 2.0	0.5
Chert ² (less than 2.40 Sp Gr.)	ASTM C123 using a medium with a density of Sp. Gr. of 2.40)	0.1 ³

¹ The limit for material finer than 75- consisting of dust of fracture that is essentially free from clay or shale. Test results supporting acceptance of increasing limit to 1.5% with statement indicating material is dust of fracture must be submitted with Concrete mix. Acceptable techniques to characterizing these fines include methylene blue adsorption or X-ray diffraction analysis.

² Chert and aggregates with less than 2.4 specific gravity.

³ The limit for chert may be increased to 1.0 percent by mass in areas not subject to severe freeze and thaw.

d. Combined aggregate gradation. This specification is targeted for a combined aggregate gradation developed following the guidance presented in United States Air Force Engineering Technical Letter (ETL) 97-5: Proportioning Concrete Mixtures with Graded Aggregates for Rigid Airfield Pavements. Base the aggregate grading upon a combination of all the aggregates (coarse and fine) to be used for the mixture proportioning. Three aggregate sizes may be required to achieve an optimized combined gradation that will produce a workable concrete mixture for its intended use. Use aggregate gradations that produce concrete mixtures with well-graded or optimized aggregate combinations. The Contractor shall submit complete mixture information necessary to calculate the volumetric components of the mixture. The combined aggregate grading shall meet the following requirements:

(1) The materials selected and the proportions used shall be such that when the Coarseness Factor (CF) and the Workability Factor (WF) are plotted on a diagram as described in paragraph 501-2.1d(4) below, the point thus determined shall fall within the parallelogram described therein.

(2) The CF shall be determined from the following equation:

—

(3) The WF is defined as the percent passing the No. 8 (2.36 mm) sieve based on the combined gradation. However, WF shall be adjusted, upwards only, by 2.5 percentage points for each 94 pounds (42 kg) of cementitious material per cubic meter yard greater than 564 pounds per cubic yard (335 kg per cubic meter).

(4) A diagram shall be plotted using a rectangular scale with WF on the Y-axis with units from 20 (bottom) to 45 (top), and with CF on the X-axis with units from 80 (left side) to 30 (right side). On this diagram a parallelogram shall be plotted with corners at the following coordinates (CF-75, WF-28), (CF-75, WF-40), (CF-45, WF-32.5), and (CF-45, WF-44.5). If the point

determined by the intersection of the computed CF and WF does not fall within the above parallelogram, the grading of each size of aggregate used and the proportions selected shall be changed as necessary. The point determined by the plotting of the CF and WF may be adjusted during production ± 3 WF and ± 5 CF. Adjustments to gradation may not take the point outside of the parallelogram.

- e. **Contractors combined aggregate gradation.** The Contractor shall submit their combined aggregate gradation using the following format:

Contractor's Combined Aggregate Gradation	
Sieve Size	Contractor's Concrete mix Gradation (Percent passing by weight)
2 inch (50 mm)	
1-1/2 inch (37.5 mm)	
1 inch (25.0 mm)	
3/4 inch (19.0 mm)	
1/2 inch (12.5 mm)	
3/8 inch (9.5 mm)	
No. 4 (4.75 mm)	
No. 8 (2.36 mm)	
No. 16 (1.18 mm)	
No. 30 (600 μ m)	
No. 50 (300 μ m)	
No. 100 (150 μ m)	

501-2.2 Cement. Cement shall conform to the requirements of ASTM 150 Type 1.

501-2.3 Cementitious materials.

- a. **Fly ash.** Fly ash shall meet the requirements of ASTM C618, with the exception of loss of ignition, where the maximum shall be less than 6%. Fly ash shall have a Calcium Oxide (CaO) content of less than 15% and a total alkali content less than 3% per ASTM C311. The Contractor shall furnish the previous three most recent, consecutive ASTM C618 reports for each source of fly ash proposed in the concrete mix, and shall furnish each additional report as they become available during the project. The reports can be used for acceptance or the material may be tested independently by the Resident Project Representative (RPR).
- b. **Slag cement (ground granulated blast furnace (GGBF)).** Slag cement shall conform to ASTM C989, Grade 100 or Grade 120. Slag cement shall be used only at a rate between 25% and 55% of the total cementitious material by mass.
- c. **Raw or calcined natural pozzolan.** Natural pozzolan shall be raw or calcined and conform to ASTM C618, Class N, including the optional requirements for uniformity and effectiveness in controlling Alkali-Silica reaction and shall have a loss on ignition not exceeding 6%. Class N pozzolan for use in mitigating Alkali-Silica Reactivity shall have a total available alkali content less than 3%.
- d. **Ultrafine fly ash and ultrafine pozzolan.** UltraFine Fly Ash (UFFA) and UltraFine Pozzolan (UFP) shall conform to ASTM C618, Class F or N, and the following additional requirements:

- (1) The strength activity index at 28 days of age shall be at least 95% of the control specimens.

- (2) The average particle size shall not exceed 6 microns.

501-2.4 Joint seal. The joint seal for the joints in the concrete pavement shall meet the requirements of Item P-605 and shall be of the type specified in the plans.

501-2.5 Isolation joint filler. Pre-molded joint filler for isolation joints shall conform to the requirements of ASTM D1751 or ASTM D1752 and shall be where shown on the plans. The filler for each joint shall be furnished in a single piece for the full depth and width required for the joint, unless otherwise specified by the RPR. When the use of more than one piece is required for a joint, the abutting ends shall be fastened securely and held accurately to shape by stapling or other positive fastening means satisfactory to the RPR.

501-2.6 Steel reinforcement. Reinforcing shall consist of welded steel wire fabric furnished in flat sheets conforming to the requirements of ASTM A1064.

501-2.7 Dowel and tie bars. Dowel bars shall be plain steel bars conforming to ASTM A615 and shall be free from burring or other deformation restricting slippage in the concrete.

- a. **Dowel Bars.** Before delivery to the construction site each dowel bar shall be epoxy coated per ASTM A1078, Type 1, with a coating thickness after curing greater than 10 mils. Patched ends are not required for Type 1 coated dowels. The dowels shall be coated with a bond-breaker recommended by the manufacturer. Dowel sleeves or inserts are not permitted. Grout retention rings shall be fully circular metal or plastic devices capable of supporting the dowel until the grout hardens.
- b. **Tie Bars.** Tie bars shall be deformed steel bars and conform to the requirements of ASTM A615. Tie bars designated as Grade 60 in ASTM A615 or ASTM A706 shall be used for construction requiring bent bars.

501-2.8 Water. Water used in mixing or curing shall be potable. If water is taken from other sources considered non-potable, it shall meet the requirements of ASTM C1602.

501-2.9 Material for curing concrete. Curing materials shall conform to one of the following specifications:

- a. Liquid membrane-forming compounds for curing concrete shall conform to the requirements of ASTM C309, Type 2, Class A, or Class B.
- b. White polyethylene film for curing concrete shall conform to the requirements of ASTM C171.
- c. White burlap-polyethylene sheeting for curing concrete shall conform to the requirements of ASTM C171.
- d. Waterproof paper for curing concrete shall conform to the requirements of ASTM C171.

501-2.10 Admixtures. Admixtures shall conform to the following specifications:

- a. **Air-entraining admixtures.** Air-entraining admixtures shall meet the requirements of ASTM C260 and shall consistently entrain the air content in the specified ranges under field conditions. The air-entraining agent and any water reducer admixture shall be compatible.

- b. Water-reducing admixtures.** Water-reducing admixture shall meet the requirements of ASTM C494, Type A, B, or D.
- c. Other admixtures.** The use of set retarding and set-accelerating admixtures shall be approved by the RPR prior to developing the concrete mix. Retarding admixtures shall meet the requirements of ASTM C494, Type A, B, or D and set-accelerating admixtures shall meet the requirements of ASTM C494, Type C. Calcium chloride and admixtures containing calcium chloride shall not be used.
- d. Lithium Nitrate.** The lithium admixture shall be a nominal 30% aqueous solution of Lithium Nitrate, with a density of 10 pounds/gallon (1.2 kg/L), and shall have the approximate chemical form as shown below:

Lithium Admixture

Constituent	Limit (Percent by Mass)
LiNO ₃ (Lithium Nitrate)	30 ±0.5
SO ₄ (Sulfate Ion)	0.1 (max)
Cl (Chloride Ion)	0.2 (max)
Na (Sodium Ion)	0.1 (max)
K (Potassium Ion)	0.1 (max)

The lithium nitrate admixture dispensing and mixing operations shall be verified and certified by the lithium manufacturer's representative.

501-2.11 Epoxy-resin. All epoxy-resin materials shall be two-component materials conforming to the requirements of ASTM C881, Class as appropriate for each application temperature to be encountered, except that in addition, the materials shall meet the following requirements:

- a.** Material for use for embedding dowels and anchor bolts shall be Type IV, Grade 3.
- b.** Material for use as patching materials for complete filling of spalls and other voids and for use in preparing epoxy resin mortar shall be Type III, Grade as approved.
- c.** Material for use for injecting cracks shall be Type IV, Grade 1.
- d.** Material for bonding freshly mixed Portland cement concrete or mortar or freshly mixed epoxy resin concrete or mortar to hardened concrete shall be Type V, Grade as approved.

501-2.12 Bond Breaker. Choke stone shall be an ASTM C33 Number 89 stone.

CONCRETE MIX

501-3.1. General. No concrete shall be placed until an acceptable concrete mix has been submitted to the RPR for review and the RPR has taken appropriate action. The RPR's review shall not relieve the Contractor of the responsibility to select and proportion the materials to comply with this section.

501-3.2 Concrete Mix Laboratory. The laboratory used to develop the concrete mix shall be accredited in accordance with ASTM C1077. The laboratory accreditation must be current and listed on the accrediting authority's website. All test methods required for developing the concrete mix must be included in the

lab accreditation. A copy of the laboratory's current accreditation and accredited test methods shall be submitted to the RPR prior to start of construction.

501-3.3 Concrete Mix Proportions. Develop the mix using the procedures contained in Portland Cement Association (PCA) publication, "Design and Control of Concrete Mixtures." Concrete shall be proportioned to achieve a 28-day flexural strength that meets or exceeds the acceptance criteria contained in paragraph 501-6.6 for a flexural strength of 700 psi per ASTM C78.

The minimum cementitious material shall be adequate to ensure a workable, durable mix. The minimum cementitious material (cement plus fly ash, or slag cement) shall be 470 pounds per cubic yard (279 kg per cubic meter). The ratio of water to cementitious material, including free surface moisture on the aggregates but not including moisture absorbed by the aggregates shall be between 0.38 – 0.45 by weight.

Flexural strength test specimens shall be prepared in accordance with ASTM C192 and tested in accordance with ASTM C78. At the start of the project, the Contractor shall determine an allowable slump as determined by ASTM C143 not to exceed 2 inches (50 mm) for slip-form placement. For fixed-form placement, the slump shall not exceed 3 inches (75 mm). For hand placement, the slump shall not exceed 4 inches (100 mm).

The results of the concrete mix shall include a statement giving the maximum nominal coarse aggregate size and the weights and volumes of each ingredient proportioned on a one cubic yard (meter) basis. Aggregate quantities shall be based on the mass in a saturated surface dry condition.

If a change in source(s) is made, or admixtures added or deleted from the mix, a new concrete mix must be submitted to the RPR for approval.

The RPR may request samples at any time for testing, prior to and during production, to verify the quality of the materials and to ensure conformance with the applicable specifications.

501-3.4 Concrete Mix submittal. The concrete mix shall be submitted to the RPR at least 30 days prior to the start of operations. The submitted concrete mix shall not be more than 180 days old and must use the materials to be used for production for the project. Production shall not begin until the concrete mix is approved in writing by the RPR.

Each of the submitted concrete mixes (i.e., slip form, side form machine finish and side form hand finish) shall be stamped or sealed by the responsible professional Engineer of the laboratory and shall include the following items and quantities as a minimum:

Certified material test reports for aggregate in accordance with paragraph 501-2.1. Certified reports must include all tests required; reporting each test, test method, test result, and requirement specified (criteria).

Combined aggregate gradations and analysis; and including plots of the fine aggregate fineness modulus.

Reactivity Test Results.

Coarse aggregate quality test results, including deleterious materials.

Fine aggregate quality test results, including deleterious materials.

Mill certificates for cement and supplemental cementitious materials.

Certified test results for all admixtures, including Lithium Nitrate if applicable.

Specified flexural strength, slump, and air content.

Recommended proportions/volumes for proposed mixture and trial water-cementitious materials ratio, including actual slump and air content.

Flexural and compressive strength summaries and plots, including all individual beam and cylinder breaks.

Correlation ratios for acceptance testing and Contractor QC testing, when applicable.

Historical record of test results documenting production standard deviation, when applicable.

501-3.5 Cementitious materials.

- a. **Fly ash.** When fly ash is used as a partial replacement for cement, the replacement rate shall be determined from laboratory trial mixes, and shall be between 20 and 30% by weight of the total cementitious material. If fly ash is used in conjunction with slag cement the maximum replacement rate shall not exceed 10% by weight of total cementitious material.
- b. **Slag cement (ground granulated blast furnace (GGBF)).** Slag cement may be used. The slag cement, or slag cement plus fly ash if both are used, may constitute between 25 to 55% of the total cementitious material by weight.
- c. **Raw or calcined natural pozzolan.** Natural pozzolan may be used in the concrete mix. When pozzolan is used as a partial replacement for cement, the replacement rate shall be determined from laboratory trial mixes, and shall be between 20 and 30% by weight of the total cementitious material. If pozzolan is used in conjunction with slag cement the maximum replacement rate shall not exceed 10% by weight of total cementitious material.

501-3.6 Admixtures.

- a. **Air-entraining admixtures.** Air-entraining admixture are to be added in such a manner that will ensure uniform distribution of the agent throughout the batch. The air content of freshly mixed air-entrained concrete shall be based upon trial mixes with the materials to be used in the work adjusted to produce concrete of the required plasticity and workability. The percentage of air in the mix shall be 2.5%. Air content shall be determined by testing in accordance with ASTM C231 for gravel and stone coarse aggregate and ASTM C173 for slag and other highly porous coarse aggregate.
- b. **Water-reducing admixtures.** Water-reducing admixtures shall be added to the mix in the manner recommended by the manufacturer and in the amount necessary to comply with the specification requirements. Tests shall be conducted with the materials to be used in the work, in accordance with ASTM C494.
- c. **Other admixtures.** Set controlling, and other approved admixtures shall be added to the mix in the manner recommended by the manufacturer and in the amount necessary to comply with the

specification requirements. Tests shall be conducted with the materials to be used in the work, in accordance with ASTM C494.

- d. **Lithium nitrate.** Lithium nitrate shall be added to the mix in the manner recommended by the manufacturer and in the amount necessary to comply with the specification requirements in accordance with paragraph 501-2.10d.

CONSTRUCTION METHODS

501-4.1 Control Strip. The control strip(s) shall be to the next planned joint after the initial 250 feet (75 m) of each type of pavement construction (slip-form pilot lane, slip-form fill-in lane, or fixed form). The Contractor shall demonstrate, in the presence of the RPR, that the materials, concrete mix, equipment, construction processes, and quality control processes meet the requirements of the specifications. The concrete mixture shall be extruded from the paver meeting the edge slump tolerance and with little or no finishing. Pilot, fill-in, and fixed-form control strips will be accepted separately. Minor adjustments to the mix design may be required to place an acceptable control strip. The production mix will be the adjusted mix design used to place the acceptable control strip. Upon acceptance of the control strip by the RPR, the Contractor must use the same equipment, materials, and construction methods for the remainder of concrete paving. Any adjustments to processes or materials must be approved in advance by the RPR. The acceptable control strip shall be paid for in accordance with paragraph 501-6.6.

501-4.2 Equipment. The Contractor is responsible for the proper operation and maintenance of all equipment necessary for handling materials and performing all parts of the work to meet this specification.

- a. **Plant and equipment.** The plant and mixing equipment shall conform to the requirements of ASTM C94 and/or ASTM C685. Each truck mixer shall have attached in a prominent place a manufacturer's nameplate showing the capacity of the drum in terms of volume of mixed concrete and the speed of rotation of the mixing drum or blades. The truck mixers shall be examined daily for changes in condition due to accumulation of hard concrete or mortar or wear of blades. The pickup and throw-over blades shall be replaced when they have worn down 3/4 inch (19 mm) or more. The Contractor shall have a copy of the manufacturer's design on hand showing dimensions and arrangement of blades in reference to original height and depth.

Equipment for transferring and spreading concrete from the transporting equipment to the paving lane in front of the finishing equipment shall be provided. The equipment shall be specially manufactured, self-propelled transfer equipment which will accept the concrete outside the paving lane and will spread it evenly across the paving lane in front of the paver and strike off the surface evenly to a depth which permits the paver to operate efficiently.

- b. **Finishing equipment.**

(1) Slip-form. The standard method of constructing concrete pavements shall be with an approved slip-form paving equipment designed and operated to spread, consolidate, screed, and finish the freshly placed concrete in one complete pass of the machine so that the end result is a dense and homogeneous pavement which is achieved with a minimum of hand finishing. The paver-finisher shall be a heavy duty, self-propelled machine designed specifically for paving and finishing high quality concrete pavements.

(2) Fixed-form. On projects requiring less than 10,000 cubic yards (7650 cubic meters) of concrete pavement or irregular areas at locations inaccessible to slip-form paving equipment,

concrete pavement may be placed with equipment specifically designed for placement and finishing using stationary side forms. Methods and equipment shall be reviewed and accepted by the RPR. Hand screeding and float finishing may only be used on small irregular areas as allowed by the RPR.

- c. **Vibrators.** Vibrator shall be the internal type. The rate of vibration of each vibrating unit shall be sufficient to consolidate the pavement without segregation or voids. The number, spacing, and frequency shall be as necessary to provide a dense and homogeneous pavement and meet the recommendations of American Concrete Institute (ACI) 309R, Guide for Consolidation of Concrete. Adequate power to operate all vibrators shall be available on the paver. The vibrators shall be automatically controlled so that they shall be stopped as forward motion ceases. The Contractor shall provide an electronic or mechanical means to monitor vibrator status. The checks on vibrator status shall occur a minimum of two times per day or when requested by the RPR.

Hand-held vibrators may only be used in irregular areas and shall meet the recommendations of ACI 309R, Guide for Consolidation of Concrete.

- d. **Concrete saws.** The Contractor shall provide sawing equipment adequate in number of units and power to complete the sawing to the required dimensions. The Contractor shall provide at least one standby saw in good working order and a supply of saw blades at the site of the work at all times during sawing operations.
- e. **Fixed forms.** Straight side fixed forms shall be made of steel and shall be furnished in sections not less than 10 feet (3 m) in length. Forms shall be provided with adequate devices for secure settings so that when in place they will withstand, without visible spring or settlement, the impact and vibration of the consolidating and finishing equipment. Forms with battered top surfaces and bent, twisted or broken forms shall not be used. Built-up forms shall not be used, except as approved by the RPR. The top face of the form shall not vary from a true plane more than 1/8 inch (3 mm) in 10 feet (3 m), and the upstanding leg shall not vary more than 1/4 inch (6 mm). The forms shall contain provisions for locking the ends of abutting sections together tightly for secure setting. Wood forms may be used under special conditions, when approved by the RPR. The forms shall extend the full depth of the pavement section.

501-4.3 Form setting. Forms shall be set to line and grade as shown on the plans, sufficiently in advance of the concrete placement, to ensure continuous paving operation. Forms shall be set to withstand, without visible spring or settlement, the impact and vibration of the consolidating and finishing equipment. Forms shall be cleaned and oiled prior to the concrete placement.

501-4.4 Base surface preparation prior to placement. Any damage to the prepared base, subbase, and subgrade shall be corrected full depth by the Contractor prior to concrete placement. The underlying surface shall be entirely free of frost when concrete is placed. The prepared grade shall be moistened with water, without saturating, immediately ahead of concrete placement to prevent rapid loss of moisture from concrete. Bond breaker shall be applied in accordance with 501-2.12.

501-4.5 Handling, measuring, and batching material. Aggregate stockpiles shall be constructed and managed in such a manner that prevents segregation and intermixing of deleterious materials. Aggregates from different sources shall be stockpiled, weighed and batched separately at the concrete batch plant. Aggregates that have become segregated or mixed with earth or foreign material shall not be used. All aggregates produced or handled by hydraulic methods, and washed aggregates, shall be stockpiled or

binned for draining at least 12 hours before being batched. Store and maintain all aggregates at a uniform moisture content prior to use. A continuous supply of materials shall be provided to the work to ensure continuous placement.

501-4.6 Mixing concrete. The concrete may be mixed at the work site, in a central mix plant or in truck mixers. The mixer shall be of an approved type and capacity. Mixing time shall be measured from the time all materials are placed into the drum until the drum is emptied into the truck. All concrete shall be mixed and delivered to the site in accordance with the requirements of ASTM C94 or ASTM C685.

Mixed concrete from the central mixing plant shall be transported in truck mixers, truck agitators, or non-agitating trucks. The elapsed time from the addition of cementitious material to the mix until the concrete is discharged from the truck should not exceed 30 minutes when the concrete is hauled in non-agitating trucks, nor 90 minutes when the concrete is hauled in truck mixers or truck agitators. In no case shall the temperature of the concrete when placed exceed 90°F (32°C). Re-tempering concrete by adding water or by other means will not be permitted. With transit mixers additional water may be added to the batch materials and additional mixing performed to increase the slump to meet the specified requirements provided the addition of water is performed within 45 minutes after the initial mixing operations and provided the water/cementitious ratio specified is not exceeded.

501-4.7 Weather Limitations on mixing and placing. No concrete shall be mixed, placed, or finished when the natural light is insufficient, unless an adequate and approved artificial lighting system is operated.

- a. **Cold weather.** Unless authorized in writing by the RPR, mixing and concreting operations shall be discontinued when a descending air temperature in the shade and away from artificial heat reaches 40°F (4°C) and shall not be resumed until an ascending air temperature in the shade and away from artificial heat reaches 35°F (2°C).

The aggregate shall be free of ice, snow, and frozen lumps before entering the mixer. The temperature of the mixed concrete shall not be less than 50°F (10°C) at the time of placement. Concrete shall not be placed on frozen material nor shall frozen aggregates be used in the concrete.

When concreting is authorized during cold weather, water and/or the aggregates may be heated to not more than 150°F (66°C). The apparatus used shall heat the mass uniformly and shall be arranged to preclude the possible occurrence of overheated areas which might be detrimental to the materials.

Curing during cold weather shall be in accordance with paragraph 501-4.13d.

- b. **Hot weather.** During periods of hot weather when the maximum daily air temperature exceeds 85°F (30°C), the following precautions shall be taken.

The forms and/or the underlying surface shall be sprinkled with water immediately before placing the concrete. The concrete shall be placed at the coolest temperature practicable, and in no case shall the temperature of the concrete when placed exceed 90°F (32°C). The aggregates and/or mixing water shall be cooled as necessary to maintain the concrete temperature at or not more than the specified maximum.

The concrete placement shall be protected from exceeding an evaporation rate of 0.2 psf (0.98 kg/m² per hour) per hour. When conditions are such that problems with plastic cracking can be

expected, and particularly if any plastic cracking begins to occur, the Contractor shall immediately take such additional measures as necessary to protect the concrete surface. If the Contractor's measures are not effective in preventing plastic cracking, paving operations shall be immediately stopped.

Curing during hot weather shall be in accordance with paragraph 501-4.13e.

- c. **Temperature management program.** Prior to the start of paving operation for each day of paving, the Contractor shall provide the RPR with a Temperature Management Program for the concrete to be placed to assure that uncontrolled cracking is avoided. (Federal Highway Administration HIPERPAV 3 is one example of a temperature management program.) As a minimum, the program shall address the following items:

- (1) Anticipated tensile strains in the fresh concrete as related to heating and cooling of the concrete material.
- (2) Anticipated weather conditions such as ambient temperatures, wind velocity, and relative humidity; and anticipated evaporation rate using Figure 19-9, PCA, Design and Control of Concrete Mixtures.
- (3) Anticipated timing of initial sawing of joint.
- (4) Anticipated number and type of saws to be used.

- d. **Rain.** The Contractor shall have available materials for the protection of the concrete during inclement weather. Such protective materials shall consist of rolled polyethylene sheeting at least 4 mils (0.1 mm) thick of sufficient length and width to cover the plastic concrete slab and any edges. The sheeting may be mounted on either the paver or a separate movable bridge from which it can be unrolled without dragging over the plastic concrete surface. When rain appears imminent, all paving operations shall stop and all available personnel shall begin covering the surface of the unhardened concrete with the protective covering.

501-4.8 Concrete Placement. At any point in concrete conveyance, the free vertical drop of the concrete from one point to another or to the underlying surface shall not exceed 3 feet (1 m). The finished concrete product must be dense and homogeneous, without segregation and conforming to the standards in this specification. Backhoes and grading equipment shall not be used to distribute the concrete in front of the paver. Front end loaders will not be used. All concrete shall be consolidated without voids or segregation, including under and around all load-transfer devices, joint assembly units, and other features embedded in the pavement. Hauling equipment or other mechanical equipment can be permitted on adjoining previously constructed pavement when the concrete strength reaches a flexural strength of 550 psi (3.8 MPa), based on the average of four field cured specimens per 2,000 cubic yards (1,530 cubic meters) of concrete placed. The Contractor must determine that the above minimum strengths are adequate to protect the pavement from overloads due to the construction equipment proposed for the project.

The Contractor shall have available materials for the protection of the concrete during cold, hot and/or inclement weather in accordance with paragraph 501-4.7.

- a. **Slip-form construction.** The concrete shall be distributed uniformly into final position by a self-propelled slip-form paver without delay. The alignment and elevation of the paver shall be regulated from outside reference lines established for this purpose. The paver shall vibrate the

concrete for the full width and depth of the strip of pavement being placed and the vibration shall be adequate to provide a consistency of concrete that will stand normal to the surface with sharp well-defined edges. The sliding forms shall be rigidly held together laterally to prevent spreading of the forms. The plastic concrete shall be effectively consolidated by internal vibration with transverse vibrating units for the full width of the pavement and/or a series of equally placed longitudinal vibrating units. The space from the outer edge of the pavement to longitudinal unit shall not exceed 9 inches (23 cm) for slipform and at the end of the dowels for the fill-in lanes. The spacing of internal units shall be uniform and shall not exceed 18 inches (0.5 m).

The term internal vibration means vibrating units located within the specified thickness of pavement section.

The rate of vibration of each vibrating unit shall be sufficient to consolidate the pavement without, segregation, voids, or vibrator trails and the amplitude of vibration shall be sufficient to be perceptible on the surface of the concrete along the entire length of the vibrating unit and for a distance of at least one foot (30 cm). The frequency of vibration or amplitude should be adjusted proportionately with the rate of travel to result in a uniform density and air content. The paving machine shall be equipped with a tachometer or other suitable device for measuring and indicating the actual frequency of vibrations.

The concrete shall be held at a uniform consistency. The slip-form paver shall be operated with as nearly a continuous forward movement as possible and all operations of mixing, delivering, and spreading concrete shall be coordinated to provide uniform progress with stopping and starting of the paver held to a minimum. If for any reason, it is necessary to stop the forward movement of the paver, the vibratory and tamping elements shall also be stopped immediately. No tractive force shall be applied to the machine, except that which is controlled from the machine.

When concrete is being placed adjacent to an existing pavement, that part of the equipment which is supported on the existing pavement shall be equipped with protective pads on crawler tracks or rubber-tired wheels on which the bearing surface is offset to run a sufficient distance from the edge of the pavement to avoid breaking the pavement edge.

Not more than 15% of the total free edge of each 500-foot (150 m) segment of pavement, or fraction thereof, shall have an edge slump exceeding 1/4 inch (6 mm), and none of the free edge of the pavement shall have an edge slump exceeding 3/8 inch (9 mm). (The total free edge of 500 feet (150 m) of pavement will be considered the cumulative total linear measurement of pavement edge originally constructed as nonadjacent to any existing pavement; that is, 500 feet (150 m) of paving lane originally constructed as a separate lane will have 1,000 feet (300 m) of free edge, 500 feet (150 m) of fill-in lane will have no free edge, etc.). The area affected by the downward movement of the concrete along the pavement edge shall be limited to not more than 18 inches (0.5 m) from the edge.

When excessive edge slump cannot be corrected before the concrete has hardened, the area with excessive edge slump will be removed the full width of the slip form lane and replaced at the expense of the Contractor as directed by the RPR.

- b. Fixed-form construction.** Forms shall be drilled in advance of being placed to line and grade to accommodate tie bars / dowel bars where these are specified.

Immediately in advance of placing concrete and after all subbase operations are completed, side forms shall be trued and maintained to the required line and grade for a distance sufficient to prevent delay in placing.

Side forms shall remain in place at least 12 hours after the concrete has been placed, and in all cases until the edge of the pavement no longer requires the protection of the forms. Curing compound shall be applied to the concrete immediately after the forms have been removed.

Side forms shall be thoroughly cleaned and coated with a release agent each time they are used and before concrete is placed against them.

Concrete shall be spread, screed, shaped and consolidated by one or more self-propelled machines. These machines shall uniformly distribute and consolidate concrete without segregation so that the completed pavement will conform to the required cross-section with a minimum of handwork.

The number and capacity of machines furnished shall be adequate to perform the work required at a rate equal to that of concrete delivery. The equipment must be specifically designed for placement and finishing using stationary side forms. Methods and equipment shall be reviewed and accepted by the RPR.

Concrete for the full paving width shall be effectively consolidated by internal vibrators. The rate of vibration of each vibrating unit shall be sufficient to consolidate the pavement without segregation, voids, or leaving vibrator trails.

Power to vibrators shall be connected so that vibration ceases when forward or backward motion of the machine is stopped.

- c. **Consolidation.** Concrete shall be consolidated with the specified type of lane-spanning, gang-mounted, mechanical, immersion type vibrating equipment mounted in front of the paver, supplemented, in rare instances as specified, by hand-operated vibrators. The vibrators shall be inserted into the concrete to a depth that will provide the best full-depth consolidation but not closer to the underlying material than 2 inches (50 mm). Vibrators shall not be used to transport or spread the concrete. For each paving train, at least one additional vibrator spud, or sufficient parts for rapid replacement and repair of vibrators shall be maintained at the paving site at all times. Any evidence of inadequate consolidation (honeycomb along the edges, large air pockets, or any other evidence) or over-consolidation (vibrator trails, segregation, or any other evidence) shall require the immediate stopping of the paving operation and adjustment of the equipment or procedures as approved by the RPR.

If a lack of consolidation of the hardened concrete is suspected by the RPR, referee testing may be required. Referee testing of hardened concrete will be performed by the RPR by cutting cores from the finished pavement after a minimum of 24 hours curing. The RPR shall visually examine the cores for evidence of lack of consolidation. Density determinations will be made by the RPR based on the water content of the core as taken. ASTM C642 shall be used for the determination of core density in the saturated-surface dry condition. When required, referee cores will be taken at the minimum rate of one for each 500 cubic yards (382 m³) of pavement, or fraction. The Contractor shall be responsible for all referee testing cost if they fail to meet the required density.

The average density of the cores shall be at least 97% of the original concrete mix density, with no cores having a density of less than 96% of the original concrete mix density. Failure to meet the referee tests will be considered evidence that the minimum requirements for vibration are inadequate for the job conditions. Additional vibrating units or other means of increasing the effect of vibration shall be employed so that the density of the hardened concrete conforms to the above requirements.

501-4.9 Strike-off of concrete and placement of reinforcement. Following the placing of the concrete, it shall be struck off to conform to the cross-section shown on the plans and to an elevation that when the concrete is properly consolidated and finished, the surface of the pavement shall be at the elevation shown on the plans. When reinforced concrete pavement is placed in two layers, the bottom layer shall be struck off to such length and depth that the sheet of reinforcing steel fabric or bar mat may be laid full length on the concrete in its final position without further manipulation. The reinforcement shall then be placed directly upon the concrete, after which the top layer of the concrete shall be placed, struck off, and screed. If any portion of the bottom layer of concrete has been placed more than 30 minutes without being covered with the top layer or if initial set has taken place, it shall be removed and replaced with freshly mixed concrete at the Contractor's expense. When reinforced concrete is placed in one layer, the reinforcement may be positioned in advance of concrete placement or it may be placed in plastic concrete by mechanical or vibratory means after spreading.

Reinforcing steel, at the time concrete is placed, shall be free of mud, oil, or other organic matter that may adversely affect or reduce bond. Reinforcing steel with rust, mill scale or a combination of both will be considered satisfactory, provided the minimum dimensions, weight, and tensile properties of a hand wire-brushed test specimen are not less than the applicable ASTM specification requirements.

501-4.10 Joints. Joints shall be constructed as shown on the plans and in accordance with these requirements. All joints shall be constructed with their faces perpendicular to the surface of the pavement and finished or edged as shown on the plans. Joints shall not vary more than 1/2-inch (12 mm) from their designated position and shall be true to line with not more than 1/4-inch (6 mm) variation in 10 feet (3 m). The surface across the joints shall be tested with a 12-foot (3 m) straightedge as the joints are finished and any irregularities in excess of 1/4 inch (6 mm) shall be corrected before the concrete has hardened. All joints shall be so prepared, finished, or cut to provide a groove of uniform width and depth as shown on the plans.

- a. **Construction.** Longitudinal construction joints shall be slip-formed or formed against side forms as shown in the plans.

Transverse construction joints shall be installed at the end of each day's placing operations and at any other points within a paving lane when concrete placement is interrupted for more than 30 minutes or it appears that the concrete will obtain its initial set before fresh concrete arrives. The installation of the joint shall be located at a planned contraction or expansion joint. If placing of the concrete is stopped, the Contractor shall remove the excess concrete back to the previous planned joint.

- b. **Contraction.** Contraction joints shall be installed at the locations and spacing as shown on the plans. Contraction joints shall be installed to the dimensions required by forming a groove or cleft in the top of the slab while the concrete is still plastic or by sawing a groove into the concrete surface after the concrete has hardened. When the groove is formed in plastic concrete the sides of the grooves shall be finished even and smooth with an edging tool. If an insert material is used,

the installation and edge finish shall be according to the manufacturer's instructions. The groove shall be finished or cut clean so that spalling will be avoided at intersections with other joints. Grooving or sawing shall produce a slot at least 1/8 inch (3 mm) wide and to the depth shown on the plans.

- c. **Isolation (expansion).** Isolation joints shall be installed as shown on the plans. The pre-molded filler of the thickness as shown on the plans, shall extend for the full depth and width of the slab at the joint. The filler shall be fastened uniformly along the hardened joint face with no buckling or debris between the filler and the concrete interface, including a temporary filler for the sealant reservoir at the top of the slab. The edges of the joint shall be finished and tooled while the concrete is still plastic

d. **Dowels and Tie Bars for Joints**

(1) **Tie bars.** Tie bars shall consist of deformed bars installed in joints as shown on the plans. Tie bars shall be placed at right angles to the centerline of the concrete slab and shall be spaced at intervals shown on the plans. They shall be held in position parallel to the pavement surface and in the middle of the slab depth and within the tolerances in paragraph 501-4.10(f.). When tie bars extend into an unpaved lane, they may be bent against the form at longitudinal construction joints, unless threaded bolt or other assembled tie bars are specified. Tie bars shall not be painted, greased, or enclosed in sleeves. When slip-form operations call for tie bars, two-piece hook bolts can be installed.

(2) **Dowel bars.** Dowel bars shall be placed across joints in the proper horizontal and vertical alignment as shown on the plans. The dowels shall be coated with a bond-breaker or other lubricant recommended by the manufacturer and approved by the RPR. Dowels bars at longitudinal construction joints shall be bonded in drilled holes.

(3) **Placing dowels and tie bars.** Horizontal spacing of dowels shall be within a tolerance of $\pm 3/4$ inch (19 mm). The vertical location on the face of the slab shall be within a tolerance of $\pm 1/2$ inch (12 mm). The method used to install dowels shall ensure that the horizontal and vertical alignment will not be greater than 1/4 inch per foot (6 mm per 0.3 m), except for those across the crown or other grade change joints. Dowels across crowns and other joints at grade changes shall be measured to a level surface. Horizontal alignment shall be checked perpendicular to the joint edge. The portion of each dowel intended to move within the concrete or expansion cap shall be wiped clean and coated with a thin, even film of lubricating oil or light grease before the concrete is placed. Dowels shall be installed as specified in the following subparagraphs.

- (a). **Contraction joints.** Dowels and tie bars in longitudinal and transverse contraction joints within the paving lane shall be held securely in place by means of rigid metal frames or basket assemblies of an approved type. The basket assemblies shall be held securely in the proper location by means of suitable pins or anchors. Do not cut or crimp the dowel basket tie wires.

At the Contractor's option, dowels and tie bars in contraction joints may be installed by insertion into the plastic concrete using approved equipment and procedures per the paver manufacturer's design. Approval of installation methods will be based on the results of the control strip showing that the dowels and tie bars are installed within

specified tolerances as verified by cores or non-destructive rebar location devices approved by the RPR.

- (b). **Construction joints.** Install dowels and tie bars by the cast-in-place or the drill-and-dowel method. Installation by removing and replacing in preformed holes will not be permitted. Dowels and tie bars shall be prepared and placed across joints where indicated, correctly aligned, and securely held in the proper horizontal and vertical position during placing and finishing operations, by means of devices fastened to the forms.
- (c). **Joints in hardened concrete.** Install dowels in hardened concrete by bonding the dowels into holes drilled into the concrete. The concrete shall have cured for seven (7) days or reached a minimum flexural strength of 450 psi (3.1 MPa) before drilling begins. Holes 1/8 inch (3 mm) greater in diameter than the dowels shall be drilled into the hardened concrete using rotary-core drills. Rotary-percussion drills may be used, provided that excessive spalling does not occur. Spalling beyond the limits of the grout retention ring will require modification of the equipment and operation. Depth of dowel hole shall be within a tolerance of $\pm 1/2$ inch (12 mm) of the dimension shown on the drawings. On completion of the drilling operation, the dowel hole shall be blown out with oil-free, compressed air. Dowels shall be bonded in the drilled holes using epoxy resin. Epoxy resin shall be injected at the back of the hole before installing the dowel and extruded to the collar during insertion of the dowel so as to completely fill the void around the dowel. Application by buttering the dowel will not be permitted. The dowels shall be held in alignment at the collar of the hole by means of a suitable metal or plastic grout retention ring fitted around the dowel.
- e. **Sawing of joints.** Sawing shall commence, without regard to day or night, as soon as the concrete has hardened sufficiently to permit cutting without chipping, spalling, or tearing and before uncontrolled shrinkage cracking of the pavement occurs and shall continue without interruption until all joints have been sawn. All slurry and debris produced in the sawing of joints shall be removed by vacuuming and washing. Curing compound or system shall be reapplied in the initial saw-cut and maintained for the remaining cure period.

Joints shall be cut in locations as shown on the plans. The initial joint cut shall be a minimum 1/8 inch (3 mm) wide and to the depth shown on the plans. Prior to placement of joint sealant or seals, the top of the joint shall be widened by sawing as shown on the plans.

501-4.11 Finishing. Finishing operations shall be a continuing part of placing operations starting immediately behind the strike-off of the paver. Initial finishing shall be provided by the transverse screed or extrusion plate. The sequence of operations shall be transverse finishing, longitudinal machine floating if used, straightedge finishing, edging of joints, and then texturing. Finishing shall be by the machine method. The hand method shall be used only on isolated areas of odd slab widths or shapes and in the event of a breakdown of the mechanical finishing equipment. Supplemental hand finishing for machine finished pavement shall be kept to an absolute minimum. Any machine finishing operation which requires appreciable hand finishing, other than a moderate amount of straightedge finishing, shall be immediately stopped and proper adjustments made or the equipment replaced. Equipment, mixture, and/or procedures which produce more than 1/4 inch (6 mm) of mortar-rich surface shall be immediately modified as necessary to eliminate this condition or operations shall cease. Compensation shall be made for surging behind the screeds or extrusion plate and settlement during hardening and care shall be taken to ensure that paving and finishing machines are properly adjusted so that the finished surface of the

concrete (not just the cutting edges of the screeds) will be at the required line and grade. Finishing equipment and tools shall be maintained clean and in an approved condition. At no time shall water be added to the surface of the slab with the finishing equipment or tools, or in any other way. Fog (mist) sprays or other surface applied finishing aids specified to prevent plastic shrinkage cracking, approved by the RPR, may be used in accordance with the manufacturer's requirements.

- a. **Machine finishing with slipform pavers.** The slipform paver shall be operated so that only a very minimum of additional finishing work is required to produce pavement surfaces and edges meeting the specified tolerances. Any equipment or procedure that fails to meet these specified requirements shall immediately be replaced or modified as necessary. A self-propelled non-rotating pipe float may be used while the concrete is still plastic, to remove minor irregularities and score marks. Only one pass of the pipe float shall be allowed. Equipment, mixture, and/or procedures which produce more than 1/4 inch (6 mm) of mortar-rich surface shall be immediately modified as necessary to eliminate this condition or operations shall cease. Remove excessive slurry from the surface with a cutting straightedge and wipe off the edge. Any slurry which does run down the vertical edges shall be immediately removed by hand, using stiff brushes or scrapers. No slurry, concrete or concrete mortar shall be used to build up along the edges of the pavement to compensate for excessive edge slump, either while the concrete is plastic or after it hardens.
- b. **Machine finishing with fixed forms.** The machine shall be designed to straddle the forms and shall be operated to screed and consolidate the concrete. Machines that cause displacement of the forms shall be replaced. The machine shall make only one pass over each area of pavement. If the equipment and procedures do not produce a surface of uniform texture, true to grade, in one pass, the operation shall be immediately stopped and the equipment, mixture, and procedures adjusted as necessary.
- c. **Other types of finishing equipment.** Clary screeds, other rotating tube floats, or bridge deck finishers are not allowed on mainline paving but may be allowed on irregular or odd-shaped slabs, and near buildings or trench drains, subject to the RPR's approval.

Bridge deck finishers shall have a minimum operating weight of 7500 pounds (3400 kg) and shall have a transversely operating carriage containing a knock-down auger and a minimum of two immersion vibrators. Vibrating screeds or pans shall be used only for isolated slabs where hand finishing is permitted as specified, and only where specifically approved.

- d. **Hand finishing.** Hand finishing methods will not be permitted, except under the following conditions: (1) in the event of breakdown of the mechanical equipment, hand methods may be used to finish the concrete already deposited on the grade and (2) in areas of narrow widths or of irregular dimensions where operation of the mechanical equipment is impractical.
- e. **Straightedge testing and surface correction.** After the pavement has been struck off and while the concrete is still plastic, it shall be tested for trueness with a 12-foot (3.7-m) finishing straightedge swung from handles capable of spanning at least one-half the width of the slab. The straightedge shall be held in contact with the surface in successive positions parallel to the centerline and the whole area gone over from one side of the slab to the other, as necessary. Advancing shall be in successive stages of not more than one-half the length of the straightedge. Any excess water and laitance in excess of 1/8 inch (3 mm) thick shall be removed from the surface of the pavement and wasted. Any depressions shall be immediately filled with freshly mixed

concrete, struck off, consolidated, and refinished. High areas shall be cut down and refinished. Special attention shall be given to assure that the surface across joints meets the smoothness requirements. Straightedge testing and surface corrections shall continue until the entire surface is found to be free from observable departures from the straightedge and until the slab conforms to the required grade and cross-section. The use of long-handled wood floats shall be confined to a minimum; they may be used only in emergencies and in areas not accessible to finishing equipment.

501-4.12 Surface texture. The surface of the pavement shall be finished as designated below for all newly constructed concrete pavements. It is important that the texturing equipment not tear or unduly roughen the pavement surface during the operation. The texture shall be uniform in appearance and approximately 1/16 inch (2 mm) in depth. Any imperfections resulting from the texturing operation shall be corrected to the satisfaction of the RPR.

- a. **Brush or broom finish.** Shall be applied when the water sheen has practically disappeared. The equipment shall operate transversely across the pavement surface.
- b. **Burlap drag finish.** Not used.
- c. **Artificial turf finish.** Not used.

501-4.13 Curing. Immediately after finishing operations are completed and bleed water is gone from the surface, all exposed surfaces of the newly placed concrete shall be cured for a 7-day cure period in accordance with one of the methods below. Failure to provide sufficient cover material of whatever kind the Contractor may elect to use, or lack of water to adequately take care of both curing and other requirements, shall be cause for immediate suspension of concreting operations. The concrete shall not be left exposed for more than 1/2 hour during the curing period.

When a two-saw-cut method is used to construct the contraction joint, the curing compound shall be applied to the saw-cut immediately after the initial cut has been made. The sealant reservoir shall not be sawed until after the curing period has been completed. When the one cut method is used to construct the contraction joint, the joint shall be cured with wet rope, wet rags, or wet blankets. The rags, ropes, or blankets shall be kept moist for the duration of the curing period.

- a. **Impervious membrane method.** Curing with liquid membrane compounds should not occur until bleed and surface moisture has evaporated. All exposed surfaces of the pavement shall be sprayed uniformly with white pigmented curing compound immediately after the finishing of the surface and before the set of the concrete has taken place. The curing compound shall not be applied during rainfall. Curing compound shall be applied by mechanical sprayers under pressure at the rate of one gallon (4 liters) to not more than 150 square feet (14 sq m). The spraying equipment shall be of the fully atomizing type equipped with a tank agitator. At the time of use, the compound shall be in a thoroughly mixed condition with the pigment uniformly dispersed throughout the vehicle. During application, the compound shall be stirred continuously by mechanical means. Hand spraying of odd widths or shapes and concrete surfaces exposed by the removal of forms will be permitted. When hand spraying is approved by the RPR, a double application rate shall be used to ensure coverage. Should the film become damaged from any cause, including sawing operations, within the required curing period, the damaged portions shall be repaired immediately with additional compound or other approved means. Upon removal of

side forms, the sides of the exposed slabs shall be protected immediately to provide a curing treatment equal to that provided for the surface.

- b. White burlap-polyethylene sheets.** The surface of the pavement shall be entirely covered with the sheeting. The sheeting used shall be such length (or width) that it will extend at least twice the thickness of the pavement beyond the edges of the slab. The sheeting shall be placed so that the entire surface and both edges of the slab are completely covered. The sheeting shall be placed and weighted to remain in contact with the surface covered, and the covering shall be maintained fully saturated and in position for seven (7) days after the concrete has been placed.
- c. Water method.** The entire area shall be covered with burlap or other water absorbing material. The material shall be of sufficient thickness to retain water for adequate curing without excessive runoff. The material shall be kept wet at all times and maintained for seven (7) days. When the forms are stripped, the vertical walls shall also be kept moist. It shall be the responsibility of the Contractor to prevent ponding of the curing water on the subbase.
- d. Concrete protection for cold weather.** Maintain the concrete at a temperature of at least 50°F (10°C) for a period of 72 hours after placing and at a temperature above freezing for the remainder of the 7-day curing period. The Contractor shall be responsible for the quality and strength of the concrete placed during cold weather; and any concrete damaged shall be removed and replaced at the Contractor's expense.
- e. Concrete protection for hot weather.** Concrete should be continuous moisture cured for the entire curing period and shall commence as soon as the surfaces are finished and continue for at least 24 hours. However, if moisture curing is not practical beyond 24 hours, the concrete surface shall be protected from drying with application of a liquid membrane-forming curing compound while the surfaces are still damp. Other curing methods may be approved by the RPR.

501-4.14 Removing forms. Unless otherwise specified, forms shall not be removed from freshly placed concrete until it has hardened sufficiently to permit removal without chipping, spalling, or tearing. After the forms have been removed, the sides of the slab shall be cured in accordance with paragraph 501-4.13.

If honeycombed areas are evident when the forms are removed, materials, placement, and consolidation methods must be reviewed and appropriate adjustments made to assure adequate consolidation at the edges of future concrete placements. Honeycombed areas that extend into the slab less than approximately 1 inch (25 mm), shall be repaired with an approved grout, as directed by the RPR. Honeycombed areas that extend into the slab greater than a depth of 1 inch (25 mm) shall be considered as defective work and shall be removed and replaced in accordance with paragraph 501-4.19.

501-4.15 Saw-cut grooving. If shown on the plans, grooved surfaces shall be provided in accordance with the requirements of Item P-621.

501-4.16 Sealing joints. The joints in the pavement shall be sealed in accordance with Item P-605.

501-4.17 Protection of pavement. The Contractor shall protect the pavement and its appurtenances against both public traffic and traffic caused by the Contractor's employees and agents until accepted by the RPR. This shall include watchmen to direct traffic and the erection and maintenance of warning signs, lights, pavement bridges, crossovers, and protection of unsealed joints from intrusion of foreign material, etc. Any damage to the pavement occurring prior to final acceptance shall be repaired or the pavement replaced at the Contractor's expense.

Aggregates, rubble, or other similar construction materials shall not be placed on airfield pavements. Traffic shall be excluded from the new pavement by erecting and maintaining barricades and signs until the concrete is at least seven (7) days old, or for a longer period if directed by the RPR.

In paving intermediate lanes between newly paved pilot lanes, operation of the hauling and paving equipment will be permitted on the new pavement after the pavement has been cured for seven (7) days, the joints are protected, the concrete has attained a minimum field cured flexural strength of 450 psi (3100 kPa), and the slab edge is protected.

All new and existing pavement carrying construction traffic or equipment shall be kept clean and spillage of concrete and other materials shall be cleaned up immediately.

Damaged pavements shall be removed and replaced at the Contractor's expense. Slabs shall be removed to the full depth, width, and length of the slab.

501-4.18 Opening to construction traffic. The pavement shall not be opened to traffic until test specimens molded and cured in accordance with ASTM C31 have attained a flexural strength of 450 pounds per square inch (3100 kPa) when tested in accordance with ASTM C78. If such tests are not conducted, the pavement shall not be opened to traffic until 14 days after the concrete was placed. Prior to opening the pavement to construction traffic, all joints shall either be sealed or protected from damage to the joint edge and intrusion of foreign materials into the joint. As a minimum, backer rod or tape may be used to protect the joints from foreign matter intrusion.

501-4.19 Repair, removal, or replacement of slabs. New pavement slabs that are broken or contain cracks or are otherwise defective or unacceptable as defined by acceptance criteria in paragraph 501-6.6 shall be removed and replaced or repaired, as directed by the RPR, at the Contractor's expense. Spalls along joints shall be repaired as specified. Removal of partial slabs is not permitted. Removal and replacement shall be full depth, shall be full width of the slab, and the limit of removal shall be normal to the paving lane and to each original transverse joint. The RPR will determine whether cracks extend full depth of the pavement and may require cores to be drilled on the crack to determine depth of cracking. Such cores shall be have a diameter of 2 inches (50 mm) to 4 inches (100 mm), shall be drilled by the Contractor and shall be filled by the Contractor with a well consolidated concrete mixture bonded to the walls of the hole with a bonding agent, using approved procedures. Drilling of cores and refilling holes shall be at no expense to the Owner. Repair of cracks as described in this section shall not be allowed if in the opinion of the RPR the overall condition of the pavement indicates that such repair is unlikely to achieve an acceptable and durable finished pavement. No repair of cracks shall be allowed in any panel that demonstrates segregated aggregate with an absence of coarse aggregate in the upper 1/8 inch (3 mm) of the pavement surface.

- a. **Shrinkage cracks.** Shrinkage cracks which do not exceed one-third of the pavement depth shall be cleaned and either high molecular weight methacrylate (HMWM) applied; or epoxy resin (Type IV, Grade 1) pressure injected using procedures recommended by the manufacturer and approved by the RPR. Sandblasting of the surface may be required following the application of HMWM to restore skid resistance. Care shall be taken to ensure that the crack is not widened during epoxy resin injection. All epoxy resin injection shall take place in the presence of the RPR. Shrinkage cracks which exceed one-third the pavement depth shall be treated as full depth cracks in accordance with paragraphs 501-4.19b and 501-19c.

- b. Slabs with cracks through interior areas.** Interior area is defined as that area more than 6 inches (150 mm) from either adjacent original transverse joint. The full slab shall be removed and replaced at no cost to the Owner, when there are any full depth cracks, or cracks greater than one-third the pavement depth, that extend into the interior area.
- c. Cracks close to and parallel to joints.** All full-depth cracks within 6 inches (150 mm) either side of the joint and essentially parallel to the original joints, shall be treated as follows.

(1) Full depth cracks and original joint not cracked. The full-depth crack shall be treated as the new joint and the original joint filled with an epoxy resin.

(a). **Full-depth crack.** The joint sealant reservoir for the crack shall be formed by sawing to a depth of 3/4 inches (19 mm), $\pm 1/16$ inch (2 mm), and to a width of 5/8 inch (16 mm), $\pm 1/8$ inch (3 mm). The crack shall be sawed with equipment specially designed to follow random cracks. Any equipment or procedure which causes raveling or spalling along the crack shall be modified or replaced to prevent raveling or spalling. The joint shall be sealed with sealant in accordance with P-605 or as directed by the RPR.

(b). **Original joint.** If the original joint sealant reservoir has been sawed out, the reservoir and as much of the lower saw cut as possible shall be filled with epoxy resin, Type IV, Grade 2, thoroughly tooled into the void using approved procedures.

If only the original narrow saw cut has been made, it shall be cleaned and pressure injected with epoxy resin, Type IV, Grade 1, using approved procedures.

Where a parallel crack goes part way across paving lane and then intersects and follows the original joint which is cracked only for the remained of the width, it shall be treated as specified above for a parallel crack, and the cracked original joint shall be prepared and sealed as originally designed.

(2) Full depth cracks and original joint cracked. If there is any place in the lane width where a parallel crack and a cracked portion of the original joint overlap, the entire slab containing the crack shall be removed and replaced.

- d. Removal and replacement of full slabs.** Make a full depth cut perpendicular to the slab surface along all edges of the slab with a concrete saw cutting any dowels or tie-bars. Remove damaged slab protecting adjacent pavement from damage. Damage to adjacent slabs may result in removal of additional slabs as directed by the RPR at the Contractor's expense.

The underlying material shall be repaired, re-compacted and shaped to grade.

Dowels of the size and spacing specified for other joints in similar pavement on the project shall be installed along all four (4) edges of the new slab in accordance with paragraph 501-4.10d.

Placement of concrete shall be as specified for original construction. The joints around the new slab shall be prepared and sealed as specified for original construction.

- e. Spalls along joints.**

(1) Spalls less than one inch wide and less than the depth of the joint sealant reservoir, shall be filled with joint sealant material.

- (2) Spalls larger than one inch and/or deeper than the joint reservoir, but less than $\frac{1}{2}$ the slab depth, and less than 25% of the length of the adjacent joint shall be repaired as follows:
- (a). Make a vertical saw cut at least one inch (25 mm) outside the spalled area and to a depth of at least 2 inches (50 mm). Saw cuts shall be straight lines forming rectangular areas surrounding the spalled area.
 - (b). Remove unsound concrete and at least $\frac{1}{2}$ inch (12 mm) of visually sound concrete between the saw cut and the joint or crack with a light chipping hammer.
 - (c). Clean cavity with high-pressure water jets supplemented with compressed air as needed to remove all loose material.
 - (d). Apply a prime coat of epoxy resin, Type III, Grade I, to the dry, cleaned surface of all sides and bottom of the cavity, except any joint face.
 - (e). Fill the cavity with low slump concrete or mortar or with epoxy resin concrete or mortar.
 - (f). An insert or other bond-breaking medium shall be used to prevent bond at all joint faces.
 - (g). A reservoir for the joint sealant shall be sawed to the dimensions required for other joints, or as required to be routed for cracks. The reservoir shall be thoroughly cleaned and sealed with the sealer specified for the joints.
- (3) Spalls deeper than $\frac{1}{2}$ of the slab depth or spalls longer than 25% of the adjacent joint require replacement of the entire slab.

- f. **Diamond grinding of Concrete surfaces.** Diamond grinding shall be completed prior to pavement grooving. Diamond grinding of the hardened concrete should not be performed until the concrete is at least 14 days old and has achieved full minimum strength. Equipment that causes ravels, aggregate fractures, spalls or disturbance to the joints will not be permitted. The depth of diamond grinding shall not exceed $\frac{1}{2}$ inch (13 mm) and all areas in which diamond grinding has been performed will be subject to the final pavement thickness tolerances specified.

Diamond grinding shall be performed with a machine specifically designed for diamond grinding capable of cutting a path at least 3 feet (0.9 m) wide. The saw blades shall be $\frac{1}{8}$ -inch (3-mm) wide with sufficient number of flush cut blades that create grooves between 0.090 and 0.130 inches (2 and 3.5 mm) wide; and peaks and ridges approximately $\frac{1}{32}$ inch (1 mm) higher than the bottom of the grinding cut. The Contractor shall determine the number and type of blades based on the hardness of the aggregate. Contractor shall demonstrate to the RPR that the grinding equipment will produce satisfactory results prior to making corrections to surfaces.

Grinding will be tapered in all directions to provide smooth transitions to areas not requiring grinding. The slurry resulting from the grinding operation shall be continuously removed and the pavement left in a clean condition. All grinding shall be at the expense of the Contractor.

CONTRACTOR QUALITY CONTROL (CQC)

501-5.1 Quality control program. The Contractor shall develop a Quality Control Program in accordance with Item C-100. No partial payment will be made for materials that are subject to specific quality control requirements without an approved quality control program.

501-5.2 Contractor Quality Control (CQC). The Contractor shall provide or contract for testing facilities in accordance with Item C-100. The RPR shall be permitted unrestricted access to inspect the Contractor's QC facilities and witness QC activities. The RPR will advise the Contractor in writing of any noted deficiencies concerning the QC facility, equipment, supplies, or testing personnel and procedures. When the deficiencies are serious enough to be adversely affecting the test results, the incorporation of the materials into the work shall be suspended immediately and will not be permitted to resume until the deficiencies are satisfactorily corrected.

501-5.3 Contractor QC testing. The Contractor shall perform all QC tests necessary to control the production and construction processes applicable to this specification and as set forth in the CQCP. The testing program shall include, but not necessarily be limited to, tests for aggregate gradation, aggregate moisture content, slump, and air content. A QC Testing Plan shall be developed and approved by the RPR as part of the CQCP.

The RPR may at any time, notwithstanding previous plant acceptance, reject and require the Contractor to dispose of any batch of concrete mixture which is rendered unfit for use due to contamination, segregation, or improper slump. Such rejection may be based on only visual inspection. In the event of such rejection, the Contractor may take a representative sample of the rejected material in the presence of the RPR, and if it can be demonstrated in the laboratory, in the presence of the RPR, that such material was erroneously rejected, payment will be made for the material at the contract unit price.

a. Fine aggregate.

(1) Gradation. A sieve analysis shall be made at least twice daily in accordance with ASTM C136 from randomly sampled material taken from the discharge gate of storage bins or from the conveyor belt.

(2) Moisture content. If an electric moisture meter is used, at least two direct measurements of moisture content shall be made per week to check the calibration. If direct measurements are made in lieu of using an electric meter, two tests shall be made per day. Tests shall be made in accordance with ASTM C70 or ASTM C566.

(3) Deleterious substances. Fine aggregate as delivered to the mixer shall be tested for deleterious substances in fine aggregate for concrete as specified in paragraph 501-2.1b, prior to production of the control strip, and a minimum of every 30-days during production or more frequently as necessary to control deleterious substances.

b. Coarse Aggregate.

(1) Gradation. A sieve analysis shall be made at least twice daily for each size of aggregate. Tests shall be made in accordance with ASTM C136 from randomly sampled material taken from the discharge gate of storage bins or from the conveyor belt.

(2) Moisture content. If an electric moisture meter is used, at least two direct measurements of moisture content shall be made per week to check the calibration. If direct measurements are

made in lieu of using an electric meter, two tests shall be made per day. Tests shall be made in accordance with ASTM C566.

(3) Deleterious substances. Coarse aggregate as delivered to the mixer shall be tested for deleterious substances in coarse aggregate for concrete as specified in paragraph 501-2.1c, prior to production of the control strip, and a minimum of every 30-days during production or more frequently as necessary to control deleterious substances.

- c. **Slump.** One test shall be made for each subplot. Slump tests shall be performed in accordance with ASTM C143 from material randomly sampled from material discharged from trucks at the paving site. Material samples shall be taken in accordance with ASTM C172.
- d. **Air content.** One test shall be made for each subplot. Air content tests shall be performed in accordance with ASTM C231 for gravel and stone coarse aggregate and ASTM C173 for slag or other porous coarse aggregate, from material randomly sampled from trucks at the paving site. Material samples shall be taken in accordance with ASTM C172.
- e. **Unit weight and Yield.** One test shall be made for each subplot. Unit weight and yield tests shall be in accordance with ASTM C138. The samples shall be taken in accordance with ASTM C172 and at the same time as the air content tests.
- f. **Temperatures.** Temperatures shall be checked at least four times per lot at the job site in accordance with ASTM C1064.
- g. **Smoothness for Contractor Quality Control.** The Contractor shall perform smoothness testing in transverse and longitudinal directions daily to verify that the construction processes are producing pavement with variances less than $\frac{1}{4}$ inch in 12 feet, identifying areas that may pond water which could lead to hydroplaning of aircraft. If the smoothness criteria is not met, appropriate changes and corrections to the construction process shall be made by the Contractor before construction continues

The Contractor may use a 12-foot (3.7 m) "straightedge, a rolling inclinometer meeting the requirements of ASTM E2133 or rolling external reference device that can simulate a 12-foot (3.7m) straightedge approved by the RPR. Straight-edge testing shall start with one-half the length of the straightedge at the edge of pavement section being tested and then moved ahead one-half the length of the straightedge for each successive measurement. Testing shall be continuous across all joints. The surface irregularity shall be determined by placing the freestanding (unleveled) straightedge on the pavement surface and allowing it to rest upon the two highest spots covered by its length, and measuring the maximum gap between the straightedge and the pavement surface in the area between the two high points. If the rolling inclinometer or external reference device is used, the data may be evaluated using the FAA profile program, Pro FAA, using the 12-foot straightedge simulation function.

Smoothness readings shall not be made across grade changes or cross slope transitions. The transition between new and existing pavement shall be evaluated separately for conformance with the plans.

(1) Transverse measurements. Transverse measurements shall be taken for each day's production placed. Transverse measurements shall be taken perpendicular to the pavement

centerline each 50 feet (15 m) or more often as determined by the RPR. The joint between lanes shall be tested separately to facilitate smoothness between lanes.

- (2) Longitudinal measurements.** Longitudinal measurements shall be taken for each day's production placed. Longitudinal tests shall be parallel to the centerline of paving; at the center of paving lanes when widths of paving lanes are less than 20 feet (6 m); and at the third points of paving lanes when widths of paving lanes are 20 ft (6 m) or greater.

Deviations on the final surface course in either the transverse or longitudinal direction that will trap water greater than 1/4 inch (6 mm) shall be corrected with diamond grinding per paragraph 501-4.19f or by removing and replacing the surface course to full depth. Grinding shall be tapered in all directions to provide smooth transitions to areas not requiring grinding. All areas in which diamond grinding has been performed shall be subject to the final pavement thickness tolerances specified in paragraph 501-6.6.

Control charts shall be kept 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 will be evaluated prior to and after placement of the concrete surface.

Measurements will be taken at appropriate grade lines (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 grade line 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 depression that that exceed grade or smoothness and that retain water on the surface must be ground off provided the course thickness after grinding is not more than 1/2 inch (12 mm) less than the thickness specified on the plans. If these areas cannot be corrected with grinding then the slabs that are retaining water must be removed and replaced in accordance with paragraph 501-4.19d. Grinding shall be in accordance with paragraph 501-4.19f. All corrections will be at the Contractors expense.

501-5.4 Control charts. The Contractor shall maintain linear control charts for fine and coarse aggregate gradation, slump, and air content. The Contractor shall also maintain a control chart plotting the coarseness factor/workability factor from the combined gradations in accordance with paragraph 501-2.1d.

Control charts shall be posted in a location satisfactory to the RPR and shall be kept up to date at all times. As a minimum, the control charts shall identify the project number, the contract item number, the test number, each test parameter, the Action and suspension Limits, or Specification limits, applicable to each test parameter, and the Contractor's test results. The Contractor shall use the control charts as part of a process control system for identifying potential problems and assignable causes before they occur. If the Contractor's projected data during production indicates a potential problem and the Contractor is not taking satisfactory corrective action, the RPR may halt production or acceptance of the material.

- a. **Fine and coarse aggregate gradation.** The Contractor shall record the running average of the last five gradation tests for each control sieve on linear control charts. Superimposed on the control charts shall be the action and suspension limits. Gradation tests shall be performed by the Contractor per ASTM C136. The Contractor shall take at least two samples per lot to check the final gradation. Sampling shall be per ASTM D75 from the flowing aggregate stream or conveyor belt.
- b. **Slump and air content.** The Contractor shall maintain linear control charts both for individual measurements and range (that is, difference between highest and lowest measurements) for slump and air content in accordance with the following Action and Suspension Limits.
- c. **Combined gradation.** The Contractor shall maintain a control chart plotting the coarseness factor and workability factor on a chart in accordance with paragraph 501-2.1d.

Control Chart Limits¹

Control Parameter	Individual Measurements	
	Action Limit	Suspension Limit
Gradation ²	*3	*3
Coarseness Factor (CF)	±3.5	±5
Workability Factor (WF)	±2	±3
Slump	+0.5 to -1 inch (+13 to -25 mm)	+1 to -1.5 inch (+25 to -38 mm)
Air Content	±1.5%	±2.0%

¹ Control charts shall developed and maintained for each control parameter indicated.

² Control charts shall be developed and maintained for each sieve size.

³ Action and suspension limits shall be determined by the Contractor.

501-5.5 Corrective action at Suspension Limit. The CQCP shall indicate that appropriate action shall be taken when the process is believed to be out of control. The CQCP shall detail what action will be taken to bring the process into control and shall contain sets of rules to gauge when a process is out of control. As a minimum, a process shall be deemed out of control and corrective action taken if any one of the following conditions exists.

- a. Fine and coarse aggregate gradation. When two consecutive averages of five tests are outside of the suspension limits, immediate steps, including a halt to production, shall be taken to correct the grading.
- b. Coarseness and Workability factor. When the CF or WF reaches the applicable suspension limits, the Contractor, immediate steps, including a halt to production, shall be taken to correct the CF and WF.
- c. Fine and coarse aggregate moisture content. Whenever the moisture content of the fine or coarse aggregate changes by more than 0.5%, the scale settings for the aggregate batcher and water batcher shall be adjusted.
- d. Slump. The Contractor shall halt production and make appropriate adjustments whenever:

(1) one point falls outside the Suspension Limit line for individual measurements

OR

(2) two points in a row fall outside the Action Limit line for individual measurements.

- e. Air content. The Contractor shall halt production and adjust the amount of air-entraining admixture whenever:

(1) one point falls outside the Suspension Limit line for individual measurements

OR

(2) two points in a row fall outside the Action Limit line for individual measurements.

MATERIAL ACCEPTANCE

501-6.1 Quality Assurance (QA) Acceptance sampling and testing. All acceptance sampling and testing necessary to determine conformance with the requirements specified in this section, with the exception of coring for thickness determination, will be performed by the RPR. The Contractor shall provide adequate facilities for the initial curing of beams. The Contractor shall bear the cost of providing initial curing facilities and coring and filling operations, per paragraph 501-6.5b(1).

The samples will be transported while in the molds. The curing, except for the initial cure period, will be accomplished using the immersion in saturated lime water method. During the 24 hours after molding, the temperature immediately adjacent to the specimens must be maintained in the range of 60° to 80°F (16° to 27°C), and loss of moisture from the specimens must be prevented. The specimens may be stored in tightly constructed wooden boxes, damp sand pits, temporary buildings at construction sites, under wet burlap in favorable weather, or in heavyweight closed plastic bags, or using other suitable methods, provided the temperature and moisture loss requirements are met.

501-6.2 Quality Assurance (QA) testing laboratory. Quality assurance testing organizations performing these acceptance tests will be accredited in accordance with ASTM C1077. The quality assurance laboratory accreditation must be current and listed on the accrediting authority's website. All test methods required for acceptance sampling and testing must be listed on the lab accreditation. A copy of the laboratory's current accreditation and accredited test methods will be submitted to the RPR prior to start of construction.

501-6.3 Lot size. Concrete will be accepted for strength and thickness on a lot basis. A lot will consist of a day's production not to exceed ~~2,000 cubic yards~~ (1530 cubic meters)

. Each lot will be divided into approximately equal sublots with individual sublots between 400 to 600 cubic yards. Where three sublots are produced, they will constitute a lot. Where one or two sublots are produced, they will be incorporated into the previous or next lot. Where more than one plant is simultaneously producing concrete for the job, the lot sizes will apply separately for each plant.

501-6.4 Partial lots. When operational conditions cause a lot to be terminated before the specified number of tests have been made for the lot or for overages or minor placements to be considered as partial lots, the following procedure will be used to adjust the lot size and the number of tests for the lot.

Where three sublots have been produced, they will constitute a lot. Where one or two sublots have been produced, they will be incorporated into the next lot or the previous lot and the total number of sublots will be used in the acceptance criteria calculation, that is, n=5 or n=6.

501-6.5 Acceptance Sampling and Testing.

a. Strength.

(1) Sampling. One sample will be taken for each subplot from the concrete delivered to the job site. Sampling locations will be determined by the RPR in accordance with random sampling procedures contained in ASTM D3665. The concrete will be sampled in accordance with ASTM C172.

(2) Test Specimens. The RPR will be responsible for the casting, initial curing, transportation, and curing of specimens in accordance with ASTM C31. Two (2) specimens will be made from each sample and slump, air content, unit weight, and temperature tests will be conducted for each set of strength specimens. Within 24 to 48 hours, the samples will be transported from the field to the laboratory while in the molds. Samples will be cured in saturated lime water.

The strength of each specimen will be determined in accordance with ASTM C78. The strength for each subplot will be computed by averaging the results of the two test specimens representing that subplot.

(3) Acceptance. Acceptance of pavement for strength will be determined by the RPR in accordance with paragraph 501-6.6b(1). All individual strength tests within a lot will be checked for outliers in accordance with ASTM E178, at a significance level of 5%. Outliers will be discarded and the remaining test values will be used to determine acceptance in accordance with paragraph 501-6.5b.

b. Pavement thickness.

(1) Sampling. One core will be taken by the Contractor for each subplot in the presence of the RPR. Sampling locations will be determined by the RPR in accordance with random sampling procedures contained in ASTM D3665. Areas, such as thickened edges, with planned variable thickness, will be excluded from sample locations.

Cores shall be a minimum 4 inch (100 mm) in diameter neatly cut with a core drill. The Contractor will furnish all tools, labor, and materials for cutting samples and filling the cored hole. Core holes will be filled by the Contractor with a non-shrink grout approved by the RPR within one day after sampling.

(2) Testing. The thickness of the cores will be determined by the RPR by the average caliper measurement in accordance with ASTM C174. Each core shall be photographed and the photograph included with the test report.

(3) Acceptance. Acceptance of pavement for thickness will be determined by the RPR in accordance with paragraph 501-6.6.

501-6.6 Acceptance criteria.

a. General. Acceptance will be based on the following characteristics of the completed pavement discussed in paragraph 501-6.5b:

(1) Strength

(2) Thickness

(3) Grade

(4) Profilograph smoothness - Not used.

(5) Adjustments for repairs

Acceptance for strength, thickness, and grade, will be based on the criteria contained in accordance with paragraph 501-6.6b(1), 501-6.6b(2), and 501-6.6b(3), respectively.

Production quality must achieve 90 PWL or higher to receive full payment.

Strength and thickness will be evaluated for acceptance on a lot basis using the method of estimating PWL. Production quality must achieve 90 PWL or higher to receive full pavement. The PWL will be determined in accordance with procedures specified in Item C-110.

The lower specification tolerance limit (L) for strength and thickness will be:

Lower Specification Tolerance Limit (L)	
Strength	0.93 strength specified in paragraph 501-3.3
Thickness	Lot Plan Thickness in inches, - 0.50 in

b. Acceptance criteria.

(1) Strength. If the PWL of the lot equals or exceeds 90%, the lot will be acceptable. Acceptance and payment for the lot will be determined in accordance with paragraph 501-8.1.

(2) Thickness. If the PWL of the lot equals or exceeds 90%, the lot will be acceptable. Acceptance and payment for the lot will be determined in accordance with paragraph 501-8.1.

(3) Grade. The final finished surface of the pavement of the completed project will not vary from the grade line elevations and cross-sections shown on the plans by more than 1/2 inch (12 mm) vertically or 0.1 feet (30 mm) laterally. The documentation, stamped and signed by a licensed surveyor, shall be in accordance with paragraph 501-5.3h. Payment for sublots that do not meet grade for over 25% of the subplot shall reduced by 5% and not be more than 95%.

(4) Profilograph roughness for QA Acceptance. Not used.

(5) Adjustments for repair. Sublots with spall repairs, crack repairs, or partial panel replacement, will be limited to no more than 95% payment.

(6) Adjustment for grinding. For sublots with grinding over 25% of a subplot, payment will be reduced 5%.

METHOD OF MEASUREMENT

501-7.1 Concrete pavement shall be measured by the number of square yards (square meters) reinforced pavement as specified in-place, completed and accepted.

BASIS OF PAYMENT

501-8.1 Payment. Payment for concrete pavement meeting all acceptance criteria as specified in paragraph 501-6.6. Acceptance Criteria shall be based on results of strength and thickness tests. Payment

for acceptable lots of concrete pavement shall be adjusted in accordance with paragraph 501-8.1a for strength and thickness; 501-8.1b for repairs; 501-8.1c for grinding; and 501-8.1d for smoothness, subject to the limitation that:

The total project payment for concrete pavement shall not exceed 100 percent of the product of the contract unit price and the total number of square yards (square meters) of concrete pavement used in the accepted work (See Note 1 under the Price Adjustment Schedule table below).

Payment shall be full compensation for all labor, materials, tools, equipment, and incidentals required to complete the work as specified herein and on the drawings.

- a. Basis of adjusted payment.** The pay factor for each individual lot shall be calculated in accordance with the Price Adjustment Schedule table below. A pay factor shall be calculated for both strength and thickness. The lot pay factor shall be the higher of the two values when calculations for both strength and thickness are 100% or higher. The lot pay factor shall be the product of the two values when only one of the calculations for either strength or thickness is 100% or higher. The lot pay factor shall be the lower of the two values when calculations for both strength and thickness are less than 100%.

Price Adjustment Schedule¹

Percentage of Materials Within Specification Limits (PWL)	Lot Pay Factor (Percent of Contract Unit Price)
96 – 100	106
90 – 95	PWL + 10
75 – 90	0.5 PWL + 55
55 – 74	1.4 PWL – 12
Below 55	Reject ²

¹ Although it is theoretically possible to achieve a pay factor of 106% for each lot, actual payment in excess of 100% shall be subject to the total project payment limitation specified in paragraph 501-8.1.

² The lot shall be removed and replaced unless, after receipt of FAA concurrence, the Owner and Contractor agree in writing that the lot will remain; the lot paid at 50% of the contract unit price; and the total project payment limitation reduced by the amount withheld for that lot.

For each lot accepted, the adjusted contract unit price shall be the product of the lot pay factor for the lot and the contract unit price. Payment shall be subject to the total project payment limitation specified in paragraph 501-8.1. Payment in excess of 100% for accepted lots of concrete pavement shall be used to offset payment for accepted lots of concrete pavement that achieve a lot pay factor less than 100%; except for rejected lots which remain in place and/or sublots with adjustments for repairs.

- b. Adjusted payment for repairs.** The PWL lot pay factor shall be reduced by 5% and be no higher than 95% for sublots which contain repairs in accordance with paragraph 501-4.19 on more than 20% of the slabs within the subplot. Payment factors greater than 100 percent for the strength and thickness cannot be used to offset adjustments for repairs.
- c. Adjusted payment for grinding.** The PWL lot pay factor shall be reduced by 5% and be no higher than 95% for sublots with grinding over 25% of a subplot.

d. Profilograph Roughness. Not used.

e. Payment. Payment shall be made under:

~~Item P-501-8.1 Concrete Pavement.~~

~~-per square yard (square meter)~~

Item P-501-1 14" Portland Cement Concrete

-per Square Yard (SY)

REFERENCES

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

ASTM International (ASTM)

ASTM A184	Standard Specification for Welded Deformed Steel Bar Mats for Concrete Reinforcement
ASTM A615	Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM A704	Standard Specification for Welded Steel Plain Bar or Rod Mats for Concrete Reinforcement
ASTM A706	Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement
ASTM A775	Standard Specification for Epoxy-Coated Steel Reinforcing Bars
ASTM A884	Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement
ASTM A934	Standard Specification for Epoxy-Coated Prefabricated Steel Reinforcing Bars
ASTM A996	Standard Specification for Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement
ASTM A1035	Standard Specification for Deformed and Plain, Low-Carbon, Chromium, Steel Bars for Concrete Reinforcement
ASTM A1064	Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
ASTM A1078	Standard Specification for Epoxy-Coated Steel Dowels for Concrete Pavement
ASTM C29	Standard Test Method for Bulk Density ("Unit Weight") and Voids in Aggregate
ASTM C31	Standard Practice for Making and Curing Concrete Test Specimens in the Field
ASTM C33	Standard Specification for Concrete Aggregates

ASTM C39	Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C70	Standard Test Method for Surface Moisture in Fine Aggregate
ASTM C78	Standard Test Method for Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading)
ASTM C88	Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
ASTM C94	Standard Specification for Ready-Mixed Concrete
ASTM C114	Standard Test Methods for Chemical Analysis of Hydraulic Cement
ASTM C117	Standard Test Method for Materials Finer than 75- Aggregates by Washing
ASTM C123	Standard Test Method for Lightweight Particles in Aggregate
ASTM C136	Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C131	Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C138	Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete
ASTM C142	Standard Test Method for Clay Lumps and Friable Particles in Aggregates
ASTM C143	Standard Test Method for Slump of Hydraulic-Cement Concrete
ASTM C150	Standard Specification for Portland Cement
ASTM C171	Standard Specification for Sheet Materials for Curing Concrete
ASTM C172	Standard Practice for Sampling Freshly Mixed Concrete
ASTM C173	Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
ASTM C174	Standard Test Method for Measuring Thickness of Concrete Elements Using Drilled Concrete Cores
ASTM C227	Standard Test Method for Potential Alkali Reactivity of Cement-Aggregate Combinations (Mortar-Bar Method)
ASTM C231	Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method

ASTM C260	Standard Specification for Air-Entraining Admixtures for Concrete
ASTM C295	Standard Guide for Petrographic Examination of Aggregates for Concrete
ASTM C309	Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C311	Standard Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use in Portland Cement Concrete
ASTM C494	Standard Specification for Chemical Admixtures for Concrete
ASTM C566	Standard Test Method for Total Evaporable Moisture Content of Aggregates by Drying
ASTM C595	Standard Specification for Blended Hydraulic Cements
ASTM C618	Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
ASTM C642	Standard Test Method for Density, Absorption, and Voids in Hardened Concrete
ASTM C666	Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing
ASTM C685	Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing
ASTM C881	Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete
ASTM C989	Standard Specification for Slag Cement for Use in Concrete and Mortars
ASTM C1017	Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete
ASTM C1064	Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete
ASTM C1077	Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation
ASTM C1157	Standard Performance Specification for Hydraulic Cement
ASTM C1260	Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)
ASTM C1365	Standard Test Method for Determination of the Proportion of Phases in Portland Cement and Portland-Cement Clinker Using X-Ray Powder Diffraction Analysis
ASTM C1567	Standard Test Method for Determining the Potential Alkali-Silica Reactivity of Combinations of Cementitious Materials and Aggregate (Accelerated Mortar-Bar Method)

ASTM C1602	Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
ASTM D75	Standard Practice for Sampling Aggregates
ASTM D1751	Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types)
ASTM D1752	Standard Specification for Preformed Sponge Rubber and Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction
ASTM D2419	Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate
ASTM D3665	Standard Practice for Random Sampling of Construction Materials
ASTM D4791	Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate
ASTM E178	Standard Practice for Dealing with Outlying Observations
ASTM E1274	Standard Test Method for Measuring Pavement Roughness Using a Profilograph
ASTM E2133	Standard Test Method for Using a Rolling Inclinator to Measure Longitudinal and Transverse Profiles of a Traveled Surface
American Concrete Institute (ACI)	
ACI 305R	Guide to Hot Weather Concreting
ACI 306R	Guide to Cold Weather Concreting
ACI 309R	Guide for Consolidation of Concrete
Advisory Circulars (AC)	
AC 150/5320-6	Airport Pavement Design and Evaluation
Federal Highway Administration (FHWA)	
HIPERPAV 3, version 3.2	
Portland Concrete Association (PCA)	
PCA	Design and Control of Concrete Mixtures, 16 th Edition
U.S. Army Corps of Engineers (USACE) Concrete Research Division (CRD)	
CRD C662	Determining the Potential Alkali-Silica Reactivity of Combinations of Cementitious Materials, Lithium Nitrate Admixture and Aggregate (Accelerated Mortar-Bar Method)
United States Air Force Engineering Technical Letter (ETL)	
ETL 97-5	Proportioning Concrete Mixtures with Graded Aggregates for Rigid Airfield Pavements

END ITEM P-501

ITEM P-602
EMULSIFIED ASPHALT PRIME COAT

ITEM P-602, "EMULSIFIED ASPHALT PRIME COAT" is a technical specification contained in Federal Aviation Administration Advisory Circular – 150/5370-10H, "Standard Specifications for Construction of Airports."

This item has been modified to make allowances for local materials, methods and requirements. This item has been updated and modified to comply with the latest editions of other applicable codes, from knowledge gained on other airport construction projects and valuable lessons learned from airport maintenance staffs.

Deletions are noted by the ~~striketrough~~ method.

Changes and additions are noted by the ***bold italic*** method.

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.~~

No separate payment shall be made for Bituminous Prime Coat. Payment for this item shall be incidental to respective bituminous surface course.

Payment will be made under:

Item P-602-5.1 — Emulsified Asphalt Prime Coat ————— - per gallon (liter)

REFERENCES

603.5-2 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 ITEM P-602

ITEM P-603
EMULSIFIED ASPHALT TACK COAT

ITEM P-603, "EMULSIFIED ASPHALT TACK COAT" is a technical specification contained in Federal Aviation Administration Advisory Circular – 150/5370-10H, "Standard Specifications for Construction of Airports."

This item has been modified to make allowances for local materials, methods and requirements. This item has been updated and modified to comply with the latest editions of other applicable codes, from knowledge gained on other airport construction projects and valuable lessons learned from airport maintenance staffs.

Deletions are noted by the ~~striketrough~~ method.

Changes and additions are noted by the ***bold italic*** method.

ITEM P-603
EMULSIFIED ASPHALT TACK COAT

DESCRIPTION

603-1.1 This item shall consist of preparing and treating an asphalt or concrete surface with asphalt material in accordance with these specifications and in reasonably close conformity to the lines shown on the plans

MATERIALS

603-2.1 Asphalt materials. The asphalt material shall be an emulsified asphalt as specified in ASTM D3628 as an asphalt application for tack coat appropriate to local conditions. The emulsified asphalt shall not be diluted. The Contractor shall provide a copy of the manufacturer's Certificate of Analysis (COA) for the asphalt material to the Resident Project Representative (RPR) before the asphalt material is applied for review and acceptance. The furnishing of COA for the asphalt material shall not be interpreted as a basis for final acceptance. The manufacturer's COA may be subject to verification by testing the material delivered for use on the project.

CONSTRUCTION METHODS

603-3.1 Weather limitations. The tack coat shall be applied only when the existing surface is dry and the atmospheric temperature is 50°F (10°C) or above; the temperature has not been below 35°F (2°C) for the 12 hours prior to application; and when the weather is not foggy or rainy. The temperature requirements may be waived when directed by the RPR.

603-3.2 Equipment. The Contractor shall provide equipment for heating and applying the emulsified asphalt material. The emulsion shall be applied with a manufacturer-approved computer rate-controlled asphalt distributor. The equipment shall be in good working order and contain no contaminants or diluents in the tank. Spray bar tips must be clean, free of burrs, and of a size to maintain an even distribution of the emulsion. Any type of tip or pressure source is suitable that will maintain predetermined flow rates and constant pressure during the application process with application speeds under eight (8) miles per hour (13 km per hour) or seven (700) feet per minute (213 m per minute).

The equipment will be tested under pressure for leaks and to ensure proper set-up before use to verify truck set-up (via a test-shot area), including but not limited to, nozzle tip size appropriate for application, spray-bar height and pressure and pump speed, evidence of triple-overlap spray pattern, lack of leaks, and any other factors relevant to ensure the truck is in good working order before use.

The distributor truck shall be equipped with a minimum 12-foot (3.7-m) spreader spray bar with individual nozzle control with computer-controlled application rates. The distributor truck shall have an easily accessible thermometer that constantly monitors the temperature of the emulsion, and have an operable mechanical tank gauge that can be used to cross-check the computer accuracy. If the distributor is not equipped with an operable quick shutoff valve, the prime operations shall be started and stopped on building paper.

The distributor truck shall be equipped to effectively heat and mix the material to the required temperature prior to application as required. Heating and mixing shall be done in accordance with the manufacturer's recommendations. Do not overheat or over mix the material.

The distributor shall be equipped with a hand sprayer.

Asphalt distributors must be calibrated annually in accordance with ASTM D2995. The Contractor must furnish a current calibration certification for the asphalt distributor truck from any State or other agency as approved by the RPR.

A power broom and/or power blower suitable for cleaning the surfaces to which the asphalt tack coat is to be applied shall be provided.

603-3.3 Application of emulsified asphalt material. The emulsified asphalt shall not be diluted. Immediately before applying the emulsified asphalt tack coat, the full width of surface to be treated shall be swept with a power broom and/or power blower to remove all loose dirt and other objectionable material.

The emulsified asphalt material shall be uniformly applied with an asphalt distributor at the rates appropriate for the conditions and surface specified in the table below. The type of asphalt material and application rate shall be approved by the RPR prior to application.

Emulsified Asphalt		
Surface Type	Residual Rate, gal/SY (L/square meter)	Emulsion Application Bar Rate, gal/SY (L/square meter)
New asphalt	0.02-0.05 (0.09-0.23)	0.03-0.07 (0.13-0.32)
Existing asphalt	0.04-0.07 (0.18-0.32)	0.06-0.11 (0.27-0.50)
Milled Surface	0.04-0.08 (0.18-0.36)	0.06-0.12 (0.27-0.54)
Concrete	0.03-0.05 (0.13-0.23)	0.05-0.08 (0.23-0.36)

After application of the tack coat, the surface shall be allowed to cure without being disturbed for the period of time necessary to permit drying and setting of the tack coat. This period shall be determined by the RPR. The Contractor shall protect the tack coat and maintain the surface until the next course has been placed. When the tack coat has been disturbed by the Contractor, tack coat shall be reapplied at the Contractor's expense.

603-3.4 Freight and waybills The Contractor shall submit waybills and delivery tickets, during progress of the work. Before the final statement is allowed, file with the RPR certified waybills and certified delivery tickets for all emulsified asphalt materials used in the construction of the pavement covered by the contract. Do not remove emulsified asphalt material from storage until the initial outage and temperature measurements have been taken. The delivery or storage units will not be released until the final outage has been taken.

METHOD OF MEASUREMENT

~~**603-4.1** The emulsified asphalt material for tack coat shall be measured by the gallon (liter). Volume shall be corrected to the volume at 60°F (16°C) in accordance with ASTM D1250. The emulsified asphalt material paid for will be the measured quantities used in the accepted work, provided that the measured quantities are not 10% over the specified application rate. Any amount of emulsified asphalt material more than 10% over the specified application rate for each application will be deducted from the~~

~~measured quantities, except for irregular areas where hand spraying of the emulsified asphalt material is necessary. Water added to emulsified asphalt will not be measured for payment.~~

BASIS OF PAYMENT

~~**603.5-1** Payment shall be made at the contract unit price per gallon (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.~~

No separate payment shall be made for Bituminous Prime Coat. Payment for this item shall be incidental to respective bituminous surface course.

~~Payment will be made under:~~

~~Item P-603-5.1 — Emulsified Asphalt Tack Coat — per gallon (liter)~~

REFERENCES

603.5-2 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-605
JOINT SEALANTS FOR PAVEMENTS

ITEM P-605, "JOINT SEALANTS FOR PAVEMENTS" is a technical specification contained in Federal Aviation Administration Advisory Circular – 150/5370-10H, "Standard Specifications for Construction of Airports."

This item has been modified to make allowances for local materials, methods and requirements. This item has been updated and modified to comply with the latest editions of other applicable codes, from knowledge gained on other airport construction projects and valuable lessons learned from airport maintenance staffs.

Deletions are noted by the ~~striketrough~~ method.

Changes and additions are noted by the ***bold italic*** method.

ITEM P-605
JOINT SEALANTS FOR PAVEMENTS

DESCRIPTION

605-1.1 This item shall consist of providing and installing a resilient and adhesive joint sealing material capable of effectively sealing joints in pavement; joints between different types of pavements; and cracks in existing pavement.

MATERIALS

605-2.1 Joint sealants. Joint sealant materials shall meet the requirements of ASTM D5893, Standard Specifications for Cold Applied, Single Component, Chemically Curing Silicone Joint Sealant for Portland Cement Concrete Pavements.

Each lot or batch of sealant shall be delivered to the jobsite in the manufacturer's original sealed container. Each container shall be marked with the manufacturer's name, batch or lot number, the safe heating temperature, and shall be accompanied by the manufacturer's certification stating that the sealant meets the requirements of this specification.

605-2.2 Backer rod. The material furnished shall be a compressible, non-shrinking, non-staining, non-absorbing material that is non-reactive with the joint sealant in accordance with ASTM D5249. The backer-rod material shall be $25\% \pm 5\%$ larger in diameter than the nominal width of the joint.

605-2.3 Bond breaking tapes. Provide a bond breaking tape or separating material that is a flexible, non-shrinkable, non-absorbing, non-staining, and non-reacting adhesive-backed tape. The material shall have a melting point at least 5°F (3°C) greater than the pouring temperature of the sealant being used when tested in accordance with ASTM D789. The bond breaker tape shall be approximately 1/8 inch (3 mm) wider than the nominal width of the joint and shall not bond to the joint sealant.

CONSTRUCTION METHODS

605-3.1 Time of application. Joints shall be sealed as soon after completion of the curing period as feasible and before the pavement is opened to traffic, including construction equipment. The pavement temperature shall be 50°F (10°C) and rising at the time of application of the poured joint sealing material. Do not apply sealant if moisture is observed in the joint.

605-3.2 Equipment. Machines, tools, and equipment used in the performance of the work required by this section shall be approved before the work is started and maintained in satisfactory condition at all times. Submit a list of proposed equipment to be used in performance of construction work including descriptive data, 30 days prior to use on the project.

- a. **Concrete saw.** Provide a self-propelled power saw, with water-cooled diamond or abrasive saw blades, for cutting joints to the depths and widths specified.
- b. **Sandblasting equipment.** Sandblasting is not allowed.
- c. **Cold-applied, single-component sealing equipment.** The equipment for installing ASTM D5893 single component joint sealants shall consist of an extrusion pump, air compressor, following plate, hoses, and nozzle for transferring the sealant from the storage container into the joint

opening. The dimension of the nozzle shall be such that the tip of the nozzle will extend into the joint to allow sealing from the bottom of the joint to the top. Maintain the initially approved equipment in good working condition, serviced in accordance with the supplier's instructions, and unaltered in any way without obtaining prior approval. Small hand-held air-powered equipment (i.e., caulking guns) may be used for small applications.

605-3.3 Preparation of joints. Pavement joints for application of material in this specification must be dry, clean of all scale, dirt, dust, curing compound, and other foreign matter. The Contractor shall demonstrate, in the presence of the RPR, that the method cleans the joint and does not damage the joint.

- a. **Sawing.** All joints shall be sawed in accordance with specifications and plan details. Immediately after sawing the joint, the resulting slurry shall be completely removed from joint and adjacent area by flushing with a jet of water, and by use of other tools as necessary.
- b. **Sealing.** Immediately before sealing, the joints shall be thoroughly cleaned of all remaining laitance, curing compound, filler, protrusions of hardened concrete, old sealant and other foreign material from the sides and upper edges of the joint space to be sealed. Cleaning shall be accomplished by concrete saw as specified in paragraph 605-3.2. The newly exposed concrete joint faces and the pavement surface extending a minimum of 1/2 inch (12 mm) from the joint edge shall be sandblasted clean. Sandblasting shall be accomplished in a minimum of two passes. One pass per joint face with the nozzle held at an angle directly toward the joint face and not more than 3 inches (75 mm) from it. After final cleaning and immediately prior to sealing, blow out the joints with compressed air and leave them completely free of debris and water. The joint faces shall be surface dry when the seal is applied.
- c. **Backer Rod.** When the joint opening is of a greater depth than indicated for the sealant depth, plug or seal off the lower portion of the joint opening using a backer rod in accordance with paragraph 605-2.2 to prevent the entrance of the sealant below the specified depth. Take care to ensure that the backer rod is placed at the specified depth and is not stretched or twisted during installation.
- d. **Bond-breaking tape.** Where inserts or filler materials contain bitumen, or the depth of the joint opening does not allow for the use of a backup material, insert a bond-separating tape breaker in accordance with paragraph 605-2.3 to prevent incompatibility with the filler materials and three-sided adhesion of the sealant. Securely bond the tape to the bottom of the joint opening so it will not float up into the new sealant.

605-3.4 Installation of sealants. Joints shall be inspected for proper width, depth, alignment, and preparation, and shall be approved by the RPR before sealing is allowed. Sealants shall be installed in accordance with the following requirements:

Immediately preceding, but not more than 50 feet (15 m) ahead of the joint sealing operations, perform a final cleaning with compressed air. Fill the joints from the bottom up to 1/4 inch (6 mm) $\pm$ 1/16 inch (2 mm) below the top of pavement surface; or bottom of groove for grooved pavement. Remove and discard excess or spilled sealant from the pavement by approved methods. Install the sealant in such a manner as to prevent the formation of voids and entrapped air. In no case shall gravity methods or pouring pots be used to install the sealant material. Traffic shall not be permitted over newly sealed pavement until authorized by the RPR. When a primer is recommended by the manufacturer, apply it evenly to the joint

faces in accordance with the manufacturer's instructions. Check the joints frequently to ensure that the newly installed sealant is cured to a tack-free condition within the time specified.

605-3.5 Inspection. The Contractor shall inspect the joint sealant for proper rate of cure and set, bonding to the joint walls, cohesive separation within the sealant, reversion to liquid, entrapped air and voids. Sealants exhibiting any of these deficiencies at any time prior to the final acceptance of the project shall be removed from the joint, wasted, and replaced as specified at no additional cost to the airport.

605-3.6 Clean-up. Upon completion of the project, remove all unused materials from the site and leave the pavement in a clean condition.

METHOD OF MEASUREMENT

~~**605-4.1** Joint sealing material shall be measured by the linear foot (meter) of sealant in place, completed, and accepted.~~

BASIS OF PAYMENT

~~**605-5.1** Payment for joint sealing material shall be made at the contract unit price per linear foot (meter). The price shall be full compensation for furnishing all materials, for all preparation, delivering, and placing of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.~~

No separate payment shall be made for Joint Sealing. Payment for this item shall be incidental to PCC surface course.

Payment will be made under:

Item P-605-5.1 — Joint Sealing Filler, ————— per linear foot (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 D789	Standard Test Method for Determination of Relative Viscosity of Polyamide (PA)
ASTM D5249	Standard Specification for Backer Material for Use with Cold- and Hot-Applied Joint Sealants in Portland-Cement Concrete and Asphalt Joints
ASTM D5893	Standard Specification for Cold Applied, Single Component, Chemically Curing Silicone Joint Sealant for Portland Cement Concrete Pavements

Advisory Circulars (AC)

AC 150/5340-30	Design and Installation Details for Airport Visual Aids

END ITEM P-605

ITEM P-610
CONCRETE FOR MISCELLANEOUS STRUCTURES

ITEM P-610, "CONCRETE FOR MISCELLANEOUS STRUCTURES" is a technical specification contained in Federal Aviation Administration Advisory Circular – 150/5370-10H, "Standards Specifications for Construction of Airports."

This item has been modified to make allowances for local materials, methods and requirements. This item has been updated and modified to comply with the latest editions of other applicable codes, from knowledge gained on other airport construction projects and valuable lessons learned from airport maintenance staffs.

Deletions are noted by the ~~striketrough~~ method.

Changes and additions are noted by the ***bold italic*** method.

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; or aggregates that meet P-501 reactivity test requirements may be utilized.

610-2.2 Coarse aggregate. The coarse aggregate for concrete shall meet the requirements of ASTM C33 and the requirements of Table 4, Class Designation 5S; and the grading requirements shown below, as required for the project.

Coarse Aggregate Grading Requirements

Maximum Aggregate Size	ASTM C33, Table 3 Grading Requirements (Size No.)
1 1/2 inch (37.5 mm)	467 or 4 and 67
1 inch (25 mm)	57
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 1.

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 Pre-molded joint material. Pre-molded joint material for expansion joints shall meet the requirements of ASTM D1751 **or ASTM D1752.**

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 bar mats conforming to the requirements of

ASTM A184.

610-2.11 Materials for curing concrete. Curing materials shall conform to ASTM C171 or ASTM C309.

CONSTRUCTION METHODS

610-3.1 General. The Contractor shall furnish all labor, materials, and services necessary for, and incidental to, the completion of all work as shown on the drawings and specified here. All machinery and equipment used by the Contractor on the work, shall be of sufficient size to meet the requirements of the work. All work shall be subject to the inspection and approval of the RPR.

610-3.2 Concrete Mixture. The concrete shall develop a compressive strength of 4,000 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.

Re-tempering 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 re-handling 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 lump sum of concrete complete in place and accepted.~~ **Concrete Splash Pads with 8" Filter Points shall be measured by the unit.**

BASIS OF PAYMENT

610-6.1 ~~Payment shall be made at the contract price lump sum.~~ **Payment shall be made at the contract unit price per each.** This price shall be full compensation for furnishing all materials including reinforcement and embedded items and for all preparation, delivery, installation, and curing of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

~~Item P-610-6.1 Concrete, lump sum~~

~~Item P-610-1 20'x15' Concrete Splash Pad with 8" Filter Points per Each (EA)~~

REFERENCES

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

ASTM International (ASTM)

ASTM A184	Standard Specification for Welded Deformed Steel Bar Mats for Concrete Reinforcement
ASTM A615	Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM A704	Standard Specification for Welded Steel Plain Bar or Rod Mats for Concrete Reinforcement
ASTM A706	Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement
ASTM A775	Standard Specification for Epoxy-Coated Steel Reinforcing Bars
ASTM A884	Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement
ASTM A934	Standard Specification for Epoxy-Coated Prefabricated Steel Reinforcing Bars

ASTM A1064	Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
ASTM C31	Standard Practice for Making and Curing Concrete Test Specimens in the Field
ASTM C33	Standard Specification for Concrete Aggregates
ASTM C39	Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C94	Standard Specification for Ready-Mixed Concrete
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C114	Standard Test Methods for Chemical Analysis of Hydraulic Cement
ASTM C136	Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C143	Standard Test Method for Slump of Hydraulic-Cement Concrete
ASTM C150	Standard Specification for Portland Cement
ASTM C171	Standard Specification for Sheet Materials for Curing Concrete
ASTM C172	Standard Practice for Sampling Freshly Mixed Concrete
ASTM C231	Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C260	Standard Specification for Air-Entraining Admixtures for Concrete
ASTM C309	Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C311	Standard Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use in Portland-Cement Concrete
ASTM C494	Standard Specification for Chemical Admixtures for Concrete
ASTM C618	Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
ASTM C666	Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing
ASTM C685	Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing
ASTM C989	Standard Specification for Slag Cement for Use in Concrete and Mortars

ASTM C1017	Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete
ASTM C1077	Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation
ASTM C1157	Standard Performance Specification for Hydraulic Cement
ASTM C1260	Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)
ASTM C1365	Standard Test Method for Determination of the Proportion of Phases in Portland Cement and Portland-Cement Clinker Using X-Ray Powder Diffraction Analysis
ASTM C1602	Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
ASTM D1751	Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding 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 D-701
PIPE FOR STORM DRAINS AND CULVERTS

ITEM D-701, "PIPE FOR STORM DRAINS AND CULVERTS" is a technical specification contained in Federal Aviation Administration Advisory Circular – 150/5370-10H, "Standard Specifications for Construction of Airports."

This item has been modified to make allowances for local materials, methods and requirements. This item has been updated and modified to comply with the latest editions of other applicable codes, from knowledge gained on other airport construction projects and valuable lessons learned from airport maintenance staffs.

Deletions are noted by the ~~strike through~~ method.

Changes and additions are noted by the ***bold italic*** method.

**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 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 C507	Standard Specification for Reinforced Concrete Elliptical Culvert, Storm Drain, and Sewer Pipe
ASTM C1433	Standard Specification for Precast Reinforced Concrete Monolithic Box Sections for Culverts, Storm Drains, and Sewers
ASTM C1479	Standard Practice for Installation of Precast Concrete Sewer, Storm Drain, and Culvert Pipe Using Standard Installations
ASTM C1577	Standard Specification for Precast Reinforced Concrete Monolithic Box Sections for Culverts, Storm Drains, and Sewers Designed According to AASHTO LRFD
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. Not used.

701-2.4 Rubber gaskets. Not used.

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 American Concrete Pipe Association Q-Cast Plant Certification program.

CONSTRUCTION METHODS

701-3.1 Excavation. The width of the pipe trench shall be sufficient to permit satisfactory jointing of the pipe and thorough tamping of the bedding material under and around the pipe, but it shall not be less than the external diameter of the pipe plus 12 inches (300 mm) on each side. The trench walls shall be approximately vertical.

The Contractor shall comply with all current federal, state and local rules and regulations governing the safety of men and materials during the excavation, installation and backfilling operations. Specifically, the Contractor shall observe that all requirements of the Occupational Safety and Health Administration (OSHA) relating to excavations, trenching and shoring are strictly adhered to. The width of the trench shall be sufficient to permit satisfactorily jointing of the pipe and thorough compaction of the bedding material under the pipe and backfill material around the pipe, but it shall not be greater than the widths shown on the plans trench detail.

Where rock, hardpan, or other unyielding material is encountered, the Contractor shall remove it from below the foundation grade for a depth of at least 8 inch (200 mm) or 1/2 inch (12 mm) for each foot of fill over the top of the pipe (whichever is greater) but for no more than three-quarters of the nominal diameter of the pipe. The excavation below grade should be filled with granular material to form a uniform foundation.

Where a firm foundation is not encountered at the grade established, due to soft, spongy, or other unstable soil, the unstable soil shall be removed and replaced with approved granular material for the full trench width. The RPR shall determine the depth of removal necessary. The granular material shall be compacted to provide adequate support for the pipe.

The excavation for pipes placed in embankment fill shall not be made until the embankment has been completed to a height above the top of the pipe as shown on the plans.

701-3.2 Bedding. The bedding surface for the pipe shall provide a foundation of uniform density to support the pipe throughout its entire length.

- a. Rigid pipe.** The pipe bedding shall be constructed uniformly for the full length of the pipe barrel, as required on the plans. The maximum aggregate size shall be 1 in when the bedding thickness is less than 6 inches, and 1-1/2 in when the bedding thickness is greater than 6 inches. Bedding shall be loosely placed uncompacted material under the middle third of the pipe prior to placement of the pipe.

- b. **Flexible pipe.** For flexible pipe, the bed shall be roughly shaped to fit the pipe, and a bedding blanket of sand or fine granular material shall be provided as follows:

Flexible Pipe Bedding

Pipe Corrugation Depth		Minimum Bedding Depth	
inch	mm	inch	mm
1/2	12	1	25
1	25	2	50
2	50	3	75
2-1/2	60	3-1/2	90

- c. **Other pipe materials.** For PVC, polyethylene, polypropylene, or fiberglass pipe, the bedding material shall consist of coarse sands and gravels with a maximum particle size of 3/4 inches (19 mm). For pipes installed under paved areas, no more than 12% of the material shall pass the No. 200 (0.075 mm) sieve. For all other areas, no more than 50% of the material shall pass the No. 200 (0.075 mm) sieve. The bedding shall have a thickness of at least 6 inches (150 mm) below the bottom of the pipe and extend up around the pipe for a depth of not less than 50% of the pipe's vertical outside diameter.

701-3.3 Laying pipe. The pipe laying shall begin at the lowest point of the trench and proceed upgrade. The lower segment of the pipe shall be in contact with the bedding throughout its full length. Bell or groove ends of rigid pipes and outside circumferential laps of flexible pipes shall be placed facing upgrade.

Paved or partially lined pipe shall be placed so that the longitudinal center line of the paved segment coincides with the flow line.

Elliptical and elliptically reinforced concrete pipes shall be placed with the manufacturer's reference lines designating the top of the pipe within five degrees of a vertical plane through the longitudinal axis of the pipe.

701-3.4 Joining pipe. Joints shall be made with (1) cement mortar, (2) cement grout, (3) rubber gaskets, (4) plastic gaskets, (5) coupling bands.

Mortar joints shall be made with an excess of mortar to form a continuous bead around the outside of the pipe and shall be finished smooth on the inside. Molds or runners shall be used for grouted joints to retain the poured grout. Rubber ring gaskets shall be installed to form a flexible watertight seal.

- a. **Concrete pipe.** Concrete pipe may be either bell and spigot or tongue and groove. Pipe sections at joints shall be fully seated and the inner surfaces flush and even. Concrete pipe joints shall be sealed with 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.

- d. **Fiberglass pipe.** Joints and fittings shall be as detailed on the plans and in accordance with the manufacturers recommendations. Joints shall meet the requirements of ASTM D4161 for flexible elastomeric seals.

701-3.5 Embedment and Overfill. Pipes shall be inspected before any fill material is placed; any pipes found to be out of alignment, unduly settled, or damaged shall be removed and re-laid or replaced at the Contractor's expense.

701-3.5-1 Embedment Material Requirements

- a. **Concrete Pipe.** Embedment material and compaction requirements shall be in accordance with the applicable Type of Standard Installation (Types 1, 2, 3, or 4) per ASTM C1479. If a concrete cradle or CLSM embedment material is used, it shall conform to the plan details.
- b. **Plastic and fiberglass Pipe.** Embedment material shall meet the requirements of ASTM D3282, A-1, A-2-4, A-2-5, or A-3. Embedment material shall be free of organic material, stones larger than 1.5 inches in the greatest dimension, or frozen lumps. Embedment material shall extend to 12 inches above the top of the pipe.
- c. **Metal Pipe.** Embedment material shall be granular as specified in the contract document and specifications, and shall be free of organic material, rock fragments larger than 1.5 inches in the greatest dimension and frozen lumps. As a minimum, backfill materials shall meet the requirements of ASTM D3282, A-1, A-2, or A-3. Embedment material shall extend to 12 inches above the top of the pipe.

701-3.5-2 Placement of Embedment Material The embedment material shall be compacted in layers not exceeding 6 inches (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 re-laid 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.

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 each class and size of pipes shall be measured separately. All fittings shall be included in the footage as typical pipe sections in the pipe being measured.

701-4.2. Not used.

701-4.3 Not used.

701-4.4 Not used.

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.

701-5.2 Not used

701-5.3 Not used.

701-5.4 Not used.

Payment will be made under:

Item 701-5.1 — inch — per linear foot (meter)

Item 701-5.2 — Not used

~~Item 701-5.3~~	~~Not used.~~	
~~Item 701-5.4~~	~~Not used.~~	
~~Item D-701-1~~	~~18" RCP, Class V~~	~~per Linear Foot (LF)~~
~~Item D-701-2~~	~~24" RCP, Class V~~	~~per Linear Foot (LF)~~
~~Item D-701-3~~	~~30" RCP, Class V~~	~~per Linear Foot (LF)~~
~~Item D-701-4~~	~~36" RCP, Class V~~	~~per Linear Foot (LF)~~
D-701-1	30"X19" ERCP, CLASS V	-per linear foot (LF)

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-751
MANHOLES, CATCH BASINS, INLETS, AND INSPECTION HOLES

ITEM D-751, "MANHOLES, CATCH BASINS, INLETS, AND INSPECTION HOLES" is a technical specification contained in Federal Aviation Administration Advisory Circular – 150/5370-10H, "Standard Specifications for Construction of Airports."

This item has been modified to make allowances for local materials, methods and requirements. This item has been updated and modified to comply with the latest editions of other applicable codes, from knowledge gained on other airport construction projects and valuable lessons learned from airport maintenance staffs.

Deletions are noted by the ~~strike through~~ method.

Changes and additions are noted by the ***bold italic*** method.

ITEM D-751
MANHOLES, CATCH BASINS, INLETS, AND INSPECTION HOLES

DESCRIPTION

751-1.1 This item shall consist of construction of manholes, catch basins, inlets, and inspection holes, in accordance with these specifications, at the specified locations and conforming to the lines, grades, and dimensions shown on the plans or required by the RPR.

MATERIALS

751-2.1 Brick. The brick shall conform to the requirements of ASTM C 32, Grade MS.

751-2.2 Mortar. 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.

751-2.3 Concrete. Plain and reinforced concrete used in structures, connections of pipes with structures, and the support of structures or frames shall conform to the requirements of Item P-610.

751-2.4 Precast Concrete Pipe Manhole Rings. Precast concrete pipe manhole rings shall conform to the requirements of ASTM C478. Unless otherwise specified, the risers and offset cone sections shall have an inside diameter of not less than 36 inches (90 cm) nor more than 48 inches (120 cm). There shall be a gasket between individual sections and sections cemented together with mortar on the inside of the manhole.

751-2.5 Corrugated Metal. Corrugated metal shall conform to the requirements of American Association of State Highway and Transportation Officials (AASHTO) M36.

751-2.6 Frames, Covers, And Grates. The castings shall conform to one of the following requirements:

- a. ASTM A48, Class 35B: Gray iron castings
- b. ASTM A47: Malleable iron castings
- c. ASTM A27: Steel castings
- d. ASTM A283, Grade D: Structural steel for grates and frames
- e. ASTM A536, Grade 65-45-12: Ductile iron castings
- f. ASTM A897: Austempered ductile iron castings

All castings or structural steel units shall conform to the dimensions shown on the plans and shall be designed to support the loadings, aircraft gear configuration and/or direct loading, specified.

Each frame and cover or grate unit shall be provided with fastening members to prevent it from being dislodged by traffic but which will allow easy removal for access to the structure.

All castings shall be thoroughly cleaned. After fabrication, structural steel units shall be galvanized to meet the requirements of ASTM A123.

751-2.7 Steps. The steps or ladder bars shall be gray or malleable cast iron or galvanized steel. The steps shall be the size, length, and shape shown on the plans and those steps that are not galvanized shall be given a coat of bituminous paint, when directed.

751-2.8 Precast inlet structures. Manufactured in accordance with and conforming to ASTM C913.

CONSTRUCTION METHODS

751-3.1 Unclassified Excavation.

- a. The Contractor shall excavate for structures and footings to the lines and grades or elevations, shown on the plans, or as staked by the RPR. The excavation shall be of sufficient size to permit the placing of the full width and length of the structure or structure footings shown. The elevations of the bottoms of footings, as shown on the plans, shall be considered as approximately only; and the RPR may direct, in writing, changes in dimensions or elevations of footings necessary for a satisfactory foundation.
- b. Boulders, logs, or any other objectionable material encountered in excavation shall be removed. All rock or other hard foundation material shall be cleaned of all loose material and cut to a firm surface either level, stepped, or serrated, as directed by the RPR. All seams or crevices shall be cleaned out and grouted. All loose and disintegrated rock and thin strata shall be removed. Where concrete will rest on a surface other than rock, the bottom of the excavation shall not be disturbed and excavation to final grade shall not be made until immediately before the concrete or reinforcing is placed.
- c. The Contractor shall do all bracing, sheathing, or shoring necessary to implement and protect the excavation and the structure as required for safety or conformance to governing laws. The cost of bracing, sheathing, or shoring shall be included in the unit price bid for the structure.
- d. All bracing, sheathing, or shoring involved in the construction of this item shall be removed by the Contractor after the completion of the structure. Removal shall not disturb or damage finished masonry. The cost of removal shall be included in the unit price bid for the structure.
- e. After excavation is completed for each structure, the Contractor shall notify the RPR. No concrete or reinforcing steel shall be placed until the RPR has approved the depth of the excavation and the character of the foundation material.

751-3.2 Brick Structures.

- a. **Foundations.** A prepared foundation shall be placed for all brick structures after the foundation excavation is completed and accepted. Unless otherwise specified, the base shall consist of reinforced concrete mixed, prepared, and placed in accordance with the requirements of Item P-610.
- b. **Laying brick.** All brick shall be clean and thoroughly wet before laying so that they will not absorb any appreciable amount of additional water at the time they are laid. All brick shall be laid in freshly made mortar. Mortar not used within 45 minutes after water has been added shall be discarded. Re-tempering of mortar shall not be permitted. An ample layer of mortar shall be spread on the beds and a shallow furrow shall be made in it that can be readily closed by the laying of the brick. All bed and head joints shall be filled solid with mortar. End joints of stretchers

and side or cross joints of headers shall be fully buttered with mortar and a shoved joint made to squeeze out mortar at the top of the joint. Any bricks that may be loosened after the mortar has taken its set, shall be removed, cleaned, and re-laid with fresh mortar. No broken or chipped brick shall be used in the face, and no spalls or bats shall be used except where necessary to shape around irregular openings or edges; in which case, full bricks shall be placed at ends or corners where possible, and the bats shall be used in the interior of the course. In making closures, no piece of brick shorter than the width of a whole brick shall be used; and wherever practicable, whole brick shall be used and laid as headers.

- c. **Joints.** All joints shall be filled with mortar at every course. Exterior faces shall be laid up in advance of backing. Exterior faces shall be plastered or parged with a coat of mortar not less than 3/8 inch (9 mm) thick before the backing is laid up. Prior to parging, all joints on the back of face courses shall be cut flush. Unless otherwise noted, joints shall be not less than 1/4 inch (6 mm) nor more than 1/2 inch (12 mm) wide and the selected joint width shall be maintained uniform throughout the work.
- d. **Pointing.** Face joints shall be neatly struck, using the weather-struck joint. All joints shall be finished properly as the laying of the brick progresses. When nails or line pins are used the holes shall be immediately plugged with mortar and pointed when the nail or pin is removed.
- e. **Cleaning.** Upon completion of the work all exterior surfaces shall be thoroughly cleaned by scrubbing and washing with water. If necessary, to produce satisfactory results, cleaning shall be done with a 5% solution of muriatic acid which shall then be rinsed off with liberal quantities of water.
- f. **Curing and cold weather protection.** The brick masonry shall be protected and kept moist for at least 48 hours after laying the brick. Brick masonry work or pointing shall not be done when there is frost on the brick or when the air temperature is below 50°F (10°C) unless the Contractor has, on the project ready to use, suitable covering and artificial heating devices necessary to keep the atmosphere surrounding the masonry at a temperature of not less than 60°F (16°C) for the duration of the curing period.

751-3.3 Concrete Structures. Concrete structures which are to be cast in place within the project boundaries shall be built on prepared foundations, conforming to the dimensions and shape indicated on the plans. The construction shall conform to the requirements specified in Item P-610. Any reinforcement required shall be placed as indicated on the plans and shall be approved by the RPR before the concrete is placed.

All invert channels shall be constructed and shaped accurately to be smooth, uniform, and cause minimum resistance to flowing water. The interior bottom shall be sloped to the outlet.

751-3.4 Precast Concrete Pipe Structures. Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or another RPR approved third party certification program.

Precast concrete structures shall conform to ASTM C478. Precast concrete structures shall be constructed on prepared or previously placed slab foundations conforming to the dimensions and locations shown on the plans. All precast concrete sections necessary to build a completed structure shall be furnished. The different sections shall fit together readily. Joints between precast concrete risers and tops shall be full-

bedded in cement mortar and shall (1) be smoothed to a uniform surface on both interior and exterior of the structure or (2) utilize a rubber gasket per ASTM C443. The top of the upper precast concrete section shall be suitably formed and dimensioned to receive the metal frame and cover or grate, or other cap, as required. Provision shall be made for any connections for lateral pipe, including drops and leads that may be installed in the structure. The flow lines shall be smooth, uniform, and cause minimum resistance to flow. The metal or metal encapsulated steps that are embedded or built into the side walls shall be aligned and placed in accordance to ASTM C478. When a metal ladder replaces the steps, it shall be securely fastened into position.

751-3.5 Corrugated Metal Structures. Corrugated metal structures shall be prefabricated. All standard or special fittings shall be furnished to provide pipe connections or branches with the correct dimensions and of sufficient length to accommodate connecting bands. The fittings shall be welded in place to the metal structures. The top of the metal structure shall be designed so that either a concrete slab or metal collar may be attached to allow the fastening of a standard metal frame and grate or cover. Steps or ladders shall be furnished as shown on the plans. Corrugated metal structures shall be constructed on prepared foundations, conforming to the dimensions and locations as shown on the plans. When indicated, the structures shall be placed on a reinforced concrete base.

751-3.6 Inlet And Outlet Pipes. Inlet and outlet pipes shall extend through the walls of the structures a sufficient distance beyond the outside surface to allow for connections. They shall be cut off flush with the wall on the inside surface of the structure, unless otherwise directed. For concrete or brick structures, mortar shall be placed around these pipes to form a tight, neat connection.

751-3.7 Placement And Treatment Of Castings, Frames, And Fittings. All castings, frames, and fittings shall be placed in the positions indicated on the plans or as directed by the RPR, and shall be set true to line and elevation. If frames or fittings are to be set in concrete or cement mortar, all anchors or bolts shall be in place before the concrete or mortar is placed. The unit shall not be disturbed until the mortar or concrete has set.

When frames or fittings are placed on previously constructed masonry, the bearing surface of the masonry shall be brought true to line and grade and shall present an even bearing surface so the entire face or back of the unit will come in contact with the masonry. The unit shall be set in mortar beds and anchored to the masonry as indicated on the plans or as directed by the RPR. All units shall set firm and secure.

After the frames or fittings have been set in final position, the concrete or mortar shall be allowed to harden for seven (7) days before the grates or covers are placed and fastened down

751-3.8 Installation Of Steps. The steps shall be installed as indicated on the plans or as directed by the RPR. When the steps are to be set in concrete, they shall be placed and secured in position before the concrete is placed. When the steps are installed in brick masonry, they shall be placed as the masonry is being built. The steps shall not be disturbed or used until the concrete or mortar has hardened for at least seven (7) days. After seven (7) days, the steps shall be cleaned and painted, unless they have been galvanized.

When steps are required with precast concrete structures, they shall meet the requirements of ASTM C478. The steps shall be cast into the side of the sections at the time the sections are manufactured or set in place after the structure is erected by drilling holes in the concrete and cementing the steps in place.

When steps are required with corrugated metal structures, they shall be welded into aligned position at a vertical spacing of 12 inches (300 mm).

Instead of steps, prefabricated ladders may be installed. For brick or concrete structures, the ladder shall be held in place by grouting the supports in drilled holes. For metal structures, the ladder shall be secured by welding the top support to the structure and grouting the bottom support into drilled holes in the foundation or as directed by the RPR.

751-3.9 Backfilling.

- a. After a structure has been completed, the area around it shall be backfilled with approved material, in horizontal layers not to exceed 8 inches (200 mm) in loose depth, and compacted to the density required in Item P-152. Each layer shall be deposited evenly around the structure to approximately the same elevation. The top of the fill shall meet the elevation shown on the plans or as directed by the RPR.
- b. Backfill shall not be placed against any structure until approved by the RPR. For concrete structures, approval shall not be given until the concrete has been in place seven (7) days, or until tests establish that the concrete has attained sufficient strength to withstand any pressure created by the backfill and placing methods.
- c. Backfill shall not be measured for direct payment. Performance of this work shall be considered an obligation of the Contractor covered under the contract unit price for the structure involved.

751-3.10 Cleaning And Restoration Of Site. After the backfill is completed, the Contractor shall dispose of all surplus material, dirt, and rubbish from the site. Surplus dirt may be deposited in embankments, shoulders, or as approved by the RPR. The Contractor shall restore all disturbed areas to their original condition. The Contractor shall remove all tools and equipment, leaving the entire site free, clear, and in good condition.

METHOD OF MEASUREMENT

751-4.1 Manholes, catch basins, inlets, and inspection holes shall be measured by the unit.

BASIS OF PAYMENT

751-5.1 The accepted quantities of manholes, catch basins, inlets, and inspection holes will be paid for at the contract unit price per each in place when completed. This price shall be full compensation for furnishing all materials and for all preparation, excavation, backfilling and placing of the materials; furnishing and installation of such specials and connections to pipes and other structures as may be required to complete the item as shown on the plans; and for all labor equipment, tools and incidentals necessary to complete the structure.

Payment will be made under:

~~Item D-751-5.1~~ — Manholes	~~—per each~~
~~Item D-751-5.2~~ — Catch Basins	~~—per each~~
~~Item D-751-5.3~~ — Inlets	~~—per each~~

~~Item D-751-5.4~~	~~Inspection Holes~~	~~-per each~~
~~Item D751-2~~	~~Type G DBI, Aircraft Rated (50,000 lb Point Load)~~	~~-per Each (EA)~~
~~Item D751-3~~	~~Type F Top on Type J, Alt B (7'-6"x10'-6") Bottom, Aircraft Rated~~	
Item D751-1	Type F DBI, Aircraft Rated (50,000 lb Point Load)	-per Each (EA)

REFERENCES

751-6.1 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 A27	Standard Specification for Steel Castings, Carbon, for General Application
ASTM A47	Standard Specification for Ferritic Malleable Iron Castings
ASTM A48	Standard Specification for Gray Iron Castings
ASTM A123	Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A283	Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates
ASTM A536	Standard Specification for Ductile Iron Castings
ASTM A897	Standard Specification for Austempered Ductile Iron Castings
ASTM C32	Standard Specification for Sewer and Manhole Brick (Made from Clay or Shale)
ASTM C144	Standard Specification for Aggregate for Masonry Mortar
ASTM C150	Standard Specification for Portland Cement
ASTM C443	Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets.
ASTM C478	Standard Specification for Precast Reinforced Concrete Manhole Sections
ASTM C913	Standard Specification for Precast Concrete Water and Wastewater Structures.

American Association of State Highway and Transportation Officials

AASHTO M36	Standard Specification for Corrugated Steel Pipe, Metallic-Coated, for Sewers and Drains

END OF SECTION D-751

ITEM D-752
CONCRETE CULVERTS, HEADWALLS, AND MISCELLANEOUS DRAINAGE STRUCTURES

ITEM D-752, "MANHOLES, CONCRETE CULVERTS, HEADWALLS, AND MISCELLANEOUS DRAINAGE STRUCTURES" is a technical specification contained in Federal Aviation Administration Advisory Circular – 150/5370-10H, "Standard Specifications for Construction of Airports."

This item has been modified to make allowances for local materials, methods and requirements. This item has been updated and modified to comply with the latest editions of other applicable codes, from knowledge gained on other airport construction projects and valuable lessons learned from airport maintenance staffs.

Deletions are noted by the ~~striketrough~~ method.

Changes and additions are noted by the ***bold italic*** method.

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 non-cohesive 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.~~

Endwalls shall be measured by the unit.

~~**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.

Payment will be made at the contract unit price per unit.—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.

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 D752-1~~	~~24" Dual Concrete Endwall~~	~~—per Each (EA)~~
D-752-1	30"X19" Temporary MES	—per Each (EA)

REFERENCES

752-6.1 The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM D698	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lb/ft ³)

ITEM F-162
CHAIN-LINK FENCES

ITEM F-162, "CHAIN-LINK FENCES" is a technical specification contained in Federal Aviation Administration Advisory Circular – 150/5370-10h, "Standard Specifications for Construction of Airports."

This item has been modified to make allowances for local materials, methods and requirements. This item has been updated and modified to comply with the latest editions of other applicable codes, from knowledge gained on other airport construction projects and valuable lessons learned from airport maintenance staffs.

Deletions are noted by the ~~striketrough~~ method.

Changes and additions are noted by the ***bold italic*** method.

**ITEM F-162
CHAIN-LINK FENCES**

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~~ **3-strand** 12-1/2 gauge zinc-coated wire with 4-point barbs and shall conform to the requirements of ASTM A121, Class 3, Chain Link Fence Grade.

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.

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 at 500 feet (150 m) intervals. 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~~ **sodded per T-904.**

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 owner shall provide AOA fence fabric. The price of **AOA Fence Installation** shall be full compensation for furnishing all **other** materials, and for all preparation, erection, and installation of these materials **including gates**, and for all labor equipment, tools, and incidentals necessary to complete the item.

The price for removal of existing fence shall be made at the contract unit price per linear foot (meter).

Payment will be made under:

~~Item F-162-5.1~~	~~Chain-Link Fence~~	~~--per linear foot (meter)~~
~~Item F-162-5.2a~~	~~Vehicle Gates~~	~~--per each~~
~~Item F-162-5.2b~~	~~Pedestrian Gates~~	~~--per each~~
~~Item F-162-1~~	~~AOA Fence Installation~~	~~--per Linear Foot (LF)~~
~~Item F-162-2~~	~~AOA Fence Removal~~	~~--per Linear Foot (LF)~~
F-162-1	AOA Fence Installation (Owner to Provide Fabric)	-per linear foot (LF)
F-162-2	AOA Fence Removal	-per linear foot (LF)

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

ITEM L-108
UNDERGROUND POWER CABLE FOR AIRPORTS

ITEM L-108, "UNDERGROUND POWER CABLE FOR AIRPORTS" is a technical specification contained in Federal Aviation Administration Advisory Circular – 150/5370-10H, "Standard Specifications for Construction of Airports."

This item has been modified to make allowances for local materials, methods and requirements. This item has been updated and modified to comply with the latest editions of other applicable codes, from knowledge gained on other airport construction projects and valuable lessons learned from airport maintenance staffs.

Deletions are noted by the ~~strikethrough~~ method.

Changes and additions are noted by the ***bold italic*** method.

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. **All submittals shall comply with Item SP-106 "Submittals, Record Documents and Maintenance Manuals" and other requirements of the Contract Documents. Where other parts of the Contract Documents apply, the stricter item shall govern.** 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.
- g. ***Only Third Party certified manufacturers, listed in AC 150/5345-53, Appendix 3 Addendum (as required) and meeting the BUY AMERICAN preference requirements can provide equipment and materials specified in the Contract Documents. Documentation certifying compliance with the BUY AMERICAN preference rules for Airport Improvement Program (AIP) cited in 49 USC §50101) shall be included with each equipment and material submittal.***

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 Type C, 5,000 volts, non-shielded, with cross-linked polyethylene insulation. L-824 conductors for use on the L-830 secondary of airfield lighting series circuits shall be sized in accordance with the manufacturer's recommendations. All other conductors shall comply with FAA and National Electric Code (NEC) requirements. Conductor sizes noted above shall not apply to leads furnished by manufacturers on airfield lighting transformers and fixtures.

Wire for electrical circuits up to 600 volts shall comply with Specification L-824 and/or Commercial Item Description A-A-59544A and shall be type THWN-2, 75°C for installation in conduit and RHW-2, 75°C for direct burial installations. Conductors for parallel (voltage) circuits shall be type and size and installed in accordance with NFPA-70, National Electrical Code.

Unless noted otherwise, all 600-volt and less non-airfield lighting conductor sizes are based on a 75°C, THWN-2, 600-volt insulation, copper conductors, not more than three single insulated conductors, in raceway, in free air. The conduit/duct sizes are based on the use of THWN-2, 600-volt insulated conductors. The Contractor shall make the necessary increase in conduit/duct sizes for other types of wire insulation. In no case shall the conduit/duct size be reduced. The minimum power circuit wire size shall be #12 AWG.

Conductor sizes may have been adjusted due to voltage drop or other engineering considerations. Equipment provided by the Contractor shall be capable of accepting the quantity and sizes of conductors shown in the Contract Documents. All conductors, pigtails, cable step-down adapters, cable step-up adapters, terminal blocks and splicing materials necessary to complete the cable termination/splice shall be considered incidental to the respective pay items provided.

Cable type, size, number of conductors, strand and service voltage shall be as specified in the Contract Document.

108-2.3 BARE COPPER WIRE (COUNTERPOISE, BARE COPPER WIRE GROUND AND GROUND RODS). Wire for counterpoise or ground installations for airfield lighting systems shall be No. 2 AWG bare solid copper wire for counterpoise and/or No. 2 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 copper-clad steel. The ground rods shall be of the length and diameter specified on the plans, but in no case be less than 10 feet (2.54 m) long and 3/4 inch (19 mm) in diameter.

- a. **Control cable for the airfield lighting control system distributed control shall be as manufactured by Beldon, 2 pair 24 AWG copper, shielded cable, Beldon M 9842 CM. Installation and termination of the airfield lighting control system distributed control cable shall be incidental to the Contractor's airfield lighting control system L-109 pay item.**

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. Not used.

108-3.4 CABLE MARKERS FOR DIRECT-BURIED CABLE. Not used.

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) Not Used (2) Not Used 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) Not Used. (2) Not Used, 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 #2 AWG copper counterpoise wire

shall be installed for lightning protection of the underground cables. The RPR shall select one of two methods of lightning protection for the airfield lighting circuit based upon sound engineering practice and lightning strike density.

- a. Equipotential.** The counterpoise size is as shown on the plans. The equipotential method is applicable to all airfield lighting systems; i.e. runway, taxiway, apron – touchdown zone, centerline, edge, threshold and approach lighting systems. The equipotential method is also successfully applied to provide lightning protection for power, signal and communication systems. The light bases, counterpoise, etc. – all components - are bonded together and bonded to the vault power system ground loop/electrode.

Counterpoise wire shall be installed in the same trench for the entire length of buried cable, conduits and duct banks that are installed to contain airfield cables. The counterpoise is centered over the cable/conduit/duct to be protected.

The counterpoise conductor shall be installed no less than 8 inches (200 mm) minimum or 12 inches (300 mm) maximum above the raceway or cable to be protected, except as permitted below:

- (1)** The minimum counterpoise conductor height above the raceway or cable to be protected shall be permitted to be adjusted subject to coordination with the airfield lighting and pavement designs.
- (2)** The counterpoise conductor height above the protected raceway(s) or cable(s) shall be calculated to ensure that the raceway or cable is within a 45-degree area of protection, (45 degrees on each side of vertical creating a 90 degree angle).

The counterpoise conductor shall be bonded to each metallic light base, mounting stake, and metallic airfield lighting component.

All metallic airfield lighting components in the field circuit on the output side of the constant current regulator (CCR) or other power source shall be bonded to the airfield lighting counterpoise system.

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** – Not used.
- c. Common Installation requirements** Grounding electrodes may be rods, ground dissipation plates, radials, or other electrodes listed in the NFPA 70 (NEC) or NFPA 780.

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.

For raceways installed under pavement; for raceways and cables not installed adjacent to the full strength pavement edge; for fixtures installed in full strength pavement and shoulder pavement and for optional method of edge lights installed in turf (stabilized soils); and for raceways or cables adjacent to the full strength pavement edge, the counterpoise conductor shall be centered over the raceway or cable to be protected as described below.

The counterpoise conductor shall be installed no less than 8 inches (203 mm) above the raceway or cable to be protected, except as permitted below.

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.

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 conductor shall be installed no more than 12 inches (305 mm) above the raceway or cable to be protected.

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.

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.

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. Not used.

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 **500** 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 **5** ohms prior to establishing connections to other ground electrodes. The fall-of-potential ground impedance test shall be used, as described by American National Standards Institute/Institute of Electrical and Electronic Engineers (ANSI/IEEE) Standard 81, to verify this requirement. As an alternate, clamp-on style ground impedance test meters may be used to satisfy the impedance testing requirement. Test equipment and its calibration sheets shall be submitted for review and approval by the RPR prior to performing the testing.

Two copies of tabulated results of all cable tests performed shall be supplied by the Contractor to the RPR. Where connecting new cable to existing cable, insulation resistance tests shall be performed on the new cable prior to connection to the existing circuit.

There are no approved "repair" procedures for items that have failed testing other than complete replacement.

METHOD OF MEASUREMENT

108-4.1 The cost of all excavation, backfill, dewatering and restoration regardless of the type of material encountered shall be included in the unit price bid for the work.

108-4.2 Cable or counterpoise wire installed in trench, duct bank or conduit shall be measured by the number of linear feet (meters) installed and grounding connectors, and trench marking tape ready for

operation, and accepted as satisfactory. Separate measurement shall be made for each cable or counterpoise wire installed in trench, duct bank or conduit. The measurement for this item shall not include additional quantities required for slack. Cable and counterpoise slack is considered incidental to this item and is included in the Contractor's unit price. No separate measurement or payment will be made for cable or counterpoise slack.

108-4.3 Ground rods shall be measured by each 10-foot section installed complete, including the earth resistance readings of each completed installation being tested and recorded for the engineer per L-108-3.10. See specification SP-111 "AIRFIELD ELECTRICAL INSTALLATION TESTING" for ground rod testing method and "EARTH RESISTANCE TEST" form.

BASIS OF PAYMENT

108-5.1

- a. Payment will be made at the contract unit price for trenching, cable and bare counterpoise wire installed in trench/**sawcut** (direct-buried), or cable 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, **connector kits, cable terminations, lugs, ID tags, cable markers, testing, and all incidentals, and trench marking tape, necessary to complete this item. The cost of the #6 AWG stranded copper bonding jumpers, the cost of the #2 AWG stranded copper bonding jumpers and conductor terminations shall be considered incidental to the item being installed. The #2 AWG solid copper counterpoise installed external to conduit and with directional bore duct shall be paid at the #2 AWG solid copper counterpoise installed in trench unit price.**
- b. **The cost for all steel, arc welding, saw cutting, sealer/adhesive, exothermic welds, cable terminations, detectable warning tape and all other incidentals and appurtenances required to install the counterpoise or ground grid conductors as required by the Contract Documents shall be included in the linear foot unit price bid for the work. The cost of all excavation, backfill, saw cuts; dewatering and restoration regardless of the type of material encountered/required shall also be included in the unit price bid for the work.**

108-5.2 Payment will be made at the contract unit price for each ground rod installed in place by the Contractor and accepted by the Engineer. Each ten foot section shall be paid as a single 0.75" diameter by 10.00' long copper clad steel sectional ground rod. This price shall be full compensation for furnishing all materials and for all preparation, installation, and testing of these materials, and for all supervision, transportation, labor, equipment, tools, installed complete with exothermic connections, excavation, backfill, and all required incidentals necessary to complete this item. The cost of all excavation, backfill, dewatering and restoration regardless of the type of material encountered shall also be included in the unit price bid for the work.

Payment will be made under:

Item L-108-1	1/C L-824 Type C Unshielded #8 AWG 5kv Stranded	
	Copper Cable	per Linear Foot (LF)
Item L-108-2	#6 AWG, THWN-2, 600V, Insulated Copper Conductor	per Linear Foot (LF)

~~Item L-108-3~~	~~1/C #2 AWG Solid Copper Counterpoise Cable, Installed Over Duct or Conduit~~	~~per Linear Foot (LF)~~
~~Item L-108-4~~	~~0.75" Diameter by 10.00' Long Copper Clad Steel Sectional Ground Rod~~	~~per Each (EA)~~

REFERENCES

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

Advisory Circulars (AC)

AC 150/5340-26	Maintenance of Airport Visual Aid Facilities
AC 150/5340-30	Design and Installation Details for Airport Visual Aids
AC 150/5345-7	Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits
AC 150/5345-26	Specification for L-823 Plug and Receptacle, Cable Connectors
AC 150/5345-53	Airport Lighting Equipment Certification Program

Commercial Item Description

A-A-59544A	Cable and Wire, Electrical (Power, Fixed Installation)
A-A-55809	Insulation Tape, Electrical, Pressure-Sensitive Adhesive, Plastic

ASTM International (ASTM)

ASTM B3	Standard Specification for Soft or Annealed Copper Wire
ASTM B8	Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft
ASTM B33	Standard Specification for Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes
ASTM D4388	Standard Specification for Nonmetallic Semi-Conducting and Electrically Insulating Rubber Tapes

Mil Spec

MIL-PRF-23586F	Performance Specification: Sealing Compound (with Accelerator), Silicone Rubber, Electrical
MIL-I-24391	Insulation Tape, Electrical, Plastic, Pressure Sensitive

National Fire Protection Association (NFPA)

NFPA-70	National Electrical Code (NEC)

NFPA-780 Standard for the Installation of Lightning Protection Systems

American National Standards Institute (ANSI)/Institute of Electrical and Electronics Engineers (IEEE)

ANSI/IEEE STD 81 IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System

Federal Aviation Administration Standard

FAA STD-019E Lightning and Surge Protection, Grounding Bonding and Shielding Requirements for Facilities and Electronic Equipment

END OF ITEM L-108

ITEM L-110
AIRPORT UNDERGROUND ELECTRICAL DUCT BANKS AND CONDUITS

ITEM L-110, "AIRPORT UNDERGROUND ELECTRICAL DUCT BANKS AND CONDUITS" is a technical specification contained in Federal Aviation Administration Advisory Circular – 150/5370-10H, "Standard Specifications for Construction of Airports."

This item has been modified to make allowances for local materials, methods and requirements. This item has been updated and modified to comply with the latest editions of other applicable codes, from knowledge gained on other airport construction projects and valuable lessons learned from airport maintenance staffs.

Deletions are noted by the ~~strikethrough~~ method.

Changes and additions are noted by the ***bold italic*** method.

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. It shall also include all turfing trenching, backfilling, removal, and restoration of any paved or turfed areas; concrete encasement, mandrelling, pulling lines, duct markers, plugging of conduits, and the testing of the installation as a completed system ready for installation of cables per the plans and specifications. This item shall also include furnishing and installing conduits and all incidentals for providing positive drainage of the system. Verification of existing ducts is incidental to the pay items provided in this specification.

EQUIPMENT AND MATERIALS

110-2.1 GENERAL.

- a. All equipment and materials covered by referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification when requested by the RPR.
- b. Manufacturer's certifications shall not relieve the Contractor of the responsibility to provide materials per these specifications and acceptable to the RPR. Materials supplied and/or installed that do not comply with these specifications shall be removed, when directed by the RPR and replaced with materials, that comply with these specifications, at the Contractor's cost.
- c. All materials and equipment used to construct this item shall be submitted to the RPR for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify products or models applicable to this project. Indicate all optional equipment and delete non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment for which they apply on each submittal sheet. Markings shall be made bold and clear with arrows or circles (highlighting is not acceptable). The Contractor is solely responsible for delays in project that accrue directly or indirectly from late submissions or resubmissions of submittals.
- d. The data submitted shall be sufficient, in the opinion of the RPR, to determine compliance with the plans and specifications. The Contractor's submittals shall be electronically submitted in pdf format, tabbed by specification section. The RPR reserves the right to reject any and all equipment, materials or procedures that do not meet the system design and the standards and codes specified in this document.
- e. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from final acceptance by the Owner. The defective materials and/or equipment shall be repaired or

replaced, at the Owner's discretion, with no additional cost to the Owner. **All submittals shall comply with Item SP-106 "Submittals, Record Documents and Maintenance Manuals" and other requirements of the Contract Documents. Where other parts of the Contract Documents apply, the stricter item shall govern.**

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.

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 conform to Item P-610, Structural Portland Cement Concrete, using **1** inch maximum size coarse aggregate with a minimum 28-day compressive strength of **4,000** psi.

Where reinforced duct banks are specified, reinforcing steel shall conform to ASTM A615 Grade 60. Concrete and reinforcing steel are incidental to the respective pay item of which they are a component part.

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. ***The tape shall continuously read "CAUTION - ELECTRIC LINE BELOW", red; "CAUTION - COMMUNICATION LINE BELOW", orange; "CAUTION - WATER LINE BELOW", blue; "CAUTION - FUEL LINE BELOW", yellow; or color and message as applicable to the utility.***

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 not be 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. ***The Contractor shall ascertain the type of soil or rock to be excavated before bidding. All such rock removal shall be performed and paid for under Item P-152.***

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 sodding shown on the plans. The Contractor shall be held responsible for maintaining all disturbed surfaces and replacements until final acceptance. All restoration shall be considered incidental to the respective L-110 pay item. Following restoration of all trenching near airport movement surfaces, the Contractor shall thoroughly visually inspect the area for foreign object debris (FOD) and remove any such FOD that is found. This FOD inspection and removal shall be considered incidental to the pay item of which it is a component part.

110-3.8 OWNERSHIP OF REMOVED CABLE. Not used.

METHOD OF MEASUREMENT

110-4.1 Underground conduits and duct banks shall be measured by the linear feet (meter) of conduits and duct banks installed, including encasement, locator tape, trenching and backfill with designated material, and restoration, and for drain lines, the termination at the drainage structure, all measured in place, completed, and accepted. Separate measurement shall be made for the various types and sizes.

110-4.2 *Split duct shall be measured and paid for by the individual linear foot. For example, 25 feet of 1 way 4" split duct would be paid as 25 linear feet of 4" split duct. 25 feet of 4 way 4" split duct would be paid for as 100 linear feet of 4" split duct.*

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. **including but not limited to, duct, couplings, elbows, end bells, inner duct, spacers, concrete, rebar, pavement reinforcement mesh, detectable warning tape, dewatering, excavating, backfill, topsoil, sodding and pavement restoration, where required** to complete this item in accordance with the provisions and intent of the **Contract Documents** plans and specifications **and to the satisfaction of the RPR.**

110-5.2 Split duct work includes all materials, supervision, labor, transportation and services required to hand excavate existing utilities, adjust to new grade, furnish and install concrete encased split duct, excavation, backfill, site restoration and all incidentals required to provide complete utility protection to the satisfaction of the Engineer.

Payment will be made under:

Item L-110-1	1 Way 2" Schedule 40 PVC Direct Earth Buried Duct	- per Linear Foot (LF)
Item L-110-2	1 Way 2" Schedule 40 PVC Concrete Encased Duct	- per Linear Foot (LF)
Item L-110-3	3 Way 2" Schedule 40 PVC Direct Earth Buried Duct	- per Linear Foot (LF)
Item L-110-4	3 Way 2" Schedule 40 PVC Concrete Encased Duct	- per Linear Foot (LF)
Item L-110-5	12 Way 2" Schedule 40 PVC Direct Earth Buried Duct	- per Linear Foot (LF)
Item L-110-6	12 Way 2" Schedule 40 PVC Concrete Encased Duct	- per Linear Foot (LF)
Item L-110-7	1 Way 4" Split Duct	- per Linear Foot (LF)
Item L-110-8	Base Can Drain Well	- per Each (EA)
L-110-1	1 Way 2" Schedule 40 PVC Direct Earth Buried Duct	-per linear foot (LF)

REFERENCES

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

Advisory Circular (AC)

AC 150/5340-30 Design and Installation Details for Airport Visual Aids

AC 150/5345-53 Airport Lighting Equipment Certification Program

ASTM International (ASTM)

ASTM A615 Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement

National Fire Protection Association (NFPA)

NFPA-70 National Electrical Code (NEC)

Underwriters Laboratories (UL)

UL Standard 6 Electrical Rigid Metal Conduit – Steel

UL Standard 514B Conduit, Tubing, and Cable Fittings

UL Standard 514C Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers

UL Standard 1242 Electrical Intermediate Metal Conduit Steel

UL Standard 651 Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings

UL Standard 651A Type EB and A Rigid PVC Conduit and HDPE Conduit

END OF ITEM L-110

ITEM L-125
INSTALLATION OF AIRPORT LIGHTING SYSTEMS

ITEM L-125, "INSTALLATION OF AIRPORT LIGHTING SYSTEMS" is a technical specification contained in Federal Aviation Administration Advisory Circular – 150/5370-10H, "Standard Specifications for Construction of Airports."

This item has been modified to make allowances for local materials, methods and requirements. This item has been updated and modified to comply with the latest editions of other applicable codes, from knowledge gained on other airport construction projects and valuable lessons learned from airport maintenance staffs.

Deletions are noted by the ~~strikethrough~~ method.

Changes and additions are noted by the ***bold italic*** method.

**ITEM L-125
INSTALLATION OF AIRPORT LIGHTING SYSTEMS**

DESCRIPTION

125-1.1 This item shall consist of airport lighting systems furnished and installed in accordance with this specification, the referenced specifications, and the applicable advisory circulars (ACs). The systems shall be installed at the locations and in accordance with the dimensions, design, and details shown in the plans. This item shall include the furnishing of all equipment, materials, services, and incidentals necessary to place the systems in operation as completed units to the satisfaction of the RPR.

EQUIPMENT AND MATERIALS

125-2.1 General.

- a. Airport lighting equipment and materials covered by Federal Aviation Administration (FAA) specifications shall be certified under the Airport Lighting Equipment Certification Program in accordance with AC 150/5345-53, current version. FAA certified airfield lighting shall be compatible with each other to perform in compliance with FAA criteria and the intended operation. If the Contractor provides equipment that does not 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. All LED light fixtures,

with the exception of obstruction lighting, (AC 150/5345-43) must be warranted by the manufacturer for a minimum of 4 years after date of installation inclusive of all electronics.” Obstruction lighting warranty is set by the individual manufacturer.

All LED light fixtures, with the exception of obstruction lighting, (AC 150/5345-43) must be warranted by the manufacturer for a minimum of 4 years after date of installation inclusive of all electronics. Obstruction lighting warranty is set by the individual manufacturer.

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. Runway and taxiway lights shall conform to the requirements of AC 150/5345-46. Lamps shall be of size and type indicated, or as required by fixture manufacturer for each lighting fixture required under this contract. Filters shall be of colors conforming to the specification for the light concerned or to the standard referenced.

LIGHTS

Type	Class	Mode	Style	Option	Base	Filter	Transformer	Notes
L-852T(L)	2	1	3		L-868B	BI-BLUE	L-830	
L-861T(L)		1			L-867B/D	BI-BLUE	L-830	14" MAX

125-2.8 Runway And Taxiway Signs. Runway and Taxiway Guidance Signs should conform to the requirements of AC 150/5345-44.

SIGNS

Type	Size	Style	Class	Mode	Notes
L-858Y, L(L)	2	3	1	2	
L-858Y, L(L)	2	5	1	2	
L-858C	3	4		2	

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 Used.

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 or L-868, Class 1A, galvanized steel, Size B or D, 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. ***The light bases shall be Type L-867 for the non-load bearing units and Type L-868 for the load bearing units. The sizes of the units shall be as shown on the Contract Documents and in this Item.***

125-2.13 ISOLATION TRANSFORMERS. Isolation Transformers shall be Type L-830, 6.6 amp primary to 6.6 amp secondary, 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.

- a. All fixtures, signs, light bases, etc., shall be installed as shown on the Contract Documents or accepted shop drawings and in accordance with the applicable FAA Advisory Circulars and manufacturers' recommendations. Survey instruments shall be used to position all items to insure precise orientation. Tolerances given in the FAA Advisory Circulars and the Contract Documents shall not be exceeded. Where no tolerance is given, no deviation is permitted. Items not installed in accordance with the FAA Advisory Circulars and the Contract Documents shall be replaced by and at the expense of the Contractor.
- b. In new or existing pavement all conduits, duct banks, counterpoise, light bases, etc., shall be installed prior to the placement of the final lift of pavement.
- c. All concrete used for this item shall be completely consolidated and contain no voids. All exposed concrete shall be finished smooth with a steel trowel and broom finished. All horizontal edges to be chamfered 1 in. at 45 degrees.
- d. The finished pavement surface shall be protected from foreign substances which could cause staining, i.e., oil, P-605, etc. The Contractor shall immediately clean all spills and correct/clean any stained surfaces at the Contractor's expense.
- e. Assemble units and connect to the system in accordance with the manufacturer's recommendations and instructions.
- f. An identification tag shall be installed with each fixture, sign, etc., as shown in the Contract Documents. Cable identification tags identifying each circuit shall be attached to each cable in the

light base, on each side of all cable to cable splices and on the cable side of the cable to transformer splices.

- g.** Provide three ft (3') of slack in each end of each cable in each light base. All connections shall be able to be made above ground.
- h.** Painted and galvanized surfaces that are damaged shall be repaired according to the manufacturer's recommendations, to the satisfaction of the Engineer. To repair galvanized surfaces, use liquid cold-galvanizing compound conforming to U.S. Navy galvanized repair coating meeting Mil. Spec. MIL-P-21035. Surfaces to be coated shall be prepared and compound applied in accordance with manufacturer's recommendations. To repair painted surfaces, obtain paint and primer, of same batch number, from the equipment manufacturer.
- i.** GE RTV-118 non-curing sealant or accepted equivalent shall be used to seal between sections of light base sections, spacer rings and adapter rings.
- j.** Where three (3) or more conduits enter an L-867B light base an L-867D light base shall be used. Drain connections are excluded from the conduit count.
- k.** All threaded connections shall utilize the appropriate anti-seize compound.
- l.** Light base shall not be installed closer than or within two and one half feet (2.5') of a paving joint (to center of light base) without written permission of the Engineer. Changes to the concrete joint layout or the location of the light base shall be submitted to the Engineer for acceptance. Conflicts that may occur due to changes in the joint layout or the location of the light bases shall be the full responsibility of the Contractor. Flag light base locations prior to installation to demonstrate joint coordination. Any/all irregularities shall be immediately reported to the Engineer.
- m.** If a light base is installed incorrectly or the duct/conduit is plugged/broken or the concrete joints are installed incorrectly or the light base is sawed by the concrete saw, the concrete slab or 600 square feet asphalt pavement around the light base shall be removed. The pavement shall be replaced in accordance with the Contract Documents with the light base properly reinstalled. The removal and replacement of the pavement and light base shall be at the Contractor's expense.
- n.** Dewatering necessary to construct L-125 Items and related erosion and turbidity control in accordance with Federal, State, and Local requirements is incidental to its respective pay item as a part of L-125. The cost of all excavation regardless of type of material encountered shall be included in the unit price bid for the L-125 Item.
- o.** All loose materials shall be removed from all excavations for electrical items. The bottom of the excavation shall be compacted to the following criteria:

Soil Type	Design Aircraft Gross Weight	Test Standard	Under Pavement	In Turf
<30% RETAINED ON ¾" SIEVE	>60,000 LBS	ASTM D1557	100%	95%
<30% RETAINED ON ¾" SIEVE	<60,000 LBS	ASTM D698	100%	98%
>30% RETAINED ON ¾" SIEVE	>60,000 LBS	AASHTO T-180	100%	95%
>30% RETAINED ON ¾" SIEVE	<60,000 LBS	AASHTO T-99	100%	95%

Backfill shall comply with the same compaction requirements.

125-3.2 Sign Installation.

- a. Position signs with survey instruments as indicated in the Contract Documents. Stake location of all signs prior to installation to demonstrate accuracy of layout, spacing intervals, and coordination with site features. Bring conflicts to the attention of the Engineer. Allow 5 calendar days for a resolution.
- b. Signs shall be oriented at 90 degrees to the direction of the taxing path from which it is viewed, unless noted otherwise.
- c. For all signs, the concrete pad shall extend to not less than three (3) ft out from the edge of the sign all around. The concrete pad shall be poured in place and rest on undisturbed soil. The pad shall be reinforced with steel bars formed and placed as indicated on Contract Documents.
- d. During construction of the pad, the transformer base shall be adjusted and firmly held in place so that machined upper surface of base flange will be level within 2 degrees and not more than 1/4 in. above the surface of pad. All other bearing areas for additional flange supports shall be in the same horizontal plane as the transformer base flange. Exposed concrete surface shall be finished smooth with a steel trowel or rubbed to a smooth finish. All horizontal edges to be chamfered 1 in. at 45 degrees. Concrete pad shall be flat with no standing water on top of pad after a rain event.
- e. The Contractor shall be responsible for final calibration and adjustments of the signs.
- f. Install sign panels in accordance with the Contract Documents, sign manufacturer's instructions and recommendations.
- g. Install sign conversion kits in accordance with the Contract Documents, sign manufacturer's instructions and recommendations.

125-3.3 Light Bases and Fixtures Installation.

- a. Light base manufacturer shall provide an onsite representative to instruct the Contractor's personnel in the proper methods of installing and aligning light bases. Position all light base with survey instruments as indicated in the Contract Documents. Stake location of all light bases prior to installation to demonstrate accuracy of layout, spacing intervals, and coordination with paving joints and site features. Bring conflicts to the attention of the Engineer. Allow 5 calendar days for a resolution.

- b. Edge light units shall be 10 ft off the edge of full strength (striped edge) of pavement (unless specifically indicated otherwise). On straight sections, they shall be optically in line when sighted from either end of a straight section. Light bases for edge light units shall be installed at the designated locations with top flanges at the required elevation and within 2 degrees of level. All elevated edge lights shall be installed at an equal height above grade not to exceed 14 in.
- c. In-pavement light units shall be located as shown in the Contract Documents. All in-pavement lights shall be installed level with the top edge between plus 0-in. and minus 1/16 in. from the pavement's final finish grade. Light bases must be aligned parallel to the centerline with a tolerance of plus or minus 1/2 degree. Provide tighter tolerances if required by fixture manufacturer to meet Advisory Circular photometric performance criteria.
- d. Prior to placing the P-610 light base anchor and duct encasement the Contractor shall demonstrate to the Engineer that the related signs, fixtures, etc. can be wired in numerical order in accordance with the Contract Documents.
- e. Before paving may proceed the Contractor shall demonstrate to the Engineer that the light bases are level at the correct elevation and azimuth and that the proper clearance exists between the light base and the paving train.
- f. Following the milling and paving operations, the Contractor shall commence the 2 in. core boring used to find the light base center and to determine the height of the top can section (less fixture and spacer ring thickness) within one working day of the final asphalt lift being placed. The contractor shall expedite the completion of this task in support of placing each order for the final top can sections within five working days of the completion of the finished paving.
- g. See applicable installation details for additional information to determine the number of spacer rings allowed, minimum top can section height, etc.
- h. At such time as the Contractor begins the process of raising the in-pavement lights to the finished grades, the Contractor shall demonstrate to the Engineer the Contractor's processes to precisely locate the center of the light base being extended. Egg shaped and figure 8 holes for the cores are unacceptable. The center of the light base shall be carefully and precisely located. The core drill diameter shall be limited to 0.50 in., +0.125 in. larger than the L-868 top can section/extension (12.5 in.) or middle can section (13 in.) that is being installed. The drilling technician shall accurately locate the core precisely over the center of the light base, and drill the core to the top of the concrete encasement of the light base. The coring machine shall be of sufficient mass and stability to prevent "wobble" and to ensure plumb cores. Following the coring operation, the Contractor shall remove the core, mud plate and plywood cover, and clean any loose laitance from the connection interface prior to installing the new top can section and new nominal 0.75 in. thick spacer ring with concrete ring and fixture. All concrete, debris and other materials that could prevent a complete metal to metal contact between the two light base section flanges shall be removed. The two light base flanges shall be in firm contact. Firm contact is defined as "the condition when the planes of contact between two contact surfaces are solidly seated against each other in continuous contact." Clean the light base interior prior to installing the fixture.

- i. The Engineer shall verify fixture has been installed level at the proper elevation and azimuth. Following this validation, the Contractor shall install P-606 and P-605 in the annular spaces around the top can section and the spacer ring with concrete ring to complete the installation to final grade.

125-3.4 Constant Current Regulator (Ccr) Installation. Not used.

125-3.5 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.

125-3.6 Shipping and Storage. Equipment shall be shipped in suitable packing material to prevent damage during shipping. Store and maintain equipment and materials in areas protected from weather and physical damage. Any equipment and materials, in the opinion of the RPR, damaged during construction or storage shall be replaced by the Contractor at no additional cost to the owner. Painted or galvanized surfaces that are damaged shall be repaired in accordance with the manufacturer's recommendations.

125-3.7 Elevated and In-Pavement Lights. Water, debris, and other foreign substances shall be removed prior to installing fixture base and light.

A jig or holding device shall be used when installing each light fixture to ensure positioning to the proper elevation, alignment, level control, and azimuth control. Light fixtures shall be oriented with the light beams parallel to the runway or taxiway centerline and facing in the required direction. The outermost edge of fixture shall be level with the surrounding pavement. Surplus sealant or flexible embedding material shall be removed. The holding device shall remain in place until sealant has reached its initial set.

METHOD OF MEASUREMENT

125-4.1 Runway and taxiway lights will be measured by the number of each type installed as completed units in place, ready for operation, and accepted by the RPR. 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 light, guidance sign, reflective marker, runway end identification light, precision approach path indicator, or abbreviated precision approach path indicator installed by the Contractor and accepted by the RPR. This payment will be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools and incidentals necessary to complete this item. ***All items are new and unused unless specifically noted otherwise.***

- a. **"N"** Denotes installation of a new fixture on a new light base in areas where new pavement is constructed. In-pavement fixtures shall be installed utilizing a new two-piece light base and 3/4 in. nominal spacer ring with concrete ring. 3/4 in. galvanized steel blank covers shall be installed

utilizing new two-piece light base and 3/4 in. nominal spacer ring with concrete ring. Elevated fixtures shall be installed utilizing a new telescoping light base. See details.

- b. "T" Denotes installation of a new fixture on a new light base in turf areas. Elevated fixtures shall be installed utilizing a new single piece light base with concrete encasement. See details.
- c. Modifiers are used in combination with symbols provided in the electrical legend to assist the Contractor in identification of the complete scope of work involved within each area of the project. See legend to determine if fixture is required to be LED type. The contractor is responsible to identify and measure the specific component required to properly adjust the light base height in accordance with FAA requirements.

Payment will be made under:

If any of the following bid items are not included in the bid, the quantity is hereby specified as zero.

~~Item L-125-1 — L852T(L) Omnidirectional, Blue, LED, In-Pavement, Taxiway Edge Light (NAC)~~
~~per Each (EA)~~

~~L-852T(L), Omnidirectional, blue, LED, style 3, T/W edge light, mounted on an L-868B, 2 piece, deep light base with a properly sized spacer ring (w/concrete ring) and properly sized L-830 transformer, L-823 connectors, and all incidentals. Align and level as required~~

~~Item L-125-2 — L-858(L) Sign — Single/Double Face, LED, Style 2, Size 2 — 2 Module~~
~~per Each (EA)~~

~~L-858(L) Y, L sign, style 5, size 3 with LED light source installed on a concrete base with a L-867D 24" deep light base, with 1/2" thick galvanized steel cover plate and gasket, properly sized L-830 transformer(s), L-823 connectors, and all incidentals. Align and level as required.~~

~~Item L-125-3 — L-858(L) Sign — Single/Double Face, LED, Style 5, Size 2 — 2 Module~~
~~per Each (EA)~~

~~L-858(L) Y, L sign, style 5, size 3 with LED light source installed on a concrete base with a L-867D 24" deep light base, with 1/2" thick galvanized steel cover plate and gasket, properly sized L-830 transformer(s), L-823 connectors, and all incidentals. Align and level as required.~~

~~Item L-125-4 — L-858(L) Sign — Single/Double Face, LED, Style 5, Size 2 Size 3 — 3 Module~~
~~per Each (EA)~~

~~L-858(L) Y, L, sign, style 5, size 3 with LED light source installed on a concrete base with a L-867D 24" deep light base, with 1/2" thick galvanized steel cover plate and gasket, properly sized L-830 transformer(s), L-823 connectors, and all incidentals. Align and level as required.~~

~~Item L-125-5 — L-858C Sign — Single Face, Non-Lighted, Taxiway End Marker — per Each (EA)~~

~~L-858C sign, size 3, non-lighted, taxiway end marker, on a concrete base, with all incidentals and appurtenances. Align and level as required.~~

~~Item L-125-7 — LED Apron Floodlight — per Each (EA)~~

~~HL-FLED Fixture Type Floodlight with glare shield, AC Input Power, Base Mounted with 14" (standard) Mounting Height, Fixture Style Single and 1.5" Frangible Coupling (P/N 13-FC1.5).~~

~~**Item L-125-8 Electrical Source for LED Apron Floodlights per Lump Sum (LS))**~~

~~This item includes all materials, labor, transportation, supervision and all incidentals to furnish and install a NEMA 4X Disconnect Switchbox and circuit breaker that powers the LED Apron Floodlights.~~

~~**Item L-125-9 Field Lightning Arrestor Assembly per Each (EA)**~~

~~This item includes all materials, labor, transportation, supervision and all incidentals to furnish and install a field lightning arrestor assembly in accordance with the Contract Documents.~~

~~**Item L-125-10 Junction Can Plaza – Three "D" Can per Each (EA)**~~

~~This item includes all materials, labor, transportation, supervision, services and all incidentals required to provide and install a junction can plaza with three L-867D, 24" deep light bases. Conduit, ground rods and counterpoise wire are paid under their respective pay items. This item includes all concrete, rebar, excavation, forming, backfill, sod, light bases, cover plates, hardware, identification tags, etc., and all appurtenances to construct a junction can plaza with four light bases in accordance with the Contract Documents and to the satisfaction of the RPR.~~

~~**Item L-125-11 Junction Can Plaza – Twelve "D" Can per Each (EA)**~~

~~This item includes all materials, labor, transportation, supervision, services and all incidentals required to provide and install a junction can plaza with twelve L-867D, 24" deep light bases. Conduit, ground rods and counterpoise wire are paid under their respective pay items. This item includes all concrete, rebar, excavation, forming, backfill, sod, light bases, cover plates, hardware, identification tags, etc., and all appurtenances to construct a junction can plaza with four light bases in accordance with the Contract Documents and to the satisfaction of the RPR.~~

~~**Item L-125-1 L-861T(L) Omnidirectional, Blue, LED, Taxiway Edge Light (T) -per Each (EA)**~~

~~L-861T(L), Omni-directional, blue, LED, MITL T/W edge light, column mounted on a L-867B/D deep light base with a "corten" or accepted equivalent base plate with gasket and properly sized L-830 transformer, L-823 connectors, and all incidentals. Align and level as required. The overall height shall be 14".~~

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

ITEM T-904
SODDING

ITEM T-904, "SODDING" is a technical specification contained in Federal Aviation Administration Advisory Circular – 150/5370-10H, "Standard Specifications for Construction of Airports."

This item has been modified to make allowances for local materials, methods and requirements. This item has been updated and modified to comply with the latest editions of other applicable codes, from knowledge gained on other airport construction projects and valuable lessons learned from airport maintenance staffs.

Deletions are noted by the ~~striketrough~~ method.

Changes and additions are noted by the ***bold italic*** method.

**ITEM T-904
SODDING**

DESCRIPTION

904-1.1 This item shall consist of furnishing, hauling, and placing approved live sod on prepared areas in accordance with this specification at the locations shown on the plans or as directed by the RPR.

MATERIALS

904-2.1 Sod. Sod furnished by the Contractor shall have a good cover of living or growing grass. This shall be interpreted to include grass that is seasonally dormant during the cold or dry seasons and capable of renewing growth after the dormant period. All sod shall be obtained from areas where the soil is reasonably fertile and contains a high percentage of loamy topsoil. Sod shall be cut or stripped from living, thickly matted turf relatively free of weeds or other undesirable foreign plants, large stones, roots, or other materials that might be detrimental to the development of the sod or to future maintenance. At least 70% of the plants in the cut sod shall be composed of the species stated in the special provisions, and any vegetation more than 6 inches (150 mm) in height shall be mowed to a height of 3 inches (75 mm) or less before sod is lifted. Sod, including the soil containing the roots and the plant growth showing above, shall be cut uniformly to a thickness not less than that stated in the special provisions.

904-2.2 Lime. Not required.

904-2.3 Fertilizer Not required

904-2.4 Water. The water shall be sufficiently free from oil, acid, alkali, salt, or other harmful materials that would inhibit the growth of grass.

904-2.5 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

904-3.1 General. Areas to be solid, strip, or spot sodded shall be shown on the plans. Areas requiring special ground surface preparation such as tilling and those areas in a satisfactory condition that are to remain undisturbed shall also be shown on the plans.

Suitable equipment necessary for proper preparation of the ground surface and for the handling and placing of all required materials shall be on hand, in good condition, and shall be approved by the RPR before the various operations are started. The Contractor shall demonstrate to the RPR before starting the various operations that the application of required materials will be made at the specified rates.

904-3.2 Preparing the ground surface. After grading of areas has been completed and before applying fertilizer and limestone, areas to be sodded shall be raked or otherwise cleared of stones larger than 2 inches (50 mm) in any diameter, sticks, stumps, and other debris which might interfere with sodding, growth of grasses, or subsequent maintenance of grass-covered areas. If any damage by erosion or other causes occurs after grading of areas and before beginning the application of fertilizer and ground

limestone, the Contractor shall repair such damage. This may include filling gullies, smoothing irregularities, and repairing other incidental damage.

904-3.3 Applying fertilizer and ground limestone. Following ground surface preparation, fertilizer shall be uniformly spread at a rate which will provide not less than the minimum quantity of each fertilizer ingredient, as stated in the special provisions. If use of ground limestone is required, it shall then be spread at a rate that will provide not less than the minimum quantity stated in the special provisions. These materials shall be incorporated into the soil to a depth of not less than 2 inches (50 mm) by discing, raking, or other suitable methods. Any stones larger than 2 inches (50 mm) in any diameter, large clods, roots, and other litter brought to the surface by this operation shall be removed.

904-3.4 Obtaining and delivering sod. After inspection and approval of the source of sod by the RPR, the sod shall be cut with approved sod cutters to such a thickness that after it has been transported and placed on the prepared bed, but before it has been compacted, it shall have a uniform thickness of not less than 2 inches (50 mm). Sod sections or strips shall be cut in uniform widths, not less than 10 inches (250 mm), and in lengths of not less than 18 inches (0.5 m), but of such length as may be readily lifted without breaking, tearing, or loss of soil. Where strips are required, the sod must be rolled without damage with the grass folded inside. The Contractor may be required to mow high grass before cutting sod.

The sod shall be transplanted within 24 hours from the time it is stripped unless circumstances beyond the Contractor's control make storing necessary. In such cases, sod shall be stacked, kept moist, and protected from exposure to the air and sun and shall be kept from freezing. Sod shall be cut and moved only when the soil moisture conditions are such that favorable results can be expected. Where the soil is too dry, approval to cut sod may be granted only after it has been watered sufficiently to moisten the soil to the depth the sod is to be cut.

904-3.5 Laying sod. Sodding shall be performed only during the seasons when satisfactory results can be expected. Frozen sod shall not be used, and sod shall not be placed upon frozen soil. Sod may be transplanted during periods of drought with the approval of the RPR, provided the sod bed is watered to moisten the soil to a depth of at least 4 inches (100 mm) immediately prior to laying the sod.

The sod shall be moist and shall be placed on a moist earth bed. Pitch forks shall not be used to handle sod, and dumping from vehicles shall not be permitted. The sod shall be carefully placed by hand, edge to edge and with staggered joints, in rows at right angles to the slopes, commencing at the base of the area to be sodded and working upward. The sod shall immediately be pressed firmly into contact with the sod bed by tamping or rolling with approved equipment to provide a true and even surface and ensure knitting without displacement of the sod or deformation of the surfaces of sodded areas. Where the sod may be displaced during sodding operations, the workmen, when replacing it, shall work from ladders or treaded planks to prevent further displacement. Screened soil of good quality shall be used to fill all cracks between sods. The quantity of the fill soil shall not cause smothering of the grass. Where the grades are such that the flow of water will be from paved surfaces across sodded areas, the surface of the soil in the sod after compaction shall be set approximately one inch (25 mm) below the pavement edge. Where the flow will be over the sodded areas and onto the paved surfaces around manholes and inlets, the surface of the soil in the sod after compaction shall be placed flush with pavement edges.

On slopes steeper than one (1) vertical to 2-1/2 horizontal and in v-shaped or flat-bottom ditches or gutters, the sod shall be pegged with wooden pegs not less than 12 inches (300 mm) in length and have a cross-

sectional area of not less than 3/4 sq inch (18 sq mm). The pegs shall be driven flush with the surface of the sod.

904-3.6 Watering. Adequate water and watering equipment must be on hand before sodding begins, and sod shall be kept moist until it has become established and its continued growth assured. In all cases, watering shall be done in a manner that will avoid erosion from the application of excessive quantities and will avoid damage to the finished surface.

904-3.7 Establishing turf. The Contractor shall provide general care for the sodded areas as soon as the sod has been laid and shall continue until final inspection and acceptance of the work. All sodded areas shall be protected against traffic or other use by warning signs or barricades approved by the RPR. The Contractor shall mow the sodded areas with approved mowing equipment, depending upon climatic and growth conditions and the needs for mowing specific areas. Weeds or other undesirable vegetation shall be mowed and the clippings raked and removed from the area.

904-3.8 Repairing. When the surface has become gullied or otherwise damaged during the period covered by this contract, the affected areas shall be repaired to re-establish the grade and the condition of the soil, as directed by the RPR, and shall then be sodded as specified in paragraph 904-3.5.

METHOD OF MEASUREMENT

904-4.1 This item shall be measured based on the area in square yards (square meters) of the surface covered with sod and accepted.

BASIS OF PAYMENT

904-5.1 This item will be paid for on the basis of the contract unit price per square yard (square meter) for sodding, which price shall be full compensation for all labor, equipment, material, staking, and incidentals necessary to satisfactorily complete the items as specified.

Payment will be made under:

Item T-904-1	Sodding, Bahia Argentina	-per Square Yard (SY)

REFERENCES

905-6.1 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

Advisory Circulars (AC)

AC 150/5200-33	Hazardous Wildlife Attractants on or Near Airports

FAA/United States Department of Agriculture

Wildlife Hazard Management at Airports, A Manual for Airport Personnel

END OF ITEM T-904

ITEM T-905
TOPSOIL

ITEM T-905, "TOPSOIL" is a technical specification contained in Federal Aviation Administration Advisory Circular – 150/5370-10H, "Standard Specifications for Construction of Airports."

This item has been modified to make allowances for local materials, methods and requirements. This item has been updated and modified to comply with the latest editions of other applicable codes, from knowledge gained on other airport construction projects and valuable lessons learned from airport maintenance staffs.

Deletions are noted by the ~~striketrough~~ method.

Changes and additions are noted by the ***bold italic*** method.

**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 μ 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 re-handled 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 re-handled 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 turving 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 cubic 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.~~

No separate payment shall be made for Topsoil. Payment for this item shall be incidental to Sodding.

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 cubic yard (cubic meter)~~

REFERENCES

905-6.1 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 mm (No. 200) Sieve in Mineral Aggregates by Washing

Advisory Circulars (AC)

AC 150/5200-33 Hazardous Wildlife Attractants on or Near Airports

FAA/United States Department of Agriculture

Wildlife Hazard Management at Airports, A Manual for Airport Personnel

END OF ITEM T-905

Appendix A



U.S. Department
of Transportation

Federal Aviation
Administration

Advisory Circular

Subject: Painting, Marking, and Lighting of
Vehicles Used on an Airport

Date: April 1, 2010

AC No: AC 150/5210-5D

Initiated by: AAS-100

Change:

1. **PURPOSE.** This advisory circular (AC) provides guidance, specifications, and standards for painting, marking, and lighting of vehicles operating in the airport air operations area (AOA). The approved lights, colors, and markings herein assure the conspicuity of vehicles operating in the AOA from both the ground and the air.

2. **CANCELLATION.** This AC cancels AC 150/5210-5C, Painting, Marking, and Lighting of Vehicles Used on an Airport, dated August 31, 2007.

3. **APPLICATION.** The Federal Aviation Administration (FAA) recommends the guidelines and standards in this Advisory Circular for vehicles operating in the airport AOA. In general, use of this AC is not mandatory. *However*, use of this AC is mandatory for vehicles funded with federal grant monies through the Airport Improvement Program (AIP) and/or with revenue from the Passenger Facility Charges (PFC) Program. See Grant Assurance No. 34, "Policies, Standards, and Specifications," and PFC Assurance No. 9, "Standard and Specifications."

Vehicles covered by this AC that do not meet this standard may be used until the vehicle is repainted or replaced, but no later than **December 31, 2010**.

4. **PRINCIPAL CHANGES.** This AC contains new specifications and recommendations for the painting, marking, and lighting of Towbarless Tow Vehicles (TLTVs).

5. **METRIC UNITS.** To promote an orderly transition to metric units, this AC includes both English and metric dimensions. The metric conversions may not be exact equivalents, and until there is an official changeover to the metric system, the English dimensions will govern.

6. **COMMENTS OR SUGGESTIONS** for improvements to this AC should be sent to:

Manager, Airport Engineering Division
Federal Aviation Administration
ATTN: AAS-100
800 Independence Avenue, S.W.
Washington, DC 20591

Michael J. O'Donnell
Director of Airport Safety and Standards

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PAINTING, MARKING, AND LIGHTING OF VEHICLES USED ON AN AIRPORT

1. SOURCES OF APPLICABLE DOCUMENTS.

- a.** American National Standards Institute, Inc. (ANSI), 25 West 43rd St. 4th Floor, New York, NY 10036. Website: **www.ansi.org**
- b.** American Society for Testing & Materials (ASTM), ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959. Website: **www.astm.org**
- c.** The National Fire Protection Association (NFPA), 1 Batterymarch Park, Quincy, Massachusetts 02169-7471. Website: **www.nfpa.org**
- d.** The U. S. General Services Administration (GSA), Centralized Mailing List Services, 501 West Felix Street, Whse 9, South End P.O. Box 6477, Fort Worth, Texas 76115-6477. Website: **www.gsa.gov**
- e.** The Superintendent of Documents, U.S. Government Printing Office, 732 North Capitol St. NW, Washington, DC 20401.
- f.** Society of Automotive Engineers, Inc. (SAE), 400 Commonwealth Drive, Warrendale, PA 15096-0001. Website: **www.sae.org**
- g.** FAA Advisory Circulars: U.S. Department of Transportation, Subsequent Distribution Office, Ardmore East Business Center, 3341 Q 75th Ave., Landover, MD 20785. Website: **www.faa.gov**
- h.** FAA Engineering Briefs: **www.faa.gov/airports/engineering/engineering_briefs/**

2. DEFINITIONS. The following definitions apply in this AC:

- a. Vehicle** – All conveyances, except aircraft, used on the ground to transport persons, cargo, equipment or those required to perform maintenance, construction, service, and security duties.
- b. Air Operations Area (AOA)** – The portion of airport that encompasses the landing, take off, taxiing, and parking areas for aircraft.
- c. Airport Emergency Vehicles** – Vehicles that are authorized in the AOA for emergency purposes (e.g., ambulances, aircraft rescue and fire fighting (ARFF) vehicles and emergency response vehicles) as authorized by the airport traffic control tower (ATCT) or an authorized on-site accident/incident commander.
- d. Airport Operations Vehicles** – Vehicles routinely used by airport operations personnel for airport inspection and duties associated with airfield operations (such as airfield condition reporting and Incident Command) on the AOA and Movement Area.
- e. Airport Security Vehicles** – Vehicles that are authorized in the AOA for security purposes, as needed (e.g. police cars).

- f. Airfield Service Vehicles** – Vehicles that are routinely used in the AOA for airfield service, maintenance, or construction (e.g. snow blowers, snowplows, maintenance trucks, and tractors).
- g. Aircraft Support Vehicles** – Vehicles that are routinely used in the AOA to support aircraft operations (e.g. aircraft pushback tractors, baggage/cargo tractors or trucks, air conditioning and aviation fuel trucks). These vehicles are typically owned by airlines, vendors, or contractors and are not eligible for Federal funding.
- h. Reduced Visibility** – Prevailing visibility is less than one statute mile (1609 meters) and/or the runway visual range (RVR) is less than 6,000 feet (1830 meters).
- i. Movement Area** – The runways, taxiways, and other areas of an airport/heliport that are used for taxiing/hover taxiing, air taxiing, takeoff, and landing of aircraft, exclusive of loading ramps and parking areas. At those airports/heliports with an operating airport traffic control tower (ATCT), specific approval for entry onto the movement area must be obtained from air traffic control (ATC).
- j. Other Vehicles** – Vehicles that are not routinely authorized in the AOA (e.g. construction vehicles). These vehicles are typically owned by airlines, vendors, or contractors and are not eligible for Federal funding.
- k. Peak Intensity** – Peak intensity, for purposes of this document, means the maximum magnitude of luminescence as measured in candela.
- l. Towbarless Tow Vehicle (TLTV)** – a type of aircraft support vehicle whose main purpose is to tow aircraft in the AOA by way of nose gear capture.

3. VEHICLE PAINTING.

NOTE: *Airport vehicle paint and markings are a safety of flight requirement. The approved colors/markings herein assure conspicuity of vehicles operating in the AOA from both the ground and air.*

a. Airport Emergency Vehicles.

(1) Ambulances. Ambulance vehicles are painted per the most current version of Federal Specification KKK-A-1822, *Federal Specification for the Star-of-Life Ambulance*. Ambulances are not considered vehicles routinely operating on the AOA.

(2) Aircraft Rescue and Fire Fighting (ARFF) Vehicles. Yellowish-green is the vehicle color standard. Color specifications are per Appendix A.

NOTE: *A yellowish-green color provides optimum visibility during all light levels encountered during a 24-hour day and under variations of light that result from weather and seasonal changes.*

b. Airport Operations Vehicles. Airport operations vehicles may be painted in colors designated by the airport operator. The characteristics must be coordinated with the respective ATCT and identified in the tower letter of agreement.

c. Airport Security Vehicles. Comply with specific state or local requirements.

d. Airfield Service Vehicles. Chrome yellow is the vehicle color standard. Color specifications are per Appendix A. When vehicles are equipped with bumper bars 8 inches (200 mm) or more in depth, the bars must be painted in alternate stripes 4 inches (100 mm) in width of chrome yellow and black inclined 45° to the vertical.

e. Aircraft Support Vehicles.

(1) Any color or combination of colors other than yellowish-green or chrome yellow. The bumper bar paint scheme in paragraph 3.d (of alternating chrome yellow and black stripe) is recommended.

(2) **TLTVs.** International orange is the vehicle color standard. Retroreflective tape covering more than 25 percent of the vehicle's vertical surfaces may be used as a temporary measure to meet this standard prior to scheduled vehicle painting.

f. Other Vehicles. Any color or combination of colors other than solid black or white.

4. VEHICLE MARKING.

a. Airport Emergency Vehicles.

(1) **Ambulances.** Ambulances are marked per the most current version of Federal Specification KKK-A-1822.

(2) **ARFF Vehicles.** Emergency rescue and fire fighting vehicles are marked with the letters "ARFF," "Fire," or "Rescue" and in accordance with 4.c.(1)-(5) of this AC.

b. Airport Operations Vehicles. Airport operations vehicles may be marked as designated by the airport operator. Marking must be coordinated with the respective ATCT and identified in the tower letter of agreement.

c. Airfield Service Vehicles and Aircraft Support Vehicles.

(1) Airport operator owned vehicles must display an identification number on each side and on the roof (the hood should be used if the vehicle has no roof).

(2) Side numbers will be a minimum of 16 inches (410 mm) in height and conspicuously located.

(3) Roof numbers will be a minimum of 24 inches (610 mm) in height and affixed with their bases toward the front of the vehicle. The identification numbers should provide sharp color contrast to the vehicle color.

(4) In addition to the identification numbers, airport operator-owned vehicles must display either the name of the airport and/or the airport insignia.

(5) To further improve night-time recognition of vehicles, a minimum 8 inch (200 mm) wide horizontal band of high gloss white paint or white reflective tape (Retroreflective, ASTM-D 4956-09, *Standard Specification for Retroreflective Sheeting for Traffic Control*, Type III & above) must be used around the vehicle's surface. Figures 1, 2, and 3 show suggested locations for the horizontal reflective band.

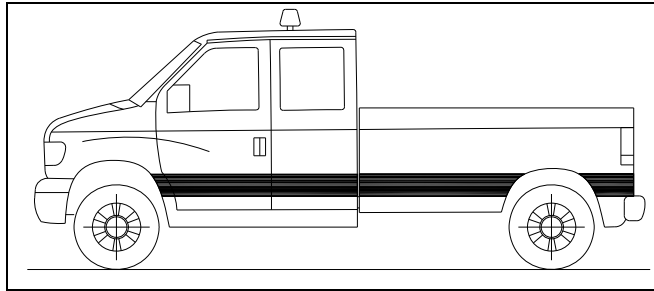


Figure 1: Suggested location for the horizontal reflective band, Option 1

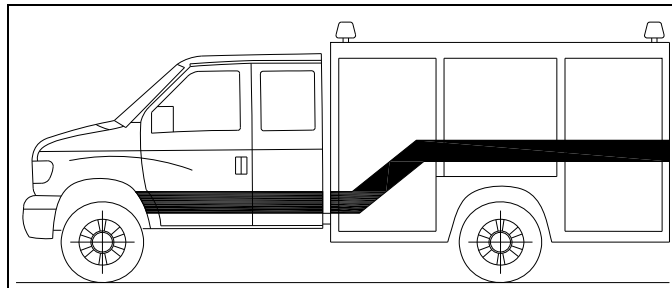


Figure 2: Suggested location for the horizontal reflective band, Option 2

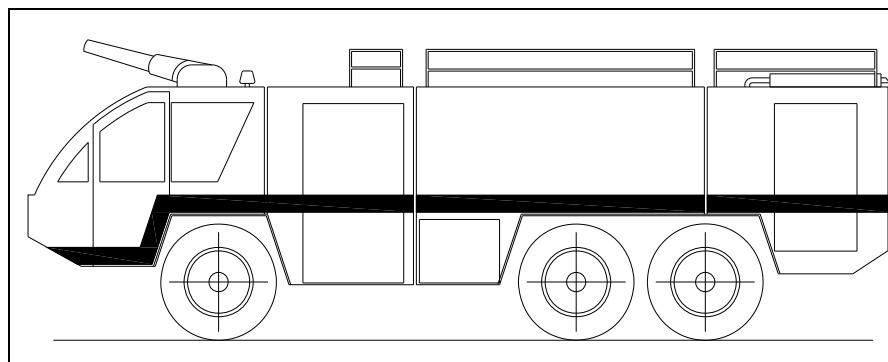


Figure 3: Suggested location for the horizontal reflective band, Option 3

(6) TLTVs. Retroreflective tape is used to outline the shape of a TLTV. If the vertical edge of the vehicle is rounded, the tape should be placed on the rounded portion to reflect light in both the horizontal and vertical planes. Where the placement of the tape may interfere with, or may be worn down by, maintenance or operational activities, tape is not required. Suggested locations for the retroreflective bands are shown in Figure 4.

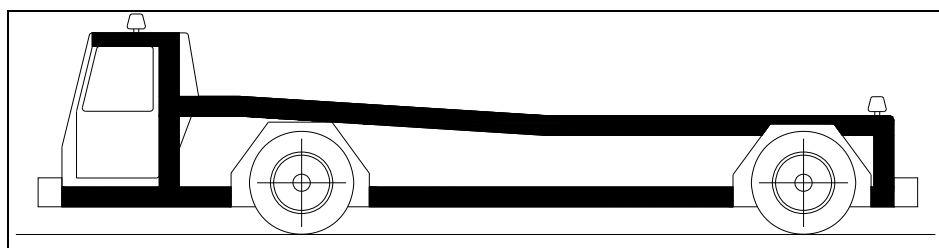


Figure 4: Suggested placement of retroreflective tape on a TLTV

d. Airport Security and Other Vehicles.

- (1) Vehicles other than those that routinely traverse any portion of the AOA under the control of ATC, which are not escorted by a vehicle in constant two-way radio communication with ATC and properly equipped and authorized to operate in the AOA, must be provided with a flag on a staff attached to the vehicle so that the flag will be readily visible.
- (2) At airports without air traffic control facilities, flags must be provided on all vehicles.
- (3) The flag must be at least a 3-foot by 3-foot (0.9 meter by 0.9 meter) square having a checkered pattern of international orange and white squares at least 1 foot (300 mm) on each side (see Appendix A for the fabric color specification).

5. VEHICLE LIGHTING.

a. Airfield Service, Aircraft Support, and Airport Operations Vehicles.

- (1) The standard for identification lighting is a yellow flashing light that is mounted on the uppermost part of the vehicle structure. A steady yellow light designates vehicles limited to non-movement areas.
- (2) The light must be visible from any direction, day and night, including from the air.
- (3) Color specifications for vehicle identification lights are per Appendix B.
- (4) **TLTVs.** An LED light bar placed above the operator's cab may be used in place of the rotating yellow flashing light. In addition, a yellow flashing light (of any type) must be installed on the upper left-rear and right-rear corners of the TLTV, and must be activated when an aircraft is in tow. The size of the rear flashing lights must be large enough to meet the requirements of Section 5.c, but not so large as to interfere with the normal or towing operations of the TLTV.

b. Airport Emergency, Security, and Other Vehicles, which are not escorted by a properly lighted vehicle, must be identified during periods of low visibility by a light.

c. Characteristics of Flashing Lights:

- (1) Ambulance lights must meet the specifications in the most current version of Federal Specification KKK-A-1822, and ARFF vehicles must meet NFPA, state, and local requirements.
- (2) Lights must have peak intensity within the range of 40 to 400 candelas (effective) from 0° (horizontal) up to 10° above the horizontal and for 360° horizontally. The upper limit of 400 candelas (effective) is necessary to avoid damage to night vision.
- (3) From 10° to 15° above the horizontal plane, the light output must be 1/10th of peak intensity or between 4 and 40 candelas (effective).

- (4) Lights must flash at 75 ± 15 flashes per minute.

NOTES:

1. *The effective intensity of a flashing light is equal to the intensity of a steady-burning (fixed) light of the same color that produces the same visual range under identical conditions of observation.*
2. *If xenon flashtubes are used, refer to AC 150/5345-43, Specification for Obstruction Lighting Equipment, for guidance concerning methods of calculating effective intensity.*

d. Light Colors.

(1) Airport Emergency Vehicles.

(a) **Ambulances.** Per the most current version of Federal Specification KKK-A-1822.

(b) **ARFF Vehicles.** Red or a combination of red-and-white flashing lights per the chromaticity requirements in Appendix B.

(2) Airport Security Vehicles. Signal blue or a combination of red and signal blue flashing light per the chromaticity requirements in Appendix B.

(3) Airfield Service, Aircraft Support, Airport Operations, and Other Vehicles. Yellow flashing light per the chromaticity requirements in Appendix B.

APPENDIX A. COLOR SPECIFICATIONS

A-1. SPECIFICATIONS. Colors specified in Table A-1 are per the Commission Internationale de l'Eclairage (CIE) L*a*b* system of color specification. For a description of this system, refer to American Society for Testing & Materials (ASTM) D 2244, *Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates*.

Table A-1. Specification for vehicle and flag colors

Standard Illuminant D65 Usage	Chrome Yellow			Yellowish-Green			International Orange		
	Vehicle Paint			Vehicle Paint			Vehicle Paint / Flag Fabric		
CIELAB DATA	L*	a*	b*	L*	a*	b*	L*	a*	b*
Centroid Color	72.8	24.4	77.6	78.3	-10.2	80.4	45.0	53.5	52.0
Point 1	72.8	31.8	82.9	78.3	-9.0	92.0	45.0	61.4	47.8
Point 2	72.8	25.5	66.7	78.3	-7.6	73.2	45.0	53.9	41.4
Point 3	72.8	18.0	69.3	78.3	-11.0	69.3	45.0	53.5	53.4
Point 4	72.8	22.4	86.0	78.3	-13.4	86.2	45.0	49.7	60.4
Light Limit	77.8			83.3			49.9		
Dark Limit	67.8			73.3			41.6		
Max ΔE	11.1			11.7			10.7		

A-2. COLOR TESTS. Acceptable colors are those that meet the gloss rating test and either a visual or an instrumental color test as follows:

NOTE: *Flag fabric colors must meet either the instrumental tests in Table A-1 or the visual method described in paragraph A-2b(1).*

a. Gloss Rating Test. This test is performed per ASTM D 523, *Standard Test Method for Specular Gloss*, on a paint sample of the color to be applied on the vehicle. An acceptable color sample is high gloss with a minimum gloss rating of 70 units, for 60° geometry.

b. Color Test Methods:

(1) Visual. Prepare a master specimen of the color (per Table A-1) and gloss (per paragraph A-2a). This specimen will be the master color and be used as the basis of comparison per ASTM D 5531-05, *Standard Guide for the Preparation, Maintenance, and Distribution of Physical Product Standards for Color and Geometric Appearance of Coatings*. To verify the paint color of a vehicle visually, vehicle paint samples must be

prepared and viewed per ASTM D 1729-96 (Reapproved 2009), *Standard Practice for Visual Appraisal of Colors and Color Differences of Diffusely-Illuminated Opaque Materials*.

(2) Instrumental. This test requires a test specimen sample and reference to Table A-1. All test specimen measurements should be conducted per ASTM E 1164-09a *Standard Practice for Obtaining Spectrometric Data for Object-Color Evaluation*. Test specimen tolerances must be per Table A-1 per the following:

(a) Plot the centroid color using the a^* and b^* CIELAB coordinate data from Table A-1 on graph paper or by entry of the coordinate data into a computer program. Plot and connect points 1 through 4 from the same table to form a quadrilateral; noting that the centroid color is within this figure. See Figure A-1 for plots of all three color specifications in Table A-1.

(b) Perform color sample measurements per ASTM E 1164-09a. If necessary, convert measurements to CIELAB L^* , a^* , and b^* color space. See ASTM E 308-08, *Standard Practice for Computing the Colors of Objects by Using the CIE System*, for color space conversion formulae.

(c) An acceptable color is one that meets:

(i) the chromaticity requirements of the color samples a^* and b^* CIELAB coordinate data by falling within the quadrilateral;

(ii) the L^* data lightness requirement by falling within the range defined by the light and dark data of Table A-1;

(iii) the total color difference (ΔE) by not exceeding the limits in Table A-1 when the CIELAB data are computed in the following formula:

$$\Delta E = (\Delta L^{*2} + \Delta a^{*2} + \Delta b^{*2})^{\frac{1}{2}}$$

where ΔL^* , Δa^* , and Δb^* values are the differences between those values for the centroid color in Table A-1 and those of the color sample measurements.

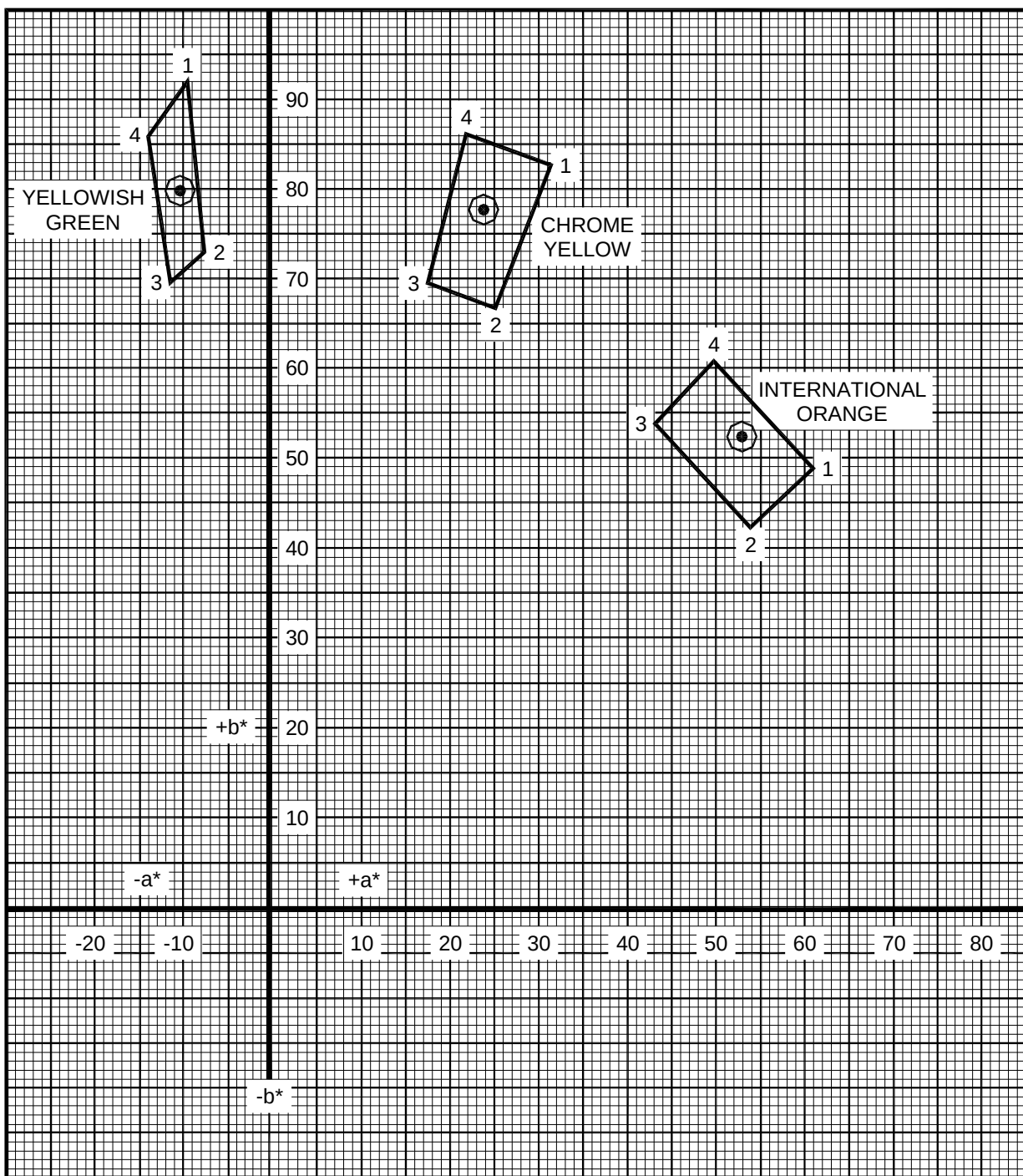


Figure A-1. Plot of selected color paint specifications

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APPENDIX B. COLOR SPECIFICATIONS FOR VEHICLE IDENTIFICATION LIGHTS

B-1. SPECIFICATIONS. The Society of Automotive Engineers (SAE) Standard J578 Revised December 2006, *Color Specification*, defines the acceptable color boundary limits and measurement of emitted red, white, signal blue, and yellow light for vehicle lights. This standard applies to the overall emitted color of light from the device in lieu of emitted light from any small area of the lens. The color of emitted light must fall within the color boundaries per SAE J578 Revised December 2006 (color boundary equations are in the standard) using color measurement methods detailed in the standard. See FAA Engineering Brief #67, Light Sources Other Than Incandescent and Xenon for Airport and Obstruction Lighting Fixtures, for additional information and Alternative Lighting Devices.

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Appendix B



U.S. Department
of Transportation
**Federal Aviation
Administration**

Advisory Circular

**Subject: AIRPORT SAFETY
SELF-INSPECTION**

Date: 04/23/04

AC No: 150/5200-18C

Initiated by: AAS-300

Change:

1. PURPOSE. This Advisory Circular (AC) provides information to airport operators on airport self-inspection programs and identifies items that airport operators should include in such a program.

2. FOCUS. Development of a self-inspection program in accordance with this AC represents an acceptable means of compliance with the 14 Code of Federal Regulations (CFR) Part 139 (Part 139) requirements.

3. CANCELLATION. Advisory Circular 150/5200-18B, Airport Safety Self-Inspection, dated 5/2/88, is cancelled.

4. RELATED READING MATERIAL.

a. 14 CFR Part 139, Certification of Airports. While Part 139 requirements are mandatory for a holder of a Part 139 Airport Operating Certificate, the regulation contains many safety practices that the Federal Aviation Administration recommends for use at all airports.

b. 14 CFR Part 77, Objects Affecting Navigable Airspace.

c. Current editions of the following advisory circulars:

- (1)** AC 150/5200-33, Hazardous Wildlife Attractants on or near Airports
- (2)** AC 150/5210-21, Airport Certification Manual (ACM). This reference is pertinent for certificated airports only.
- (3)** AC 150/5210-20, Ground Vehicle Operations on Airports.
- (4)** AC 150/5200-28, Notices to Airmen (NOTAMs) for Airport Operators.
- (5)** AC 150/5200-30, Airport Winter Safety and Operations.
- (6)** AC 150/5210-5, Painting, Marking, and Lighting of Vehicles Used on an Airport.
- (7)** AC 150/5230-4, Aircraft Fuel Storage, Handling, and Dispensing on Airports.
- (8)** AC 150/5300-13, Airport Design.
- (9)** AC 150/5340-1, Standards for Airport Markings.
- (10)** AC 150/5340-18, Standards for Airport Sign Systems.
- (11)** AC 150/5340-21, Airport Miscellaneous Lighting Visual Aids.
- (12)** AC 150/5340-24, Runway and Taxiway Edge Lighting System.

- (13) AC 150/5340-26, Maintenance of Airport Visual Aid Facilities.
- (14) AC 150/5370-2, Operational Safety on Airports During Construction.
- (15) AC 150/5370-10, Standards for Specifying Construction of Airports.

d. Obtain the latest version of the free Advisory Circular publications from the FAA on its Web site at www.faa.gov/arp/. In addition, these ACs are available by contacting the U.S. Department of Transportation, Subsequent Distribution Office, SVC-121.23, Ardmore East Business Center, 3341 Q 75th Avenue, Landover, MD 20785. All FAA ACs are listed in the Advisory Circular Checklist, AC 00-2.1, which is available on the internet. The Checklist also explains how to obtain the circulars.

5. BACKGROUND.

a. While some hazardous airport conditions develop virtually instantaneously, others are gradual. It is important that the airport operator have an airport safety self-inspection program that monitors specific airport conditions in order to identify unsatisfactory conditions for prompt corrective actions. A number of airport operators have some form of a safety self-inspection program. The programs vary in scope and effectiveness from verbal instructions and unscheduled and unrecorded inspections to very comprehensive inspection programs with multiple daily schedules and widely distributed responsibilities.

b. At airports certificated under 14 CFR Part 139, the self-inspection program is a key component of an airport operator's airport certification program and required under §139.327. An effective self-inspection program enables an airport operator to operate in compliance to Part 139 standards on a day-to-day basis. In accordance with Part 139, all airports must have an Airport Operating Certificate if serving—

(1) Scheduled or unscheduled passenger operations of an air carrier with aircraft having a seating capacity of more than 30 passengers, or

(2) Scheduled passenger operations with aircraft having a seating capacity of more than 9 and less than 31 passengers.¹

One of the requirements of Part 139 is that the operator of each certificated airport regularly conduct a daily safety self-inspection to ensure that prompt corrective action is taken to eliminate unsafe conditions on the airport. The specific requirements of the self-inspection program at each certificated airport are addressed in the airport certification manual.

c. This AC suggests components, responsibilities, and items for regularly scheduled, continuous surveillance, periodic condition and special inspections, and checklists for use during any of these airport safety self-inspections. This guidance can be modified as necessary to meet local situations. The information and guidance in this publication serve as a basis by which airports operators may develop their own safety self-inspection programs.

6. RESPONSIBILITIES.

a. **Safety Self-Inspection.** Self-inspection is a primary responsibility of the airport owner, operator, or a duly authorized representative. It is customary to assign the job of assuring overall airport ground safety to the airport manager or operations supervisor. Primary attention should be given to such operational items as pavement areas, safety areas, markings, signs, lighting, aircraft rescue and fire fighting, fueling operations, navigational aids, ground vehicles, obstructions, public protection, wildlife

¹ Part 139 is only applicable in the State of Alaska to airport operators serving scheduled or unscheduled passenger operations of an air carrier with aircraft having a seating capacity of more than 30 passengers.

hazard management, construction, and snow and ice control. Inspection of areas that have been assigned to individual air carriers, fixed base operators, or other tenants can be made the responsibility of the user. However, at Part 139 airports, the FAA will hold the certificate holder ultimately responsible for operating the airport safely.

b. Recommended Inspection Frequency.

(1) **Regularly scheduled inspection.** The airport should be inspected at least daily during times when aircraft activity is minimal in order to create the least impact on airport operations. Part of this inspection should be done during the hours of darkness at those airports that serve air carriers after dark.

(2) **Continuous surveillance inspection.** Those activities and facilities that have been identified to require continuous surveillance should be inspected any time personnel are in the air operations area. Hazardous conditions can occur at any time and in a short period of time.

(3) **Periodic condition inspection.** Periodic condition inspection of activities and facilities can be conducted on a regularly scheduled basis but less frequently than daily. The time interval could be weekly, monthly, or quarterly, depending on the activity or facility.

(4) **Special inspection.** Special inspections of activities and facilities should be conducted after receipt of a complaint or when an unusual condition or unusual event occurs on the airport, such as a significant meteorological event or an accident or incident. Special inspections should also be conducted at the end of construction activity to ensure that there are no unsafe conditions present related to the construction activity. A special inspection should be conducted prior to construction personnel leaving the airport in the event that corrective actions are necessary. Special inspections should be documented on the appropriate portions of the regularly scheduled inspection checklist.

c. Inspection Records. An effective safety self-inspection program includes procedures for reporting and correcting deficiencies. This means that the airport operator should have a work order system in place so that deficiencies can be corrected in an expeditious manner.

(1) The operator should issue a Notice to Airmen (NOTAM), as appropriate, through the appropriate Flight Service Station (FSS) reporting deficient conditions that could have an immediate and critical impact on the safety of aircraft operations. When corrective actions have been taken, the NOTAM should be cancelled. At Part 139 airports, other similar systems and procedures may be used if approved by the FAA.

(2) For even the smallest airport, it is desirable to use a safety self-inspection checklist that constitutes a written record of conditions noted, and acts as a check on follow-up actions taken. The scheduled use of a dated checklist will assure the regularity and thoroughness of safety inspections and follow-up. The checklist can be an important administrative tool for airport management. It can provide a snapshot of the condition of the airport, indicating trends, defining problem areas, indicating systems that are beginning to deteriorate and helping to define budgetary requirements. It is most desirable to use a format (see examples, Appendices 1–5) in which each inspected area of the airport complex is positively noted. Retain the checklist until indicated actions are completed. Airports certificated under Part 139 must retain the regularly scheduled inspection checklist for 12 months. Airports may use additional, specialized materials and forms, such as maintenance work orders, NOTAMs, fire station and first aid reports, etc. Some airport operators use computerized versions specifically designed to meet their self-inspection requirements. There are several vendors that have developed these computer programs that can use laptops and Personal Data Assistants (PDAs). However, the regularly scheduled inspection checklist should be the basic log documenting that safety inspection responsibilities are being met.

d. Follow-up. The airport operator should follow up on complaints or requests for corrective action and on all deficient items or problem areas noted during the daily inspection. Determine which problems

require immediate attention and treat those with highest priority, including developing appropriate NOTAM notification.

7. INSPECTION TECHNIQUES.

Inspectors should vary the pattern of the inspection. Fixed inspection patterns, while easy to learn, do not provide for an adequate inspection. The use of such fixed inspection patterns can lead to complacency and to the possibility of missing items that are in need of correction. When conducting an inspection on a runway and when there is time to do only one pass on that runway, inspection personnel, whenever practical, should drive towards the direction of landing aircraft with high intensity flashing beacon and headlights on day and night. This practice will enable self-inspection personnel to see approaching aircraft and improve visibility of the vehicle to pilots. However, it is recommended that a runway inspection be done in both directions. Inspection personnel should also drive the stub taxiways between the runway and parallel taxiway as these areas are commonly overlooked.

8. KNOWLEDGE AND EQUIPMENT FOR SELF-INSPECTION.

a. Airport personnel who conduct safety self-inspections (referred to as inspectors in this AC) should receive training in at least the following areas:

b. Inspectors should know the location and types of airport facilities, airport rules and regulations and, at Part 139 airports, be familiar with the FAA-approved Airport Certification Manual.

- (1)** Airport familiarization, including airport signs, marking, and lighting;
- (2)** Airport Emergency Plan (if the airport has one);
- (3)** Notice to Airmen (NOTAM) notification procedures;
- (4)** Procedures for pedestrians and ground vehicles in movement areas and safety areas;
- (5)** Airport inspection procedures and techniques; and
- (6)** Discrepancy reporting procedures.

c. Inspectors should know the FAA Advisory Circular standards applicable to the airport and have access to copies for reference. Some applicable standards can be found in the FAA Advisory Circulars listed in paragraph 3c. (This is not an all-inclusive list.). They can also be found on the Internet at **www.faa.gov**.

d. Inspectors should have a vehicle equipped with:

(1) a two-way ground control radio capable of communicating with the Airport Traffic Control Tower on controlled airports and on the Common Traffic Advisory Frequency (CTAF) or UNICOM at uncontrolled airports (or at controlled airports when the tower is closed);

(2) a beacon for nighttime (or inclement weather conditions) inspections; and

(3) either a beacon or checkered flag for daytime inspections.

e. Inspectors should know and use correct radio communication phraseology, procedures and techniques, as specified in the Aeronautical Information Manual. If the airport operator uses airport police to do all or part of the self-inspection, the police should use aviation terminology and not 10-4 codes.

f. Inspectors should be supplied with checklists covering the various inspection areas (sample airport safety self-inspection checklists are contained in Appendices 1–5). While format of checklists vary, it is important to develop a checklist that is useful for the airport and its operation. If certain

inspectors will be responsible for only certain items, separate checklists pertinent to those areas may be developed. A sketch of the airport should accompany the checklist so that the location of problems can be marked for easy identification.

g. Inspectors should review the most recently completed checklist from the previous inspection cycle prior to beginning the inspection.

h. If construction is in progress, inspectors should be familiar with the safety plan for the project.

i. If the airport is certificated under Part 139, inspectors should be familiar with the airport certification manual requirements concerning training and self-inspection.

9. COMPONENTS OF A SAFETY SELF-INSPECTION PROGRAM. A successful safety self-inspection program has four components:

a. A regularly scheduled inspection of physical facilities (which must be conducted daily at airports certificated under Part 139 or in accordance with the FAA-approved airport certification manual). If the airport serves air carriers after dark, there should also be a nighttime inspection of lighting;

b. Continuous surveillance inspection of certain airport activities, such as fueling operations, construction, airfield maintenance;

c. A periodic condition inspection program for such things as surveying approach slopes, obstructions, etc.; and

d. Special condition inspections during unusual conditions or situations, such as changing weather or days of unusually high number of aircraft operations.

10. REGULARLY SCHEDULED INSPECTION.

The regularly scheduled inspection consists of specific observations of airport physical facilities on at least a daily basis. This inspection should concentrate on the areas described in this section, which are also included in Appendix 1. If deficiencies exist, the inspector should indicate the deficient item and identify its location on a airport sketch, providing dimensions and depths, as necessary. If appropriate, the inspector should take photographs to document the condition.

a. Pavement Areas. The condition of pavement surfaces is an important part of airport safety. Pavement inspection should be conducted daily before flight operations commence to ensure pavement surfaces are clear. As a minimum, a daily inspection should be performed of all paved areas that are the responsibility of the airport operator or as specified in the FAA-approved Airport Certification Manual. During the pavement inspection, the inspector should:

(1) Check the pavement lips—the area between full-strength pavement and shoulders or paved shoulders and safety areas—to assure that they are no greater than necessary to allow water to drain off the pavement. A lip height no greater than 1 1/2 inches is usually sufficient to allow proper drainage. (At airports certificated under Part 139, pavement lips shall not exceed 3 inches as stated in § 139.305.)

(2) Determine if there are any cracks wide enough to cause directional control problems for an aircraft. Report and monitor these cracks.

(3) Determine if there are any holes that could cause directional control problems for an aircraft. (At airports subject to Part 139, any hole that cannot be covered by a 5-inch circle, and the side slope at any point in the hole that exceeds 3 inches in depth and is 45 degrees or greater, is a discrepancy. If the hole cannot be covered by a 5-inch circle but the side slope at any point in the hole that exceeds 3

inches in depth or is less than 45 degrees, it may be a discrepancy if it is determined to be a surface variation that could impair directional control of an air carrier aircraft.)

(4) Check the condition of pavement areas for cracks, scaling, spalling, bumps, low spots, and for debris that could cause foreign object damage to aircraft.

(5) Check for vegetation growth along runway and taxiway edges that may impede drainage from the pavement surface.

(6) Check for vegetation growth in cracks.

(7) Report and monitor any cracks, holes, variations and vegetation that can cause loss of aircraft directional control or may cause pavement damage, including damaged caused by damming or ponding water.

b. Safety Areas. The inspector should know the dimensions of the runway and taxiway safety areas at the airport. At airports certificated under Part 139, the dimensions of the safety areas should be documented in the airport certification manual. During the safety area inspection, the inspector should:

(1) Determine if there are any hazardous ruts, depressions, humps or variations from the normal smooth surface.

(2) Check to ensure no object is located in a safety area, except objects that must be in the safety areas because of their functions (such as runway lights, signs, or navigational aids). These objects must be constructed on frangibly mounted structures of the lowest practical height. At Part 139 airports, the frangible point must be no higher than 3 inches above grade.

(3) Determine if the base for any equipment in safety areas is at grade level (especially during the winter thaw) and equipment and NAVAIDs mounted on frangible couplings.

(4) Check to ensure that manhole and handhole covers are at grade level and can support vehicles and aircraft. Check to ensure that mounts for light fixtures are at grade level.

(5) Check for surface variation and other damage caused by rodents or other animals.

(6) Report any objects that are not frangible or not at grade level. Also report extraneous equipment and objects, such construction equipment, and surface variations that would cause damage to an aircraft or impede emergency response vehicles. At airports certificated under Part 139, issue a NOTAM regarding objects in the safety area contrary to § 139.309 (see § 139.339)

c. Markings. Airport markings provide important information to pilots during takeoff, landing, and taxiing. To avoid confusion and disorientation, airport markings should be in compliance with FAA marking standards specified in AC 150/5340-1, Standards for Airport Markings. (Compliance with these standards is mandatory for operators of airports certificated under Part 139 and for airport operators that have accepted Federal funds for runway and taxiway construction/rehabilitation.) The inspector should know the appropriate markings required at the airport. During the marking inspection, the inspector should:

(1) Check markings for correct color-coding, peeling, blistering, chipping, fading, and obscurity due to rubber buildup.

(2) Check to see if all runway hold position markings are clearly visible.

(3) During and after construction projects, check new markings for compliance with FAA marking standards.

(4) If the markings have glass beads, check markings during periods of darkness to determine if the reflectivity of glass beads is adequate at night.

(5) Report and monitor any nonstandard marking or markings that are obscured, faded or deteriorating.

d. Signs. Signs provide important information to pilots while taxiing. To avoid pilot confusion and disorientation, airport signs should be in accordance with FAA sign standards specified in AC 150/5340-18, Standards for Airport Sign Systems. (Compliance with these standards is mandatory for operators of airports certificated under Part 139 and for airport operators that have accepted Federal funds for runway and taxiway construction/rehabilitation.) The inspector should know the appropriate sign standards and specifications at the airport and at a Part 139 certificated airport, ensure signs comply with the FAA-approved Sign Plan.

(1) Check signs to ensure they are easy to read, in accordance with color standards, retro-reflective, and that all lighted signs are working and not obscured by vegetation, dirt, snow, etc.

(2) Check signs to ensure they are frangibly mounted and concrete bases are properly maintained at grade level.

(3) Check to see that sign panels are not missing or damaged, that they have the correct legend and arrow orientation, and that they are not cracked or broken.

(4) During and after construction projects, check new signs for compliance to FAA sign standards and, at Part 139 airports, in accordance with the FAA-approved Sign Plan.

(5) During periods of darkness, check signs to ensure they are properly illuminated. Ensure mandatory instruction signs are illuminated with the associated runway lighting system. Check signs for correct operations; that they are on the correct circuits, they do not flicker and that they follow the intensity setting of the runway or taxiway lights.

(6) Report and monitor any nonstandard sign or any sign that is not functioning, is faded or damaged. At airports certificated under Part 139, issue a NOTAM regarding any malfunctioning holding position sign or ILS critical are sign, as specified under § 139.339

e. Lighting. At night and during periods of low visibility, lighting is important for safe airport operations. Lights come in different shapes, sizes, colors, and configurations and can be located either in the pavement or along its edges. Inspection of lighting is best accomplished during periods of darkness in order to evaluate lighting systems when they provide the primary visual aid for pilots. The inspection should concentrate on the lighting owned by the airport operator. However, the inspector should observe any lighting owned or operated by others and report any observed problems immediately to the appropriate responsible owner. During the lighting inspection, the inspector should:

(1) Check to ensure that the following are operable, if installed, and that vegetation or deposits of foreign material do not obscure the light fixture.

(i) Runway and taxiway edge lights;

(ii) Apron edge lights;

(iii) Runway centerline and touchdown zone lights;

(iv) Taxiway centerline lights or centerline reflectors;

(v) Runway threshold/end lights; and

(vi) Runway guard lights (both elevated and in-pavement, if installed).

(2) Check that the following are operable, if installed:

(i) Ramp lights and floodlights used in construction to ensure they are properly shielded);

- (ii) Obstruction lights; and
- (iii) Lighting in fuel storage areas.
- (3) Report all fixtures missing and lights that are not working or appear dim.
- (4) Report any missing or broken light fixture lenses.
- (5) Ensure that runway and taxiway lights and runway threshold lights are the proper color and are oriented correctly.
- (6) Check that lights function properly through the manual or radio control features, and that photocell controls function properly.
- (7) Check the lights for proper alignment, aiming and correct changes in intensity, for correct height, erosion around the bases and the height of frangibility.

f. Navigational Aids (NAVAIDs). The inspection of NAVAIDs should concentrate on the visual navigational aids owned by the airport operator. However, the inspector should observe any navigational aids owned or operated by others, such as the FAA, and report any observed problems immediately to the NAVAID owner. During the inspection of NAVAIDs, the inspector should:

- (1) Determine if the segmented circle is clear of vegetation and that it can be seen easily from the air.
- (2) Determine if the airport rotating beacon is visible and working properly.
- (3) Check the wind cone(s) to ensure that it swings freely, the cone fabric is not faded or frayed, and, if lighted, that all lights are operating.
- (4) Determine if the Runway End Lights (RENs, formerly known as Runway End Identifier Lights) are flashing in proper sequence and mounted on frangible couplings.
- (5) Check Visual Glide Slope Indicators (VASIs, PLASIs, or PAPIs) to ensure that their lights are working and mounted on frangible couplings.
- (6) Determine if the Approach Lighting systems are functioning properly.
- (7) Report and monitor any NAVAID that is malfunctioning, inoperable or misaligned, damaged or missing.

g. Obstructions. The inspection of obstructions should concentrate on a visual check of construction underway on or near the airport that could affect aircraft operations. This also includes checking for any vegetation, especially, trees, that may penetrate the Part 77 surfaces. During the inspection of obstructions, the inspector should:

- (1) Check to ensure that construction equipment, especially tall cranes being used at construction sites, are not an obstruction. If construction is found and thought to create an obstruction, the airport operator should determine if proper notification to FAA, such as is required through Part 77 or Airport Layout Plan review, has been provided.
- (2) Determine if obstructions are properly marked and lighted.
- (3) Direct any person proposing construction near a public-use airport meeting the notice requirements contained in Part 77, Objects Affecting Navigable Airspace, to the Air Traffic Division or Airports District Office immediately if their construction has not been reported to the FAA.
- (4) Report and monitor any obstruction light that is missing, inoperative or damaged, and any object that appears to be an obstruction and is not properly marked or lit.

h. Fueling Operations. The daily inspection on aircraft fueling operations should concentrate on a quick inspection for the most common problems concerning compliance with local fire safety codes at fuel storage areas and with mobile fuelers. The inspection should also include security, fire protection, general housekeeping, and fuel dispensing facilities and procedures. A more detailed fueling operation inspection should be scheduled quarterly (see Quarterly Fueling Operations under Periodic Condition Inspection). During the daily inspection of aircraft fueling operations, the inspector should:

- (1) Determine if the fueling operator is permitting any unsafe fueling practices or is in violation of local fire code, such as failure to bond aircraft with the mobile fuelers during fueling operations or fueling personnel smoking while fueling aircraft.
- (2) Check to ensure that the appropriate signs for the fuel farm are installed and that all gates are locked except when the facility is occupied by an authorized user.
- (3) Report and monitor any unsafe fueling practices and violation of local fire codes. At Part 139 airports, report any noncompliance with fuel fire safety procedures specified in the FAA-approved Airport Certification Manual.

i. Snow and Ice. The inspector should be familiar with the airport's snow and ice removal procedures and guidance provided in AC 150/5200-30, Airport Winter Safety and Operations. At Part 139 certificated airports, the inspector should be familiar with the airport's FAA-approved Snow and Ice Control Plan. During the snow and ice control inspection, the inspector should:

- (1) Determine if any lights and signs are obscured by snow or damaged by snow removal operations.
- (2) Check to ensure that snow banks and drifts next to the runway and taxiways provide clearance for aircraft wing tips, engines, and propellers.
- (3) Check to ensure that snow is not piled across the runway threshold or across runway/runway intersections.
- (4) Check to be sure that no foreign objects are left on the pavement from snow removal operations.
- (5) Check to ensure that snow removal operations have not blocked any taxiways or access routes dedicated for aircraft rescue and fire fighting equipment.
- (6) Check to ensure that snow is not accumulated or piled in the critical areas for electronic NAVAIDs.
- (7) Check for and report slippery pavement conditions in terms of either braking action or MU values. If a friction measurement device is available, issue the appropriate numbers obtained from the equipment. (Do not attempt to correlate friction measurement numbers with braking action reports.)
- (8) Report and monitor any snow and ice accumulation that has been missed by the snow and ice removal operation, and any dangerous condition created by such operations, such as obscured signs or lights. At airports certificated under Part 139, issue a NOTAM regarding snow, ice, slush or water on the movement area or loading ramps, and parking areas, as specified under § 139.339.

j. Construction. The inspector should be familiar with the airport's construction safety procedures and guidance provided in AC 150/5370-2, Operational Safety on Airports During Construction. At Part 139 certificated airports, the inspector should be familiar with the airport's FAA-approved Construction Safety Plan. During the construction inspection, the inspector should:

- (1) Determine if stockpiled material and construction materials are properly stored to keep them from being moved by wind, jet blast, or prop wash, and is not left in safety areas or movement area.

(2) Check all construction adjacent to movement areas to ensure areas are identified with conspicuous marking and lighting.

(3) Determine if construction equipment (such as bulldozers, cranes, etc.) are marked and lighted and parked clear of the safety areas.

(4) Ensure construction barricades are properly positioned to define the limits of construction and hazardous areas and, if barricades are lighted, check to ensure lights are working properly and are positioned correctly.

(5) Check to ensure that debris and foreign objects are continuously being picked up around construction areas.

(6) Check for open trenches in the safety areas or adjacent to movement areas.

(7) Check operation of lighting in areas adjacent to construction daily before the construction crews depart for the day. In particular, ensure that mandatory instruction signs remain lit with the associated runway lights, even on taxiways that have been closed for construction.

(8) Check NOTAMs daily during construction projects to ensure they accurately reflect the conditions on the airport.

(9) Verify that closed taxiways or runways are properly marked and lighted.

(10) Report and monitor any dangerous condition created by construction activity, including damage to signs, lights, markings and NAVAIDS or equipment and supplies left in movement areas and safety areas.

k. Aircraft Rescue and Fire Fighting. During the inspection of aircraft rescue and fire fighting (ARFF) capabilities, the inspector should:

(1) Check the status of ARFF response, including the availability of equipment, fire fighters and extinguishing agent. At Part 139 airports, ensure that such ARFF capabilities comply with the FAA-approved Airport Certification Manual and that the airport's ARFF Index is still appropriate for air carrier aircraft served.

(2) Ensure alarm and emergency notification communication systems are operable.

(3) Determine the adequacy of available fire extinguishing agents.

(4) Check for construction or maintenance activity on the movement area that could affect ARFF response routes. Ensure that the ARFF Department has been notified if construction or maintenance activity could affect emergency response routes.

(5) Report and monitor any ARFF vehicle, equipment or extinguishing agent that is not available or inoperative; any ARFF personnel that are not available; and any changes to aircraft that may require a change to ARFF capabilities. At Part 139 airports, notify the FAA if ARFF vehicles is inoperative and cannot be replaced immediately, as specified under § 139.319(g) and issue a NOTAM regarding non-availability of any rescue and firefighting capability, as specified under § 139.339.

l. Public Protection. During the public protection inspection, check gates, fencing, locks, and other safeguards are in place and functioning properly to prevent inadvertent entry to movement areas by unauthorized persons and vehicles and offer protection from jet blast. Report and monitor any safeguards that are damaged or missing. In accordance with the airport's security plan, report unauthorized persons or vehicles in the movement area (airports regulated by the Transportation Security Administration may have additional requirements for reporting and responding to unauthorized persons and vehicles).

m. Wildlife Hazard Management. During the wildlife hazard inspection, the inspector should check for evidence of birds or animals on the runways, taxiways, aprons, and ramps or other signs that

wildlife problems may have developed - such as large flocks of birds on or adjacent to the airport. Wildlife hazards found during the daily self-inspection should be properly documented. All dead wildlife found and all wildlife aircraft strikes should be reported to the FAA on the FAA Form 5200-7, Bird/Other Wildlife Strike Report. This form may be obtained from the FAA Internet site, at www.faa.gov. Additionally, the inspector should check fencing and gates for wildlife accessibility and should ensure that wildlife control equipment is available and operational.

11. CONTINUOUS SURVEILLANCE INSPECTION. Continuous surveillance inspection consists of general observation of activities for compliance with regulations, procedures, etc., as well as abnormalities with physical facilities that are readily apparent. This is performed any time inspection personnel are on the air operations area. Continuous surveillance of airport physical facilities and activities should cover at least the areas described in this section, which are also included in Appendix 2.

a. Ground Vehicles. During the continuous surveillance inspection of ground vehicles, the inspector should:

(1) Determine if vehicle drivers are following the airport's procedures and arrangements for the orderly operations of ground vehicles (including mowing machines or other maintenance vehicles in the safety areas). Extra attention should be paid to ground vehicle activity during construction, winter operations, and other special events.

(2) Report and monitor any vehicle operator that is not complying with the airport's vehicle procedures and arrangements.

(3) Report any ground vehicle accident observed and any ground vehicle signs and markings that are damaged, missing or obscured.

b. Fueling Operations. The inspector should:

(1) Emphasize fire and explosion hazards inherent in aircraft refueling.

(2) Ensure proper bonding is being used, deadman controls are not blocked, and no smoking prohibitions are being observed, and aircraft are not being fueled inside hangars.

(3) Check for proper parking of mobile fuelers to ensure these vehicles are at least 10' apart and 50' from buildings.

(4) Check for fuel leaks or spills in the fuel storage area and around mobile fuelers.

(5) Determine if the fuel farm is free of flammable materials, including litter and vegetation.

(6) Report and monitor any of unsafe fueling conditions discussed above and other obvious violations of local fire code and airport fuel fire safety procedures.

c. Snow and Ice. During the continuous surveillance inspection of snow and ice removal operations, the inspector should check snow or ice covered pavements and report and monitor any surfaces where snow and ice may affect the safety of aircraft operations. In addition, the inspector should monitor snow and ice removal NOTAMS to ensure they remain current and issue timely corrections, as necessary. If the airport uses other means to notify tenants of snow and ice removal operations, e.g., faxed or electronic messages, the inspector should also monitor this information for accuracy. Check to ensure that snow or ice on pavement surfaces does not affect the safety of aircraft operations and that NOTAMS are current.

d. Construction. The Inspector should check construction projects to ensure that the contractor is following the construction safety plan. During the continuous surveillance inspection of construction activity, the inspector should check for, and report, any of the following conditions:

- (1) Unauthorized use of runways, taxiways, and aprons by construction personnel and equipment.
- (2) Conditions that may result in runway incursions and other irregularities. This includes ensuring that construction areas are delineated appropriately with barricades, cones, markings, etc.
- (3) Construction equipment is not operated in ILS/MLS critical areas unless coordination with FAA has been accomplished.
- (4) Perimeter gates are left open and unattended, unlocked or construction vehicles and personnel are not following access and escort procedures.
- (5) Construction vehicles not properly marked or missing appropriate flags and/or beacons.
- (6) Foreign object debris on haul roads adjacent to movement areas that can be tracked onto taxiways, aprons, and ramp areas.
- (7) Confusing or missing signs, markings or lighting that could potentially confuse or mislead pilots.
- (8) Barricades and lighting are in place and operational.

e. Public Protection. Pay special attention to public protection during construction and special events. During the continuous surveillance inspection of safeguards used to protect the public, the inspector should check for, and report, any of the following conditions:

- (1) Unauthorized personnel, vehicles, and animals, particularly in areas aircraft passengers and the general public are present on the air carrier ramp and other portions of the movement area, i.e, remote aircraft parking locations.
- (2) Inoperable or blocked gates, particularly those that would impede access by aircraft rescue and fire fighting equipment.
- (3) Open or unlocked gates and missing or damaged signs posted to prevent unauthorized access to the airfield.
- (4) Damaged or missing jet blast fences.

f. Wildlife Hazard Management. During the continuous surveillance inspection of wildlife hazards, the inspector should check for, and report, any of the following conditions:

- (1) Birds or animals, such as dogs, deer, etc., on or adjacent to the runways, taxiways, aprons, and ramps to determine if there is a potential wildlife hazard problem.
- (2) Potential hazard created by birds on or adjacent to the airport.
- (3) Wildlife strikes and carcasses found on the runways. Report these on FAA Form 5200-7, Bird/Other Wildlife Strike Report. This form may be obtained from the FAA Internet site at www.faa.gov.

g. Foreign Object Debris (FOD). The inspector should continuously check for, and remove any FOD in movement areas, aircraft parking areas and loading ramps.

12. PERIODIC CONDITION INSPECTION. Periodic condition inspections consist of specific checks of physical facilities on a regularly scheduled basis (but less frequently than daily). Checks may require use of equipment (e.g., Walker Bar to measure VASI glide slope angles or transit to survey approach slopes, or continuous friction measurement equipment) or checking specific features of physical facilities. Periodic inspection of airport physical facilities and activities should cover at least the areas described in this section, which are also included in Appendix 3.

a. Pavement Areas. The inspector should check pavement surfaces for rubber buildup, polishing, or other items affecting friction.

b. Markings. The inspector should:

(1) Check pavement markings to ensure they are correct and clearly visible. Markings on concrete and faded asphalt should be outlined with a black border.

(2) Determine if markings are visible at night, especially examine for rubber buildup in the touchdown zone areas.

c. Signs. The inspector should check signs faces for peeling and for fading or faded colors.

d. Quarterly Fueling Inspections. Airports certificated under Part 139 are required to establish fire safety standards for safe fueling operations and conduct quarterly inspections of the fueling facilities. The inspection procedures in this section are based on the NFPA 407 fire code for airport fueling operations, which is one of the more common fire codes in effect at certificated airports. The fire safety standards for fueling operations should be listed in the Airport Certification Manual (ACM) and the quarterly inspections should be conducted for compliance to the fueling fire safety standards listed in the ACM. Sample quarterly inspection checklists for fuel storage areas and mobile fuelers are included in Appendix 5. Typical fire safety standards to inspect quarterly are listed below. Airports certificated under Part 139 are required to maintain a record of this inspection for at least 12 months.

(1) **Fuel storage areas and loading/unloading stations.** The inspector should:

(i) Check fuel storage areas for adequate fencing and security to prevent unauthorized access or tampering.

(ii) Check for “No Smoking” signs that are clearly visible.

(iii) Check fuel storage areas for materials such as trash or vegetation that could contribute to the spread of fire. Also check for equipment, functions or activities that could be ignition sources.

(iv) Note if fueling equipment appears to be in good operating condition and free of fuel leaks.

(v) Check piping for reasonable protection from damage by vehicles if piping is above ground.

(vi) Check fuel storage areas for at least two accessible and serviceable fire extinguishers. Where the open hose discharge capacity of the equipment is more than 200 gallons per minute, at least one wheeled extinguisher with at least 125 lbs of agent is also required.

(vii) Check for explosion proof equipment, switches and wiring that is reasonably protected from heat, abrasion or impact, which could cause an ignition source.

(viii) Check for piping, filters, tanks and pumps being electrically bonded together and interconnected to an adequate grounding rod.

(ix) Check for a serviceable bond/ground wire with clip at each loading/unloading facility for grounding tankers and mobile fuelers.

(x) Check loading stations for deadman control features.

(xi) Look for a boldly marked emergency cutoff capable of stopping all fuel flow with one physical movement. The emergency cutoff should be located outside the probable fuel spill area near the route that normally is used to leave the spill area or to reach the fire extinguishers.

(2) **Mobile fuelers.** At least once every 3 months, inspect all fuel trucks to ensure they meet fire safety standards. The inspector should:

(i) Note if mobile fuelers appear to be in good operating condition and free of fuel leaks.

(ii) Check mobile fuelers for parking at least 50 feet from a building and at least 10 feet from each other. Note: Some airports have a mobile fueller maintenance building that is approved by the local fire marshal.

(iii) Check for flammability decals on all sides. Lettering should be at least 3 inches high. Also check for hazardous materials placards on all sides. The Hazmat number for Jet A trucks should be #1863 and #1203 for 100LL trucks.

(iv) Check the cab for a "No Smoking" sign and the presence of smoking equipment. Ashtrays and cigarette lighters are not to be provided.

(v) Check for two fire extinguishers, accessible from each side of the mobile fueller. Fire extinguishers should be charged, sealed and tagged from the last fire extinguisher inspection. Check dry chemical extinguishers to ensure they are only B-C rated. ABC rated multi-purpose dry chemical extinguishers are not to be used on mobile fuelers as they are highly corrosive to aircraft and can cause significant damage to aircraft engines.

(vi) Check emergency fuel cutoffs to ensure they are boldly marked and operable. There should be an emergency fuel cutoff accessible from each side.

(vii) Check electrical equipment, switches, wiring and tail light lens covers for explosion proof construction and reasonable protection from heat, abrasion or impact which could be an ignition source.

(viii) Check for serviceable bonding wires and clamps.

(ix) Check nozzles for deadman control feature.

(x) Check the vehicle exhaust system for exhaust leaks and for adequate shielding if it extends under the fuel tank portion of the vehicle.

e. **Navigational Aids.** Periodically check the aiming of REILs and Visual Glide Slope Indicators owned by the airport.

f. **Lighting.** The inspector should:

(1) Determine that power generator and circuit resistance tests are being conducted.

(2) Ensure lights with adjustable optical systems are checked for proper aiming.

g. **Obstructions.** The inspector should:

(1) Check to ensure there are no overhead power lines in the aircraft parking areas.

(2) Annually survey trees and other structures near the airport that could affect glide path angles, approach light lanes, or be an obstruction to Part 77 surfaces.

h. **Aircraft Rescue and Fire Fighting.** The inspector should:

(1) Periodically determine if the aircraft rescue and fire fighting equipment is capable of meeting response times, if it is required under Part 139.

- (2) Ensure that recurrent training and hot-fire drills are being conducted as required by Part 139.
- (3) Check to ensure the availability of adequate entry tools.

13. SPECIAL CONDITION INSPECTIONS. Special condition inspections occur after receipt of a complaint or as triggered by an unusual condition or event. A special inspection should be conducted after an accident or incident. Depending upon circumstances, special condition inspections may include the inspection of any of the specific facilities or activities under the other three components. A special condition inspection of airport physical facilities and activities should cover at least the areas described in this section, which are also included in Appendix 4.

a. Pavement Areas. After a rain or thunderstorm, the inspector should check the pavement areas for ponding and edge damming.

b. Markings and Signs. The inspector should:

(1) Determine if markings are visible at night especially when the pavement is wet following a rain.

(2) After construction or maintenance operations, ensure that pavement markings are correct.

c. Safety Areas. The inspector should:

(1) Ensure that the storm sewer system is checked to verify that inlets are not clogged and drainage channels are free of debris. Note any standing water.

(2) Ensure all inlet covers are in place and sewer covers are at grade level.

(3) Conduct a special inspection before reopening a runway or taxiway following any construction or maintenance that has been performed in or around that safety area.

(4) Any time an aircraft has left the pavement and entered a safety area, check to ensure that no ruts or holes have been made by the aircraft tires or by personnel and equipment during the recovery operation.

(5) Check for construction and maintenance activities to ensure that no hazardous conditions have been created (equipment left in safety areas, unacceptable pavement lips created by ground alteration work, ruts from mowing equipment, etc.).

(6) Inspect engineered materials arresting system (EMAS), if installed, for damage and for deterioration.

(7) Physically drive or walk the safety areas to check for any discrepancies.

d. Snow and Ice. Several special inspections may be needed during a winter storm until the airport is back to a normal operation. The inspector should:

(1) Check to ensure that all foreign objects have been picked up after snow and ice removal operations.

(2) If a friction measurement device is available, issue the appropriate numbers obtained from the equipment. Do not attempt to correlate friction measurement numbers with braking action reports. If a friction measurement device is not available, issue to Air Traffic braking action reports.

(3) Conduct a special sign inspection after snowstorms for signs that may have been damaged by plows or by snow thrown by blowers.

e. Construction. The inspector should:

(1) Ensure that construction areas are barricaded and lighted properly.

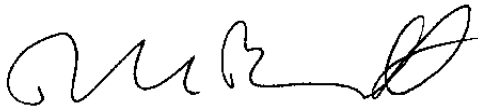
- (2) Check construction equipment to ensure that they are parked within the pre-arranged areas.
- (3) Conduct night inspections to ensure that barricades, warning lighting, and reflectors are adequate to keep aircraft away from the construction area.
- (4) Check the location of construction material and stockpiles to ensure that they are outside of safety areas and do not block any signs.
- (5) Check any movement areas adjacent to construction areas or movement areas traversed by construction vehicles to ensure there is no FOD present.
- (6) Check movement areas around construction sites for potentially confusing marking, lighting, and signs that could cause pilot confusion or result in a runway incursion.

f. Surface Movement Guidance and Control Systems (SMGCS).

(1) For operations below 1,200 feet runway visual range, the inspector should conduct an initial inspection of stop bar lights, runway guard lights, clearance bar lights, taxiway centerline lights, and taxiway edge lights installed on the low visibility routes in accordance with the airport's SMGCS plan.

(2) SMGCS lighting systems that are not electronically monitored should be periodically inspected every 2 to 4 hours for during operations below 1,200 feet to 600 feet. For operations below 600 feet, these inspections should take place every 2 hours. Such inspections should be detailed in the airport's SMGCS plan.

14. CONDITION REPORTING. Alert users of the airport to any unsafe conditions that exists and that could affect their operations. Ensure appropriate NOTAMS are issued for unsafe conditions that are identified during an inspection but cannot be corrected immediately. After reporting NOTAMS to the Flight Service Station, follow-up to ensure that the NOTAMS were processed and transmitted.



David L. Bennett
Director, Office of Airport Safety and Standards

APPENDICES 1–4**SUGGESTED AIRPORT SAFETY SELF-INSPECTION CHECKLISTS**

An airport safety self-inspection checklist should cover the condition of the facilities and equipment on the airport for it to be a part of a good safety inspection program. The checklist should be developed so that it is useful for the airport and its operation. A sketch of the airport is highly recommended to readily identify the location of problems found during the daily inspection.

The suggested checklists consist of a listing of facilities and equipment and a series of conditions that are inspected.

The blank squares indicate the conditions to be evaluated for each facility. A check (✓) in one of these squares would indicate that the condition of the facility and equipment was found to be satisfactory. On the other hand, an “x” in one of these squares would indicate that the condition of the facility and equipment was found to be unsatisfactory.

When an unsatisfactory condition is found:

1. An “x” for each applicable square should be entered;
2. A note provided in the Remark/Action Taken section;
3. The location of the condition should be identified in the airport sketch; and
4. Appropriate follow-up action including NOTAMs should be initiated. Corrective action should be documented on either the self-inspection checklists or on a separate work order system.

These checklists are ideal for electronic conversion to PDAs and laptop computers.

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APPENDIX 1

AIRPORT SAFETY SELF-INSPECTION CHECKLIST

DATE: _____ DAY: _____

✓ Satisfactory

X Unsatisfactory

Day Inspector/Time: _____ Night Inspector/Time: _____

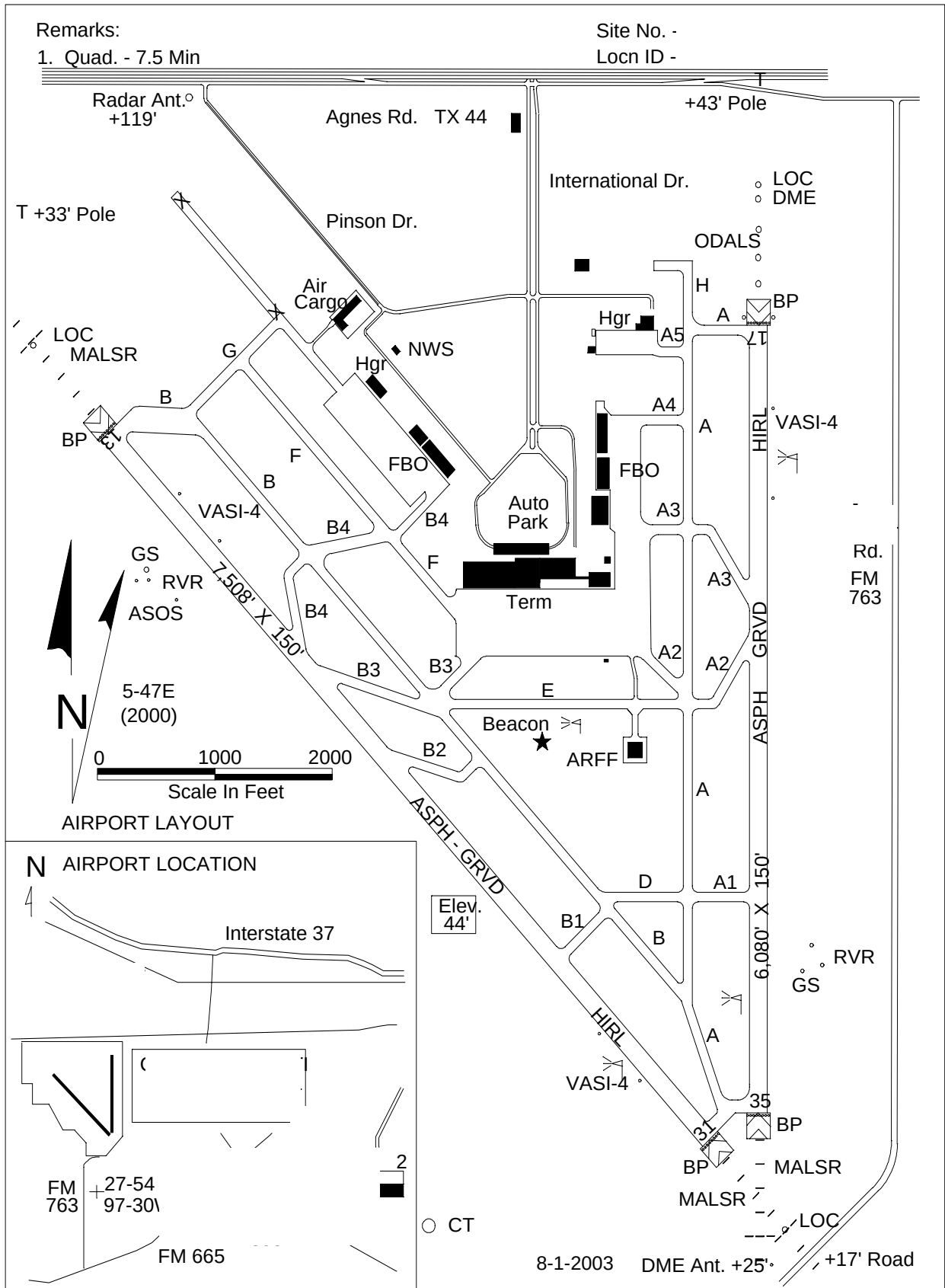
FACILITIES	CONDITIONS	D	N	REMARKS	RESOLVED BY (Date/Initials)
Pavement Areas	Pavement lips over 3"				
	Hole – 5" diam. 3" deep				
	Cracks/spalling/heaves				
	FOD: gravel/debris/sand				
	Rubber deposits				
	Ponding/edge dams				
Safety Areas	Ruts/humps/erosion				
	Drainage/construction				
	Support equipment/aircraft				
	Frangible bases				
	Unauthorized objects				
Markings	Clearly visible/standard				
	Runway markings				
	Taxiway markings				
	Holding position markings				
	Glass beads				
Signs	Standard/meet Sign Plan				
	Obscured/operable				
	Damaged/retroreflective				

FACILITIES	CONDITIONS	D	N	REMARKS	RESOLVED BY (Date/Initials)
Lighting	Obscured/dirty/operable				
	Damaged/missing				
	Faulty aim/adjustment				
	Runway lighting				
	Taxiway lighting				
	Pilot control lighting				
Navigational Aids	Rotating beacon operable				
	Wind indicators				
	RENLS/VGSI systems				
Obstructions	Obstruction lights operable				
	Cranes/trees				
Fueling Operations	Fencing/gates/signs				
	Fuel marking/labeling				
	Fire extinguishers				
	Frayed wires				
	Fuel leaks/vegetation				
Snow & Ice	Surface conditions				
	Snowbank clearances				
	Lights & signs obscured				
	NAVAIDS				
	Fire access				

FACILITIES	CONDITIONS	D	N	REMARKS	RESOLVED BY (Date/Initials)
Construction	Barricades/lights				
	Equipment parking				
	Material stockpiles				
	Confusing signs/markings				
Aircraft Rescue and Fire Fighting	Equipment/crew availability				
	Communications/alarms				
	Response routes affected				
Public Protection	Fencing/gates/signs				
	Jet blast problems				
Wildlife Hazards	Wildlife present/location				
	Complying with WHMP				
	Dead birds				

Comments/Remarks: _____

Airfield Map on Reverse Side

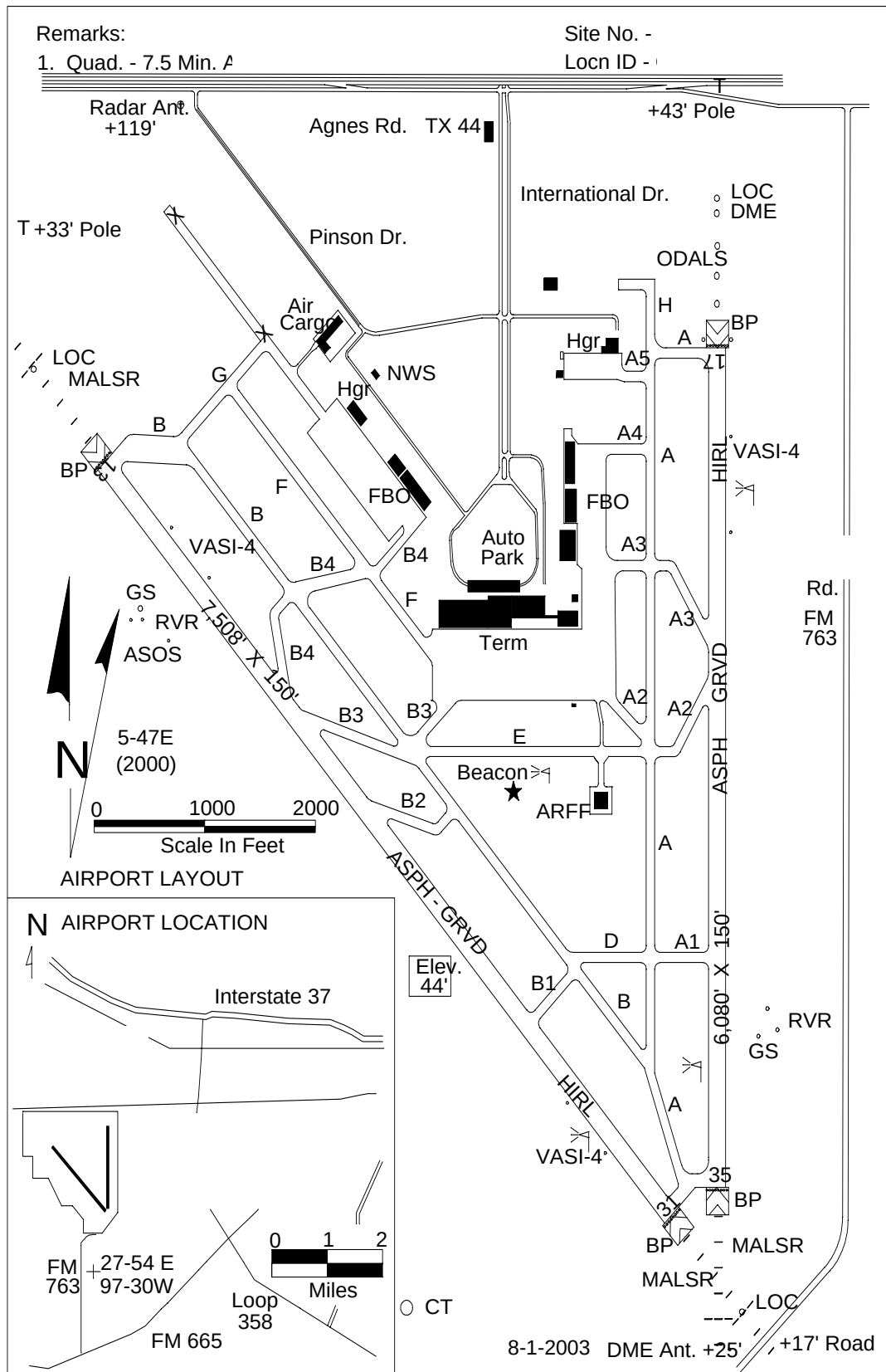


APPENDIX 2

CONTINUOUS SURVEILLANCE CHECKLIST

✓ Satisfactory X Unsatisfactory			
DATE: _____		DAY: _____	
TIME: _____		INSPECTOR: _____	
FACILITIES	CONDITIONS	✓	REMARKS/ACTIONS TAKEN
Ground Vehicles	Rules/Procedures Followed		
Fueling Operations	Fire/Explosion Hazards		
	Signing/No smoking		
Snow & Ice	Surface Conditions		
Construction	Safety Plan		
	Runway Incursions		
	Runway & Taxiway Use		
	FOD		
Public Protection	Unauthorized Persons		
	Unauthorized Vehicles		
	Gates clear		
Wildlife Hazards	Birds/Animals		
Miscellaneous	Pedestrians in Movement Areas		
	Passenger Load/Unload		
	Debris in Movement Area		
Additional Remarks			

Airfield Map on Reverse Side



APPENDIX 3

PERIODIC CONDITION INSPECTION CHECKLIST

DATE: _____ DAY: _____		√ Satisfactory
TIME: _____ INSPECTOR: _____		X Unsatisfactory
FACILITIES	CONDITIONS	REMARKS/ACTIONS TAKEN
Pavement Areas	Rubber Deposits	
	Polishing	
Markings and Signs	Visible	
	Standards	
Fueling Operations	Physical Facilities	
	Mobile Fuelers	
	Fire Extinguishers	
	Fuel Marking/Labeling	
	Frayed Wiring	
Navigational Aids	RENLS/VGSI Aiming	
Lighting	Power Generator Check	
	Circuit Resistance Test	
	Aim/Adjustment	
Obstructions	Surveyed Trees/Structures	
	Overhead Power Lines	
Aircraft Rescue and Fire Fighting	Response Times	
	Live Fire Drills	
	Training	
Additional Remarks		

Airfield Map on Reverse Side

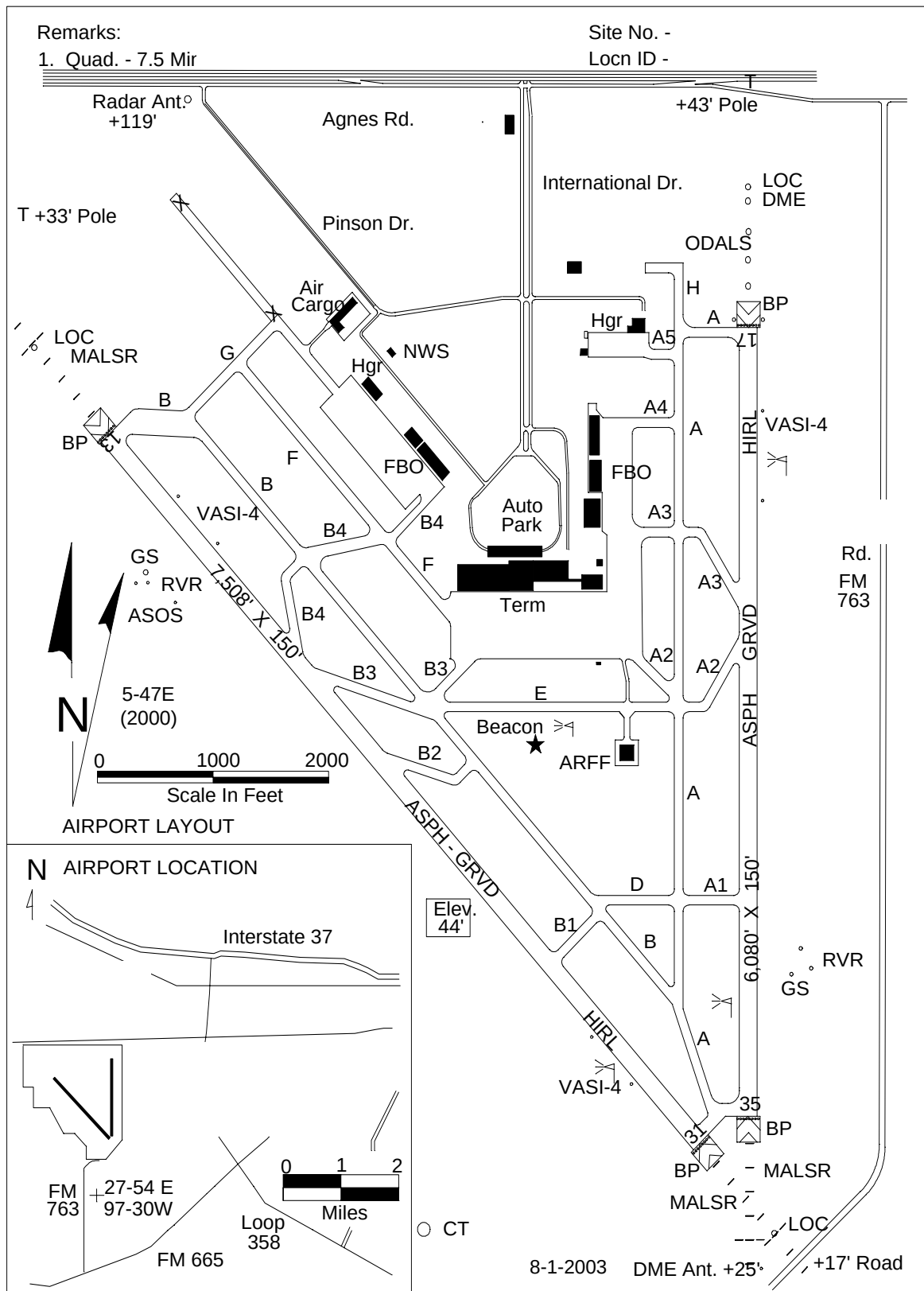


APPENDIX 4

SPECIAL INSPECTION CHECKLIST

DATE: _____ DAY: _____		√ Satisfactory
TIME: _____ INSPECTOR: _____		X Unsatisfactory
FACILITIES	CONDITIONS	REMARKS/ACTIONS TAKEN
Pavement Areas	Ponding/Edge Dams	
Markings And Signs	Visible after rain	
	Standards after Construction	
Safety Areas	Drainage	
	Reopening Runways	
	Reopening Taxiways	
Snow and Ice	Surface conditions	
	Snowbank clearance	
	Lights & Signs Obscured	
	FOD	
	Braking Action/MU Reports	
Construction	Barricades	
	Construction Lights	
	Equipment Parking	
SMGCS	SMGCS Lighting	
Additional Remarks		

Airfield Map on Reverse Side



APPENDIX 5A

QUARTERLY INSPECTION – MOBILE FUELERS

Inspector: _____ Fueling Agent: _____ Date: _____

S – Satisfactory U – Unsatisfactory R – Remark Below	Jet A Fuelers			100LL Fuelers			Other Fueler								
	S	U	R	S	U	R	S	U	R						
No Smoking sign in cab															
Flammability Signs/Haz Mat Placards all sides															
Bonding Cables and Clips functional															
Deadman Control for all nozzles															
2 Fire Extinguishers – Proper type/Inspected															
Emergency Shutoffs operable and marked															
No Fuel Leaks – Hoses/Gaskets/Valves															
Vehicle Exhaust System – Shielded/Leak free															
No evidence of Smoking – No ashtray in cab															
Vehicle Parking – 10' apart/50' from buildings.															
Explosion proof electrical/Light lens intact															
Ignition Sources (Clothing, Shoes, Matches)															
							No of Mobile Fuelers								
Proper Fueling Procedures Observed							Jet A _____								
Fueling Personnel Meet Training Requirements							100 LL _____								
Fueling Personnel Training Records maintained							Other _____								
Remarks: _____															

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APPENDIX 5B

QUARTERLY INSPECTION – FUEL STORAGE AREAS

Inspector: _____ Fueling Agent: _____ Date: _____

S – Satisfactory U – Unsatisfactory R – Remark Below	Jet A Section			100LL Section			Other _____		
	S	U	R	S	U	R	S	U	R
Fencing/Locks/Signs									
Piping protected from vehicles									
No Smoking signs posted									
Deadman Controls for loading stations									
2 Fire Extinguishers – Inspected/Accessible									
Boldly Marked Emergency Cutoffs – Location									
No Fuel Leaks									
Bonding wire/clips at loading stations/operable									
Piping/Pumps bonded and grounded									
No vegetation or materials to spread fire									
No evidence of Smoking									
Hoses in good condition									
Explosion Proof Electrical Equipment									
Remarks: _____									

Appendix C



U.S. Department
of Transportation
**Federal Aviation
Administration**

Advisory Circular

Subject: Operational Safety on
Airports During Construction

Date: 12/13/2017

AC No: 150/5370-2G

Initiated By: AAS-100

Change:

1 **Purpose.**

This AC sets forth guidelines for operational safety on airports during construction.

2 **Cancellation.**

This AC cancels AC 150/5370-2F, *Operational Safety on Airports during Construction*, dated September 29, 2011.

3 **Application.**

This AC assists airport operators in complying with Title 14 Code of Federal Regulations (CFR) Part 139, *Certification of Airports*. For those certificated airports, this AC provides one way, but not the only way, of meeting those requirements. The use of this AC is mandatory for those airport construction projects receiving funds under the Airport Improvement Program (AIP). See Grant Assurance No. 34, *Policies, Standards, and Specifications*. While we do not require non-certificated airports without grant agreements or airports using Passenger Facility Charge (PFC) Program funds for construction projects to adhere to these guidelines, we recommend that they do so to help these airports maintain operational safety during construction.

4 **Related Documents.**

ACs and Orders referenced in the text of this AC do not include a revision letter, as they refer to the latest version. Appendix A contains a list of reading material on airport construction, design, and potential safety hazards during construction, as well as instructions for obtaining these documents.

5 **Principal Changes.**

The AC incorporates the following principal changes:

1. Notification about impacts to both airport owned and FAA-owned NAVAIDs was added. See paragraph 2.13.5.3, NAVAIDs.

2. Guidance for the use of orange construction signs was added. See paragraph 2.18.4.2, Temporary Signs.
3. Open trenches or excavations may be permitted in the taxiway safety area while the taxiway is open to aircraft operations, subject to restrictions. See paragraph 2.22.3.4, Excavations.
4. Guidance for temporary shortened runways and displaced thresholds has been enhanced. See Figure 2-1 and Figure 2-2.
5. Figures have been improved and a new Appendix F on the placement of orange construction signs has been added.

Hyperlinks (allowing the reader to access documents located on the internet and to maneuver within this document) are provided throughout this document and are identified with underlined text. When navigating within this document, return to the previously viewed page by pressing the “ALT” and “←” keys simultaneously.

Figures in this document are schematic representations and are not to scale.

6 **Use of Metrics.**

Throughout this AC, U.S. customary units are used followed with “soft” (rounded) conversion to metric units. The U.S. customary units govern.

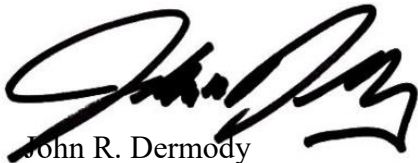
7 **Where to Find this AC.**

You can view a list of all ACs at

http://www.faa.gov/regulations_policies/advisory_circulars/. You can view the Federal Aviation Regulations at http://www.faa.gov/regulations_policies/faa_regulations/.

8 **Feedback on this AC.**

If you have suggestions for improving this AC, you may use the Advisory Circular Feedback form at the end of this AC.



John R. Dermody

Director of Airport Safety and Standards

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CHAPTER 1. PLANNING AN AIRFIELD CONSTRUCTION PROJECT

1.1 Overview.

Airports are complex environments, and procedures and conditions associated with construction activities often affect aircraft operations and can jeopardize operational safety. Safety considerations are paramount and may make operational impacts unavoidable. However, careful planning, scheduling, and coordination of construction activities can minimize disruption of normal aircraft operations and avoid situations that compromise the airport's operational safety. The airport operator must understand how construction activities and aircraft operations affect one another to be able to develop an effective plan to complete the project. While the guidance in this AC is primarily used for construction operations, the concepts, methods and procedures described may also enhance the day-to-day airport maintenance operations, such as lighting maintenance and snow removal operations.

1.2 Plan for Safety.

Safety, maintaining aircraft operations, and construction costs are all interrelated. Since safety must not be compromised, the airport operator must strike a balance between maintaining aircraft operations and construction costs. This balance will vary widely depending on the operational needs and resources of the airport and will require early coordination with airport users and the FAA. As the project design progresses, the necessary construction locations, activities, and associated costs will be identified and their impact to airport operations must be assessed. Adjustments are made to the proposed construction activities, often by phasing the project, and/or to airport operations to maintain operational safety. This planning effort will ultimately result in a project Construction Safety and Phasing Plan (CSPP). The development of the CSPP takes place through the following five steps:

1.2.1 Identify Affected Areas.

The airport operator must determine the geographic areas on the airport affected by the construction project. Some, such as a runway extension, will be defined by the project. Others may be variable, such as the location of haul routes and material stockpiles.

1.2.2 Describe Current Operations.

Identify the normal airport operations in each affected area for each phase of the project. This becomes the baseline from which the impact on operations by construction activities can be measured. This should include a narrative of the typical users and aircraft operating within the affected areas. It should also include information related to airport operations: the Aircraft Approach Category (AAC) and Airplane Design Group (ADG) of the airplanes that operate on each runway; the ADG and Taxiway Design Group (TDG)¹ for each affected taxiway; designated approach visibility minimums;

¹ Find Taxiway Design Group information in [AC 150/5300-13, Airport Design](#).

available approach and departure procedures; most demanding aircraft; declared distances; available air traffic control services; airport Surface Movement Guidance and Control System (SMGCS) plan; and others. The applicable seasons, days and times for certain operations should also be identified as applicable.

1.2.3 Allow for Temporary Changes to Operations.

To the extent practical, current airport operations should be maintained during the construction. In consultation with airport users, Aircraft Rescue and Fire Fighting (ARFF) personnel, and FAA Air Traffic Organization (ATO) personnel, the airport operator should identify and prioritize the airport's most important operations. The construction activities should be planned, through project phasing if necessary, to safely accommodate these operations. When the construction activities cannot be adjusted to safely maintain current operations, regardless of their importance, then the operations must be revised accordingly. Allowable changes include temporary revisions to approach procedures, restricting certain aircraft to specific runways and taxiways, suspension of certain operations, decreased weights for some aircraft due to shortened runways, and other changes. An example of a table showing temporary operations versus current operations is shown in Appendix E.

1.2.4 Take Required Measures to Revise Operations.

Once the level and type of aircraft operations to be maintained are identified, the airport operator must determine the measures required to safely conduct the planned operations during the construction. These measures will result in associated costs, which can be broadly interpreted to include not only direct construction costs, but also loss of revenue from impacted operations. Analysis of costs may indicate a need to reevaluate allowable changes to operations. As aircraft operations and allowable changes will vary widely among airports, this AC presents general guidance on those subjects.

1.2.5 Manage Safety Risk.

The FAA is committed to incorporating proactive safety risk management (SRM) tools into its decision-making processes. FAA Order 5200.11, *FAA Airports (ARP) Safety Management System (SMS)*, requires the FAA to conduct a Safety Assessment for certain triggering actions. Certain airport projects may require the airport operator to provide a Project Proposal Summary to help the FAA determine whether a Safety Assessment is required prior to FAA approval of the CSPP. The airport operator must coordinate with the appropriate FAA Airports Regional or District Office early in the development of the CSPP to determine the need for a Safety Risk Assessment. If the FAA requires an assessment, the airport operator must at a minimum:

1. Notify the appropriate FAA Airports Regional or District Office during the project "scope development" phase of any project requiring a CSPP.
2. Provide documents identified by the FAA as necessary to conduct SRM.
3. Participate in the SRM process for airport projects.
4. Provide a representative to participate on the SRM panel.

5. Ensure that all applicable SRM identified risks elements are recorded and mitigated within the CSPP.

1.3 **Develop a Construction Safety and Phasing Plan (CSPP).**

Development of an effective CSPP will require familiarity with many other documents referenced throughout this AC. See Appendix A for a list of related reading material.

1.3.1 List Requirements.

A CSPP must be developed for each on-airfield construction project funded by the Airport Improvement Program (AIP) or located on an airport certificated under Part 139. For on-airfield construction projects at Part 139 airports funded without AIP funds, the preparation of a CSPP represents an acceptable method the certificate holder may use to meet Part 139 requirements during airfield construction activity. As per FAA Order 5200.11, projects that require Safety Assessments do not include construction, rehabilitation, or change of any facility that is entirely outside the air operations area, does not involve any expansion of the facility envelope and does not involve construction equipment, haul routes or placement of material in locations that require access to the air operations area, increase the facility envelope, or impact line-of-sight. Such facilities may include passenger terminals and parking or other structures. However, extraordinary circumstances may trigger the need for a Safety Assessment and a CSPP. The CSPP is subject to subsequent review and approval under the FAA's Safety Risk Management procedures (see paragraph 1.2.5).

1.3.2 Prepare a Safety Plan Compliance Document (SPCD).

The Safety Plan Compliance Document (SPCD) details how the contractor will comply with the CSPP. Also, it will not be possible to determine all safety plan details (for example specific hazard equipment and lighting, contractor's points of contact, construction equipment heights) during the development of the CSPP. The successful contractor must define such details by preparing an SPCD that the airport operator reviews for approval prior to issuance of a notice-to-proceed. The SPCD is a subset of the CSPP, similar to how a shop drawing review is a subset to the technical specifications.

1.3.3 Assume Responsibility for the CSPP.

The airport operator is responsible for establishing and enforcing the CSPP. The airport operator may use the services of an engineering consultant to help develop the CSPP. However, writing the CSPP cannot be delegated to the construction contractor. Only those details the airport operator determines cannot be addressed before contract award are developed by the contractor and submitted for approval as the SPCD. The SPCD does not restate nor propose differences to provisions already addressed in the CSPP.

1.4 **Who Is Responsible for Safety During Construction?**

1.4.1 Establish a Safety Culture.

Everyone has a role in operational safety on airports during construction: the airport operator, the airport's consultants, the construction contractor and subcontractors, airport users, airport tenants, ARFF personnel, Air Traffic personnel, including Technical Operations personnel, FAA Airports Division personnel, and others, such as military personnel at any airport supporting military operations (e.g. national guard or a joint use facility). Close communication and coordination between all affected parties is the key to maintaining safe operations. Such communication and coordination should start at the project scoping meeting and continue through the completion of the project. The airport operator and contractor should conduct onsite safety inspections throughout the project and immediately remedy any deficiencies, whether caused by negligence, oversight, or project scope change.

1.4.2 Assess Airport Operator's Responsibilities.

An airport operator has overall responsibility for all activities on an airport, including construction. This includes the predesign, design, preconstruction, construction, and inspection phases. Additional information on the responsibilities listed below can be found throughout this AC. The airport operator must:

- 1.4.2.1 Develop a CSPP that complies with the safety guidelines of Chapter 2, Construction Safety and Phasing Plans, and Chapter 3, Guidelines for Writing a CSPP. The airport operator may develop the CSPP internally or have a consultant develop the CSPP for approval by the airport operator. For tenant sponsored projects, approve a CSPP developed by the tenant or its consultant.
- 1.4.2.2 Require, review and approve the SPCD by the contractor that indicates how it will comply with the CSPP and provides details that cannot be determined before contract award.
- 1.4.2.3 Convene a preconstruction meeting with the construction contractor, consultant, airport employees and, if appropriate, tenant sponsor and other tenants to review and discuss project safety before beginning construction activity. The appropriate FAA representatives should be invited to attend the meeting. See *AC 150/5370-12, Quality Management for Federally Funded Airport Construction Projects*. (Note “FAA” refers to the Airports Regional or District Office, the Air Traffic Organization, Flight Standards Service, and other offices that support airport operations, flight regulations, and construction/environmental policies.)
- 1.4.2.4 Ensure contact information is accurate for each representative/point of contact identified in the CSPP and SPCD.
- 1.4.2.5 Hold weekly or, if necessary, daily safety meetings with all affected parties to coordinate activities.
- 1.4.2.6 Notify users, ARFF personnel, and FAA ATO personnel of construction and conditions that may adversely affect the operational safety of the airport via Notices to Airmen (NOTAM) and other methods, as appropriate. Convene a meeting for review and discussion if necessary.
- 1.4.2.7 Ensure construction personnel know applicable airport procedures and changes to those procedures that may affect their work.
- 1.4.2.8 Ensure that all temporary construction signs are located per the scheduled list for each phase of the project.
- 1.4.2.9 Ensure construction contractors and subcontractors undergo training required by the CSPP and SPCD.
- 1.4.2.10 Ensure vehicle and pedestrian operations addressed in the CSPP and SPCD are coordinated with airport tenants, the airport traffic control tower (ATCT), and construction contractors.
- 1.4.2.11 At certificated airports, ensure each CSPP and SPCD is consistent with Part 139.

- 1.4.2.12 Conduct inspections sufficiently frequently to ensure construction contractors and tenants comply with the CSPP and SPCD and that there are no altered construction activities that could create potential safety hazards.
 - 1.4.2.13 Take immediate action to resolve safety deficiencies.
 - 1.4.2.14 At airports subject to 49 CFR Part 1542, *Airport Security*, ensure construction access complies with the security requirements of that regulation.
 - 1.4.2.15 Notify appropriate parties when conditions exist that invoke provisions of the CSPP and SPCD (for example, implementation of low-visibility operations).
 - 1.4.2.16 Ensure prompt submittal of a Notice of Proposed Construction or Alteration (Form 7460-1) for conducting an aeronautical study of potential obstructions such as tall equipment (cranes, concrete pumps, other), stock piles, and haul routes. A separate form may be filed for each potential obstruction, or one form may be filed describing the entire construction area and maximum equipment height. In the latter case, a separate form must be filed for any object beyond or higher than the originally evaluated area/height. The FAA encourages online submittal of forms for expediency at <https://oeaaa.faa.gov/oeaaa/external/portal.jsp>. The appropriate FAA Airports Regional or District Office can provide assistance in determining which objects require an aeronautical study.
 - 1.4.2.17 Ensure prompt transmission of the Airport Sponsor Strategic Event Submission, FAA Form 6000-26, located at https://oeaaa.faa.gov/oeaaa/external/content/AIRPORT_SPONSOR_STRATEGIC_EVENT_SUBMISSION_FORM.pdf, to assure proper coordination for NAS Strategic Interruption per Service Level Agreement with ATO.
 - 1.4.2.18 Promptly notify the FAA Airports Regional or District Office of any proposed changes to the CSPP prior to implementation of the change. Changes to the CSPP require review and approval by the airport operator and the FAA. The FAA Airports Regional or District office will determine if further coordination within the FAA is needed. Coordinate with appropriate local and other federal government agencies, such as Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA), Transportation Security Administration (TSA), and the state environmental agency.
- 1.4.3 Define Construction Contractor's Responsibilities.
- The contractor is responsible for complying with the CSPP and SPCD. The contractor must:

- 1.4.3.1 Submit a Safety Plan Compliance Document (SPCD) to the airport operator describing how it will comply with the requirements of the CSPP and supply any details that could not be determined before contract award. The SPCD must include a certification statement by the contractor, indicating an understanding of the operational safety requirements of the CSPP and the assertion of compliance with the approved CSPP and SPCD unless written approval is granted by the airport operator. Any construction practice proposed by the contractor that does not conform to the CSPP and SPCD may impact the airport's operational safety and will require a revision to the CSPP and SPCD and re-coordination with the airport operator and the FAA in advance.
- 1.4.3.2 Have available at all times copies of the CSPP and SPCD for reference by the airport operator and its representatives, and by subcontractors and contractor employees.
- 1.4.3.3 Ensure that construction personnel are familiar with safety procedures and regulations on the airport. Provide a point of contact who will coordinate an immediate response to correct any construction-related activity that may adversely affect the operational safety of the airport. Many projects will require 24-hour coverage.
- 1.4.3.4 Identify in the SPCD the contractor's on-site employees responsible for monitoring compliance with the CSPP and SPCD during construction. At least one of these employees must be on-site when active construction is taking place.
- 1.4.3.5 Conduct sufficient inspections to ensure construction personnel comply with the CSPP and SPCD and that there are no altered construction activities that could create potential safety hazards.
- 1.4.3.6 Restrict movement of construction vehicles and personnel to permitted construction areas by flagging, barricading, erecting temporary fencing, or providing escorts, as appropriate, and as specified in the CSPP and SPCD.
- 1.4.3.7 Ensure that no contractor employees, employees of subcontractors or suppliers, or other persons enter any part of the air operations area (AOA) from the construction site unless authorized.
- 1.4.3.8 Ensure prompt submittal through the airport operator of Form 7460-1 for the purpose of conducting an aeronautical study of contractor equipment such as tall equipment (cranes, concrete pumps, and other equipment), stock piles, and haul routes when different from cases previously filed by the airport operator. The FAA encourages online submittal of forms for expediency at <https://oeaaa.faa.gov/oeaaa/external/portal.jsp>.

- 1.4.3.9 Ensure that all necessary safety mitigations are understood by all parties involved, and any special requirements of each construction phase will be fulfilled per the approved timeframe.
- 1.4.3.10 Participate in pre-construction meetings to review construction limits, safety mitigations, NOTAMs, and understand all special airport operational needs during each phase of the project.

1.4.4 Define Tenant's Responsibilities.

If planning construction activities on leased property, Airport tenants, such as airline operators, fixed base operators, and FAA ATO/Technical Operations sponsoring construction are strongly encouraged to:

1. Develop, or have a consultant develop, a project specific CSPP and submit it to the airport operator. The airport operator may forgo a complete CSPP submittal and instead incorporate appropriate operational safety principles and measures addressed in the advisory circular within their tenant lease agreements.
2. In coordination with its contractor, develop an SPCD and submit it to the airport operator for approval issued prior to issuance of a Notice to Proceed.
3. Ensure that construction personnel are familiar with safety procedures and regulations on the airport during all phases of the construction.
4. Provide a point of contact of who will coordinate an immediate response to correct any construction-related activity that may adversely affect the operational safety of the airport.
5. Identify in the SPCD the contractor's on-site employees responsible for monitoring compliance with the CSPP and SPCD during construction. At least one of these employees must be on-site when active construction is taking place.
6. Ensure that no tenant or contractor employees, employees of subcontractors or suppliers, or any other persons enter any part of the AOA from the construction site unless authorized.
7. Restrict movement of construction vehicles to construction areas by flagging and barricading, erecting temporary fencing, or providing escorts, as appropriate, as specified in the CSPP and SPCD.
8. Ensure prompt submittal through the airport operator of Form 7460-1 for conducting an aeronautical study of contractor equipment such as tall equipment (cranes, concrete pumps, other), stock piles, and haul routes. The FAA encourages online submittal of forms for expediency at <https://oeaaa.faa.gov/oeaaa/external/portal.jsp>.
9. Participate in pre-construction meetings to review construction limits, safety mitigations, NOTAMs, and understand all special airport operational needs during each phase of the project.

CHAPTER 2. CONSTRUCTION SAFETY AND PHASING PLANS

2.1 Overview.

Aviation safety is the primary consideration at airports, especially during construction. The airport operator's CSPP and the contractor's Safety Plan Compliance Document (SPCD) are the primary tools to ensure safety compliance when coordinating construction activities with airport operations. These documents identify all aspects of the construction project that pose a potential safety hazard to airport operations and outline respective mitigation procedures for each hazard. They must provide information necessary for the Airport Operations department to conduct airfield inspections and expeditiously identify and correct unsafe conditions during construction. All aviation safety provisions included within the project drawings, contract specifications, and other related documents must also be reflected in the CSPP and SPCD.

2.2 Assume Responsibility.

Operational safety on the airport remains the airport operator's responsibility at all times. The airport operator must develop, certify, and submit for FAA approval each CSPP. It is the airport operator's responsibility to apply the requirements of the FAA approved CSPP. The airport operator must revise the CSPP when conditions warrant changes and must submit the revised CSPP to the FAA for approval. The airport operator must also require and approve a SPCD from the project contractor.

2.3 Submit the CSPP.

Construction Safety and Phasing Plans should be developed concurrently with the project design. Milestone versions of the CSPP should be submitted for review and approval as follows. While these milestones are not mandatory, early submission will help to avoid delays. Submittals are preferred in 8.5 × 11 inch or 11 × 17 inch format for compatibility with the FAA's Obstruction Evaluation / Airport Airspace Analysis (OE / AAA) process.

2.3.1 Submit an Outline/Draft.

By the time approximately 25% to 30% of the project design is completed, the principal elements of the CSPP should be established. Airport operators are encouraged to submit an outline or draft, detailing all CSPP provisions developed to date, to the FAA for review at this stage of the project design.

2.3.2 Submit a CSPP.

The CSPP should be formally submitted for FAA approval when the project design is 80 percent to 90 percent complete. Since provisions in the CSPP will influence contract costs, it is important to obtain FAA approval in time to include all such provisions in the procurement contract.

2.3.3 Submit an SPCD.

The contractor should submit the SPCD to the airport operator for approval to be issued prior to the Notice to Proceed.

2.3.4 Submit CSPP Revisions.

All revisions to a previously approved CSPP must be re-submitted to the FAA for review and approval/disapproval action.

2.4 **Meet CSPP Requirements.**

2.4.1 To the extent possible, the CSPP should address the following as outlined in Chapter 3, Guidelines for Writing a CSPP. Details that cannot be determined at this stage are to be included in the SPCD.

1. Coordination.
 - a. Contractor progress meetings.
 - b. Scope or schedule changes.
 - c. FAA ATO coordination.
2. Phasing.
 - a. Phase elements.
 - b. Construction safety drawings.
3. Areas and operations affected by the construction activity.
 - a. Identification of affected areas.
 - b. Mitigation of effects.
4. Protection of navigation aids (NAVAIDs).
5. Contractor access.
 - a. Location of stockpiled construction materials.
 - b. Vehicle and pedestrian operations.
6. Wildlife management.
 - a. Trash.
 - b. Standing water.
 - c. Tall grass and seeds.
 - d. Poorly maintained fencing and gates.
 - e. Disruption of existing wildlife habitat.
7. Foreign Object Debris (FOD) management.
8. Hazardous materials (HAZMAT) management.
9. Notification of construction activities.

- a. Maintenance of a list of responsible representatives/ points of contact.
 - b. NOTAM.
 - c. Emergency notification procedures.
 - d. Coordination with ARFF Personnel.
 - e. Notification to the FAA.
10. Inspection requirements.
- a. Daily (or more frequent) inspections.
 - b. Final inspections.
11. Underground utilities.
12. Penalties.
13. Special conditions.
14. Runway and taxiway visual aids. Marking, lighting, signs, and visual NAVAIDs.
- a. General.
 - b. Markings.
 - c. Lighting and visual NAVAIDs.
 - d. Signs, temporary, including orange construction signs, and permanent signs.
15. Marking and signs for access routes.
16. Hazard marking and lighting.
- a. Purpose.
 - b. Equipment.
17. Work zone lighting for nighttime construction (if applicable).
18. Protection of runway and taxiway safety areas, object free areas, obstacle free zones, and approach/departure surfaces.
- a. Runway Safety Area (RSA).
 - b. Runway Object Free Area (ROFA).
 - c. Taxiway Safety Area (TSA). Provide details for any adjustments to Taxiway Safety Area width to allow continued operation of smaller aircraft. See paragraph 2.22.3.
 - d. Taxiway Object Free Area (TOFA). Provide details for any continued aircraft operations while construction occurs within the TOFA. See paragraph 2.22.4.
 - e. Obstacle Free Zone (OFZ).
 - f. Runway approach/departure surfaces.
19. Other limitations on construction.
- a. Prohibitions.

b. Restrictions.

2.4.2 The Safety Plan Compliance Document (SPCD) should include a general statement by the construction contractor that he/she has read and will abide by the CSPP. In addition, the SPCD must include all supplemental information that could not be included in the CSPP prior to the contract award. The contractor statement should include the name of the contractor, the title of the project CSPP, the approval date of the CSPP, and a reference to any supplemental information (that is, “I, (Name of Contractor), have read the (Title of Project) CSPP, approved on (Date), and will abide by it as written and with the following additions as noted:”). The supplemental information in the SPCD should be written to match the format of the CSPP indicating each subject by corresponding CSPP subject number and title. If no supplemental information is necessary for any specific subject, the statement, “No supplemental information,” should be written after the corresponding subject title. The SPCD should not duplicate information in the CSPP:

1. Coordination. Discuss details of proposed safety meetings with the airport operator and with contractor employees and subcontractors.
2. Phasing. Discuss proposed construction schedule elements, including:
 - a. Duration of each phase.
 - b. Daily start and finish of construction, including “night only” construction.
 - c. Duration of construction activities during:
 - i. Normal runway operations.
 - ii. Closed runway operations.
 - iii. Modified runway “Aircraft Reference Code” usage.
3. Areas and operations affected by the construction activity. These areas and operations should be identified in the CSPP and should not require an entry in the SPCD.
4. Protection of NAVAIDs. Discuss specific methods proposed to protect operating NAVAIDs.
5. Contractor access. Provide the following:
 - a. Details on how the contractor will maintain the integrity of the airport security fence (gate guards, daily log of construction personnel, and other).
 - b. Listing of individuals requiring driver training (for certificated airports and as requested).
 - c. Radio communications.
 - i. Types of radios and backup capabilities.
 - ii. Who will be monitoring radios.
 - iii. Who to contact if the ATCT cannot reach the contractor’s designated person by radio.

- d. Details on how the contractor will escort material delivery vehicles.
- 6. Wildlife management. Discuss the following:
 - a. Methods and procedures to prevent wildlife attraction.
 - b. Wildlife reporting procedures.
- 7. Foreign Object Debris (FOD) management. Discuss equipment and methods for control of FOD, including construction debris and dust.
- 8. Hazardous Materials (HAZMAT) management. Discuss equipment and methods for responding to hazardous spills.
- 9. Notification of construction activities. Provide the following:
 - a. Contractor points of contact.
 - b. Contractor emergency contact.
 - c. Listing of tall or other requested equipment proposed for use on the airport and the timeframe for submitting 7460-1 forms not previously submitted by the airport operator.
 - d. Batch plant details, including 7460-1 submittal.
- 10. Inspection requirements. Discuss daily (or more frequent) inspections and special inspection procedures.
- 11. Underground utilities. Discuss proposed methods of identifying and protecting underground utilities.
- 12. Penalties. Penalties should be identified in the CSPP and should not require an entry in the SPCD.
- 13. Special conditions. Discuss proposed actions for each special condition identified in the CSPP.
- 14. Runway and taxiway visual aids. Including marking, lighting, signs, and visual NAVAIDs. Discuss proposed visual aids including the following:
 - a. Equipment and methods for covering signage and airfield lights.
 - b. Equipment and methods for temporary closure markings (paint, fabric, other).
 - c. Temporary orange construction signs.
 - d. Types of temporary Visual Guidance Slope Indicators (VGSI).
- 15. Marking and signs for access routes. Discuss proposed methods of demarcating access routes for vehicle drivers.
- 16. Hazard marking and lighting. Discuss proposed equipment and methods for identifying excavation areas.
- 17. Work zone lighting for nighttime construction (if applicable). Discuss proposed equipment, locations, aiming, and shielding to prevent interference with air traffic control and aircraft operations.

18. Protection of runway and taxiway safety areas, object free areas, obstacle free zones, and approach/departure surfaces. Discuss proposed methods of identifying, demarcating, and protecting airport surfaces including:
 - a. Equipment and methods for maintaining Taxiway Safety Area standards.
 - b. Equipment and methods to ensure the safe passage of aircraft where Taxiway Safety Area or Taxiway Object Free Area standards cannot be maintained.
 - c. Equipment and methods for separation of construction operations from aircraft operations, including details of barricades.
19. Other limitations on construction should be identified in the CSPP and should not require an entry in the SPCD.

2.5 **Coordination.**

Airport operators, or tenants responsible for design, bidding and conducting construction on their leased properties, should ensure at all project developmental stages, such as predesign, prebid, and preconstruction conferences, they capture the subject of airport operational safety during construction (see AC 150/5370-12, *Quality Management for Federally Funded Airport Construction Projects*). In addition, the following should be coordinated as required:

2.5.1 Progress Meetings.

Operational safety should be a standing agenda item for discussion during progress meetings throughout the project developmental stages.

2.5.2 Scope or Schedule Changes.

Changes in the scope or duration at any of the project stages may require revisions to the CSPP and review and approval by the airport operator and the FAA (see paragraph 1.4.2.17).

2.5.3 FAA ATO Coordination.

Early coordination with FAA ATO is highly recommended during the design phase and is required for scheduling Technical Operations shutdowns prior to construction. Coordination is critical to restarts of NAVAID services and to the establishment of any special procedures for the movement of aircraft. Formal agreements between the airport operator and appropriate FAA offices are recommended. All relocation or adjustments to NAVAIDs, or changes to final grades in critical areas, should be coordinated with FAA ATO and may require an FAA flight inspection prior to restarting the facility. Flight inspections must be coordinated and scheduled well in advance of the intended facility restart. Flight inspections may require a reimbursable agreement between the airport operator and FAA ATO. Reimbursable agreements should be coordinated a minimum of 12 months prior to the start of construction. (See paragraph 2.13.5.3.2 for required FAA notification regarding FAA-owned NAVAIDs.)

2.6 **Phasing.**

Once it has been determined what types and levels of airport operations will be maintained, the most efficient sequence of construction may not be feasible. In this case, the sequence of construction may be phased to gain maximum efficiency while allowing for the required operations. The development of the resulting construction phases should be coordinated with local Air Traffic personnel and airport users. The sequenced construction phases established in the CSPP must be incorporated into the project design and must be reflected in the contract drawings and specifications.

2.6.1 Phase Elements.

For each phase the CSPP should detail:

- Areas closed to aircraft operations.
- Duration of closures.
- Taxi routes and/or areas of reduced TSA and TOFA to reflect reduced ADG use.
- ARFF access routes.
- Construction staging, disposal, and cleanout areas.
- Construction access and haul routes.
- Impacts to NAVAIDs.
- Lighting, marking, and signing changes.
- Available runway length and/or reduced RSA and ROFA to reflect reduced ADG use.
- Declared distances (if applicable).
- Required hazard marking, lighting, and signing.
- Work zone lighting for nighttime construction (if applicable).
- Lead times for required notifications.

2.6.2 Construction Safety Drawings.

Drawings specifically indicating operational safety procedures and methods in affected areas (i.e., construction safety drawings) should be developed for each construction phase. Such drawings should be included in the CSPP as referenced attachments and should also be included in the contract drawing package.

2.7 **Areas and Operations Affected by Construction Activity.**

Runways and taxiways should remain in use by aircraft to the maximum extent possible without compromising safety. Pre-meetings with the FAA ATO will support operational simulations. See Appendix E for an example of a table showing temporary operations versus current operations. The tables in Appendix E can be useful for coordination among all interested parties, including FAA Lines of Business.

2.7.1 Identification of Affected Areas.

Identifying areas and operations affected by the construction helps to determine possible safety problems. The affected areas should be identified in the construction safety drawings for each construction phase. (See paragraph 2.6.2.) Of particular concern are:

2.7.1.1 **Closing, or Partial Closing, of Runways, Taxiways and Aprons, and Displaced Thresholds.**

When a runway is partially closed, a portion of the pavement is unavailable for any aircraft operation, meaning taxiing, landing, or takeoff in either direction on that pavement is prohibited. A displaced threshold, by contrast, is established to ensure obstacle clearance and adequate safety area for landing aircraft. The pavement prior to the displaced threshold is normally available for take-off in the direction of the displacement and for landing and takeoff in the opposite direction. Misunderstanding this difference, may result in issuance of an inaccurate NOTAM, and can lead to a hazardous condition.

2.7.1.1.1 Partially Closed Runways.

The temporarily closed portion of a partially closed runway will generally extend from the threshold to a taxiway that may be used for entering and exiting the runway. If the closed portion extends to a point between taxiways, pilots will have to back-taxi on the runway, which is an undesirable operation. See Figure 2-1 for a desirable configuration.

2.7.1.1.2 Displaced Thresholds.

Since the portion of the runway pavement between the permanent threshold and a standard displaced threshold is available for takeoff and for landing in the opposite direction, the temporary displaced threshold need not be located at an entrance/exit taxiway. See Figure 2-2.

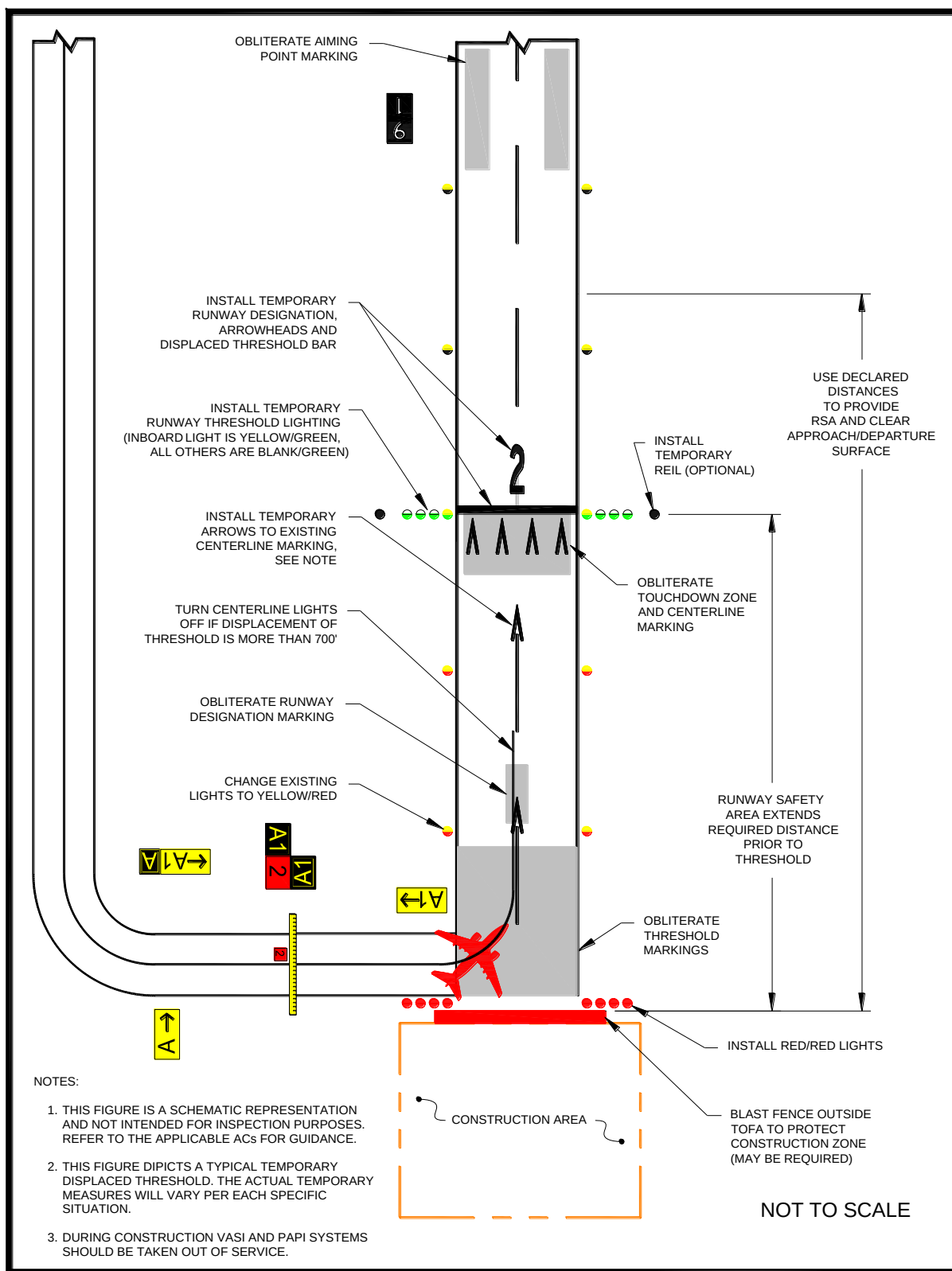
2.7.1.2 Closing of aircraft rescue and fire fighting access routes.

2.7.1.3 Closing of access routes used by airport and airline support vehicles.

2.7.1.4 Interruption of utilities, including water supplies for fire fighting.

2.7.1.5 Approach/departure surfaces affected by heights of objects.

2.7.1.6 Construction areas, storage areas, and access routes near runways, taxiways, aprons, or helipads.

Figure 2-2. Temporary Displaced Threshold

Note: See paragraph 2.18.2.5.

2.7.2 Mitigation of Effects.

Establishment of specific procedures is necessary to maintain the safety and efficiency of airport operations. The CSPP must address:

- 2.7.2.1 Temporary changes to runway and/or taxi operations.
- 2.7.2.2 Detours for ARFF and other airport vehicles.
- 2.7.2.3 Maintenance of essential utilities.
- 2.7.2.4 Temporary changes to air traffic control procedures. Such changes must be coordinated with the ATO.

2.8 **Navigation Aid (NAVAID) Protection.**

Before commencing construction activity, parking vehicles, or storing construction equipment and materials near a NAVAID, coordinate with the appropriate FAA ATO/Technical Operations office to evaluate the effect of construction activity and the required distance and direction from the NAVAID. (See paragraph 2.13.5.3.) Construction activities, materials/equipment storage, and vehicle parking near electronic NAVAIDs require special consideration since they may interfere with signals essential to air navigation. If any NAVAID may be affected, the CSPP and SPCD must show an understanding of the “critical area” associated with each NAVAID and describe how it will be protected. Where applicable, the operational critical areas of NAVAIDs should be graphically delineated on the project drawings. Pay particular attention to stockpiling material, as well as to movement and parking of equipment that may interfere with line of sight from the ATCT or with electronic emissions. Interference from construction equipment and activities may require NAVAID shutdown or adjustment of instrument approach minimums for low visibility operations. This condition requires that a NOTAM be filed (see paragraph 2.13.2.). Construction activities and materials/equipment storage near a NAVAID must not obstruct access to the equipment and instruments for maintenance. Submittal of a 7460-1 form is required for construction vehicles operating near FAA NAVAIDs. (See paragraph 2.13.5.3.)

2.9 **Contractor Access.**

The CSPP must detail the areas to which the contractor must have access, and explain how contractor personnel will access those areas. Specifically address:

2.9.1 Location of Stockpiled Construction Materials.

Stockpiled materials and equipment storage are not permitted within the RSA and OFZ, and if possible should not be permitted within the Object Free Area (OFA) of an operational runway. Stockpiling material in the OFA requires submittal of a 7460-1 form and justification provided to the appropriate FAA Airports Regional or District Office for approval. The airport operator must ensure that stockpiled materials and equipment adjacent to these areas are prominently marked and lighted during hours of restricted visibility or darkness. (See paragraph 2.18.2.) This includes determining and

verifying that materials are stabilized and stored at an approved location so as not to be a hazard to aircraft operations and to prevent attraction of wildlife and foreign object damage from blowing or tracked material. See paragraphs 2.10 and 2.11.

2.9.2 Vehicle and Pedestrian Operations.

The CSPP should include specific vehicle and pedestrian requirements. Vehicle and pedestrian access routes for airport construction projects must be controlled to prevent inadvertent or unauthorized entry of persons, vehicles, or animals onto the AOA. The airport operator should coordinate requirements for vehicle operations with airport tenants, contractors, and the FAA air traffic manager. In regard to vehicle and pedestrian operations, the CSPP should include the following, with associated training requirements:

2.9.2.1 **Construction Site Parking.**

Designate in advance vehicle parking areas for contractor employees to prevent any unauthorized entry of persons or vehicles onto the AOA. These areas should provide reasonable contractor employee access to the job site.

2.9.2.2 **Construction Equipment Parking.**

Contractor employees must park and service all construction vehicles in an area designated by the airport operator outside the OFZ and never in the safety area of an active runway or taxiway. Unless a complex setup procedure makes movement of specialized equipment infeasible, inactive equipment must not be parked on a closed taxiway or runway. If it is necessary to leave specialized equipment on a closed taxiway or runway at night, the equipment must be well lighted. Employees should also park construction vehicles outside the OFA when not in use by construction personnel (for example, overnight, on weekends, or during other periods when construction is not active). Parking areas must not obstruct the clear line of sight by the ATCT to any taxiways or runways under air traffic control nor obstruct any runway visual aids, signs, or navigation aids. The FAA must also study those areas to determine effects on airport design criteria, surfaces established by 14 CFR Part 77, Safe, Efficient Use, and Preservation of the Navigable Airspace (Part 77), and on NAVAIDs and Instrument Approach Procedures (IAP). See paragraph 2.13.1 for further information.

2.9.2.3 **Access and Haul Roads.**

Determine the construction contractor's access to the construction sites and haul roads. Do not permit the construction contractor to use any access or haul roads other than those approved. Access routes used by contractor vehicles must be clearly marked to prevent inadvertent entry to areas open to airport operations. Pay special attention to ensure that if construction traffic is to share or cross any ARFF routes that ARFF right of way is not impeded at any time, and that construction traffic on haul

roads does not interfere with NAVAIDs or approach surfaces of operational runways. Address whether access gates will be blocked or inoperative or if a rally point will be blocked or inaccessible.

- 2.9.2.4 Marking and lighting of vehicles in accordance with AC 150/5210-5, *Painting, Marking, and Lighting of Vehicles Used on an Airport*.
- 2.9.2.5 Description of proper vehicle operations on various areas under normal, lost communications, and emergency conditions.
- 2.9.2.6 Required escorts.
- 2.9.2.7 **Training Requirements for Vehicle Drivers to Ensure Compliance with the Airport Operator's Vehicle Rules and Regulations.**

Specific training should be provided to vehicle operators, including those providing escorts. See AC 150/5210-20, *Ground Vehicle Operations on Airports*, for information on training and records maintenance requirements.
- 2.9.2.8 **Situational Awareness.**

Vehicle drivers must confirm by personal observation that no aircraft is approaching their position (either in the air or on the ground) when given clearance to cross a runway, taxiway, or any other area open to airport operations. In addition, it is the responsibility of the escort vehicle driver to verify the movement/position of all escorted vehicles at any given time. At non-towered airports, all aircraft movements and flight operations rely on aircraft operators to self-report their positions and intentions. However, there is no requirement for an aircraft to have radio communications. Because aircraft do not always broadcast their positions or intentions, visual checking, radio monitoring, and situational awareness of the surroundings is critical to safety.
- 2.9.2.9 **Two-Way Radio Communication Procedures.**
- 2.9.2.9.1 General.

The airport operator must ensure that tenant and construction contractor personnel engaged in activities involving unescorted operation on aircraft movement areas observe the proper procedures for communications, including using appropriate radio frequencies at airports with and without ATCT. When operating vehicles on or near open runways or taxiways, construction personnel must understand the critical importance of maintaining radio contact, as directed by the airport operator, with:

 1. Airport operations
 2. ATCT

3. Common Traffic Advisory Frequency (CTAF), which may include UNICOM, MULTICOM.
4. Automatic Terminal Information Service (ATIS). This frequency is useful for monitoring conditions on the airport. Local air traffic will broadcast information regarding construction related runway closures and “shortened” runways on the ATIS frequency.

2.9.2.9.2 Areas Requiring Two-Way Radio Communication with the ATCT.

Vehicular traffic crossing active movement areas must be controlled either by two-way radio with the ATCT, escort, flagman, signal light, or other means appropriate for the particular airport.

2.9.2.9.3 Frequencies to be Used.

The airport operator will specify the frequencies to be used by the contractor, which may include the CTAF for monitoring of aircraft operations. Frequencies may also be assigned by the airport operator for other communications, including any radio frequency in compliance with Federal Communications Commission requirements. At airports with an ATCT, the airport operator will specify the frequency assigned by the ATCT to be used between contractor vehicles and the ATCT.

2.9.2.9.4 Proper radio usage, including read back requirements.

2.9.2.9.5 Proper phraseology, including the International Phonetic Alphabet.

2.9.2.9.6 Light Gun Signals.

Even though radio communication is maintained, escort vehicle drivers must also familiarize themselves with ATCT light gun signals in the event of radio failure. See the FAA safety placard “Ground Vehicle Guide to Airport Signs and Markings.” This safety placard may be downloaded through the Runway Safety Program Web site at http://www.faa.gov/airports/runway_safety/publications/ (see “Signs & Markings Vehicle Dashboard Sticker”) or obtained from the FAA Airports Regional Office.

2.9.2.10 **Maintenance of the secured area of the airport, including:**

2.9.2.10.1 Fencing and Gates.

Airport operators and contractors must take care to maintain security during construction when access points are created in the security fencing to permit the passage of construction vehicles or personnel. Temporary gates should be equipped so they can be securely closed and locked to prevent access by animals and unauthorized people. Procedures should be in place to ensure that only authorized persons and vehicles have access to the AOA and to prohibit “piggybacking” behind another person or vehicle. The Department of Transportation (DOT) document DOT/FAA/AR-

00/52, *Recommended Security Guidelines for Airport Planning and Construction*, provides more specific information on fencing. A copy of this document can be obtained from the Airport Consultants Council, Airports Council International, or American Association of Airport Executives.

2.9.2.10.2 Badging Requirements.

Airports subject to 49 CFR Part 1542, *Airport Security*, must meet standards for access control, movement of ground vehicles, and identification of construction contractor and tenant personnel.

2.10 **Wildlife Management.**

The CSPP and SPCD must be in accordance with the airport operator's wildlife hazard management plan, if applicable. See AC 150/5200-33, *Hazardous Wildlife Attractants On or Near Airports*, and CertAlert 98-05, *Grasses Attractive to Hazardous Wildlife*. Construction contractors must carefully control and continuously remove waste or loose materials that might attract wildlife. Contractor personnel must be aware of and avoid construction activities that can create wildlife hazards on airports, such as:

2.10.1 Trash.

Food scraps must be collected from construction personnel activity.

2.10.2 Standing Water.

2.10.3 Tall Grass and Seeds.

Requirements for turf establishment can be at odds with requirements for wildlife control. Grass seed is attractive to birds. Lower quality seed mixtures can contain seeds of plants (such as clover) that attract larger wildlife. Seeding should comply with the guidance in AC 150/5370-10, *Standards for Specifying Construction of Airports*, Item T-901, Seeding. Contact the local office of the United 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.

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

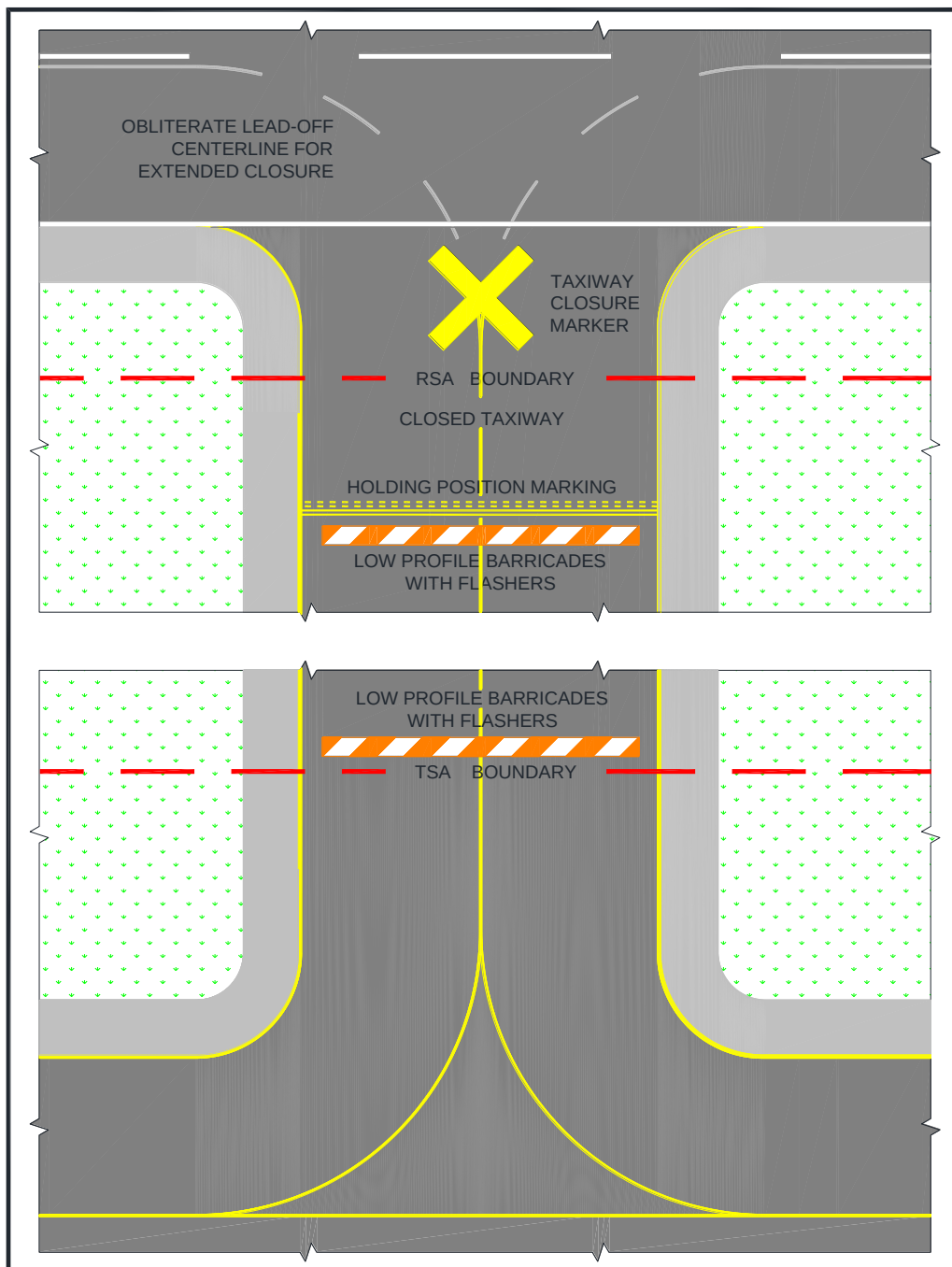


1. **Partially Closed Runways.** Pavement markings for temporary closed portions of the runway consist of a runway threshold bar, runway designation, and yellow chevrons to identify pavement areas that are unsuitable for takeoff or landing (see [AC 150/5340-1](#)). Obliterate or cover markings prior 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.

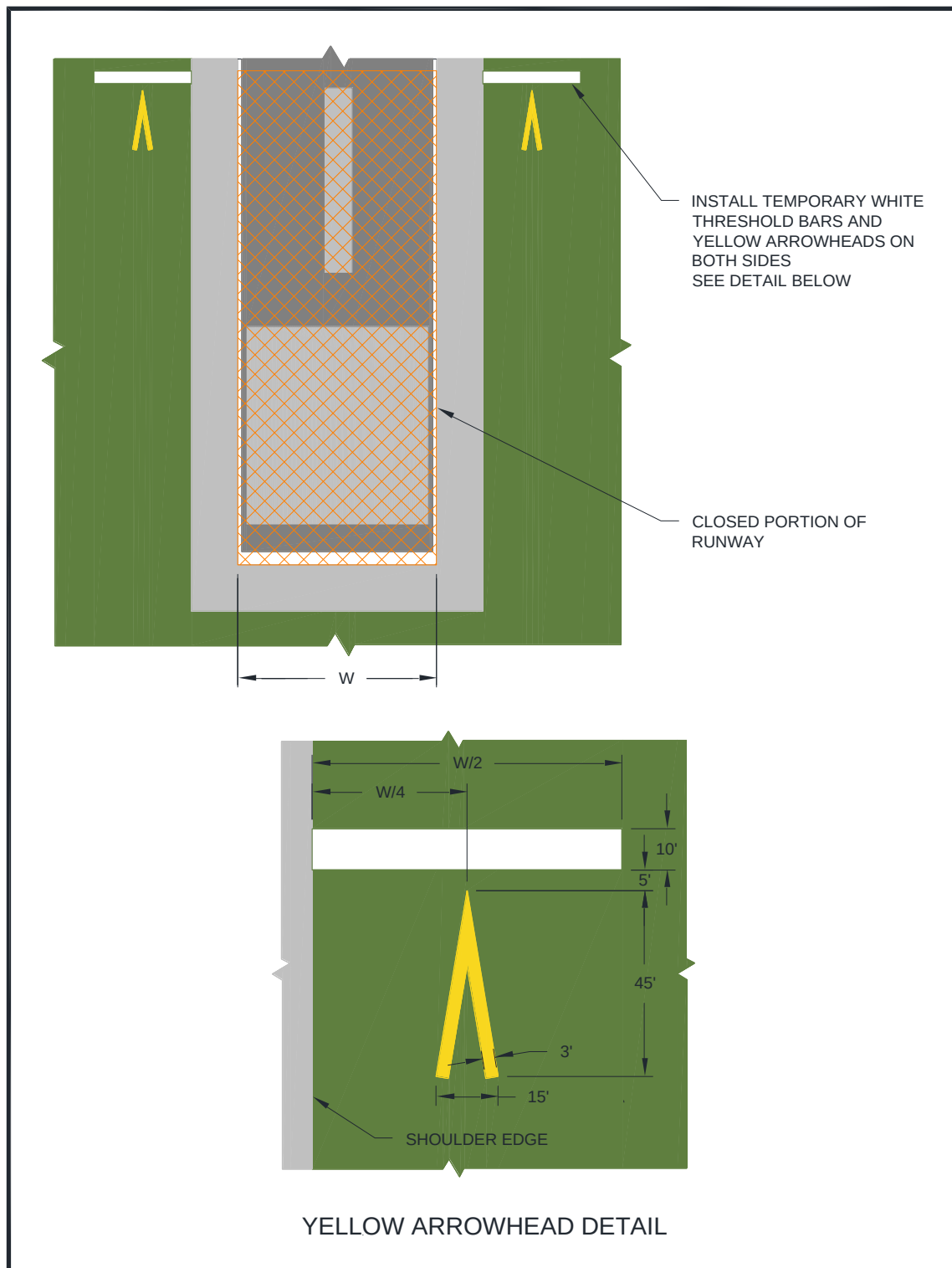
- 2.18.2.3 It may be necessary to remove or cover runway markings, including but not limited to, runway designation markings, threshold markings, centerline markings, edge stripes, touchdown zone markings and aiming point markings, depending on the length of construction and type of activity at the airport. 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

Number	Title and Description
<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

Number	Title and Description
<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>

Number	Title and Description
<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

Number	Title
Title 14 CFR Part 77	Safe, Efficient Use and Preservation of the Navigable Airspace
Title 14 CFR Part 139	Certification of Airports
Title 49 CFR Part 1542	Airport Security

Obtain the latest version of the Manual on Uniform Traffic Control Devices from the Federal Highway Administration at <http://mutcd.fhwa.dot.gov/>.

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APPENDIX B. TERMS AND ACRONYMS**Table B-1. Terms and Acronyms**

Term	Definition
Form 7460-1	Notice of Proposed Construction or Alteration. For on-airport projects, the form submitted to the FAA regional or airports division office as formal written notification of any kind of construction or alteration of objects that affect navigable airspace, as defined in 14 CFR Part 77, <i>Safe, Efficient Use, and Preservation of the Navigable Airspace</i> . (See guidance available on the FAA web site at https://oeaaa.faa.gov .) The form may be downloaded at http://www.faa.gov/airports/resources/forms/ , or filed electronically at: https://oeaaa.faa.gov .
Form 7480-1	Notice of Landing Area Proposal. Form submitted to the FAA Airports Regional Division Office or Airports District Office as formal written notification whenever a project without an airport layout plan on file with the FAA involves the construction of a new airport; the construction, realigning, altering, activating, or abandoning of a runway, landing strip, or associated taxiway; or the deactivation or abandoning of an entire airport. The form may be downloaded at http://www.faa.gov/airports/resources/forms/ .
Form 6000-26	Airport Sponsor Strategic Event Submission Form
AC	Advisory Circular
ACSI	Airport Certification Safety Inspector
ADG	Airplane Design Group
AIP	Airport Improvement Program
ALECP	Airport Lighting Equipment Certification Program
ANG	Air National Guard
AOA	Air Operations Area, as defined in 14 CFR Part 107. Means a portion of an airport, specified in the airport security program, in which security measures are carried out. This area includes aircraft movement areas, aircraft parking areas, loading ramps, and safety areas, and any adjacent areas (such as general aviation areas) that are not separated by adequate security systems, measures, or procedures. This area does not include the secured area of the airport terminal building.
ARFF	Aircraft Rescue and Fire Fighting
ARP	FAA Office of Airports
ASDA	Accelerate-Stop Distance Available
AT	Air Traffic
ATCT	Airport Traffic Control Tower
ATIS	Automatic Terminal Information Service
ATO	Air Traffic Organization
Certificated Airport	An airport that has been issued an Airport Operating Certificate by the FAA under

Term	Definition
	the authority of 14 CFR Part 139, <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.

Term	Definition
NOTAM	Notices to Airmen
Obstruction	Any object/obstacle exceeding the obstruction standards specified by 14 CFR Part 77, subpart C.
OCC	Operations Control Center
OE / AAA	Obstruction Evaluation / Airport Airspace Analysis
OFA	Object Free Area. An area on the ground centered on the runway, taxiway, or taxi lane centerline provided to enhance safety of aircraft operations by having the area free of objects except for those objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes. (See <u>AC 150/5300-13</u> 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 <u>AC 150/5300-13</u> 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 <u>AC 150/5300-13</u> .
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 <u>AC 150/5300-13</u> .
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 <u>AC 150/5300-13</u> 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	
General Considerations					
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>				
Areas and Operations Affected by Construction Activity					
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>				
NAVAIDs					
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>				
Contractor Access					
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 <u>AC 150/5210-5, Painting, Marking and Lighting of Vehicles Used on an Airport</u> , 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>				
Wildlife Management					
The airport operator's wildlife management procedures are addressed.	<u>2.10</u>				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
Foreign Object Debris Management					
The airport operator’s FOD management procedures are addressed.	<u>2.11</u>				
Hazardous Materials Management					
The airport operator’s hazardous materials management procedures are addressed.	<u>2.12</u>				
Notification of Construction Activities					
Procedures for the immediate notification of airport user and local FAA of any conditions adversely affecting the operational safety of the airport are detailed.	<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>				
Inspection Requirements					
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>				
Underground Utilities					
Procedures for protecting existing underground facilities in excavation areas are described.	<u>2.15</u>				
Penalties					
Penalty provisions for noncompliance with airport rules and regulations and the safety plans are detailed.	<u>2.16</u>				
Special Conditions					
Any special conditions that affect the operation of the airport or require the activation of any special procedures are addressed.	<u>2.17</u>				
Runway and Taxiway Visual Aids - Marking, Lighting, Signs, and Visual NAVAIDs					
The proper securing of temporary airport markings, lighting, signs, and visual NAVAIDs is addressed.	<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>				
Marking and Signs For Access Routes					
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>				
Hazard Marking and Lighting					
Prominent, comprehensible warning indicators for any area affected by construction that is normally accessible to aircraft, personnel, or vehicles are specified.	<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	
Work Zone Lighting for Nighttime Construction					
If work is to be conducted at night, the CSPP identifies construction lighting units and their general locations and aiming in relationship to the ATCT and active runways and taxiways.	<u>2.21</u>				
Protection of Runway and Taxiway Safety Areas					
The CSPP clearly states that no construction may occur within a safety area while the associated runway or taxiway is open for aircraft operations.	<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>				
Other Limitations on Construction					
The CSPP prohibits the use of open flame welding or torches unless adequate fire safety precautions are provided and the airport operator has approved their use.	<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

Item	Action Required (Describe)	No Action Required (Check)
Excavation adjacent to runways, taxiways, and aprons improperly backfilled.		
Mounds of earth, construction materials, temporary structures, and other obstacles near any open runway, taxiway, or taxi lane; in the related Object Free area and aircraft approach or departure areas/zones; or obstructing any sign or marking.		
Runway resurfacing projects resulting in lips exceeding 3 inch (7.6 cm) from pavement edges and ends.		
Heavy equipment (stationary or mobile) operating or idle near AOA, in runway approaches and departures areas, or in OFZ.		
Equipment or material near NAVAIDs that may degrade or impair radiated signals and/or the monitoring of navigation and visual aids. Unauthorized or improper vehicle operations in localizer or glide slope critical areas, resulting in electronic interference and/or facility shutdown.		
Tall and especially relatively low visibility units (that is, equipment with slim profiles) — cranes, drills, and similar objects — located in critical areas, such as OFZ and		

Item	Action Required (Describe)	No Action Required (Check)
approach zones.		
Improperly positioned or malfunctioning lights or unlighted airport hazards, such as holes or excavations, on any apron, open taxiway, or open taxi lane or in a related safety, approach, or departure area.		
Obstacles, loose pavement, trash, and other debris on or near AOA. Construction debris (gravel, sand, mud, paving materials) on airport pavements may result in aircraft propeller, turbine engine, or tire damage. Also, loose materials may blow about, potentially causing personal injury or equipment damage.		
Inappropriate or poorly maintained fencing during construction intended to deter human and animal intrusions into the AOA. Fencing and other markings that are inadequate to separate construction areas from open AOA create aviation hazards.		
Improper or inadequate marking or lighting of runways (especially thresholds that have been displaced or runways that have been closed) and taxiways that could cause pilot confusion and provide a potential for a runway incursion. Inadequate or improper methods of marking, barricading, and lighting of temporarily closed portions of AOA create aviation hazards.		
Wildlife attractants — such as trash (food scraps not collected from construction personnel activity), grass seeds, tall grass, or standing water — on or near airports.		
Obliterated or faded temporary markings on active operational areas.		
Misleading or malfunctioning obstruction lights. Unlighted or unmarked obstructions in the approach to any open runway pose aviation hazards.		

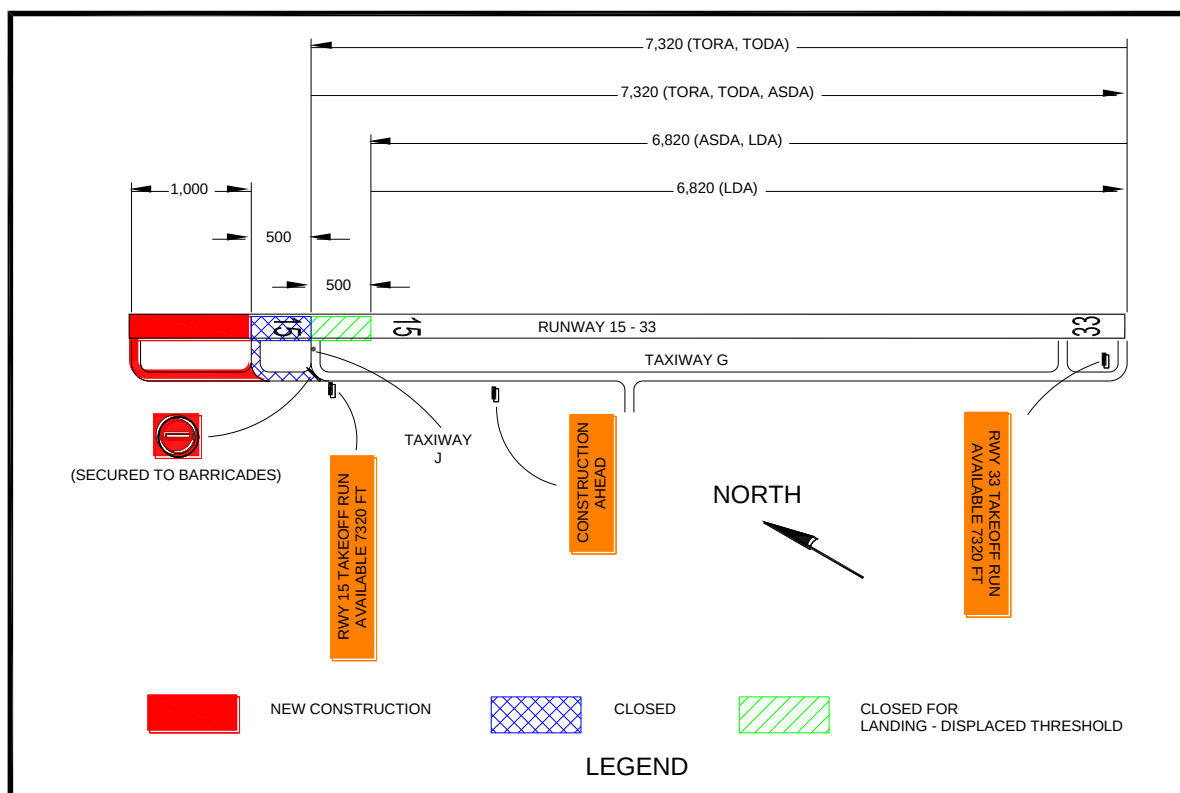
Item	Action Required (Describe)	No Action Required (Check)
Failure to issue, update, or cancel NOTAMs about airport or runway closures or other construction related airport conditions.		
Failure to mark and identify utilities or power cables. Damage to utilities and power cables during construction activity can result in the loss of runway / taxiway lighting; loss of navigation, visual, or approach aids; disruption of weather reporting services; and/or loss of communications.		
Restrictions on ARFF access from fire stations to the runway / taxiway system or airport buildings.		
Lack of radio communications with construction vehicles in airport movement areas.		
Objects, regardless of whether they are marked or flagged, or activities anywhere on or near an airport that could be distracting, confusing, or alarming to pilots during aircraft operations.		
Water, snow, dirt, debris, or other contaminants that temporarily obscure or derogate the visibility of runway/taxiway marking, lighting, and pavement edges. Any condition or factor that obscures or diminishes the visibility of areas under construction.		
Spillage from vehicles (gasoline, diesel fuel, oil) on active pavement areas, such as runways, taxiways, aprons, and airport roadways.		
Failure to maintain drainage system integrity during construction (for example, no temporary drainage provided when working on a drainage system).		

Item	Action Required (Describe)	No Action Required (Check)
Failure to provide for proper electrical lockout and tagging procedures. At larger airports with multiple maintenance shifts/workers, construction contractors should make provisions for coordinating work on circuits.		
Failure to control dust. Consider limiting the amount of area from which the contractor is allowed to strip turf.		
Exposed wiring that creates an electrocution or fire ignition hazard. Identify and secure wiring, and place it in conduit or bury it.		
Site burning, which can cause possible obscuration.		
Construction work taking place outside of designated work areas and out of phase.		

APPENDIX E. SAMPLE OPERATIONAL EFFECTS TABLE**E.1 Project Description.**

Runway 15-33 is currently 7820 feet long, with a 500 foot stopway on the north end. This project will remove the stopway and extend the runway 1000 feet to the north and 500 feet to the south. Finally, the existing portion of the runway will be repaved. The runway 33 glide slope will be relocated. The new runway 33 localizer has already been installed by FAA Technical Operations and only needs to be switched on. Runway 15 is currently served only by a localizer, which will remain in operation as it will be beyond the future RSA. Appropriate NOTAMS will be issued throughout the project.

- E.1.1 During Phase I, the runway 15 threshold will be displaced 1000 feet to keep construction equipment below the approach surface. The start of runway 15 takeoff and the departure end of runway 33 will also be moved 500 feet to protect workers from jet blast. Declared distances for runway 33 will be adjusted to provide the required RSA and applicable departure surface. Excavation near Taxiway G will require its ADG to be reduced from IV to III. See [Figure E-1](#).

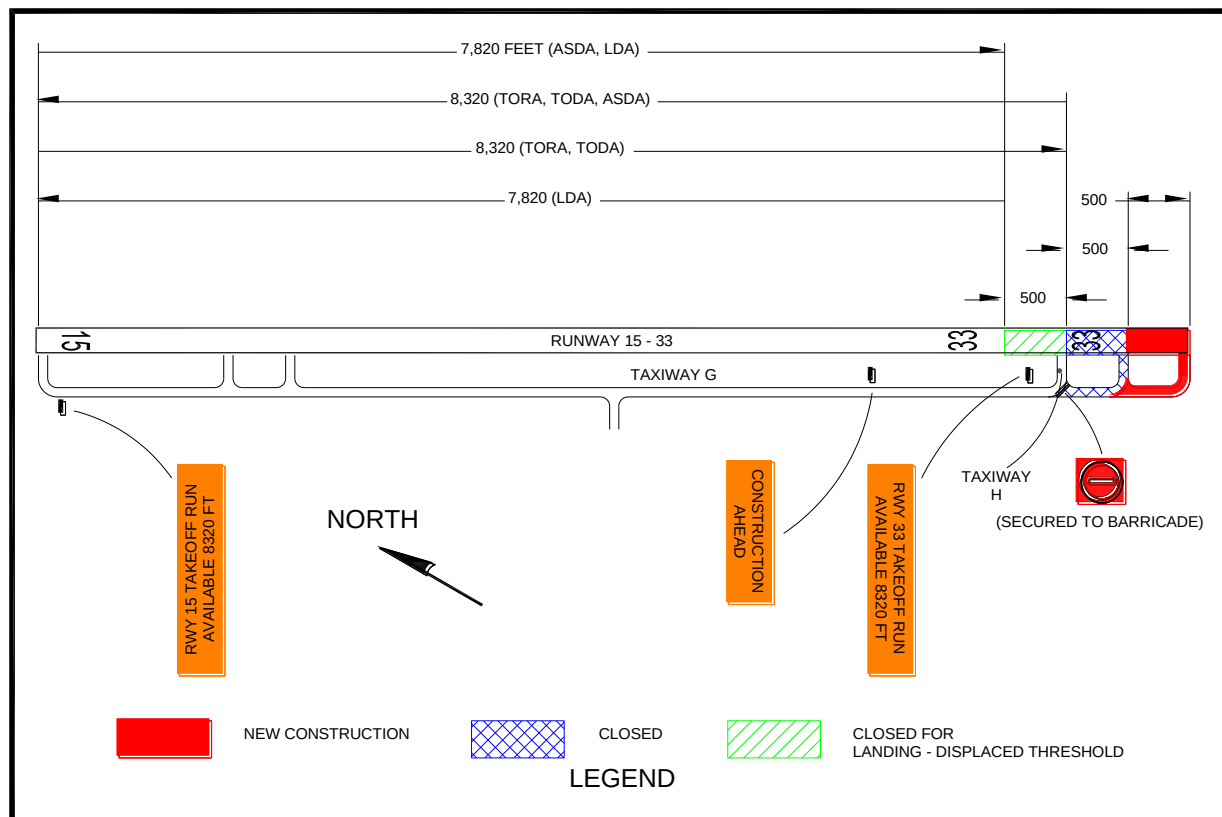
Figure E-1. Phase I Example

Note 1: Where hold signs are installed on both sides of a taxiway, install the TORA sign on the left side of the taxiway before the final turn to the runway intersection.

Note 2: Based on the declared distances for Runway 33 departures, the maximum equipment height in the construction area is 12.5 feet ($500/40 = 12.5$).

- E.2 During Phase II, the runway 33 threshold will be displaced 1000 feet to keep construction equipment below the approach surface. The start of runway 33 takeoff and the departure end of runway 15 will also be moved 500 feet to protect workers from jet blast. Declared distances for runway 15 will be adjusted to provide the required RSA and applicable departure surface. See Figure E-2.

Figure E-2. Phase II Example



Note 1: Where hold signs are installed on both sides of a taxiway, install the TORA sign on the left side of the taxiway before the final turn to the runway intersection.

Note 2: Based on the declared distances for Runway 15 departures, the maximum equipment height in the construction area is 12.5 feet ($500/40 = 12.5$).

- E.3 During Phase III, the existing portion of the runway will be repaved with Hot Mix Asphalt (HMA) and the runway 33 glide slope will be relocated. Construction will be accomplished between the hours of 8:00 pm and 5:00 am, during which the runway will be closed to operations.

Figure E-3. Phase III Example

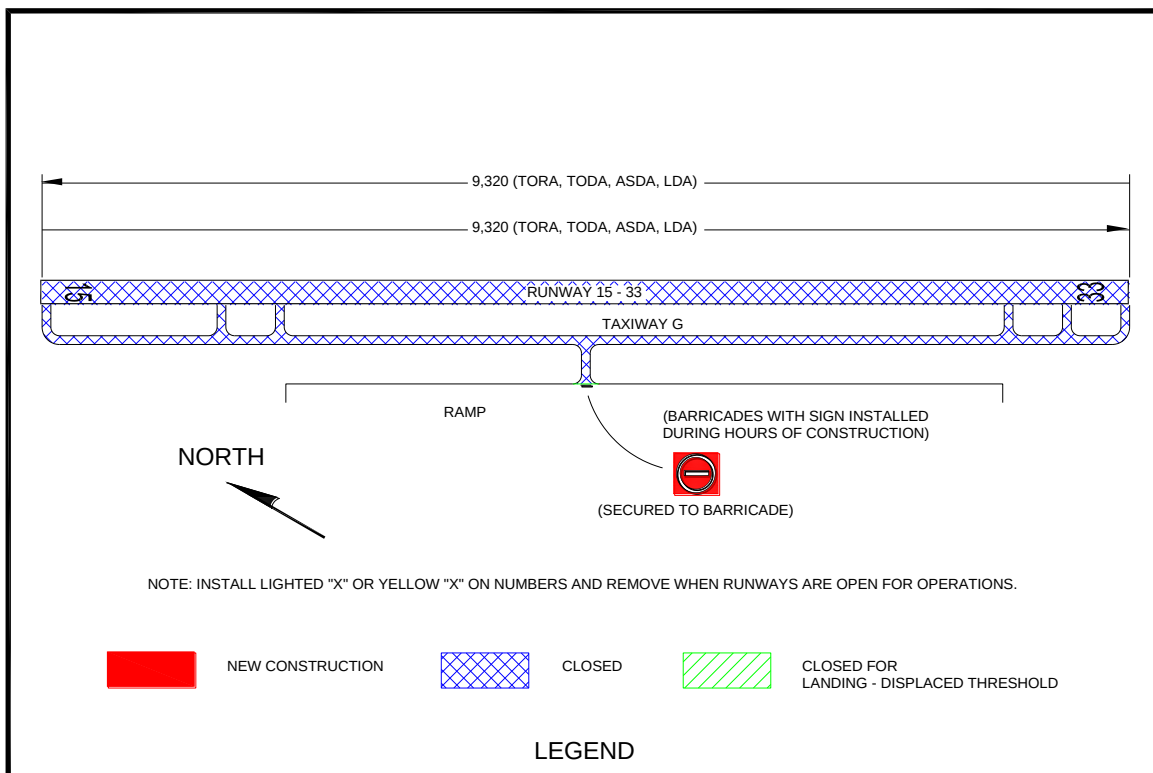


Table E-1. Operational Effects Table

Project	Runway 15-33 Extension and Repaving			
Phase	Normal (Existing)	Phase I: Extend Runway 15 End	Phase II: Extend Runway 33 End	Phase III: Repave Runway
Scope of Work	N/A	Extend Runway 15-33 1,000 ft on north end with Hot Mix Asphaltic Concrete (HMA).	Extend Runway 15-33 500 ft on south end with Hot Mix Asphaltic Concrete (HMA).	Repave existing runway with HMA Relocate Runway 33 Glide Slope
Effects of Construction Operations	N/A	Existing North 500 ft closed	Existing South 500 ft closed	Runway closed between 8:00 pm and 5:00 am Edge lighting out of service
Construction Phase	N/A	Phase I (Anticipated)	Phase II (Anticipated)	Phase III (Anticipated)
Runway 15 Average Aircraft Operations	Carrier: 52 /day GA: 26 /day Military: 11 /day	Carrier: 40 /day GA: 26 /day Military: 0 /day	Carrier: 45 /day GA: 26 /day Military: 5 /day	Carrier: 45 / day GA: 20 / day Military: 0 /day
Runway 33 Average Aircraft Operations	Carrier: 40 /day GA: 18 /day Military: 10 /day	Carrier: 30 /day GA: 18 /day Military: 0 /day	Carrier: 25 /day GA: 18 /day Military: 5 /day	Carrier: 20 /day GA: 5 /day Military: 0 /day
Runway 15-33 Aircraft Category	C-IV	C-IV	C-IV	C-IV
Runway 15 Approach Visibility Minimums	1 mile	1 mile	1 mile	1 mile
Runway 33 Approach Visibility Minimums	$\frac{3}{4}$ 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.

Project		Runway 15-33 Extension and Repaving			
Phase		Normal (Existing)	Phase I: Extend Runway 15 End	Phase II: Extend Runway 33 End	Phase III: Repave Runway
Runway 15 Declared Distances	TORA	7,820	7,320	8,320	9,320
	TODA	7,820	7,320	8,320	9,320
	ASDA	7,820	7,320	7,820	9,320
	LDA	7,820	6,820	7,820	9,320
Runway 33 Declared Distances	TORA	7,820	7,320	8,320	9,320
	TODA	7,820	7,320	8,320	9,320
	ASDA	8,320	6,820	8,320	9,320
	LDA	7,820	6,820	7,820	9,320
Runway 15 Approach Procedures		LOC only	LOC only	LOC only	LOC only
		RNAV	RNAV	RNAV	RNAV
		VOR	VOR	VOR	VOR
Runway 33 Approach Procedures		ILS	ILS	ILS	LOC only
		RNAV	RNAV	RNAV	RNAV
		VOR	VOR	VOR	VOR
Runway 15 NAVAIDs		LOC	LOC	LOC	LOC
Runway 33 NAVAIDs		ILS, MALSR	ILS, MALSR	ILS, MALSR	LOC, MALSR
Taxiway G ADG		IV	III	IV	IV
Taxiway G TDG		4	4	4	4
ATCT (hours open)		24 hours	24 hours	24 hours	0500 - 2000
ARFF Index		D	D	D	D

Project	Runway 15-33 Extension and Repaving			
Phase	Normal (Existing)	Phase I: Extend Runway 15 End	Phase II: Extend Runway 33 End	Phase III: Repave Runway
Special Conditions	Air National Guard (ANG) military operations	All military aircraft relocated to alternate ANG Base	Some large military aircraft relocated to alternate ANG Base	All military aircraft relocated to alternate ANG Base
Information for NOTAMs		Refer above for applicable declared distances. Taxiway G limited to 118 ft wingspan	Refer above for applicable declared distances.	Refer above for applicable declared distances. Airport closed 2000 – 0500. Runway 15 glide slope OTS.

Note: This table is one example. It may be advantageous to develop a separate table for each project phase and/or to address the operational status of the associated NAVAIDs per construction phase.

Complete the following chart for each phase to determine the area that must be protected along the runway and taxiway edges:

Table E-2. Runway and Taxiway Edge Protection

Runway/Taxiway	Aircraft Approach Category* A, B, C, or D	Airplane Design Group* I, II, III, or IV	Safety Area Width in Feet Divided by 2*

*See AC 150/5300-13 to complete the chart for a specific runway/taxiway.

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	: 1
				ft	: 1
				ft	: 1

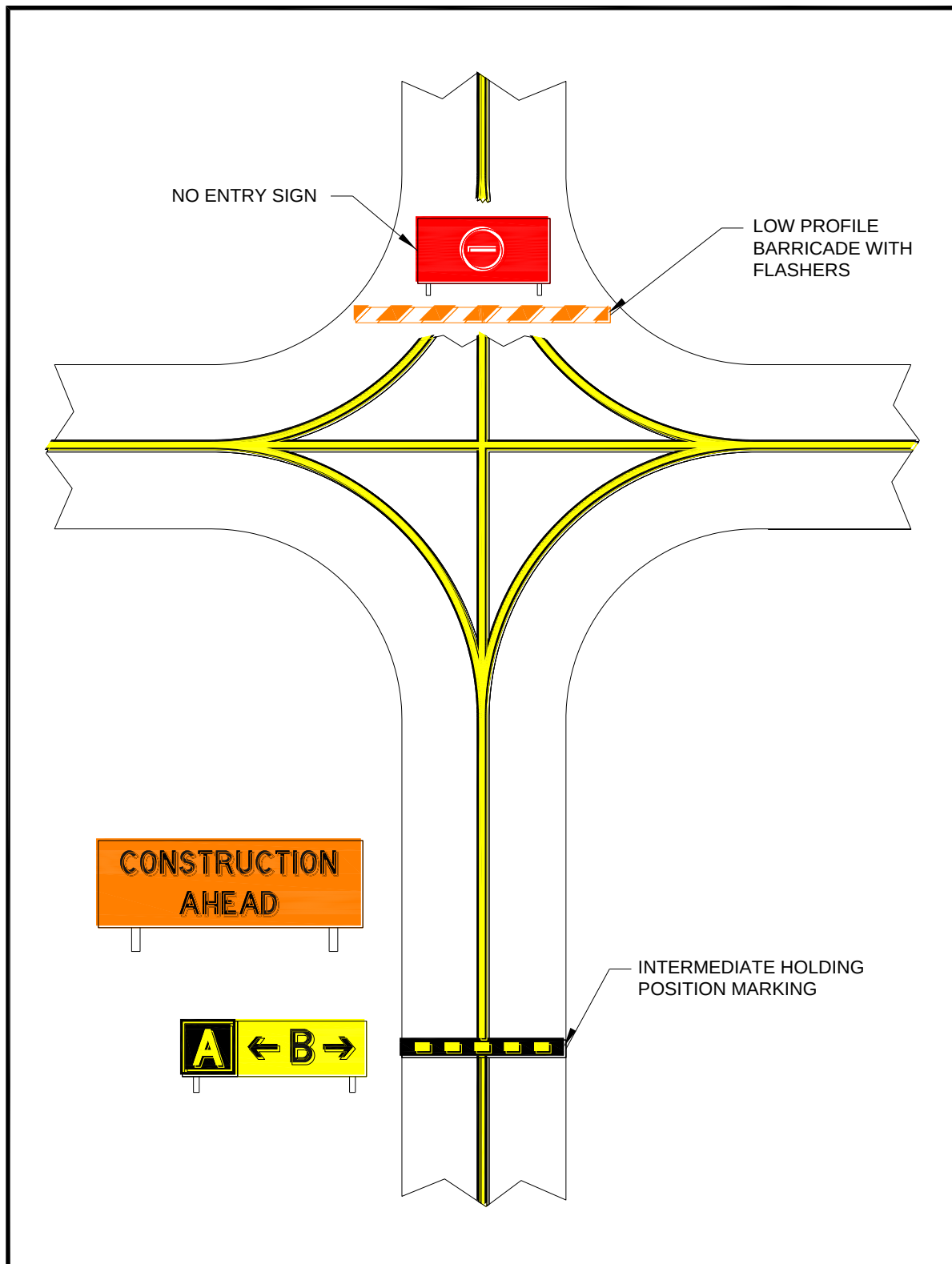
*See AC 150/5300-13 to complete the chart for a specific runway.

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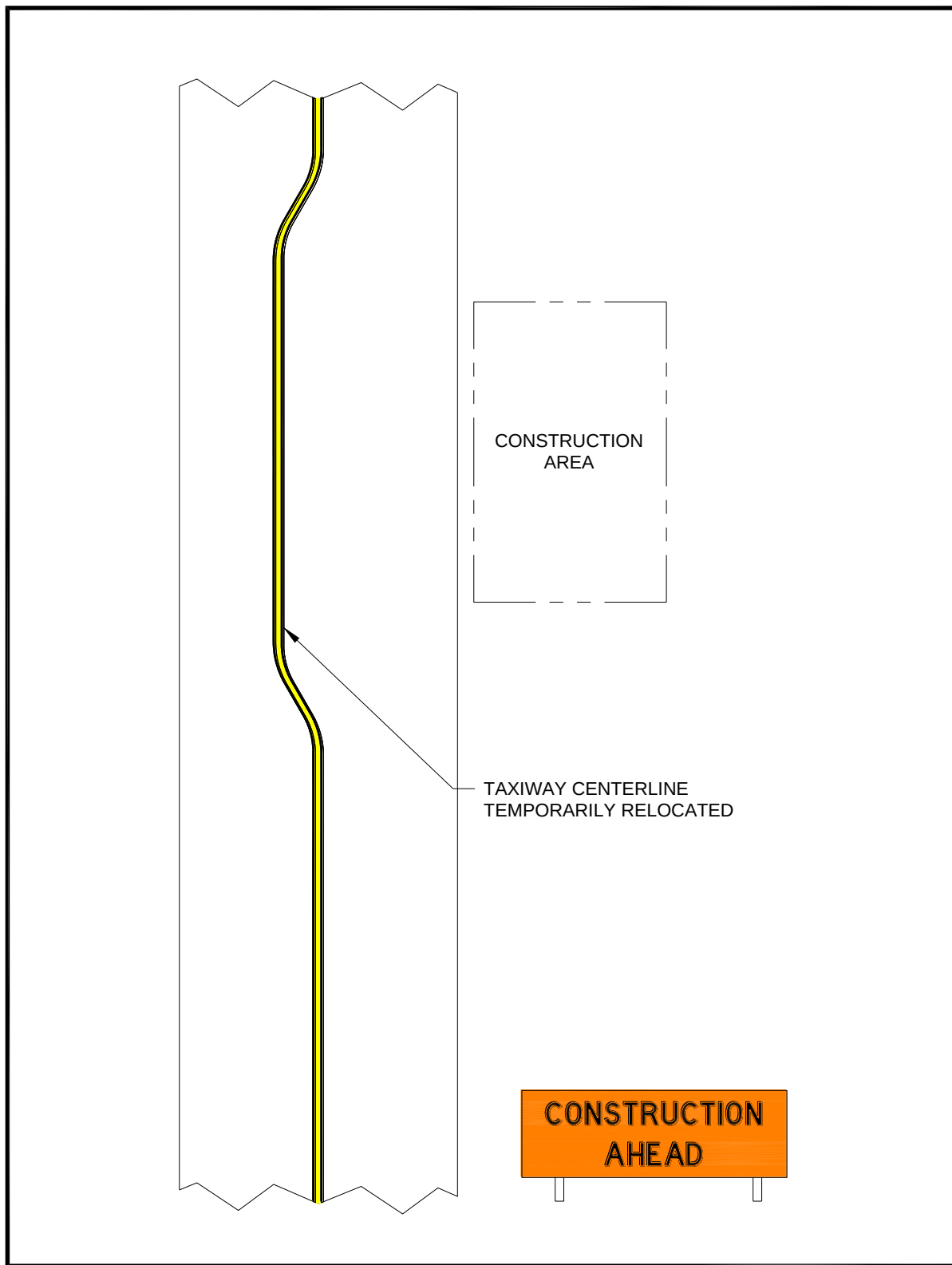
APPENDIX F. ORANGE CONSTRUCTION SIGNS

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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Miscellaneous Documentation

GEOTECHNICAL ENGINEERING REPORT



ECP Taxiway E-1 Transient Apron
Bay County, Florida

PREPARED FOR:

ZHA
601 North Magnolia Avenue, Suite 100
Orlando, Florida 32801

NOVA Project Number: 7217129

January 26, 2018



January 26, 2018

ZHA

601 North Magnolia Avenue, Suite 100
Orlando, Florida 32801

Attention: Mr. Frederick J. Mellin, Jr., President/CEO

Subject: Geotechnical Engineering Report
ECP Taxiway E-1 Transient Apron
Bay County, Florida
NOVA Project Number 7217129

Dear Mr. Mellin,

NOVA Engineering and Environmental LLC (NOVA) has completed the authorized subsurface exploration and geotechnical engineering evaluation for the proposed ECP Taxiway E-1 Transient Apron to be constructed within the Northwest Florida Beaches International Airport facility in Panama City, Bay County, Florida. The work was performed in general accordance with NOVA proposal number 011-20172773, dated January 9, 2018. This report briefly discusses our understanding of the project at the time of the subsurface exploration, describes the geotechnical consulting services provided by NOVA, and presents our findings, conclusions and recommendations.

We appreciate your selection of NOVA and the opportunity to be of service on this project. If you have any questions, or if we may be of further assistance, please do not hesitate to contact us.

Sincerely,

NOVA ENGINEERING AND ENVIRONMENTAL LLC

Brian W. Bloomfield, P.E.
Branch Manager
Florida Registration No. 65580

Andre Kniazeff, P.E.
Geotechnical Service Line Leader
Florida Registration No. 81315



Copies Submitted: Addressee (electronic)

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APPENDIX

APPENDIX A – FIGURES & MAPS
APPENDIX B – SUBSURFACE DATA
APPENDIX C – LABORATORY TEST RESULTS
APPENDIX D – SUPPORT DOCUMENTS

1.0 SUMMARY

A brief summary of pertinent findings, conclusions and recommendations is presented below. This information should not be utilized in design or construction without reading all of the recommendations presented in the text and Appendix of this report.

1.1 GENERAL

Our field exploration at the subject site included performing six (6) Standard Penetration Test (SPT) borings at design team specified locations within the proposed apron footprint. Additionally, two (2) bulk soil samples of the pre-dominant shallow soil materials (below topsoil) present within the proposed apron footprint were collected for Limerock Bearing Ratio (LBR) testing. Drilling, testing and sampling operations were performed in general accordance with ASTM designations and other industry standards.

The SPT test borings generally encountered mixed strata of loose to very dense slightly silty fine-grained sands (USCS classifications of SP-SM) from the existing ground surface elevation to the maximum depth explored of about 10 feet below existing grade (BEG).

1.2 SITE PREPARATION

We recommend stripping and grubbing the proposed pavement footprint to remove all surficial vegetation and topsoil, trees and associated root systems, and any other deleterious non-soil materials that are found to be present. Resulting or additional excavations should be backfilled with structural fill compacted to a minimum soil density of at least 98 percent of the maximum dry density as determined by the Modified Proctor test (ASTM D-1557).

A geotechnical engineer should also carefully evaluate all subgrades prior to pavement section construction to confirm compliance with this report; evaluate geotechnical sections of the plans and specifications for the overall project; and provide additional recommendations that may be required.

1.3 GROUNDWATER CONTROL

Groundwater was encountered in test borings at depths ranging between about 8 to 9 feet BEG at the time of our subsurface exploration, which occurred during a period of normal seasonal rainfall. We do not anticipate that groundwater will adversely impact the planned development of this property.

1.4 PAVEMENT SUBGRADE

To estimate the California Bearing Ratio (CBR), two (2) bulk samples of the predominant surficial soils were collected within the proposed apron and LBR tests were performed. To estimate the CBR of the soils, a conversion factor of 0.8 was applied to the LBR's in accordance to the US Department of Transportation Federal Aviation Administration Advisory Circular 150/5320-6F Section 2.5.6. Based upon the results of our testing, the estimated CBR value at of the surficial soils at test locations LBR-1 and LBR-2 are approximately 27 and 48, respectively.

2.0 INTRODUCTION

2.1 PROJECT INFORMATION

Our understanding of the proposed development is based on recent conversations and email exchanges with the Client, review of the provided site plan and aerial photography of the site via internet-based GIS software; and our experience with similar geotechnical conditions in the near vicinity to this project site.

2.1.1 SITE PLANS AND DOCUMENTS

We were furnished with the following documents:

- Document: Soil Boring Location Plan
Prepared by: Client
Dated: None Provided

2.1.2 PROPOSED CONSTRUCTION

NOVA understands that the project will consist of constructing a new transient apron on the east side of Johnny Reaver Road within the Northwest Florida Beaches International Airport facility in Panama City, Bay County, Florida.

2.2 SCOPE OF WORK

ZHA engaged NOVA to provide geotechnical engineering consulting services for the proposed **ECP Taxiway E-1 Transient Apron** project. This report briefly discusses our understanding of the project, describes our exploratory procedures, and presents our findings, conclusions, and recommendations.

The primary objective of this study was to perform a geotechnical exploration within the proposed construction areas and to assess these findings as they relate to geotechnical aspects of the planned site improvements. The authorized geotechnical engineering services included a site reconnaissance, a soil test boring and sampling program, laboratory testing, engineering evaluation of the field and laboratory data, and the preparation of this report. The services were performed substantially as outlined in our proposal number 011-20172773, dated January 9, 2018, and in general accordance with industry standards. As authorized per the above referenced proposal, the completed geotechnical report was to include:

- A description of the site, fieldwork, laboratory testing and general soil conditions encountered, together with a Boring Location Plan, and individual Test Boring Records.
- Site preparation considerations that include geotechnical discussions regarding site stripping and subgrade preparation, and engineered fill/backfill placement.
- Recommendations for controlling groundwater and/or run-off during construction and, the need for permanent dewatering systems based on the anticipated post construction groundwater levels.
- Summary of laboratory test data performed on select soil samples.
- Suitability of on-site soils for re-use as structural fill and backfill. Additionally, the criteria for suitable fill materials will be provided.

The assessment of site environmental conditions, including the presence of wetlands or detection of pollutants in the soil, rock or groundwater, laboratory testing of samples, or a site-specific seismic study was beyond the scope of this geotechnical study. If requested, NOVA can provide these services.

3.0 SITE DESCRIPTION

3.1 LOCATION AND LEGAL DESCRIPTION

The area of study is located on the east side of Johnny Reaver Road within the Northwest Florida Beaches International Airport facility in Panama City, Bay County, Florida.

3.2 CURRENT USE OF THE PROPERTY

At the time of our field exploration, the Subject Property was undeveloped and vacant land that was vegetated primarily with low-lying grasses.

4.0 FIELD AND LABORATORY PROCEDURES

4.1 FIELD EXPLORATION

The Client provided boring locations were established in the field by NOVA personnel using a handheld GPS locator. Consequently, referenced boring locations should be considered approximate. If the client desires increased accuracy, NOVA recommends that the boring locations and elevations be surveyed.

Our field exploration included:

- Six (6) SPT borings, each advanced to a depth of approximately 10 feet BEG within the footprint of the proposed apron.
- Obtaining two (2) bulk soil samples of the pre-dominant subsurface materials present below topsoil within the proposed apron footprint for Limerock Bearing Ratio (LBR) testing.

Standard Penetration Test Borings: The standard penetration test borings were performed using the guidelines of ASTM Designation D-1586, "Penetration Test and Split-Barrel Sampling of Soils". A mud rotary drilling process was used to advance the borings. At regular intervals, soil samples were obtained with a standard 1.4-inch I.D., 2.0-inch O.D., split-tube sampler. The sampler was first seated six inches and then driven an additional foot with blows of a 140-pound hammer falling 30 inches. The number of hammer blows required to drive the sampler the final foot is designated the "Penetration Resistance". The penetration resistance, when properly interpreted, is an index to the soil strength and density. Representative portions of the soil samples, obtained from the sampler, were placed in sealed containers and transported to our laboratory for further evaluation and laboratory testing.

Groundwater Levels: The groundwater levels reported on the Test Boring Records represent measurements made at the completion of the soil test boring. The soil test borings were subsequently backfilled with the soil cuttings from the drilling process for safety concerns.

4.2 LABORATORY TESTING

A laboratory testing program was conducted to characterize materials existing at the site using split spoon and bulk/grab soil samples recovered from the borings. The laboratory test data are presented in the Appendix. Selected test data are presented on the Test Boring Records attached in the Appendix. The specific tests are briefly described below. Further laboratory testing was beyond the scope of this exploration.

It should be noted that all soil samples will be properly disposed of 30 days following the submittal of this NOVA subsurface exploration report unless you request otherwise.

4.2.1 SOIL CLASSIFICATION

Soil classification provides a general guide to the engineering properties of various soil types and enable the engineer to apply past experience to current problems. In our explorations, samples obtained during drilling operations are observed in our laboratory and visually classified by an engineer. The soils are classified according to relative density (based on SPT N-values), color and texture. These classification descriptions are included on our Test Boring Records. The classification system discussed above is primarily qualitative; laboratory testing is generally required for detailed soil classification. Using the test results, the soils were visually/manually classified according to the Unified Soil Classification System. This classification system and the in-place physical soil properties provide an index for estimating the soil's behavior. The soil classification and physical properties obtained are presented in this report.

4.2.2 MOISTURE CONTENT

The moisture content is the ratio expressed as a percentage of the weight of water in a given mass of soil to the weight of the solid particles. These tests were conducted in general accordance with ASTM Designation D-2216. A total of four (4) moisture content tests were performed in this study.

4.2.3 FINES CONTENT

The percentage of fines passing through the No. 200 sieve is generally considered to represent the amount of silt and clay of the tested soil sample. The fine content tests were conducted in general accordance with ASTM Designations D-6913 and D-1140. A total of six (6) fines content tests were performed in this study.

4.2.4 LBR TESTS

Two (2) Limerock Bearing Ratio (LBR) tests were performed in accordance with FM 5-515 – Florida Method of Test for Limerock Bearing Ratio (LBR) to determine strength and deflection characteristics of soil with respect to stabilized subgrade acceptance criteria correlated with pavement performance to establish design curves for pavement thickness.

5.0 SUBSURFACE CONDITIONS

5.1 GEOLOGY

According to the United States Geological Survey (USGS) the subject site is located in Bay County within the Gulf Coastal Plain, separated from the Florida Platform by geologic structures known as the Gulf Trough and Apalachicola Embayment. These structures formed a bathymetric and environmental barrier from the earliest Eocene or earliest Oligocene periods into the Miocene.

According to the “Text to Accompany the Geologic Map of Florida” by Scott, 2001, the site is generally underlain by undifferentiated sediments deposited during the Quaternary period. These sediments typically consist of siliciclastics (sand), organics and freshwater carbonates. These soils are highly permeable and form the Sand and Gravel Aquifer of the surficial aquifer system.

Surficial soils in the region are primarily siliciclastic sediments deposited in response to the renewed uplift and erosion in the Appalachian highlands to the north and sea-level fluctuations. The extent and type of deposit is influenced by numerous factors, including mineral composition of the parent rock and meteorological events.

5.2 SOIL CONDITIONS

The following paragraph provides a generalized description of the subsurface profile and soil conditions encountered by the borings. The Test Boring Records provided in the Appendix should be reviewed to provide more detailed descriptions of the subsurface conditions encountered at the boring locations. Conditions may vary at other locations and times.

The SPT test borings generally encountered mixed strata of loose to very dense fine-grained sands to slightly silty fine-grained sands (USCS classifications of SP and SP-SM, respectively) from the existing ground surface elevation to the maximum depth explored of about 10 feet below existing grade (BEG).

5.3 GROUNDWATER CONDITIONS

5.3.1 GENERAL

Groundwater in the Gulf Coastal Plain typically occurs as an unconfined aquifer condition. Recharge is provided by the infiltration of rainfall and surface water through the soil overburden. More permeable zones in the soil matrix can affect groundwater conditions. The groundwater table is expected to be a subdued replica of the original surface topography.

5.3.2 SOIL TEST BORING GROUNDWATER CONDITIONS

Groundwater was encountered in test borings at depths ranging between about 8 to 9 feet BEG at the time of our subsurface exploration, which occurred during a period of normal seasonal rainfall.

Groundwater levels vary with changes in season and rainfall, construction activity, surface water runoff and other site-specific factors. Groundwater levels in the Bay County area are typically lowest in the late spring and the late fall and highest in the summer with annual groundwater fluctuations by seasonal rainfall; consequently, the water table may vary at times.

6.0 CONCLUSIONS AND RECOMMENDATIONS

The following conclusions and recommendations are based on our understanding of the proposed construction, our site observations, our evaluation and interpretation of the field and laboratory data obtained during this exploration, our experience with similar subsurface conditions, and generally accepted geotechnical engineering principles and practices.

Subsurface conditions in unexplored locations or at other times may vary from those encountered at specific boring locations. If such variations are noted during construction, or if project development plans are changed, we request the opportunity to review the changes and amend our recommendations, if necessary.

As previously noted, the Client selected boring locations were established in the field by NOVA personnel using a handheld GPS locator. Consequently, referenced boring locations should be considered approximate. If increased accuracy is desired by the client, we recommend that the boring locations and elevations be surveyed.

6.1 SITE PREPARATION

We recommend stripping and grubbing the proposed crane mound and pavement areas to remove all surficial vegetation and topsoil, trees and associated root systems, and any other deleterious non-soil materials that are found to be present. Resulting or additional excavations should be backfilled with structural fill compacted to a minimum soil density of at least 98 percent of the maximum dry density as determined by the Modified Proctor test (ASTM D-1557).

A geotechnical engineer should also carefully evaluate all subgrades prior to pavement section construction to confirm compliance with this report; evaluate geotechnical sections of the plans and specifications for the overall project; and provide additional recommendations that may be required.

6.2 FILL PLACEMENT

6.2.1 FILL SUITABILITY

Fill materials should include relatively clean sands with less than 12 percent fines (material passing the No. 200 sieve) that are free of non-soil materials and rock fragments larger than 3 inches in diameter. Soils with fines contents between 13 and 25 percent may also be used as fill soils for this project, but we note that strict moisture control would be required at the time of placement for these moisture-sensitive soils. Based on visual examination, the near-surface existing slightly silty fine-grained sands (USCS classifications of SP-SM) encountered during this exploration appear suitable for reuse as structural site fill.

Fill materials that contain organic debris (organic contents greater than 4 percent) or construction debris/rubble are not suitable for reuse as structural fill. Prior to construction, bulk samples of the proposed fill materials should be laboratory tested to confirm their suitability.

Organic and/or debris-laden material is not suitable for re-use as structural fill. Topsoil, mulch, and similar organic materials can be wasted in architectural areas. Debris-laden materials should be excavated, transported, and disposed of off-site in accordance with appropriate solid waste rules and regulations.

6.2.2 FILL COMPACTION

Fill should be placed in thin, horizontal loose lifts (maximum 12-inch) and compacted to a minimum soil density of at least 98 percent of the Modified Proctor maximum dry density (ASTM D-1557). Fill materials used in structural areas should have a target maximum dry density of at least 95 pounds per cubic foot (pcf). If lighter weight fill materials are used, the NOVA geotechnical engineer should be consulted to assess the impact on design recommendations.

Soil moisture content should be maintained within 3 percent of the optimum moisture content. We recommend that the grading contractor have equipment on site during earthwork for both drying and wetting fill soils. Moisture control may be difficult during rainy weather.

Filling operations should be observed by a NOVA soils technician, who can confirm suitability of material used and uniformity and appropriateness of compaction efforts. The technician can also document compliance with the specifications by performing field density tests using thin-walled tube, nuclear, or sand cone testing methods (ASTM D-2937, D-6938, or D-1556, respectively). One test per 2,000 square feet in the proposed pavement area should be performed in each lift of fill, with test locations well distributed throughout the fill mass. When filling in small areas, at least one test per day per area should be performed.

6.3 GROUNDWATER CONTROL

6.3.1 General

Groundwater was encountered in test borings at depths ranging between about 8 to 9 feet BEG at the time of our subsurface exploration, which occurred during a period of normal seasonal rainfall. We do not anticipate that groundwater will adversely impact the planned development of this property.

6.4 PAVEMENT SUBGRADE

Based on the results of our field exploration, the subsurface conditions encountered in the test borings appear to be adaptable for providing adequate support of the planned apron pavement section.

To estimate the California Bearing Ratio (CBR), two (2) bulk samples of the predominant surficial soils were collected within the proposed apron and LBR tests were performed. To estimate the CBR of the soils, a conversion factor of 0.8 was applied to the LBR's in accordance to the US Department of Transportation Federal Aviation Administration Advisory Circular 150/5320-6F Section 2.5.6. Based upon the results of our testing, the estimated CBR value at of the surficial soils at test locations LBR-1 and LBR-2 are approximately 27 and 48, respectively.

We recommend a minimum compaction of 98 percent of the maximum dry density for the base and stabilized subgrade courses as determined by the Modified Proctor test method (ASTM D-1557). All pavement material and paving operations should meet applicable specifications of the American Concrete Institute and Federal Aviation Administration requirements. A NOVA technician should observe placement and perform density testing of the stabilized subgrade, base course material and concrete.

Results of the laboratory LBR testing, as well as correlated CBR and subgrade modulus (k) values, are presented below in Table 1.

Table 1 – Results of CBR Testing and Subgrade Modulus Values		
Corresponding Sampling Locations	CBR-1	CBR-2
CBR Value (at 0.1 inch penetration)	27	48
Fines Content, percentage	4.8	8.3
Estimated Subgrade Modulus, k (pci)	225	225

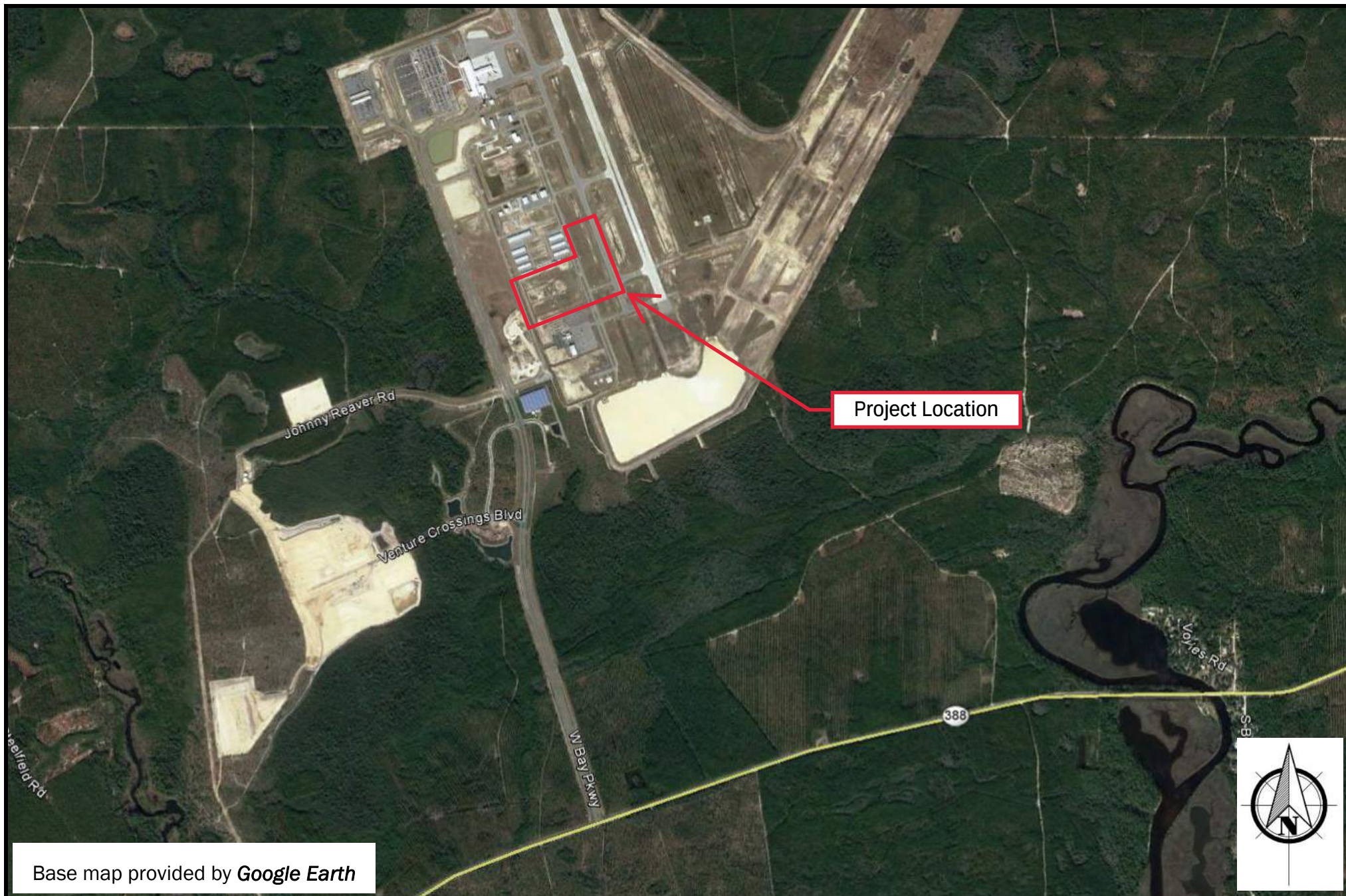
7.0 CONSTRUCTION OBSERVATIONS

7.1 PAVEMENT SECTION

The pavement section should utilize materials and be constructed in accordance with applicable FAA specifications. Also, NOVA should be retained during construction to confirm subgrade conditions are as anticipated and that the construction process is as required by the contract documents.

APPENDIX A

Figures and Maps



Base map provided by *Google Earth*

Scale: Not To Scale

Date Drawn: January 19, 2018

Drawn By: J. Findling

Checked By: A. Kniazeff



17612 Ashley Drive
Panama City Beach, Florida 32413
850.249.6682 ♦ 850.249.6683

PROJECT LOCATION MAP

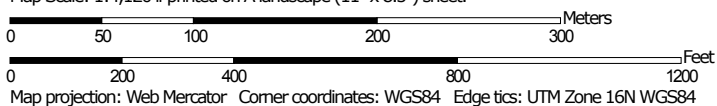
ECP Taxiway E-1 Transient Apron
Panama City, Bay County, Florida
NOVA Project Number 7217129

Soil Map—Bay County, Florida
(7217129 - ECP Taxiway E-1 Transient Apron)



Soil Map may not be valid at this scale.

Map Scale: 1:4,120 if printed on A landscape (11" x 8.5") sheet.



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

1/23/2018
Page 1 of 3

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils



Soil Map Unit Polygons



Soil Map Unit Lines



Soil Map Unit Points

Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

Water Features



Streams and Canals

Transportation



Rails



Interstate Highways



US Routes



Major Roads

Background



Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Bay County, Florida

Survey Area Data: Version 17, Sep 19, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 31, 2009—Jan 28, 2017

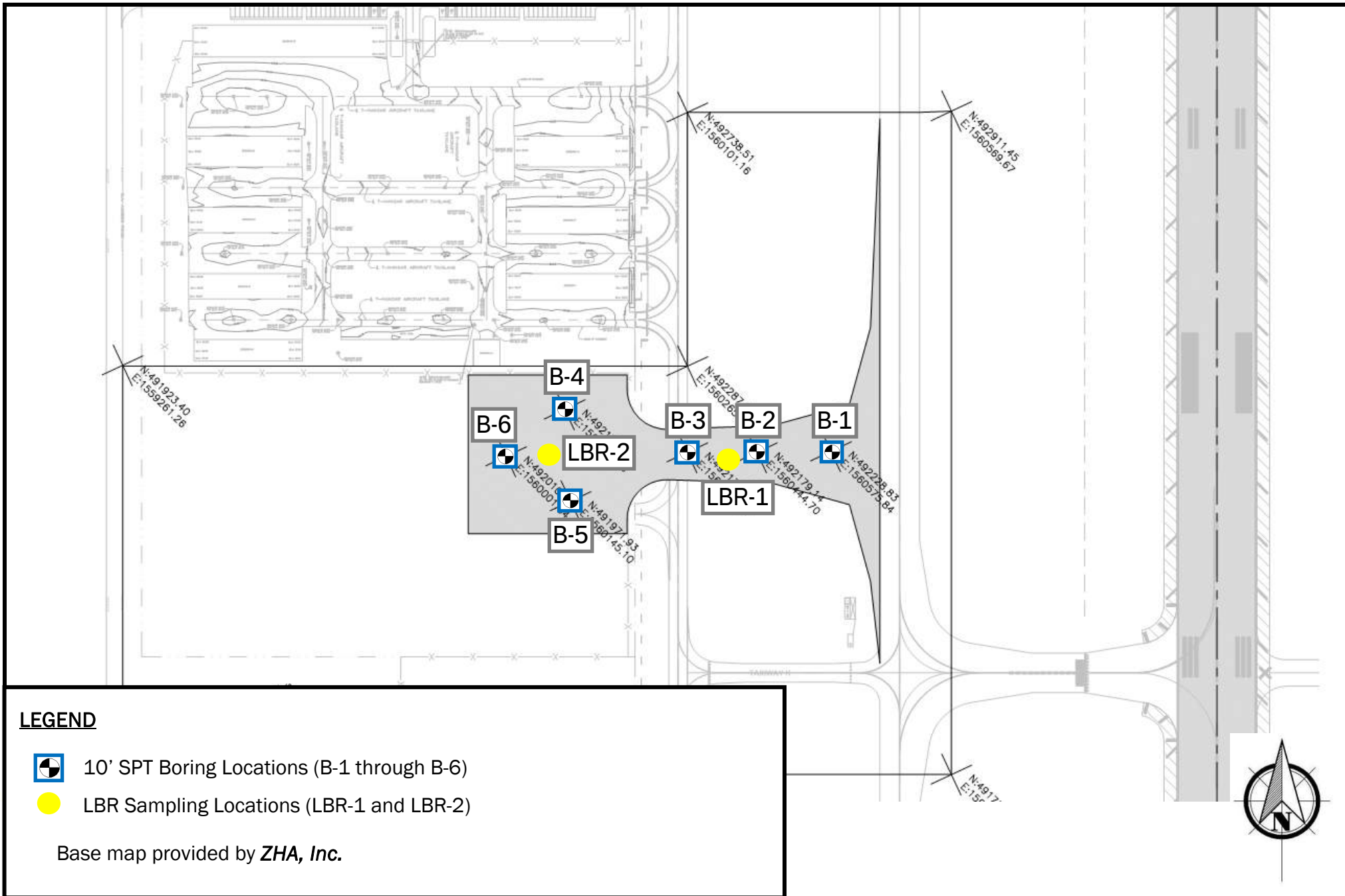
The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
13	Leon sand, 0 to 2 percent slopes	0.4	0.5%
22	Pamlico-Dorovan complex	5.5	6.5%
25	Hurricane sand, 0 to 2 percent slopes	36.0	42.4%
30	Pottsburg-Pottsburg, wet, sand, 0 to 2 percent slopes	43.0	50.6%
Totals for Area of Interest		84.9	100.0%

APPENDIX B

Subsurface Data



Scale: Not To Scale
Date Drawn: January 19, 2018
Drawn By: J. Findling
Checked By: A. Kniazeff

NOVA
 17612 Ashley Drive
 Panama City Beach, Florida 32413
 850.249.NOVA(6682) ♦ 850.249.6683

BORING LOCATION PLAN
ECP Taxiway E-1 Transient Apron
 Panama City, Bay County, Florida
 NOVA Project Number 7217129

SYMBOLS AND ABBREVIATIONS

SYMBOL	DESCRIPTION
N-Value	No. of Blows of a 140-lb. Weight Falling 30 Inches Required to Drive a Standard Spoon 1 Foot
WOR	Weight of Drill Rods
WOH	Weight of Drill Rods and Hammer
	Sample from Auger Cuttings
	Standard Penetration Test Sample
	Thin-wall Shelby Tube Sample (Undisturbed Sampler Used)
% REC	Percent Core Recovery from Rock Core Drilling
RQD	Rock Quality Designation
	Stabilized Groundwater Level
	Seasonal High Groundwater Level (also referred to as the W.S.W.T.)
NE	Not Encountered
GNE	Groundwater Not Encountered
BT	Boring Terminated
-200 (%)	Fines Content or % Passing No. 200 Sieve
MC (%)	Moisture Content
LL	Liquid Limit (Atterberg Limits Test)
PI	Plasticity Index (Atterberg Limits Test)
K	Coefficient of Permeability
Org. Cont.	Organic Content
G.S. Elevation	Ground Surface Elevation

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES
COARSE-GRAINED SOILS More than 50% retained on the No. 200 sieve*	GRAVELS 50% or more of coarse fraction retained on No. 4 sieve	CLEAN GRAVELS	GW	Well-graded gravels and gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels and gravel-sand mixtures, little or no fines
		GRAVELS WITH FINES	GM	Silty gravels and gravel-sand-silt mixtures
			GC	Clayey gravels and gravel-sand-clay mixtures
	SANDS More than 50% of coarse fraction passes No. 4 sieve	CLEAN SANDS 5% or less passing No. 200 sieve	SW**	Well-graded sands and gravelly sands, little or no fines
			SP**	Poorly graded sands and gravelly sands, little or no fines
		SANDS with 12% or more passing No. 200 sieve	SM**	Silty sands, sand-silt mixtures
			SC**	Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS 50% or more passes the No. 200 sieve*	SILTS AND CLAYS Liquid limit 50% or less	ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands	
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, lean clays	
		OL	Organic silts and organic silty clays of low plasticity	
	SILTS AND CLAYS Liquid limit greater than 50%	MH	Inorganic silts, micaceous or diamicaceous fine sands or silts, elastic silts	
		CH	Inorganic clays or clays of high plasticity, fat clays	
		OH	Organic clays of medium to high plasticity	
		PT	Peat, muck and other highly organic soils	

*Based on the material passing the 3-inch (75 mm) sieve

** Use dual symbol (such as SP-SM and SP-SC) for soils with more than 5% but less than 12% passing the No. 200 sieve

RELATIVE DENSITY

(Sands and Gravels)

Very loose – Less than 4 Blows/Foot
Loose – 4 to 10 Blows/Foot
Medium Dense – 11 to 30 Blows/Foot
Dense – 31 to 50 Blows/Foot
Very Dense – More than 50 Blows/Foot

CONSISTENCY

(Sils and Clays)

Very Soft – Less than 2 Blows/Foot
Soft – 2 to 4 Blows/Foot
Medium Stiff – 5 to 8 Blows/Foot
Stiff – 9 to 15 Blows/Foot
Very Stiff – 16 to 30 Blows/Foot
Hard – More than 30 Blows/Foot

RELATIVE HARDNESS

(Limestone)

Soft – 100 Blows for more than 2 Inches
Hard – 100 Blows for less than 2 Inches

MODIFIERS

These modifiers Provide Our Estimate of the Amount of Minor Constituents (Silt or Clay Size Particles) in the Soil Sample

Trace – 5% or less
With Silt or With Clay – 6% to 11%
Silty or Clayey – 12% to 30%
Very Silty or Very Clayey – 31% to 50%

These Modifiers Provide Our Estimate of the Amount of Organic Components in the Soil Sample

Trace – Less than 3%
Few – 3% to 4%
Some – 5% to 8%
Many – Greater than 8%

These Modifiers Provide Our Estimate of the Amount of Other Components (Shell, Gravel, Etc.) in the Soil Sample

Trace – 5% or less
Few – 6% to 12%
Some – 13% to 30%
Many – 31% to 50%



TEST BORING RECORD B-1

PROJECT: ECP Taxiway E-1 Transient Apron PROJECT NO.: 7217129
CLIENT: Zha, Inc.
PROJECT LOCATION: Panama City, Bay County, Florida
LOCATION: See Boring Location Plan ELEVATION: Existing Grade
DRILLER: J. Governale LOGGED BY: J. Findling
DRILLING METHOD: Mud Rotary DATE: January 15, 2018
DEPTH TO - WATER> INITIAL: 9 feet AFTER 24 HOURS: CAVING> C

Depth (feet)	Elevation (feet)	Description	Graphic	Groundwater	Sample Type	N-Value	ORGANIC CONTENT -200 (%) BLOW COUNT MC (%) PLASTIC LIMIT LIQUID LIMIT
0		Loose to medium dense light brown to brown slightly silty fine-grained SAND (SP-SM)				6	
						14	
5						15	
						23	
						17	
10		Boring Terminated at 10 ft.					
15							
20							
25							
30							
35							



TEST BORING RECORD B-2

PROJECT: ECP Taxiway E-1 Transient Apron PROJECT NO.: 7217129
CLIENT: Zha, Inc.
PROJECT LOCATION: Panama City, Bay County, Florida
LOCATION: See Boring Location Plan ELEVATION: Existing Grade
DRILLER: J. Governale LOGGED BY: J. Findling
DRILLING METHOD: Mud Rotary DATE: January 15, 2018
DEPTH TO - WATER> INITIAL: 8.5 feet AFTER 24 HOURS: CAVING> C

Depth (feet)	Elevation (feet)	Description	Graphic	Groundwater	Sample Type	N-Value	ORGANIC CONTENT -200 (%) BLOW COUNT MC (%) PLASTIC LIMIT LIQUID LIMIT
0		Loose to medium dense grey slightly silty fine-grained SAND (SP-SM)				9	
						22	
5		Medium dense light brown to brown slightly silty fine-grained SAND (SP-SM)				22	
						18	
10		Boring Terminated at 10 ft.				16	
15							
20							
25							
30							
35							



TEST BORING RECORD B-3

PROJECT: ECP Taxiway E-1 Transient Apron PROJECT NO.: 7217129
CLIENT: Zha, Inc.
PROJECT LOCATION: Panama City, Bay County, Florida
LOCATION: See Boring Location Plan ELEVATION: Existing Grade
DRILLER: J. Governale LOGGED BY: J. Findling
DRILLING METHOD: Mud Rotary DATE: January 15, 2018
DEPTH TO - WATER> INITIAL: 9 feet AFTER 24 HOURS: CAVING> C

Depth (feet)	Elevation (feet)	Description	Graphic	Groundwater	Sample Type	N-Value	ORGANIC CONTENT -200 (%) BLOW COUNT MC (%) PLASTIC LIMIT LIQUID LIMIT
0		Meidum dense light brown/grey slightl silty fine-grained SAND (SP-SM)				11	
						22	
5						29	
						25	
						22	
10		Boring Terminated at 10 ft.					
15							
20							
25							
30							
35							



TEST BORING RECORD B-4

PROJECT: ECP Taxiway E-1 Transient Apron PROJECT NO.: 7217129
CLIENT: Zha, Inc.
PROJECT LOCATION: Panama City, Bay County, Florida
LOCATION: See Boring Location Plan ELEVATION: Existing Grade
DRILLER: J. Governale LOGGED BY: J. Findling
DRILLING METHOD: Mud Rotary DATE: January 15, 2018
DEPTH TO - WATER> INITIAL: 9 feet AFTER 24 HOURS: CAVING> C

Depth (feet)	Elevation (feet)	Description	Graphic	Groundwater	Sample Type	N-Value	ORGANIC CONTENT -200 (%) BLOW COUNT MC (%) PLASTIC LIMIT LIQUID LIMIT
0		Loose to very dense brown to dark brown slightly silty fine-grained SAND (SP-SM)				5	
						20	
5						53	
						56	
						51	
10		Boring Terminated at 10 ft.					
15							
20							
25							
30							
35							



TEST BORING RECORD B-5

PROJECT: ECP Taxiway E-1 Transient Apron PROJECT NO.: 7217129
CLIENT: Zha, Inc.
PROJECT LOCATION: Panama City, Bay County, Florida
LOCATION: See Boring Location Plan ELEVATION: Existing Grade
DRILLER: J. Governale LOGGED BY: J. Findling
DRILLING METHOD: Mud Rotary DATE: January 15, 2018
DEPTH TO - WATER> INITIAL: 9 feet AFTER 24 HOURS: CAVING> C

Depth (feet)	Elevation (feet)	Description	Graphic	Groundwater	Sample Type	N-Value	ORGANIC CONTENT -200 (%) BLOW COUNT MC (%) PLASTIC LIMIT LIQUID LIMIT
0		Loose to dense light brown to brown slightly silty fine-grained SAND (SP-SM)				6	
						16	
5						38	
						40	
						46	
10		Boring Terminated at 10 ft.					
15							
20							
25							
30							
35							



TEST BORING RECORD B-6

PROJECT: ECP Taxiway E-1 Transient Apron PROJECT NO.: 7217129
CLIENT: Zha, Inc.
PROJECT LOCATION: Panama City, Bay County, Florida
LOCATION: See Boring Location Plan ELEVATION: Existing Grade
DRILLER: J. Governale LOGGED BY: J. Findling
DRILLING METHOD: Mud Rotary DATE: January 15, 2018
DEPTH TO - WATER> INITIAL: 8 feet AFTER 24 HOURS: CAVING> C

Depth (feet)	Elevation (feet)	Description	Graphic	Groundwater	Sample Type	N-Value	ORGANIC CONTENT -200 (%) BLOW COUNT MC (%) PLASTIC LIMIT LIQUID LIMIT
0		Loose to very dense brown to dark brown slightly silty fine-grained SAND (SP-SM)				9	
						18	
5						33	
						51	
						53	
10		Boring Terminated at 10 ft.					
15							
20							
25							
30							
35							

APPENDIX C

Laboratory Data

SUMMARY OF CLASSIFICATION & INDEX TESTING

ECP Taxiway E-1 Transient Apron
Panama City, Bay County, Florida
NOVA Project Number 7217129

Boring Number	Sample Number	Sample Depth (ft)	Natural Moisture (%)	Percent (%) Passing Sieve								USCS Soil Classification
				1/2"	3/8"	#4	#10	#40	#60	#100	#200	
B-1	1	0.0 - 2.0	12	--	--	--	--	--	--	--	7.7	SP-SM
B-2	4	6.0 - 8.0	12	--	--	--	--	--	--	--	8.4	SP-SM
B-4	3	4.0 - 6.0	15	--	--	--	--	--	--	--	7.1	SP-SM
B-6	1	0.0 - 2.0	12	--	--	--	--	--	--	--	7.2	SP-SM
LBR-1	BULK	0.0 - 1.0	--	--	--	--	--	--	--	--	5.0	SP-SM
LBR-2	BULK	0.0 - 1.0	--	--	--	--	--	--	--	--	8.3	SP-SM

Boring No.	Sample Depth (ft)	Optimum Moisture Content (%)*	Maximum Dry Density (lbs/ft³)*	Maximum LBR Value	Maximum CBR Value**
LBR-1	0.0 - 1.0	12.1	110.0	34	27
LBR-2	0.0 - 1.0	9.9	109.7	60	48

*Note: Based on Modified Proctor Moisture-Density Relationship

**Note: Conversion factor of 0.8 was applied with accordance to US Department of Transportation Federal Aviation Administration Advisory Circular 150/5320-6F Section 2.5.6



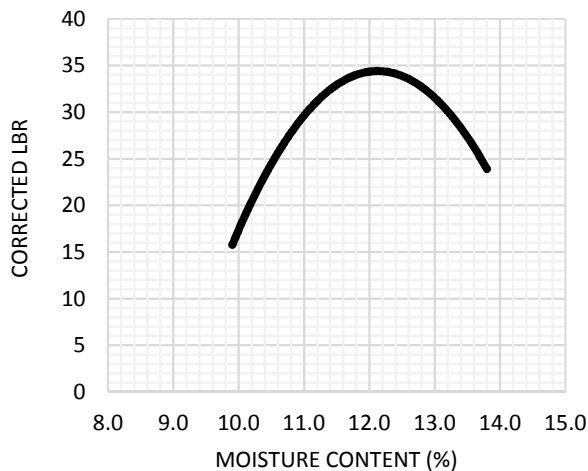
Report of Limerock Bearing Ratio

FM 5-515

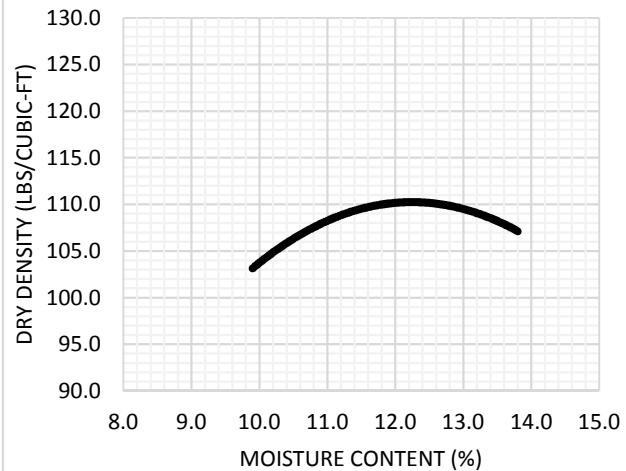


Project Number 7217129
Project Name ECP Taxiway E-1 Transient Apron
Material Description Grey fine-grained SAND (SP)
Sample Number LBR-1
Date Tested 1/17/2018

Limerock Bearing Ratio
at 0.1-in. Penetration



Moisture/ Density Results



Mold #

1	2	3	4	

Dry Density (pcf)

102.2	105.4	110.0	107.2	

Moisture Content (%)

9.9	10.1	12.1	13.8	

LBR Value

14	21	34	24	

Percent Passing 3/4" Sieve

100.0%

Percent Passing #4 Sieve

100.0%

Percent Passing #200 Sieve

4.8%

Maximum Density

110.0

Optimum Moisture

12.1%

Estimated LBR

34

Test Remarks:

Compacted using ASTM
D1557/T180 (Modified Proctor
Method)

NOVA Technician: R. Morello

Reviewed By: S. Willing

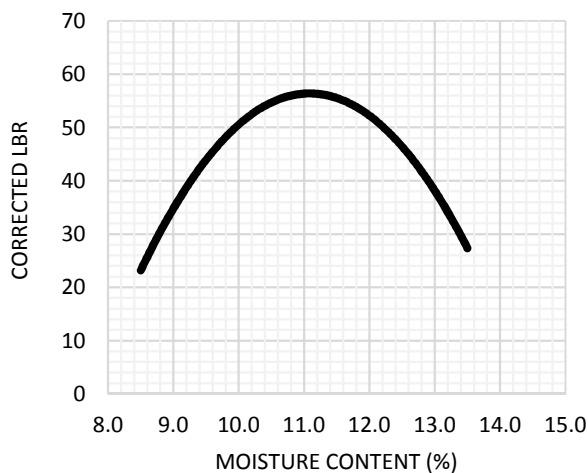
Report of Limerock Bearing Ratio

FM 5-515

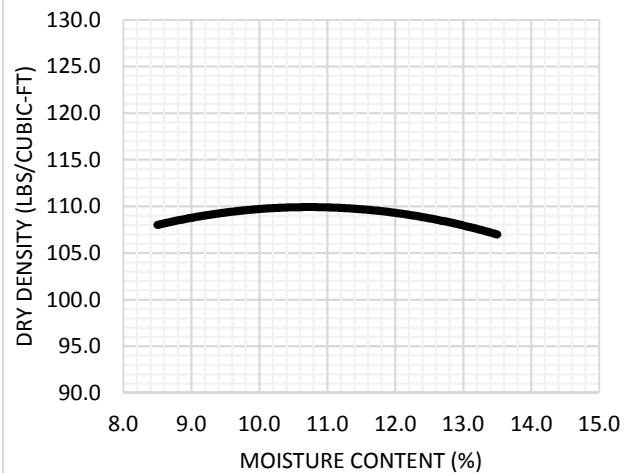


Project Number 7217129
Project Name ECP Taxiway E-1 Transient Apron
Material Description Grey slightly silty fine-grained SAND (SP-SM)
Sample Number LBR-2
Date Tested 1/19/2018

Limerock Bearing Ratio
at 0.1-in. Penetration



Moisture/ Density Results



Mold #	1	2	3	4	
Dry Density (pcf)	108.0	109.7	109.6	107.0	
Moisture Content (%)	8.5	9.9	11.6	13.5	
LBR Value	19	60	46	30	

Percent Passing 3/4" Sieve	100.0%
Percent Passing #4 Sieve	100.0%
Percent Passing #200 Sieve	8.3%
Maximum Density	109.7
Optimum Moisture	9.9%
Estimated LBR	60

Test Remarks:

Compacted using ASTM
D1557/T180 (Modified Proctor
Method)

NOVA Technician: R. Morello

Reviewed By: S. Willing

APPENDIX D

Support Documents

QUALIFICATIONS OF RECOMMENDATIONS

The findings, conclusions and recommendations presented in this report represent our professional opinions concerning subsurface conditions at the site. The opinions presented are relative to the dates of our site work and should not be relied on to represent conditions at later dates or at locations not explored. The opinions included herein are based on information provided to us, the data obtained at specific locations during the study, and our previous experience. If additional information becomes available which might impact our geotechnical opinions, it will be necessary for NOVA to review the information, re-assess the potential concerns, and re-evaluate our conclusions and recommendations.

Regardless of the thoroughness of a geotechnical exploration, there is the possibility that conditions between borings may differ from those encountered at specific boring locations, that conditions are not as anticipated by the designers and/or the contractors, or that either natural events or the construction process has altered the subsurface conditions. These variations are an inherent risk associated with subsurface conditions in this region and the approximate methods used to obtain the data. These variations may not be apparent until construction.

The professional opinions presented in this report are not final. Field observations and foundation installation monitoring by the geotechnical engineer, as well as soil density testing and other quality assurance functions associated with site earthwork and foundation construction, are an extension of this report. Therefore, NOVA should be retained by the owner to observe all earthwork and foundation construction to confirm that the conditions anticipated in this study actually exist, and to finalize or amend our conclusions and recommendations. NOVA is not responsible or liable for the conclusions and recommendations presented in this report if NOVA does not perform these observation and testing services.

This report is intended for the sole use of **ZHA** only. The scope of work performed during this study was developed for purposes specifically intended by **ZHA** only, and may not satisfy other users' requirements. Use of this report or the findings, conclusions or recommendations by others will be at the sole risk of the user. NOVA is not responsible or liable for the interpretation by others of the data in this report, nor their conclusions, recommendations or opinions.

Our professional services have been performed, our findings obtained, our conclusions derived and our recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices in the State of Florida. This warranty is in lieu of all other statements or warranties, either expressed or implied.

Important Information about This Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a civil engineer may not fulfill the needs of a constructor — a construction contractor — or even another civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. No one except you should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you — should apply this report for any purpose or project except the one originally contemplated.*

Read the Full Report

Serious problems have occurred because those relying on a geotechnical-engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

Geotechnical Engineers Base Each Report on a Unique Set of Project-Specific Factors

Geotechnical engineers consider many unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk-management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical-engineering report that was:

- not prepared for you;
- not prepared for your project;
- not prepared for the specific site explored; or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical-engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an

assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical-engineering report is based on conditions that existed at the time the geotechnical engineer performed the study. *Do not rely on a geotechnical-engineering report whose adequacy may have been affected by:* the passage of time; man-made events, such as construction on or adjacent to the site; or natural events, such as floods, droughts, earthquakes, or groundwater fluctuations. *Contact the geotechnical engineer before applying this report to determine if it is still reliable.* A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ — sometimes significantly — from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide geotechnical-construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are Not Final

Do not overrely on the confirmation-dependent recommendations included in your report. *Confirmation-dependent recommendations are not final*, because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations *only* by observing actual subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's confirmation-dependent recommendations if that engineer does not perform the geotechnical-construction observation required to confirm the recommendations' applicability.*

A Geotechnical-Engineering Report Is Subject to Misinterpretation

Other design-team members' misinterpretation of geotechnical-engineering reports has resulted in costly

problems. Confront that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Constructors can also misinterpret a geotechnical-engineering report. Confront that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing geotechnical construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical-engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make constructors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give constructors the complete geotechnical-engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise constructors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure constructors have sufficient time to perform additional study.* Only then might you be in a position to give constructors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and constructors fail to recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help

others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Environmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform an *environmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold-prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, many mold-prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical-engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; *none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.*

Rely, on Your GBC-Member Geotechnical Engineer for Additional Assistance

Membership in the Geotechnical Business Council of the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project. Confer with you GBC-Member geotechnical engineer for more information.



8811 Colesville Road/Suite G106, Silver Spring, MD 20910

Telephone: 301/565-2733 Facsimile: 301/589-2017

e-mail: info@geoprofessional.org www.geoprofessional.org

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