

**BID ENVELOPE**  
**MSCAA PROJECT NO. 18-1413-01**

NAME OF PROJECT: TAXIWAY ALPHA WEST RECONSTRUCTION - CONSTRUCTION

BIDS DUE: 5/9/2023 TIME: 2:00 PM Local Time

MEMPHIS SHELBY COUNTY AIRPORT AUTHORITY (MSCAA)  
PROCUREMENT DEPARTMENT  
MEMPHIS INTERNATIONAL AIRPORT  
4121 Runway Road, Suite B  
Memphis, TN 38118 (901) 922-8000

**BIDDER IDENTIFICATION:**

Bidder \_\_\_\_\_

Address \_\_\_\_\_

**TENNESSEE CONTRACTOR LICENSE INFORMATION:**

License Number \_\_\_\_\_

License Classification Applicable to Project \_\_\_\_\_

License Expiration Date \_\_\_\_\_

Dollar Limit \_\_\_\_\_

**SUBCONTRACTORS (OR PRIME CONTRACTORS) TO BE USED ON THIS PROJECT IN THE BELOW LISTED CAPACITIES:**

Note: Where applicable, one contractor/subcontractor performing electrical, plumbing, heating, ventilation, air conditioning, and masonry work must have its license number, applicable classification, expiration date and dollar limit on the BID ENVELOPE containing the BID PROPOSAL. **Prime contractors** who are to perform the electrical, plumbing, heating, ventilation, air conditioning or masonry work MUST list themselves as "Self-Perform" in the Sub-contractor list below.

	Sub-contractor List	License No.	Applicable Classification	Expiration Date	Dollar Limit
Electrical					
Plumbing					
Heating					
Ventilation					
Air Conditioning					
Masonry					

**BID ENVELOPE**

COMPLETE THIS FORM AND ATTACH IT TO THE OUTSIDE OF THE BID ENVELOPE. PLEASE REVIEW INSTRUCTIONS TO BIDDERS FOR BID PACKAGE DELIVERY AND FOR OTHER INFORMATION AND CONDITIONS. MSCAA RESERVES THE RIGHT, IN ITS SOLE DISCRETION, TO REJECT AND DISQUALIFY YOUR BID IF YOU, YOUR PARENT, SUBSIDIARY, AFFILIATE, OR PREDECESSOR IN INTEREST OR ANY OF YOUR SUBCONTRACTORS, SUPPLIERS, AND/OR THEIR PARENTS, SUBSIDIARIES, AFFILIATES OR PREDECESSORS IN INTEREST HAVE PENDING LITIGATION OR CLAIMS WITH THE MSCAA.

**SPECIFICATIONS**  
**FOR**  
**TAXIWAY ALPHA WEST RECONSTRUCTION - CONSTRUCTION**

**MEMPHIS INTERNATIONAL AIRPORT**  
**MEMPHIS, TENNESSEE**



**MSCAA PROJECT NO. 18-1413-01**

**DATED: April 6, 2023**

**ISSUED FOR BID**

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SPECIFICATIONS  
FOR  
TAXIWAY ALPHA WEST RECONSTRUCTION - CONSTRUCTION

MEMPHIS INTERNATIONAL AIRPORT  
MEMPHIS, TENNESSEE

MSCAA NO. 18-1413-01

April 6, 2023

TECHNICAL SPECIFICATIONS – ISSUED FOR BID

I hereby certify that Specifications 18-1413 were prepared by me or under my direct supervision and that I am a duly Registered Engineer under the laws of the State of Tennessee.

Harry Pratt, P.E.

Date: April 6, 2023      Reg. No. 13777





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**Division/Section Code**  
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**ISSUED FOR BID**

**Division/Section Code**  
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November 11, 2019

**END OF SECTION 00010**

**DIVISION 0 – SECTION 00015****LIST OF DRAWINGS**

DRAWINGS, Entitled Taxiway Alpha West Reconstruction - Construction, Issued for Bid, dated April 6, 2023, with revisions, as noted on the drawing sheets:

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G-PH-15	PHASING PLAN PHASE 2a AND PHASE 2b
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C-ER-02	EROSION CONTROL PLAN - PHASE 1 STA 19+50.00 TO STA 31+50.00
C-ER-03	EROSION CONTROL PLAN - PHASE 1 STA 31+50.00 TO STA 43+50.00
C-ER-04	EROSION CONTROL PLAN - PHASE 1 STA 43+50.00 TO STA 53+50.00
C-ER-05	EROSION CONTROL PLAN - PHASE 1 - ILS SERVICE ROAD
C-ER-06	EROSION CONTROL PLAN - PHASE 1 - ILS SERVICE ROAD
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C-HZ-04	GEOMETRIC LAYOUT PLAN STA. 43+50.00 TO STA. 53+50.00
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C-MK-02	PAVEMENT MARKING PLAN STA. 19+50.00 TO STA. 31+50.00
C-MK-03	PAVEMENT MARKING PLAN STA. 31+50.00 TO STA. 43+50.00
C-MK-04	PAVEMENT MARKING PLAN STA. 43+50.00 TO STA. 53+50.00
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E-DP-02	LIGHTING DEMOLITION PLAN STA. 19+50.00 TO STA. 31+50.00
E-DP-03	LIGHTING DEMOLITION PLAN STA. 31+50.00 TO STA. 43+50.00
E-DP-04	LIGHTING DEMOLITION PLAN STA. 43+50.00 TO STA. 53+50.00
E-LT-00	LIGHTING LEGEND AND NOTES
E-LT-01	LIGHTING LAYOUT PLAN STA. 10+50.00 TO STA. 19+50.00
E-LT-02	LIGHTING LAYOUT PLAN STA. 19+50.00 TO STA. 31+50.00
E-LT-03	LIGHTING LAYOUT PLAN STA. 31+50.00 TO STA. 43+50.00
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C-XS-10	CROSS SECTIONS
C-XS-11	CROSS SECTIONS
C-XS-12	CROSS SECTIONS
C-XS-13	CROSS SECTIONS
C-XS-14	CROSS SECTIONS
C-XS-15	CROSS SECTIONS

**END OF SECTION 00015**



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**LEGAL NOTICE**  
**Request for Bids**  
**MSCAA Project Number 18-1413-01**  
**Taxiway Alpha West Reconstruction - Construction**

Sealed bids for Taxiway Alpha West Reconstruction - Construction will be received by the Memphis-Shelby County Airport Authority (Authority), Procurement Department, 4150 Louis Carruthers Drive, Memphis, TN 38118, until **2:00 PM Local Time on 5/9/2023**. Bids will not be received at any other location. Within 30 minutes thereafter, the bids will be opened and publicly read via phone/video conference.

<https://us06web.zoom.us/j/82644203689?pwd=NmxURVVRbUlnRHliTmhOcktKbnpVQT09>

Phone: +1 312 626 6799; Meeting ID: 826 4420 3689; Passcode: 838632

The Bid Documents, including a description of the scope of work, the required response format, and additional instructions may be obtained on or after **April 11, 2023** online at [www.flymemphis.com](http://www.flymemphis.com). A virtual Pre-Bid Meeting will be held Tuesday April 18th at 1:30 PM local time via phone/video conference.

<https://us06web.zoom.us/j/83507056464?pwd=N2ZGUGlFSSsvWHNWM3gyVm4wcDVpdz09>

Phone: +1 312 626 6799; Meeting ID: 835 0705 6464; Passcode: 596944

Attendance at the Pre-Bid Meeting is strongly recommended. The project site will be available for inspection upon request.

All Bidders are responsible for checking the Authority's website up to the submission deadline for any updates, addenda or additional information. The successful Bidder must sign a contract with the Authority that includes Federal Aviation Administration provisions, if applicable, regarding the Buy American Preference, Foreign Trade Restriction, Davis-Bacon, Affirmative Action, Debarment and Suspension, and Drug-Free Workplace, all of which are incorporated herein by reference.

Each bid must be made by a contractor licensed in Tennessee and be accompanied by a 5% Bid Guarantee. The successful bidder must execute a Performance Bond and a Payment Bond in the amount of 100% each of the Contract Price and meet the Disadvantaged Business Enterprise (DBE) participation goal for this project, which is 26%.

The Authority reserves the right to reject any or all responses to this Request for Bids in whole or in part; to waive any informalities, technicalities, or omissions related to this Request for Bids; and to reject responses on any other basis authorized by the Authority's purchasing policies..

The Authority is an equal opportunity employer and prohibits discrimination based on the grounds of age, race, sex, color, national origin, disability, marital status, military service, or sexual orientation in its hiring and employment practices and in the admission to, access to, or operation of its programs, services, and activities.

By order of:  
Scott A. Brockman, A.A.E.  
President and CEO  
Memphis-Shelby County Airport Authority

**DIVISION 0 – SECTION 00200****INSTRUCTIONS TO BIDDERS / PROPOSERS**

Instruction for the preparation of proposals and the delivery thereof to the Memphis-Shelby County Airport Authority (MSCAA) are contained in General Provision Section 20 and additionally as follows. Prepare and submit proposals accordingly.

**1. RESERVATION OF RIGHTS:**

MSCAA reserves the right, in its sole discretion, to reject and disqualify the bid of any bidder that has pending litigation or claims with the MSCAA and to reject the bid when a parent, subsidiary, affiliate, or predecessor in interest of the Bidder has pending litigation or claims with the MSCAA.

MSCAA also reserves the right, in its sole discretion, to reject and disqualify the bid of any bidder if the bid includes any subcontractor(s) or supplier(s) of any tier that have pending litigation or claims with MSCAA, and to reject the bid when a parent, subsidiary, affiliate, or predecessor in interest of the subcontractor or supplier has pending litigation or claims with the MSCAA.

Bidders shall request from MSCAA a list of entities that have pending claims or litigation with MSCAA to avoid including such entities or their parents, subsidiaries, affiliates, or predecessors in interest in their proposal or bid. A list of affected entities may be obtained by a written or telephone request to Development Division at MSCAA, 2491 Winchester Road, Suite 113, Memphis, TN 38116-3856, telephone number (901) 922-8033.

**2. PRE-BID CONFERENCE:**

A virtual Pre-Bid Meeting will be held Thursday April 18th at 9:30 AM local time via phone/video conference. <https://us06web.zoom.us/j/83507056464?pwd=N2ZGUGlFSSsvWHNWM3gyVm4wcDVpdz09>

Phone: +1 312 626 6799; Meeting ID: 835 0705 6464; Passcode: 596944

Attendance at the Pre-Bid Meeting is strongly recommended. The project site will be available for inspection upon request.

**3. DRAWINGS AND SPECIFICATIONS FURNISHED TO CONTRACTOR:**

One printed set of contract documents will be furnished to the Contractor who is awarded the work at no cost to him. Contractor may obtain additional printed copies of the contract documents at their reproduction cost. If the Contractor waives his right to one printed set of contract documents, one digital set of contract documents will be furnished to the Contractor at no cost to him.

**4. REFUSAL OF ISSUANCE OF PROPOSAL FORM TO BIDDERS IN DEFAULT AND DISQUALIFICATION OF BIDDERS:**

See General Provision Section 20 for disqualification of bidders and bidders in default.

**5. SUBMIT THE FOLLOWING WITH THE BID IN THE MANNER DESCRIBED BELOW:**

- A. (1) Proposal
- (2) Proposal Guarantee (Required Bid Security)
- (3) Buy America Certificate **THIS IS REQ'D ONLY ON AIP-FUNDED PROJECTS.**
- (4) DBE Assurance Statement/Letter of Intent on Bidder's / Proposer's Letterhead for each DBE subcontractor, subcontractors' signatures not required.

- (5) Written quote or proposal or other communication from each DBE upon which the scope of work and dollar value contained in your Assurance Statements is based with items included in the Proposal either circled and/or highlighted.
- (6) DBE Goals Accomplishment Statement
- (7) Information on All Firms that Provide Bids or Quotes

B. The following must be submitted within 24 hours of the proposal submittal deadline:

- (1) DBE Assurance Statement/Letter of Intent on Bidder's / Proposer's Letterhead for each DBE subcontractor, subcontractors' signatures required.

See General Provision Section 20, PROPOSAL REQUIREMENTS AND CONDITIONS.

C. By executing the proposal submittal, the Contractor is confirming that (1) neither the Contractor nor any of Contractor's potential subcontractors or suppliers have pending claims or litigation, arbitration, or other dispute resolution proceedings where the Owner and the Contractor or potential subcontractors or suppliers are parties; or (2) the Contractor has disclosed in writing any such pending claims or proceedings to Owner through its own writing and/or the writing of Contractor's potential subcontractors or suppliers and submitted same to Owner with the proposal submittal.

D. Bids should be delivered to the following address:

Memphis-Shelby County Airport Authority  
Procurement Department  
Memphis International Airport  
4150 Louis Carruthers Drive  
Memphis, TN 38118  
Project No. 18-1413-01

The bid must be sealed and the project number must be included in the address.

Within 30 minutes thereafter, the bids will be opened and publicly read via phone/video conference.  
<https://us06web.zoom.us/j/82644203689?pwd=NmxURVVVRbUlnRHliTmhOcktKbnpVQT09>  
Phone: +1 312 626 6799; Meeting ID: 826 4420 3689; Passcode: 838632

## 6. **CONSIDERATION OF BID:**

The Owner reserves the right to reject any or all bids in whole or in part and to waive any informalities, technicalities, or omissions therein.

It is intention of the Owner to award a contract based upon the lowest responsive bid on the lump sum base bid. Bidder understands and agrees that, after a review of all the bids, the Owner will select the lump sum base bid that best suits the Owner's needs within the sole discretion of the Owner.

## 7. **NO FINANCIAL INTEREST:**

Respondent understands and agrees that no Airport Authority employee or member of the Board of Commissioners shall receive any financial benefit arising out of this proposal or its contract, if awarded, either directly or indirectly. Further, any fees paid to any person or entity by contractor for assistance in obtaining this contract, if awarded, with the Authority must be fully disclosed to the Authority.

## 8. **PROTEST:**

- A. Any protest must be filed in writing and received by the Authority within seven (7) calendar days of the date of the occurrence of the event that is the subject of the protest, e.g., the opening of responses, the award, or a determination that a respondent is not responsible or that a response is not responsive. Any protest must be actually delivered to the Authority during the business hours of 7:00 AM – 3:30 PM Local Time in order to be deemed to be received by the Authority as required under this Section. A protest must be submitted in hard copy and addressed as follows:

Memphis-Shelby County Airport Authority  
Attention: Director of Procurement  
4150 Louis Carruthers Drive  
Memphis, Tennessee 38118-6613

Any protest sent by telegraphic or facsimile transmission or by email or other electronic means will not meet the filing requirements set forth herein and will not be deemed to be received by the Authority.

No objections with regard to the application, meaning, or interpretation of the specifications contained herein will be considered after the opening of the subject bid.

**END OF SECTION 00200**

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**DIVISION 0 – SECTION 00405****PROPOSAL**Project Identification: **Taxiway Alpha West Reconstruction - Construction**Contract Number: MSCAA Project No. **18-1413-01****For Overnight Courier  
or Hand Delivery Submit to:**

Memphis-Shelby County Airport Authority  
 Memphis International Airport  
 Procurement Department  
 4150 Louis Carruthers Drive  
 Memphis, Tennessee 38118

1. The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an agreement with Owner in the form included in the Contract Documents to perform and furnish all Work as specified or indicated in the Contract Documents for the Contract Price and within the Contract Time indicated in this Bid and in accordance with other terms and conditions of the Contract Documents.
2. Bidder accepts all of the terms and conditions of the Legal Notice to Bidders and Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for seventy-five (75) days after the day of Bid opening. Bidder will sign and submit the Construction Contract with the Bonds and other documents required by the Bidding Requirements, within ten (10) days after the date of Owner's Notice of Award.
3. In submitting this Bid, Bidder represents, as more fully set forth in the Contract that:
  - (a) Bidder has examined copies of all the Bidding Documents and of the following Addenda (receipt of all which is hereby acknowledged):

Date	Number
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

- (b) Bidder has familiarized itself with the nature and extent of the Contract Documents, Work, site, locality, and all local conditions and Laws and Regulations that in any manner may affect cost, progress, performance or furnishing of the Work.

- (c) Bidder has studied carefully all reports and drawings of subsurface conditions and drawings of physical conditions which are identified in Division 0 and Division 1 Specifications, and accepts the determination set forth in General Provision Section 20 paragraph 20-06 of the extent of the technical data contained in such reports and drawings upon which Bidder is entitled to rely.
- (d) Bidder has obtained and carefully studied (or assumes responsibility for obtaining and carefully studying) all such examinations, investigations, explorations, tests and studies (in addition to or to supplement those referred to in (c) above) which pertain to the subsurface or physical conditions at the site or otherwise may affect the cost, progress, performance or furnishing of the Work at the Contract Price, within the Contract Time and in accordance with other terms and conditions of the Contract Documents, including specifically the provisions of General Provision Section 20 paragraph 20-06; and no additional examination, investigations, explorations, tests, reports or similar information or data are or will be required by Bidder for such purposes.
- (e) Bidder has reviewed and checked all information and data shown or indicated on the Contract Documents with respect to existing Underground Facilities at or contiguous to the site and assumes responsibility for the accurate location of said Underground Facilities. No additional examinations, investigations, explorations, tests, reports or similar information or data in respect of said Underground Facilities are or will be required by Bidder in order to perform and furnish the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents.
- (f) Bidder has correlated the results of all such observations, examinations, investigations, explorations, tests, reports and studies with the terms and conditions of the Contract Documents.
- (g) Bidder has given Owner or Engineer written notice of all conflicts, errors or discrepancies that it has discovered in the Contract Documents and the written resolution thereof by Owner or Engineer is acceptable to Bidder.
- (h) This Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; Bidder has not solicited or induced any person, firm or corporation to refrain from bidding; and Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over Owner.



4. Bidder will complete Base Bid Work for the following price(s).

**UNIT PRICE SCHEDULE – BASE BID**

ITEM NO.	SPEC NO.	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL PRICE
1	1210	AIRFIELD PAVEMENT REPAIR	ALLOW	1	\$ 50,000.00	
2	S-100-6.1	PLASTIC SAFETY FENCE	LF	8,360		
3	S-100-6.2	GUARD HOUSE (CONTRACTOR FURNISHED)	EA	3		
4	S-100-6.3	LOW PROFILE BARRICADE (TYPE 1) (CONTRACTOR FURNISHED)	EA	163		
5	S-100-6.4	FIELD OFFICE TRAILER AND CURING FACILITIES	LS	1		
6	S-100-6.5	CROSSING GATE ARM (CONTRACTOR FURNISHED)	EA	3		
7	S-100-6.6	TRAFFIC CONTROL	LS	1		
8	S-100-6.7	PROJECT SAFETY & SECURITY	LS	1		
9	S-100-6.8	PORTABLE LIGHTED RUNWAY CLOSURE MARKER	EA	2		
10	C-102-5.1	SILT FENCE	LF	21,300		
11	C-102-5.2	CATCH BASIN SEDIMENT TRAP	EA	10		
12	C-102-5.3	FILTER SOCK CHECK DAM	EA	10		
13	C-102-5.4	INLET PROTECTION	EA	12		
14	C-102-5.5	CONSTRUCTION ENTRANCES	EA.	2		
15	C-105-6.1	MOBILIZATION	LS	1		
16	C-105-6.2	DEMOBILIZATION	ALLOW	1	\$675,000	
17	P-101-5.01	DEMOLITION OF EXISTING RCP STORM DRAIN PIPE	LF	1,800		
18	P-101-5.02	DEMOLITION OF EXISTING HEADWALL (ALL SIZES AND TYPES)	EA	1		
19	P-101-5.03	DEMOLITION OF MANHOLE (ALL SIZES)	EA	1		
20	P-101-5.04	DEMOLITION OF INLET (ALL SIZES AND TYPES)	EA	8		
21	P-101-5.05	MISCELLANEOUS DEMOLITION	LS	1		
22	P-101-5.06	DEMOLITION OF EXISTING LIGHT FIXTURE (BASE AND FLUSH MOUNTED)	EA	472		
23	P-101-5.07	REMOVE EXISTING LIGHT FIXTURE AND TRANSFORMER (FLUSH MOUNTED)	EA	49		
24	P-101-5.08	DEMOLITION OF ELECTRICAL HANDHOLE	EA	14		
25	P-101-5.09	DEMOLITION OF DUCT BANK	LF	355		
26	P-101-5.10	DEMOLITION OF CONCRETE SIGN BASE	EA	11		
27	P-101-5.11	REMOVE AND STORE LIGHTED SIGN WITH TRANSFORMER	EA	15		
28	P-152-4.01	UNCLASSIFIED EXCAVATION	CY	15,000		
29	P-152-4.02	UNDERCUT EXCAVATION AND DISPOSAL	CY	1,500		
30	P-152-4.03	UNSUITABLE MATERIAL EXCAVATION AND DISPOSAL	CY	1,500		
31	P-152-4.04	BORROW EXCAVATION	CY	19,000		
32	P-152-4.05	PAVEMENT EXCAVATION, MILL ASPHALT 1.5"	SY	1,010		
33	P-152-4.06	PAVEMENT EXCAVATION, FULL DEPTH GRAVEL ROADWAY	SY	510		
34	P-152-4.07	PAVEMENT EXCAVATION, FULL DEPTH ASPHALT ROADWAY	SY	3,760		
35	P-152-4.08	PAVEMENT EXCAVATION, FULL DEPTH ASPHALT TAXIWAY SHOULDER	SY	31,500		
36	P-152-4.09	PAVEMENT EXCAVATION, FULL DEPTH ASPHALT TAXIWAY	SY	4,000		

37	P-152-4.10	PAVEMENT EXCAVATION, FULL DEPTH AIRFIELD PORTLAND CEMENT CONCRETE PAVEMENT	SY	58,600		
38	P-152-4.11	GRANULAR STONE BACKFILL FOR UNDERCUT AND UNSUITABLE MATERIAL	CY	3,000		
39	P-152-4.12	PAVEMENT EXCAVATION, MILL ASPHALT 1.5" FOR HAUL ROUTE REPAIR	SY	4,200		
40	p-152-4.13	SUBGRADE PROCESSING	SY	62,000		
41	P-209-5.1	CRUSHED AGGREGATE BASE COURSE	CY	14,400		
42	P-209-5.2	CRUSHED AGGREGATE BASE COURSE (8" THICK)	SY	3,440		
43	P-220-6.1	CEMENT TREATED SUBGRADE (12" THICK)	SY	64,200		
44	P-304-8.1	CEMENT-TREATED AGGREGATE BASE COURSE (8" THICK)	SY	61,500		
45	P-401-8.1	BITUMINOUS SURFACE COURSE (5" THICK)	SY	3,010		
46	P-401-8.2	BITUMINOUS BASE COURSE (4" THICK)	SY	3,010		
47	P-401-8.3	BITUMINOUS SURFACE COURSE OVERLAY (1.5" THICK)	SY	1,010		
48	P-403-8.1	BITUMINOUS SURFACE COURSE - SHOULDER (2.5" THICK)	SY	34,980		
49	P-403-8.2	BITUMINOUS BASE COURSE - SHOULDER (2.5" THICK)	SY	34,980		
50	P-403-8.3	BITUMINOUS SURFACE COURSE - SERVICE ROAD (2" THICK)	SY	1,406		
51	P-403-8.4	BITUMINOUS SURFACE COURSE OVERLAY - HAUL ROUTE REPAIR (1.5" THICK)	SY	4,200		
52	P-407-7.1	ASPHALT TREATED POROUS BITUMINOUS BASE COURSE (4" THICK)	SY	62,000		
53	P-501-8.1	CONCRETE PAVEMENT (PLAIN AND REINFORCED; 19 INCH THICK)	SY	57,900		
54	P-602-5.1	EMULSIFIED ASPHALT PRIME COAT (@ 0.3 gal/sq yd)	GAL.	9,620		
55	P-603-5.1	EMULSIFIED ASPHALT TACK COAT (@ 0.05 gal/sq yd)	GAL.	1,970		
56	P-620-5.1	PAVEMENT MARKING (REFLECTIVE)	SF	19,750		
57	P-620-5.2	NON-MOVEMENT AREA MARKINGS	LF	90		
58	P-620-5.3	TAXIWAY/TAXIWAY INTERMEDIATE HOLDING PATTERN MARKING	LF	1,470		
59	P-620-5.4	ILS CRITICAL AREA HOLD LINE MARKING	LF	310		
60	P-620-5.5	RUNWAY HOLDING POSITION MARKING	LF	260		
61	P-620-5.6	ENHANCED CENTERLINE MARKING	LF	160		
62	P-620-5.7	GEOGRAPHIC POSITION MARKING	EA	11		
63	P-620-5.8	EXISTING PAINT MARKING REMOVAL	SF	5,500		
64	D-701-5.1	24 INCH REINFORCED CONCRETE PIPE (CLASS V)	LF	303		
65	D-701-5.2	36 INCH REINFORCED CONCRETE PIPE (CLASS V)	LF	1,071		
66	D-701-5.3	48 INCH REINFORCED CONCRETE PIPE (CLASS V)	LF	557		
67	D-701-5.4	18 INCH CORRUGATED METAL PIPE (2-2/3 X 1/2, 16 GAGE)	LF	20		
68	D-701-5.5	12 INCH REINFORCED CONCRETE PIPE (CLASS III)	LF	37		
69	D-705-5.1	4 INCH PERFORATED UNDERDRAIN PIPE	LF	12,420		
70	D-705-5.2	6 INCH PERFORATED UNDERDRAIN PIPE	LF	10,380		
71	D-705-5.3	6 INCH NON- PERFORATED UNDERDRAIN OUTFALL PIPE	LF	2,200		
72	D-705-5.4	UNDERDRAIN CLEANOUT	EA	40		
73	D-705-5.5	UNDERDRAIN ENDWALL	EA	10		
74	D-751-5.1	TYPE 2 STORM DRAIN INLET	EA	7		
75	D-752-5.1	SAFETY ENDWALL FOR 36" RCP	EA	1		
76	D-752-5.2	9' SQUARE MANHOLE	EA	1		
77	D-754-5.1	CONCRETE LINED SWALE	LF	1,200		
78	D-754-5.2	CONCRETE APRON AROUND INLET	SF	1,210		
79	T-904-5.1	SODDING	SY	52,600		

80	T-905-5.1	TOPSOILING- ( 4 INCHES THICK)	SY	52,600		
81	L-108-5.1	NO. 8 AWG, 5KV, L-824C, TYPE C CABLE, INSTALLED IN DUCT BANK OR CONDUIT	LF	42,100		
82	L-108-5.2	NO. 6 AWG, SOLID, BAARE COPPER COUNTERPOISE WIRE, INSTALLED WITH GROUND RODS & CONNECTORS	LF	24,300		
83	L-108-5.3	NO. 6 AWG, SOLID, BARE COPPER GROUND, INSTALLED WITH GROUND RODS & CONNECTORS	LF	2,330		
84	L-108-5.4	NO. 8 L-824C 5KV TEMPORARY JUMPER CABLE, INCLUDING COUNTERPOISE WITH GROUND RODS & CONNECTORS, TRENCH & BACKFILL, CONDUIT, SAWKERFS & SEALANT, OR OTHER PROTECTION, INSTALLED & REMOVED	LF	9,000		
85	L-110-5.1	CONCRETE ENCASED ELECTRICAL CONDUIT, 1W-2" SCH. 40 PVC INSTALLED UNDER NEW RIGID PVMT	LF	14,200		
86	L-110-5.2	CONCRETE ENCASED ELECTRICAL CONDUIT, 1W-2" SCH. 40 PVC INSTALLED UNDER NEW FLEXIBLE PVMT	LF	10,200		
87	L-110-5.3	CONCRETE ENCASED ELECTRICAL CONDUIT, 1W-2" SCH. 40 PVC INSTALLED IN SOIL BELOW SUBGRADE OR TURF	LF	1,750		
88	L-110-5.4	DEB DRAIN CONDUIT, 1W-2" SCH. 40 PVC	LF	300		
89	L-110-5.5	CONCRETE ENCASED ELECTRICAL DUCT BANK, 4W-4" SCH. 40 PVC, INSTALLED IN SOIL BELOW SUBGRADE OR TURF	LF	315		
90	L-115-5.1	AIRCRAFT-RATED PULLBOX	EA	14		
91	L-125-5.01	FURNISH L-852C LED BIDIRECTIONAL TAXIWAY CENTERLINE FIXTURE & TRANSFORMER	EA	93		
92	L-125-5.02	FURNISH L-852C LED TAXIWAY CLEARANCE BAR FIXTURE & TRANSFORMER	EA	33		
93	L-125-5.03	FURNISH L-852D LED BIDIRECTIONAL TAXIWAY CENTERLINE FIXTURE & TRANSFORMER	EA	206		
94	L-125-5.04	FURNISH & INSTALL L-852D LED UNIDIRECTIONAL TAXIWAY CENTERLINE FIXTURE & TRANSFORMER	EA	1		
95	L-125-5.05	FURNISH L-852F LED OMNIDIRECTIONAL TAXIWAY CENTERLINE FIXTURE & TRANSFORMER	EA	3		
96	L-125-5.06	FURNISH L-852T LED TAXIWAY EDGE FIXTURE & TRANSFORMER	EA	143		
97	L-125-5.07	INSTALL FIXTURE WITH TRANSFORMER, COMPLETE	EA	479		
98	L-125-5.08	FURNISH & INSTALL L-868B 3/4" BLANK COVER ON EXISTING BASE	EA	2		
99	L-125-5.09-1	FURNISH & INSTALL 2-PIECE L-868B W/BAND RING & MULTIHOLE ADAPTER IN NEW RIGID PVMT. COMPLETE	EA	297		
100	L-125-5.09-2	FURNISH & INSTALL 2-PIECE L-868B W/BAND RING & MULTIHOLE ADAPTER IN NEW FLEXIBLE PVMT. COMPLETE	EA	143		
101	L-125-5.10	FURNISH MATERIALS AND CONSTRUCT LIGHT BASE BLOCKOUT, COMPLETE	EA	20		
102	L-125-5.11	FURNISH L-858 LED SIGN, 1 FACE, 3 MODULE, W/TRANSFORMER	EA	1		
103	L-125-5.12	SIGN BASE, CONSTRUCTED-IN-PLACE, COMPLETE	SF	700		
104	L-125-5.13	INSTALL L-858 LED SIGN ON NEW OR EXISTING BASE, COMPLETE	EA	16		

**CONTRACT BASE BID TOTAL(TOTAL OF LINE ITEMS 1-104) \$** \_\_\_\_\_

**CONTRACT BASE BID TOTAL (TOTAL OF LINE ITEMS 1-104):**

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(use words)

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(\$ \_\_\_\_\_)

5. The Owner reserves the right to reject any or all bids in whole or in part and to waive any informalities, technicalities, or omissions therein.

It is intention of the Owner to award a contract based upon the lowest responsive bid on the lump sum base bid. Bidder understands and agrees that, after a review of all the bids, the Owner will select the lump sum base bid that best suits the Owner's needs within the sole discretion of the Owner.

6. Bidder agrees that the Work: will be completed and ready for final payment within the calendar days (as described in Section 01100) after the date when the Contract Time commences to run. Bidder accepts the provisions of the Contract as to liquidated damages in the event of failure to complete the Work on time.

7. See Section 00200, INSTRUCTIONS TO BIDDERS, for a complete list of documents that are made a condition of this Bid.

8. Communications concerning this Bid shall be addressed to: \_\_\_\_\_  
(Printed Name)

The address of Bidder indicated above, or

the following address: \_\_\_\_\_

email address: \_\_\_\_\_

9. The terms used in this Bid which are defined in General Provision Section 10 of the Specifications included as part of the Contract Documents have the meanings assigned to them in the Division 0 and Division 1 Specifications.

Submitted on \_\_\_\_\_, 20\_\_\_\_.

10. The undersigned Bidder confirms that (1) neither Bidder nor any of Bidder's potential subcontractors or suppliers have pending claims or litigation, arbitration, or other dispute resolution proceedings where the Owner and Bidder or Bidder's potential subcontractors or suppliers are parties; or (2) such claims or proceedings are pending and Bidder is disclosing same through its own writing and/or the writing of Bidder's potential subcontractors or suppliers and submitting same to Owner with this proposal submittal.

If Bidder is:

An Individual

\_\_\_\_\_  
(Individual's Printed Name)

\_\_\_\_\_  
(Individual's Signature)

doing business as: \_\_\_\_\_

Business address: \_\_\_\_\_

\_\_\_\_\_  
Phone No.: \_\_\_\_\_ FAX No. \_\_\_\_\_ E-Mail \_\_\_\_\_

A Partnership

\_\_\_\_\_  
(Firm Name)

By: \_\_\_\_\_  
(Signature of General Partner and Printed Name)

Business address: \_\_\_\_\_

\_\_\_\_\_  
Phone No.: \_\_\_\_\_ FAX No. \_\_\_\_\_ E-Mail \_\_\_\_\_

A Corporation

\_\_\_\_\_  
(Corporation Name)

By: \_\_\_\_\_ Title: \_\_\_\_\_  
(Signature of person authorized to sign)

\_\_\_\_\_  
(Printed Name)

(Corporate Seal)

Attest: \_\_\_\_\_  
(Signature of Secretary) (Printed Name)

\_\_\_\_\_  
(State of Incorporation)

Business address: \_\_\_\_\_

Phone No.: \_\_\_\_\_ FAX No. \_\_\_\_\_ E-Mail \_\_\_\_\_

A Joint Venture

\_\_\_\_\_  
(Joint Venture)

By: \_\_\_\_\_  
(Signature of Joint Venturer) (Printed Name)

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

Phone No.: \_\_\_\_\_ FAX No. \_\_\_\_\_ E-Mail \_\_\_\_\_

By: \_\_\_\_\_  
(Signature of Joint Venturer) (Printed Name)

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

Phone No.: \_\_\_\_\_ FAX No. \_\_\_\_\_ E-Mail \_\_\_\_\_

(Each joint venturer must sign. The manner of signing for each individual, partnership and corporation that is a party to the joint venture should be in the manner indicated above).

**END OF SECTION 00405**

**DIVISION 0 – SECTION 00410****PROPOSAL GUARANTEE**

KNOW ALL MEN BY THESE PRESENT, that we, the undersigned, \_\_\_\_\_

\_\_\_\_\_ as Principal, and

\_\_\_\_\_ as Surety, are

hereby held and firmly bound unto Memphis-Shelby County Airport Authority as Owner, in the sum of \_\_\_\_\_ for the payment of which, well and truly to be made, the said Principal and Surety hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors, and assigns.

Whereas the Principal has submitted to Memphis-Shelby County Airport Authority a certain bid, attached hereto and hereby made a part hereof, to enter into a contract in writing for the Taxiway Alpha West Reconstruction - Construction, MSCAA Project No. 18-1413-01.

NOW, THEREFORE, if said bid shall be rejected, or in the alternate, if said bid shall be accepted and the Principal shall execute and deliver a contract in accordance with the terms of the Contract Documents and shall furnish a bond for its faithful performance of said contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said bid, then this obligation shall be void, otherwise the same shall remain in full force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligation of said Surety and its bond shall be in no way impaired or affected by any extension of the time within which the Owner may accept such bid; and said Surety does hereby waive notice of any such extension.

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

this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

PRINCIPAL

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

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

SURETY

SEAL

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

\_\_\_\_\_  
(Attorney-in-Fact)

**END OF SECTION 00410**

**ISSUED FOR BID**

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**DIVISION 0 – SECTION 00440****BUY AMERICAN CERTIFICATION**

The contractor agrees to comply with 49 USC § 50101, which provides that Federal funds may not be obligated unless all steel and manufactured goods used in AIP funded projects are produced in the United States, unless the FAA has issued a waiver for the product; the product is listed as an Excepted Article, Material Or Supply in Federal Acquisition Regulation subpart 25.108; or is included in the FAA Nationwide Buy American Waivers Issued list.

A bidder or offeror must complete and submit the Buy America certification included herein with their bid or offer. The Owner will reject as nonresponsive any bid or offer that does not include a completed Certificate of Buy American Compliance.

**CERTIFICATE OF BUY AMERICAN COMPLIANCE FOR TOTAL FACILITY**

As a matter of bid responsiveness, the bidder or offeror must complete, sign, date, and submit this certification statement with their proposal. The bidder or offeror must indicate how they intend to comply with 49 USC § 50101 by selecting one of the following certification statements. These statements are mutually exclusive. Bidder must select one or the other (i.e. not both) by inserting a checkmark (✓) or the letter “X”.

- ☐ Bidder or offeror hereby certifies that it will comply with 49 USC. 50101 by:
- Only installing steel and manufactured products produced in the United States; or
  - Installing manufactured products for which the FAA has issued a waiver as indicated by inclusion on the current FAA Nationwide Buy American Waivers Issued listing; or
  - Installing products listed as an Excepted Article, Material or Supply in Federal Acquisition Regulation Subpart 25.108.

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

- To provide to the Owner evidence that documents the source and origin of the steel and manufactured product.
  - To faithfully comply with providing US domestic products.
  - To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.
- ☐ The bidder or offeror hereby certifies it cannot comply with the 100% Buy American Preferences of 49 USC § 50101(a) but may qualify for either a Type 3 or Type 4 waiver under 49 USC § 50101(b). By selecting this certification statement, the apparent bidder or offeror with the apparent low bid agrees:
- To submit to the Owner within 15 calendar days of the bid opening, a formal waiver request and required documentation that support the type of waiver being requested.
  - That failure to submit the required documentation within the specified timeframe is cause for a non-responsive determination that may result in rejection of the proposal.
  - To faithfully comply with providing US domestic products at or above the approved US domestic content percentage as approved by the FAA.
  - To furnish US domestic product for any waiver request that the FAA rejects.
  - To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.

**Required Documentation**

**Type 3 Waiver** - The cost of components and subcomponents produced in the United States is more than 60% of the cost of all components and subcomponents of the “facility”. The required documentation for a type 3 waiver is:

- a) Listing of all manufactured products that are not comprised of 100% US domestic content (Excludes products listed on the FAA Nationwide Buy American Waivers Issued listing and products excluded by Federal Acquisition Regulation Subpart 25.108; products of unknown origin must be considered as non-domestic products in their entirety)
- b) Cost of non-domestic components and subcomponents, excluding labor costs associated with final assembly and installation at project location.
- c) Percentage of non-domestic component and subcomponent cost as compared to total “facility” component and subcomponent costs, excluding labor costs associated with final assembly and installation at project location.

**Type 4 Waiver** – Total cost of project using US domestic source product exceeds the total project cost using non-domestic product by 25%. The required documentation for a type 4 of waiver is:

- a) Detailed cost information for total project using US domestic product
- b) Detailed cost information for total project using non-domestic product

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

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Date

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Signature

---

Company Name

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Title

**END OF SECTION 00440**

**DIVISION 0 – SECTION 00445****DISADVANTAGED BUSINESS ENTERPRISE  
(DBE) REQUIREMENTS**

MSCAA operates a federal Disadvantaged Business Enterprise (DBE) Program and a non-federal Business Diversity Development Program (BDDP) to ensure full and fair opportunities in MSCAA contracting for businesses owned by socially and economically disadvantaged individuals. Memphis-Shelby County Airport Authority (MSCAA) administers both programs according to the regulations that apply to the federal program, primarily 49 CFR Part 26. Because the BDDP program applies to contracts involving non-federal funds, not every aspect of 49 CFR Part 26 is relevant to the BDDP program. In most areas, 49 CFR Part 26 will guide our operation of the BDDP including, but not necessarily limited to, rules dealing with certification and counting participation. Only firms that are certified consistent with 49 CFR Part 26 and by the MSCAA or Tennessee Department of Transportation Unified Certification Program (TN UCP), as identified below, will be considered to be certified as a Disadvantaged Business Enterprise.

This section, entitled “Disadvantaged Business Enterprise Requirements” is provided in an effort to assist Respondents. The information contained in this section is not intended to, nor does it, supplement or amend any federal regulation. All Respondents are responsible for compliance with all applicable federal and MSCAA rules and requirements.

It is a requirement that all Respondents providing services for the MSCAA take all reasonable steps to ensure that DBE have a full and fair opportunity to compete for and perform contract work without discrimination on the basis of age, race, sex, color, national origin, creed, religion, sexual orientation or disability. In order to satisfy this requirement, Respondents will be expected to timely submit documentation as identified below and throughout the contract period if selected, and cooperate with MSCAA. Failure to timely submit requested documentation, cooperate with MSCAA or answer inquiries truthfully will be considered a material contract breach and may result in termination.

**The following documents must be submitted with your response to this solicitation:**

**DBE Assurance Statement/Letter of Intent. The Respondent must submit an Assurance Statement for each DBE whose participation the Respondent is counting toward the goal. This may include first, second, third and so on tier subcontractors and the Respondent and all subcontractors between the Respondent and the DBE should sign the Assurance Statement. The Respondent must submit this Assurance Statement on Company Letterhead.**

**For each Assurance Statement, the Respondent must also provide the written quote or proposal from the DBE or other communication from the DBE upon which the scope of work and dollar value contained in your Assurance Statement is based (“quote/proposal”).**

**For all RFQs using federal monies, the Assurance Statement(s) must still be submitted and list the DBE s to be used and their scope of work, but no dollar amount(s) is entered. Dollar amounts(s) will be submitted by the prevailing Respondent upon completion of the selection process.**

**All portions of the Assurance Statement must be completed (including the description of work, the estimated contract amount, and the estimated dollar value of DBE participation for counting and goal purposes) before the Assurance Statement is signed by either the DBE or the Respondent. If the DBE’s, and if applicable the 2nd/3rd Tier Subcontractor’s, signature(s) can be obtained on the completed Assurance Statement before the bid**

**submission deadline, the Respondent should submit the fully-completed and fully-signed Assurance Statement. If the Respondent submits an Assurance Statement that is completed except for the DBE's, and if applicable, the 2nd/3rd Tier Subcontractor's signature(s) and a quote/proposal from the DBE as described above, the Respondent will be given 24 hours from the bid submission deadline to submit the completed Assurance Statement signed by the DBE and if applicable the 2nd/3rd Tier Subcontractor. Each Assurance Statement submitted during this 24 hour window must conform to the previously submitted Assurance Statement except for DBE signature. These signed Assurance Statements must be submitted pursuant to the same location and time restrictions that applied to the solicitation response and late signed Assurance Statements will only be accepted for good cause as determined solely by MSCAA.**

**MSCAA reserves the right to ask questions of the Respondent, investigate and require additional information as it determines necessary in its sole discretion to ensure that the regulations and MSCAA's rules are followed as it relates to DBE participation.**

**Respondent DBE Goals Accomplishment Statement**

Submit on Company Letterhead

**Information on All Firms that Provide Bids or Quotes**

We ask, but do not require, that **the Respondent** submit the following information with the response to this solicitation:

**Voluntary Disclosure of Respondent Data**

**Definition of Socially and Economically Disadvantaged**

The rules that govern eligibility and certification of DBE are found generally at 49 CFR Part 26.5 and 26.61 through 26.73. These rules define a DBE as a for-profit, small business concern which is at least fifty-one percent (51%) owned and controlled by one or more socially and economically disadvantaged individuals. In the case of any publicly owned business, at least fifty-one percent (51%) of the stock must be owned by one or more socially and economically disadvantaged individuals. In addition, the personal net worth of the socially and economically disadvantaged owners of the small business concern must not exceed one million three hundred twenty thousand dollars (\$1,320,000).

As defined by 49 CFR, Part 26.5, a socially and economically disadvantaged individual is any individual who is a citizen (or lawfully admitted permanent resident) of the United States and who is –

- (1) Any individual who a recipient finds to be a socially and economically disadvantaged individual on a case-by-case basis.
- (2) Any individual in the following groups, members of which are rebuttably presumed to be socially and economically disadvantaged:
  - (i) “Black Americans” which includes persons having origins in any of the Black racial groups of Africa;
  - (ii) “Hispanic Americans” which includes persons of Mexican, Puerto Rican, Cuban, Dominican, Central or South American, or other Spanish or Portuguese culture or origin, regardless of race;
  - (iii) “Native Americans” which includes persons who are American Indians, Eskimos, Aleuts, or Native Hawaiians;

- (iv) “Asian-Pacific Americans” which includes persons whose origins are from Japan, China, Taiwan, Korea, Burma (Myanmar), Vietnam, Laos, Cambodia (Kampuchea), Thailand, Malaysia, Indonesia, the Philippines, Brunei, Samoa, Guam, the U. S. Trust Territories of the Pacific islands (Republic of Palau), the Commonwealth of the Northern Marianas Islands, Macao, Fiji, Tonga, Kiribati, Tuvalu, Nauru, Federated States of Micronesia, or Hong Kong;
- (v) “Subcontinent Asian Americans” which includes persons whose origins are from India, Pakistan, Bangladesh, Bhutan, the Maldives islands, Nepal or Sri Lanka;
- (vi) Women;
- (vii) Any additional groups whose members are designated as socially and economically disadvantaged by the SBA, at such time as the SBA designation becomes effective.

### **DBE Liaison Officer**

The DBE Liaison Officer is responsible for developing, implementing, and monitoring the DBE program on a day-to-day basis in coordination with other appropriate officials; carrying out technical assistance for a DBE ; and, disseminating information on available business opportunities so that a DBE is provided an equitable opportunity to bid on MSCAA contracts. The DBE Liaison Officer reports directly to the President of the MSCAA. For questions or information related to the DBE program, contact Joe Claiborne at (901) 922-2556.

### **DBE Certification**

MSCAA certifies all of its DBEs through internal processes. The MSCAA compiles a directory of firms who have met the selection criteria for eligibility as a DBE, including 49 CFR Part 26. You can review the searchable directory of certified firms for MSCAA at our website (<https://mscaa.mwdbe.com/>). In the right hand column, you will find links to both the TN UCP Directory and the MSCAA DBE/ACDBE Directory. The TN UCP is a cooperative of entities which are recipients of federal funds that have developed a “one-stop shop” for certification throughout the State of Tennessee of which MSCAA is a certifying member. In order to be considered as meeting the DBE goal for a contract, each business wishing to participate as a DBE or a joint venture DBE, must either be:

- (1) **certified by the MSCAA or the TN UCP** in accordance with 49 CFR Part 26, or;
- (2) **receive affirmation from the MSCAA or the TN UCP** that their certification from another entity is consistent with and acceptable to the MSCAA or the TN UCP.

Persons or entities who consider themselves a DBE but who are not certified by MSCAA, the TN UCP as a DBE, have not received affirmation from the MSCAA or the TN UCP that their certification from another entity is consistent with and acceptable to the MSCAA or the TN UCP will not be considered. Unless a firm meets the criteria above by the time the responses to this solicitation are due, its participation will not be considered as meeting the DBE goal in the solicitation. Each business wishing to participate as a DBE or a joint venture DBE must be certified at the time of bid opening and a current copy of the DBE’s certification must be attached to the Assurance Statement.

### **Identification of Contract Goal and Requirements**

As an example: “For this contract, the DBE goal is established as **26%**.” In order to be responsive, a Respondent must either meet the goal or make good faith efforts to do so. Good faith efforts are defined in Appendix A to 49 CFR Part 26 and discussed in the following section.

If a Respondent’s DBE Assurance Statement proposes a DBE percentage less than the established goal, the Respondent must, at the time of making the response, submit appropriate documentation justifying its submitted DBE percentage. MSCAA reserves the right to request additional documentation or information from Respondent regarding its DBE Assurance Statement and, if applicable, any good faith efforts documentation. If MSCAA enters into a contract based on the Respondent’s DBE Goals Accomplishment Statement and documentation, the DBE percentage accepted by MSCAA will become a contractual requirement. If the Respondent’s DBE Assurance Statement proposes to attain a DBE percentage higher than the established goal, the established goal will remain the contractual requirement.

Respondents shall not contract with, demand, require or coerce a DBE into any agreement or into the signing of any Assurance Statement or any other document which prohibits the DBE from providing subcontracting quotations or doing business with other Respondents. The DBE shall be free to provide their services to any number of Respondents. To ensure that all obligations under sub-contracts awarded to a DBE are met, the MSCAA will review the agreement between the Respondent and DBE, and Respondent’s DBE involvement efforts during the performance of the contract. The Respondent shall bring to the attention of the MSCAA any situation in which regularly scheduled progress payments are not made to a DBE. If, in the opinion of the MSCAA, the Respondent has made significant deviations from the DBE program commitments, it shall be considered a breach of contract.

#### **Good Faith Efforts Statement and Requirements**

In order to be responsive, Respondents must either meet the DBE goal or make good faith efforts to meet the goal. Respondents who do not meet the goal must establish adequate good faith efforts by submitting documentation along with the Respondent DBE Goals Accomplishment Statement. This statement should show that they took all necessary and reasonable steps to achieve the DBE goal, which could reasonably be expected to obtain sufficient DBE participation, even if they were not fully successful. The Respondent’s DBE Goals Accomplishment Statement and supporting documents should conform to the good faith requirements outlined in Appendix A of 49 CFR Part 26.

The following is a list of types of actions that may be part of a Respondent’s efforts to obtain DBE participation and may be included in the Respondent DBE Goals Accomplishment Statement and documentation. This list is not intended to be a mandatory checklist, nor is it intended to be exclusive or exhaustive. Other factors or types of efforts may be relevant in appropriate cases:

- A. Soliciting through all reasonable and available means (e.g. attendance at pre-bid meetings, advertising and/or written notices) the interest of all certified as a DBE who have the capability to perform the work of the contract. The Respondent must solicit this interest within sufficient time to allow the DBE to respond to the solicitation and take appropriate steps to follow-up initial solicitations to determine interest.
- B. Selecting portions of the work to be performed by a DBE in order to increase the likelihood that the goals of the will be achieved.
- C. Providing any interested DBE with adequate information about the plans, specifications, and requirements of the contract in a timely manner to assist them in responding to a solicitation.
- D. Negotiating in good faith with any interested DBE. It is the Respondent’s responsibility to make a portion of the work available to DBE subcontractors and suppliers and to select those

portions of the work or material needs consistent with the available DBE subcontractors and suppliers, so as to facilitate DBE participation.

- E. Not rejecting any DBE as being unqualified without sound reasons based on a thorough investigation of their capabilities.
- F. Making efforts to assist any interested DBE in obtaining bonding, lines of credit, or insurance as required by the recipient or contractor.
- G. Making efforts to assist any interested DBE in obtaining necessary equipment, supplies, materials, or related assistance or services.
- H. Effectively using the services of available minority/women community organizations; minority/women contractors' groups; local, state, and Federal minority/women business assistance offices; and other organizations as allowed on a case-by-case basis to provide assistance in the recruitment and placement of any DBE.
- I. Making efforts to identify and assist eligible firms, which are not yet certified by the MSCAA or the TN UCP as a DBE, to obtain certification. These types of efforts will have special weight where it appears that the relevant firms will be certified in time for the execution of the contract.

If a Respondent has not met the DBE goal and submits Respondent DBE Goals Accomplishment Statement and documentation, the Respondent should summarize in detail all good faith efforts taken by the Respondent, including, but not limited to, the activities listed above in A through I, and supporting documentation. While the Respondent should submit documentation to support its good faith efforts at the time of bid submission, MSCAA may ask questions of Respondent or request additional documentation after review of Respondent's DBE Goals Accomplishment Statement and any documentation. In submitting the information required under this section, Respondent understands and agrees that the determination of whether Respondent has met the DBE goal or established good faith efforts to meet the goal is a judgment call that MSCAA will make.

### **COUNTING THE DBE PARTICIPATION**

DBE participation shall be counted toward meeting the DBE goal as outlined in 49 CFR Part 26, especially 26.55. When **the Respondent** completes an Assurance Statement, **the Respondent** must include not only the total value of the work to be performed and/or the materials to be supplied by the DBE but also the total amount of DBE participation that should be counted toward meeting the goal. For example, if a DBE is a regular dealer or supplier of pipe but does not install the pipe, then **the Respondent** can generally count the dollar value spent on the pipe at 60%. This would mean that if the DBE was supplying \$100,000 of pipe then the contract amount would be \$100,000 but the total amount of DBE participation would be \$60,000 for counting and meeting the goal purposes. If you have any questions about counting, we strongly urge you to consult 49 CFR Part 26. The following may be helpful to you in counting DBE participation and in determining which sections of Part 26.55 you need to review in more detail:

- (a) When a DBE participates in a contract or subcontract, the provider will count only the value of the work actually performed by the DBE toward the DBE goals. In a construction contract (and other similar contracts), this will include the work performed by the DBE's own forces and supplies purchased or equipment leased by the DBE as described below, especially (d) (but not supplies or equipment the DBE subcontractor purchases from the prime contractor or its affiliate.) The Respondent will count the entire amount of fees or commissions charged by a DBE for providing a bona fide service toward goals provided that we determine the fees to

be reasonable and not excessive. When a DBE subcontracts part of the work of its contract to another firm, the value of the subcontracted work may be counted toward DBE goals only if the subcontractor is itself a DBE.

- (b) When a DBE performs as a participant in a joint venture, the Respondent will count a portion of the total dollar value of the contract equal to the distinct, clearly defined portion of the work of the contract that the DBE performs with its own forces toward DBE goals.
- (c) The Respondent will count expenditures to a DBE contractor toward DBE goals only if the DBE is performing a commercially useful function on that contract. A DBE performs a commercially useful function when it is responsible for execution of the work of the contract or subcontract and is carrying out its responsibilities by actually performing, managing, and supervising the work involved. To determine whether a DBE is performing a commercially useful function, the Respondent will evaluate industry practices, the amount of work subcontracted, whether the amount the firm is to be paid under the contract is commensurate with work it is actually performing, and the DBE credit claimed for its performance of the work, and other relevant factors. The Respondent will determine questions of commercially useful function with regard to trucking companies under 49 CFR Part 26.55 (d).
- (d) The Respondent will count expenditures with the DBE for materials or supplies toward DBE goal in the manner described in 49 CFR Part 26.55 (e). Please review Part 26.55(e) carefully. It is important to note that the rule counts expenditures differently based upon whether the DBE is a manufacturer as defined by the rule (normally counted at 100% percent of the cost), a regular dealer as defined by the rule (normally counted at 60% of the cost) or neither of the two (normally counted at the entire amount of fees or commissions, or fees or transportation charges, provided they are reasonable). It is important to note that materials and supplies provided by a DBE that is not a regular dealer in those materials and supplies do not count toward meeting the goal. For example, if the DBE is a regular dealer of piping, the DBE cannot purchase office equipment and then supply that office equipment to the prime and count any portion of the cost of the office equipment toward meeting the goal. Such conduct for DBE counting purposes is prohibited by the rules and is considered to be an impermissible and illegal pass-through.
- (e) If a firm is not currently certified as a DBE, in accordance with the standards of subpart D of this part, at the time of the execution of the contract, the Respondent will not count the Firm's participation toward any DBE goals, except as provided for in 49 CFR Part 26.87(i).
- (f) The Respondent will not count the dollar value of work performed under a contract with a firm after it has ceased to be certified toward any goals except as provided in 49 CFR Part 26.87(j).
- (g) The Respondent will not count the participation of a DBE subcontractor toward a contractor's final compliance with its DBE obligations on a contract until the amount being counted has actually been paid to the DBE.

### **SANCTIONS FOR NON-COMPLIANCE**

In case of the Respondent's non-compliance with DBE and/or BDDP requirements as applicable, including, but not limited to, documentation, cooperation, and truthfulness, MSCAA shall impose such contract sanctions as it may determine to be appropriate. This may include but is not limited to:

- a) Withholding of payments to the Respondent under the Contract until the Respondent complies; and/or



- b) Cancellation, termination, or suspension of the Contract, in whole or in part; and/or
- c) Payment by the Respondent to MSCAA of an amount equal to the difference in the DBE dollar value contracted for and the dollar value achieved in documented DBE participation or any lesser amount or penalty as deemed appropriate by MSCAA, which dollar value shall be considered liquidated damages for failure to perform the requirements of this Contract and for which Respondent and all of its subcontractors agree to be bound.

#### **PROMPT PAYMENT/RETAINAGE**

The Respondent agrees to pay each subcontractor under this prime contract for invoices submitted or normal progress payments for work completed satisfactorily or supplies provided satisfactorily pursuant to its contract and no later than fifteen (15) days from the receipt of each payment it receives from the MSCAA.

There is no retainage or other sums allowed to be withheld from progress payments or any other payments and any exceptions to this prompt pay/retainage provision must be requested in writing by Respondent (Contractor) and approved in writing by an MSCAA Vice-President or higher prior to the delay or withholding of any payments under this provision.

Respondent (Contractor) will include the following paragraphs in all contracts and/or agreements related to the work [under this Contract] with subcontractors or suppliers and will require all its subcontractors and suppliers to include this paragraph in any contracts and/or agreements related to the work [under this Contract] with any other third parties and any other lower tier subcontractors or suppliers:

“It is understood and agreed by all involved parties that payment for work completed satisfactorily or supplies provided satisfactorily will be made to the appropriate party no later than fifteen (15) days from receipt of payment for that work or those supplies.

There is no retainage or other sums allowed to be withheld from progress payments or any other payments and any exceptions to this prompt pay/retainage provision must be requested in writing to MSCAA and approved in writing by an MSCAA Vice-President or higher prior to the delay or withholding of any payments under this provision.”

#### **49 CFR Part 26**

The Respondent shall carry out the applicable requirements of 49 CFR Part 26 in the award and administration of MSCAA contracts. Respondent agrees to provide all its subcontractors and suppliers and to require all its subcontractors and suppliers on this project to provide a complete copy of the **Disadvantaged Business Enterprise (DBE) Requirements** of this contract to all those who provide supplies or work related to this contract and to require all those providing supplies or work to be bound by these requirements as it relates to their work related to this contract.

Project No. \_\_\_\_\_

**DBE ASSURANCE STATEMENT/LETTER OF INTENT****RESPONDENT:**

Name of Firm: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Telephone: \_\_\_\_\_

**DBE:**

Name of Firm: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Telephone: \_\_\_\_\_

**Description of work to be performed by DBE:**

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**The Respondent is committed to utilizing the above-named DBE for the work described above. The estimated dollar value of this work is \$ \_\_\_\_\_, which is \_\_\_\_\_% the total base bid proposal.**

**AFFIRMATION**

The above-named DBE affirms that it will perform the portion of the contract for the estimated dollar value as stated above.

By: \_\_\_\_\_  
Signature of DBE and Title                      Date                      Name

By: \_\_\_\_\_  
Signature of 2<sup>nd</sup>/3<sup>rd</sup> Tier Subcontractor                      Date                      Name  
and Title

**If the Respondent does not receive award of the prime contract, any and all representations in this letter of Intent and Affirmation shall be null and void.**

By: \_\_\_\_\_  
Signature of Respondent and Title                      Date                      Name

**(SUBMIT ON RESPONDENT'S LETTERHEAD FOR EACH DBE SUBCONTRACTOR.)**

Project No. \_\_\_\_\_

**RESPONDENT DBE GOALS ACCOMPLISHMENT STATEMENT**

The undersigned Respondent has satisfied the requirements of the bid/proposal specification in the following manner (please complete the appropriate spaces):

\_\_\_\_\_The Respondent is committed to a minimum of 26% DBE utilization on this contract.

\_\_\_\_\_The Respondent is unable to meet the DBE goal of \_\_\_\_\_% but is committed to a minimum of \_\_\_\_\_% DBE utilization on this contract and submits the attached narrative and documentation demonstrating good faith efforts consistent with Appendix A of 49 CFR 26. **The Respondent should attach as many pages as necessary to provide a full and complete narrative and supporting documentation of good faith efforts made. This narrative must be written on company letterhead and signed.**

**Please provide an explanation for the percentage quoted above:**

Provide an explanation of the dollar value of DBE's participation and compensation and how this has been determined to meet the specific goal requirements of this solicitation in whole or part.

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If DBE and company will enter into a Joint Venture, please describe the terms of the relationship and attach a copy of the contract between the parties.

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It is the present intent of the Respondent to utilize the specific DBE firms identified in this proposal in the execution of this contract. If for any reason, one or more of the DBE identified here are unable or unwilling to participate, the Respondent will make good faith efforts to replace the DBE with a similar DBE. The Authority DBE Good Faith Procedures are provided in this package and apply to this proposal.

**Respondent's Name:** \_\_\_\_\_

**State Registration No.:** \_\_\_\_\_

**Federal Tax ID No.:** \_\_\_\_\_

**By:** \_\_\_\_\_  
Signature and Title Date

(SUBMIT THIS PAGE ON RESPONDENT'S LETTERHEAD)

**VOLUNTARY DISCLOSURE OF RESPONDENT DATA**

For Title VI Compliance, we ask for **voluntary disclosure** of the following information:

Gender:        Male

Female

Race:        Caucasian

Black American

Hispanic American

Native American

Subcont. Asian American

Asian-Pacific American

Other (please specify) \_\_\_\_\_

**(DO NOT SUBMIT THIS PAGE ON LETTERHEAD)**

**Information on All Firms that Provided Bids or Quotes to:**

This requirement applies to all firms, regardless of whether they are subs or primes, regardless of the gender or race of their owners, and regardless of whether they are ultimately chosen to participate in the contract. Please list below the name, address, phone number and contact person for every firm that provided you a bid or a quote on this project – even if you ultimately decided not to use the firm in preparing your final bid. The first line should be used for the **prime contractor** on this project. All sections must be completed to the best of your ability.

MSCAA Proj./Bid No.: \_\_\_\_\_

Name of Firm	Selected? Y/N	Full Address of Firm	Point of Contact	Phone No.	DBE? Y/N	Firm Age	AGRR *
						yrs	
						yrs	
						yrs	
						yrs	
						yrs	
						yrs	
						yrs	
						yrs	
						yrs	
						yrs	
						yrs	
						yrs	
						yrs	
						yrs	
						yrs	
						yrs	

\*Footnote: Please enter the letter for the category that best identifies your annual gross revenue.

AGRR =Annual Gross Revenue Ranges:

**A** = Less than \$500,000    **B** = \$500,000 - \$1 Million    **C** = \$1 - \$2 Million    **D** = \$2 - \$5 Million    **E** = Over \$5 Million

**DIVISION 0 – SECTION 00490**

**ADDENDA AND MODIFICATIONS**

**1. INTERPRETATIONS - ADDENDA AND MODIFICATIONS**

- A. If, during the bidding period Bidder finds discrepancies, ambiguities, omissions, or is in doubt as to meaning or intent of Contract Documents, notify the Owner or Engineer not less than seven (7) days prior to Bid Date. All such necessary clarifications, information, interpretations or amendments shall be answered in the form of written addenda to Drawings and Specifications, and shall be issued simultaneously to all holders of complete sets of Documents.
- B. No Addenda will be issued less than two days prior to the Bid opening date. Neither the Owner nor Engineer shall be responsible for oral interpretations or instructions during the bidding period.
- C. All Addenda are incorporated by reference into the Contract. Failure of any Bidder or sub-bidder to receive any addenda shall not relieve the Bidder of any obligation with respect to the Bid.
- D. All Addenda and Modifications to the Contract Documents shall be inserted and indexed in this location behind this page.

**END OF SECTION 00490**

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**CONSTRUCTION CONTRACT  
FOR  
TAXIWAY ALPHA WEST RECONSTRUCTION - CONSTRUCTION**

**BY AND BETWEEN  
THE MEMPHIS-SHELBY COUNTY AIRPORT AUTHORITY  
AND  
(CONTRACTOR NAME)**

**MSCAA PROJECT NO. 18-1413-01**

**THIS CONSTRUCTION CONTRACT** (hereinafter referred to as "Contract") is made and entered into as of \_\_\_\_\_, between MEMPHIS-SHELBY COUNTY AIRPORT AUTHORITY, a body politic and corporate under the laws of Tennessee (hereinafter referred to as "**Owner**" or "**Sponsor**") doing business at 2491 Winchester Road, Suite 113, Memphis, Tennessee 38116-3856, and {insert **CONTRACTOR NAME**}, a {insert **LEGAL ENTITY TYPE and STATE**} doing business at {insert Contractor address}, (hereinafter referred to as "**Contractor**," "**Bidder**," or "**Offeror**"). Owner and Contractor may sometimes be referred to herein individually as "Party" or collectively as "Parties."

**RECITALS**

1. **WHEREAS**, the Owner desires to have constructed certain work in Memphis, Tennessee, more particularly described as Taxiway Alpha West Reconstruction - Construction, MSCAA Project No. 18-1413-01 (herein referred to as "the Project"); and

2. **WHEREAS**, the Contractor desires to enter into this Contract as an independent contractor and is ready, willing and able to construct the Project in accordance with the terms and subject to the conditions of this Contract; and

3. **WHEREAS**, the "Program Manager" is to act as the Owner's representative, and the Owner will advise the Contractor in writing of the name of the Program Manager; and

4. **WHEREAS**, the "Engineer" is the Owner's representative with responsibility for design of the technical specifications, and the Owner will advise the Contractor in writing of the name of the Engineer; and

**NOW, THEREFORE**, in consideration of good and valuable consideration, received or to be received, the sufficiency of which the Parties acknowledge, the Parties agree as follows:

**ARTICLE 1**

**SCOPE OF THE WORK AND TERM OF AGREEMENT**

**Section 1.01. Scope of the Work.** The general scope of the work is more particularly described in Exhibit A, which is attached hereto and incorporated herein by reference. Contractor agrees that the Project shall be constructed in accordance with the terms of this Contract and the "Contract Documents" as defined in Article 2 of this Contract. The term "Work" includes, but is not limited to, all labor, materials, supplies, tools, equipment and services necessary to construct the Project as described in the Contract Documents, whether or not all materials and equipment are incorporated or will be incorporated in the Project; and all Work deemed necessary to fully close the Project including demobilization.

**Section 1.02. Term of Contract and Completion.** The term of this Contract shall commence upon Owner's issuance of the Notice to Proceed pursuant to Section 3.01 and shall continue until the Work is completed in accordance with the Contract Documents, unless earlier terminated by the provisions set forth in Section 23 of this Contract.



## ARTICLE 2

### **CONTRACT DOCUMENTS**

**Section 2.01. Definition.** The "Contract Documents" include this Contract, the Legal Notice, Instructions to Bidders, the Proposal, the Proposal Guaranty, the drawings and the specifications, the Federal Aviation Authority ("FAA") General Provisions ("GP"), all addenda, and exhibits or modifications to any of them, issued prior to or after execution of this Contract. The Contract Documents are more particularly described in Exhibit B, which is attached hereto and incorporated herein by reference. As used in this Contract, a "modification" is either:

- (a) a written and signed Contract Amendment to this Contract; or
- (b) an accepted Request for Proposal ("RFP"); or
- (c) an Engineer's Supplemental Instruction ("ESI"); or
- (d) a Construction Change Directive (as defined in Section 9.02(c) of this Contract).

**Section 2.02. Intent of Contract Documents.** The intent of the Contract Documents is to include all design, architecture and engineering, except as otherwise expressly provided in the Contract Documents, materials, appliances, labor and services of every kind necessary for the proper execution of the Work and the terms and conditions of payment for the Work. The Contract Documents are to be considered as one document, and whatever is called for by any one of the Contract Documents shall be as binding as if called for by all.

**Section 2.03. Coordination of the Contract, Plans and Specifications.** This Contract, the plans, specifications, and all referenced standards cited in the Contract Documents are essential parts of the Contract requirements. A requirement occurring in one of the Contract Documents is as binding as though occurring in all. They are intended to be complementary and used to describe and provide a complete project. In case of dimensional discrepancies, calculated dimensions will govern over scaled dimensions. In the event of conflicts or discrepancies among the Contract Documents, interpretations will be based on the following priorities:

- (a) This Contract.
- (b) The Addenda, with those of later date having precedence over those of earlier date.
- (c) The Technical Specifications.
- (d) The Plans.
- (e) Cited standards for materials or testing and cited FAA General Provisions and advisory circulars.

**Section 2.04. Errors in Contract Documents.** Prior to commencing the Work, the Contractor shall review all of the Contract Documents for the purpose of identifying any error, inconsistency, omission, discrepancy, or variance that may be contained therein. If the Contractor finds any error, inconsistency, omission, discrepancy, or variance in the Contract Documents, it shall notify the Owner at least ten (10) days before beginning the affected portion of the Work. The Owner shall make any correction, interpretation, or clarification promptly, basing its decision on the intent of the Contract Documents. Failure of the Contractor to timely notify the Owner of any such error, inconsistency, discrepancy, or variance within the time provided by this paragraph shall bar the Contractor from making any claim for additional time or compensation caused by any such error, inconsistency, discrepancy, or variance even if the error, inconsistency, discrepancy or variance caused the Contractor to incur additional expense or time of performance.

## ARTICLE 3

### **PROGRESS OF THE WORK**

**Section 3.01. Commencement and Completion.** The Contractor shall commence the Work upon receipt of the written Notice to Proceed, as defined in Section 01100 of the Technical Specifications, from the Owner and shall achieve substantial completion of the Work, as defined in Section 01100 of the Technical Specifications. The Contractor warrants that it will deliver the Project to the Owner free from any and all mechanics' liens or other encumbrances. Contractor further agrees to promptly (which is defined for purposes of this paragraph as no more than three (3) days from receipt of any lien or other notice) notify the Owner of the existence of any and all mechanics' liens filed by any subcontractors, materialmen, suppliers, or sub-subcontractors. If any mechanics' liens are filed, Contractor shall, at its expense, bond off any such mechanics' liens within three (3) days from receipt of a written request of Owner to do so. Time is of the essence, and the substantial completion date may be altered only as provided in this Contract. Substantial completion shall occur when the Work is sufficiently complete in accordance with the Contract Documents, so the Owner can occupy or utilize the Work for its intended use, and when only minor punch list work remains to be done and a certificate of occupancy has been issued. The Owner will, upon written request of the Contractor, issue a certificate establishing the substantial completion date at any time after substantial completion has occurred.

**Section 3.02. The Progress Schedule.** Contractor shall fully comply with the requirements for scheduling the Work as set forth in Section 01100 and Section 01320 of the Technical Specifications. The Owner reserves the right to reschedule the Work, or the sequence of the activities of the Contractor, for no additional compensation should Owner deem such rescheduling to be in its best interest. At least fifteen (15) days prior to the due date of the first payment to be made hereunder by the Owner and thereafter on a monthly basis, the Contractor shall submit to the Owner a cash flow projection depicting the projected monthly cash flow for the entire Project.

### **Section 3.03. Extension of Substantial or Final Completion Date.**

(a) Except as otherwise expressly provided herein, the "Substantial Completion Date" or "Final Completion Date" shall be extended only for such number of calendar days that the Work is actually delayed by a casualty, a fire, or a Contract Amendment (hereinafter referred to as "Excusable Delays"). No extensions to the Substantial Completion Date shall be granted due to the negligence or fault of the Contractor or its subcontractors, non-availability of materials or non-availability of labor. No extension to the Substantial Completion Date shall be granted for the period of time during a delay in the performance of the Work which is caused in part by the Owner or the Engineer, and in part by the Contractor or one for whom the Contractor is responsible ("Concurrent Delay"). A request for a time extension based upon inclement weather shall be governed by the provisions of Section 01320 (3.05) of the Technical Specifications.

(b) In order to obtain an extension of the Final Completion Date or the Substantial Completion Date due to an Excusable Delay, the Contractor in each instance shall give written notice to the Owner within seven (7) days after the occurrence of each Excusable Delay. If the Contractor fails to issue written notice to the Owner, its right to an extension, if any, will be deemed waived. The Owner shall render a written decision, which shall be made in good faith, granting or refusing the request of the Contractor for an extension within a reasonable time after receipt of the request for a time extension. If a Contract Amendment is agreed to by the Contractor and Owner, any extension of the Substantial Completion Date caused by the Contract Amendment work must be stated in the Contract Amendment. If no extension to the Substantial Completion Date is stated in the Contract Amendment, then the Contractor shall be barred from later seeking an extension to the Substantial Completion Date or Final Completion Date because of the Contract Amendment work. No extension to the Substantial Completion Date or the Final Completion Date shall be granted due to the aggregate number of Contract Amendments.

**Section 3.04. No Damage for Delay.** Contractor agrees to perform the Work and to require the subcontractors to perform the Work in a timely and proper method so as to meet the dates reflected on the progress schedule. In the event that the Contractor is delayed in the performance of the Work through no fault of the Contractor or its subcontractors, and for causes set forth in Section 3.03(a), and defined therein as Excusable Delay, then the Contractor may seek a time extension in accordance with the provisions of Section 3.03(b). Contractor agrees that such time extension is its sole and exclusive remedy for any damages regardless of the cause of such delays. Contractor also agrees that the Owner shall not be liable for any other monetary damages sustained by Contractor or its subcontractors

for acceleration, disruption, inefficiencies, suspension or resequencing of the Work or any other damages related to the progress schedule regardless of the cause of such damages. The Owner shall not be liable for consequential damages of any nature for any reason at any time.

**Section 3.05. Liquidated Damages.** As set forth in Section 01100 of the Technical Specifications, liquidated damages will be assessed for the Project. The Contractor shall proceed with the Work at such rate of progress to ensure full completion by the Final Completion Date.

## ARTICLE 4

### PAYMENT

**Section 4.01. Contract Price.** The Owner and Contractor agree that the Contractor shall be paid the amount of **Thousand and 00/100 Dollars (\$000.00)** ("Contract Price"), as set forth in the Contractor's Proposal, for completion of the Work in accordance with the Contract Documents. The Contract Price shall include all profit and overhead, including without limitation field overhead, general conditions and home office overhead of the Contractor. The Contract Price also includes all allowances specified in the Contract Documents.

**Section 4.02. Payment Procedures.** As Work proceeds under the Contract, payments ("Progress Payments") shall be made by the Owner to the Contractor in accordance with the following procedure:

(a) By the 1<sup>st</sup> day of each calendar month during the performance of the Work, the Contractor shall submit to the Owner an Application and Certificate for Payment, based on the Work completed during the previous month ("previous month" being defined for this Section only as the second calendar day of the prior month through the first calendar day of the current month), using a form approved by the Owner. Contractor shall not be paid any amounts exceeding the Contract Price set forth in Section 4.01 of this Contract, unless modified by a properly executed written Contract Amendment in accordance with the provisions of Article 9 of this Contract.

(b) Each Application and Certificate for Payment shall be accompanied by: (1) lien waivers of the Contractor conditioned upon payment by the Owner of the amount sought in the Application; (2) other documentation as may be requested by the Owner for the proper review of the Application and Certificate for Payment; (3) a list of current subcontractors, sub-subcontractors and material suppliers; (4) the Business Diversity Monthly Compliance Reports; and (5) all documents required by the Owner Controlled Insurance Program ("OCIP") Manual, as applicable.

(c) The Owner or Engineer shall promptly review each Application and Certificate for Payment and recommend for approval such amount as is properly due under the Contract Documents.

(d) Payments by the Owner shall be made within thirty (30) days from the date on which an Application and Certificate for Payment has been submitted and approved by the Owner or the next working day if the thirtieth day is a Saturday, Sunday or holiday.

**Section 4.03. Mobilization.** The work, which is conducted in preparation for the construction activities, which includes but is not limited to, movement of personnel, equipment, stockpiles, supplies to the project site, (all as more particularly described in Article 3.01 of Section 01100 of the Technical Specifications) shall be designated as "Mobilization." The Mobilization lump sum amount for this Contract shall be [ ] and 00/100 Dollars (\$ ) ] which is a fixed amount that shall not change for the term of the Contract.

**Section 4.04. Demobilization.** The activities which are conducted by the Contractor in order to complete the work and conduct any closeout items, which includes but is not limited to, removal of personnel, equipment, Contractor owned stockpiles, supplies, and incidentals from the project site, (all as more particularly described in Article 3.01 of Section 01100 of the Technical Specifications) shall be designated as "Demobilization." The Demobilization lump sum amount for this Contract shall be **Six Hundred Seventy-Five Thousand and 00/100 Dollars (\$675,000.00)**, which is a fixed amount and shall not change for the term of the Contract.

#### **Section 4.05. Payment for Material Stored On-Site.**

(a) Payment for the actual unit cost of materials suitably stored on the site of the Work ("Work Site") and intended for incorporation in the Work will be made by the Owner to the Contractor subject to the provisions of Section 4.02 of this Contract, Section 90-07 of the FAA General Provisions, and the following conditions:

- (1) The Contractor shall furnish supporting evidence satisfactory to the Owner evidencing the cost of the materials and shipment to the work site.
- (2) The materials shall not be stored on the work site for more than ninety (90) calendar days before they are installed without the written consent of the Owner.
- (3) The materials shall be stored on the work site in accordance with applicable recommendations of the manufacturer and the instructions of the Owner.
- (4) A representative of the Owner or Engineer may inspect and inventory any stored materials.

(b) Payment will not be made for materials stored away from the work site without the written consent of Owner. In the event that the Owner consents to payment for materials stored off-site, such payment shall be conditioned upon submission by the Contractor of bills of sale or such other documentation satisfactory to the Owner to establish the title of the Owner to such materials or equipment, and the submission of satisfactory insurance certificates for the stored materials.

(c) Notwithstanding any provision herein to the contrary, if payments are to be made on account of materials or equipment not incorporated in the Work but delivered and suitably stored at the work site, such payments shall be conditioned upon submission by the Contractor of bills of sale or such other documentation satisfactory to the Owner to establish the title of the Owner to such materials or equipment, and the submission of satisfactory insurance certificates for the stored materials to protect the interest of the Owner.

(d) Regardless of ownership or insurance, the Contractor shall remain the guardian and protector of all materials and equipment stored or incorporated into the Work.

**Section 4.06. Use of Payments.** The Contractor shall use all sums paid to it pursuant to this Contract for the performance of the Work in accordance with the Contract Documents. Upon the request of the Owner or Engineer, the Contractor shall furnish satisfactory proof of payment, including, but not limited to, partial release of liens and the Business Diversity Monthly Compliance Report, as to the disposition of any monies paid to the Contractor by the Owner.

**Section 4.07. Payment Not a Waiver.** Neither the approval or making of any payment to the Contractor, nor the partial or entire use or occupancy of the Work by the Owner, shall be deemed an acceptance of any portion of the Work.

#### **Section 4.08. Final Payment.**

(a) "Final Payment," by the Owner shall constitute a waiver of all claims by the Owner for performance of the Work except for claims of the Owner arising from unsettled liens, incomplete or defective workmanship, defective materials, failure to perform in accordance with the progress schedule, or for the breach of any guarantees of warranties provided or to be provided by the Contractor under this Contract. Acceptance of the Final Payment by the Contractor shall constitute a waiver and release of any and all claims which the Contractor may then have or in the future have against the Owner or the Engineer arising from the Work or this Contract.

(b) Final Acceptance of the Work shall occur only after all Work (including punch list items) provided for in the Contract Documents has been finally completed and accepted in writing by the Owner, and only after the Contractor has provided the Owner with instructions and operating manuals, parts lists, "record" drawings and all other items required by the Contract Documents.

(c) Within thirty (30) days after "Final Acceptance" of the Work, the Final Payment of amounts found properly due under the Contract Documents shall be paid to the Contractor.

(d) Final Payment shall not become due until the Contractor submits to the Owner the following:

- (1) An affidavit that all payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or its property might in any way be responsible, have been paid or otherwise satisfied; and
- (2) A consent of surety to Final Payment; and
- (3) Other data establishing payment or satisfaction of all such obligations, such as receipts, releases and waivers of liens arising out of the Work, to the extent and in such form as may be designated by the Owner or Engineer; and
- (4) Any documents required by Article 6 of this Contract.

(e) The Owner shall issue a "Certificate of Final Completion" when, in its sole discretion, the Project has been completed and all conditions required by this Section 4.07 have been complied with by Contractor.

**Section 4.09. The Right of Owner to Withhold Payment.** The Owner may withhold or, on account of subsequent evidence, nullify, the whole or part of any Progress Payment, including the Final Payment, to such extent as may be necessary to reasonably protect itself from any of the following:

- (a) unacceptable work as further described in Section 50-10 of the FAA General Provisions; or
- (b) third-party claims filed or reasonable evidence indicating probable filing of such claims; or
- (c) reasonable doubt that the Work will be substantially completed by the Substantial Completion Date; or
- (d) failure of the Contractor to make payments properly to subcontractors or for equipment, materials, services or labor; or
- (e) reasonable evidence of fraud, over-billing or overpayment; or
- (f) failure of the Contractor to perform the Work in accordance with the Contract Documents; or
- (g) a reasonable doubt that the Work can be completed for the unpaid balance of the Contract Price; or
- (h) damage to the Owner, or to another contractor, subcontractor or sub-subcontractor caused by the Contractor; or
- (i) failure to provide certified payroll records; or
- (j) failure to provide any documents required by the Owner Controlled Insurance Program (OCIP); or
- (k) failure to keep the record drawings current each month in accordance with Article 6 of this Contract.

## ARTICLE 5

### **EQUIPMENT AND MATERIALS**

#### **Section 5.01. Materials Provided by Contractor.**

(a) Unless otherwise provided in the Contract Documents, the Contractor shall provide all equipment, materials, labor, services, water, and power to the Work Site, as well as all tools, equipment, lights, transportation, and other facilities necessary for the performance of the Work.

(b) All equipment, machinery, material, and articles incorporated in the Work shall be new and unused unless otherwise specified in the Contract Documents. When not specified in detail in the Contract Documents, the equipment, machinery, material, and articles incorporated in the Work shall be of the most suitable grade and quality for the purpose intended.

#### **Section 5.02. Type of Equipment Used.**

(a) When any equipment, machinery, material, or article is referred to by trade name, make, or catalog number followed by the words "or equal," the reference shall be regarded as establishing the minimum standard of quality and performance required and shall not be construed as limiting competition. The Contractor may, with the prior written approval of the Owner, use other equipment, machinery, materials, or articles which are at least equal in quality and performance to that named in the Contract Documents; provided, however, that in no event shall such approval be construed as a waiver of the right of the Owner to require equipment, machinery, materials, or articles which conform to the standard of quality and performance established by reference to the trade name, make, or catalog number of the equipment, machinery, materials, or articles for which the substitution has been approved. Any cost of redesign and additional expense resulting from the substitution shall be at the sole expense of the Contractor.

(b) The name of the manufacturer, model number, and other identifying information respecting the performance, capacity, nature, and rating of equipment, machinery, materials, and articles proposed in substitution of those specified in the Contract Documents shall be submitted to the Owner in sufficient time to avoid delays in the Work.

#### **Section 5.03. Non-Conforming Materials.**

(a) Equipment, machinery, materials or articles installed or used in the Work which do not comply with the requirements of the Contract Documents, and which have not been previously approved in writing by the Owner shall be installed or used at the risk of the Contractor of subsequent rejection by the Owner.

(b) The Contractor shall be fully and solely responsible for quality control for all equipment, machinery, materials, or articles used in the performance of the Work.

**Section 5.04. Owner Furnishing Equipment or Fixtures.** The Owner may directly furnish any and all of the equipment or fixtures required for the Project. In the event the Owner elects to do so, the Contract Price shall be reduced by the amount which was to be charged by Contractor for such equipment or fixtures as set forth and included in the Contract Documents. A Contract Amendment reducing the Contract Price for that item of Work shall be executed by Owner and Contractor to reflect a reduction in the Contract Price for that item of Work and that the Owner is to furnish the equipment or fixtures. The Contractor shall assume responsibility for and be fully responsible for the care, custody, and control of all Owner furnished equipment or fixtures after said equipment or fixtures arrives on the Work Site or in any approved offsite storage facility, as set forth in Section 60-08 of the FAA's General Provisions.

## ARTICLE 6

### **RECORD DRAWINGS AND DATA**

**Section 6.01. Record Drawings.** A complete set of drawings shall be maintained by the Contractor at the Work Site for the purpose of accurately indicating all record conditions. The drawings shall be kept up-to-date and marked each

day to show all changes and variations and each entry shall be dated and verified as made. At the completion of the Work and prior to Final Payment, a complete set of marked record drawings shall be furnished by the Contractor to the Owner. If the record drawings are not kept current each month, the Owner shall have no obligation to pay the Contractor until the record drawings are made current.

#### **Section 6.02. Operation and Maintenance Data.**

(a) The Contractor shall furnish complete and necessary data for the operation, repair, and maintenance of each operating component of the Work (hereinafter referred to as "the Data"). The Data shall include prints of shop drawings, "as-installed" conditions, sources of equipment and principal materials, specified tests and performance data, repair and maintenance data, lubrication instructions and recommendations, parts lists, and other catalog data or information required to operate and maintain any part of the Work. Care shall be taken to include all pertinent data and to exclude inapplicable or duplicative information.

(b) Prior to Final Payment, a set of Data shall be furnished to the Owner in an electronic PDF format. In addition, three (3) complete sets of the Data in a form directed by the Owner shall be provided to the Owner, indexed alphabetically by components, grouped together and securely bound in a durable folder or binder that is labeled and indexed to show its contents.

(c) Installation information for all machinery and equipment also shall be kept on the site of the Work during construction, but used or marked prints or data sheets are not to be used in assembling the final maintenance and operating manuals described in paragraph (b) of this Section 6.02.

(d) Operations and maintenance demonstrations by the manufacturer of all machinery and equipment shall be complete in all respects and shall specify the appropriate and inappropriate uses of the machinery and equipment.

**Section 6.03. Information from Suppliers.** The Contractor shall make it a requirement or condition of purchase from its suppliers of equipment and/or materials: (1) to furnish complete and adequate operating and maintenance data pertaining to their equipment and/or materials; (2) to assign to the Owner any warranty, express or implied, furnished by the manufacturer of the equipment and/or materials; and, (3) to assign to the Owner any customary maintenance or repair service, spare parts supply service, or personnel support service furnished by the manufacturer of the equipment and/or materials. If the terms and conditions of any warranty, maintenance or repair service, spare parts supply service, or personnel support service furnished by manufacturer of the equipment and/or materials are negotiable, they shall be negotiated by the Owner and the manufacturer.

### **ARTICLE 7**

#### **SUBCONTRACTS**

##### **Section 7.01. Definition.**

(a) As used in the Contract Documents, a "subcontractor" is a person or organization that has a contract with the Contractor to perform any portion of the Work or to furnish any equipment, labor or materials to the Project.

(b) As used in the Contract Documents, a "sub-subcontractor" is a person or organization that has a contract with a subcontractor to perform any portion of the Work or to furnish any equipment, labor or materials to the Project.

**Section 7.02. No Contractual Relationship with Owner.** Nothing contained in the Contract Documents or otherwise shall create any contractual relationship between the Owner and any subcontractor or sub-subcontractor, and no subcontract or sub-subcontract shall relieve the Contractor of its responsibilities and obligations should any subcontractor or sub-subcontractor fail to perform its work in a satisfactory manner. The Contractor agrees to be as fully responsible to the Owner for the acts and omissions of its subcontractors and their sub-subcontractors and of persons either directly or indirectly employed by them as it is for the acts and omissions of persons directly employed by Contractor.

### **Section 7.03. Award of Subcontracts.**

(a) Unless the Owner gives its written approval to Contractor, the Contractor shall not enter into a subcontract or purchase order with any entity that is a party in any litigation, arbitration, or other dispute resolution proceeding with the Owner. The Contractor shall request written confirmation from any potential subcontractor or supplier prior to the execution of any subcontract or purchase order that there is no pending litigation, arbitration, or other dispute resolution proceeding where the Owner and the potential subcontractor or supplier are adverse parties. Such written confirmation shall be sent to the Owner within seven (7) days from the receipt of bids.

(b) If the Owner refuses to accept any subcontractor or material supplier (or sub-subcontractor) or person or organization because of such pending litigation, arbitration, or other dispute resolution proceeding, the Contractor shall submit an acceptable substitute at no additional cost to Owner.

**Section 7.04. Change of Subcontractors.** The Owner may require a change of any subcontractor. The Contract Price shall be adjusted accordingly due to the Owner's requiring a change of any subcontractor, sub-subcontractor, or material supplier previously approved in writing by the Owner, unless the change was required because the subcontractor, sub-subcontractor or material supplier was unable to timely or properly perform its work in accordance with the Contract Documents.

**Section 7.05. No Substitution of Subcontractors.** The Contractor shall not make any substitution for any subcontractor nor allow the substitution of any sub-subcontractor who has been accepted by the Owner unless the substitution is required and previously approved by the Owner. Acceptable reasons for substitution (other than where required by the Owner) shall be limited to the following:

- (a) Inability of the subcontractor or sub-subcontractor to provide bonds, if required; or
- (b) Failure of the subcontractor or sub-subcontractor to perform according to approved schedules or other provisions of the Contract Documents; or
- (c) Other reasons which would reasonably render the subcontractor or sub-subcontractor unable to perform its work according to the Contract Documents as evidenced in writing by the Contractor.

**Section 7.06. Subcontract Terms.** All portions of the Work performed by a subcontractor or sub-subcontractor shall be pursuant to an appropriate agreement between the Contractor and the subcontractor (and where appropriate between subcontractors and sub-subcontractors) which shall contain provisions that:

- (a) Preserve and protect the rights of the Owner under the Contract Documents, including, but not limited to, the obligation to indemnify the Owner as set forth in Article 21 of this Contract with respect to the portion of the Work to be performed under the subcontract (or sub-subcontract) so that the subcontracting will not prejudice such rights; and
- (b) Require that such Work be performed in accordance with the requirements of the Contract Documents; and
- (c) Require submission to the Contractor of applications for payment under each subcontract to which the Contractor is a party; and
- (d) Require that all requests for additional compensation, extensions of time or otherwise with respect to subcontracted portions of the Work be submitted to the Contractor (via any subcontractor or sub-subcontractor where appropriate) in sufficient time so that the Contractor may comply in the manner provided in the Contract Documents for like requests by the Contractor upon the Owner; and
- (e) Name the Owner as an additional insured under all applicable insurance policies; and



- (f) Require compliance with the federal Disadvantaged Business Enterprise ("DBE") requirements, including, but not limited to, the non-discrimination and prompt pay provisions.

**Section 7.07. Subcontractor Relations Requirements.** By appropriate written agreement, the Contractor shall require each subcontractor, to the extent of the Work to be performed by the subcontractor, to be bound by the obligations, terms and conditions of this Contract and the Contract Documents, and to assume toward the Contractor all the obligations, terms, conditions and responsibilities which the Contractor, by this Contract and the Contract Documents, assumes toward the Owner and the Engineer. Each subcontract agreement shall preserve and protect the rights of the Owner and the Engineer under this Contract and the Contract Documents with respect to the Work to be performed by the subcontractor so that subcontracting thereof will not prejudice the rights of the Owner or the Engineer. The Contractor shall require each subcontractor to enter into a similar agreement with sub-subcontractors. The Contractor shall make available to each proposed subcontractor, prior to the execution of the subcontract agreement, copies of this Contract and the Contract Documents to which the subcontractor will be bound. Subcontracts shall similarly make copies of this Contract and the Contract Documents available to their respective proposed sub-subcontractors.

## **ARTICLE 8**

### **PAYMENT TO SUBCONTRACTORS**

**Section 8.01. Payments to Subcontractors from the Contractor.** The Contractor shall pay each subcontractor an amount equal to the percentage of completion allowed to the Contractor on account of the work of each subcontractor. The Contractor shall also require each subcontractor to make similar payments to its sub-subcontractors.

**Section 8.02. Withholding of Payment by the Owner.** If the Owner withholds monies for any cause which is the fault of the Contractor and/or the fault of a particular subcontractor, the Contractor shall pay all other subcontractors, in accordance with the terms of their applicable subcontract, if not in conflict with this Contract and applicable law, any time after the progress payment by the Owner should otherwise have been issued, for its Work to the extent completed. Notwithstanding this Section 8.02, Contractor may withhold funds from any subcontractor that is not performing its work in accordance with the Contract Documents.

**Section 8.03. Independent Obligation to Pay.** The obligation of the Contractor to pay its subcontractors (and their obligation to pay sub-subcontractors) is an independent obligation from the obligation of the Owner to make payment to the Contractor. The Owner shall have no obligation to pay or to see to the payment of any monies to any subcontractor or sub-subcontractor. The provisions of this Contract are solely intended for the benefit of the Owner and Contractor and not for any other person. Nothing in this Contract is intended to create any third-party rights against the Owner.

**Section 8.04. Payments to Sub-Subcontractors.** This Contract is governed by federal prompt pay provisions where applicable and as set forth in Exhibit "E" to this Contract. To the extent that Tennessee statutes are not superseded by applicable federal statutes, Tennessee statutes also will apply. Contractor agrees to require each of its subcontractors (1) to pay their subcontractors for invoices submitted or normal progress payments for work completed satisfactorily pursuant to its contract with each subcontractor and (2) to make such payments to their respective subcontractors no later than ten (10) days after any such subcontractors receive payment from the prime contractor or their respective subcontractor, as applicable.

## **ARTICLE 9**

### **CHANGES**

#### **Section 9.01. Changes in the Work.**

(a) The Owner, without invalidating this Contract, may order extra work or make changes by altering, adding to or deducting from the Work by executing a Contract Amendment or a Construction Change Directive in a form provided by the Owner or Engineer. All Work performed pursuant to a valid Contract Amendment, or a Construction Change Directive shall be performed under the conditions of this Contract and the Contract Documents.

(b) The Owner shall have authority to make changes in the Work not involving extra cost, not involving an extension to the Substantial Completion Date, and not inconsistent with the purposes of the Work, but otherwise, no extra Work or change in the Work shall be made unless pursuant to a Contract Amendment or a Construction Change Directive and no claim by Contractor for additional cost or fee or any extension of the Substantial Completion Date shall be valid unless so ordered in a written Contract Amendment or a Construction Change Directive.

(c) Engineer's Supplemental Instructions (ESI) are written instruments prepared by the Owner or Engineer to issue additional instructions or interpretations or to order changes in the Work not involving extra costs or fees, or any extension of the scheduled Substantial Completion Date. Contractor shall give prompt written notice to Owner if it believes that the contents of an ESI require the Contractor to incur extra costs or fees or affect the Substantial Completion Date.

#### **Section 9.02. Construction Change Directive.**

(a) A Construction Change Directive is a written order prepared by the Owner, Program Manager, or Engineer and signed by the Owner, Engineer or Program Manager directing a change in the Work and stating a proposed basis for adjustment, if any, in the Contract Price or the Substantial Completion Date, or both. The Owner may, by Construction Change Directive, without invalidating this Contract, order changes in the Work consisting of additions, deletions, or other revisions.

(b) A Construction Change Directive shall be used in the absence of an agreement on the terms of a Contract Amendment.

(c) If the Construction Change Directive provides for an adjustment to the Lump Sum Price, the adjustment shall be based on one of the following methods:

- (1) Mutual acceptance of a lump sum properly itemized and supported by sufficient documentation to permit evaluation; or
- (2) Unit prices stated in the Contract Documents or subsequently agreed upon; or
- (3) Cost to be determined in a manner agreed upon by the Parties and a mutually acceptable fixed or percentage fee; or
- (4) As provided in paragraph (f) of this Section 9.02.

(d) Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Owner of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Price or the Substantial Completion Date.

(e) A Construction Change Directive signed by the Contractor indicates the agreement of the Contractor therewith, including adjustment in the Contract Price, the Substantial Completion Date or the method of determining the adjustment. Such agreement shall be effective immediately and shall be recorded as a Contract Amendment.

(f) If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Price, the method and the adjustment shall be determined by the Owner on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Price, a reasonable allowance for overhead and profit. In such case, the Contractor shall keep and present, in such form as the Owner may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purpose of this paragraph shall be limited to the following:

- (1) The actual cost for labor, including social security and unemployment insurance, fringe benefits required by agreement, and workers' or workmen's compensation insurance; and/or

- (2) The actual cost of materials, supplies, machinery, and equipment, including cost of transportation, whether incorporated or consumed; and/or
- (3) The actual cost of subcontractors and sub-subcontractors; and/or
- (4) The actual cost of premiums for all bonds and insurance, permit fees and sales, use or similar taxes related to the Work; and/or
- (5) The actual additional costs of supervision and field office personnel, if any, directly attributable to the change.

(g) Pending final determination of cost to the Owner, amounts not in dispute may be included in Certificates and Applications for Payment. The amount of credit to be allowed by the Contractor to the Owner for a deletion or change which results in a net decrease in the Contract Price shall be actual net cost, as confirmed by the Owner. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be calculated on the basis of net increase, if any, with respect to that change.

**Section 9.03. Contract Amendment Procedure.** If the Owner desires extra Work or changes in the Work, the Owner shall submit a Request for Proposal ("RFP") to the Contractor. The Contractor shall furnish to the Owner a statement setting forth in detail the proposal of the Contractor for performing the extra Work or changes and the effect of the extra Work or changes, if any, in the Contract Price and the Substantial Completion Date attributable to the extra Work or changes set forth in the request of the Owner. If the Owner approves in writing the proposal of the Contractor, a Contract Amendment in the form provided by the Owner shall be executed by the Parties and the Contract Price and the Substantial Completion Date shall be adjusted accordingly. In preparing Lump Sum quotes in response to an RFP, the Contractor shall provide a cost breakdown to the Owner that provides sufficient detail for the Owner or Engineer to determine that the quoted costs are reasonable and allowable and to verify that markups are properly calculated according to the terms of this Contract.

**Section 9.04. Changes in the Contract Price.** Any increase or decrease in the Contract Price attributable to a Contract Amendment performed by the Contractor or any of its subcontractors shall be governed by the provisions of Section 90-05 of the FAA's General Provisions.

**Section 9.05. Time and Materials.** In the event that the Owner and the Contractor cannot agree on the amount or time extension, if any due, to the Contractor for a Contract Amendment, the Owner may, in writing, direct the Contractor to proceed with the performance of such Work. The Contractor agrees to comply with any such directive issued by the Owner. If any additional compensation is due to the Contractor as a result of a directive, it will be calculated pursuant to the provisions of Section 150-90 of the FAA General Provisions Addendum.

**Section 9.06. Unconditional Obligation to Proceed.** Notwithstanding anything herein to the contrary, the Contractor will proceed with the Work so as to complete the Work on or before the Substantial Completion Date even if it has a dispute with the Owner concerning a Construction Contract Amendment, a Construction Change Directive or any extension of time which is or could be due to the Contractor pursuant to a Contract Amendment, a Construction Change Directive or otherwise.

**Section 9.07. Request for Additional Compensation.** If for any reason the Contractor believes that additional compensation is due for work not clearly provided for in the Contract Documents, the Contractor shall provide written notice to the Owner at least three (3) days before beginning the work which is not clearly provided for in the Contract Documents. If such notification is not given, then the Contractor hereby agrees to waive any claim for such additional compensation. Such notice by the Contractor shall not in any way be construed as proving or substantiating the validity of the request for additional compensation. When the work, which is the basis for the Contractor's request for additional compensation, has been completed, the Contractor shall, within ten (10) calendar days, submit evidence of costs incurred by the Contractor and a narrative which provides the basis for the request for additional compensation.

## ARTICLE 10

### **THE UNDERSTANDING OF THE CONTRACTOR**

**Section 10.01. Examination of Work Site.** The Contractor acknowledges that it has, by careful examination, satisfied itself as to the nature and location of the Work, the conformation of the ground conditions, the character, quality and quantity of the materials, equipment, supplies, machinery, and facilities needed preliminary to and during the performance of the Work, the general and local conditions, and all other matters which can in any way affect the Work.

**Section 10.02. Sufficiency of Contract Documents and Representations of Contractor.**

(a) The Contractor acknowledges that the Contract Documents are sufficient to enable it to determine the cost of all of the Work and that the Work can be completed in accordance with the Contract Documents for the Contract Price.

(b) The Contractor acknowledges that any observed errors, discrepancies, omissions, ambiguities, or conflicts in the Contract Documents will be brought to the attention of the Owner, as set forth in Section 2.04 of this Contract, and in a timely manner in order to ensure substantial completion of the Work by the Substantial Completion Date. The Contractor shall be responsible for using its best efforts to discover and observe errors, discrepancies, omissions, ambiguities, or conflicts in the Contract Documents. In addition, the Contractor acknowledges that the Owner has not made, nor shall it be deemed to have made any warranties, guarantees, or representations of any kind whatsoever regarding the sufficiency of the Contract Documents or any conditions relating to the Work.

(c) Contractor represents that it has reviewed and checked all information and data shown or indicated on the Contract Documents with respect to existing underground use facilities at or contiguous to the Work Site and, subject to the provisions of Section 10.03 of this Contract, assumes responsibility for the accurate location of said underground use facilities. No additional examinations, investigations, explorations, tests, reports, studies or similar information or data in respect of said underground use facilities are or will be required by Contractor in order to perform and furnish the Work for the Contract Price and substantially complete the Work by the Substantial Completion Date. However, notwithstanding anything herein to the contrary, the Contractor may, at its sole expense after receiving written permission from the Owner, and subject to any limitations specified by the Owner or Engineer, conduct any additional testing it deems necessary.

**Section 10.03. Differing Work Site Conditions.** If conditions are encountered at the Work Site that are: (1) subsurface physical conditions, which differ materially from those indicated in the Contract Documents; or (2) unknown physical conditions of an unusual nature, which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, then notice by the observing Party shall be given to the other Party promptly before conditions are disturbed and in no event later than seven (7) days after the first observance of the conditions. The Owner or Engineer will promptly investigate such conditions and, if they differ materially and cause an increase or decrease in the Contractor's cost, or time required, for performance of any part of the Work; will recommend an equitable adjustment in the Contract Price or the Substantial Completion Date, or both. However, any equitable adjustment in the Contract Price shall not include additional general conditions costs. If the Owner determines that the conditions at the Work Site are not materially different from those indicated in the Contract Documents and that no change in the terms of this Contract is justified, the Owner shall so notify the Contractor in writing, stating the reasons. Claims by the Contractor in opposition to such determination must be made within fourteen (14) days after the Owner has given notice of the decision.

**Section 10.04. No Oral Modification.** No oral agreement or conversation with any officer, agent or employee of the Owner or its representatives, including the Engineer, either before or after the execution of this Contract, shall affect or modify any of the terms or obligations contained in this Contract or the Contract Documents.

## ARTICLE 11

### **SUPERVISION OF THE WORK; SAFETY AND SECURITY**

**Section 11.01. The Superintendent of the Contractor.** The Contractor shall designate in writing to the Owner and keep on the Project during its progress a competent employee who has responsibility to oversee the Work

("Superintendent"). The Superintendent shall be satisfactory to the Owner. The Superintendent shall be changed upon written request of the Owner but shall not be changed by the Contractor except with the consent of the Owner unless the Superintendent ceases to be in its employ. The Superintendent shall represent the Contractor, and all directions given to him by the Owner shall be as binding as if given to the Contractor directly. The Superintendent shall devote his full time to the Work and shall maintain an office on the Work Site. The Superintendent shall direct, coordinate and supervise all Work, inspect all materials delivered to the Work Site to ascertain whether or not they comply with the requirements of the Contract Documents, and reject all non-conforming materials or workmanship.

**Section 11.02. Order and Discipline.** The Contractor shall at all times be responsible for enforcing strict discipline and good order among its employees, and all employees of its subcontractors and sub-subcontractors. If any person on the Work Site shall appear to be incompetent, disorderly, or intemperate, in any way disrupts or interferes with the Work, or is in any other manner not qualified for or unfaithful to the job entrusted to him, such person shall be discharged from the Project immediately and shall not again be employed on the Work Site without the prior written consent of the Owner.

**Section 11.03. Cleaning Up.**

(a) During the performance of the Work, the Contractor shall keep the Work Site clean and free of all rubbish, waste materials, debris and other materials in accordance with the instructions set forth in the Contract Documents. At the end of each working day, the Contractor shall remove all waste materials, rubbish, debris, and other materials from and about the Work Site as well as all surplus materials and shall leave the Work Site clean in accordance with the Contract Documents.

(b) The Contractor shall establish an active ongoing program to eliminate any foreign objects from the Work Site that may cause damage to aircraft or cause personal injury to other persons.

(c) The Contractor shall pay particular attention to haul routes used to and from the Work Site to prevent any construction debris from being dropped or tracked that may present a hazard.

(d) The Contractor, upon written notice from the Owner, shall promptly cut the grass and clean debris around the Work Site. If the Contractor fails to clean up any debris which is deposited as a result of construction operations, the Owner will, after notice, immediately do so. The cost thereof will be charged to the Contractor at actual cost per hour, but not less than the minimum rate of Two Hundred Fifty Dollars (\$250.00) per hour. The Contractor shall assume full responsibility for failure to perform cleanup operations required by this Section 11.03.

(e) All materials delivered to the Work Site shall be stored and handled so as to preclude inclusion of any foreign substances, and to prevent any discoloration or damage which might reduce its effectiveness as part of the Work.

**Section 11.04. Safety and Security.**

(a) The Contractor shall be solely responsible for and oversee all safety orders, precautions and programs necessary for the safety of the Work. The Contractor shall take the precautions set forth in the Contract Documents in order to ensure the safety of all persons involved in the Work, all other persons whom the Work might affect, all equipment and materials incorporated in the Work, all property on the Work Site and adjacent to it, and the Owner's business operations which are functioning on the Work Site or in the vicinity of it.

(b) The Contractor shall keep an accurate record of all persons who are on the Work Site and shall provide a copy of such a list to the Owner with each monthly Application and Certificate for Payment. The Contractor, its subcontractors, their sub-subcontractors, and all employees of same, shall comply with all security rules made by the Owner and the Federal Aviation Administration. In addition, Contractor shall comply with the construction safety and health guidelines which are set forth in Exhibit D.

(c) The Contractor shall conform to Owner's rules and regulations for airport operations.

(d) Prior to the commencement of the Work, the Contractor shall provide the Owner a list of all of its employees who will perform any portion of the Work.

#### **Section 11.05. Observation of the Work.**

(a) The Engineer, the Owner and persons designated by the Owner, shall at all times have access to the Work Site whenever it is in preparation or progress and the Contractor shall provide proper facilities for such access and for observation. If the Owner or the Engineer discovers any defective Work in connection with any observation, it shall be reported to the Contractor in writing and the Contractor shall correct it.

(b) If the Contract Documents, the written instructions of the Owner, laws, ordinances, rules or regulations, or any public authority require any of the Work to be specifically tested or inspected, the Contractor shall give the Owner timely notice of its readiness for inspection and testing, and of the date set for such test or inspection. Inspections by the Owner or Engineer shall be promptly made. If any of the Work should be covered up without the approval or consent of the Owner, the Engineer or any public authority, it shall be uncovered for examination, if required by the Owner, the Engineer, or such other public authority, at the sole expense of the Contractor.

(c) Re-examination of questioned Work that has been previously tested or inspected by the Engineer or the Owner may be ordered by the Engineer or the Owner and, if so ordered, the questioned Work shall be uncovered by the Contractor. If such Work is found to be in compliance with the Contract Documents, the Owner shall pay the actual cost of the re-examination. If such Work is found not to be in compliance with the Contract Documents, the Contractor shall bear the costs of the re-examination.

(d) The Contractor shall not be required to provide professional services which constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to fulfill the Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures. The Contractor shall not be required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, then the Contractor shall promptly and at its expense secure such services. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, shop drawings and other submittals prepared by such professional. Shop drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Owner or Engineer. The Owner and the Engineer shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals.

### **ARTICLE 12**

#### **PERMITS, LICENSES, LAWS AND REGULATIONS**

**Section 12.01. Contractor to Secure All Permits.** The Contractor shall secure and pay for all construction related permits, including the building permit. The Contractor shall be responsible for all inspections required by governmental authorities in conjunction with the issuance of said permits. Contractor shall secure and pay for all governmental fees, licenses, and other permits necessary for the lawful and proper execution and completion of the Work.

**Section 12.02. Compliance with Laws.** The Contractor shall give all notices and shall comply with all laws, ordinances, rules, regulations and orders of any public authority having jurisdiction over the Work, which have any bearing on the execution of the Work. If the Contractor observes that any of the Contract Documents are at variance in any respect with any such laws, ordinances, rules, regulations, and orders, it shall promptly notify the Owner and the Engineer in writing and any necessary changes shall be made by the Contractor. If the Contractor fails to give such notice or executes any of the Work in a manner contrary to any such laws, ordinances, rules, regulations or orders, the Contractor shall bear all resulting costs to correct said Work to comply with such laws and regulations and be liable for any resulting fines, penalties, judgments or damages imposed on or incurred by the Owner.

## ARTICLE 13

### **TAXES AND OTHER FEES AND COSTS**

#### **Section 13.01. Payment of Taxes by Contractor.**

(a) Any and all taxes, excises, duties and assessments in any manner levied, assessed or imposed by any government or subdivision or agency having jurisdiction over the Work shall be the sole responsibility and liability of the Contractor.

(b) The Contractor shall promptly pay and discharge when due, unless the validity or application is being contested by the Contractor in good faith, any and all taxes, excises, duties and assessments, together with any interest and penalties, if any, the responsibility and liability for which the Contractor has assumed pursuant to the provisions of paragraph (a) of this Section 13.01, unless any such tax, excise, duty or assessment is levied, assessed or imposed upon the Owner, in which case the Owner shall promptly give the Contractor notice of such levy, assessment or imposition, whereupon the Contractor shall promptly pay and discharge the same. Upon the written request and at the sole expense of the Contractor, the Owner shall assist the Contractor in contesting the validity or application of any such levy, assessment or imposition, and in the event a refund of all or any part of any tax, excise, duty or assessment (including interest and penalties, if any), said refund shall be refunded to the Contractor (less the amount of expenses associated with such contest not previously reimbursed by the Contractor to the Owner).

(c) The Contractor shall pay all applicable fees, and for all damage to sidewalks, streets, Owner's property, and other public property or to any public utilities caused by the performance of this Contract.

**Section 13.02. Damage to Owner Property.** Contractor agrees to promptly notify Owner of any damage caused to Airport property arising from Contractor's activities at the Airport. Contractor also agrees to comply with any request made by the Owner for reimbursement of costs associated with any damage to Airport property arising from work performed at the Airport by Contractor or any of Contractor's representatives, managers, employees, agents, contractors, subcontractors, licensees or invitees or from the conduct of same. This provision shall survive the termination of this Contract.

## ARTICLE 14

### **SHOP DRAWINGS AND SAMPLES; MATERIAL TESTING**

#### **Section 14.01. Definitions.**

(a) As used in this Contract, "shop drawings" are drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are prepared by the Contractor, any subcontractor, sub-subcontractor, manufacturer, supplier or distributor, and which illustrates some portion of the Work.

(b) As used in this Contract, "samples" are physical examples furnished by the Contractor to illustrate materials, equipment or workmanship.

#### **Section 14.02. Submissions.**

(a) Contractor shall submit to Owner all shop drawings in electronic format or as hard copies in accordance with the Technical Specifications. Contractor shall review, stamp with its approval and submit, in orderly sequence so as to cause no delay in the Work or the work of any other contractor, all shop drawings and samples required by the Contract Documents or subsequently by the Owner or Engineer. Shop drawings and samples shall be properly identified as specified in the Contract Documents or as the Engineer or Owner may require. At the time of submission, the Contractor shall inform the Engineer and the Owner by separate written correspondence of any deviation in the shop drawings or samples from the requirements of the Contract Documents.

(b) By approving and submitting shop drawings and samples, the Contractor represents that it has determined and verified all field measurements, field construction criteria, materials, catalogue numbers and other data, and that it has checked and coordinated each shop drawing and sample with the requirements of the Work and the Contract Documents.

**Section 14.03. Review of the Engineer.**

(a) The Engineer will review and act upon shop drawings and samples with reasonable promptness so as to cause no unreasonable delay in the Work, but only for conformance with the design concept of the Work and with the information given in the Contract Documents. The review of the Engineer or its agents of a given item shall not indicate approval of an assembly in which the item functions.

(b) The approval of the Engineer of shop drawings or samples shall not relieve the Contractor of its responsibility for any deviation from the requirements of the Contract Documents unless the Contractor has informed the Engineer and the Owner by separate written letter of such deviation at the time of submission and the Owner or Engineer has given written approval of the specific deviation, nor shall the approval of the Engineer relieve the Contractor from responsibility for errors or omissions in the shop drawings or samples.

**Section 14.04. Corrections Made by Contractor.** The Contractor shall make any corrections required by the Owner or Engineer and shall submit the required number of corrected copies of shop drawing or new samples until approved by Owner. The Contractor shall direct specific attention in writing or on resubmitted shop drawings or samples to revisions other than the corrections requested by the Engineer or the Owner on previous submissions.

**Section 14.05. Prior Approval Required.** No portion of the Work requiring a shop drawing or sample submission shall be commenced until the submission has been approved by the Owner or Engineer. All such portions of the Work shall be performed in accordance with approved shop drawings and samples and the Contract Documents.

**Section 14.06. Submittal Schedule.** Within seven (7) days after execution of this Contract, the Contractor shall provide the Owner and the Engineer with a preliminary submittal schedule of the dates that each shop drawing or sample will be submitted for approval. Within thirty (30) days after execution of this Contract, the Contractor shall provide the Engineer and the Owner with a final schedule of the dates that each shop drawing or sample will be submitted for approval. The sequence of the submittals of the Contractor shall be scheduled so as to permit an orderly review by the Engineer. The schedule shall allow reasonable added time according to the number or complexity of shop drawings or samples in each submittal for the checking, correction, and rechecking of corrections, as well as for return of approved or rejected shop drawings and samples to the Contractor. The submittal schedules shall allow not less than fourteen (14) calendar days for the Engineer to review any shop drawing or sample.

**Section 14.07. Material Testing.**

(a) If the Contract Documents, laws, ordinances, rules, regulations, or orders of any public authority having jurisdiction require any portion of the Work to be inspected, tested or approved, the Contractor shall give the Owner timely notice of its readiness so the Owner or Engineer may observe such inspection, testing or approval. The Contractor shall bear all costs of such inspections, tests or approvals required by public authorities. Unless otherwise provided, the Owner shall bear all costs of other inspection, tests, or approvals.

(b) If the Owner or Engineer determines that any Work requires special inspection, testing or approval which paragraph (a) of this Section 14.07 does not include, the Owner or Engineer will instruct the Contractor to order such special inspection, testing or approval, and the Contractor shall give notice as provided in paragraph (a) of this Section 14.07. If such special inspection or testing reveals a failure of the Work to comply with the requirements of the Contract Documents, the Contractor shall bear all costs thereof, including compensation for the Owner's or Engineer's additional services made necessary by such failure; otherwise, the Owner shall bear such costs and an appropriate Contract Amendment shall be issued.

(c) Required certificates of inspection, testing or approval shall be secured by the Contractor and promptly delivered to the Owner.



(d) If the Owner or Engineer is to observe the inspections, tests or approvals required by the Contract Documents, they will do so promptly.

## ARTICLE 15

### **THE RIGHT OF THE OWNER TO INSPECT AND AUDIT**

**Section 15.01. Right to Audit.** The Contractor shall keep full and accurate records of all costs incurred and items billed in connection with any Work which records shall be open to audit by the Owner, or any authorized representative of the Owner, including but not limited to the Federal Aviation Administration and the Comptroller General of the United States during the course of the Project and until four (4) years after the final payment by the Owner to the Contractor. In addition, the Contractor shall make it a condition of all subcontracts and sub-subcontracts entered into in furtherance of the Work that any and all subcontractors and sub-subcontractors will keep accurate records of costs incurred and items billed in connection with the subcontract (or sub-subcontract) and that such records shall be open to audit by the Owner, or any authorized representative of the Owner, including but not limited to the Federal Aviation Administration and the Comptroller General of the United States during the course of the Work and until four (4) years after final payment by the Owner to the Contractor.

**Section 15.02. Review of Subcontracts.** Upon request of the Owner or Engineer, the Contractor shall provide the Owner with an executed copy of all subcontracts, sub-subcontracts and purchase orders entered into in furtherance of the Work.

## ARTICLE 16

### **SEPARATE CONTRACTS**

**Section 16.01. The Right of the Owner to Award Separate Contracts.** The Owner reserves the right to award other contracts in connection with work at or in the vicinity of the Work and the Contractor agrees to cooperate fully and not to unreasonably interfere with the work of such other contractors.

**Section 16.02. Cooperation.** The Contractor shall afford the other contractors of Owner the opportunity for the introduction and storage of their materials and equipment to their work sites and for the execution of their work. The Contractor shall properly connect and coordinate the Work with the work of any other contractors of the Owner.

**Section 16.03. Inspection of Work of Other Contractors.** If any part of the Work depends, for proper execution or result upon, the work of another contractor of Owner, the Contractor shall inspect and promptly report to the Engineer and the Owner any discrepancies or defects in such work that render it unsuitable for such proper execution or results. Failure of the Contractor to so inspect and report shall constitute an acceptance of the Work of the other contractor as fit and proper to receive the Work.

**Section 16.04. Responsibility for Damage.** Should the Contractor cause damage to the work or property of any other contractor of the Owner, including, but not limited to, delay, disruption, suspension of work and/or acceleration damages, the Contractor shall settle all claims with such other contractor if the other contractor will so settle. If such other contractor sues the Owner on account of any damage alleged to have been so sustained, the Owner shall notify the Contractor who shall defend such proceedings at the expense of the Contractor, or provide counsel of Owner's choice for Owner at the expense of Contractor, and if any judgment or award against the Owner results, the Contractor shall pay or satisfy it and shall reimburse the Owner for all attorney's fees and other litigation costs which the Owner has incurred.

## ARTICLE 17

### **WARRANTIES OF THE CONTRACTOR**

**Section 17.01. Warranty of Title.** The Contractor warrants and guarantees that title to all Work, materials and equipment covered by an Application and Certificate for Payment, whether incorporated in the Work or not, will pass to

the Owner, free and clear of all liens, claims, security interests or encumbrances (hereinafter "Liens") and that none of the Work, materials or equipment covered by an Application and Certificate for Payment will have been acquired by the Contractor, or by any other person performing any part of the Work or furnishing materials and equipment for the Work, subject to an agreement under which a lien is retained by the seller or supplier.

**Section 17.02. Special Warranties.** When special guarantees or warranties are required by the Contract Documents for specific parts of the Work, the Contractor shall procure certified copies of such guarantees or warranties, countersign them and submit them to the Owner in triplicate. Delivery of such guarantees or warranties will not relieve the Contractor from any obligations assumed under any provision of this Contract or the Contract Documents.

**Section 17.03. Assignment of Warranties.** The Contractor hereby assigns to the Owner any and all existing assignable warranties, service life policies and patent indemnities of manufacturers of materials, equipment or items incorporated in the Work. Upon the request of the Owner or the Engineer, the Contractor shall give the Owner assistance in enforcing the rights of the Owner arising under such warranties, service life policies and patent indemnities. At the request of the Owner or the Engineer, the Contractor shall give notice (with copies to the Owner) to any such manufacturers of the assignment of such warranties, service life policies and patent indemnities.

**Section 17.04. General Warranty and Correction of Work.**

(a) In addition to any special guarantees or warranties contained in the Contract Documents, the Contractor warrants to the Owner that all materials and equipment furnished in performance of the Work will be new unless otherwise specified, and that all Work will be of good quality, free from faults and defects and in conformance with the Contract Documents. All work not so conforming to these standards shall be considered defective.

(b) The Contractor shall promptly correct all defective Work to comply with the Contract Documents whether observed before or after the substantial completion date and whether or not fabricated, installed, or completed. The Contractor shall bear all costs of correcting defective Work.

(c) If, within one (1) year after the substantial completion date, or within such longer period of time as may be prescribed by law or by the terms of any applicable special guarantee or warranty required by the Contract Documents, any of the Work is found to be defective and not in accordance with the Contract Documents, the Contractor shall correct it promptly after receipt of a written notice from the Owner, or the Engineer, to do so.

(d) All defective or non-conforming Work shall be removed from the site of the Work if necessary, and the Work shall be corrected to comply with the Contract Documents without cost to the Owner. The Contractor also shall bear the cost of making good all work of other contractors destroyed or damaged by removal or correction of the defective Work of Contractor.

(e) If the Contractor fails to timely and properly correct defective Work, the Owner may correct it and hold the Contractor liable for all costs, expenses and damages, including attorney's fees and litigation costs incurred by Owner in correcting it.

(f) In addition to the foregoing warranty, a warranty period of one (1) year shall apply under the same terms and conditions as the original warranty, to any work, supplied in correction of defective work under warranty pursuant to the provisions of this Section 17.04 and the Contractor shall assign to the Owner any warranties, including extended warranties, which are available in connection with the performance of such correction of defective Work. The warranty period shall commence on the date the Owner accepts the corrective Work of the Contractor.

**ARTICLE 18**

**RIGHT OF THE OWNER TO DO WORK**

**Section 18.01. Right of the Owner to do Work.** If the Contractor should neglect to perform the Work properly or fails to do anything required by the Contract Documents, and the Contractor does not correct the untimely or improper performance within seven (7) days after written demand is made, the Owner may, without prejudice to any other remedy it

may have under this Contract or at law or in equity, make good any deficiencies in the Work, including, but not limited to, supplementing the workforces of the Contractor and deduct all costs of doing so from the payment then due or thereafter due the Contractor. The Owner shall not be required to give multiple notices to the Contractor in order to exercise its rights under this paragraph.

**Section 18.02. Deduction for Uncorrected Work.** If the Owner deems it inexpedient to correct deficiencies in the Work pursuant to Section 18.01 of this Contract, the Owner may deduct the reasonable cost of correcting the deficiencies, including any attorney's fees and additional fees and expenses of the Engineer, from the payment then due or thereafter due to the Contractor, but the making of such a deduction shall in no way be deemed an election of remedies by the Owner.

**Section 18.03. Correction of Work before Final Payment.**

(a) The Contractor shall promptly remove from the Work Site all materials, equipment or other items rejected by the Engineer or the Owner as failing to conform to the Contract Documents, whether incorporated in the Work or not, and the Contractor shall promptly replace and re-execute its original work to comply with the Contract Documents without expense to the Owner. In addition, the Contractor shall bear the expense of making good all work of other contractors destroyed or damaged by such removal or replacement.

(b) If the Contractor does not remove rejected material, equipment or other items within a reasonable time (as fixed by written notice from the Owner, or the Engineer), the Engineer or the Owner may remove such items and store them at the expense of the Contractor, or dispose of such material, equipment or other items at the sole discretion of the Owner. If the Contractor does not pay the expense of such removal or storage within ten (10) days, the Owner may, upon ten (10) days written notice, sell such items at auction or at private sale and shall account for the net proceeds of such sale, after deducting all the costs and expenses of removal that should have been borne by the Contractor.

**ARTICLE 19**

**INSURANCE**

**Section 19.01. Insurance Requirements.** The Contractor shall fully comply with all requirements relating to insurance for the Project as set forth in this Article 19.

**Section 19.02. Owner Controlled Insurance Program.** The Owner has established an Owner Controlled Insurance Program (OCIP). To the extent required by the Owner, Contractor shall fully participate in and comply with all requirements of the OCIP. A copy of the OCIP Manual is attached hereto as Exhibit C and incorporated herein by reference. However, if the OCIP is not used, Contractor agrees to meet the requirements for Insurance coverage referenced in Section 19.03. A copy of the Construction Safety and Health Guidelines is attached hereto as Exhibit D and incorporated herein by reference.

**Section 19.03. Contractor Provided Insurance Coverage.** During the Term of this Contract, Contractor shall comply with the insurance requirements set forth in Exhibit C ("Insurance Requirements").

**Section 19.04. Survival.** The insurance provisions of this Article 19 shall survive any termination of this Contract.

**ARTICLE 20**

**SURETY BONDS**

**Section 20.01. Surety Bonds Required.** The Contractor shall furnish and keep in force throughout the performance of the Work a separate performance bond and separate labor and material payment bond, each in the amount of the total of the Contract Price (as the same may be modified from time to time) conditioned upon the faithful performance of the Work by the Contractor and payment of all obligations arising in connection with the Work by the

Contractor. The bonds shall also guarantee to the Owner that the Work shall be free of all liens. The bonds shall name the Owner as obligee and shall be in such form and with such sureties as the Owner may approve prior to commencement of the Work.

## ARTICLE 21

### INDEMNIFICATION

#### **Section 21.01. Indemnification of the Contractor.**

(a) Without limiting any insurance required herein and to the fullest extent permitted by law, Contractor, on behalf of itself, its subcontractors, their agents, their employees or any entity or person for which the Contractor is or may be responsible (hereinafter collectively referred to as "Indemnitors"), shall fully defend, indemnify, save and hold the Owner, the Board of Commissioners of the Owner, the Program Manager, the Engineer, their agents, employees, officers, directors, partners and related entities (hereinafter collectively referred to as "Indemnitees") harmless from and against all liability, damages, loss, claims, demands, actions and expenses of any nature whatsoever, including, but not limited to reasonable attorney's fees which arise out or are connected with: (1) any negligent act, error or omission by any Indemnitor, or (2) the failure of the Indemnitor to comply with any applicable laws, statutes, ordinances, rules or regulations of any governmental or quasi-governmental authority, or (3) the material breach of any term or condition of this Contract by any of the Indemnitors.

(b) Without limiting the generality of the foregoing, the indemnity set forth in this Article 21 shall include all liability, damages, loss, claims, demands, and actions on account of personal injury, death or property loss to any third party, any Indemnitees, any of the Indemnitees' employees, agents, licensees or invitees relating to the Project and which results from the negligent act, error or omission of Contractor.

(c) When the Contractor is obligated to provide the Owner a defense hereunder, it shall do so with qualified counsel that is selected by the Contractor and approved by the Owner. Such approval shall not be unreasonably withheld. In light of the Owner and Contractor's continuing relationship, however, the potential for conflicts of interests exists if the same counsel represents both the Owner and Contractor when the Contractor accepts the Owner's tender of defense under the indemnity provision of this Contract. Therefore, the Owner retains the right to select its own counsel from a list of qualified attorneys provided by Contractor or Contractor's insurer. The selected counsel's fees and expenses shall be paid for by Contractor or its insurer, and the counsel shall be different from that selected by Contractor to represent it in the same matter.

(d) The indemnity set forth in this Article 21 shall survive any termination of this Contract.

**Section 21.02. Labor Indemnity.** The Contractor shall indemnify, defend and hold harmless the Owner, the Board of Commissioners of the Owner, the Program Manager, and the Engineer, their agents, employees, officers, directors, partners and related entities, from any and all administrative and judicial actions (including reasonable attorney's fees related to any such action), incurred by the Owner, the Program Manager, or the Engineer in connection with any labor related activity arising from the wrongful acts or omissions of the Contractor or its subcontractors in the performance of the Work of the Contractor. As used in this Contract, "labor related activity" includes, but is not limited to, strikes, walk-outs, informational or organizational picketing, use of placards, or distribution of hand-outs or leaflets at or in the vicinity of any facility where the Owner conducts business. The Owner shall advise the Contractor if any labor related activity occurs and the Contractor shall arrange for the legal representation necessary to protect the Owner, the Program Manager, and the Engineer provided such representation is previously approved by Owner.

**Section 21.03. Royalties and Patents.** The Contractor shall pay all royalties and license fees in anyway relating to the Work, shall defend all suits or claims for infringement of any patent or copyrights, and shall indemnify and hold the Owner, the Board of Commissioners of the Owner, their agents, officers, directors, partners, and related entities, harmless from loss on account of such suit or claim.

**Section 21.04. Attorney's Fees.** In the event it becomes necessary for Owner to employ an attorney to enforce any provision of this Contract or to defend against any claim or litigation initiated by the Contractor, then the Contractor

shall be liable for all attorney's fees and litigation expenses of Owner.

## **ARTICLE 22**

### **RIGHT TO OCCUPY BY OWNER**

**Section 22.01. Early Occupancy by Owner.** The Owner has the right to occupy or use ahead of schedule, at no additional cost nor obligation to Owner, all or any substantially completed or partially completed portion of the Work when such occupancy and use are in its best interest, notwithstanding the time of completion for all of the Work. Maintenance of occupied portion will remain the Contractor's responsibility.

**Section 22.02. Corrections after Occupancy.** After the Owner has taken occupancy of all or any portion of the Work, the Contractor shall not disrupt the use and occupancy of the Owner to make corrections in the Work.

## **ARTICLE 23**

### **DEFAULT: RIGHT TO TERMINATE BY OWNER**

**Section 23.01. Breach of Contract Terms. (Required by FAA)** Any violation or breach of terms of this contract on the part of the contractor or its subcontractors may result in the suspension or termination of this contract or such other action that may be necessary to enforce the rights of the parties of this agreement.

Owner will provide Contractor written notice that describes the nature of the breach and corrective actions the Contractor must undertake in order to avoid termination of the contract. Owner reserves the right to withhold payments to Contractor until such time the Contractor corrects the breach or the Owner elects to terminate the contract. The Owner's notice will identify a specific date by which the Contractor must correct the breach. Owner may proceed with termination of the contract if the Contractor fails to correct the breach by deadline indicated in the Owner's notice.

The duties and obligations imposed by the Contract Documents and the rights and remedies available thereunder are in addition to, and not a limitation of, any duties, obligations, rights and remedies otherwise imposed or available by law.

### **Section 23.02. Default and Termination by Owner. (Required by FAA)**

(a) 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:

- (1) Fails to begin the Work under the Contract within the time specified in the Notice to Proceed, or
- (2) 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
- (3) 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
- (4) Discontinues the execution of the Work, or
- (5) Fails to resume Work which has been discontinued within a reasonable time after notice to do so, or
- (6) Becomes insolvent or is declared bankrupt, or commits any act of bankruptcy or insolvency, or
- (7) Allows any final judgment to stand against the Contractor unsatisfied for a period of 10 days, or
- (8) Makes an assignment for the benefit of creditors, or
- (9) 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.

(b) 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.

(c) 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 to 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.

**Section 23.03. Termination for Convenience by Owner. (Required by FAA)** The Owner may terminate this Contract without cause at any time by providing fifteen (15) days prior written notice to Contractor. Upon receipt of a written notice of termination, except as explicitly directed by the Owner, the Contractor shall immediately proceed with the following obligations regardless of any delay in determining or adjusting amounts due under this clause:

- (a) Contractor must immediately discontinue work as specified in the written notice;
- (b) Terminate all subcontracts to the extent they relate to the work terminated under the notice;
- (c) Discontinue orders for materials and services except as directed by the written notice;
- (d) Deliver to the Owner all fabricated and partially fabricated parts, completed and partially completed Work, supplies, equipment and materials acquired prior to termination of the Work and as directed in the written notice;
- (e) Complete performance of the Work not terminated by the notice; and
- (f) Take action as directed by the Owner to protect and preserve property and work related to this Contract that Owner will take possession.

Owner agrees to pay Contractor for:

- (1) Completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination;
- (2) Documented expenses sustained prior to the effective date of termination in performing Work and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work;
- (3) Reasonable and substantiated claims, costs and damages incurred in settlement of terminated contracts with Subcontractors and Suppliers; and
- (4) Reasonable and substantiated expenses to the Contractor directly attributable to Owner's termination action.

Owner will not pay Contractor for loss of anticipated profits or revenue or other economic loss arising out of or resulting from the Owner's termination action.

The rights and remedies this clause provides are in addition to any other rights and remedies provided by law or under this Contract.

**Section 23.04. Suspension by the Owner.**

(a) The Owner may order the Contractor in writing to suspend, delay, or interrupt the Work in whole or in part for such period of time as the Owner may determine (hereinafter referred to as "Suspension").

(b) Provided the Suspension lasts for more than ninety (90) days, an adjustment to the Contract Price ("Adjustment") shall be made as set forth in paragraph (c) of this Section 23.02. The Substantial Completion Date shall be extended by written Contract Amendment to the extent that substantial completion is actually delayed by this Suspension. No Adjustment shall be made to the extent:

- (1) That performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is in full or in part responsible; or
- (2) That an equitable adjustment is made or denied under another provision of this Contract.

(c) The amount of the Contractor's compensation for a Suspension pursuant to this Section 23.02 shall be limited to any properly documented costs of maintaining personnel and equipment in the field provided such costs are pre-approved by the Owner in writing. The Owner shall not be liable at any time for home office overhead or consequential damages. At the Owner's option, the Contractor may be ordered to demobilize its forces because the Project is suspended. In such event, the Owner will reimburse the Contractor for the reasonable cost of demobilization and remobilization.

**Section 23.05. Assignment of Subcontracts.** In the event of termination by the Owner pursuant to this Article 23 or Exhibit E to this Contract, the Owner may require the Contractor to promptly assign to it all or some of the subcontracts, materials, tools, and equipment to be installed under this Contract, or rental agreements, and any other commitments which the Owner, in its sole discretion, chooses to take by assignment. In such event, the Contractor shall promptly execute and deliver to the Owner written assignments of such commitments.

**ARTICLE 24**

**HAZARDOUS MATERIALS**

**Section 24.01. Hazardous Materials Covenants.**

(a) Contractor hereby represents and warrants to and for the benefit of Owner that the Project or Work Site will not be used or operated in any manner that will result in the storage, use, treatment, manufacture, or disposal of any Hazardous Materials (hereinafter defined) upon the Project or Work Site or any portion thereof or which will result in Hazardous Materials Contamination (hereinafter defined). For purposes of this Article 24, the term "Hazardous Materials" shall mean and refer to: (1) any "hazardous waste" as defined by the Resource Conservation and Recovery Act of 1976 (42 U.S.C. § 6901 *et seq.*), as amended from time to time, and regulations promulgated thereunder; (2) any "hazardous substance" as defined by the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (42 U.S.C. § 9601 *et seq.*) ("CERCLA"), as amended from time to time, and regulations promulgated thereunder; (3) asbestos; (4) polychlorinated biphenyls; (5) urea formaldehyde; (6) any substance the presence of which on the premises is prohibited by any applicable environmental laws or regulations ("Laws") or by any other legal requirements affecting the Project or the Work Site; (7) petroleum based materials (with the exception of tires affixed to vehicles); and, (8) any other substance which is defined as hazardous, toxic, infectious or radioactive by any Laws or by any other legal requirements affecting the Project or Project site. For purposes of this Article 24, the term "Hazardous Materials Contamination" shall mean and refer to the contamination of the Project or Project site, soil, surface water, ground water, air, or other elements on, or of, the buildings, facilities, soil, surface water, ground water, air, or other elements on or of any other property as a result of Hazardous Materials at any time emanating from the Project or Work Site.

(b) In addition to and without limiting the generality of any other provision of this Contract, Contractor shall and hereby does indemnify and hold Owner, the Board of Commissioners of the Owner, the Program Manager, the Engineer, their agents, employees, officers, directors, partners and related entities harmless from and against any and all losses, damages, expenses, fees, claims, demands, causes of action, judgments, costs and liabilities, including, but not limited to, attorney's fees and costs of litigation, and costs and expenses of response, remedial and corrective work and other cleanup activities, arising out of or in any manner connected with: (1) the "release" or "threatened release" (as those terms are defined in CERCLA and the rules and regulations promulgated thereunder, as from time to time amended) by Contractor or Contractor's employees, agents, delegees, invitees, licensees, concessionaires, subcontractors or representatives, of any Hazardous Materials; or (2) any occurrence of Hazardous Materials Contamination affecting the Project or Work Site caused by or resulting from, in whole or in part, the operations of the Contractor or Contractor's employees, agents, delegees, invitees, licensees, concessionaires, subcontractors or representatives. The provisions of this paragraph shall survive any payment or satisfaction of this Contract and such provisions shall remain in full force and effect.

(c) When use or storage of hazardous materials or equipment or unusual methods of construction are necessary, the Contractor shall obtain prior written approval from the Owner. The use of explosives is strictly prohibited provided, however, powder activated fasteners are permitted.

(d) If Contractor encounters on the Work Site any substance or material reasonably believed by Contractor to be hazardous, Contractor immediately shall (i) stop work in the area affected, (ii) take measures appropriate to the condition to keep people away from the suspected Hazardous Material and, (iii) report the condition to Owner in writing. If the Work is so stopped and Hazardous Material is found, the Work in the affected area shall not thereafter be resumed except by the issuance of a Construction Change Directive pursuant to Section 9.02 of this Contract. Any such Construction Change Directive shall be limited to an adjustment to the Substantial Completion Date appropriate. If no Hazardous Material is found after the Work is stopped, no Construction Change Directive is required to resume the Work in the affected area.

## **ARTICLE 25**

### **MISCELLANEOUS**

**Section 25.01. No Waiver.** No consent or waiver, express or implied, by either party to this Contract or of any breach or default by the other in the performance of any of its obligations hereunder shall be deemed or construed to be a consent or waiver to or of any other breach or default by such party. Failure on the part of the Owner to complain of any act or failure to act of the Contractor or to declare the Contractor in default, irrespective of how long such failure continues, shall not constitute a waiver of the rights of Owner.

**Section 25.02. Assignment.** This Contract shall not be assigned, delegated or transferred in whole or in part by the Contractor nor shall the Contractor assign any monies due or to become due to it without the prior written consent of the Owner.

**Section 25.03. Governing Law.** This Contract is entered into in Tennessee and shall be governed by and construed according to the laws of Tennessee. Any and all disputes arising out of this Contract, and/or the Project shall be decided by a state or federal court of competent jurisdiction in Memphis, Shelby County, Tennessee.

**Section 25.04. Execution of Contract.** The parties hereby agree and express their intent to execute this Contract electronically if Owner has a designated information processing system. The parties also hereby agree that this Contract may be executed in counterparts, each of which shall be deemed to be an original, but all of which, taken together, shall constitute one and the same agreement.

**Section 25.05. Article and Section Headings.** Article and section headings contained in this Contract are for ease of reference only and shall not affect the interpretation or meaning of this Contract.



**Section 25.06. Parties in Interest.** This Contract shall inure to the benefit of and be binding upon the Parties and their respective successors, assigns and legal representatives. It is specifically agreed between the Owner and the Contractor that the Parties do not intend to create any third-party beneficiary rights by the execution of this Contract.

**Section 25.07. Severability.** If any one or more of the provisions contained in this Contract shall for any reason be held invalid, illegal or unenforceable in any respect, such invalidity, illegality or unenforceability shall not affect any other provision of this Contract, but it shall be construed as if such invalid, illegal or unenforceable provision had never been contained herein.

**Section 25.08. Written Notices.** Whenever by the terms of this Contract notice shall be given either to Owner or to Contractor, such notice shall be in writing and shall be sent by regular United States Postal Service, by hand-delivery, by registered or certified mail, by a nationally recognized overnight delivery service or by electronic mail with a delivery receipt. Notice intended for Owner shall be addressed to the Vice President of Operations as follows with a copy to Owner's General Counsel at the address for regular mail:

If to the Owner, address to:

Regular Mail or Hand Delivery  
Vice President of Operations  
Memphis-Shelby County Airport Authority  
2491 Winchester Rd., Suite 113  
Memphis, Tennessee 38116-3856

Certified Mail or Overnight Delivery  
4150 Louis Carruthers Drive  
Memphis, TN 38118  
(901) 922-8000

If to the Contractor, address to:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Either Party, from time to time, may change its address by giving written notice to the other Party.

**Section 25.09. Exhibits.** All exhibits described in this Contract shall be deemed to be incorporated into and made a part of this Contract. If there is any inconsistency between this Contract and the provisions of any exhibits, the provisions of this Contract shall control to the extent of the inconsistency.

**Section 25.10. Entire Contract.** This Contract, together with the exhibits and the other Contract Documents, constitutes the entire agreement between the Owner and the Contractor and supersedes all prior written or oral agreements, understandings, representations, negotiations, and correspondence between the Parties. This Contract shall not be supplemented, amended, or modified by any course of dealing, course of performance or usage of trade and may only be amended or modified by a written instrument duly executed by officers of both Parties.

**Section 25.11. Non-Federally Assisted Projects.** Regardless of the funding source for the Project, Contractor hereby agrees to comply with all nondiscrimination provisions of this Contract.

**Section 25.12. Disadvantaged Business Enterprise Participation.**

(a) The Project is subject to the requirements of Owner's Business Diversity Development Program (BDDP) and Small Business Participation Program (SBPP). It is the responsibility of the Contractor to see that all requirements of the BDDP and SBPP are met. The Disadvantaged Business Enterprise (DBE) participation goal for the Project is **TWENTY-SIX PERCENT (26%)**. This percentage is defined as the dollar value of subcontracts awarded to certified DBEs divided by the base bid or alternate amount. To qualify, a firm must be included on the Owner's list of certified DBE firms.

(b) Proposed changes to the designated participating DBEs during performance of the Work must be submitted to the Owner. Contractors must make every effort to replace a DBE subcontractor with another certified DBE, based on said DBEs' availability. All substitutes for DBE subcontractors or joint ventures require prior approval of the Owner, such approval not to be unreasonably withheld; and said approval may be granted for reasons including, but not limited to, the following: (1) subcontractor requests that its subcontract or joint venture agreement with the prime contractor be voided; (2) subcontractor is unable to perform the Work; and/or (3) subcontractor has consistently performed unacceptable work.

(c) A determination by the Owner that the Contractor has either failed to comply with this Section 25.12, to timely submit to Owner requested documentation related hereto, to cooperate with Owner, or to answer inquiries truthfully shall subject the Contractor to any or all of the following penalties:

- (1) Withholding from the Contractor all future payments under this Contract until the Contractor is in compliance; and/or
- (2) Cancellation, termination, or suspension of this Contract, in whole or in part; and/or
- (3) Payment by the Contractor to the Owner of an amount equal to the difference in the DBE dollar value achieved in documented DBE participation or any lesser amount or penalty as deemed appropriate by the Owner, which dollar value shall be considered liquidated damages for failure to perform the requirements of this Contract and for which the Contractor and all of its subcontractors agree to be bound.

(d) A violation of this provision shall be considered a material breach of this Contract. If, in the opinion of the Owner, the Contractor has made significant deviations from the DBE program commitments, such deviations shall be considered a breach of this Contract.

**Section 25.13. No Financial Benefit.** Contractor understands and agrees that no Owner employee or member of the Board of Commissioners, Memphis City Council or Shelby County Commission shall receive any financial benefit arising out of this Contract, either directly or indirectly. Further, any fees paid to any person or entity by Contractor for assistance in obtaining this Contract with Owner must be fully disclosed to Owner. Notwithstanding any term, condition, obligation or provision in this Contract, any other writing, any other agreement, any oral understanding or agreement, or any conduct or failure to act by the Owner, Contractor stipulates and agrees conclusively that Contractor has against the Owner no right, entitlement or claim for any payment, compensation, cost, or remuneration of any type other than pursuant to the terms of this Contract.

## **ARTICLE 26**

### **FEDERAL AVIATION ADMINISTRATION (FAA) REQUIRED CONTRACT PROVISIONS**

**Section 26.01. FAA Required Provisions.** Federal laws and regulations require that specific contract provisions be included in certain contracts and subcontracts. All such provisions are set forth in Exhibit E, which is attached hereto and incorporated herein by reference. Contractor hereby agrees to insert these provisions in each contract and subcontract (to the extent applicable) related to the performance of this Contract and to require each of its subcontractors to do the same. Contractor also hereby agrees to incorporate these provisions by reference for work done under any purchase order, rental agreement or other agreement for supplies or services related to the performance of this Contract. Contractor further agrees to be responsible for compliance with these provisions by any subcontractor, lower-tier subcontractor or service provider. Contractor acknowledges that the FAA prevents any modification to these provisions that creates a conflict with federal laws and regulations or changes the intent of the required provision.

## ARTICLE 27

### **STATE REQUIRED CONTRACT PROVISIONS**

**Section 27.01. State of Tennessee Laws and Regulations - Grant Contract Provisions**. State laws and regulations require that specific contract provisions be included in certain contracts and subcontracts. All such provisions are set forth in Exhibit F, which is attached hereto and incorporated herein by reference.

*The remainder of this page intentionally left blank.  
[Signature page to follow.]*

**IN WITNESS WHEREOF**, the Parties have made and executed this Contract as of the day and year first above written.

**MEMPHIS-SHELBY COUNTY  
AIRPORT AUTHORITY**

**CONTRACTOR**

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

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

Title: President and CEO

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

**Approved as to Content:**

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

Title: Vice President of Operations

**Approved as to Form and Legality:**

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

Title: General Counsel

**Reviewed and Approved:**

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

Title: Director of Development

**EXHIBIT A  
TO  
UNIT PRICE CONSTRUCTION CONTRACT  
FOR  
TAXIWAY ALPHA WEST RECONSTRUCTION - CONSTRUCTION**

**BY AND BETWEEN  
THE MEMPHIS-SHELBY COUNTY AIRPORT AUTHORITY  
AND  
(CONTRACTOR NAME)**

**SCOPE OF WORK**

General scope of work is full-depth reconstruction of approximately 4,125 linear feet of Taxiway Alpha at Memphis International Airport. The work includes, but is not limited to, demolition of existing pavement and associated infrastructure, grading and drainage, underdrains, Portland cement concrete pavement including subgrade preparation, cement treated base, soil cement subbase, joint sealing, bituminous pavement, airfield signage and markings, airfield electrical lighting and underground ducts, earthwork, erosion control, sodding, and other efforts normally required for taxiway reconstruction. The scope of work is more specifically described in the Contract Documents, as defined in Article 2 of this Contract.

**EXHIBIT B  
TO  
UNIT PRICE CONSTRUCTION CONTRACT  
FOR  
TAXIWAY ALPHA WEST RECONSTRUCTION - CONSTRUCTION**

**BY AND BETWEEN  
THE MEMPHIS-SHELBY COUNTY AIRPORT AUTHORITY  
AND  
(CONTRACTOR NAME)**

**CONTRACT DOCUMENTS**

**EXHIBIT C  
TO  
UNIT PRICE CONSTRUCTION CONTRACT  
FOR  
TAXIWAY ALPHA WEST RECONSTRUCTION - CONSTRUCTION**

**BY AND BETWEEN  
THE MEMPHIS-SHELBY COUNTY AIRPORT AUTHORITY  
AND  
(CONTRACTOR NAME)**

**OWNER CONTROLLED INSURANCE PROGRAM**

**C.1. Owner Controlled Insurance Program**

The Owner has elected to implement an Owner Controlled Insurance Program (OCIP) that will provide **Workers' Compensation, Employer's Liability, Commercial General Liability, Excess Liability and Builders' Risk insurance** for Contractors and Subcontractors of every tier who have been properly enrolled and are providing direct labor to the Project. A general summary of coverage provided by the OCIP is included in the MSCAA OCIP Manual, (hereinafter called the Manual), a copy of which is attached hereto and made a part of this Agreement and should be attached to and incorporated in every subcontract. All terms and conditions of Exhibit C will apply during the term of the contract. The Owner agrees to pay all premiums associated with the OCIP.

While the OCIP provides uniform coverages and reasonable limits, the OCIP is not intended to meet all the insurance needs of the Contractor and eligible Subcontractors who have been properly enrolled. In addition to any insurance provided by Owner, the Contractor and all Subcontractors working on the Project will be responsible for providing certain insurance as specified in paragraph C.2. Contractors and eligible Subcontractors should discuss the OCIP with their insurance agent or consultant to assure that other proper coverages are maintained. Contractor and eligible Subcontractors enrolled in the OCIP agree that the insurance company policy limits of liability, coverage terms and conditions shall determine the scope of coverage provided by the OCIP.

**C.1.1. Applicability of the OCIP**

Participation in the OCIP by the Contractor and all eligible Subcontractors is mandatory but not automatic. The Contractor and each eligible Subcontractor (as defined below) must follow the enrollment procedures shown in the Manual. The Contractor shall comply with all requirements of the OCIP as outlined in the OCIP Manual and shall require all eligible Subcontractors to comply with requirements of the OCIP manual. The Manual may be updated and revised during the course of construction to reflect any changes in State Law, Rules and/or Regulations or Procedures that may be necessary or appropriate, and said revisions will replace all previous versions. Copies of any revised Manual will be distributed by the OCIP Administrator.

- If the Contractor or any eligible Subcontractor fails to enroll any of its eligible Subcontractors of any tier, it will be subject to a penalty charge of the full and complete deduct as shown in C.1.2.c or 3% of the subcontract cost, whichever is greater. Note: Collection of the penalty charge of any non-enrolled contractor(s) of any tier does not provide automatic coverage in the program.
- If any Contractor or any eligible Subcontractor enrolls in the OCIP more than 30 days after its start date, it will have to provide a No Known Loss Letter to the Carrier along with the enrollment documentation.

Eligible Subcontractor includes all Subcontractors providing or subcontracting for direct labor on any Designated Project (see definition of ineligible Subcontractors below).

Ineligible Subcontractor includes (but is not limited to) subcontractors performing any type of environmental remediation work (example: asbestos or underground tank removal), consultants, suppliers (that do not perform or subcontract installation), vendors, materials dealers, guard services, janitorial services, truckers (including trucking to any Designated Project where delivery is the only scope of work performed), employee leasing companies, temporary labor services and other temporary project services. However, such Employee leasing and temporary labor service companies can be

insured by the OCIP but must be submitted for review to the OCIP administrator prior to acceptance.

A Designated Project is a project designated and approved by the Owner as a Designated Project and enrolled by the OCIP Administrator with the insurance company. This project is a Designated Project. A Designated Project includes operations necessary or incidental to the Work. The Contractor's/Subcontractor's regularly established workplace, plant, factory, office, shop, warehouse, yard or other property even if such operations are for fabrications of materials to be used at the job site or training of apprentices will be considered off-site and not covered by the OCIP.

Unless otherwise directed by the Owner, the Contractor, eligible Subcontractors, and all Subcontractors not enrolled in the OCIP, will be required to maintain at least the insurance coverages set forth in paragraph C.2 and are required to participate in the MSCAA OCIP Safety Program. Contractor will promptly furnish the Owner, or their designated representative, certificates of insurance giving evidence that all required insurance is in force.

#### **C.1.2. Contractor Insurance Cost Identification**

The Contractor and eligible Subcontractors will exclude their cost for all insurance coverages to be provided by the Owner for the work at any Designated Project from their bid. The Contractor and each Subcontractor of any tier warrant that all insurance premium calculations for work performed at the Designated Project Site have been correctly identified and removed from their bids.

#### **C.1.3. Change Order Pricing**

Contractor and all enrolled Subcontractors will price each change order to exclude the cost of insurance.

#### **C.1.4. Assignment of Return Premiums**

The Owner will be responsible for the payment of all premiums associated solely with the OCIP and will be the sole recipient of any dividend(s) and/or return premium(s) generated by the OCIP. In consideration of the Owner's provision of said coverages under the OCIP program, the Contractor and eligible Subcontractors agree to:

- 1) Exclude all applicable insurance costs for coverage provided by the Owner associated with their contract work and excluded from their bid; and cooperate with the OCIP Administrator in the administration of the OCIP.
- 2) Irrevocably assign to and for the benefit of the Owner, all return premiums, premium refunds, premium discounts, dividends, retentions, credits, and any other monies in connection with the OCIP insurance. Contractor also assigns its right of cancellation of all insurance policies provided by Owner. Contractor agrees to evidence such assignment by executing and delivering the Form-2. Contractor further agrees to require each eligible Subcontractor to execute the assignment on the Form-2, for the benefit of the Owner.

#### **C.1.5 Audit of Contractor and/or Subcontractor Payroll**

For insurance purposes, the Contractor and all tiers of Subcontractors agree to keep and maintain accurate and classified records of their payroll for operations at any Designated Project. Contractor and all eligible Subcontractors agree to furnish a copy of the Monthly Payroll Reporting Form, Form 5, to the OCIP Program Administrator by the 20th of each month and attach a copy of the Form-5, to their monthly pay application. If this report (Form-5) is not attached to the monthly pay application, payment may be held until the report is received.

The Contractor and all eligible Subcontractors will permit the Owner and its representative to examine and/or audit its books and records pertaining to any Designated Project. Contractor and eligible Subcontractor will also provide any additional information to the Owner or its appointed representatives as may be required. At the end of each contract, an audit may be performed of the reported payroll by the OCIP Carrier.

Upon Final Completion of each contract, the Contractor and eligible Subcontractors will furnish a completed and signed Form-4 - Notice of Anticipated Completion Form (a copy of which is attached hereto as "Form-4") to the OCIP Administrator, together with all required documentation.

Demobilization payments will not be released until all closeout documentation has been received and approved.



## C.1.6. OCIP Deductibles

### General Liability:

If a claim arises under the Owner provided Commercial General Liability OCIP policy from the partial or sole negligence of a Contractor or Subcontractor, or for violation of any OCIP Safety Requirements, such Contractor or Subcontractor shall be responsible for reimbursing the Owner's deductible to the extent of their respective negligence, as determined solely by owner, up to a maximum of \$10,000 per occurrence per Contractor.

### Builders Risk:

The Contractor shall be responsible for a deductible of \$25,000 for each and every loss.

## C.1.7. Termination/Modification of the OCIP

The Owner reserves the right to terminate or to modify the OCIP or any portion thereof. To exercise this right, the Owner will provide thirty (30) days advance written notice of termination or material modification to the Contractor and all eligible Subcontractors covered by the OCIP. In such event, the Contractor will promptly obtain appropriate replacement insurance coverage acceptable to the Owner. Written evidence of such insurance will be provided to the Owner prior to the effective date of the termination or modification of the OCIP coverages. The reasonable cost of such replacement insurance will be reimbursed by the Owner to the Contractor.

**SPECIAL NOTE:** The Contractor and eligible Subcontractors who have completed their work at any Designated Project and whose insurance as provided by MSCAA OCIP has been terminated, and who returns to the site to perform warranty work does so under its own insurance coverages and not under those provided by MSCAA OCIP.

## C.2 Contractor Provided Coverages

All insurance obtained by the Contractor pursuant to this Agreement shall be written by insurance companies licensed to do business in Tennessee and acceptable to Owner.

Prior to the commencement of any operations by or on behalf of the Contractor relating to the Project, and with respect to any and all such operations, the Contractor shall procure, maintain, and provide to Owner and the Program Manager:

- 1) Evidence of Contractor's **Commercial Automobile Liability Insurance**. A certificate of insurance and copy of endorsement shall be provided as evidence of:
  - a) Coverage for Owner, their officers, directors, and employees as additional insureds.
  - b) Coverage to apply to all liability arising out of the ownership or use of all vehicles owned by, hired by, or used on behalf of the Contractor.
  - c) Waiver of Subrogation to be provided in favor of the Owner, the Design Professional, the Program Manager and their officers, directors, and employees.
  - d) If hazardous materials or waste are to be transported, the policy will be endorsed with the MCS-90 endorsement in accordance with the applicable legal requirements.

This insurance shall be for an amount not less than \$1,000,000 combined single limit liability.

- 2) Evidence of Contractor's **Workers' Compensation and Employer's Liability Insurance**. A certificate of insurance or, at Owner's request, a certified policy copy shall be provided as evidence of:
  - a) Coverage for claims for damages arising out of bodily injury, occupational sickness or disease or death of Contractor's employees under any applicable workers' compensation statute or any other applicable employers' liability law. Certificate of insurance or policy must clearly identify that coverage applies in the state of Tennessee.
  - b) A waiver of subrogation by the insurer against the Owner the Design Professional, the Program Manager and their officers, directors and employees.
  - c) This insurance shall include Employer's Liability limits of not less than \$1,000,000 bodily injury each accident, \$1,000,000 bodily injury by disease each employee and \$1,000,000 bodily injury by disease in the aggregate.
  - d) All Enrolled Contractors must provide Workers' Compensation and Employer's Liability insurance covering all employees for injuries that occur AWAY from the Designated Project Site or after OCIP termination, expiration, or cancellation.
  - e) Ineligible subcontractors or subcontractors not enrolled must provide coverage for ALL operations.

- 3) Evidence of Contractor's **Commercial General Liability Insurance**. Certificate of insurance and copies of endorsements to Contractor's primary commercial general liability policy and shall be provided as evidence of:
- a) Coverage for Owner and the Design Professional, Program Manager, their officers, directors, and employees as additional insureds as respects claims or liabilities arising from or connected with Contractor's work, operations and completed operations. The additional insured endorsements shall be at least as broad as the ISO CG 2010 (1001) during the course of construction and CG2037 (1001) until the expiration of the statute of repose, or its carrier equivalent.
  - b) Coverage shall be primary and non-contributing with any coverage Owner maintains in its own name and on its own behalf.
  - c) Coverage shall be written on an occurrence coverage form, with coverage at least as broad as that provided under the current edition of the ISO Commercial General Liability coverage form, CG 0001. Other than standard exclusions applicable to pollution, asbestos, mold, employment practices, ERISA and professional liability, there shall be no limitations or exclusions beyond those contained in the standard policy forms which apply to property damage, products and completed operations, contractual liability, or construction defects. In addition to procuring and maintaining this insurance during the duration of the contract, contractor agrees to continue to procure and maintain products and completed operations liability insurance coverage for a minimum of six (6) year(s) after the date the contract is completed or terminated or in accordance with the applicable statute of limitations under state law, whichever is longer.
  - d) Waivers of subrogation by insurers against Owner, Design Professional, Program Manager and their officers, directors and employees.
  - e) Contractual Liability Insurance applicable to the indemnification agreement contained in Section 21.01 of this Agreement.
  - f) The required amounts of primary Commercial General Liability Coverage in the amount of:
 

\$1,000,000	Bodily Injury and Property Damage Limit for each occurrence
\$1,000,000	Personal & Advertising Injury
\$2,000,000	General Aggregate (Annual)
\$2,000,000	Products/Completed Operations Aggregate (annual)

 The general aggregate limit shall apply separately to each project.
  - g) All Enrolled Contractors must provide General Liability insurance covering third-party losses that occur AWAY from the Project Site (including products liability for any product manufactured, assembled or otherwise worked upon away from the Designated Project Site) or after OCIP termination, expiration or cancellation.
  - h) Ineligible contractors or subcontractors not enrolled must provide coverage for ALL operations.
  - i) The policy will be endorsed to exclude any "Designated Project" for onsite coverage only, if you are a participant in the OCIP.
- 4) Evidence of Contractor's **Excess or Umbrella Liability Insurance**. Certificate of insurance and copies of endorsements to Contractor's Excess or Umbrella liability policy and shall be provided as evidence of this excess liability or umbrella insurance with an annual an aggregate amount of not less than \$25,000,000 for the Contractor and \$1,000,000 limits required of subcontractors unless otherwise stated in the Contract Documents and shall be excess and follow form over primary coverages included herein. Such coverage will be excess and "drop down" for defense and indemnity in the event of exhaustion of the underlying insurances of Commercial, Automobile, Liability, Employer's Liability and the Commercial General Liability policies.
- 5) Evidence of **Professional Liability Insurance** (If Applicable):  
 Per Claim and in the Aggregate: Not Applicable  
 All professional services firms must provide professional liability insurance appropriate for their profession. Architectural and engineering firms must provide coverage for liability arising out of design errors and omissions. The policies shall provide a three (3) year extended reporting period.
- 6) Evidence of **Contractors Pollution Liability Insurance** (If Applicable):  
 Each Occurrence Limit and in the Aggregate: \$2,000,000  
 Coverage applies to third-party bodily injury and property damage claims (including natural resource damage), and clean-up costs, caused by pollution conditions which result from covered operations performed by, or on behalf of,

contractors and subcontractors of all tiers at the Designated Project Site. Coverage shall apply to claims for mold and fungus damage that result from the work as well as gradual and sudden and accidental pollution incidents arising from activities of the contractors working at the project site.

Coverage must be evidenced for on-site and off-site transportation which may result in a pollution incident/event and non-owned disposal site coverage (if applicable to the project).

The policy shall be endorsed to provide a Waiver of Subrogation in favor of the Owner, Design Professional and Program Manager. In addition, the Owner, their officers, directors, and employees shall be included as Additional Insureds.

7) **Evidence of Contractor's Equipment Insurance:**

The Contractor is responsible for their tools and equipment including, but not limited to, construction trailers and their contents and temporary scaffolding at the project site, whether owned, leased, rented, or borrowed. Contractor acknowledges and agrees that the Owner will not be responsible for any loss or damage to their tools and equipment. If insured, the Contractor's insurance policies covering tools and equipment will include a waiver of subrogation and any other rights of recovery in favor of the Owner. If uninsured, the Contractor will hold harmless the Owner, Program Manager and Design Professional for loss or damage to their tools and equipment.

8) **Aircraft/Aviation Liability Insurance** (If Applicable): Not Applicable

Each Occurrence Limit and in the Aggregate (including passenger liability):

The operator of an aircraft of any kind, whether manned or unmanned, must maintain liability insurance covering bodily injury and property damage on a Combined Single Limit basis. If non-employee passengers are carried, there cannot be a per-passenger sublimit.

Prior to commencing operations, the operator must provide the Owner with a certificate of insurance naming the Owner, their officers, directors and employees as additional insureds on a primary and non-contributory basis. Operator and their insurer(s) must hold the Owner harmless and waive subrogation with respect to damage to the aircraft.

If aircraft is to be used to perform lifts at the Designated Project Site, a "slung cargo" endorsement must be included to cover the full replacement value of any equipment being lifted.

**NOTE:** If the Contractor and / or eligible Subcontractor participating in the OCIP choose(s) to have the policy endorsed to include any "Designated Project" site during the construction period, coverage should be Excess and/or Difference in Conditions (DIC) of the OCIP and this cost should not be passed back to the Owner. Inclusion of any "Designated Project" Site on such insurance policies shall not replace the OCIP coverage or otherwise affect the cost identification requirement in paragraph C.1.2.

**C.2.2. Contractor's Insurance Primary.**

Any coverage applicable to Owner under Contractor's insurance policies shall be primary and non-contributing with any insurance maintained by Owner in its own name and on its own behalf. Copies of endorsements to Contractor's policies shall be provided to Owner.

**C.2.3. Cancellation.**

All such insurance shall be in form and substance satisfactory to the Owner and shall provide that not less than thirty (30) days' notice of cancellation or non-renewal, other than non-payment of premium which shall be ten (10) days' notice, be provided to Owner. If unavailable, Contractor must provide Owner with thirty (30) days' advance written notice of cancellation, other than non-payment of premium, which shall be ten (10) days' notice. Contractor must notify Owner of any material change or reduction in coverage to the Contractor's insurance policies.

**C.2.4. Certificates of Insurance - Contractor Provided Insurance Coverage Requirements**

As shown in Section C.2

**Description of Operations for contractors participating in the OCIP shall read:**

Workers' Compensation and Commercial General Liability coverages shown above do not apply to any Designated Project at Memphis International Airport.

**Additional Insured Wording for Contractors shall read:**

Memphis-Shelby County Airport Authority, Program Manager, Design Professional and their officers, commissioners, agents, and employees as now or hereafter exist as respect to the services / work to be performed under this Agreement, for coverages as required by contract.

**Additional Insured Wording for Subcontractors shall read:**For Subcontractors participating in the OCIP

The Memphis-Shelby County Airport Authority, Program Manager, Design Professional and their officers, commissioners, representatives, agents, and employees ATIMA are additional insureds for coverages as required by contract 18-1413-01.

For Subcontractors not participating in the OCIP

The Memphis-Shelby County Airport Authority, Program Manager, Design Professional and their officers, commissioners, representatives, agents and employees ATIMA and Awarding Contractor are additional insureds as respect to the services / work to be performed under this Agreement for coverages as required by contract 18-1413-01.

IN THE EVENT THAT THE LAW OF THE STATE IN WHICH THE PROJECT IS LOCATED (OR APPLICABLE LAW) LIMITS THE ADDITIONAL INSURED COVERAGE THAT OWNER MAY REQUIRE FROM CONTRACTOR AND SUBCONTRACTORS, THEN CONTRACTOR AND SUBCONTRACTORS SHALL BE REQUIRED TO OBTAIN ADDITIONAL INSURED COVERAGE TO THE FULLEST EXTENT OF COVERAGE AND LIMITS ALLOWED BY APPLICABLE LAW AND THIS CONTRACT SHALL BE READ TO CONFORM TO SUCH LAW.

**Filing of Certificates**

Certificates of insurance acceptable to the Owner shall be filed with the Owner by furnishing to the OCIP Administrator, prior to commencement of the Work. If any of the foregoing insurance coverages are required to remain in force after final payment and are reasonably available, an additional certificate evidencing continuation of such coverage shall be submitted with the final Application for Payment.

A sample is provided of a certificate of insurance is provided in the OCIP Manual.

**MSCAA OCIP**

c/o Willis Towers Watson National Project Insurance Practice.

Attn: OCIP Administrator

15305 North Dallas Parkway, Suite 1100

Addison, TX 75001

**C.2.5. The Right of the Owner to Maintain Insurance.**

In the event the Contractor fails to furnish and maintain the required insurance or to furnish certificates of insurance, the Owner shall have the right, at its option, to terminate this Agreement or to take out and maintain such insurance and hold the Contractor liable for the cost. Compliance by the Contractor with the requirements of this Article shall in no way relieve the Contractor from liability under any provision of this Agreement or the Contract Documents.

**C.2.6. Other Insurance**

Any type of insurance or any increase of limits of liability not described in this section which the Contractor or any Subcontractor requires for their own protection or on account of any statute will be their own responsibility and their own expense. Any type of insurance or any increases of limits of liability not described herein that the Contractor or any Subcontractor requires for its own protection or on account of statute shall be its own responsibility and its own expense. If the Contractor or the Subcontractors maintain any insurance policies covering owned, leased or borrowed, equipment, such policies shall contain a waiver of subrogation against the Owner. Each item must be shown as a line item and approved by the Owner.

**C.2.7. Deductibles**

The Contractor shall be responsible for the payment of the deductible amounts for any insurance in force pursuant to this Agreement whether such insurance is furnished by the Owner or the Contractor.

#### **C.2.8. Insurance for Project Property While outside the United States and Canada.**

If any project property is in transit or is located outside the continental United States or Canada for any reason, Contractor shall arrange to insure such property for its full replacement value separate from the other insurance described herein.

#### **C.2.9. Subcontractors Flow-Down Clause.**

Subcontractors of all tiers are subject to the same insurance requirements as Contractor. Contractor shall cause each Subcontractor employed by Contractor to purchase and maintain such insurance and upon request, must promptly furnish Owner with copies of certificates of insurance evidencing coverage for each Subcontractor.

#### **C.2.10. No Representation of Coverage Adequacy.**

In specifying minimum Contractor insurance requirements, Owner does not represent that such insurance is adequate to protect Contractor for loss, damage or liability arising from its work. Contractor is solely responsible to inform itself of the types or amounts of insurance it may need beyond these requirements to protect itself. The insurance requirements set forth in minimum amounts shall not be construed to relieve Contractor for liability in excess of such coverage, nor shall it preclude Owner from taking such other actions as is available to it under any other provision of the contract.

#### **C.2.11. Contractor Responsibilities**

The Contractor will cooperate with and will require all eligible Subcontractors to cooperate with The Owner and/or the OCIP Administrator with regards to the administration and operation of the OCIP. The Contractor and eligible Subcontractors responsibilities will include, but not be limited to:

- 1) Compliance with all rules and regulations of the applicable State Insurance Bureau/Board; failure to meet state requirements may result in fines being assessed, and, if this occurs, the Owner shall deduct from monies due or to become due under the provisions of this contract for any applicable fines that are assessed against the Owner, the Contractor or any eligible Subcontractor;
- 2) Compliance with applicable Construction Safety Program;
- 3) Provision of necessary contract, operations, and insurance information, including verification of current Worker's Compensation Experience Modifier;
- 4) Cooperation with any insurance company or OCIP Administrator with respect to requests for claims, payroll or other information required under the program;
- 5) The Contractor and all eligible Subcontractors shall adhere to and perform all reporting requirements as set forth in the Claims Procedures portion of the OCIP Program Manual.

#### **C.2.12. Contractor's Responsibility for its Subcontractors.**

The Contractor will include this Exhibit and the Manual with the bid documentation. The Contractor will require that all eligible Subcontractors participate in the OCIP and comply with all rules and procedures as outlined in MSCAA Enrollment Process Summary. It will be the Contractor's responsibility to submit to The Owner and its designated representative all bid documentation for approval. If Contractor fails to comply with this section and any eligible Subcontractors do not enroll in the program, the Owner has the right to retain the 3% of subcontracted work as a penalty from the awarding Contractor/Subcontractor as set out in C.1.2.c.

#### **C.2.13. Approval of Forms and Companies**

All insurance described in this Section will be written by an insurance company or companies satisfactory to the Owner and licensed to do business in Tennessee and will be in a form and content satisfactory to the Owner. No party subject to the provisions of this contract will violate or knowingly permit to be violated any of the provisions of the policies of insurance described herein.

#### **C.2.14. Coverage to be provided by Contractor during Warranty Period**

During the period following the final acceptance date and prior to expiration of the warranty period hereunder, Contractor will maintain in full force and effect all insurance as specified in paragraph C.2 covering all Work performed during such period.

### **C.3. Waiver of Subrogation and Waiver of Rights of Recovery**

#### **Owner Controlled Insurance Program**

Except as respects any deductibles identified above, Owner waives all rights of subrogation and recovery against the Contractor and all Subcontractors of all tiers to the extent of any loss or damage, which is insured under the OCIP. Except as respects the deductibles identified above, Contractor waives all rights of subrogation and recovery against the Owner, Design Professional and Program Manager, other Contractors, and Subcontractors of all tiers to the extent of any loss or damage, which is insured under the OCIP. The Contractor and each Subcontractor will require all Subcontractors to similarly waive their rights of subrogation and recovery in each of their respective construction contracts with respect to their work on any Designated Project.

#### **Contractor Provided Coverages**

Contractor waives all rights of subrogation and recovery against the Owner, Design Professional and Program Manager, to the extent loss or damage is insured under the Contractor's policies. The Contractor and each Subcontractor will require all Subcontractors to similarly waive their rights of subrogation and recovery in each of their respective construction contracts with respect to their work on any Designated Project.

### **C.4. Project Safety Administration**

It is the responsibility of the Contractor to maintain total control of safety to ensure that its employees and the general public will be provided an environment free of recognized hazards during construction activities. In carrying out this policy it is clear the only accepted level of performance is to be "Incident Free" on this project each and every day.

#### **A. Project Safety Manual**

The safety requirements of any Designated Project Safety Manual are a supplementary document to all Government rules, codes and regulations. It is understood that the ultimate responsibility for providing a safe place to work rests with each individual Contractor. All Contractors are responsible for full compliance with the requirements and standards referenced in the manual.

#### **B. New Employee Orientation**

Each new Contractor or Subcontractor employee will be required to attend an orientation program. This orientation is designed to communicate all project specific safety policies, procedures, and expectations of "the Safety Team" in regard to the construction of any Designated Project.

#### **C. Contractor Safety Program Review**

To proactively monitor the safety, health and environmental performance of Contractors and Subcontractors the Owner and/or his Representative, will be conducting a periodic review of Contractor or Subcontractor safety programs. This will be a formal process, which will be done with or without advanced notice. Upon completion of the Safety Program Review, a list of recommendations will be provided to the Contractor or Subcontractor. There will be a timeline developed and agreed upon for the purpose of abating any deficiencies in the Contractor or Subcontractor safety program.

### **C.5. No Release**

The provision of the OCIP by The Owner will in no way be interpreted as relieving the Contractor or any Subcontractor of any other responsibility or liability under this agreement or any applicable law, statute, regulation or order.

### **C.6. CIP Exclusion Limitation**

If any party's insurance includes an exclusion tied to Controlled Insurance Programs (a.k.a. "wrap-ups" or "CIPs") or other project-specific insurance, it may apply only to the extent of coverage available to that party under the CIP or other Sponsor-provided insurance. Such exclusion may not be broader than what the CIP or such other Sponsor-provided insurance actually covers.



## MSCAA OCIP V

### **An Owner Controlled Insurance Program Manual for Construction Projects**

## MSCAA OCIP – ENROLLMENT SUMMARY

### Contract Bid – All Contractors/Subcontractors

Bid package will be furnished to bidders

1. All eligible Contractors/Subcontractors of every tier will exclude their cost of insurance for coverage provided by the Owner from their bid. Contractors and eligible Subcontractors should discuss the OCIP with their insurance agent or consultant to assure that the OCIP insurance identification cost is accurate.
2. Contractors and Subcontractors at any tier shall not charge any eligible Subcontractor for its participation in the OCIP.
3. Workers' Compensation – Tennessee Payroll Rules are applicable to WC payroll. First dollar coverage is given to all Contractors on WC.
4. General Liability – Mandatory deductible not to exceed \$10,000 will apply to any loss as described in the OCIP manual. 5% credit will be applied to Contractor's premium for this deductible

### Contract Award

Once notification of contract award has been received, all eligible Contractors/Subcontractors of every tier will complete and submit Form 2 with the required certificate of insurance. Any Contractors or Subcontractors who enroll in the OCIP 30 days after their start date will have to provide a No Known Loss Letter to the Carrier along with the enrollment documentation. The OCIP Administrator will:

- 1) Assign a location code for this contract, forward the **Form 2** to the insurance carrier for enrollment into program
- 2) Issue a certificate of insurance which will reflect all OCIP coverages. The original copy will be sent to the enrolled contractor/Subcontractor with a copy to their awarding contractor.

### Change Order

Contractor and all enrolled Subcontractors will price each change order to exclude the cost of insurance provided by the Owner.

### Monthly Payroll Reporting

The Enrolled Contractor/Subcontractor will receive a Payroll Request e-mail from the following email address On behalf of Willis Admin at the beginning of each month during construction reminding them to complete their payroll report via the link in the email by the payroll due date. The payroll link will expire in 30 days. If the payroll link expires please contact your Willis Towers Watson CIP Administrator to receive an updated link.

### If Contractor/Subcontract receives additional contracts

Once the contractor/Subcontractor has enrolled in the OCIP, all additional contract bids must also exclude the Contractor's cost of insurance for coverage provided by the Owner. **Form 2** must be submitted to the OCIP Administrator to receive confirmation of enrollment in the OCIP for the additional contract. (Contact the OCIP Administrator if you have questions). The OCIP Administrator will:

- 1) Assign a location code for this contract, forward the **Form 2** to the insurance carrier for enrollment into program
- 2) Issue a certificate of insurance which will reflect all OCIP coverages. The original copy will be sent to the enrolled contractor/Subcontractor, a copy to their awarding contractor.

### When Contractor/Subcontract reaches Substantial Completion

Notice of Anticipated Completion - **Form 4** – Prior to completion of all work being performed under the contract. This will initiate Closeout Procedures. Payroll and Receipts may be audited.

### When Contractor/Subcontractor has completed the Work

Contractor should notify their insurance agent/broker to remove any exclusion for this Designated Project from their primary policies.

### Claims

All Contractors/Subcontractors must follow claims rules and procedures outlined in the MSCAA OCIP Manual.

### Safety

All Contractors/Subcontractors must follow safety rules and procedures outlined in the MSCAA OCIP Site Specific Safety Plan.

### Notice to All Contractors/Subcontractors

Failure to follow the Enrollment or Claims procedures outlined in MSCAA OCIP Manual may result in fines being assessed by the State Bureau/NCCI, State's Workers' Compensation Commission or the Owner against the Contractor or Subcontractor. If the Owner or Carrier is assessed fines due to Contractor's or Subcontract's failure to follow State rules or regulations, the Owner will deduct from monies due or to become due for any applicable fines.

**CHANGES TO ANY OCIP REQUIREMENT OR PROCEDURE MUST BE APPROVED BY THE OWNER AND OCIP ADMINISTRATOR. NO CONTRACTOR OR SUBCONTRACTOR HAS THE AUTHORITY TO AMEND THE OCIP REQUIREMENTS.**



## **INTRODUCTION**

This manual identifies, defines, and assigns responsibilities related to the administration of the Memphis-Shelby County Airport Authority (MSCAA) Owner Controlled Insurance Program (OCIP).

This manual:

- Describes the OCIP and details the insurance-related responsibilities of the various parties involved.
- Provides a basic description of the OCIP structure and operation, with an overview of coverage provided by the OCIP and guidelines for carrying out specific administrative and audit procedures.
- Provides answers to questions that are likely to arise during the course of the project.

Because it is impossible to anticipate every question or situation that may arise, the directory lists those involved in the administration of the OCIP and their areas of expertise. Please feel free to call with any questions.

This Manual will be updated as changes dictate during the course of this project.

### **NOTE**

- This Manual does not, and is not intended to, provide coverage interpretations or complete information about coverages.
- The terms and conditions of the insurance policies govern how coverage is applied.
- The information herein is not intended to alter any provisions of the actual contract documents of the Contractors, and if any such conflict occurs, the contract documents will govern.

**CHANGES TO ANY OCIP REQUIREMENT OR PROCEDURE MUST BE APPROVED BY THE SPONSOR AND OCIP ADMINISTRATOR. NO CONTRACTOR OR SUBCONTRACTOR HAS THE AUTHORITY TO AMEND THE OCIP REQUIREMENTS.**

## **ADMINISTRATION**

### **Program Management**

#### **OCIP Program Coordinator**

**Willis Towers Watson**

**John Shorten**

8285 Tournament Drive, Suite 130

Memphis, TN 38125

Phone: (901) 248-3102

Fax: (901) 248-3101

E-mail: [john.shorten@willistowerswatson.com](mailto:john.shorten@willistowerswatson.com)

#### **OCIP Program Unit Manager**

**Willis Towers Watson**

**Nancy Jarmon**

500 North Akard St., Suite 4300

Dallas, TX 75201

Phone: (972) 973-2394

Fax: (972) 386-5561

E-Mail: [nancy.jarmon@willistowerswatson.com](mailto:nancy.jarmon@willistowerswatson.com)

#### **OCIP Administration**

**Willis Towers Watson**

**Starla Lacey**

Five Course Parkway, Suite 1800

Atlanta, GA 30328

Phone: (404) 224-5000

Cell: (404) 536-8567

E-Mail: [starla.lacey@willistowerswatson.com](mailto:starla.lacey@willistowerswatson.com)

#### **On-Site Safety**

**Willis Towers Watson**

**Wes Shelby**

4225 Airways Blvd.

Memphis, TN 38116

Phone: (901) 344-1659

Cell: (901) 604-2136

Fax: (901) 345-6636

E-Mail: [wes.shelby@willistowerswatson.com](mailto:wes.shelby@willistowerswatson.com)

### **Claims Management**

#### **Zurich North America**

PO Box 968077

Schaumburg, IL 60196-8077

**FAX NUMBER FOR REPORTING CLAIMS: (877) 967-2567**

**GENERAL CLAIMS FAX NUMBER: (615) 872-1303**

**GENERAL PHONE NUMBER: (800) 366-8366**

<b>Leadership</b>	<b>Title</b>	<b>Phone</b>	<b>Email</b>
Tammy Fike	GL Sr. Specialist	(404) 851-3616	<a href="mailto:tammy.fike@zurichna.com">tammy.fike@zurichna.com</a>
Ginny Howard	WC Team Manager	(615) 872-1315	<a href="mailto:ginny.howard@zurichna.com">ginny.howard@zurichna.com</a>
Karen Kingo	WC Pension Manager	(847) 413-5868	<a href="mailto:karen.kingo@zurichna.com">karen.kingo@zurichna.com</a>
Vea Storey	WC Claims Specialist	(615) 872-1241	<a href="mailto:veatrice.storey@zurichna.com">veatrice.storey@zurichna.com</a>
Patricia Painter	WC Claims Specialist	(615) 391-7501	<a href="mailto:patricia.painter@zurichna.com">patricia.painter@zurichna.com</a>
Nat Woodruff	Claims Customer Service Executive	(404) 851-3278	<a href="mailto:nathaniel.woodruff@zurichna.com">nathaniel.woodruff@zurichna.com</a>

## ***Insurance Policy References***

### **Workers Compensation**

**Insurance Company:** Zurich American Insurance Company

**Master Policy Number:** WC 6675835-00

Each Contractor and/or Subcontractor will be issued their own Workers' Compensation Policy

Part One - Workers' Compensation TN State Limits

Part Two - Employers' Liability

Bodily Injury by Accident – Each Accident \$1,000,000

Bodily Injury by Disease – Policy Limit \$1,000,000

Bodily Injury by Disease – Each Employee \$1,000,000

Part Three – Other States Insurance

All States except those listed in Part One and Monopolistic States (OH,ND,WA,WY)

### **Commercial General Liability**

**Insurance Company:** Zurich American Insurance Company

**Master Policy Number:** GLO 6675834-00

General Aggregate Limit (Other than Products – Completed Operations) \$4,000,000

Product-completed Operations Aggregate Limit \$4,000,000

Personal and Advertising Injury Limit (Any One Person or Organization) \$2,000,000

Each Occurrence Limit \$2,000,000

Fire Legal Liability (Any One Fire) \* \$250,000

Medical Expense Limit (Any One Person) \$10,000

### **Umbrella Liability**

**Insurance Company:** ACE Property and Casualty Insurance Company

**Master Policy Number:** XCQ G46622029 001

**Limits:** \$25,000,000 excess of primary

### **Excess Liability – Layer 1**

**Insurance Company:** Allied World National Assurance Company

**Master Policy Number:** 0313-3804

**Limits:** \$10,000,000 excess of \$10,000,000

### **Excess Liability – Layer 2**

**Insurance Company:** ACE Property and Casualty Insurance Company

**Master Policy Number:** XCQ G7257896A 001

**Limits:** \$15,000,000 excess of \$15,000,000

### **Excess Liability – Layer 3**

**Insurance Company:** Great American Security Insurance Co.

**Master Policy Number:** EXC 4051403

**Limits:** \$12,500,000 excess of \$12,500,000

### **Excess Liability – Layer 4**

**Insurance Company:** Starr Indemnity & Liability Company

**Master Policy Number:** 1000587787221

**Limits:** \$15,000,000 excess of \$15,000,000

**Insurance Company:** Endurance Risk Solutions Assurance Co.

<b>Master Policy Number:</b>	XSC30019604800
<b>Limits:</b>	\$15,000,000 excess of \$15,000,000
<b>Insurance Company:</b>	Westchester Surplus Lines Insurance Company
<b>Master Policy Number:</b>	G72578387001
<b>Limits:</b>	\$20,000,000 excess of \$20,000,000

## Program Definitions

<b>Owner Controlled Insurance Program (OCIP)</b>	The Insurance Program under which Workers' Compensation, Employer's Liability, Commercial General Liability and Excess Liability are procured or provided on a project "wrap-up" basis for Contractors/Subcontractors(s) of any tier, who have been properly enrolled, while performing operations on a designated Project Site for Memphis-Shelby County Airport Authority.
<b>Insured</b>	The Memphis-Shelby County Airport Authority, Contractors(s) and Subcontractors of any tier who are enrolled in the OCIP and who have been named in a policy, certificate of insurance, or advice of insurance.
<b>Enrolled Contractors</b>	"Enrolled Contractors", mean "Eligible Contractors" who, prior to the commencement of their work on the covered project, have completed the appropriate enrollments documents for the "designated project site".
<b>Insurer</b>	Insurance Company, as identified in the Insurance Policy Reference section.
<b>OCIP Coordinator and Administrator</b>	The firms responsible for the insurance broker and administration of the OCIP.
<b>OCIP Safety Consultants</b>	These representatives are employees of the Insurer and Willis Towers Watson who will provide safety consulting services to MSCAA and its contractors enrolled in the OCIP.
<b>Project Description</b>	All Designated Projects identified and approved by the Owner and on file with the Insurance Company.
<b>On-Site Activities/ Designated Project</b>	<p>Zurich's designated project means:</p> <p>"The project shown in this Schedule, including operations on the project site or location that are necessary or incidental to the project as described in contract documents. "Designated Project" includes the work site(s) associated with such "designated project(s)" and any offsite staging areas, as long as they are dedicated solely to the "designated project(s)" and the sponsor agrees to provide coverage. Also included are those areas immediately adjacent to the "designated projects", including boundaries of local streets or public easement, in which the enrolled subcontractors at any tier perform work under their respective contracts."</p> <p>The OCIP does not provide insurance coverage for permanent yards or other locations of any Contractors/Subcontractors, except as specifically requested by Contractors and, if accepted by insurer, endorsed to the policy.</p>
<b>Eligible Contractors</b>	<b>Insured by the OCIP:</b> Eligible Contractors include all contractors providing direct labor on the Designated Project (see definition of ineligible contractors below). Temporary labor services and leasing companies are to be treated as subcontractors.
<b>Ineligible Contractors</b>	<b>Not insured by the OCIP:</b> Includes (but is not limited to) contractors performing any type of environmental remediation work (example: asbestos or underground tank removal), consultants, suppliers (that do not perform or subcontract installation), vendors, materials dealers, guard services, janitorial services, truckers (including

trucking to any Designated Project where delivery is the only scope of work performed), Blasting Contractors or Any Person or organizations that manufactures or fabricates products or components outside the designated project that does not also install the product or component at the designated project, employee leasing companies, temporary labor services and other temporary project services. However, such Employee leasing and temporary labor service companies can be insured by the OCIP but must be submitted for review to the OCIP administrator prior to acceptance.

**Certificate of Insurance**

Written evidence of the existence of coverage terms of a particular insurance policy.

## COVERAGE SUMMARY

The OCIP coverage applies only to work performed under the Agreement at any Designated Project Site for eligible enrolled contractors. Contractor and Subcontractors must provide their own insurance as detailed in the contract.

Through a combination of insured and self-insured insurance programs the Owner, at its sole expense, will provide and maintain in force the types of insurance listed in subsection (1) through (4) below as a part of the OCIP for Contractor and eligible Subcontractors who have been enrolled. Contractor and eligible Subcontractors enrolled in the OCIP agree that the insurance company policy limits of liability, coverage terms and conditions shall determine the scope of coverage provided by the OCIP.

This section provides a brief description of the coverages provided under the OCIP. The Contractor shall refer to the actual policies for details concerning coverages, exclusions and limitations. Policies are available for review upon request.

While the OCIP is intended to provide uniform coverages and reasonable limits, the OCIP is not intended to meet all the insurance needs of the Contractor and all eligible Subcontractors who have been properly enrolled. Contractor and eligible Subcontractors enrolled in the OCIP agree that they will discuss the OCIP with their insurance agent or consultant to ensure that proper coverages are maintained. It is the contractors' responsibility to notify their agent that the work performed on-site will be insured under an OCIP.

1) **Workers' Compensation and Employers' Liability Insurance** (Off-site operations are excluded unless locations are scheduled & approved by the Owner and OCIP insurance carriers) with Statutory Limits with All States Endorsement and minimum Employer's Liability Limits will be provided as follows:

- a) \$1,000,000 Bodily Injury with Accident - Each Accident;
- b) \$1,000,000 Bodily Injury by Disease - Policy Limit
- c) \$1,000,000 Bodily Injury by Disease - Each Employee; and

Each Enrolled Contractor will be issued a separate Workers' Compensation policy. The premium and loss experience on the Project Site will be reported to the appropriate rating authorities in the normal manner for use in calculating Enrolled Contractors' future experience modifiers. OCIP loss experience will impact Contractor's future insurance costs and, therefore, compliance with the project safety guidelines will directly benefit all Contractors.

2) **Commercial General Liability Insurance**, (Off-site operations are excluded unless locations are scheduled & approved by the Owner and OCIP insurance carriers) will be provided on an "occurrence" form under a single liability policy. Certificates of insurance will be provided to the Contractor and all tiers of eligible Subcontractors reflecting the following Limits of Liability, Coverages, and Terms:

a) Limit of Liability: Limits of Liability Shared by all Enrolled Contractors

General Aggregate Limit (Other than Products – Completed Operations)	\$4,000,000
Product-completed Operations Aggregate Limit	\$4,000,000
Personal and Advertising Injury Limit (Any One Person or Organization)	\$2,000,000
Each Occurrence Limit	\$2,000,000
Fire Legal Liability (Any One Fire)	\$250,000
Medical Expense Limit (Any One Person)	\$10,000

b) Coverage and Terms:

- i) Occurrence Basis;
- ii) Products;
- iii) Contractual Liability specifically designating the indemnity provision of this agreement as an insured contract;
- iv) Completed Operations (Six Year Term);
- v) Independent Contractor/Subcontractor's Liability;
- vi) Personal Injury; Explosion, Collapse, and Underground (X, C, U) exclusion deleted;
- vii) Coverage limited to any Designated Project;
- viii) General Aggregate Limits will apply per project and annually;
- ix) Products and Completed Operations Aggregate Limit applies once or all projects and applies once for the

policy period and extended completed operations period combined; and

x) Policy Exclusions include (but are not limited to) asbestos, pollution, mold, professional liability, employment practices, EIFS, impaired property and work or operations performed away from any Designated Project Site.

c) If a claim arises under the Owner provided Commercial General Liability OCIP policy from the partial or sole negligence of a Contractor or Subcontractor, or for violation of any OCIP Safety Requirements, such Contractor or Subcontractor shall be responsible for reimbursing the Owner's deductible to the extent of their respective negligence, as determined solely by owner, up to a maximum of \$10,000 per occurrence per Contractor.

d) The limits of liability detailed under 2) a) apply to construction operations within the property boundary of the applicable Airport under the management of MSCAA and as per the issued policies' definitions.

3) **Umbrella and Excess Liability Insurance** (Off-site operations are excluded)

a) Limits of Liability Shared by all Enrolled Contractors

i) \$100,000,000 per Occurrence

ii) \$100,000,000 Aggregate

iii) \$100,000,000 Products / Completed Operations Aggregate

4) **Builder's Risk Insurance** will be provided on "All-Risk" coverage on a replacement cost basis, subject to the limits of the insurance policy. This insurance will include the interests of the Owner the Contractor and all tiers of Subcontractors in the Work. The Builders Risk policy will not provide coverage against loss by theft or disappearance of any materials (unless the materials are to be incorporated into the Project), tools, or equipment of the Contractor or any tier of Subcontractor, or any other person furnishing labor or materials for the Work. The Contractor shall be responsible for a deductible of \$25,000 for each and every loss.

## **ACCIDENT REPORTING AND CLAIMS PROCEDURES**

When accidents happen, everyone needs to work together. Even though the Contractors and each Subcontractor has instituted tough safety measures, work-related accidents are bound to occur. When they do, the OCIP Insurers stand ready to serve the Contractors and Subcontractors, but they need help if they are to perform this service in the most effective and efficient manner.

Each Contractor/Subcontractor should have the claims procedures and emergency numbers posted on the jobsite and in all vehicles.

The Insurer will have a claims adjuster available to handle all Commercial General Liability and Workers' Compensation claims.

The Insurer will arrange for legal counsel to handle all lawsuits emanating from the project.

Never discuss any accident or claim with anyone except authorized representatives of MSCAA, Contractor, the Insurer(s), and the Owners Insurance Broker or Law Enforcement agencies.

### ***MSCAA Emergency Procedures (Serious Injuries)***

1. Contact MSCAA Emergency Dispatch at **(901) 922-8333 (DO NOT call 911)**. Specific directions should be given to the accident scene. If the accident occurred in the SIDA area, give location in relation to an active taxiway/runway. If outside the SIDA, give location relative to a street or construction gate. Explain the extent of injuries.
2. Notify the on-site OCIP Safety Coordinator, Wes Shelby, (901) 604-2136 (cell).
3. Methodist South Hospital Emergency Room, 1300 Wesley Drive, Memphis, TN, will be used (901) 516-3700, the decision on the treating medical facility will be made by the EMT, in serious cases, the Med Trauma Center may be used.
4. Contractors must have currently qualified First Aid personnel on site at all times. First Aid supplies must be readily available and maintained, including rubber gloves to protect First Aid personnel against blood borne pathogens, etc.
5. After the call for emergency unit is made to MSCAA, the contractor should send escorts to all locations where the emergency unit could enter the site.
6. If the injured employee does not speak English, send a good interpreter to the treating medical facility.
7. The Contractor should provide the Medical Facility with a completed Authorization For Treatment form (sample provided in the OCIP Manual).



**A. Workers' Compensation Claims**

1. Seek immediate medical attention for the injured person(s).
2. Immediately notify your supervisor and project manager of the situation.
3. Notify the on-site OCIP Safety Coordinator, Wes Shelby, (901) 604-2136 (cell). If you cannot reach Wes, please leave a voice mail message.
4. Complete a **First Report of Injury form** and the **Claim Reporting Cover Sheet** (include appropriate Location Code) and forward to **Zurich Insurance Company** via fax **877-967-2567** or email [usz\\_carecenter@zurichna.com](mailto:usz_carecenter@zurichna.com) immediately. If not possible, then send before the end of the business day.
5. MSCAA the Contractor's safety representative or designated person will transport the injured worker to

**Concentra Medical Center**  
**2831 Airways Boulevard**  
**Suite 102**  
**Memphis, TN 38132**  
**Phone: (901) 348-0200**  
**Hours: 8a.m. to 8p.m. (Mon. – Fri.)**

If accident occurs and Concentra Medical Center is not open:

**Methodist South Hospital**  
**1300 Wesley Drive**  
**Memphis, TN 38116**  
**Phone: (901) 516-3700**  
**24 Hours, 7 days per week**

Or

**Baptist Memorial Hospital DeSoto**  
**7601 Southcrest Parkway**  
**Southaven, MS 38671**  
**Phone: (662) 349-4000**  
**24 Hours, 7 days per week**

6. Complete the **Accident Investigation Form** and forward it along with the **Claim Reporting Cover Sheet** to Wes Shelby, OCIP Safety Coordinator (e-mail: [Wes.Shelby@willis.com](mailto:Wes.Shelby@willis.com), fax: (901) 345-6636, or mail: 4225 Airways Blvd., Memphis, TN 38116 before the end of the day.
7. Receipt of Acknowledgement of Claim and claim number from Zurich Insurance Company will be sent to the contact person provided on the Claim Reporting Cover Sheet and to Wes Shelby, OCIP Safety Coordinator. The claim number should be used for future reference.
8. All medical bills, hospital bills, etc. should be forwarded to Zurich Insurance Company identifying the injured employee and claim number.

**After Hours / Close of Business Claims Reporting**

1. Call Zurich Insurance Company at (800) 987-3373.
2. Tell the Zurich representative that an injury just occurred and that you need to be routed to the on call specialist to authorize treatment.
3. You will either be placed directly in touch with the on-call person or the on-call person will be paged and will return your call within two hours.
4. If hospital needs to speak with Zurich directly, the contractor will have to supply the hospital name and phone number to Zurich and they will call the hospital directly.

**B. Commercial General Liability Claims**

Any occurrence involving Bodily Injury or Property Damage to members of the public that is NOT caused by an automobile accident.

1. Seek immediate medical attention for any injured person(s).
2. Immediately notify your supervisor and project manager of the situation.
3. Notify the on-site OCIP Safety Coordinator, Wes Shelby, (901) 604-2136 (cell). If you cannot reach, please leave a voice mail message.
4. Complete the **Claim Reporting Cover Sheet** (include appropriate Location Code) and forward to Zurich Insurance Company via fax **(866) 691-7068** or email [usz\\_carecenter@zurichna.com](mailto:usz_carecenter@zurichna.com) immediately. If not possible, then send before the end of the business day.
5. Complete the Accident Investigation Form and Claim Reporting Cover Sheet (include appropriate Location Code) and forward to Wes Shelby, OCIP Safety Coordinator, (e-mail: [wes.shelby@willis.com](mailto:wes.shelby@willis.com), fax: (901) 345-6636, or mail: 4225 Airways Blvd., Memphis, TN 38116.
6. Receipt of Acknowledgement of Claim and claim number from Zurich Insurance Company will be sent to the contact person provided on the Claim Reporting Cover Sheet and to Wes Shelby, OCIP Safety Coordinator. The claim number should be used for future reference.
7. All investigation reports, pictures, medical bills, hospital bills, etc should be forwarded to Zurich Insurance Company identifying the injured individual, claimant and claim number.

**C. Duties in the event of a claim or suit**

1. Follow the claims reporting procedures above.
2. You must see to it that the OCIP Safety Coordinator, Wes Shelby, is notified promptly of an "occurrence" which may result in a claim. Notice should include:
  - a. How, when and where the "occurrence" took place, and;
  - b. The names and addresses of any injured persons and witnesses.
3. If a claim is made or "lawsuit" is brought against any insured, you provide written notice of the claim or "lawsuit".
4. You and any other involved insured must:
  - a. Cooperate with the Insurer in their investigation, settlement or defense of the claims or "suit"; and
  - b. Assist the Insurer, upon their request, in the enforcement of any right against any person or organization which may be liable to the insured because of injury or damage to which this insurance may also apply.
5. No Insureds will, except at their own cost, voluntarily make a payment, assume any obligation or incur any expense, other than for first aid, without Insurer's consent.

**D. Automobile Claims**

Even though no Automobile Liability or Physical Damage coverage is provided under the OCIP, the Contractor/Subcontractor must notify Wes Shelby, OCIP Safety Coordinator, in writing of any automobile accident which could be related to the project. This should be done as soon as possible following the accident.

**E. Contractor's Equipment Claims**

Even though no coverage is provided under the OCIP for loss of or damage to Contractor's or Subcontractor's owned equipment the Contractor/Subcontractors must notify Wes Shelby, OCIP Safety Coordinator, in writing, of any loss or damage to their equipment at the project. This should be done as soon as possible, following first knowledge of loss or damage.

**F. Miscellaneous Claims Notes**

1. Any incident that involved injury to persons or property is to be reported to Wes Shelby, OCIP Safety Coordinator's office immediately.
2. Any claims adjuster representing a Contractor/Subcontractor's normal insurer who seeks to come onto Any Designated Project site must obtain written authorization from Wes Shelby, OCIP Safety Coordinator, prior to coming on the site. There will be no exceptions to this stipulation.

## ***FORMS***

**Zurich Claim Reporting Cover Sheet**

**Incident Investigation Report**

**Workers' Compensation Referral Slip for Injured Employees**

**Authorization to Treat**

**Form 1 – Notice of Sub-contract Award**

**Form 2 – Enrollment Form**

**Form 4 – Notice of Anticipated Completion**

**Certificate of Insurance**

**ZURICH CLAIM REPORTING COVER SHEET**

Email to: [USZ\\_CARECENTER@ZURICHNA.COM](mailto:USZ_CARECENTER@ZURICHNA.COM)

**OR**

**Fax to:** (866) 691-7068

**Account Name:** Memphis Shelby County Airport OCIP V

**Master WC policy #:** WC 6675835-00

**Master GL Policy #:** GLO 6675834-00

**Project Location:** \_\_\_\_\_

**Subcontractor/Employer:** \_\_\_\_\_

**Subcontractor/Employer Policy Number:** \_\_\_\_\_

**Contact Name:** \_\_\_\_\_

**Contact Phone Number:** \_\_\_\_\_

**Contact Fax Number:** \_\_\_\_\_

**Location Code:** \_\_\_\_\_

**Injured Worker:** \_\_\_\_\_

**Attention Zurich Representative –** Please fax the receipt and claim number immediately to the contact above.

# Incident Investigation Report

(To be completed within 24 hours by Supervisor at time of incident)

## INJURED EMPLOYEE INFORMATION

Employee Name	Male	Female	Date of Birth	Ht.	Wt.
<hr/>					
Employee Address	Street	City	State	Zip Code	Home Phone
<hr/>					
Employer Name	Address				
Date of Incident	Time	AM/PM	Jobsite/Area		
Employee Job Title			Length of Employment		
Weather Condition	Shift	Supervisor			

## UNSAFE ACTS

What actions caused or contributed to the incident?

- ☐ Operating equipment without authority
- ☐ Failure to warn/signal
- ☐ Failure to secure/lock out/tag out
- ☐ Reaching into/servicing equipment in operation
- ☐ Making safety devices inoperable
- ☐ Used defective equipment
- ☐ Took unsafe/improper position
- ☐ Horseplay, disruptive actions
- ☐ Improper lifting or movement
- ☐ Other: \_\_\_\_\_
- ☐ No unsafe action

What actions caused or influenced above unsafe acts?

- ☐ Unaware of job hazards
- ☐ Inattention to hazards
- ☐ Unaware of safe method/procedure
- ☐ Tried to gain or save time
- ☐ Influence of fatigue/illness
- ☐ Influence of emotions/stress
- ☐ Defective vision/bodily defects
- ☐ Under influence of alcohol or drugs
- ☐ Failure to enforce procedures/rules
- ☐ Other: \_\_\_\_\_

## UNSAFE CONDITIONS

What conditions of tools, equipment, or environment contributed to incident?

- ☐ Inadequate guard/barrier/safety device
- ☐ Inadequate/improper protective equipment
- ☐ Inadequate warning system
- ☐ Defective or work tools/equipment materials
- ☐ Congestion or restricted area
- ☐ Fire or explosion hazard
- ☐ Hazardous storage method
- ☐ Unsecured against movement
- ☐ Lighting/noise/visual obstruction
- ☐ Environmental/atmospheric conditions
- ☐ Other: \_\_\_\_\_
- ☐ No unsafe condition

What caused or influenced above unsafe condition?

- ☐ Defective/worn from normal use
- ☐ Defective/worn from abuse/misuse
- ☐ Housekeeping/cleaning failure
- ☐ Lack of preventative maintenance
- ☐ Inadequate maintenance
- ☐ Exposure to environment
- ☐ Inadequate purchasing
- ☐ Safety inspection failure
- ☐ Other: \_\_\_\_\_
- ☐ Unknown

## INJURY/ILLNESS DATA

Describe the nature and extent of injury/illness (body part affected, type of injury, etc.) \_\_\_\_\_

Was first aid administered?	Yes	No	If yes, what type and by whom
Was employee taken to hospital/clinic?	Yes	No	If yes, list name, address and phone number of
hospital/physician/nurse attending _____			

List any eyewitnesses to the incident and others who might provide information about the incident \_\_\_\_\_

## INCIDENT/ILLNESS EVALUATION

How did the incident occur? Describe in detail the task the employee was doing when injured or became ill. Include specifics such as equipment, structure tools, materials, objects (size, shape, and weight), people involved in the task, positions, distances, rate of movement, sequence of events, etc.

(Attach any additional information comments, documentation of interviews, sketches, pictures, etc. as necessary)

### Incident Investigation Report

#### Incident/Illness Evaluation (continued)

Type of exertion/body motion during injury: Pull \_\_\_\_\_ Lift \_\_\_\_\_ Bend \_\_\_\_\_ Reach \_\_\_\_\_ Twist \_\_\_\_\_ Other \_\_\_\_\_  
Was this the employee's regular job? Yes \_\_\_\_\_ No \_\_\_\_\_ How much experience does this employee have on this job? \_\_\_\_\_  
Was the employee trained in this job or task? Yes \_\_\_\_\_ No \_\_\_\_\_ When was last training on this task? \_\_\_\_\_  
Was this the employee's first job-related injury or illness? Yes \_\_\_\_\_ No \_\_\_\_\_ If no, briefly describe previous injuries (date, nature, extent, etc.) \_\_\_\_\_

Hours of overtime worked in last 24 hours \_\_\_\_\_ Did this possibly contribute to incident? If so, describe \_\_\_\_\_

Does a safety rule or policy apply to this task? Yes \_\_\_\_\_ No \_\_\_\_\_ If yes, describe rule and how employee followed or violated \_\_\_\_\_

Does a specific procedure for task exist? Yes \_\_\_\_\_ No \_\_\_\_\_ If yes, describe procedure briefly and if it was followed \_\_\_\_\_

Is protective equipment required for this task? Yes \_\_\_\_\_ No \_\_\_\_\_ If yes, describe equipment, if it was used, if it was adequate/functioned properly, and if the employee(s) were trained on it. \_\_\_\_\_

Is there possibly any third party which contributed to the incident? (Other contractors, employee, etc.) Yes \_\_\_\_\_ No \_\_\_\_\_  
If yes, describe. \_\_\_\_\_

Did any unsafe physical/environmental conditions exist? Yes \_\_\_\_\_ No \_\_\_\_\_ If yes, describe conditions (physical, mechanical, electrical, etc.) which contributed to the incident \_\_\_\_\_

Is material handling equipment required for this task? Yes \_\_\_\_\_ No \_\_\_\_\_ If yes, was it used and did it function properly? \_\_\_\_\_

#### Possible actions to be taken to prevent reoccurrence

_____ Reinstruction of employee(s) involved	_____ Do/revise Job Safety Analysis	_____ Repair/replace/modify equipment
_____ Preventative instruction of others who do job	_____ Revise/establish safety rule	_____ Improve clean-up procedure
_____ Training of employee(s)	_____ Reassign employee to another job	_____ Improve inspection procedure
_____ Action to improve enforcement	_____ Require/replace protective equipment	_____ Eliminate/reduce congestion
_____ Reprimand/discipline of employee(s) involved	_____ Install safety guard device	_____ Improve design/construction
		_____ Improve environmental conditions

#### CORRECTIVE ACTION(S) TAKEN OR PLANNED

What was/will be done	By Whom	Estimated Completion Date	Completion Confirmed	
			Date	Initials

Incident discussed with employee to prevent reoccurrence? Yes \_\_\_\_\_ No \_\_\_\_\_ Date \_\_\_\_\_  
Any disciplinary action taken? Yes \_\_\_\_\_ No \_\_\_\_\_ If yes, describe what type. \_\_\_\_\_

#### FOLLOW UP COMMUNICATION

YES \_\_\_\_\_ NO \_\_\_\_\_ Incident site reviewed by supervisor with employee (and safety coordinator if applicable.)  
YES \_\_\_\_\_ NO \_\_\_\_\_ Incident review meeting conducted. Attended by \_\_\_\_\_  
YES \_\_\_\_\_ NO \_\_\_\_\_ Employee or supervisor reviewed incident with work group.  
YES \_\_\_\_\_ NO \_\_\_\_\_ Employee reviewed injury with safety committee  
YES \_\_\_\_\_ NO \_\_\_\_\_ Project Safety informed of incident  
Date of Report \_\_\_\_\_ Prepared by \_\_\_\_\_ Signature \_\_\_\_\_ Title \_\_\_\_\_  
Reviewed by \_\_\_\_\_ Superintendent \_\_\_\_\_

## MSCAA OCIP V

4225 Airways Blvd.  
Memphis, TN, 38116

### WORKER'S COMPENSATION REFERRAL SLIP FOR INJURED EMPLOYEES

**On-Site EMT:** **(901) 922-8333**

*Authorized Clinic:* **Concentra Medical Center**  
**2831 Airways Boulevard**  
**Suite 102**  
**Memphis, TN 38132**  
**(901) 348-0200 (Phone)**  
**(901) 348-0046 (Fax)**

**Clinic Hours:** **8 a.m. to 8 p.m. (Mon. – Fri.)**

*Authorized After-* **Methodist South Hospital**

*Hours Clinics:* **1300 Wesley Drive**  
**Memphis, TN 38116**  
**(901) 516-3700**

**Baptist Memorial Hospital DeSoto**  
**7601 Southcrest Parkway**  
**Southaven, MS 38671**  
**(662) 349-4000**

Employee Name: \_\_\_\_\_ Date: \_\_\_\_\_

Employer: \_\_\_\_\_ Employer Policy Number: \_\_\_\_\_

Location Code (if known): \_\_\_\_\_ Claim Number (if known): \_\_\_\_\_

Account Name: **Memphis Shelby County Airport Authority OCIP V**  
Insurer: **Zurich**  
Master Policy Number: **WC 6675835-00**

#### **Instructions for medical facility:**

The person listed above has been injured on the job. Please provide the employee with medical treatment per OCIP protocol.



**MSCAA OCIP V**  
**Authorization to Treat**

**Local Office Information**

**Company Name:** \_\_\_\_\_  
**Designated Representative:** \_\_\_\_\_  
**Address:** \_\_\_\_\_  
**Phone:** \_\_\_\_\_ **Fax:** \_\_\_\_\_ **E-mail:** \_\_\_\_\_

**Billing Information for Drug Screens**

**Company Name:** **Zurich North America**  
**Address:** PO Box 968077  
Schaumburg, IL 60196-8077  
**Phone:** (800) 366-8366 **Fax:** (615) 872-1303

**Insurance Information for Work Comp Carrier**

**Company Name:** Zurich American Insurance Company **Master Policy #: WC 0183275-00**  
**Address:** PO Box 968077  
Schaumburg, IL 60196-8077  
**Phone:** (877) 928-4531 **Fax:** (866) 691-7068

**Services Required**

**Worker's Comp Injuries** \_\_\_\_\_

**Drug Screen Required For (employer to check necessary testing):**

<input type="checkbox"/> Pre-Employment	<input type="checkbox"/> Random
<input type="checkbox"/> Probable Cause	<input type="checkbox"/> Post Accident
<input type="checkbox"/> Urine (collection only)	<input type="checkbox"/> Breath Alcohol
<input type="checkbox"/> Test Cup (Cocaine, PCP, etc.)	

**Treating Medical Center:** Please be advised if negative, DO NOT send out. Be sure to mark on the Chain of Custody (COC) the information for the employer:

**Employer:** \_\_\_\_\_ **Fax:** \_\_\_\_\_

**Special Instructions:** Use TEST CUP. Do NOT send out unless the test reads positive.

Fax results to designated employer listed above.

**Company Authorized Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**MSCAA OCIP V****Notice of Subcontract Award and Request for Insurance**

Send this Form to:

**Willis Towers Watson****Starla Lacey, CSS****Copy: Nancy Jarmon, CSS****500 N. Akard St., Suite 4300****Dallas, TX 75201****Phone: (972) 715-6303****Email: [starla.lacey@wtwco.com](mailto:starla.lacey@wtwco.com)****Email: [nancy.jarmon@wtwco.com](mailto:nancy.jarmon@wtwco.com)****Phone: (404) 536-8567**

RE: Project Name: \_\_\_\_\_

This is to inform you that we have awarded the following subcontract to the following Subcontractor:

Name of Firm: \_\_\_\_\_

Address: \_\_\_\_\_ City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

\_\_\_\_\_

Phone: (\_\_\_\_) \_\_\_\_\_ Fax: (\_\_\_\_) \_\_\_\_\_

Office Contact: \_\_\_\_\_ E-Mail: \_\_\_\_\_

Type of Work: \_\_\_\_\_ Job # \_\_\_\_\_ Contract Value: \$ \_\_\_\_\_

Award Date: \_\_\_\_\_ Estimated Start Date: \_\_\_\_\_

Awarding Contractor: \_\_\_\_\_

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

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

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

Prime Contractor (if different) \_\_\_\_\_

***DO NOT complete this form for your own company.****A Form-1 should be completed on each of your Subcontractors.*

- **Award Date – date Notice to Proceed was given (Verbally or in Writing)**

- **Start date is mandatory – date shown will be the effective date of coverage.**

**Any Contractors or Subcontractors who enrolls in the OCIP 30 days after their start date will have to provide a No Known Loss Letter to the Carrier along with the enrollment documentation.**

- ☐ New Award  
Additional Contract  
☐ Time & Material Contract  
Short Term (< 30 days)  
☐ Small Contract (< \$30,000)

## MSCAA OCIP V ENROLLMENT FORM

**Project:** \_\_\_\_\_

### CONTRACTOR'S INFORMATION

Contractor: \_\_\_\_\_ Indv \_\_\_\_\_ Ptshp \_\_\_\_\_ Corp \_\_\_\_\_ J/V \_\_\_\_\_  
Address: \_\_\_\_\_ FEIN: \_\_\_\_\_  
Office Contact: \_\_\_\_\_ Phone: \_\_\_\_\_ Email: \_\_\_\_\_  
Site Contact: \_\_\_\_\_ Phone: \_\_\_\_\_ Email: \_\_\_\_\_  
Safety Contact: \_\_\_\_\_ Phone: \_\_\_\_\_ Email: \_\_\_\_\_  
Insurance Contact: \_\_\_\_\_ Phone: \_\_\_\_\_ Email: \_\_\_\_\_  
Payroll Contact: \_\_\_\_\_ Phone: \_\_\_\_\_ Email: \_\_\_\_\_  
Address (if different): \_\_\_\_\_

### CONTRACT INFORMATION

**Contract Value: \$** \_\_\_\_\_

Job Name/Description: \_\_\_\_\_ Contract/JOB #: \_\_\_\_\_  
Awarding Contractor: \_\_\_\_\_ Prime Contractor: \_\_\_\_\_  
Award Date: \_\_\_\_\_ Start Date: \_\_\_\_\_ Est Completion Date: \_\_\_\_\_  
Self Performed: \_\_\_\_\_%, Est. CV \$: \_\_\_\_\_ Subcontracted \_\_\_\_\_%, Est. CV \$: \_\_\_\_\_  
Est. # of Subcontractors \_\_\_\_\_ Est. Man hours \_\_\_\_\_ DBE/MBE/WBE: \_\_\_\_\_

### CURRENT INSURANCE INFORMATION:

**Contractors' Insurance Broker or Agent:**

**PLEASE PRINT**

Company Name: \_\_\_\_\_ Contact: \_\_\_\_\_  
City/State/Zip: \_\_\_\_\_ Phone: (\_\_\_\_\_) \_\_\_\_\_

### WORKERS' COMPENSATION

Current Experience Modifier: \_\_\_\_ (Provide documentation confirming)

W.C. Classification	W.C. Class Codes	Estimated Payroll
1.		
2.		
3.		
4.		

**It is each Contractor's responsibility to notify its own insurance carrier to exclude all work to be done under this contract from your current insurance program. Any Contractors or Subcontractors who enrolls in the OCIP 30 days after their start date will have to provide a No Known Loss Letter to the Carrier along with the enrollment documentation.**

Contractor warrants that the insurance costs for coverages provided by the Owner have been removed from the bid and no eligible Subcontractor has been charged by the Contractor for its participation in the OCIP. The OWNER, or their Agent, is granted permission by Contractors to inspect the insurance and payroll records. At completion of the Work, Owner's Agent shall have the right to audit the project payroll records of Contractors. Any and all returns of premiums, dividends, discounts or other adjustments to any OCIP policy, including rights of cancellations assigned, transferred and set over absolutely to OWNER. This assignment is valid for insurance policies whose premiums have been paid by the OWNER on behalf of such Contractors.

Signed \_\_\_\_\_ Title \_\_\_\_\_ Date \_\_\_\_\_

**Send this Form to:**

**Willis Towers Watson**  
**Starla Lacey, CSS**  
**Copy: Nancy Jarmon, CSS**  
**500 N. Akard St., Suite 4300**  
**Dallas, TX 75201**

**Phone: (972) 715-6303**  
**Email: [starla.lacey@wtwco.com](mailto:starla.lacey@wtwco.com)**  
**Email: [nancy.jarmon@wtwco.com](mailto:nancy.jarmon@wtwco.com)**  
**Phone: (404) 536-8567**

# MSCAA OCIP V

## NOTICE OF ANTICIPATED COMPLETION

(to be submitted with Final Pay Request)

**Send this Form to:**

**Willis Towers Watson**  
**Starla Lacey, CSS**  
**Copy: Nancy Jarmon, CSS**  
**500 N. Akard St., Suite 4300**  
**Dallas, TX 75201**

**Phone: (972) 715-6303**  
**Email: [starla.lacey@wtwco.com](mailto:starla.lacey@wtwco.com)**  
**Email: [nancy.jarmon@wtwco.com](mailto:nancy.jarmon@wtwco.com)**  
**Phone: (404) 536-8567**

Please be advised, we, \_\_\_\_\_ are scheduled to complete our work

for: Awarding Contractor: \_\_\_\_\_ Prime Contractor: \_\_\_\_\_

Project Description: \_\_\_\_\_ Actual Start Date: \_\_\_\_\_ Completion Date: \_\_\_\_\_

Reported Contract Value: \_\_\_\_\_ Final Contract Value: \_\_\_\_\_

Self Performed Work: \_\_\_\_\_ Subcontracted Work: \_\_\_\_\_

Estimated WC On Site Payroll: \_\_\_\_\_ Final WC On Site Payroll: \_\_\_\_\_

We used the following enrolled subcontractors, who will also complete their work on the date shown above:

**Subcontractors**

**Reported Contract Value**

**Final Contract Value**

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

This is our contract: YES ☐ NO ☐

We are still working on the following contracts:

**Location Code**

**Awarding Contractor**

**Prime Contractor**

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Your Company's Name: \_\_\_\_\_ Date: \_\_\_\_\_

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

Final insurance audits may be made under the applicable policies. Please show who in your office (or another location if applicable) is responsible for this information:

Name: \_\_\_\_\_ Phone: \_\_\_\_\_ Fax: \_\_\_\_\_ E-Mail: \_\_\_\_\_

Address: \_\_\_\_\_ City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

<h2 style="margin: 0;">CERTIFICATE OF LIABILITY INSURANCE</h2>	DATE (MM/DD/YYYY)																				
THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.																					
IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).																					
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INSURED OCIP Enrolled Contractor																					

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THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN. THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.																			
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DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)																			
Workers' Compensation and Commercial General Liability coverages shown above do not apply to any Designated Project at the Memphis International Airport – only for off-site activities/operations. The Memphis-Shelby County Airport Authority, its officers, commissioners, representatives, agents and employees ATIMA and [AWARDING CONTRACTOR] are additional insureds applicable to the Auto Liability Insurance and off-site Commercial General Liability insurance policies including Excess Umbrella. 30 Day Notice of Cancellation or Non-Renewal other than 10 days for non-payment of premium is provided to MSCAA. Waiver of Subrogation in favor of MSCAA is provided by all policies.																			

CERTIFICATE HOLDER	CANCELLATION
MSCAA OCIP c/o Willis Towers Watson Attn: OCIP Administrator 500 North Akard St., Suite 4300 Dallas, TX 75201	SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.  AUTHORIZED REPRESENTATIVE

EXHIBIT D  
TO  
UNIT PRICE CONSTRUCTION CONTRACT  
FOR  
TAXIWAY ALPHA WEST RECONSTRUCTION - CONSTRUCTION

BY AND BETWEEN  
THE MEMPHIS-SHELBY COUNTY AIRPORT AUTHORITY  
AND  
(CONTRACTOR NAME)

CONSTRUCTION SAFETY AND HEALTH GUIDELINES

# Memphis-Shelby County Airport Authority

## Construction Safety and Health Guidelines



Revision	Date
1	11/30/2012
2	05/02/2016
3	02/06/2017



## Confirmation of these Project Safety & Health Guidelines

It is the responsibility of the Contractor to maintain total control of safety to ensure that employees and the general public are provided with an environment free of hazards during construction and renovation activities. This program does not relieve the Contractor of their responsibilities regarding the safety of their employees, the employees of their Subcontractors and sub-subcontractors, protection of the general public and the preservation of property.

**Contractors shall develop their own written site-specific safety and health plans for the Memphis-Shelby County Airport Authority.** At minimum, the safety and health plan shall meet the requirements of 29CFR1926 – Federal OSHA Construction regulations and the requirements established in the **Memphis-Shelby County Airport Authority Construction Safety Guidelines**. In short, as required by law, each Contractor is responsible for protecting the health and safety of its employees and the employees of each subcontractor and sub-subcontractor while ensuring they have a safe and healthful place to work. The site-specific safety and health program shall be submitted for approval within fifteen (15) days after the Notice to Proceed for approval to the Project Safety Manager, Wes Shelby, 4225 Airways Blvd., Memphis, TN.

The Safety Requirements of these safety guidelines are a supplementary document to all Government rules, codes and regulations. It does not negate, abrogate, alter or otherwise change any provisions of these rules, codes and/or regulations, and is intended to supplement and enforce the individual program of each contractor and the overall safety effort. It is understood that the ultimate responsibility for providing a safe place to work rests with each individual Contractor.

In the event of a conflict between the provisions of these guidelines and applicable local, State or Federal safety and health laws, regulations and/or standards, contract documents or the Contractor's Safety Plan the more stringent shall apply.

By Signature, each individual confirms their understanding of the contents of this manual and shall conform to the standards of safety outlined in this manual.

\_\_\_\_\_  
Contractor – Project Manager

\_\_\_\_\_  
Contractor – Field Supervisor

\_\_\_\_\_  
Date

\_\_\_\_\_  
Date

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## POLICY STATEMENT

**Memphis-Shelby County Airport Authority** is committed to ensuring that all construction workers have the best possible working environment while working on this project. It shall be the responsibility of each Contractor/Subcontractor to abide by the Safety and Health Provisions listed in OSHA 29 CFR 1926.

In addition, each Contractor, Subcontractor and Sub-Subcontractor shall abide by **Memphis-Shelby County Airport Authority** Construction Safety Guidelines, Federal Regulations, State laws and regulations, local and county laws and regulations which are applicable.

The primary goal established for the **Memphis-Shelby County Airport Authority** is to safely perform work with “**ZERO ACCIDENTS**”; totally free from lost time injuries for the mutual benefit of the worker, environment, and community.

The safety goals and objectives established for the Project can only be achieved when everyone commits to perform their tasks safely and efficiently. This commitment to achieve these goals will result in both increased productivity and the PREVENTION of job-related injuries and illnesses. This will be considered as safe construction.

## Definitions

OCIP Team – Means the Owner **Memphis-Shelby County Airport Authority**, Willis Towers Watson and all applicable insurance carrier representatives or the representative of defined such agencies and firms working together to implement the OCIP insurance program.

Construction Managers – Means the Management Group or General Contractor that has direct contract with the Owner **Memphis-Shelby County Airport Authority** to provide the overall control of the construction at the project.

General Contractor – Means the Contractor that has direct contract with the owner or Construction Managers as bid for the project. The General Contractor is also the controlling contractor on the construction site when a Construction Manager is not present.

Subcontractor – Means the contractor and or contractors that carry contracts with the General Contractor or Construction Managers. Subcontractors bid portions of the scope of work to be completed.

Sub-Subcontractors – Means any subcontractors of a subcontractor working or contracted to do work on the project.

Critical Lift – A lift that exceeds 75% of the rated capacity of the crane or requires the use of more than one crane. Also, relates to the installation of equipment and/or materials that are critical to the completion of the project and damage to such equipment and/or material could result in delays to the project.

The General Public – Is defined as all persons not employed by or under contract, subcontract, or sub-subcontract to the **Memphis-Shelby County Airport Authority**.

## PREFACE

From the inception of **Memphis-Shelby County Airport Authority** there has been a determination and commitment to provide a safe environment for all workers and for the public from hazards associated with the construction of the Project.

All Contractors shall implement measures that will create safety awareness, promote safe work practices at the job site and pursue the contract objectives in the safest possible manner. Each Contractor shall bear sole and exclusive responsibility for safety in all phases of their work. Nothing contained herein shall relieve such responsibility.

**Each Contractor shall be responsible for all its subcontractors' and sub-subcontractors' compliance with the project safety requirements.**

**Contractors shall develop their own written site-specific safety and health plan for the MSCAA OCIP.** At minimum,

the safety and health plan shall conform to the requirements addressed in the Occupational Safety and Health Act of 1970 and all additions and revisions thereto, and the requirements established in the **Memphis-Shelby County Airport Authority** Construction Safety Guidelines. In short, as required by law, each Contractor is responsible for protecting the health and safety of its employees while ensuring they have a safe and healthful place to work.

**Contractor developed plans/program(s).**

Programs will be reviewed and approved by OCIP Team. Example(s) of such OSHA mandated plans/programs are shown below.

Site Traffic Control Plan	Fall Protection Plan
Fire Protection Plan	Trench Safety Plan
Respiratory Protection Plan	Hazard Communication Program
Confined Space Entry	Scaffold Safety Program
Hearing Conservation Program	Ladder Safety Training
Dust Control Plan	

**Emergency Procedures** shall be made part of the Contractor's Safety Program. The following provisions shall be included in the emergency plan:

- a. Highest ranking supervisor automatically becomes responsible for the handling of any emergency that occurs during his working hours; they may call upon the assistance of any available worker. A responsible supervisor must be designated for each shift.
- b. On a regular basis, at both supervisory and "weekly toolbox meetings" instruct and update all employees in any course of action for emergencies.
- c. Establish teams to handle each of the various emergencies.
- d. Following an emergency, ranking personnel shall secure the area as expediently as possible and provide access and an account of the emergency to authorized representative(s) of MSCAA. Questions from the media should be referred to MSCAA.

Emergency procedures that may occur during any 24-hour period in the following categories must be established by each contractor:

- a. Fire
- b. Employee injury
- c. Pedestrian injury due to work activity of any kind
- d. Property damage and damage to above ground and buried utilities
- e. Public demonstrations
- f. Bomb threats

On a regular basis, the Contractor shall review and, when necessary, update Emergency Procedures for maximum effectiveness. The contractor should provide MSCAA, the Construction manager, and the on-site safety rep a telephone list of key management personnel, for after-hours emergency contact.

Should a serious accident or emergency occur, the contractor shall contact the Construction Manager immediately. If an emergency requires the presence of an ambulance or the Fire Department, including nights, weekends and holidays, the contractor shall call MSCAA emergency dispatch at (901)922-8333. Non injury accidents need to be reported to the airport police at (901)922-8298. **DO USE 911**

**Site Access**

1. ***Use only designated haul routes/crossings.***
2. ***Stay in assigned work area as identified on plans and as defined by fences and barricades. Barricades/fences must not be crossed.***
3. ***Instructions from guards and escort personnel must be obeyed.***

Contractors, Subcontractors, and Sub-Subcontractors will be monitored for implementation and application of their respective safety programs at the work site. Members of the OCIP Team shall have the authority to stop work when either site conditions and/or work practices present an imminent danger until those conditions and/or practices are corrected. Contractors will be notified of any non-compliance and corrective action required. This notice, when delivered

to the contractor or their representative at the site of the work, shall be deemed sufficient notice of non-compliance and corrective action required. After receiving the notice, the contractor shall immediately take corrective action. If the contractor fails or refuses to take corrective action promptly, a stop work order may be issued. The cost to bring the work activity into compliance shall be incurred by the Contractor, Subcontractor or Sub-subcontractor. The Contractor, Subcontractor or Sub-Subcontractor shall not submit a request for extension of time or increased costs as a result of any such stop work order. Members of the OCIP Team shall not be liable for any damages experienced by the Contractor due to the work stoppage. Progress payments may also cease until the Contractor and/or its Subcontractor and Sub-Subcontractors are in full compliance with all applicable safety and health rules, standards and regulations.

Each Contractor and their subcontractors and sub-subcontractors shall establish and enforce an effective disciplinary program (Appendix B). Contractors shall discipline and/or dismiss employees who violate established rules and regulations. This includes immediate termination for serious violations, repeated violations, or the refusal to follow safety and health rules.

OCIP Team members shall have the authority to effectively remove from the site, any person (employees including supervisors and management of any contractor) who is regarded as a frequent violator of safe work practices, or who fails to ensure persons working under their supervision or in a workplace they control are not exposed to serious work hazards. Any Competent Person assigned to identify existing and predictable hazards and authorized to eliminate them, which fails to perform this duty for any reason shall be replaced by the employer.

The Contractor shall not receive additional payment or reimbursement for safety items and procedures which have been identified as required by the Project Safety and Health Guidelines.

Failure to comply with the contract safety requirements will be considered as non-compliance with the contract and may result in remedial action including withholding of progress payments due the Contractor and/or termination of the Contractor from the site.

In the event the work or any portion thereof is shut down by either an outside agency or because of an unsafe condition as determined by the OCIP Team, the responsible Contractor shall bear the total cost caused by that shut down.

In no case shall the Contractor be relieved of overall responsibility for compliance with the requirements of federal, state and local safety and health laws for all work to be performed under the contract.

For any construction equipment working near operating right of way and in aircraft safety areas that could encroach into MSCAA's operating right of way and aircraft safety areas shall submit to MSCAA (and obtain approval from the MSCAA) a plan describing the use of such equipment, and the necessary precautions to be taken to preclude any accidental encroachment unto the right of way or aircraft safety area.

## **INTRODUCTION**

### **Construction Safety and Health Guidelines, Purpose and Scope**

These guidelines are established to aid in the prevention of job-related accidents and health problems during the construction of the **Memphis-Shelby County Airport Authority**. These guidelines set forth elements which all Contractors, subcontractors and sub-subcontractors shall include in their safety plan. This manual is not all-inclusive. Other elements may be added, or conveyed individually to Contractors to whom they expressly apply. There are other essentials which some Contractors, by nature of the specific type of work being performed, must integrate within their own safety plan.

These guidelines set forth basic rules and regulations for all personnel involved in the construction of the Project. The intent of these guidelines is to enhance and supplement the safety and health standards which are required by law, in contract documents, and are applicable to the construction projects for which it is applied. These guidelines do not cover the full spectrum of published safety and health standards mandated by law, and Contractors shall not assume that they are responsible only for those which are referenced in this manual, nor that they are current and quoted as published. It is the responsibility of the Contractor and its employees to ensure that they are in compliance and their safety plan is in compliance with all safety directives required by law.

In the event of a conflict between the provisions of these guidelines and applicable local, State or Federal safety and health laws, regulations and/or standards, contract documents or the Contractor's Safety Plan the more stringent shall apply.

## RESPONSIBILITIES

### General

Each participant involved in the construction of the Project is individually responsible for conducting their activities to ensure compliance with all applicable safety and health requirements. Construction activities of the Contractor and their Subcontractors and sub-subcontractors will be monitored for compliance with FAA, MSCAA, Federal, State, County, and local safety and health regulations and contract safety and health requirements.

### Contractors

The Contractor shall be responsible for the safety and health of employees, subcontractors, sub-subcontractors, visitors, and vendors in accordance with State, Local and Federal regulations, and the Contract Documents. Each Contractor shall establish and submit for review a written Safety and Health Plan which includes details commensurate with the work to be performed. The Contractor's Safety and Health Plan shall clearly describe the contractor's commitments for meeting its obligations to provide a safe and healthful work environment for its employees and subcontractor employees, to protect vendors, visitors, and members of the general public. The Contractor's Safety and Health Plan shall reference Federal OSHA standards, and any other rules or regulations applicable to construction activities.

*Each Contractor shall designate an on-site Safety Representative who is charged with the responsibility of on-site safety management. The Safety Representative's sole duty shall be safety management and shall not have other collateral duties. At minimum the safety representative shall meet the requirements of a "competent person" as defined by OSHA for all phases of construction and have a minimum of three (3) years construction safety experience. A resume shall be provided that outlines such items as: work experience, education, training completed and professional organizations, etc. The safety representative shall remain on the Project until contract acceptance (full-term of contract). Safety representative must be knowledgeable on SC-230, SC-240, and other safety requirements as outlined in GP-200, the safety plan and site safety manual. The safety representative shall be interviewed by the OCIP Team.*

As a condition of this contract, a safety improvement team shall be established for this project. The following guidelines (Appendix H) shall be followed.

As a condition of their contract, all Contractors shall submit to the Project Safety Manager or designee:

- A site-specific safety plan within fifteen (15) days after receipt of Notice to proceed and prior to start of any construction activities.
- The name and qualifications (resume) of designated on-site safety person;
- An immediate copy of all citations and/or warning of safety violations received from any state or federal jurisdiction, agency, insurance company, or by any of its subtier contractor.

The Contractor shall:

- Ensure that all employees, subcontractors', and sub-subcontractors' employees are given a comprehensive Safety and Health orientation. This orientation shall include general Safety and Health procedures and policies as well as the project specific rules, regulations and specific hazards. Employees shall be advised that disregard for these rules, or any other applicable Safety and Health regulations shall be subject to company disciplinary action and/or removal from the project. All workers shall complete an acknowledgment that indicates the worker has read, understood, and will abide by the rules and regulations. The following information shall be obtained from all employees: worker's name, date of orientation, Contractor's name, and project name (Appendix A).

- Investigate all accidents and incidents that result in personal injury or illness to workers, damage to buildings or equipment and any incident with the general public.
- Conduct daily job inspections, identify unsafe conditions, or work practices and assure they are corrected, and maintain documentation.
- Conduct weekly, documented, safety meetings with Contractor supervisory personnel.
- Attend monthly Safety committee meetings and participate
- Ensure that employees acting in a supervisory capacity understand and enforce all safe work practices. **Foreman and supervisors are required to have completed a 10-hour OSHA Outreach hazard recognition course within Two (2) years prior to directing work on the project.** Documentation must be made available for review
- Ensure that employees acting in a supervisory capacity understand and enforce all safe work practices. **Foreman and supervisors are required to have completed a 10-hour OSHA Outreach hazard recognition course within Two (2) years prior to directing work on the project.** Documentation must be made available for review.
- Ensure a Competent Person is provided at work locations where required by OSHA.
- Ensure that all Personal Protective Equipment (PPE) is available and being used as required.
- Ensure all construction equipment and motor vehicles certification, inspection, repair and controls are in compliance with the safety requirements of the project and OSHA. Annual crane certification shall be available for review for each to a crane on the project.
- Prior to making critical crane lift, detailed lift plan shall be submitted. (See Appendix C, "Critical Lift Checklist")
- Assure that all hand and power tools are in safe working order.
- Assure that all work areas are kept clear of debris and trash and that adequate trash barrels are placed throughout the work area and emptied frequently.
- Provide the appropriate number and types of sanitary facilities for employees.
- Assure that fall protection equipment is provided and used. Inspections of this equipment shall be documented and on file for review.
- Assure that all perimeter cables, barricades, or any other safety-related items are installed correctly and maintained. If another Contractor must remove a safety item, coordinate this activity with the Contractor who installed the device and other Contractors who may be exposed. **Safety devices shall be replaced by the Contractor removing them.** Warning signs, tags, or barricades shall be installed if other safety devices are removed.
- Assure that employees receive adequate training as required by the Project and OSHA. Additional training for foreman and safety representative may be required based on unique hazards involved in a task.

## WORKPLACE SUBSTANCE ABUSE POLICY

The contractor shall submit as a part of their overall Safety and Health Plan a copy of their company Workplace Substance Abuse policy. This policy shall at minimum comply with Appendix D, "Substance Abuse".

The Contractor shall ensure that all subcontractors and sub-subcontractors are in compliance. The Contractor shall submit a monthly notarized letter stating they and their subcontractors are in compliance with the Project's Substance Abuse Policy.

Contractors should contact the State of Tennessee, at 1-800-332-2667, if there are questions concerning the Tennessee Drug Free Workplace Program. Contractors should also consult their own legal counsel.

## INSTRUCTION AND TRAINING

### Safety Orientation Program

Newly employed, promoted, and/or transferred personnel shall receive an orientation regarding the general safety and health rules and regulations as well as the site-specific policies and hazards prior to starting work on the construction site. The Contractor shall be responsible for the orientation of their employees, Subcontractors and sub-subcontractors, and visitors. Documentation of this orientation shall be maintained on file for review (Appendix A). Hard hat stickers (provided by the Project) are to be issued to an employee following their orientation, and then documented on training Log Sheet. It

is the responsibility of the contractor to ensure that non-English speaking employees receive these same instructions in a language they understand. Safety orientation of all personnel shall include at a minimum the following topics Safety orientation of all personnel shall include at a minimum the following topics:

- Unique hazards of the project
- Employer/personnel responsibilities under OSHA Standards – location of required posters
- Personal protective equipment, including appropriate work attire
- Confined space entry
- 6-Foot fall rule - 100% continuous fall protection (*including steel erection and scaffolds*)
- 100% eye protection, 100% hard hat protection
- Appropriate guarding and other warning devices
- Housekeeping
- Fire protection
- Accident reporting procedures - First-aid facilities - Emergency procedures
- Crane and lifting hazards
- Scaffolding tagging requirements
- Hazard communication/ Right-to-Know, location of MSDS's
- Substance abuse policy
- Disciplinary procedures
- Trenching & excavation
- Electrical hazards

## PROTECTION OF THE PUBLIC

All necessary precautions to prevent injury to the public or damage to property of others shall be taken. The "Public" is defined as all persons not employed by or under contractor or subcontractor to **Memphis-Shelby County Airport Authority**. Installation of temporary barriers and/or fencing designated to protect the Public shall be reviewed and approved by the Owner and/or their representative. Precautions shall include but not be limited to the following:

1. Work shall not be performed in any area occupied by the Public unless specifically permitted according to the terms of the contract or in writing.
2. When necessary to maintain public use of work areas involving vehicular roadways, etc., the contractor shall protect the Public in accordance with the applicable regulations.
3. Appropriate warnings, signs and instructional safety signs shall be conspicuously posted where necessary. In addition, a signal person shall control the movement of motorized equipment in areas where the public might be endangered. All signage warnings and traffic control shall comply with the particular agency that takes judicial precedence.
4. Each project work area shall be protected by a fence constructed and erected per MSCAA requirements.
5. Barricades for the general public or public roadways shall be secured against accidental displacement and in place at all times, except when temporary removal is required. As such times, a flag person shall be assigned to control the unprotected area. Barricades used on the airfield will be reconstructed, erected and maintained per MSCAA/FAA requirements.
6. Required signs and symbols shall be visible at all times when work is being performed and shall be removed or covered promptly when the hazards no longer exist.

## Group Tours and Site Visitors

It is particularly important that a high degree of protection be afforded to all persons on the authorized tours of construction worksites. The following instructions shall be complied with, as applicable, by the Contractor and those responsible for arranging such tours. The following procedures shall be followed:



- a) Group tours shall be cleared through the site **Memphis-Shelby County Airport Authority** office, allowing maximum advance notice.
- b) If visitors to the site will be on foot or out of the vehicle/bus, the individual or organization requesting the tour shall ensure that:
  - In all cases, the Construction Manager, MSCAA and the contractor shall advise of any tour in a timely manner prior to the tour taking place.
  - Release and Hold Harmless Agreement – Each visitor shall be required to sign a release and hold harmless agreement prior to the commencement of the tour.
  - MSCAA will coordinate the tour arrangements and ensure notification to the Construction Manager
  - Tour groups are limited to no more than (25) twenty-five persons.
  - Visitors are required to wear appropriate clothing and shoes.
  - Children under 18 years of age are not permitted on the Project tours.
  - All visitors shall comply with Contractor safety requirements.
  - Site **Memphis-Shelby County Airport Authority** or designee personnel will escort Tours.

## **HARASSMENT-FREE WORK POLICY**

### **Employee Harassment**

It is the policy of **Memphis-Shelby County Airport Authority** to provide a workplace free from employee harassment on the basis of race, color, religion, sex, national origin, age, handicap, disability, etc. Improper interference with the ability of an employee to perform their work activities will not be tolerated. Harassment can appear in many forms, including derogatory comments, jokes, slurs, unwanted physical contact, derogatory drawings, or threats.

### **Sexual Harassment**

Unwanted sexual advances, requests for sexual favors and other verbal physical conduct of a sexual nature will not be tolerated. Sexual harassing conduct includes, but is not limited to:

- ☐ Unwelcome sexual flirtation, touching, advances or propositions
- ☐ Verbal abuse of a sexual nature, including graphic or suggestive comments about an individual's dress or degrading words used to describe an individual
- ☐ The display in the workplace of sexually suggestive objects or pictures, including nude photographs
- ☐ Other verbal or physical conduct of a sexual nature can affect an employee's work performance

### **Reporting of Harassment**

It is the policy of **Memphis-Shelby County Airport Authority** to actively investigate any alleged incidence of harassment. Anyone who believes they have been harassed should contact the project manager. Any allegation or complaint will be held in the strictest confidence.

Any employee who commits a wrongful act of harassment shall be subject to disciplinary action, up to and including termination.

## **REPORTING, ACCIDENT INVESTIGATION, AND RECORDKEEPING**

Contractors shall provide an American Red Cross and CPR Certified First Aid representative and designate an appropriate area for the first aid and medical care to treat injured employees at the job site. A copy of the First Aid Representative's qualifications shall be submitted to the Project Safety Manager.

The contractor must designate an individual to coordinate injury treatment with the workers' compensation carrier. The

contractors' designated representative should also coordinate return to work and availability of modified work.

To coordinate medical services, the contractor will complete "Employee Medical Data Sheet" and "Company Drug Screen Request: forms.

## **Reporting**

All accidents resulting in employee injury, property damage, or involving the general public shall be reported immediately to the designated project representative and the Project Safety Manager.

The Contractor and their subcontractors and sub-subcontractors shall complete a Supervisor's Incident Report Form (See Appendix E) and submit the report to the Project Safety Manager for all job-related accidents involving any of the following:

1. Any employee injury of the contractor, any subcontractor or sub-subcontractor.
2. Any injury and/or incident with the general public (including any alleged injuries reported by a member of the general public).
3. Equipment
4. Property

A formal accident investigation report and "First Report of Injury" shall be submitted within 24 hours. Pertinent facts that are not available within the above time shall be submitted as soon as available in a supplemental report.

A drug and alcohol test shall be administered to employee(s) injured and/or any employees in a work crew involved in an accident involving bodily injury.

## **Record-Keeping and Files**

The Contractor and all Subcontractors and sub-subcontractors shall maintain a master or central file for safety and health related documentation on the jobsite. Files shall be maintained in such a manner that distinguishes each contractor and their subcontractors from other subcontractors and sub-subcontractors.

See Insurance manual for claim reporting procedures.

## **Accident Investigation**

All accidents/incidents shall be investigated by the contractor's safety supervisor and/or their safety designee. An accident investigation report must be submitted to the Designated Project Representative, OCIP Administrator/Willis Towers Watson and OCIP Insurance Carrier within twenty-four (24) hours of the occurrence.

The accident investigation should generate appropriate recommendations for corrective actions to prevent recurrence of similar accidents. Depending upon severity of the accident, the foreman of the injured worker may be requested to appear at the job safety and coordination meeting to:

1. Describe the cause of the accident.
2. Report as to what corrective action has been initiated to avoid future accidents.

The Contractor and all Subcontractors shall maintain a current OSHA 300 log. The log shall be available for review by any OCIP team member at any time.

The Contractor and all Subcontractors and Sub-Subcontractors shall submit on a monthly basis a monthly summary of accident/incidents for the project. The summary shall follow the format contained within (Appendix G).

Under the direction of MSCAA AD HOC Committee may be appointed for investigation of serious accidents that result in loss of life, injury to several workers on pedestrians or major property loss. The committee will submit a report to MSCAA at the conclusion of the investigation.

## **RETURN-TO-WORK**

Under the OCIP Program, every effort shall be made to **return employees to work as soon as possible** after an accident and under the direction of the physician. The insurance carrier will be in contact with the physician to determine the employee's physical demands and limitations.

A return-to-work program shall be developed and implemented by each Contractor to assist workers who are temporarily disabled due to an injury or illness. The Contractor and all subcontractors shall participate in the return-to-work program.

The Contractor, Subcontractor or Sub-subcontractor shall agree that their injured employees shall be treated by an authorized medical treatment facility. The medical facility shall be utilized for initial treatment and evaluation of all injured employees. Follow-up care will be provided in accordance with applicable Workers' Compensation statutes.

When employees report a work-related illness or injury, they shall be taken to the approved medical facility for examination and/or treatment. If the doctor determines that the employee qualifies for "Return to Work" ("light-duty"), the doctor will complete appropriate forms indicating the restrictions and conditions for transitional work.

The Contractor, Subcontractor or Sub-subcontractor shall provide modified work until the employee is able to resume regular duties. All modified work is temporary in nature and is designed to facilitate a return to regular duties as soon as possible. Modified duty positions may be offered at any location of the project or on any shift. Modified work can also be provided at other work locations of the Contractor with approval from the OCIP Team.

In no case shall an injured employee be laid-off or terminated from an "alternative work" position, unless first discussed with the Owner and its representatives.

## **WORK PRACTICE CONTROL**

### **Overview**

The primary focus of these Safety and Health Guidelines is to provide guidance for Contractors. Each Contractor shall have on site and available for employee review a written safety and health plan. This plan shall cover work exposures the contractors' work operations. It is a project requirement that each and every employee conduct their operations in accordance with OSHA and all other applicable standards for all project operations.

**Memphis-Shelby County Airport Authority** prohibits the use, possession, concealment, transportation, promotion or sale of the following controlled items:

- a. Firearms, weapons, and ammunition – except when authorized for security reasons.
- b. Switchblades.
- c. Unauthorized explosives, including fireworks.
- d. Stolen or contraband.

### **Hazard Communication Program**

The Contractor shall develop a written Hazard Communication Program that contains at minimum the following elements:

- The name of the program coordinator.
- A list of hazardous substances present within the Contractor's workplace.

- A written system that ensures MSDS's are obtained and made readily accessible to all employees, including lower tier subcontractor personnel, on each shift. In the event of an emergency, MSDS's shall be made available on an immediate basis.
- A labeling program that ensures that containers of hazardous substances in the workplace are properly labeled with the name of the substance and any applicable hazard warnings.
- A training program regarding hazards of substances that are used in the workplace and the protective measures that must be taken by the employee or any other persons potentially exposed to the hazardous substances.

The Contractor shall ensure that each employee, prior to working with, or being potentially exposed to hazardous substances, receives initial training on the Hazard Communication Program and the safe use of the hazardous substances. Additional training shall be provided to employees whenever new substances are introduced to the workplace.

Permanent records shall be maintained by the Contractor, describing all Hazard Communication Program training.

### Record-Keeping and Files

The Contractor and all Subcontractors and sub-subcontractors shall maintain a master or central file for safety and health related documentation on the jobsite. Files shall be maintained in such a manner that distinguishes each contractor and their subcontractors from other subcontractors and sub-subcontractors.

Contractors shall submit and/or have available on site:

REPORT NAME	Annual	Immediately	24 Hr.	Weekly <sup>1</sup>	Monthly <sup>2</sup>	Per Occurrence	Per Request
Annual Crane Inspection	X						X
Chemical Inventory					X		X
Contractor Weekly Inspection				X			X
Critical Lift Checklist						X	X
First Report of Injury		X				X	
Incident Investigation		X				X	
MSDS's					X		X
OSHA 300 Log					X		X
OSHA Citations		X				X	
Safety Observation				X			
Safety Plan of Action or JSA <sup>3</sup>				X		X	X
Safety Statistics					X		X
Safety Training					X		X
Substance Abuse Policy compliance notarized letter					X		X
Toolbox Safety Meetings				X			X
Daily equipment / Vehicle Inspections							X

Daily -- Daily inspections are required on all equipment / vehicles.

<sup>1</sup> Weekly -- Weekly reports are due the following Tuesday morning

<sup>2</sup> Monthly -- Monthly reports are due by the 6<sup>th</sup> of the following month.

<sup>3</sup> Safety Action Plan or JSA -- As required by contract or specification

The Owner and it's Representatives shall have the right to review all documentation at any time upon request. The Contractor shall give full cooperation during these reviews.

The following documentation shall be in the safety files:

- A written project site specific Safety & Health Plan
- Hazard Communication Program, including current MSDS's. A project specific MSDS file shall be maintained on-site for employee review
- Site emergency plans
- All required safety & health permits
- Weekly safety meeting reports - including meeting topic(s) and employee attendance sheets
- Specific job hazard worker training
- Daily jobsite safety inspection reports - including documentation of corrective measures
- Equipment inspection reports
- Crane inspection reports - daily and monthly (annual certification reports required prior to equipment operation)
- Employee orientation training records
- Accident investigation reports, including near-misses
- Job hazard analysis
- Competent person qualifications
- Written safety violations
- Noise and air quality monitoring

### **Job Safety Analysis (JSA)**

In order to provide Contractor employees with a safe workplace through pre-planning hazardous work, a Job Safety Analysis (JSA) shall be prepared. JSA's shall be required when thorough pre-job planning, it is determined that the process, equipment, or procedure indicates potential for serious injury and/or property damage. The Contractor shall also prepare a JSA upon request by an OCIP Team member. JSA's will be done daily. JSA's should be kept in the work area, possibly at the toolbox and/or where they are readily available to the workers. JSA's will also be on file with the contractor.

The JSA shall be used by Contractors to analyze the jobs they perform, to identify the existing and potential hazards associated with each job step and establish controls for them. These JSA's shall be used as a task specific training tool to instruct employees, inspectors, and visitors of potential hazards and required safety precautions. Each employee working on the project shall sign a training log indicating that they understand the hazards of the project as indicated on the JSA.

Examples of activities that may require a JSA:

- Potential for collapse, (work-in trenching, tunneling. This may include demolition, etc).
- Potential release of stored energy, (electrical, pressure, explosive, etc).
- Crane supported work plate form use.
- Critical crane lifts (two cranes used to lift one load).
- Unusual crane operation as defined by the CIP Team.
- Potential exposure to uncontrolled hazardous materials or wastes.
- Blasting operations
- Abrasive /Sandblasting, Hydro blasting, etc.
- Potential injury from burns, both chemical and thermal.
- Respirator use.
- Potential oxygen-deficient environments.
- Entry into confined space.
- Potential of entanglement in, on, or between objects.
- Work in public streets and highways.
- Lockout/Tagout.
- Operations involving fall exposure.
- Structural Steel Erection.
- Use of new or Hazardous Materials, procedures, equipment.
- Material Storage & Handling.
- Powder actuated tool use.
- Suspended scaffolds.

- Scaffold erection.
- Scaffold dismantlement
- Rock drilling.
- Work on live electrical systems.

## SPECIFIC PROJECT SAFETY REQUIREMENTS

Controls for possible conflicts between construction operations and aircraft

- 1) Contractor must request that a notice to Airmen (NOTAM) be issued prior to start of any construction that might affect navigable airspace or surface movement.
- 2) Barricades and temporary lighting must be installed and maintained per specs.
- 3) Operators of equipment/vehicles must be instructed on routes and haul procedures.
- 4) All personnel must stay in defined work areas. Fences/barricades are not to be crossed.
- 5) No access to active taxiways/runways will be allowed without prior authorization and direction/escort by MSCAA personnel.

### Scaffolds, Stair Towers and Work Platforms

The Project requires **100% continuous fall protection** during the erection and dismantling of scaffolds where employees may be exposed to a fall greater than (6) six feet. A competent person must be present during erection, dismantling or moving of scaffold. The Contractor/Subcontractor shall develop and use a scaffold tagging system similar to the following:

#### Tagging

The tagging procedure, at minimum, shall consist of three (3) tags. The appropriate tag will be placed on a scaffold approved by the competent person. Each tag must have at least the following information and be visible by all employees:

- Date tag was placed - date of the last inspection.
- Name of person inspecting. All tags must be weather resistant.

A **GREEN** tag means the scaffold complies with federal OSHA regulations and can be used by any person.

A **YELLOW** tag indicates the scaffold is complete but does not meet all federal OSHA specifications. This tag will be used only in special circumstances. Special precautions, such as wearing a safety harness may be required because any accessory, such as a handrail, could not be installed due to the location of the scaffold.

A **RED** tag shall be placed on a scaffold that is being erected, dismantled, damaged and/or defective. No employees except members of the erection/dismantling crew shall work from a red tagged scaffold.

Employees will be instructed to read tags before using scaffolds. If a tag is not attached to the scaffold, **DO NOT USE** the scaffold.

*Exceptions:* Single buck or Baker scaffolds need not be tagged.

### Walking and Working Surfaces

#### Barrier Identification Tape

Barrier identification tape is strictly prohibited from being used for any form of personnel fall protection. Barricade tape around excavations can be used for short term (24-hours), after this period physical barriers are required.

- **YELLOW** barricade tape shall be used for **CAUTION/WARNING**

- **RED** barricade tape shall be used for **DANGER DO NOT ENTER**

Note: Once the area barricaded is free of the hazard(s) for which it was erected the tape will be removed and properly discarded.

## Fall Protection

Employees shall not be exposed to fall hazards. When an employee observes a fall hazard, they will notify their supervisor of the hazard. The responsible Contractor will immediately correct the hazard. **100% continuous fall protection, for fall hazards greater than six (6') feet, shall be implemented on this Project - including steel erection and scaffold use, erection and dismantling.**

Each Contractor shall be responsible for meeting fall protection requirements in their overall safety and health program.

Each Contractor shall evaluate ALL fall exposure conditions or tasks and must develop a Fall Protection Plan which outlines what methods, procedures and/or devices will be used in their program.

Each Contractor shall be responsible for implementing the requirements to achieve fall protection in accordance with all Federal, State, local rules, regulations, and the OCIP Safety and Health Guideline.

All fall protection systems used on this project shall comply with OSHA regulations and the project safety guidelines. Fall protection shall provide a positive means of protection. **Controlled Access Zones and Safety Monitoring Systems are not considered positive means of fall protection and shall not be permitted.** Any employee exposed to a fall greater than six (6) feet shall use approved fall protection equipment or devices. Fall protection systems shall be designed and installed under the direction of a Registered Professional Engineer or Qualified Person. Fall protection is required, as a minimum, under the following examples:

- Formwork and reinforcing steel. Each employee on the face of formwork or reinforcing steel shall be protected from falling 6 feet or more to lower levels by Personal Fall Arrest Systems, safety net systems, or positioning device systems.
- When working from telescoping, articulating, or rotating type lifts and scissors lifts, personnel shall wear a safety harness with shock absorbing lanyard, secured to an approved anchorage point.
- When working on a ladder higher than six (6) feet from a solid surface if the employee's torso extends past the side rails or if a vertical ladder extended a total of 20' or greater.
- When working on a platform or other support not equipped with an adequate guardrail, which is higher than six (6) feet from a solid surface.
- When working from a crane-suspended work platform, a safety harness with shock absorbing lanyard is mandatory.
- When an employee may have to be lowered into or raised from a confined space, a personal fall arrest system will be worn. The employee will be supported by an approved platform or a boatswain's chair, with certified hoisting device and fall arrest device.
- When working adjacent to an unguarded floor opening or sloped roof, a lifeline system is desirable for mobility. A positive means of fall protection must be provided unless it can be proven infeasible.
- When working adjacent to a deep excavation, pit or trench. Employees will be instructed on the proper wearing and use of personal Fall Protection Arresting Device Systems.
- **Barricade tape is not adequate fall protection.**

The Fall Protection Plan shall detail in writing when fall protection is required and exactly how this protection is to be provided. This written plan is required for any Contractor exposing workers to falls six (6) feet or greater.

The Contractor shall prepare a written training program to ensure that each employee who might be exposed to fall hazards is knowledgeable of the Fall Protection Plan requirements. The program shall enable each employee the ability to recognize the hazards of falling and shall train each employee in the procedures to be followed in order to eliminate or

minimize these hazards.

The Contractor shall ensure that each employee has been trained.

**Personnel who have been trained, then re-trained and continue to violate the established fall protection plan/regulations shall be removed from the project IMMEDIATELY.**

### **Confined Space Entry**

All employees required to enter a confined space shall be knowledgeable of the hazards involved with confined space entry. Prior to the start of such an entry the Contractor involved in the work will develop a Confined Space Entry Procedure. The Contractor shall train all personnel who will enter the confined space. No one shall enter a confined space area until properly instructed. Contractors shall identify all confined spaces within their work area with a sign identifying the area as a confined space.

A Confined Space Entry procedure shall be used to:

- Prevent inadvertent operation of equipment and/or work process while people are working in the confined space.
- Eliminate unexpected exposure to hazardous materials, oxygen deficient or inert/toxic gaseous atmosphere while working in confined spaces.
- Plan for a timely and effective response to an emergency during a confined space entry.

Confined Spaces are considered to be areas with limited entry and exit, or poor natural ventilation, and not intended for human occupancy. Examples of a confined space include tanks, covered basins, vaults, columns, mixers, manholes, pipelines, sumps, ditches or excavations. All spaces shall be considered permit-required confined spaces until the pre-entry procedures demonstrate otherwise.

Safety considerations include but are not limited to atmosphere testing for gaseous conditions/lack of oxygen, appropriate personal protective and emergency equipment, and additional personnel as needed to assure communications and assist the individual conducting the entry.

A Permit Required Confined Space means confined space that has one or more of the following:

- May or may not potentially contain a hazardous atmosphere;
- Contains a material that has potential for engulfing entrant;
- Has internal configuration that could trap the entrant;
- Contains any other recognized serious health or safety hazard;

Contractors shall provide their own permit.

A Non-Permit Required Confined Space is a confined space that does not contain or with respect to atmospheric hazards, the potential of causing death or serious physical harm.

### **Employee Ground Transportation**

The purpose of this section is to establish minimum acceptable guidelines for the safe transportation of all personnel traveling within the Project confines. Eliminate personal accidents and injuries resulting from improper equipment use.

Contractors are responsible for assuring that all personnel follow the requirements of this section and prohibit improper transportation of employees and visitors. Transporting employees in cargo beds of pick-ups, vans, etc. is prohibited, unless approved seats and seat belts are provided and used.

- Operators must be qualified. Vehicle operators must have valid state operator's license
- All equipment/vehicles must be identified (company logo) per specifications.
- Safe speed must be maintained and adjusted to site conditions.



- Use flashers/headlamps as directed.
- Mobile cranes, forklifts, winch trucks, front-end loaders, tractors, and other materials handling equipment are not permitted to transport passengers.
- Trucks
  - A maximum of three passengers are permitted to ride inside of the truck cab unless the cab is specifically designed to accommodate additional passengers.
  - Passengers shall ride with all portions of their bodies inside the truck body or frame.
  - Passengers shall be in the seated position, with the seat belts secured and adjusted properly, before the vehicle is set in motion.
  - Riding on a vehicle's bumper or tailgate is prohibited.
  - Tailgates will be closed and latched before the vehicle is operated.
  - Passengers are not permitted to ride in the body of a dump truck, in the bed of a pickup truck or in trailers.
  - Passengers are not permitted to ride on top of the load or to hold materials from shifting.
  - Vehicles must be designed to accommodate passenger transportation, or the vehicle shall not be used for that purpose.
  - Drivers transporting passengers shall follow the posted speed limit and Project traffic rules.
  - The Contractor shall establish a designated employee parking area. Employee vehicles shall not be allowed on the construction project.

### **Housekeeping - MUST BE A CONTINUING PROCESS**

The purpose of this section is to incorporate into the day-to-day work activity a good housekeeping action plan that will be followed by all Contractors working on the project.

- Contractors, through inspection and example, are responsible for assuring that trash and debris remain out of the work areas. Contractors are responsible for all of their work areas and the work areas of their subcontractors and sub-subcontractors. If poor housekeeping practices are observed, corrective action will be discussed with the appropriate Contractor to remind them that cluttered work areas will not be tolerated and that their work area(s) pose a hazard to his employees and other personnel.
- Should the Contractor fail to address and correct their poor housekeeping upon 24 hour written notification, the "owner" may at its option, cause the same to be removed and charge the expense of such removal to the appropriate Contractor.
- Specific attention is needed for operations to the Aircraft Operation Area (AOA).
- Contractors shall monitor their work areas daily or more frequently if needed to assure that all debris is removed to minimize hazards.
- Immediately available vacuum sweeper for cleaning taxiway/runway crossings.
- Personnel immediately available for taxiway and runway cleanup. (Provide brooms to supplement cleanup by sweeper.)
- Access to taxiway/runway crossings for cleanup only at the direction of MSCAA guard.
- Loading of haulage vehicles to minimize spillage.
- Maintenance of vehicles/equipment so that no fluids will leak.
- Provide waste containers at the direction of the Construction Manager.

### **Project Electrical Requirements**

- The Contractor shall implement an electrical safety program. This safety program element shall include safe installation, work practices, maintenance, and special equipment considerations. All electrical installations, either temporary or permanent, shall be in conformance with the National Electrical Safety Code, NFPA-70, ANSI-C1, and low and high voltage electrical safety orders OSHA code requirements. Only qualified employees shall install electrical tools and equipment, defective and/or improperly installed equipment shall be repaired immediately.
- Only qualified electricians familiar with code requirements shall be allowed to perform electrical work.

- Extension cords used with portable electrical tools and appliances shall be heavy duty (minimum 12 AWG) and of the three-wire type. Cords shall be covered, elevated or otherwise protected from damage that would create a hazard to construction site personnel.
- Electrical cords and equipment shall be visually inspected before each shift for external defects. All damaged and defective cords shall be removed from service immediately (this includes cords with the ground prong missing). Cords shall be repaired with approved heat-shrink methods, electrical tape is not permitted.
- All temporary electrical tools, cords and equipment shall be properly protected by ground fault circuit interrupters (GFCI). All portable generators shall have properly functioning GFCI outlets. GFCI receptacles shall be tested monthly with a multi-range GFCI tester (the tests shall be documented) to insure the GFCI is properly functioning and protecting the worker.
- A "task-specific" lockout/tagout safety plan shall be established to ensure power sources to equipment and/or machinery are isolated and de-energized. This plan shall establish minimum steps necessary to disable equipment and machinery to prevent the unexpected release of potentially hazardous energy. Lockout/Tagout shall be performed in accordance with 29 CFR 1910.147.

### **Cranes and Hoisting Equipment**

- Cranes and hoists shall not be used without a current annual certificate of examination and testing issued by an accredited crane examiner. **Annual inspection certificates shall be available when cranes arrive on-site. Operators' manual shall be in the cab of each crane prior to crane operation.**
- Only qualified and designated personnel shall operate cranes or hoisting equipment. Crane operators must have current (Certified Crane Operator) CCO certification and/or local or state certification.
- Rated load capacities and recommended operating speeds, special hazard warnings, or instructions, shall be conspicuously posted on all equipment; they shall be visible to the operator from his/her control station, and an accessible fire extinguisher of 10:ABC rating, shall be available at all operator stations or cabs of equipment. Crane operations position shall be kept clear of loose tools or material.
- Outrigger cribbing shall be used for all crane operations. The size of the cribbing shall be determined by taking the cranes capacity and dividing by 5 (example: 40 to crane divided by 5 = 8 sq. ft. per outrigger).
- All cranes working over shafts or lifting personnel platforms shall have anti-two block devices installed and operate properly.
- Radio or other positive means of communication shall be used to direct the operator when the point of operation is not in direct view of the operator.
- The operator shall respond to signals from only one person. The operator shall not follow any signal which is not understood but shall always obey a stop signal.
- The operator shall be responsible for the operations and load under their control at all times. Whenever there are doubts about the safety of movement, the operator shall stop operations until safety is assured.
- A warning signal, such as a horn, shall be sounded to alert personnel to proximity of moving loads. Loads should not be passed over personnel, and personnel should not be permitted to work in the area directly under a suspended load.
- Concrete buckets - Employees shall be permitted to work under concrete buckets while the buckets are elevated.
- **Employees shall keep out from under suspended loads at all times.**
- Employees shall not ride on loads, slings, hooks, buckets, or other load handling attachments.
- All repairs, adjustments, modifications, rigging assembly or dismantling shall be conducted only by qualified and authorized personnel.
- The swing radius shall be barricaded, or other positive means shall be taken to prevent personnel from entering the area between the counterweight/swing radius and any stationery and/or outside obstructions.
- A critical lift checklist will be completed and submitted anytime:
  - 2 cranes are used to make a lift
  - when a lift exceeds 75% of the load chart
  - or any unusual conditions are encountered
 (See Appendix C, "Critical Lift Checklist")
- Crane suspended work platforms shall only be used if there is no other safe means to reach the work area. The Contractor shall complete a JSA prior to the lift.

- Any overhead wire shall be considered to be energized unless and until the person owning such line or operating officials of the electrical utility supplying the line assures that it is NOT ENERGIZED, and it has been visibly grounded at the work site.
- Taglines shall be used to control all loads
- Daily inspection of all cranes shall be completed and documented prior to crane use

## **Rigging**

- Major rigging operations shall be planned and supervised by Competent Personnel to ensure that the best methods and most suitable equipment and tackle are employed. This should be the superintendent or foreman in charge.
- Job site management shall ensure that:
  - Proper rigging equipment is available.
  - All rigging is inspected before use. Documented inspections are required.
  - Correct load ratings are available for the material and equipment used for rigging.
  - Rigging material and equipment are maintained in proper working condition.
- The supervisor of the hoisting operation shall be responsible for:
  - Proper rigging of the load.
  - Supervision of the rigging crew.
  - Ensuring that the rigging material and equipment have the necessary capacity for the job and are in safe condition.
  - Ensuring correct assembly of rigging material or equipment as required during the operation, such as the correct installation of lifting bolts.
  - Safety of the rigging crew and other personnel as they are affected by the rigging operation.

## **Excavation (Any process which disturbs soil)**

- A. Contact MSCAA/FAA through the Construction Manager at least 72 hours prior to proposed work for location of underground hazards (cables, ducts, fuel lines, etc.). A request form will be provided to the contractor.
- B. The contractor must contact Tennessee one call at least 72 hours prior to proposed excavation for location of utilities. Contractor must make arrangements to have personnel at the site when utilities are located. Documentation of the control number must be maintained on site.
- C. **Utilities must be located/marked prior to any process that disturbs the soil.**

## **Earthmoving Equipment and Trucks**

- All earthmoving equipment shall be maintained in safe working condition and shall be appropriate and adequate for the intended use.
- Only authorized personnel shall operate equipment. Operators of equipment, machinery or vehicles shall be qualified and properly licensed for the operation involved.
- Equipment maintenance shall be performed only by qualified mechanics.
- Equipment operators and truck drivers shall make a documented pre-shift safety inspection of their equipment. Any conditions that affect safe operation will be corrected before use.
- Equipment shall not be operated unless all required safety devices are in place and functioning properly.
- Careless, reckless, or otherwise unsafe operation or use of equipment shall result in discipline and may constitute grounds for dismissal.
- Before performing any service or repair work, all equipment shall be stopped and positively secured against movement or operation, locked, and tagged out of service, unless it is designed to be serviced while running, following the manufacturer's instructions.
- When equipment is serviced or repaired, the operator shall dismount until the service or repair is completed and then make a complete walk-around safety check before remounting.
- All heavy equipment including cranes, forklifts, dozers, end-loaders, skid-steers, etc., shall have a reverse signal/back-up alarm audible above surrounding background noise.

- All off-highway earthmoving equipment and trucks such as loaders, dozers, scrapers, motor graders, rock trucks, tractors, rollers and compactors shall be equipped with roll-over protective structures (ROPS) and seat belts.
- Seat belts shall be used and adjusted properly by operators of all heavy equipment.
- Mobile equipment shall not be left unattended unless parked securely to prevent movement, with all ground engaging tools lowered to the ground, brakes set and the engine off.
- Equipment parked at night shall be lighted, barricaded or otherwise clearly marked when exposed to traffic. Keys shall not be left in equipment overnight.
- Personnel shall not be transported or ride on equipment or vehicles that are not equipped with seats for passengers.
- When fueling equipment or vehicles with gasoline or liquefied petroleum gas (LPG) the engine shall be shut down.
- All equipment and vehicles shall be equipped with appropriate fire extinguisher or fire suppression system.
- Haul roads shall be designed, constructed, and maintained for safe operation consistent with the type of haulage equipment in use. Standard traffic control signs shall be used where necessary.
- Elevated roadways shall have axle high beams or guards maintained on their outer banks.
- Equipment, tools, and materials hauled on pickups and flat bed trucks must be secured to prevent them from falling onto the road.

## **Welding & Cutting**

- Welding leads and cutting hoses shall be kept clear of walkways and stairways.
- Flash arrestors shall be installed provided in both oxygen and acetylene hoses at the regulator connection.
- Welders shall wear approved eye and head protection when welding. Personnel assisting the welder shall also wear approved eye protection.
- Prior to welding or cutting a "20-ABC" rated fire extinguisher shall be within easy reach of the worker. A fire watch shall be stationed at all locations where sparks and/or flames may fall to a lower floor/work area or to another side of a wall.
- A suitable cylinder truck, with chain shall be used to keep cylinders from being knocked over while in use.
- Spent welding rods shall be picked up and disposed of daily.
- When practical all welding and cutting operations shall be shielded by non-combustible or flame-proof screens.
- Oxygen and acetylene cylinders shall not be stored inside buildings.
- Rubber boot protectors shall be provided on all welding leads where they make connections at the welding machine

## **Personal Protective Equipment**

### Eye and Face Protection

All employees shall wear safety glasses 100% of the time while on the construction site. Minimum eye protection shall include approved safety glasses **with side shields** which meet the standards specified in ANSI Z-87.1-1989 (this shall also include prescription eye wear).

Additional eye and face protection in combination shall be worn when:

- Welding, burning or cutting with torches
- Using abrasive wheels, portable grinders or files
- Chipping concrete, stone, or metal
- Working with any materials subject to scaling, flaking or chipping
- Drilling or working under dusty conditions
- Using explosive actuated fastening or nailing tools
- Working with compressed air or other gases

Only clear safety glasses shall be worn inside any building(s).

### Head Protection

All construction workers shall wear hard hats which meet ANSI Z 89.1-1986, 100% of the time while on the construction site. Hard hats shall display the company decal where the employee works.

All delivery personnel, vendors and visitors shall wear approved hard hats while on the project.

#### Hearing Protection

Work areas shall be monitored to identify areas of high noise exposure (85 dBA and higher). All work areas identified as high noise exposure shall be properly posted to warn employees of the exposure.

Appropriate hearing protection shall be worn in work areas where noise levels are 85 dBA or greater.

#### Respiratory Protection

Contractors whose work activities warrant that employees wear respiratory protection, shall establish and implement a respiratory protection program. The program shall meet the requirements set forth in 29 CFR 1926.134.

#### Foot Protection

All personnel on the construction site shall wear leather hard-soled work boots. No one is permitted to wear sneakers (including ANSI approved), tennis shoes or athletic shoes of any type, sandals, high heels, or thongs on the construction site.

#### Clothing

Suitable clothing for construction shall be worn on the construction site. Shirts with sleeves (at least t-shirt (4 inches) in length), full length pants and reflective safety vests shall be required. Shorts, sweatpants, or tank-tops are not allowed.

## Appendix A - Safety Orientation

**Check each box when completed** - To be completed by all employees on the jobsite. To be completed by site supervision and employee prior to beginning work.

- ☐ Alcohol and/or drug use, fighting or horseplay are prohibited and will result in immediate termination
- ☐ 100 % eye protection, hard hats and reflective safety vests are required when on the construction project
- ☐ Review potential hazards on the project and the precautions to be taken to prevent injury
- ☐ Disciplinary Policy:

**Non-serious violation**

First violation - Verbal warning

Second violation - Verbal & written warning

Third violation - Verbal & written warning and three day suspension without pay

Fourth violation - Employee discharge from company

**Serious violation** - (see disciplinary policy)

First violation - Verbal & written warning

Second violation - Employee discharge from company

- ☐ Hazard Communication Program - location of MSDS's and written program on the project
- ☐ All accidents, injuries and unsafe conditions shall be reported to supervisor immediately
- ☐ Medical treatment protocols for injuries requiring off-site medical treatment with a doctor
- ☐ Safety meetings are held on a weekly basis (attendance is mandatory)
- ☐ All employees shall dress properly while working. Minimum attire is long pants, shirt with at least 4 inch sleeves and sturdy above the ankle work boots
- ☐ Ground fault circuit interrupters (GFCI) are required on all tools. All extension cords and power tools shall be properly grounded. Notify supervision immediately if defective equipment exists.
- ☐ All employees exposed to a fall exposure of six or greater, shall be protected by the means of fall protection. Specific training is required for fall protection.
- ☐ Employee are not allowed to work in excavations 4 feet or more in depth, unless they are properly sloped or protected by shielding or shoring
- ☐ Lockout/tagout is required when working on equipment or tools where unexpected start-up may occur or the release of energy may result in injury
- ☐ Before any employee is allowed to wear a respirator (including paper masks) they must be medically approved by a doctor and fit-tested
- ☐ Scaffolds shall be inspected and tagged prior to use by any personnel. Red tag means DO NOT USE; Yellow Tag means section of scaffold does not meet OSHA standards and Green Tag means SAFE FOR USE.
- ☐ Other hazards discussed related to the construction project:

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### **Equipment Issued**

- ☐ Hardhat
- ☐ Safety Glasses
- ☐ Orange vest
- ☐ Fall Protection Harness & Lanyard

☐ Respirator

☐ Other \_\_\_\_\_

**To be completed by supervisor in the field with the employee**

- ☐ Show employee around the project and discuss potential hazards
- ☐ Introduce employee to crew members
- ☐ Assign new employee to experienced work crew
- ☐ Specify work duties
- ☐ Where to eat lunch

This is to acknowledge that I have completed new employee orientation and understand that failure to comply with the Safety Program may be grounds for dismissal.

Employee Print Name: \_\_\_\_\_ Date: \_\_\_\_\_

Emergency Contact: \_\_\_\_\_

Employee Signature: \_\_\_\_\_

Supervision Signature: \_\_\_\_\_ Date: \_\_\_\_\_



## Appendix B – Employee Disciplinary Guideline

The discipline policy is intended to encourage compliance with the requirements of the Federal Occupational Safety and Health Act of 1970 (OSHA) and all additions and revisions thereto, as well as other applicable federal, state and local requirements and this Safety and Health Guideline. Workers performing work in an unsafe manner that would endanger the employee, other workers or the public shall be subject to discipline or termination.

The Project Representative in conjunction with the Project Manager and Project Foreman will determine the course of action best suited to the circumstances. The steps to be taken shall be progressive, except in the most egregious circumstances and shall include:

- a) **Non-Serious** – Initial, isolated, or rare instances of violation, that do not result in danger to the employee, property, or others, should be corrected through non disciplinary discussion and instruction. Safety violations of a less serious nature will be handled as follows:

First Offense	Verbal Warning
Second Offense	Written Warning
Third Offense	Employee given three-day suspension without pay
Fourth Offense	Employee Discharge

- b) **Serious** – One which could result in serious injury or loss of life or serious loss of property, shall be subject to:

First Offense	Employee given three-day suspension without pay
Second Offense	Employee Discharge

- c) **Supervisor Accountability** – If two or more employees working for the same supervisor are found in serious violation as described above, that subcontractor supervisor is also subject to disciplinary action up to and including immediate discharge.

**Documentation** - Notice of safety violation (written) shall be given to the employee, and a copy sent to the Project Safety Representative.

## Appendix C - Critical Lift Checklist

Project: \_\_\_\_\_

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

Description of Lift: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Name of supervisor in charge of lift: \_\_\_\_\_

Name of crane operator(s): \_\_\_\_\_

Name of signal person(s): \_\_\_\_\_

### **Crane Data:**

Make and Model: \_\_\_\_\_

Boom Length: \_\_\_\_\_

Counterweight: \_\_\_\_\_

Capacity: \_\_\_\_\_

### **Load Data:**

Gross Load Weight: \_\_\_\_\_

Rigging Weight: \_\_\_\_\_

Load block & line Weight: \_\_\_\_\_

Max. Load Radius: \_\_\_\_\_

Min. Load Angle: \_\_\_\_\_

Max. Boom Angle: \_\_\_\_\_

Min. Boom Angle: \_\_\_\_\_

Net Load Weight: \_\_\_\_\_

### **Pre-Lift Requirements:**

- \_\_\_\_\_ Load is within chart limits.
- \_\_\_\_\_ Has the Center of Gravity of the Load been established and marked?
- \_\_\_\_\_ Is rigging adequate and in good condition?
- \_\_\_\_\_ Load chart utilized is for exact crane model; boom type, length, tip; counterweight.
- \_\_\_\_\_ Competent person in charge of lift: Name \_\_\_\_\_
- \_\_\_\_\_ Competent signal person identified: Name \_\_\_\_\_
- \_\_\_\_\_ Pre-pick meeting held with crew
- \_\_\_\_\_ Written crane inspection completed within 1 day of critical pick
- \_\_\_\_\_ Swing path not over personnel
- \_\_\_\_\_ Footing is sound and level (soil conditions/compaction, underground tunnel or utilities).
- \_\_\_\_\_ Pre-planning for radio or hand signal communications.
- \_\_\_\_\_ Minimum clearances from power lines can and will be maintained.
- \_\_\_\_\_ The load radius has been measured with tape measure.
- \_\_\_\_\_ Weather conditions have been checked, including wind speed.
- \_\_\_\_\_ Load will not touch boom at any time.

\_\_\_\_\_ For dual crane lift – diagrams have been prepared.

\_\_\_\_\_ Pad blocking is adequate and substantial.

\_\_\_\_\_ Outriggers are fully extended.

Signed: \_\_\_\_\_  
Supervisor in Charge

## Appendix D – Substance Abuse

### Policy Statement

The Owner **Memphis-Shelby County Airport Authority** and the OCIP Team are committed to providing project employees with a drug-free and alcohol-free workplace. It is our goal to protect the health and safety of these employees and visitors to our job site, promote a productive workplace, and protect the reputation of our project.

Consistent with those goals, the use, possession, distribution or sale at project sites of drugs, drug paraphernalia or alcohol is prohibited. A program of drug and alcohol testing will be instituted to monitor compliance with this policy.

**Contractors / Subcontractors refusing to comply with this Drug and Alcohol Policy will not be permitted to work on this OCIP project and will be noted as being in violation of their contract with the (Project Name) / or other contractors & subcontractors working on this project.**

This Policy does not represent a contract between the Owner **Memphis-Shelby County Airport Authority**, Design and Development, the OCIP Team, Owners of project, Construction Managers, General Contractors, Subcontractors, employees or perspective employees of the project.

### Policy Administration

It is our combined goal to protect the health and safety of personnel, craft workers, and visitors to our job site; to promote a productive workplace and protect the reputation of this OCIP.

### Prohibited Substances

1. Drugs or Drug is defined as any substance which may impair mental or motor function including but not limited to illegal drugs, controlled substances, designer drugs, synthetic drugs, look alike drugs, and under circumstances described in this policy -prescription drugs.
2. Alcohol is defined as any beverage or substance containing alcohol, ethyl alcohol or ethanol. "Alcohol Testing or Alcohol test means testing by certified breath-alcohol technician using a DOT approved initial screening device or urine alcohol testing conducted by a certified laboratory and confirmed by gas chromatography/mass spectroscopy (GC/MS)". Test levels must not meet or exceed.04 grams per 210 liter of breath.

### Pre-Project Testing

Prior to the beginning work on this Project, employers will be required to ensure that all employees have met the requirements of this policy with a negative (passing) test result. Employers and employees not meeting the requirements will not be allowed to work on this OCIP job site.

### Additional Testing of Employees

1. **Post-Accident:** It is agreed that drug and alcohol testing of employees shall be required after each and every work-related incident. This testing shall take place at the medical facility providing treatment for the injury. A work-related accident is defined as an accident resulting in an injury requiring treatment by a physician to the employee or other employees injured and / or resulting in damage to property or equipment.
2. **Reasonable Suspicion:** Is defined as supervision having a reason to suspect employee drug or alcohol use. The employer will bear the cost of this test.

### Points of Understanding Regarding Substance Abuse Testing

1. The employer, the medical facility and the testing laboratory agree that the results of the described tests are to be held in strictest **CONFIDENCE** between the employer, the OCIP Workers Compensation Carrier and the medical facility (MRO). This is an issue of employee – employer relationship (employment) and falls under the requirements within the employer's program.
2. This statement is noted for the purpose of adjudicating a workers compensation claim. The OCIP Workers Compensation Carrier requires the employer to report all accident-related drug and alcohol test results to them immediately.

### Testing Procedures

1. At a minimum pre-project and post-accident testing is required.
2. Testing shall include the following drugs at a minimum:  
**Marijuana, Cocaine, Opiates, Amphetamines, Phencyclidine, Barbiturates, Benzodiazepines, Methadone, Propoxyphene**
3. For reasons of safety, any employee subject to a reasonable suspicion test shall be suspended until test results are available.

### Prescription Drugs

The use of current valid prescription Drugs that may impair an employee's ability to safely perform his or her duties must be reported to the safety director, supervisor and management personnel.

### Alcoholic Beverages

Under no circumstances are alcoholic beverages allowed on the project site.

### Disciplinary Action

1. A positive pre-project or post-accident test will result in worker dismissal from this project site.
2. Employees found using, selling, possessing, or manufacturing drugs shall be removed from this project and may be reported to local law enforcement.

### Confidentiality

All actions taken under this policy will be in conformance with the Local Drug Testing Act

### Subcontractors and Vendors

Subcontractors, sub-tiered contractors, vendors, and their employees shall cooperate with this policy in achieving a drug-free and alcohol-free workplace.

### Amendments to Policy

Amendments to this policy may be issued to comply with project owner requirements, state or local laws, or federal contract requirements.

Company Name \_\_\_\_\_

**DRUG AND ALCOHOL POLICY  
ACKNOWLEDGMENT AND ACCEPTANCE STATEMENT**

I certify that I have read and understand the statement and policy. I further understand that prior to employment and during employment, I am subject to drug and alcohol screening tests. I agree to provide the specimen appropriate to such drug or alcohol test(s) as may be required. I further understand that my property and I may be subject to search under the terms of this policy while I am on the Owner's premises. Failure to provide the appropriate specimen, or to permit a search, will subject me to removal from this site.

I also understand that I will not be allowed to go to work prior to the reporting of my pre-employment drug test results.

If I am an employee of a subcontractor company, an employee of an affiliate company assigned to the job site, or a contract staff, I understand that I am subject to pre-employment drug testing and all testing conditions of this Policy. Failure to provide the appropriate specimen or to permit a search or a positive test result will result in my immediate removal from this job site.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Print Name and Title

\_\_\_\_\_  
Witness

## Guidelines for Reasonable Suspicion

### Observation Checklist

- |   |   |   |                                      |  |
|---|---|---|--------------------------------------|--|
| 1. <b>Walking</b>   | <input type="checkbox"/> Stumbling      | <input type="checkbox"/> Staggering       | <input type="checkbox"/> Falling     | <input type="checkbox"/> Unable to Walk    |
|   | <input type="checkbox"/> Swaying        | <input type="checkbox"/> Unsteady         | <input type="checkbox"/> Holding On  | <input type="checkbox"/> Normal            |
| 2. <b>Standing</b>  | <input type="checkbox"/> Swaying        | <input type="checkbox"/> Rigid            |                                      | <input type="checkbox"/> Unable to Stand   |
|   | <input type="checkbox"/> Staggering     | <input type="checkbox"/> Sagging at Knees |                                      | <input type="checkbox"/> Feet Wide Apart   |
| 3. <b>Speech</b>  | <input type="checkbox"/> Shouting       | <input type="checkbox"/> Silent           | <input type="checkbox"/> Whispering  | <input type="checkbox"/> Slow              |
|   | <input type="checkbox"/> Rambling       | <input type="checkbox"/> Mute             | <input type="checkbox"/> Slurred     | <input type="checkbox"/> Slobbering        |
|   | <input type="checkbox"/> Incoherent     | <input type="checkbox"/> Confused         | <input type="checkbox"/> Normal      |  |
| 4. <b>Demeanor</b>  | <input type="checkbox"/> Cooperative    | <input type="checkbox"/> Polite           | <input type="checkbox"/> Calm        | <input type="checkbox"/> Sleepy            |
|   | <input type="checkbox"/> Silent         | <input type="checkbox"/> Talkative        | <input type="checkbox"/> Crying      | <input type="checkbox"/> Excited           |
|   | <input type="checkbox"/> Sarcastic      | <input type="checkbox"/> Fighting         |                                      |  |
| 5. <b>Actions</b>   | <input type="checkbox"/> Resisting      | <input type="checkbox"/> Fighting         | <input type="checkbox"/> Threatening | <input type="checkbox"/> Erratic           |
|   | <input type="checkbox"/> Communications |   |                                      |  |
|   | <input type="checkbox"/> Drowsy         | <input type="checkbox"/> Profanity        | <input type="checkbox"/> Hyperactive | <input type="checkbox"/> Hostile           |
|   | <input type="checkbox"/> Calm           |   |                                      |  |
| 6. <b>Eyes</b>  | <input type="checkbox"/> Bloodshot      | <input type="checkbox"/> Watery           | <input type="checkbox"/> Dilated     | <input type="checkbox"/> Glassy            |
|   | <input type="checkbox"/> Droopy         | <input type="checkbox"/> Closed           | <input type="checkbox"/> Normal      |  |
| 7. <b>Face</b>  | <input type="checkbox"/> Flushed        | <input type="checkbox"/> Pale             | <input type="checkbox"/> Sweaty      | <input type="checkbox"/> Normal            |
| 8. <b>Appearance/<br/>Clothing</b>  | <input type="checkbox"/> Unruly         | <input type="checkbox"/> Messy            | <input type="checkbox"/> Dirty       | <input type="checkbox"/> Partially Dressed |
|   | <input type="checkbox"/> Body           | <input type="checkbox"/> Stains           | <input type="checkbox"/> Neat        | <input type="checkbox"/> Normal            |
|   | <input type="checkbox"/> Excrement      |   |                                      |  |
| 9. <b>Breath</b>  | <input type="checkbox"/> Alcoholic      | <input type="checkbox"/> Faint Alcohol    | <input type="checkbox"/> No Odor     |  |
|   | <input type="checkbox"/> Odor           | <input type="checkbox"/> Odor             |                                      |  |
| 10. <b>Movement</b>   | <input type="checkbox"/> Fumbling       | <input type="checkbox"/> Jerky            | <input type="checkbox"/> Slow        | <input type="checkbox"/> Hyperactive       |
|   | <input type="checkbox"/> Nervous        | <input type="checkbox"/> Normal           |                                      |  |
| 11. <b>Eating/<br/>Chewing</b>  | <input type="checkbox"/> Gum            | <input type="checkbox"/> Candy            | <input type="checkbox"/> Mints       | <input type="checkbox"/> Other – identify  |
| 12. Other observations: (Visible drug use, possession, sale, etc.: attendance; poor work performance or accident; tampering with drug test; credible reports, etc.) |   |   |                                      |  |

\_\_\_\_\_

\_\_\_\_\_

Observed by: \_\_\_\_\_ Observed by: \_\_\_\_\_

Date: \_\_\_\_\_ Time: \_\_\_\_\_ Location: \_\_\_\_\_

## Appendix E - Supervisor's Report of Bodily Injury

Date of Accident \_\_\_\_\_ Date Returned to Work: \_\_\_\_\_  
Location of Accident \_\_\_\_\_ Time of Accident \_\_\_\_\_ am/pm  
Contractor/Subcontractor Involved \_\_\_\_\_  
First Aid: \_\_\_\_\_ Recordable \_\_\_\_\_ Lost Time \_\_\_\_\_ Fatality \_\_\_\_\_  
Damage\* \_\_\_\_\_ Fire \_\_\_\_\_ Property \_\_\_\_\_  
Equipment \_\_\_\_\_  
Injured Person: \_\_\_\_\_ SSN: \_\_\_\_\_  
Address: \_\_\_\_\_ Occupation: \_\_\_\_\_  
\_\_\_\_\_ Home Phone: \_\_\_\_\_  
Male \_\_\_\_\_ Female \_\_\_\_\_ Age \_\_\_\_\_  
Nature of Injury: \_\_\_\_\_  
First Aid Administered By: \_\_\_\_\_  
Hospital \_\_\_\_\_  
Physician \_\_\_\_\_  
Witnesses: \_\_\_\_\_  
\_\_\_\_\_  
Equipment and/or Materials Involved: \_\_\_\_\_  
Cause Of Accident: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
Superintendent's Corrective Action: \_\_\_\_\_  
\_\_\_\_\_  
Employee's Signature: \_\_\_\_\_  
Supt. Signature \_\_\_\_\_  
Date of report: \_\_\_\_\_

\*Attach a list of damaged property and/or equipment excluding motor vehicles. Indicate owner's names and addresses. Complete "Report of Damage to Equipment or Property" (Appendix F).



## Appendix F - Report of Damage to Equipment or Property

Date \_\_\_\_\_

Contractor/Subcontractor \_\_\_\_\_

Location of Accident \_\_\_\_\_

Equipment Involved \_\_\_\_\_

Personal injuries Yes \_\_\_\_\_ No \_\_\_\_\_

Damage Estimate \$ \_\_\_\_\_

Witness to Accident

Statement Obtained

Statement Attached

Yes No

Yes No

Yes No

Yes No

Yes No

Yes No

Yes No

Yes No

Remarks \_\_\_\_\_

Time of Accident \_\_\_\_\_ AM \_\_\_\_\_ PM \_\_\_\_\_ Date \_\_\_\_\_

Weather Conditions \_\_\_\_\_ Temperature \_\_\_\_\_

Roadway or surface type \_\_\_\_\_ Wet \_\_\_\_\_ Dry \_\_\_\_\_ Other \_\_\_\_\_ \*

\*If other, explain \_\_\_\_\_

If more space is required, use back of this sheet for additional information and sketches.

Signed \_\_\_\_\_

Title \_\_\_\_\_

Employee Name \_\_\_\_\_

## Appendix G - Contractor Monthly Report of Safety Statistics

<b>MONTHLY ACCIDENT EXPERIENCE SUMMARY</b>		CONTRACT NO:	
		CONTRACTOR/SUBCONTRACTOR NAME:	
		MONTH	YEAR
		REPORTING PERIOD: THROUGH:	
	THIS MONTH	YEAR TO DATE	PROJECT TO DATE
HOURS WORKED			
PAYROLL			
A. FIRST-AID CASES B. OSHA RECORDABLE CASES C. LOST TIME CASES (list each under comments) D. TOTAL LOST WORK DAYS E. PROPERTY DAMAGE F. EQUIPMENT G. GENERAL PUBLIC			
OSHA Recordable Incidence Rate* Lost Time Incident Rate*			
COMMENTS:			
Prepared By:		PM/Superintendent	Date

## Appendix H – Safety Improvement Team Guidelines

The Owner recognizes that a cooperative effort is required to insure a safe construction project. Therefore, the Contractor shall establish a Safety Improvement Team to facilitate the proper cooperative attitude.

The Safety Improvement Team shall be composed of an equal number of employee and management representatives. The management personnel (4) will consist of one Owner representative, one person from the Contractor, one from the workers' compensation/general liability insurance carrier and a representative of subcontractor supervision. The employee members (4) shall be selected from the various subcontractor trades on a voluntary basis or by nomination to serve a minimum of one year each.

The Contractor's Safety Manager shall serve as the Safety Improvement Team advisor and is responsible for providing meeting agendas and minutes, giving assignments to the committee, and publicizing committee accomplishments. Safety Improvement Team meeting minutes and attendance roster shall be maintained.

The Contractor's Safety Manager is responsible for assuring that Committee members are adequately trained to perform their duties and responsibilities.

The Contractor's Safety Manager is responsible for assuring that subcontractors with 25 or more employees establish their own Safety Improvement Team commensurate with the NRS requirements.

The primary purpose of the Safety Improvement Team is to evaluate safety and health program effectiveness, suggestions, hazard reports, hotline reports, etc., and to provide suggestions and recommendations to improve workplace safety.

Additional duties include advising and educating employees in safe working practices, investigating accidents and their causes, recommending preventative measures, inspecting work areas, and other duties as assigned.

Meetings shall be held at least monthly, discussion items shall include:

- Inspection Reports

- Accident Reports

- The safety of construction methods and practices

- Review and make recommendations on employee hazard reports, hotlines, etc.

The Safety Improvement Team members will receive their regular rates of pay while performing Safety Improvement Team duties. Time spent performing Safety Improvement Team duties shall be documented using normal time reporting procedures.

**EXHIBIT E  
TO  
UNIT PRICE CONSTRUCTION CONTRACT  
FOR  
TAXIWAY ALPHA WEST RECONSTRUCTION - CONSTRUCTION**

**BY AND BETWEEN  
THE MEMPHIS-SHELBY COUNTY AIRPORT AUTHORITY  
AND  
(CONTRACTOR NAME)**

**FAA REQUIRED CONTRACT PROVISIONS**

Federal laws and regulations require that recipients of federal assistance (Sponsors) include contract provisions in certain contracts, requests for proposals, or invitations to bid. The provisions are as follows:

**1. Title VI Clauses for Compliance with Nondiscrimination Requirements (FAA Provision A6.4.1).** (Reference: 49 USC § 47123)

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:

**Compliance with Regulations:** The contractor (hereinafter includes consultants) will comply with the Title VI List of Pertinent Nondiscrimination Acts And Authorities, as they may be amended from time to time, which are herein incorporated by reference and made a part of this contract.

**Non-discrimination:** The contractor, with regard to the work performed by it during the contract, will not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor will not participate directly or indirectly in the discrimination prohibited by the Nondiscrimination Acts and Authorities, including employment practices when the contract covers any activity, project, or program set forth in Appendix B of 49 CFR part 21.

**Solicitations for Subcontracts, Including Procurements of Materials and Equipment:** In all solicitations, either by competitive bidding, or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials, or leases of equipment, each potential subcontractor or supplier will be notified by the contractor of the contractor's obligations under this contract and the Nondiscrimination Acts And Authorities on the grounds of race, color, or national origin.

**Information and Reports:** The contractor will provide all information and reports required by the Acts, the Regulations, and directives issued pursuant thereto and will permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the sponsor or the Federal Aviation Administration to be pertinent to ascertain compliance with such Nondiscrimination Acts And Authorities and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish the information, the contractor will so certify to the sponsor or the Federal Aviation Administration, as appropriate, and will set forth what efforts it has made to obtain the information.

**Sanctions for Noncompliance:** In the event of a contractor's noncompliance with the Non-discrimination provisions of this contract, the sponsor will impose such contract sanctions as it or the Federal Aviation Administration may determine to be appropriate, including, but not limited to:

- a. Withholding payments to the contractor under the contract until the contractor complies; and/or
- b. Cancelling, terminating, or suspending a contract, in whole or in part.

**Incorporation of Provisions:** The contractor will include the provisions of paragraphs one through six in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts, the Regulations and directives

issued pursuant thereto. The contractor will take action with respect to any subcontract or procurement as the sponsor or the Federal Aviation Administration may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, that if the contractor becomes involved in, or is threatened with litigation by a subcontractor, or supplier because of such direction, the contractor may request the sponsor to enter into any litigation to protect the interests of the sponsor. In addition, the contractor may request the United States to enter into the litigation to protect the interests of the United States.

## **2. Title VI List of Pertinent Nondiscrimination Acts and Authorities (FAA Provision A6.4.5).**

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the “contractor”) agrees to comply with the following non-discrimination statutes and authorities; including but not limited to:

Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d *et seq.*, 78 stat. 252), (prohibits discrimination on the basis of race, color, national origin);

49 CFR part 21 (Non-discrimination In Federally-Assisted Programs of The Department of Transportation—Effectuation of Title VI of The Civil Rights Act of 1964);

The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 U.S.C. § 4601), (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);

Section 504 of the Rehabilitation Act of 1973, (29 U.S.C. § 794 *et seq.*), as amended, (prohibits discrimination on the basis of disability); and 49 CFR part 27;

The Age Discrimination Act of 1975, as amended, (42 U.S.C. § 6101 *et seq.*), (prohibits discrimination on the basis of age);

Airport and Airway Improvement Act of 1982, (49 USC § 471, Section 47123), as amended, (prohibits discrimination based on race, creed, color, national origin, or sex);

The Civil Rights Restoration Act of 1987, (PL 100-209), (Broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, The Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms “programs or activities” to include all of the programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);

Titles II and III of the Americans with Disabilities Act of 1990, which prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities (42 U.S.C. §§ 12131 – 12189) as implemented by Department of Transportation regulations at 49 CFR parts 37 and 38;

The Federal Aviation Administration’s Non-discrimination statute (49 U.S.C. § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which ensures non-discrimination against minority populations by discouraging programs, policies, and activities with disproportionately high and adverse human health or environmental effects on minority and low-income populations;

Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. at 74087 to 74100);

Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 U.S.C. 1681 *et seq.*).

## **3. Federal Fair Labor Standards Act (FAA Provision A17). (Reference: 29 U.S.C. § 201, *et seq.*)**

All contracts and subcontracts that result from this solicitation incorporate by reference the provisions of 29 CFR part 201, the Federal Fair Labor Standards Act (FLSA), with the same force and effect as if given in full text. The FLSA sets minimum wage, overtime pay, recordkeeping, and child labor standards for full and part time workers.

The Contractor has full responsibility to monitor compliance to the referenced statute or regulation. The Contractor must address any claims or disputes that arise from this requirement directly with the U.S. Department of Labor – Wage and Hour Division.

**4. Occupational Safety and Health Act of 1970 (FAA Provision A20).** (Reference: 29 CFR part 1910)

All contracts and subcontracts that result from this solicitation incorporate by reference the requirements of 29 CFR Part 1910 with the same force and effect as if given in full text. Contractor must provide a work environment that is free from recognized hazards that may cause death or serious physical harm to the employee. The Contractor retains full responsibility to monitor its compliance and their subcontractor's compliance with the applicable requirements of the Occupational Safety and Health Act of 1970 (20 CFR Part 1910). Contractor must address any claims or disputes that pertain to a referenced requirement directly with the U.S. Department of Labor – Occupational Safety and Health Administration.

**5. General Civil Rights Provisions (FAA Provision A5).** (Reference: 49 U.S.C. § 47123)

The Contractor agrees to comply with pertinent statutes, Executive Orders and such rules as are promulgated to ensure that no person shall, on the grounds of race, creed, color, national origin, sex, age, or disability be excluded from participating in any activity conducted with or benefiting from Federal assistance.

This provision binds the contractor and subcontractors 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. If the Contractor transfers its obligation to another, the transferee is obligated in the same manner as the Contractor. The above provision obligates the Contractor for the period during which the property is owned, used or possessed by the Contractor and the airport remains obligated to the Federal Aviation Administration.

## FAA REQUIRED CONTRACT PROVISIONS – AIP CONTRACTS

### 6. Buy American Preference (FAA Provision A4). (Reference: 49 USC § 50101)

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

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

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

#### CERTIFICATE OF BUY AMERICAN COMPLIANCE FOR CONSTRUCTION PROJECTS

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

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

- a) Only installing steel and manufactured products produced in the United States; or
- b) Only installing construction materials defined as: an article, material, or supply – other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives that are or consist primarily of non-ferrous metals; plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables); glass (including optic glass); lumber or drywall that have been manufactured in the United States; or
- c) Installing manufactured products for which the FAA has issued a waiver as indicated by inclusion on the current FAA Nationwide Buy American Waivers Issued listing; or
- d) Installing products listed as an Excepted Article, Material or Supply in Federal Acquisition Regulation Subpart 25.108.

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

- 1. To provide to the Owner or the FAA evidence that documents the source and origin of the steel and manufactured product.
- 2. To faithfully comply with providing US domestic products.
- 3. To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.

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

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

1. To submit to the Owner within 15 calendar days of being selected as the responsive bidder, a formal waiver request and required documentation that support the type of waiver being requested.
2. That failure to submit the required documentation within the specified timeframe is cause for a non-responsive determination that may result in rejection of the proposal.
3. To faithfully comply with providing US domestic products at or above the approved US domestic content percentage as approved by the FAA.
4. To furnish US domestic product for any waiver request that the FAA rejects.
5. To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.

#### Required Documentation

**Type 3 Waiver** - The cost of components and subcomponents produced in the United States is more than 60% of the cost of all components and subcomponents of the "facility". The required documentation for a type 3 waiver is:

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

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

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

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

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Company Name

\_\_\_\_\_  
Title



## CERTIFICATE OF BUY AMERICAN COMPLIANCE FOR EQUIPMENT/ BUILDING PROJECTS

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

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

- a) Only installing steel and manufactured products produced in the United States, or;
- b) Only installing construction materials defined as: an article, material, or supply – other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives that are or consist primarily of non-ferrous metals; plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables); glass (including optic glass); lumber or drywall that have been manufactured in the United States, or;
- c) Installing manufactured products for which the FAA has issued a waiver as indicated by inclusion on the current FAA Nationwide Buy American Waivers Issued listing, or;
- d) Installing products listed as an Excepted Article, Material or Supply in Federal Acquisition Regulation Subpart 25.108.

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

- 1. To provide to the Owner evidence that documents the source and origin of the steel and manufactured product.
- 2. To faithfully comply with providing US domestic product.
- 3. To furnish US domestic product for any waiver request that the FAA rejects.
- 4. To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.

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

- 1. To submit to the Owner within 15 calendar days of being selected as the responsive bidder, a formal waiver request and required documentation that support the type of waiver being requested.
- 2. That failure to submit the required documentation within the specified timeframe is cause for a non-responsive determination that may result in rejection of the proposal.
- 3. To faithfully comply with providing US domestic products at or above the approved US domestic content percentage as approved by the FAA.
- 4. To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.

### Required Documentation

**Type 3 Waiver** - The cost of the item components and subcomponents produced in the United States is more than 60% of the cost of all components and subcomponents of the "item". The required documentation for a type 3 waiver is:

- a) Completed Content Percentage Worksheet and Final Assembly Questionnaire including;

- b) Listing of all product components and subcomponents that are not comprised of 100% US domestic content (Excludes products listed on the FAA Nationwide Buy American Waivers Issued listing and products excluded by Federal Acquisition Regulation Subpart 25.108; products of unknown origin must be considered as non-domestic products in their entirety).
- c) Cost of non-domestic components and subcomponents, excluding labor costs associated with final assembly at place of manufacture.
- d) Percentage of non-domestic component and subcomponent cost as compared to total "item" component and subcomponent costs, excluding labor costs associated with final assembly at place of manufacture.

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

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

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

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Company Name

\_\_\_\_\_  
Title

**7. Clean Air and Water Pollution Control (FAA Provision A7).** (Reference 2 CFR § 200, Appendix II(G))

Contractor agrees to comply with all applicable standards, orders, and regulations issued pursuant to the Clean Air Act (42 U.S.C. § 740-7671q) and the Federal Water Pollution Control Act as amended (33 U.S.C. § 1251-1387). The Contractor agrees to report any violation to the Owner immediately upon discovery. The Owner assumes responsibility for notifying the Environmental Protection Agency (EPA) and the Federal Aviation Administration.

Contractor must include this requirement in all subcontracts that exceeds \$150,000.

**8. Contract Workhours and Safety Standards Act Requirements (FAA Provision A8).** (Reference: 2 CFR § 200, Appendix II (E))

**1. Overtime Requirements.**

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

**2. Violation; Liability for Unpaid Wages; Liquidated Damages.**

In the event of any violation of the clause set forth in paragraph (1) of this clause, the contractor 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 paragraph (1) of this clause, 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) of this clause.

**3. Withholding for Unpaid Wages and Liquidated Damages.**

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

**4. Subcontractors.**

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

**9. Debarment and Suspension (FAA Provision A11).** (Reference: 2 CFR part 180 (Subpart C); 2 CFR part 1200; DOT Order 4200.5)

**CERTIFICATION OF OFFERER/BIDDER REGARDING DEBARMENT**

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

## CERTIFICATION OF LOWER TIER CONTRACTORS REGARDING DEBARMENT

The successful bidder, by administering each lower tier subcontract that exceeds \$25,000 as a "covered transaction", must verify each lower tier participant of a "covered transaction" under the project is not presently debarred or otherwise disqualified from participation in this federally assisted project. The successful bidder will accomplish this by:

1. Checking the System for Award Management at website: <http://www.sam.gov>.
2. Collecting a certification statement similar to the Certificate Regarding Debarment and Suspension (Bidder or Offeror), above.
3. Inserting a clause or condition in the covered transaction with the lower tier contract.

If the FAA later determines that a lower tier participant failed to disclose to a higher tier participant that it was excluded or disqualified at the time it entered the covered transaction, the FAA may pursue any available remedies, including suspension and debarment of the non-compliant participant.

### 10. Prohibition of Segregated Facilities (FAA Provision A19). (Reference: 41 CFR § 60)

- (a) The Contractor agrees that it does not and will not maintain or provide for its employees any segregated facilities at any of its establishments, and that it does not and will not permit its employees to perform their services at any location under its control where segregated facilities are maintained. The Contractor agrees that a breach of this clause is a violation of the Equal Opportunity clause in this contract.
- (b) "Segregated facilities," as used in this clause, means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees, that are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, sex, or national origin because of written or oral policies or employee custom. The term does not include separate or single-user rest rooms or necessary dressing or sleeping areas provided to assure privacy between the sexes.
- (c) The Contractor shall include this clause in every subcontract and purchase order that is subject to the Equal Opportunity clause of this contract.

### 11. Access to Records and Reports (FAA Provision A1). (Reference: 2 CFR § 200.333, 2 CFR § 200.336)

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

### 12. Affirmative Action Requirement (FAA Provision A2). (Reference: 41 CFR part 60-4, Executive Order 11246)

#### NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY

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

#### Timetables

Goals for minority participation for each trade: 32.3%

Goals for female participation in each trade: 6.9%

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

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

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

**13. Copeland "Anti-Kickback" Act (FAA Provision A9).** (Reference: 2 CFR § 200, Appendix II (D), 29 CFR Parts 3 & 5)

Contractor must comply with the requirements of the Copeland "Anti-Kickback" Act (18 U.S.C. 874 and 40 U.S.C. 3145), as supplemented by Department of Labor regulation 29 CFR part 3. Contractor and subcontractors are prohibited from inducing, by any means, any person employed on the project to give up any part of the compensation to which the employee is entitled. The Contractor and each Subcontractor must submit to the Owner, a weekly statement on the wages paid to each employee performing on covered work during the prior week. Owner must report any violations of the Act to the Federal Aviation Administration.

**14. Davis-Bacon Requirements (FAA Provision A10).** (Reference: 2 CFR § 200, Appendix II (D), 29 CFR Part 5)

**1. Minimum Wages**

- (i) All laborers and mechanics employed or working upon the site of the work will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by the Secretary of Labor under the Copeland Act (29 CFR Part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalent thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (1)(iv) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually

performed, without regard to skill, except as provided in 29 CFR Part 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: *Provided*, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under (1)(ii) of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can easily be seen by the workers.

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

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

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

(C) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

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

- (iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.
- (iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, *Provided*, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

## **2. Withholding.**

The Federal Aviation Administration or the sponsor shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or

mechanic, including any apprentice, trainee, or helper, employed or working on the site of work, all or part of the wages required by the contract, the Federal Aviation Administration may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

### 3. Payrolls and basic records.

- (i) Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made, and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records 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 costs incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.
- (ii) (A) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the Federal Aviation Administration if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant, sponsor, or owner, as the case may be, for transmission to the Federal Aviation Administration. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead, the payrolls shall only need to include an individually identifying number for each employee (e.g. the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <http://www.dol.gov/esa/whd/forms/wh347instr.htm> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the Federal Aviation Administration if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit them to the applicant, sponsor, or owner, as the case may be, for transmission to the Federal Aviation Administration, the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the sponsoring government agency (or the applicant, sponsor, or owner).
- (B) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:
  - (1) That the payroll for the payroll period contains the information required to be provided under 29 CFR § 5.5(a)(3)(ii), the appropriate information is being maintained under 29 CFR § 5.5 (a)(3)(i) and that such information is correct and complete;
  - (2) That each laborer and mechanic (including each helper, apprentice and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations 29 CFR Part 3;
  - (4) 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.

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

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

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

#### **4. Apprentices and Trainees.**

- (i) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State Apprenticeship Agency recognized by the Bureau, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Bureau of Apprenticeship and Training, or a State Apprenticeship Agency recognized by the Bureau, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.
- (ii) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate that is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the



event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

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

#### **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.

#### **6. Subcontracts.**

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

#### **7. Contract Termination: Debarment.**

A breach of the contract clauses in paragraph 1 through 10 of this section may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

#### **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.

#### **9. Disputes Concerning Labor Standards.**

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

#### **10. Certification of Eligibility.**

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

#### **15. Disadvantaged Business Enterprises (FAA Provision A12).** (Reference: 49 CFR part 26)

- (a) **Contract Assurance (§ 26.13)** - The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of 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, which may include, but is not limited to:

- 1) Withholding monthly progress payments;
- 2) Assessing sanctions;
- 3) Liquidated damages; and/or
- 4) Disqualifying the Contractor from future bidding as non-responsible.

- (b) **Prompt Payment (§26.29)** - The prime contractor agrees to pay each subcontractor under this prime contract for satisfactory performance of its contract no later than ten (10) days from the receipt of each payment the prime contractor receives from Memphis-Shelby County Airport Authority. The prime contractor agrees further to return retainage payments to each subcontractor within ten (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 Memphis-Shelby County Airport Authority. This clause applies to both DBE and non-DBE subcontractors.

**16 Energy Conservation Requirements (FAA Provision A14).** (Reference: 2 CFR § 200, Appendix II(H))

Contractor and Subcontractor agree to comply with mandatory standards and policies relating to energy efficiency as contained in the state energy conservation plan issued in compliance with the Energy Policy and Conservation Act (42 U.S.C. 6201 *et seq*).

**17.1 Equal Employment Opportunity (EEO) (FAA Provision A16).** (Reference: 2 CFR 200, Appendix II(C) ,41 CFR § 60-1.4, Executive Order 11246)

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

- (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, sexual orientation, gender identify or national origin. Such action shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.
- (2) The contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive considerations for employment without regard to race, color, religion, sex, or national origin.
- (3) The contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representatives of the contractor's commitments under this section and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
- (4) The contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.
- (5) The contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the administering agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.
- (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 of September 24, 1965, and such other sanctions may be imposed and

remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

- (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 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The contractor will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such 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 administering agency the contractor may request the United States to enter into such litigation to protect the interests of the United States.

**17.2 Equal Employment Opportunity Specification (FAA Provision A16).** (Reference: 2 CFR 200, Appendix II(C) 41 CFR § 60-1.4, Executive Order 11246)

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. "Minority" includes:

- (1) Black (all) persons having origins in any of the Black African racial groups not of Hispanic origin);
- (2) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin regardless of race);
- (3) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and
- (4) American Indian or Alaskan native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

2. Whenever the contractor, or any subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of \$10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.
3. If the contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the 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 shall be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each contractor or subcontractor participating in an approved plan is individually required to comply with its obligations under the EEO clause and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other contractors or subcontractors toward a goal in an approved Plan does not excuse any covered contractor's or subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.
4. The contractor shall implement the specific affirmative action standards provided in paragraphs 7a through 7p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the

total hours of employment and training of minority and female utilization the contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. Covered construction contractors performing construction work in a geographical area where they do not have a Federal or federally assisted construction contract shall apply the minority and female goals established for the geographical area where the work is being performed. Goals are published periodically in the Federal Register in notice form, and such notices may be obtained from any Office of Federal Contract Compliance Programs office or from Federal procurement contracting officers. The contractor is expected to make substantially uniform progress in meeting its goals in each craft during the period specified.

5. Neither the provisions of any collective bargaining agreement nor the failure by a union with whom the contractor has a collective bargaining agreement to refer either minorities or women shall excuse the contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.
6. In order for the non-working training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees shall be employed by the contractor during the training period and the contractor shall have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees shall be trained pursuant to training programs approved by the U.S. Department of Labor.
7. The contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The contractor shall document these efforts fully and shall implement affirmative action steps at least as extensive as the following:
  - a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the contractor's employees are assigned to work. The contractor, where possible, will assign two or more women to each construction project. The contractor shall specifically ensure that all foremen, superintendents, and other onsite supervisory personnel are aware of and carry out the contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.
  - b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.
  - c. Maintain a current file of the names, addresses, and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source, or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the contractor by the union or, if referred, not employed by the contractor, this shall be documented in the file with the reason therefore along with whatever additional actions the contractor may have taken.
  - d. Provide immediate written notification to the Director when the union or unions with which the contractor has a collective bargaining agreement has not referred to the contractor a minority person or female sent by the contractor, or when the contractor has other information that the union referral process has impeded the contractor's efforts to meet its obligations.
  - e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the contractor's employment needs, especially those programs funded or approved by the Department of Labor. The contractor shall provide notice of these programs to the sources compiled under 7b above.

- f. Disseminate the contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.
- g. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination, or other employment decisions including specific review of these items with onsite supervisory personnel such as superintendents, general foremen, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.
- h. Disseminate the contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the contractor's EEO policy with other contractors and subcontractors with whom the contractor does or anticipates doing business.
- i. Direct its recruitment efforts, both oral and written, to minority, female, and community organizations, to schools with minority and female students; and to minority and female recruitment and training organizations serving the contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the contractor shall send written notification to organizations, such as the above, describing the openings, screening procedures, and tests to be used in the selection process.
- j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer, and vacation employment to minority and female youth both on the site and in other areas of a contractor's workforce.
- k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.
- l. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel, for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.
- m. Ensure that seniority practices, job classifications, work assignments, and other personnel practices do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the contractor's obligations under these specifications are being carried out.
- n. Ensure that all facilities and company activities are non-segregated except that separate or single user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.
- o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.
- p. Conduct a review, at least annually, of all supervisor's adherence to and performance under the contractor's EEO policies and affirmative action obligations.

8. Contractors are encouraged to participate in voluntary associations, which assist in fulfilling one or more of their affirmative action obligations (7a through 7p). 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 7a through 7p of these specifications provided that the contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the contractor's minority and female workforce participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the contractor. The obligation to comply, however, is the contractor's and failure of such a group to fulfill an obligation shall not be a defense for the contractor's noncompliance.
  9. A single goal for minorities and a separate single goal for women have been established. The contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, if the particular group is employed in a substantially disparate manner (for example, even though the contractor has achieved its goals for women generally,) the contractor may be in violation of the Executive Order if a specific minority group of women is underutilized.
  10. The contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.
  11. The contractor shall not enter into any subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.
  12. The contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination, and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs. Any contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.
  13. The contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.
  14. The contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government, and to keep records. Records shall at least include for each employee, the name, address, telephone number, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.
  15. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).
- 18. Lobbying and Influencing Federal Employees (FAA Provision A18).** (Reference: 31 U.S.C. § 1352, 49 CFR part 20, Appendix A)

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

- (1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the Bidder or Offeror, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
- (2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.
- (3) The undersigned shall require that the language of this certification be included in the award documents for all sub-awards at all tiers (including subcontracts, sub-grants, and contracts under grants, loans, and cooperative agreements) and that all sub-recipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

**19. Rights to Inventions (FAA Provision A22).** (Reference: 2 CFR § 200, Appendix II(F), 37CFR § 401)

Contracts or agreements that include the performance of experimental, developmental, or research work must provide for the rights of the Federal Government and the Owner in any resulting invention as established by 37 CFR part 401, Rights to Inventions Made by Non-profit Organizations and Small Business Firms under Government Grants, Contracts, and Cooperative Agreements. This contract incorporates by reference the patent and inventions rights as specified in 37 CFR §401.14. Contractor must include this requirement in all sub-tier contracts involving experimental, developmental or research work.

**20. Trade Restriction Certification (FAA Provision A26).** (Reference: 49 USC § 50104, 49 CFR part 30)

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

- a. is not owned or controlled by one or more citizens of a foreign country included in the list of countries that discriminate against U.S. firms as published by the Office of the United States Trade Representative (U.S.T.R.);
- b. has not knowingly entered into any contract or subcontract for this project with a person that is a citizen or national of a foreign country included on the list of countries that discriminate against U.S. firms as published by the U.S.T.R; and
- c. has not entered into any subcontract for any product to be used on the Federal project that is produced in a foreign country included on the list of countries that discriminate against U.S. firms published by the U.S.T.R.

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.

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

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

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

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

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

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

**21. Veteran's Preference (FAA Provision A27).** (Reference: 49 USC § 47112(c))

In the employment of labor (excluding executive, administrative, and supervisory positions), the contractor and all sub-tier contractors must give preference to covered veterans as defined within Title 49 United States Code Section 47112. Covered veterans include Vietnam-era veterans, Persian Gulf veterans, Afghanistan-Iraq war veterans, disabled veterans, and small business concerns (as defined by 15 U.S.C. 632) owned and controlled by disabled veterans. This preference only applies when there are covered veterans readily available and qualified to perform the work to which the employment relates.

**22. Procurement of Recovered Materials (FAA Provision A21).** (Reference: 2 CFR § 200.322, 40 CFR part 247)

Contractor and subcontractor agree to comply with Section 6002 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act, and the regulatory provisions of 40 CFR Part 247. In the performance of this contract and to the extent practicable, the Contractor and subcontractors are to use products containing the highest percentage of recovered materials for items designated by the Environmental Protection Agency (EPA) under 40 CFR Part 247 whenever:

- a) The contract requires procurement of \$10,000 or more of a designated item during the fiscal year; or,
- b) The contractor has procured \$10,000 or more of a designated item using Federal funding during the previous fiscal year. The list of EPA-designated items is available at [www.epa.gov/smm/comprehensive-procurement-guidelines-construction-products](http://www.epa.gov/smm/comprehensive-procurement-guidelines-construction-products).  
Section 6002(c) establishes exceptions to the preference for recovery of EPA-designated products if the contractor can demonstrate the item is:
  - a) Not reasonably available within a timeframe providing for compliance with the contract performance schedule;
  - b) Fails to meet reasonable contract performance requirements; or
  - c) Is only available at an unreasonable price.

**23. Seismic Safety (FAA Provision A23).** (Reference: 49 CFR part 41)

- (a) In the performance of design services, the Consultant agrees to furnish a building design and associated construction specification that conform to a building code standard which provides a level of seismic safety substantially equivalent to standards as established by the National Earthquake Hazards Reduction Program (NEHRP). Local building codes that model their building code after the current version of the International



Building Code (IBC) meet the NEHRP equivalency level for seismic safety. At the conclusion of the design services, the Consultant agrees to furnish the Owner a "certification of compliance" that attests conformance of the building design and the construction specifications with the seismic standards of NEHRP or an equivalent building code.

- (b) The contractor agrees to ensure that all work performed under the contract, including work performed by subcontractors, conforms to a building code standard that provides a level of seismic safety substantially equivalent to standards established by the National Earthquake Hazards Reduction Program (NEHRP). Local building codes that model their code after the current version of the International Building Code (IBC) meet the NEHRP equivalency level for seismic safety.

#### **24. Distracted Driving (FAA Provision A13).** (Reference: Executive Order 13513, DOT Order 3902.10)

In accordance with Executive Order 13513, "Federal Leadership on Reducing Text Messaging While Driving" (10/1/2009) and DOT Order 3902.10 "Text Messaging While Driving" (12/30/2009), the FAA encourages recipients of Federal grant funds to adopt and enforce safety policies that decrease crashes by distracted drivers, including policies to ban text messaging while driving when performing work related to a grant or sub-grant.

In support of this initiative, the Owner encourages the Contractor to promote policies and initiatives for its employees and other work personnel that decrease crashes by distracted drivers, including policies that ban text messaging while driving motor vehicles while performing work activities associated with the project. The Contractor must include the substance of this clause in all sub-tier contracts exceeding \$10,000 which involve driving a motor vehicle in performance of work activities associated with the project.

#### **25. Tax Delinquency and Felony Conviction (FAA Provision A24).**

##### **CERTIFICATION OF OFFERER/BIDDER REGARDING TAX DELINQUENCY AND FELONY CONVICTIONS**

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

##### **Certifications**

- a) The applicant represents that it is ( ✓ ) is not ( ✓ ) a corporation that has any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability.
- b) The applicant represents that it is ( ✓ ) is not ( ✓ ) is not a corporation that was convicted of a criminal violation under any Federal law within the preceding 24 months.

##### **Note**

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

##### **Term Definitions**

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

U.S.C. § 3559.

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

**26. Domestic Preferences for Procurements (FAA Provision A28)**

**CERTIFICATION REGARDING DOMESTIC PREFERENCES FOR PROCUREMENTS**

The Bidder or Offeror certifies by signing and submitting this bid or proposal that, to the greatest extent practicable, the Bidder or Offeror has provided a preference for the purchase, acquisition, or use of goods, products, or materials produced in the United States (including, but not limited to, iron, aluminum, steel, cement, and other manufactured products) in compliance with 2 CFR § 200.322.

**27. Prohibition on Certain Telecommunications and Video Surveillance Services or Equipment (FAA Provision A14)**

**PROHIBITION ON CERTAIN TELECOMMUNICATIONS AND VIDEO SURVEILLANCE SERVICES OR EQUIPMENT**

Contractor and Subcontractor agree to comply with mandatory standards and policies relating to use and procurement of certain telecommunications and video surveillance services or equipment in compliance with the National Defense Authorization Act [Public Law 115-232 § 889(f)(1)].

**EXHIBIT F  
TO  
CONSTRUCTION CONTRACT  
FOR  
TAXIWAY ALPHA WEST RECONSTRUCTION - CONSTRUCTION**

**BY AND BETWEEN  
THE MEMPHIS-SHELBY COUNTY AIRPORT AUTHORITY  
AND  
(CONTRACTOR NAME)**

**STANDARD TERMS AND CONDITIONS:**

Grantees shall not assign an Aeronautics Grant Contract or enter into a subcontract for any of the services performed under an Aeronautics Grant Contract without obtaining the prior written approval of the State. If such subcontracts are approved by the State, each shall contain, at a minimum, sections of the Aeronautics Grant Contract pertaining to "Conflicts of Interest," "Lobbying," "Nondiscrimination," "Public Accountability," "Public Notice," and "Records" (as identified by the section headings). Notwithstanding any use of approved subcontractors, the Grantee shall remain responsible for all work performed.

**CONTRACT CLAUSES:**

- F.1. Conflicts of Interest. Contractor warrants that no part of the total contract amount shall be paid directly or indirectly to an employee or official of the State of Tennessee as wages, compensation, or gifts in exchange for acting as an officer, agent, employee, subcontractor, or consultant to MSCAA in connection with any work contemplated or performed relative to this Contract.
- F.2. Lobbying. The Contractor certifies, to the best of its knowledge and belief, that:
- a. No federally appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any federal contract, the making of any federal grant, the making of any federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any federal contract, grant, loan, or cooperative agreement.
  - b. If any funds other than federally appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this contract, grant, loan, or cooperative agreement, the Promisor shall complete and submit Standard Form-LLL, "Disclosure of Lobbying Activities," in accordance with its instructions.
  - c. The Contractor shall require that the language of this certification be included in the award documents for all sub-awards at all tiers (including subcontracts, sub-grants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into and is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. § 1352.

- F.3. Nondiscrimination. Contractor hereby agrees, warrants, and assures that no person shall be excluded from participation in, be denied benefits of, or be otherwise subjected to discrimination in the performance of this Grant

Contract or in the employment practices of the Contractor on the grounds of handicap or disability, age, race, color, religion, sex, national origin, or any other classification protected by federal, Tennessee state constitutional, or statutory law. The Contractor shall, upon request, show proof of nondiscrimination and shall post in conspicuous places, available to all employees and applicants, notices of nondiscrimination.

- F.4. Public Accountability. If the Contractor is subject to Tenn. Code Ann. § 8-4-401 *et seq.*, or if this Contract involves the provision of services to citizens by Contractor on behalf of the State, Contractor agrees to establish a system through which recipients of services may present grievances about the operation of the service program. The Contractor shall also display in a prominent place, located near the passageway through which the public enters in order to receive Grant supported services, a sign at least eleven inches (11") in height and seventeen inches (17") in width stating:

NOTICE: THIS AGENCY IS A RECIPIENT OF TAXPAYER FUNDING. IF YOU OBSERVE AN AGENCY DIRECTOR OR EMPLOYEE ENGAGING IN ANY ACTIVITY WHICH YOU CONSIDER TO BE ILLEGAL, IMPROPER, OR WASTEFUL, PLEASE CALL THE STATE COMPTROLLER'S TOLL-FREE HOTLINE: 1-800-232-5454.

The sign shall be on the form prescribed by the Comptroller of the Treasury. MSCAA shall obtain copies of the sign from the Tennessee Department of Transportation, Aeronautics Division, and upon request from the Contractor, provide Contractor with any necessary signs.

- F.5. Public Notice. All notices, informational pamphlets, press releases, research reports, signs, and similar public notices prepared and released by the Contractor in relation to this Contract shall include the statement, "This project is funded under a grant contract with the State of Tennessee." All notices by the Contractor in relation to this Contract shall be approved by the State.
- F.6. Records. The Contractor and any approved subcontractor shall maintain documentation for all charges under this Contract. The books, records, and documents of the Contractor and any approved subcontractor, insofar as they relate to work performed or money received under this Grant Contract, shall be maintained in accordance with applicable Tennessee law. In no case shall the records be maintained for a period of less than five (5) full years from the date of the final payment. The Contractor's records shall be subject to audit at any reasonable time and upon reasonable notice by the Tennessee Department of Transportation, the Comptroller of the Treasury, or their duly appointed representatives.

The records shall be maintained in accordance with Governmental Accounting Standards Board (GASB) Accounting Standards or the Financial Accounting Standards Board (FASB) Accounting Standards Codification, as applicable, and any related AICPA Industry Audit and Accounting guides.

In addition, documentation of grant applications, budgets, reports, awards, and expenditures will be maintained in accordance with U.S. Office of Management and Budget's *Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards*.

Contract expenditures shall be made in accordance with local government purchasing policies and procedures and purchasing procedures for local governments authorized under state law.

The Contractor shall also comply with any recordkeeping and reporting requirements prescribed by the Tennessee Comptroller of the Treasury.

The Contractor shall establish a system of internal controls that utilize the COSO Internal Control - Integrated Framework model as the basic foundation for the internal control system. The Contractor shall incorporate any additional Comptroller of the Treasury directives into its internal control system.

Any other required records or reports which are not contemplated in the above standards shall follow the format designated by the head of the Tennessee Department of Transportation, the Central Procurement Office, or the Commissioner of Finance and Administration of the State of Tennessee.

**DIVISION 0 – SECTION 00605**  
**CERTIFICATE OF SECRETARY**

AS TO RESOLUTION ADOPTED BY BOARD OF DIRECTORS

On \_\_\_\_\_

I, \_\_\_\_\_, hereby certify that I am the duly authorized Secretary of \_\_\_\_\_, charged with keeping the records and the seal of said Corporation, and that the following is a true and correct copy of a resolution adopted at a meeting of the Board of Directors of the Corporation duly held on \_\_\_\_\_, which resolution is now in full force and effect.

RESOLVED, that \_\_\_\_\_, (President, Vice President) of \_\_\_\_\_ is hereby authorized to execute contracts, performance bonds and labor materials bonds on behalf of the Corporation.

WITNESS my hand as Secretary, and the seal of the Corporation this \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_  
 Secretary

BEFORE ME, a notary public of the state and county mentioned, personally appeared

\_\_\_\_\_, with whom I am personally acquainted, and who, upon oath,

acknowledged such person to be \_\_\_\_\_, and officer authorized to execute the

instrument, of \_\_\_\_\_, the within named bargainor, a corporation, and that such

officer, as such \_\_\_\_\_, executed the foregoing instrument for the purposes therein contained, by personally signing their name of the corporation as \_\_\_\_\_.

WITNESS my hand and seal, at office, this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_  
 Notary Public

(SEAL)

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

**END OF SECTION 00605**

**ISSUED FOR BID**

00605  
 Page 1

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**PERFORMANCE BOND**

KNOW ALL MEN BY THESE PRESENTS: that

as Principal, hereinafter called Contractor or Principal, and

as Surety, hereinafter called Surety, are held and firmly bound unto

MEMPHIS-SHELBY COUNTY AIRPORT AUTHORITY

hereinafter called Owner, or Obligee, in the amount of \_\_\_\_\_ Dollars, for the performance whereof Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly, severally, and solidarily, firmly by these presents.

The penal sum of this Performance Bond shall be increased by the amount that the Contract, as herein below defined, is increased during the term of the Performance Bond.

WHEREAS, Principal has entered into a written agreement with the Owner (hereinafter referred to as "Contract") for:

in accordance with Drawings and Specifications prepared and to be prepared by

Allen & Hoshall, Inc

which Contract is by reference incorporated herein and made a part hereof.

WHEREAS, the Surety represents that it possesses an A-VIII rating or higher in the most recent edition of Best Insurance Reports and that Surety is authorized to execute and deliver bonds in the State of Tennessee.

NOW THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Principal shall promptly and faithfully perform each and every term, condition, obligation and provision of said Contract, including but not limited to, completion and delivery of the work described in the Contract within the scheduled time as such time may be extended from time to time as permitted in the Contract, then this obligation shall be null and void; otherwise, it shall remain in full force and effect.

The Surety shall within sixty (60) days from notice by Owner to the Surety, either

1. Proceed to complete the performance of the Contract timely in accordance with the terms and conditions of the Contract, including but not limited to:

(a) The responsibilities of the Principal for completion of the Work, correction of defective Work, warranty Work and payment for the Work; and

(b) Payment of liquidated damages specified in the Contract, or

2. Pay to the Owner the amount of its costs and damages, up to the penal sum of this bond, that would be owed by the Principal to the Obligee under the Contract to complete the obligations of the Principal, including any liquidated damages that may be due and any additional legal, design professional or delay costs resulting from the Contractor's default less any remaining contract funds.

The Surety hereby waives notice of any alteration or extension of time made by the Owner. The Surety hereby waives notice of any change in the scope of the Contract.

Any suit under this Performance Bond must be instituted in a court of competent jurisdiction, in Shelby County, Tennessee, and not elsewhere within four (4) years from Substantial Completion as defined in the Contract.

No right of action shall accrue on this bond to or for the use of any person, partnership or corporation other than the Owner or the heirs, executors, administrators, successors or assigns of the Owner.

Notice of claim to the Surety under the bond shall be sent to the following address:

SIGNED AND SEALED this \_\_\_\_ day of \_\_\_\_\_, 20 \_\_\_\_.

\_\_\_\_\_  
PRINCIPAL

TITLE: \_\_\_\_\_

\_\_\_\_\_  
SURETY

TITLE: \_\_\_\_\_

\_\_\_\_\_  
ADDRESS

\_\_\_\_\_  
CITY STATE ZIP CODE



**LABOR AND MATERIAL PAYMENT BOND**

KNOW ALL MEN BY THESE PRESENTS: that

as Principal, hereinafter called Contractor or Principal, and

as Surety, hereinafter called Surety, are held and firmly bound unto

MEMPHIS-SHELBY COUNTY AIRPORT AUTHORITY

hereinafter called Owner or Obligee, in the amount of \_\_\_\_\_ Dollars, for the payment whereof Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly, severally, and solidarily, firmly by these presents.

The penal sum of this Labor and Material Payment Bond shall increase by the amount that the Contract, as herein below defined, is increased during the term of the Labor and Material Payment Bond.

WHEREAS, Principal has entered into a written agreement with the Owner (hereinafter referred to as the "Contract") for:

in accordance with Drawings and Specifications prepared and to be prepared by

Allen & Hoshall, Inc

which Contract is by reference incorporated herein and made a part hereof.

WHEREAS, the Surety represents that it possesses an A--.VIII rating or higher in the most recent edition of Best Insurance Reports and that Surety is authorized to execute and deliver bonds in the State of Tennessee.

NOW THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Principal shall promptly and faithfully complete the work as defined in the Contract free and clear of all claims, liens and any other contractual, statutory, or legal rights the Claimants, as hereinbelow defined, may have for the payment of amounts owed in connection with or arising out of the Contract ("Claims"); and the Principal shall make prompt payment to all persons having a Claim or lien pursuant to any statute or law of the State of Tennessee, then this obligation shall be void; otherwise, it shall remain in full force and effect.

1. A Claimant is defined as one having a contract with the Principal or a subcontractor or supplier of any tier for labor, materials, equipment used or reasonably required for use in the performance of the Contract, labor and materials being construed to include water, power, gas, light, heat, oil, gasoline, or telephone services applicable to the Contract.
2. No suit or action shall be commenced by any Claimant:
  - a) After the expiration of two (2) years following the date which Substantial Completion as defined in the Contract is achieved. However, if any limitation embodied in this bond is prohibited by any law controlling the construction hereof, such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.

- b) Other than in a court of competent jurisdiction in Shelby County, Tennessee, and not elsewhere.
3. Upon written notice to Surety from the Owner, Surety shall, within forty-five (45) days after receipt of said notice, pay or cause to be paid all Claims made or if the Surety contests in good faith the validity of any Claim, the Surety shall, within forty-five (45) days after receipt of said notice, cause bonds to be posted in an amount and form acceptable to Oblige to bond off such Claims. Surety shall indemnify, defend and hold Oblige harmless from any such Claims together with any and all attorney's fees, costs and expenses or liability in any manner arising out of or in connection therewith.
4. The Surety hereby waives notice of any alteration or extension of time made by the Owner. The Surety hereby also waives notice of any changes in the scope of the Contract, including changes to the contract amount.

Notice of claim to the Surety under the bond shall be sent to the following address.

SIGNED AND SEALED this the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_  
PRINCIPAL

TITLE: \_\_\_\_\_

\_\_\_\_\_  
SURETY

TITLE: \_\_\_\_\_

\_\_\_\_\_  
ADDRESS

\_\_\_\_\_  
CITY STATE ZIP CODE



## MEMPHIS INTERNATIONAL AIRPORT

## APPLICATION FOR PAYMENT NO. \_\_\_\_

TO: MEMPHIS-SHELBY COUNTY AIRPORT AUTHORITY

 REGARDING CONTRACT FOR: **MSCAA PROJECT NO. 18-1413-01**  
**TAXIWAY ALPHA WEST RECONSTRUCTION – CONSTRUCTION**

CONTRACTOR: CONTRACTOR

FOR WORK ACCOMPLISHED FROM \_\_ TO \_\_

STATUS OF CONTRACT:

ORIGINAL CONTRACT PRICE: **\$0.00**

APPROVED CONTRACT AMENDMENTS:

No. 1 Approved	MM/DD/YYYY	Adds <u>0</u> days	<b>\$0.00</b>
No. 2 Approved	MM/DD/YYYY	Adds <u>0</u> days	<b>\$0.00</b>
No. 3 Approved	MM/DD/YYYY	Adds <u>0</u> days	<b>\$0.00</b>
No. 4 Approved	MM/DD/YYYY	Adds <u>0</u> days	<b>\$0.00</b>
No. 5 Approved	MM/DD/YYYY	Adds <u>0</u> days	<b>\$0.00</b>
No. 6 Approved	MM/DD/YYYY	Adds <u>0</u> days	<b>\$0.00</b>
<b>Total time extension:</b>		<b>Adds <u>0</u> days</b>	

TOTAL AMENDED CONTRACT PRICE **\$0.00**

NOTICE TO PROCEED DATE:

ORIGINAL COMPLETION DATE:

AMENDED COMPLETION DATE:

REMARKS:

<b>TOTAL INSTALLED TO DATE</b>		
previously installed to date	<b>\$0.00</b>	
this application installed	<b>\$0.00</b>	<b>\$0.00</b>
<b>plus STORED MATERIALS</b>		
previously stored materials	<b>\$0.00</b>	
this application stored materials	<b>\$0.00</b>	<b>\$0.00</b>
<b>less PREVIOUSLY CERTIFIED FOR PAYMENT</b>		<b>\$0.00</b>
<b>equals AMOUNT DUE THIS APPLICATION</b>		<b>\$0.00</b>

CONTRACTOR'S CERTIFICATION:

The undersigned Contractor certifies that (1) all previous progress payments received from Owner on account of Work done under the Contract referred to above have been applied to discharge in full all obligations of Contractor incurred in connection with Work covered by prior Application for Payment number 0 through \_\_\_\_ inclusive; and (2) title to all materials and equipment incorporated in said Work or otherwise listed in or covered by this Application for Payment will pass to Owner at time of payment free and clear of all liens, claims, security interests and encumbrances (except such as covered by Bond acceptable to Owner). Progress status is as described in schedule under monthly construction payment request.

Dated: MM/DD/YYYY

State of: TennesseeCounty of: Shelby

Subscribed and sworn to before me this \_\_\_\_\_ day of \_\_\_\_\_, YYYY.

Notary Public: \_\_\_\_\_

CONTRACTOR:  
ContractorBY: \_\_\_\_\_  
Signatory  
Title

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

PROGRAM MANAGER'S RECOMMENDATION:

Payment of the above AMOUNT DUE THIS APPLICATION to CONTRACTOR is recommended.

DATED:

BY: \_\_\_\_\_  
Program Manager Signatory  
Title

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## DIVISION 0 - SECTION 00640

## Business Diversity Monthly Compliance Report

MSCAA Project. Name and Number: Taxiway Alpha West Reconstruction - Construction  
(18-1413-01) Date: \_\_\_\_\_

To: Memphis Shelby County Airport Authority From: Name: \_\_\_\_\_  
 Attn: ReGina Armstrong Company: \_\_\_\_\_  
 2491 Winchester Rd., Ste. 113 Address: \_\_\_\_\_  
 Memphis, TN 38116-3856 Ph: \_\_\_\_\_  
 Owner Gender & Ethnicity: \_\_\_\_\_

For the month ending \_\_\_\_\_, I certify that the current payment for this contract was satisfied by the means shown below:

Name, Address, & Phone No. of All Subcontractors	Company Code	Current Payment Amt.	Check No.	Total for Calendar Year	Cumulative Total to Date	Gender	Ethnicity

**PLEASE PROVIDE PROOF OF YOUR PAYMENT AMOUNT TO YOUR SUB CONTRACTORS.**

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

**Gender Code:** M=Male, F=Female

**Proof of Payments:** Copy of Check, or Copy of E-Payment Confirmation

**Company Code:** DBE =Disadvantaged Business Enterprise, MOC=Majority Owner Company, INC=Incorporated/Partnership,  
 CM/WBE = M/WBEs the owners of which have been certified as having a personal net worth less than \$1.32mil

**Ethnicity Code:** B=Black, H=Hispanic, N=Native American, AA=Asian American, APA=Asian Pacific American, SCA=Sub  
 Continent Asian, NM=Non-Minority, C=Caucasian & O=Other

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**DIVISION 0 – SECTION 00661**  
**DAVIS-BACON WAGE DETERMINATION**

**GENERAL DECISION NUMBER: TN20220147 02/25/2022**

**Superseded General Decision Number: TN20210147**

State: Tennessee

Construction Type: Highway

Counties: Tennessee Statewide.

**HIGHWAY CONSTRUCTION PROJECTS**

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60).

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:	. Executive Order 14026 generally applies to the contract. . The contractor must pay all covered workers at least \$15.00 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2022.
If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:	. Executive Order 13658 generally applies to the contract. . The contractor must pay all covered workers at least \$11.25 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2022.

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at <https://www.dol.gov/agencies/whd/government-contracts>.

**ISSUED FOR BID**

00661  
Page 1

## Modification Number    Publication Date

0            01/07/2022

1            02/25/2022

\* SUTN2016-001 07/13/2016

## Rates            Fringes

BRICKLAYER.....\$ 14.26 \*\*

CARPENTER.....\$ 17.52

CEMENT MASON/CONCRETE FINISHER...\$ 15.55

ELECTRICIAN.....\$ 24.08

## IRONWORKER

Reinforcing.....\$ 16.29

Structural.....\$ 16.89

## LABORER

Common/Unskilled.....\$ 13.11 \*\*

## Skilled

Air Tool Operator,

Asphalt Raker, Chain Saw

Operator, Concrete Mixer

(less than 1 yd),

Concrete Rubber, Edger,

Fence Erector, Form

Setter (steel), Guard

Rail Erector, Mechanic's

Tender (tire changer or

oiler), Mortar Mixer,

Nozzleman or Gun Operator

(gunite), Pipelayer,

Sign Erector.....\$ 15.27

PAINTER (INCLUDES SANDBLASTER)...\$ 26.36

## POWER EQUIPMENT OPERATOR:

## GROUP 1

Backhoe/Hydraulic

Excavator (3/4 yd &amp;

over), Crane (less than

20 Tons), End Loader (3

yd &amp; over), Motor Patrol

(finish), Piledriver,

Dragline.....\$ 19.14

## GROUP 1A

Drill Operator (Caisson)...\$ 25.26

Farm Tractor Operator

(Power Broom).....\$ 13.50 \*\*

## GROUP 2

Backhoe/Hydraulic



Excavator (less than 3/4  
yd), Bulldozer or Push  
Dozer, End Loader (less  
than 3 yd), Motor Patrol  
(rough), Tractor  
(crawler/ utility), Truck  
Driver (Heavy Duty, Off  
Road) Scraper, Shovel, or  
Trenching Machine.....\$ 17.08

**GROUP 3**

Asphalt Paver, Concrete  
Finishing Machine,  
Concrete Paver, Scale,  
Spreader (self-  
propelled), Concrete  
Grinder, Asphalt Milling  
Machine, Boring Machine  
(horizontal).....\$ 17.75

**GROUP 4**

Bobcat, Central Mining  
Plant, Concrete Pump,  
Concrete Saw, Curb  
Machine (automatic or  
manual), Dozer or Loader  
(stockpile), Drill  
(piling), Mulcher or  
Seeder, Rock Drill (truck  
mounted), Roller  
(asphalt), Roller  
(compaction self-  
propelled), Soil  
Stabilization Machine,  
Tractor (boom and hoist),  
Bituminous Distributor  
Machine, pump, Track  
Drill, Striping Machine....\$ 16.48  
Heavy Duty Mechanic.....\$ 20.33  
Light Duty Mechanic.....\$ 19.53  
Sweeping Machine (Vacuum)  
Operator.....\$ 15.56

**GROUP 5**

Crane (over 20 Tons).....\$ 20.44

**TRUCK DRIVER**

2 axles.....\$ 15.36  
3-4 axles.....\$ 14.86 \*\*  
5 or more axles.....\$ 16.27

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**WELDERS** - Receive rate prescribed for craft performing operation to which welding is incidental.

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\*\* Workers in this classification may be entitled to a higher minimum wage under Executive Order 14026 (\$15.00) or 13658 (\$11.25). Please see the Note at the top of the wage determination for more information.

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at <https://www.dol.gov/agencies/whd/government-contracts>.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

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The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

#### Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

#### Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

#### Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

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#### WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- \* an existing published wage determination
- \* a survey underlying a wage determination
- \* a Wage and Hour Division letter setting forth a position on a wage determination matter
- \* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour National Office because National Office has responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

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

Branch of Construction Wage Determinations  
Wage and Hour Division  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

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

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

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

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

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

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

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**END OF GENERAL DECISION**

**ISSUED FOR BID**

**END OF SECTION 00661**

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**DIVISION 0 – SECTION 00663**

**LABOR STANDARDS INTERVIEW**

In accord with Davis-Bacon Requirements, the Contractor shall permit Owner to conduct interviews with employees during working hours on the job. These interviews will be conducted at least once every three months with one person employed by the Contractor and one person employed by each of the subcontractors (and sub-subcontractors to all tiers of the project, as applicable). Any and all employees subject to payment minimum wages per Davis-Bacon Requirements may be selected for interviews. The frequency and quantity of interviews may be increased or decreased at the Owner's sole discretion. The interview form on the next page will be used to conduct each interview and will be available to the Contractor upon request.

**END OF SECTION 00663**

Memphis-Shelby County Airport Authority  
Labor Standards Interview Form



SECTION 1 – TO BE COMPLETED BY INTERVIEWER UNDER INTERVIEWEE'S OBSERVATION

Project Name: Taxiway Alpha West Reconstruction - Construction Project Number: 18-1413-01

Interviewee's Name: \_\_\_\_\_

Work Classification: \_\_\_\_\_ Interviewee's Wage Rate: \_\_\_\_\_

Interviewee's Employer: \_\_\_\_\_

Interviewee's Supervisor: \_\_\_\_\_

Do you work over 8 hours per day? Yes ☐ No ☐

Do you work over 40 hours per week? Yes ☐ No ☐

Are you paid at least time and a half for overtime hours? Yes ☐ No ☐

Are you receiving any cash payments for fringe benefits required by the posted wage determination decision? Yes ☐ No ☐

Are there deductions other than taxes and social security made from your pay? Yes ☐ No ☐

If yes to previous question, describe deductions: \_\_\_\_\_

What tools do you use? \_\_\_\_\_

**The above information is correct to the best of my knowledge**

Interviewee's Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Interviewer's Signature: \_\_\_\_\_ Date: \_\_\_\_\_

SECTION 2 – TO BE COMPLETED BY INTERVIEWER SEPARATE FROM INTERVIEWEE

Work being completed by interviewee at time of interview: \_\_\_\_\_

Are wage rates and posters displayed? Yes ☐ No ☐

SECTION 3 – TO BE COMPLETED BY PAYROLL CHECKER

Is interviewee properly classified and paid? Yes ☐ No ☐

Is above information in agreement with payroll data? Yes ☐ No ☐

Checker's Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**DIVISION 0 – SECTION 00765****SUPPLEMENTAL PROVISIONS****00765-01 CONTRACTOR'S FIELD OFFICE**

A Contractor's field office is required for this project. Contractor shall keep on file at the project site copies of contract drawings, shop drawings, specifications, and other records pertaining to the project, in good condition, and readily accessible to the Contractor, Owner, Engineer, and all parties concerned.

**00765-02 PROTECTION OF PERSONS AND PROPERTY**

**00765-02.1** The Contractor shall be responsible for initiating, maintaining and supervising safety and anti-substance abuse precautions and programs in connection with the Work, and shall provide all protection to prevent injury to all persons involved in any way in the Work and all other persons, including, without limitation, the employees, agents, guests, visitors, invitees and licensees of the Owner who may visit or be affected thereby. These precautions shall include, but in no event be limited to: the posting of danger signs and personal notification to all affected persons of the existence of a hazard of whatever nature; the furnishing and maintaining of necessary traffic control barricades and flagman services; the use, or storage, removal and disposal of required explosives or other hazardous materials only under the supervision of qualified personnel and after first obtaining permission of all applicable governmental authorities; and the maintenance of adequate quantities of both hose and operable fire extinguishers at the job site. The Contractor shall set forth in writing its safety and anti-substance abuse precautions and programs in connection with the Work and, if requested by the Owner, submit the same to the Owner for review. The Owner may, but shall not be obligated to, make suggestions and recommendations to the Contractor with respect thereto.

**00765-02.2** All Work, whether performed by the Contractor, its Subcontractors or Sub-Subcontractors, or anyone directly or indirectly employed by any of them, and all equipment, appliances, machinery, materials, tools and like items incorporated or used in the Work, shall be in compliance with, and conform to: (a) all applicable laws, ordinances, rules, regulations and orders of any public, quasi-public or other governmental authority relating to the safety of persons and their protection against injury, specifically including, but in no event limited to, the Federal Occupational Safety and Health Act of 1970, as amended, and all rules and regulations now or hereafter in effect pursuant to said Act; and (b) all codes, rules, regulations and requirements of the Owner and its insurance carriers relating thereto. In the event of conflicting requirements, the more stringent shall govern.

**00765-02.3** The Contractor shall designate a responsible member of its organization at the Job site as the Project Safety Officer, whose duties it shall be to enforce the Contractor's safety and anti-substance abuse programs, to assure compliance with the Contract Documents and to prevent accidents. This person shall have enforcement authority and be responsible for carrying out the relevant duties and be designated in writing by the Contractor and approved by the Owner. The Contractor shall further cause each of its Subcontractors and Sub-Subcontractors to designate a responsible supervisory representative to assist the Contractor's Project Safety Officer representative in the performance of their duties as aforesaid.

**00765-02.4** Should the Contractor fail to provide a safe area for the performance of the Work or any portion thereof, the Owner shall have the right, but not the obligation, to suspend Work in the unsafe area. All costs of any nature (including, without limitation, overtime pay) resulting from the suspension, by whomsoever incurred, shall be borne by the Contractor.

**00765-02.5** The Contractor shall provide to each worker on the job site the proper safety equipment for the duties being performed by that worker and will not permit any worker on the job site who fails or refuses to use the same. The Owner shall have the right, but not the obligation, to order the Contractor to send a worker home for the day or to discharge a worker for their failure to comply with safe practices or anti-substance abuse policies, with which order the Contractor shall promptly comply.

**00765-02.6** The Contractor shall indemnify the Owner, from and against any and all liability, public or private, penalties, contractual or otherwise, losses, damages, costs, attorney's fees, expenses, causes of action, claims or judgments resulting either in whole or in part from any failure of the Contractor, its Subcontractors or Sub-Subcontractors or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, to comply with the provisions of the Contract. The Contractor shall not be relieved of its responsibilities under the Contract, should the Owner act or fail to act pursuant to its rights hereunder, nor shall the Owner thereby assume, nor be deemed to have assumed, any responsibilities otherwise imposed upon the Contractor by this Construction Contract, in any manner whatsoever.

**00765-02.7** The Contractor shall, throughout the performance of the Work, maintain adequate and continuous protection of all Work and temporary facilities against loss or damage from whatever cause, shall protect the property of the Owner and third parties from loss or damage from whatever cause arising out of the performance of the Work and shall comply with the requirements of the Owner, its designated agents, and its insurance carriers and with all applicable laws, codes, rules and regulations with respect to the prevention of loss or damage to property as a result of fire or other hazards. The Owner may, but shall not be required to, make periodic patrols of the job site as a part of its normal security program. In such event, however, the Contractor shall not be relieved of its aforesaid responsibilities.

**END OF SECTION 00765**



**DIVISION 0 – SECTION 00801****AIRPORT CONSTRUCTION SAFETY REQUIREMENTS****PART 1 GENERAL****1.01 SUMMARY**

- A. This section contains the minimum level of safety requirements for construction projects at Memphis International Airport.
- B. Related work:
  - 1. Other contract documents affecting construction safety include, but are not limited to, the DIVISION 0 AND DIVISION 1 specifications.

**PART 2 PRODUCTS**

Not used.

**PART 3 EXECUTION****3.01 CONTRACTOR PERSONNEL SAFETY ORIENTATION**

- A. The Contractor shall be responsible for briefing all construction personnel on the requirements contained in this section prior to their working in the construction area and at periodic intervals throughout the course of the contract. These briefings will be documented in writing.

**3.02 SCHEDULING WORK**

- A. See Specification section 01100, SEQUENCE OF CONSTRUCTION & LIQUIDATED DAMAGES.
- B. See General Provision Section 80, Paragraph 80-04, Limitation of Operations.

**3.03 CONSTRUCTION SECURITY**

- A. See Specification section 00802, AIRPORT SECURITY REQUIREMENTS.

**3.04 LIMITATION ON CONSTRUCTION**

- A. The limits of construction, material storage areas, equipment parking and other areas defined as available for the contractor's exclusive use during construction shall be identified and defined by the contractor prior to starting work on the project. Temporary barricades, flagging and flashing caution lights may be required at access points, taxiway crossings and pavement tie-ins. The type markings, barricades and flashing caution lights are designated on the construction plans and must be inspected and approved by the Airport Authority.
- B. The Contractor shall store all materials and park construction equipment, when not in use only in the areas designated on the plans or during the pre-construction conference.
- C. Stockpiling of dirt and construction materials shall be constrained in a manner preventing movement resulting from jet blast or wind in excess of 10 knots.
- D. Construction debris, waste, wrappings or loose material capable of causing damage to aircraft engines, propellers, or landing gear shall not be allowed on active aircraft movement areas. Material meeting this criteria shall be contained and removed immediately from the AOA.

- E. Open flame, welding, or torch cutting operations are prohibited in the construction area unless written permission has been given by the Airport Authority and adequate fire and safety precautions have been taken.
- F. The use or possession of explosives is prohibited on Airport property.
- G. Extensive stockpiles of construction materials will not be permitted near runway ends, runway edges, taxiways or aircraft parking aprons.
- H. Excavation and open trenches may be permitted within runway safety areas and up to the edge of structural pavement on taxiways and aprons, on a case-by-case basis, i.e. cable trenches, pavement tie-ins, etc.; but only with prior approval of the Owner and, where required, the FAA.
- I. Hazardous areas, into which no part of an aircraft may enter, (i.e., excavations, open trenches, material stockpiles, etc.) must be permanently delineated by use of barricades with alternate orange and white markings. The barricades are to be supplemented with orange flags (20x20 inch minimum) made and installed so that they are always in the extended position and properly oriented. For nighttime use, the barricades are supplemented with flashing red lights. Light intensity and barricade spacing must adequately delineate the hazardous area. Flare pots are prohibited.

Note: The Contractor shall designate an individual by name who is on call 24 hours per day for emergency maintenance of airport hazard lighting and barricades.

- J. FAA approval is required in advance of scheduled operation of any crane or other construction equipment with top elevation exceeding 300 feet mean sea level or that will penetrate any navigable surface as defined under FAR PART 77. Advance notification of intended use will be provided by the Owner well in advance of intended use.

### **3.06 CONSTRUCTION VEHICLE TRAFFIC**

- A. Access to the construction site is as shown on the plans or as directed by the Owner. No other access point is authorized unless designated in writing by the Airport Authority. Construction traffic will operate only on designated haul routes within the construction area limits.
- B. Drivers of construction vehicles will be knowledgeable of construction routes or will be escorted by other Contractor or Owner designated personnel who are knowledgeable.
- C. The Contractor will be responsible for traffic control in the various construction areas of the work site. The Contractor will not permit unauthorized personnel or vehicles on the construction site.
- D. The Contractor shall be responsible for immediate cleanup of any debris deposited along construction routes, as result of his construction traffic.
- E. Directional signing at the construction access gate and along the delivery route to work site temporary storage areas shall be as designated and approved by the Owner.
- F. Construction vehicle identification shall be as prescribed in Specification Section 00802, AIRPORT SECURITY REQUIREMENTS.
- G. No construction vehicle is authorized on any active AOA pavement surface or to enter runway safety areas without specific authorization from the Owner.

**3.07 REPORTING PROPERTY DAMAGE OR PERSONNEL INJURY**

- A. All persons involved in any accident whether personal injury, aircraft or automotive, occurring on Airport property, shall make a full report to the Airport Police (922-8298) as soon after the accident as possible. The report shall include, but not be limited to, the names, addresses of all principals and witnesses, if known, and a statement of the facts. Construction accidents fall under this category.
- B. In the event of personnel injury requiring ambulance response, the Airport Police Dispatcher, upon notification, telephone 922-8333, will call the ambulance and arrange Airport Police escort to the injury site. A written report will be prepared by the Airport Police after the injury is treated.

**END OF SECTION 00801**

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**DIVISION 0 – SECTION 00802****AIRPORT SECURITY REQUIREMENTS****PART 1 GENERAL****1.01 CONTRACTORS SECURITY AND VEHICLE PROCEDURES OVERVIEW**

- A. This overview outlines procedures concerning Airport security requirements, vehicle operation, and maintenance requirements for contractors at Memphis International Airport or any airport owned and operated by the Memphis-Shelby County Airport Authority. The sponsor Memphis-Shelby County Airport Authority (Airport Authority), airline, tenant, or concessionaire at the Airport who has hired the contractor is responsible for ensuring the contractor understands and complies with all the rules and regulations. This is a consolidated synopsis of the contractor requirements from the Airport Security Program and the Airport Rules and Regulations.

**1.02 DEFINITIONS**

- A. **Aircraft** - shall mean any contrivance known or hereinafter invented, used or designed for navigation of or flight in the air.
- B. **Air Operations Area (AOA)** - that part of the Airport used or intended to be used for landing, taking off, surface maneuvering, loading, unloading, or servicing the aircraft.
- C. **Airport** - shall mean the Memphis International Airport and/or the General DeWitt Spain Airport and/or the Charles W. Baker Airport – where applicable.
- D. **Airport Restricted Area** - area of Memphis International Airport that is not intended for public uses or access. These are areas designated by the Airport Authority as restricted areas and clearly identified with signs designating those areas as "RESTRICTED AREA." The restricted area also includes the AOA.
- E. **AOA Driver's Permit** - permit issued by the Airport Authority for operating unescorted motor vehicles on the AOA.
- F. **Construction Restricted Area** - any area, inside or outside of the Airport Restricted Area, which is fenced, or in some like manner defined by the Contractor. The Contractor is responsible for the security of the Construction Restricted Area.
- G. **Director** - shall mean the Director of Operations and Public Safety or his duly authorized representatives.
- H. **Job Site** - a predetermined geographic area with specific boundaries established by the Airport Authority.
- I. **Movement Area** - runways, taxiways, and other areas of the Airport used for taxiing, takeoff, and landing of aircraft, except loading ramps and parking areas.
- J. **Personal Escort** - remaining within sight of the individual under escort at all times while in the Airport restricted areas at a distance not to exceed 20 feet.
- K. **Public Area** - any area within Airport facilities open to the general public.
- L. **SIDA** - Security Identification Display Area.

- M. **Unescorted Identification Badge** - pictured identification badge issued by the Airport Authority, which allows bearer to enter Airport Restricted Areas where there is a job related need.
- N. **Vehicle Escort** - means the following of an authorized escort vehicle into the Airport Restricted Areas.

## **PART 2 PRODUCTS**

(No products are required in this Section.)

## **PART 3 EXECUTION**

### **3.01 AMENDMENTS AND SPECIAL NOTICES**

- A. The Contractor will be bound by any future amendments, additions, deletions, or corrections of the Airport Rules and Regulations promulgated by the Airport Authority, as dictated by changes in Federal Transportation Security Administration (TSA) regulations, as dictated by changes in Federal Aviation Administration (FAA) regulations, or safety requirements at Memphis International Airport or any airport owned and operated by Memphis-Shelby County Airport Authority.
- B. Special regulations, notices, memoranda, or directions of an operations nature of interest to persons engaged in business with the Airport Authority, as generated by the Director, shall be issued under the authority of the Airport Regulations and shall have the same effect as the Airport Rules and Regulations.
- C. The Director is authorized to interpret and construe these regulations wherever necessary, either by directions of general or specific application, and his interpretation and construction should be deemed a part of the regulations and binding upon all persons.

### **3.02 ENFORCEMENT AND COMPLIANCE WITH AIRPORT REGULATIONS**

- A. The uniformed Airport Police Officers of the Airport Authority and other representatives as designated by the Director are empowered to require compliance with Airport Rules and Regulations, ordinances of the City of Memphis, laws of the State of Tennessee, and federal rules and regulations. No authority is either hereby expressed or implied, however, that would permit any individual other than the Director to change, alter, or amend Airport Rules and Regulations.
- B. It shall be unlawful for any person to do or commit any act forbidden herein or fail to perform any act required by Airport Rules and Regulations.

### **3.03 SCOPE**

- A. All users of and persons on Airport property shall be governed by the Airport Rules and Regulations and directions of the Director. Airport Rules and Regulations are subject to change by the Airport Authority Board of Directors at any time.
- B. Airport Rules and Regulations are not intended to amend, modify or supersede federal, state, or local laws or regulations.
- C. If any portion of the Airport Rules and Regulations shall be invalid or unenforceable, all other portions shall remain in effect and be construed to achieve the purposes hereof.

### **3.04 IDENTIFICATION REQUIREMENTS**

- A. Entry into the SIDA is controlled by an automated access control system as mandated under CFR 49 Part 1540 and 1542. All persons in the SIDA must display, on the outermost garment, below the head and above the waist, an Airport-approved identification media unless under Airport approved escort.
- B. The Airport Authority will issue Airport Identification badges to the Contractor's employees who require access to the Airport Secured/Restricted Areas. The extent of the background check necessary for access into any worksite will be determined on a project by project basis. AIRPORT ID BADGES REMAIN AIRPORT AUTHORITY PROPERTY. Other identification procedures must be authorized by the Director in accordance with TSA regulations.
- C. Recent changes to Federal TSA Regulations provide for individual sanctions against employees who violate regulatory requirements. Individual employees may be subject to federal enforcement action by the TSA to include civil penalties. Some examples of punishable actions would include:
  - 1. Loaning a badge to someone else for use in the system.
  - 2. "Tailgating" through restricted area doors (or not using their own badge when entering or exiting).
  - 3. Failing to challenge unauthorized individuals in Airport restricted areas.
  - 4. Failing to notify proper authorities for individuals violating prescribed security regulations.
- D. The Memphis International Airport Identification Badge is the property of the Memphis-Shelby County Airport and must be surrendered upon termination of employment or completion of the project. The bearer will be held personally responsible for its return and is subject to any fines or penalties imposed. The badge is mandated through federal government guidelines and any misuse or tampering of badges is punishable under federal guidelines.
- E. Any employee attempting to bypass security measures will be subject to having their badge confiscated and access privileges terminated. Further, any efforts by an employee to circumvent prescribed security measures could result in arrest and the imposition of penalties from the TSA to the employee and to the related employer.
- F. Identification badges will be issued following the procedures listed below.
  - 1. Identification Badge Application – To be issued at Pre-Construction Meeting.
    - a. Prior to the issuance of an Airport identification badge to a contract employee of the Airport or Airport tenant, a badge application form must be prepared and submitted to the Airport Authority Identification Office.
    - b. Badge applications must be completed before badges will be issued. Employees should be instructed to print all information clearly and legibly. After an employee completes the employee and applicant portions of the application, certification by a designated MSCAA Approved Certifying Official is required.
    - c. Access is limited to only those restricted areas predicated on the Contractor's duties determined by the Development and Operations Divisions.
    - d. The Aviation Transportation Security Act (ATSA), which was passed by Congress on November 19, 2001, changed the requirements for SIDA access by requiring immediate fingerprint based background checks of all persons applying for and currently with unescorted SIDA access.

In addition, the number of disqualifying criminal offenses has increased. (See Attachment) The fingerprint based check must be complete and not reveal any

disqualifying crimes in the last 10 years prior to any applicant receiving unescorted access to the SIDA.

- e. For employees unable to produce a legible set of fingerprints, they will submit to a manual criminal history check by the TSA. The process will take 30 days or more.

2. Airport Security Briefing

- a. Each employee requesting an Airport identification badge must attend a security training class. This briefing is conducted Monday through Friday. Contact the Airport Authority Identification Office at 922-8005 for the correct time.

3. Accountability

- a. In accordance with TSA guidelines, no more than 5% of identification badges issued by the Airport Authority can be unaccounted for at any time. A badge is considered unaccounted for if it is lost, stolen or not returned. If 5% of issued identification badges are unaccounted for, all badges must be reissued. Contractors will be assessed a fee for each badge leading to this reissuance. See Section 3.04, Identification Requirements, paragraph H.1.h below for the applicable fee.
- b. Federal regulations require immediate notification of employee terminations and lost badges to the operator in charge of deleting access privileges, which, in our case, would be the Control Center, 922-8298.
- c. When the Contractor has reason to believe that the terminated employee may pose a threat to the Airport or air carrier operations, the Contractor is responsible to immediately notify the Airport Authority Identification Office in person, via telephone, or in writing whichever is most expeditious.
- d. Routine termination of employee access authority will be accomplished by the Airport Authority Identification Office **within 8 hours** of notification. The identification badge must be returned to the Airport Authority Identification Office or the Airport Authority Security Coordinator **within 24 hours** of employee dismissal or resignation. Identification cards recovered from the employee at the time of routine termination are considered to be denied access.
- e. It is the Contractor's responsibility to retrieve the Airport identification badge IMMEDIATELY upon an employee's termination (voluntary or involuntary), transfer, retirement, death, reassignment, or completion of work assignment.
- f. Reportedly lost or stolen identification badges must be thoroughly investigated and closely scrutinized. Replacement Identification badges will be issued only upon written request from the employer. Such request must be on company letterhead stationary, must state the circumstances surrounding the loss, and must be signed by an authorized company representative on file with the Airport Authority. A fee will be charged for a lost badge.
- g. Identification badges shall be valid only during the term of the contract for which it is issued.
- h. If the Airport Authority Identification Office receives notification from an outside source (e.g. Airport Police Department, etc.) that immediate denial



should be enacted, then our office will contact the proper company officials to notify them of the change that is being requested.

#### H. Identification Badge Fees.

1. After the Contractor meets all requirements, the Airport Authority shall issue the Contractor's employees automated photo identification badges for the following fees. Payment must be made according to the arrangement made with the Finance Division as indicated on the badge application. The following fees will be implemented as of September 1, 2018.

a.	Fingerprint Fee (required initially and every two years) .....	\$27.00
b.	Fingerprint Admin Fee .....	\$10.00
c.	Initial ID Badge (Includes \$11 lifetime STA fee) .....	\$25.00
d.	Deposit Per Badge .....	\$100.00
e.	Badge Renewal Fee .....	\$10.00
f.	1 <sup>st</sup> Lost Badge Fee (Refund of \$50 upon return) .....	\$100.00
g.	2 <sup>nd</sup> Lost Badge Fee (Refund of \$75 upon return) .....	\$150.00
h.	3 <sup>rd</sup> Lost Badge Fee (Refund of \$100 upon return) .....	\$200.00*
i.	Non-Returned Badge .....	\$100.00
j.	Badge Replacement .....	\$10.00
k.	Damaged Badge .....	No Charge

\*Requires meeting with Project Manager and Security Coordinator before identification badge can be replaced.

2. Deposits.
  - a. Badge deposits are due prior to the release of any badges.
  - b. Payments may be made by check, money order or cashier's check. Absolutely no cash will be accepted.
  - c. The fee for expired badges will be deducted from the deposit until the badge is returned. If an update for the expired badge is requested, the Contractor must bring the amount on deposit to \$100 before the badge can be released.
  - d. Deposits will be reimbursed to the Contractor upon receipt of the identification badges once a project has been completed or badging is no longer required.
3. Employees challenged in the Airport Restricted Areas without an Airport Identification Badge **PROPERLY DISPLAYED** will be transported to the Airport Police Office where a fine of \$25.00 will be assessed and access authority removed for a minimum of 5 days. **FINES NOT PAID WITHIN 14 DAYS OF THE VIOLATION WILL RESULT IN THE SUSPENSION OF THE EMPLOYEE'S ACCESS TO AIRPORT RESTRICTED AREAS.**

#### I. Airport Access Gate Control.

1. At the Contract preconstruction conference a specific airfield security gate will be designated in writing for Contractor ingress and egress to and from the construction site. The Contractor's, suppliers, and subcontractors are required to use **only** this gate unless designation is made in writing by the Director of Operations and Public Safety, authorizing use of a different gate.
2. Under normal circumstances the designated access gate will be manned by security personnel under contract with the Airport Authority. These gates are manned only during specific hours. Contractors scheduling work are required to coordinate with the

Construction Security Coordinator, 922-8021, a minimum of 30 days in advance of required gate use.

3. If a gate other than the regular construction gate is necessary, the Contractor must provide a guardhouse for the Airport security guard. Contractor will be required to furnish a guard house which meets the requirements as set forth in Exhibit B.
4. The Contractor will submit a projected estimate of the guard services required 30 days in advance. This projection must be submitted to the Security Coordinator. (Exhibit C)

J. Clearance Procedures.

1. Gate guards will perform the following procedures for all persons requesting entrance into restricted areas:
  - a. The guard will take possession of the badge of each person entering an access gate.
  - b. The photo is checked against the holder.
  - c. The badge information is checked against the stop list.
    - (1) If a badge is on the stop list the guard will retain the badge and notify the Airport Police.
  - d. Expiration date is checked to ensure that the badge has not expired.
  - e. The vehicle will be checked for an authorizing decal, debris and unauthorized items. A request to enter a restricted area IMPLIES CONSENT TO SEARCH.
  - f. The person or vehicle (if applicable) will be logged in by entering name, employer, destination, license number, time in and badge expiration date.
  - g. Clear persons to be escorted (if required) to destination.
2. Under special circumstances, Contractors may have airfield security gates designated for their contract use, which are not manned by security personnel. In this event the Airport Authority, with the concurrence of the TSA, will furnish the Contractor with written requirements for the control of authorized access gates proper to the beginning of any construction.

K. Escorts Into An Airport Restricted Area.

1. Contractors who do not have a valid Airport identification badge wishing to enter a restricted area must be escorted by a person holding a valid Airport identification badge.
2. All vehicles operated in a restricted area must either be driven by or escorted by a person holding an Airport identification badge and an Airport Driver's Permit.

L. Operating Without Escort.

1. The Airport Authority will take under consideration, on a case-by-case basis, the issuance of an Airport Driver's Permit to one project supervisor on each shift. The Contractor will be required to justify, in writing to the Director of Public Safety, the need for unescorted vehicle movement. This Airport Driver's Permit does not permit the holder to escort other vehicles.
2. If a Contractor is authorized by the Airport Authority to provide their own vehicle escorts, the Airport Police will conduct the necessary training. This training will consist of approximately 16 hours of classroom and practical exercises.

M. Exiting Restricted Areas.

1. Construction workers must exit the same gate they entered.
2. Upon exiting the restricted area, vehicles may be required to stop and all persons in the vehicle may be required to present an Airport photo identification badge to the gate guard.

N. Flag Persons.

1. The contractor is required to provide flag persons, as required to complete the project, including within Airport Restricted Area.

**3.05 VEHICLE PARKING AND OPERATION**

A. General.

1. All streets on the Airport shall have the status of dedicated city streets for the purpose of traffic enforcement.
2. Motor vehicles operated on the public roadways and parking lots of the Airport shall be governed by the traffic ordinance of the city and state laws applicable and, in addition thereto, the following regulations shall be applicable.

B. Traffic Rules and Regulations in the Air Operations Area.

1. The driver of any motor vehicle operating within the Airport boundary shall comply with the lawful orders, signals or directives of Airport Police Officers.
2. All drivers operating motor vehicles within the Airport boundary must possess a valid state driver's license.
3. Only drivers possessing a valid Airport Driver's Permit issued by the Airport Authority are authorized to operate any motorized vehicle unescorted on the AOA of Memphis International Airport. (The Security Coordinator may designate certain construction areas as void of this requirement)
4. Riding on trailer hitches, fenders, or on any portion of a vehicle not equipped with proper seats, running boards, or handholds is prohibited. Standing up in a moving motor vehicle, riding outside of a moving motor vehicle, or riding with arms or legs protruding from the body of the vehicle is prohibited.
5. All vehicle lights shall be lighted during the hours of darkness or during the time of reduced visibility when said vehicle is being operated in the restricted area.
6. No person shall operate any motorized vehicle when vision is restricted due to the load being carried, or for any other reason.
7. No person under the influence of alcoholic beverages or narcotic drugs shall operate any motor vehicle or motorized equipment on the Airport.

8. It shall be the responsibility of the operator to ascertain that the vehicle is in good operating condition. Operators are required to check proper operation of the vehicle's brakes before commencing any operation on airport.
9. Vehicles dripping oil, gasoline, water, or debris of any kind, shall be restricted.
10. Pedestrians and aircraft shall at all times have right-of-way over vehicular traffic. All vehicles must pass to the rear of taxiing aircraft.

C. Radio Equipment.

1. All vehicles operating in the aircraft movement area must be equipped with a two-way radio and, when the movement area is being controlled, be in continuous communication with the Control Tower, unless being escorted by authorized escort vehicle.
2. The installation of two-way radios does not permit the operation of vehicles on the Airport without proper authorization of the Director.
3. Flagmen operating within the AOA shall be required to be equipped with VHF handheld radios, as required to safely perform their duties.

D. Contractor Employee Parking.

1. Employee parking is not available on the job site. The Contractor must provide for remote parking for employees and transport them to the job site.

E. Authorized Contractor Vehicles.

1. Unless otherwise authorized, the Contractor and each subcontractor shall be permitted to have no more than one (1) vehicle per trade on the job site. All Contractor vehicles authorized access to Airport restricted areas shall be:
  - a. Owned or hired by the Contractor or subcontractor;
  - b. Insured under company policy;
  - c. On a pre-approved list; and
  - d. Marked in accordance with Airport regulations.
2. Passenger type vehicles, including pickup trucks, must have the company name displayed on each front door of the vehicle. The company name must be readable, but at a minimum (the letter size shall be 4.5"). The vehicle must display the appropriate Airport registration decal. Specialized equipment such as bulldozers, cranes, etc., will be exempted from this requirement.
3. Cranes used during daylight hours shall have a red flag affixed to the top of boom. Cranes shall have a red obstruction light on the top of boom when used at night. Crane booms shall not be left erect when not in use or following end of workday.

F. Emergency Vehicles and Conditions.

1. Any person operating a motor vehicle on the air operations area shall immediately yield the right-of-way to the police, ambulance, fire department, or other emergency vehicle giving an audible or visual signal or as otherwise directed by an Airport law enforcement officer or fire/rescue department personnel.
2. Emergency conditions existing on the air operations area will not mitigate or cancel existing regulations for non-emergency vehicles in areas not affected by the emergency.

3. Under emergency conditions such as an aircraft accident or fire, access to the scene is denied to all vehicles or persons except those whose duties require their presence. Permits and licensing shall be rendered invalid in the area of emergency conditions and the Airport Authority shall determine when normal operations may be resumed.

G. Passing Aircraft.

1. All vehicles shall pass to the rear of taxiing aircraft and shall pass no nearer than 100 feet horizontal distance.

H. Passenger Concourse.

1. No motorized vehicles or carts of any type shall be used in any concourse or terminal lobby unless approved by the Director.
2. No vehicle or motorized equipment shall be driven under concourses except at authorized vehicle pass-throughs designated by the Director.

I. AOA Driving Lanes.

1. Vehicles on the aircraft parking apron at the terminal and air cargo buildings shall be operated within the marked driving lanes and in compliance with marked traffic control signs except for the following:
  - a. Authorized vehicles engaged in parking apron repair and inspection; and
  - b. Vehicles exceeding a width of 12 feet which shall follow marked lanes as closely as possible.
2. Vehicles shall enter and exit designated driving lanes at a point nearest to the origin and destination.
3. No vehicles or equipment shall be parked in a manner as to obstruct any portion of the driving lanes.

J. Taxiing Aircraft.

1. Vehicles shall yield to taxiing aircraft or aircraft under tow.

K. Speed Limits.

1. No person shall operate a motor vehicle or other motorized equipment at a speed greater than the following:
  - a. Five miles per hour in designated drives under the terminal;
  - b. Fifteen miles per hour on paved service roads in the vicinity of the terminal and air cargo buildings; or
  - c. Twenty-five miles per hour on all aprons or ramps unless the area has an otherwise posted speed limit.
  - d. Fifteen miles per hour on all aprons or ramps unless the area has an otherwise posted speed limit.

L. Inspection of Vehicles.

1. Contractors authorized to operate vehicles on the air operations area shall be responsible for ensuring that each motor vehicle is inspected at least each 12 months by a qualified mechanic, is in good mechanical condition and has all the required safety equipment.
2. The Contractor shall remove from service any vehicle, which, in the opinion of the Director, is defective and in need of repair and said vehicle will not be returned to service until properly repaired.

M. Violations of Restricted Area Traffic Regulations.

1. The penalties for a violation of restricted area traffic regulations shall be as follows:
  - a. First offense within any 12-month period: retraining;
  - b. Second offense within any 12 month period: retraining and fine not to exceed \$50.00;
  - c. Third offense within any 12 month period: retraining and fine not to exceed \$100.00; and
  - d. Fourth offense within any 12 month period: revocation of privilege to drive in restricted area (unescorted or escorted).
2. The above set penalties do not negate the right of the Airport Authority to immediately revoke driving privileges, dependent upon the seriousness of the violation.

N. Vehicle Registration.

1. The Contractor shall list all construction vehicles requiring passage through the access gate on the "AOA Access Decal Request Form," which will be provided upon request.
2. Each vehicle approved will be issued a windshield decal, which must be affixed to the driver's side of the windshield. This decal is not transferable. Only those vehicles so marked will be allowed through the access gate with the following exceptions:
  - a. dump trucks;
  - b. concrete trucks;
  - c. vehicles making deliveries; and
  - d. cranes, tractor, etc.

O. Delivery Vehicles.

1. Each day the Contractor shall give the access gate guard a written list of deliveries expected. No delivery will be cleared into the restricted area unless it is on the list or the construction supervisor is contacted for clearance.

**3.06 GENERAL INFORMATION**

A. Access to Public Facilities.

1. Contractor employees are not authorized to use public facilities, (i.e., rest rooms, eating facilities, boarding gate hold rooms or other public areas of the terminal), except as specifically authorized by the Airport Authority and as necessary for access to job site.

2. Contractors shall provide adequate rest room and break facilities within the job site and staging areas as appropriate.
3. All public areas authorized for use by the Contractor's employees are to be kept in a clean and sanitary manner, free of all construction debris.

**B. Accident Reports.**

1. All persons involved in any accident whether personal injury, aircraft or automotive, occurring on Airport property, shall make a full report to the Airport Police (922-8298) as soon after the accident as possible. The report shall include, but not be limited to, the names, addresses of all principals and witnesses, if known, and a statement of the facts. Construction accidents fall under this category
2. To request paramedics call 922-8333.

**C. Airport Rules and Regulations.**

1. The Contractor shall conform to the "Memphis-Shelby County Airport Authority Rules and Regulations."
2. The Contractor shall conform to "Memphis-Shelby County Airport Authority's Air Operations Area Rules and Regulations and its Airport Security Program."

**D. Alcoholic Beverages and Narcotic Drugs.**

1. No person shall have any alcoholic beverages or narcotic drugs on Airport property.

**E. Damages.**

1. Contractors shall be fully responsible for all damages to buildings, equipment, real property and appurtenances in the ownerships or custody of the Airport Authority caused by negligence, abuse or carelessness on the part of their employees, agents, customers, visitors, suppliers or persons with whom they do business.

**F. Disorderly Conduct.**

1. No person shall commit any disorderly, obscene or indecent act nor commit any nuisance.
2. Abusive behavior by Contractor supervisors or their employees will not be tolerated.

**G. Debris and Cleanup.**

1. No person shall dispose of any garbage, trash, refuse or any other material on the Airport except in the receptacles provided for that purpose.
2. No person shall dispose of any fill or building materials or any other materials on Airport property except in such areas as are specifically designated by the Director.
3. Contractors are responsible for the cleanliness of the job site and access to the job site as appropriate. All Contractors must establish an active ongoing program to eliminate any foreign objects which may cause damage to aircraft or cause personal injury to other persons. Contractors must pay particular attention to haul routes used to and from the job site to clean up any debris which may be tracked onto or dropped on the air operations area. Contractor will immediately remove such debris to eliminate the hazard. **END OF**

**THE WORKDAY CLEANUP WILL NOT SUFFICE.** Cleanup shall be done to the satisfaction of the Airport Authority. All Active taxiway crossings and work areas adjacent to the taxiways shall be kept clean.

4. If it should become necessary for the Airport Authority to remove debris left by a Contractor, the Contractor shall be billed at 2 1/2 times the actual cost of the cleanup or a minimum of \$250 per trip whichever is greater.

H. Firearms and Explosives.

1. No person shall have any firearm, explosive or incendiary device on or about their person or accessible property while on Airport property.

I. Fire Equipment.

1. All Contractors shall supply and maintain adequate and readily accessible fire extinguishers for the particular hazard involved as directed by the Airport Authority or the Fire Marshal. All fire apparatus shall be maintained in first class operable condition.
2. The Contractor shall maintain the following items on site:
  - a. Two-pound dry chemical extinguisher, or
  - b. Four-pound carbon dioxide extinguisher.
3. Carbon tetrachloride chlorobromethene or other vaporizing liquid extinguishers are not permitted inside buildings due to their high toxicity unless approved in writing by the Fire Marshal.

J. Gambling.

1. No person shall conduct gambling in any form or operate gambling devices anywhere on Airport property.

K. Hazards.

1. No person shall use flammable volatile liquids having a flash point of less than 100°F in cleaning of parts, appliances, or for any other purpose unless such operations are conducted in the open air not within 50 feet of an aircraft, away from structures and equipment or in properly ventilated, approved paint booths.
2. No person shall keep or store any flammable liquids, gases, oil, oil wastes, flares, paints, or other similar material in any building within the Airport boundary except that such materials may be kept in specially provided rooms or receptacles approved by the Fire Marshal.
3. Contractors shall provide suitable metal receptacles with covers for the storage of wastes, rags, or other rubbish.
4. No person shall start any open fires of any type, including flare posts, torches or fires in containers formerly used for oil, paint, or similar materials on any part of an Airport without permission of the Director.

L. Picketing and Public Demonstrations.

1. Subject to applicable federal, state and local regulations and laws, no persons shall walk in a picket line as a picketer or take part in any labor or other public demonstration on



any Airport property or facilities therein except in those places which may be specifically assigned for use of such picket lines or other public demonstration by the Director.

M. Restricted Areas.

1. No persons shall enter any area posted as being restricted or closed to the public except for the following:
  - a. Persons assigned to duty therein;
  - b. Persons authorized by the Director; or
  - c. Persons under contractual agreement with the Airport Authority or tenants of the Airport Authority.
2. All persons in restricted areas of Memphis International Airport must be duly authorized and must have displayed on their person an official identification badge which will clearly establish the individual by name, contractor affiliation, and construction project completion date.
3. The identification badge must be worn on the outermost garment above the waist except in those cases where there exists an overriding safety consideration approved by the FAA.

N. Signs on the Airport.

1. Signs may not be installed in public view on the Airport without prior approval of the Airport Authority. Proposals should be documented and submitted to the Airport Authority with an accompanying sketch depicting the general appearance and location of the desired sign, and the name and telephone number of an individual to contact.

O. Smoking.

1. No person shall smoke or carry lighted cigars, cigarettes, pipes, matches or any naked flame in or on any fuel storage areas, Air Operations Area, public aircraft parking and storage area, in any other place where smoking is specifically prohibited by signs or upon any open space within 50 feet of any fuel carrier which is not in motion. Smoking by tank vehicle drivers, helpers, repairmen, or other personnel is prohibited while they are driving, making deliveries, filling or making repairs to tank vehicles. No person shall smoke or permit any open flame within 100 feet of any aircraft undergoing fuel service or within at least 50 feet of any hangar or building.

P. Storage of Equipment.

1. Contractors shall store or stock material or equipment in a neat and orderly manner and in a manner not to constitute a hazard to personnel or property.

Q. Trash Containers.

1. Areas to be used for trash and garbage containers shall be designated by the Director and no other areas shall be used. Only trash containers approved by the Director shall be used by contractors for the collection of trash and garbage. The placement of trash or garbage outside approved containers is strictly prohibited.

R. Utilities.

1. The following instructions must be adhered to without exception:

- a. No contractor or employee for any craft shall turn off any utilities without contacting the Airport Authority. This includes water, electrical and HVAC;
  - b. No one shall open any electrical substations, distribution or motor control centers without first notifying the Airport Authority. No branch circuits shall be turned off or on, without obtaining permission from the Airport Authority; and
  - c. No one shall turn off the water or the HVAC or open any drain lines without notifying the Airport Authority.
2. All notifications for utility disruption must be made through the Airport Authority and must be made a minimum of 14 days prior to scheduled shutoff.
3. The Airport Authority has a responsibility to keep the Airport in operation; it is your responsibility to conform to the above instructions. You may contact the Airport Authority.

FOR ANY QUESTIONS CONCERNING SECURITY REGULATIONS CONTACT THE SECURITY COORDINATOR AT 901/922-8021.

**END OF SECTION 00802**

**EXHIBIT B**

**GUARD HOUSE SPECIFICATIONS**

1. No less than 5' x 8'
2. Heated, air conditioned and lighted
3. Counter or table (minimum size 16" x 36")
4. House must have two doors to allow guards to check entering and exiting vehicles.
5. Windows on all sides, large enough for guard to observe restricted areas from a seated position.
6. Chair with turning radius of 360 degrees, at a height which allows guards to observe restricted areas through windows.
7. Trash can (dumping daily responsibility of Contractor)

**PORTABLE TOILETS**

1. Daily cleanliness responsibility of Contractor
2. Restricted to guards only. NO CONSTRUCTION PERSONNEL PERMITTED.

**PLACEMENT OF GUARD HOUSES AND PORTABLE TOILETS**


1. Area to be designated by Airport Authority
2. Clear Accessibility (paved or gravel)

The Contractor is responsible for supplying and maintaining power source for the guard houses. The contractor is also responsible for maintaining the heating and cooling of same.

**END OF EXHIBIT B**

## EXHIBIT C

## CONTRACT SECURITY SERVICE PROJECTION FORM (.PDF VERSION IS AVAILABLE)



# CONTRACT SECURITY SERVICE PROJECTION FORM

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CONSTRUCTION

**A CONTRACT SECURITY SERVICE PROJECTION FORM SHOULD BE SUBMITTED TO THE AIRPORT SECURITY COORDINATOR EACH THURSDAY NO LATER THAN 12:00 PM FOR THE FOLLOWING WEEK. CONTRACT SECURITY SERVICES MAY NOT BE AVAILABLE IF AN ACCURATE PROJECTION FORM IS NOT RECEIVED ON TIME. IF YOU HAVE ANY QUESTIONS CONTACT THE MSCAA SECURITY COORDINATOR AT 901-922-8021 OR EMAIL @CROBINSON@FLYMEMPHIS.COM.**

**IMPORTANT NOTE:** THIS FORM MUST BE FILLED OUT COMPLETELY & SIGNED PRIOR TO SUBMITTAL.

PROJECTED SCHEDULE FOR THE WEEK OF:		SCHEDULE				
COMPANY NAME:		DAY	DATE	OPEN TIME	CLOSE TIME	SIGN IN TIME <small>(FOR OFFICIAL USE ONLY)</small>
PROJECT NAME:		SUNDAY				
PROJECT NUMBER:		MONDAY				
LOCATION:		TUESDAY				
POINT OF CONTACT:		WEDNESDAY				
PHONE#:		THURSDAY				
		FRIDAY				
		SATURDAY				

**IMPORTANT NOTE:** A 24 HOUR NOTICE IS REQUIRED FOR ANY CHANGES TO A SUBMITTED SCHEDULE.

COMPANY AUTHORIZED SIGNATORY AUTHORIZATION/VERIFICATION

(LAST NAME)

(FIRST)

(MI)

(SIGNATURE)

(COMPANY)

(DATE)

(CONTACT TEL #)

ALL REQUESTS FOR SERVICE MUST BE MADE BY AN AIRPORT AUTHORIZED SIGNATORY

CS FM03 - CONTRACT SECURITY SERVICE PROJECTION FORM

END OF EXHIBIT C

## Part 1 – General Contract Provisions

### Section 10 Definition of Terms

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

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

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

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

<b>Paragraph Number</b>	<b>Term</b>	<b>Definition</b>
		Resident Project Representative (RPR) to be necessary to complete the work within the intended scope of the contract as previously modified.
<b>10-28</b>	<b>FAA</b>	The Federal Aviation Administration. When used to designate a person, FAA shall mean the Administrator or their duly authorized representative.
<b>10-29</b>	<b>Federal Specifications</b>	The federal specifications and standards, commercial item descriptions, and supplements, amendments, and indices prepared and issued by the General Services Administration.
<b>10-30</b>	<b>Force Account</b>	<p><b>a.</b> Contract Force Account - A method of payment that addresses extra work performed by the Contractor on a time and material basis.</p> <p><b>b.</b> Owner Force Account - Work performed for the project by the Owner's employees.</p>
<b>10-31</b>	<b>Intention of Terms</b>	<p>Whenever, in these specifications or on the plans, the words “directed,” “required,” “permitted,” “ordered,” “designated,” “prescribed,” or words of like import are used, it shall be understood that the direction, requirement, permission, order, designation, or prescription of the Engineer and/or Resident Project Representative (RPR) 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 and/or RPR, subject in each case to the final determination of the Owner.</p> <p>Any reference to a specific requirement of a numbered paragraph of the contract specifications or a cited standard shall be interpreted to include all general requirements of the entire section, specification item, or cited standard that may be pertinent to such specific reference.</p>
<b>10-32</b>	<b>Lighting</b>	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.
<b>10-33</b>	<b>Major and Minor Contract Items</b>	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



<b>Paragraph Number</b>	<b>Term</b>	<b>Definition</b>
		20% of the total amount of the award contract. All other items shall be considered minor contract items.
<b>10-34</b>	<b>Materials</b>	Any substance specified for use in the construction of the contract work.
<b>10-35</b>	<b>Modification of Standards (MOS)</b>	Any deviation from standard specifications applicable to material and construction methods in accordance with FAA Order 5300.1.
<b>10-36</b>	<b>Notice to Proceed (NTP)</b>	A written notice to the Contractor to begin the actual contract work on a previously agreed to date. If applicable, the Notice to Proceed shall state the date on which the contract time begins.
<b>10-37</b>	<b>Owner</b>	The term "Owner" shall mean the party of the first part or the contracting agency signatory to the contract. Where the term "Owner" is capitalized in this document, it shall mean airport Sponsor only. The Owner for this project is <b>Memphis-Shelby County Airport Authority</b> .
10-38	Passenger Facility Charge (PFC)	Per 14 Code of Federal Regulations (CFR) Part 158 and 49 United States Code (USC) § 40117, a PFC is a charge imposed by a public agency on passengers enplaned at a commercial service airport it controls.
<b>10-39</b>	<b>Pavement Structure</b>	The combined surface course, base course(s), and subbase course(s), if any, considered as a single unit.
<b>10-40</b>	<b>Payment bond</b>	The approved form of security furnished by the Contractor and their own surety as a guaranty that the Contractor will pay in full all bills and accounts for materials and labor used in the construction of the work.
<b>10-41</b>	<b>Performance bond</b>	The approved form of security furnished by the Contractor and their own surety as a guaranty that the Contractor will complete the work in accordance with the terms of the contract.
<b>10-42</b>	<b>Plans</b>	The official drawings or exact reproductions which show the location, character, dimensions and details of the airport and the work to be done and which are to be considered as a part of the contract, supplementary to the specifications. Plans may also be referred to as 'contract drawings.'

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

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

<b>Paragraph Number</b>	<b>Term</b>	<b>Definition</b>
<b>10-61</b>	<b>Taxilane</b>	A taxiway designed for low speed movement of aircraft between aircraft parking areas and terminal areas.
<b>10-62</b>	<b>Taxiway</b>	The portion of the air operations area of an airport that has been designated by competent airport authority for movement of aircraft to and from the airport's runways, aircraft parking areas, and terminal areas.
<b>10-63</b>	<b>Taxiway/Taxilane Safety Area (TSA)</b>	A defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an aircraft. See the construction safety and phasing plan (CSPP) for limits of the TSA.
<b>10-64</b>	<b>Work</b>	The furnishing of all labor, materials, tools, equipment, and incidentals necessary or convenient to the Contractor's performance of all duties and obligations imposed by the contract, plans, and specifications.
<b>10-65</b>	<b>Working day</b>	A working day shall be any day other than a legal holiday, Saturday, or Sunday on which the normal working forces of the Contractor may proceed with regular work for at least six (6) hours toward completion of the contract. When work is suspended for causes beyond the Contractor's control, it will not be counted as a working day. Saturdays, Sundays and holidays on which the Contractor's forces engage in regular work will be considered as working days.
<b>10-66</b>	<b>Owner Defined terms</b>	See Section 150 General Provisions Addendum for additional terms.

### END OF SECTION 10

## Section 20 Proposal Requirements and Conditions

**20-01 Advertisement (Notice to Bidders).** See specification section 00100, Legal Notice to Bidders.

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

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

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

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

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

See sections C-105, 00405, and 01100 for information on Mobilization.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

## END OF SECTION 20

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## Section 30 Award and Execution of Contract

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

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

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

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

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

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

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

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

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

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

**30-06 Execution of contract.** The successful bidder shall sign (execute) the necessary agreements for entering into the contract and return the signed contract to the Owner, along with the fully executed surety

bond or bonds specified in paragraph 30-05, *Requirements of Contract Bonds*, of this section, within fifteen (15) calendar days from the date mailed or otherwise delivered to the successful bidder.

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

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

### END OF SECTION 30

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## Section 40 Scope of Work

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

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

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

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

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

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

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

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

When determined by the RPR to be in the Owner's best interest, the RPR may order the Contractor to proceed with extra work as provided in Section 90, paragraph 90-05, *Payment for Extra Work*. Extra work

that is necessary for acceptable completion of the project, but is not within the general scope of the work covered by the original contract shall be covered by a supplemental agreement as defined in Section 10, paragraph 10-59, *Supplemental Agreement*.

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

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

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

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

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

c. When the contract requires the maintenance of an existing road, street, or highway during the Contractor's performance of work that is otherwise provided for in the contract, plans, and specifications, the Contractor shall keep the road, street, or highway open to all traffic and shall provide maintenance as may be required to accommodate traffic. The Contractor, at their expense, shall be responsible for the repair to equal or better than preconstruction conditions of any damage caused by the Contractor's equipment and personnel. The Contractor shall furnish, erect, and maintain barricades, warning signs, flag person, and other traffic control devices in reasonable conformity with the Manual on Uniform Traffic Control Devices (MUTCD) (<http://mutcd.fhwa.dot.gov/>), unless otherwise specified. The Contractor shall also construct and maintain in a safe condition any temporary connections necessary for ingress to and egress from abutting property or intersecting roads, streets or highways. Unless otherwise specified herein, the Contractor will not be required to furnish snow removal for such existing road, street, or highway.

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

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

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

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

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

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

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

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

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

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

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

#### END OF SECTION 40

## Section 50 Control of Work

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

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

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

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

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

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

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

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

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

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

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

**50-04 List of Special Provisions. NOT APPLICABLE**

**50-05 Cooperation of Contractor.** The Contractor shall be supplied with one (1) hard copy or an electronic PDF of the plans and specifications. The Contractor shall have available on the construction site at all times one hardcopy each of the plans and specifications. Additional hard copies of plans and specifications may be obtained by the Contractor for the cost of reproduction.

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

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

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

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

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

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

Prior to the start of construction, the Contractor will check all control points for horizontal and vertical accuracy and certify in writing to the RPR that the Contractor concurs with survey control established for the project. All lines, grades and measurements from control points necessary for the proper execution



and control of the work on this project will be provided to the RPR. The Contractor is responsible to establish all layout required for the construction of the project.

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

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

See Section 01321 for additional surveying requirements.

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

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

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

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

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

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

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

**50-10 Removal of unacceptable and unauthorized work.** All work that does not conform to the requirements of the contract, plans, and specifications will be considered unacceptable, unless otherwise

determined acceptable by the RPR as provided in paragraph 50-02, *Conformity with Plans and Specifications*.

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

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

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

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

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

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

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

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

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

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

**50-14 Partial acceptance.** If at any time during the execution of the project the Contractor substantially completes a usable unit or portion of the work, the occupancy of which will benefit the Owner, the

Contractor may request the RPR to make final inspection of that unit. If the RPR finds upon inspection that the unit has been satisfactorily completed in compliance with the contract, the RPR may accept it as being complete, and the Contractor may be relieved of further responsibility for that unit. Such partial acceptance and beneficial occupancy by the Owner shall not void or alter any provision of the contract.

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

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

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

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

## END OF SECTION 50

## Section 60 Control of Materials

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

In order to expedite the inspection and testing of materials, the Contractor shall furnish documentation to the RPR as to the origin, composition, and manufacture of all materials to be used in the work.

Documentation shall be furnished promptly after execution of the contract but, in all cases, prior to delivery of such materials.

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

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

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

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

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

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

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

**60-03 Certification of compliance/analysis (COC/COA).** The RPR may permit the use, prior to sampling and testing, of certain materials or assemblies when accompanied by manufacturer's COC stating that such materials or assemblies fully comply with the requirements of the contract. The certificate shall be signed by the manufacturer. Each lot of such materials or assemblies delivered to the

work must be accompanied by a certificate of compliance in which the lot is clearly identified. The COA is the manufacturer's COC and includes all applicable test results.

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

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

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

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

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

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

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

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

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

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

**60-05 Engineer/ Resident Project Representative (RPR) field office. NOT REQUIRED**

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

the storage of materials on private property. Upon request, the Contractor shall furnish the RPR a copy of the property Owner's permission.

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

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

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

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

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

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

## END OF SECTION 60

## Section 70 Legal Regulations and Responsibility to Public

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

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

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

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

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

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

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

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

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

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

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

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

**70-08 Construction Safety and Phasing Plan (CSPP).** The Contractor shall complete the work in accordance with the approved Construction Safety and Phasing Plan (CSPP) developed in accordance with AC 150/5370-2, Operational Safety on Airports During Construction. The CSPP is on sheets G-PH-01 to G-PH-05 of the project plans.

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

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

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

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

**70-11 Responsibility for damage claims.** The Contractor shall indemnify and hold harmless the Engineer/RPR and the Owner and their officers, agents, and employees from all suits, actions, or claims, of any character, brought because of any injuries or damage received or sustained by any person, persons, or property on account of the operations of the Contractor; or on account of or in consequence of any neglect in safeguarding the work; or through use of unacceptable materials in constructing the work; or because of any act or omission, neglect, or misconduct of said Contractor; or because of any claims or amounts recovered from any infringements of patent, trademark, or copyright; or from any claims or amounts arising or recovered under the "Workmen's Compensation Act," or any other law, ordinance, order, or decree. Money due the Contractor under and by virtue of their own contract considered necessary by the Owner for such purpose may be retained for the use of the Owner or, in case no money



is due, their own surety may be held until such suits, actions, or claims for injuries or damages shall have been settled and suitable evidence to that effect furnished to the Owner, except that money due the Contractor will not be withheld when the Contractor produces satisfactory evidence that he or she is adequately protected by public liability and property damage insurance.

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

**70-13 Opening sections of the work to traffic.** If it is necessary for the Contractor to complete portions of the contract work for the beneficial occupancy of the Owner prior to completion of the entire contract, such “phasing” of the work must be specified below and indicated on the approved Construction Safety and Phasing Plan (CSPP) and the project plans. When so specified, the Contractor shall complete such portions of the work on or before the date specified or as otherwise specified.

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

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

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

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

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

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

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

and sodding furnished under the contract, and shall take adequate precautions to protect new tree growth and other important vegetative growth against injury.

**70-15 Contractor's responsibility for utility service and facilities of others.** As provided in paragraph 70-04, *Restoration of Surfaces Disturbed by Others*, the Contractor shall cooperate with the owner of any public or private utility service, FAA or NOAA, or a utility service of another government agency that may be authorized by the Owner to construct, reconstruct or maintain such utility services or facilities during the progress of the work. In addition, the Contractor shall control their operations to prevent the unscheduled interruption of such utility services and facilities.

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

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

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

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

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

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

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

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

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

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

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

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

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

d. Any damage to FAA cables, access roads, or FAA facilities during construction caused by the Contractor's equipment or personnel whether by negligence or accident will require the Contractor to repair or replace the damaged cables, access road, or FAA facilities to FAA requirements. The Contractor shall not bear the cost to repair damage to underground facilities or utilities improperly located by the FAA.

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

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

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

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

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

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

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

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

Should the Owner order suspension of the Contractor's operations in order to protect an archaeological or historical finding, or order the Contractor to perform extra work, such shall be covered by an appropriate contract change order or supplemental agreement as provided in Section 40, paragraph 40-04, *Extra Work*, and Section 90, paragraph 90-05, *Payment for Extra Work*. If appropriate, the contract change order or supplemental agreement shall include an extension of contract time in accordance with Section 80, paragraph 80-07, *Determination and Extension of Contract Time*.

**70-21 Insurance Requirements.** See Article 19 of Section 00500 Construction Contract.

#### END OF SECTION 70

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## Section 80 Execution and Progress

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

The Contractor shall perform, with his organization, an amount of work equal to at least twenty-five (25) percent of the total contract cost.

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

**The Contractor shall provide copies of all subcontracts to the RPR 14 days prior to being utilized on the project. As a minimum, the information shall include the following:**

- Subcontractor's legal company name.
- Subcontractor's legal company address, including County name.
- Principal contact person's name, telephone and fax number.
- Complete narrative description, and dollar value of the work to be performed by the subcontractor.
- Copies of required insurance certificates in accordance with the specifications.
- Minority/ non-minority status.

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

**80-03 Execution and progress.** Unless otherwise specified, the Contractor shall submit their coordinated construction schedule showing all work activities for the RPR's review and acceptance at least 10 days prior to the start of work. The Contractor's progress schedule, once accepted by the RPR, will represent the Contractor's baseline plan to accomplish the project in accordance with the terms and conditions of the Contract. The RPR will compare actual Contractor progress against the baseline schedule to determine that status of the Contractor's performance. The Contractor shall provide sufficient materials, equipment, and labor to guarantee the completion of the project in accordance with the plans and specifications within the time set forth in the proposal.

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

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

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

The Contractor shall maintain the work schedule and provide an update and analysis of the progress schedule on a 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.

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

When the work requires the Contractor to conduct their operations within an AOA of the airport, the work shall be coordinated with airport operations (through the RPR) at least 48 hours prior to commencement of such work. The Contractor shall not close an AOA until so authorized by the RPR and until the necessary temporary marking, signage and associated lighting is in place as provided in Section 70, paragraph 70-08, *Construction Safety and Phasing Plan (CSPP)*.

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

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

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

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

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

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

**80-05 Character of workers, methods, and equipment.** The Contractor shall, at all times, employ sufficient labor and equipment for prosecuting the work to full completion in the manner and time required by the contract, plans, and specifications.

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

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

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

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

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

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

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

In the event that the Contractor is ordered by the Owner, in writing, to suspend work for some unforeseen cause not otherwise provided for in the contract and over which the Contractor has no control, the Contractor may be reimbursed for actual money expended on the work during the period of shutdown. No allowance will be made for anticipated profits. The period of shutdown shall be computed from the effective date of the written order to suspend work to the effective date of the written order to resume the work. Claims for such compensation shall be filed with the RPR within the time period stated in the RPR's order to resume work. The Contractor shall submit with their own claim information substantiating



the amount shown on the claim. The RPR will forward the Contractor's claim to the Owner for consideration in accordance with local laws or ordinances. No provision of this article shall be construed as entitling the Contractor to compensation for delays due to inclement weather or for any other delay provided for in the contract, plans, or specifications.

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

**80-07 Determination and extension of contract time.** The number of calendar days shall be stated in the proposal and contract and shall be known as the Contract Time.

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

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

At the time of final payment, the contract time shall be increased in the same proportion as the cost of the actually completed quantities bears to the cost of the originally estimated quantities in the proposal. Such increase in the contract time shall not consider either cost of work or the extension of contract time that has been covered by a change order or supplemental agreement. Charges against the contract time will cease as of the date of final acceptance.

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

Schedule	Liquidated Damages Cost	Allowed Construction Time
Substantial Completion	\$3,000 per calendar day	475 calendar days
Phase 1A	\$5,000 per calendar day	60 calendar days
Phase 2B	\$5,000 per calendar day	60 calendar days
All Other Phases	\$2,000 per calendar day	See Phasing Plans

Schedule	Liquidated Damages Cost	Allowed Construction Time
Final Completion & Demobilization Phase	\$1,000 per calendar day	45 calendar days

Permitting the Contractor to continue and finish the work or any part of it after the time fixed for its completion, or after the date to which the time for completion may have been extended, will in no way operate as a waiver on the part of the Owner of any of its rights under the contract.

**80-09 Default and termination of contract.** The Contractor shall be considered in default of their contract and such default will be considered as cause for the Owner to terminate the contract for any of the following reasons, if the Contractor:

- a. Fails to begin the work under the contract within the time specified in the Notice to Proceed, or
- b. Fails to perform the work or fails to provide sufficient workers, equipment and/or materials to assure completion of work in accordance with the terms of the contract, or
- c. Performs the work unsuitably or neglects or refuses to remove materials or to perform anew such work as may be rejected as unacceptable and unsuitable, or
- d. Discontinues the execution of the work, or
- e. Fails to resume work which has been discontinued within a reasonable time after notice to do so, or
- f. Becomes insolvent or is declared bankrupt, or commits any act of bankruptcy or insolvency, or
- g. Allows any final judgment to stand against the Contractor unsatisfied for a period of 10 days, or
- h. Makes an assignment for the benefit of creditors, or
- i. For any other cause whatsoever, fails to carry on the work in an acceptable manner.

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

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

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

**80-10 Termination for national emergencies.** The Owner shall terminate the contract or portion thereof by written notice when the Contractor is prevented from proceeding with the construction contract as a

direct result of an Executive Order of the President with respect to the execution of war or in the interest of national defense.

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

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

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

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

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

## END OF SECTION 80

## Section 90 Measurement and Payment

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

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

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

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

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

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

### Measurement and Payment Terms

Term	Description
<b>Excavation and Embankment Volume</b>	In computing volumes of excavation, the average end area method will be used unless otherwise specified.
<b>Measurement and Proportion by Weight</b>	The term “ton” will mean the short ton consisting of 2,000 pounds (907 kg) avoirdupois. All materials that are measured or proportioned by weights shall be weighed on accurate, independently certified scales by competent, qualified personnel at locations designated by the RPR. If material is shipped by rail, the car weight may be accepted provided that only the actual weight of material is paid for. However, car weights will not be acceptable for material to be passed through mixing plants. Trucks used to haul material being paid for by weight shall be weighed empty daily at such times as the RPR directs, and each truck shall bear a plainly legible identification mark.

Term	Description
<b>Measurement by Volume</b>	Materials to be measured by volume in the hauling vehicle shall be hauled in approved vehicles and measured therein at the point of delivery. Vehicles for this purpose may be of any size or type acceptable for the materials hauled, provided that the body is of such shape that the actual contents may be readily and accurately determined. All vehicles shall be loaded to at least their water level capacity, and all loads shall be leveled when the vehicles arrive at the point of delivery.
<b>Asphalt Material</b>	Asphalt materials will be measured by the gallon (liter) or ton (kg). When measured by volume, such volumes will be measured at 60°F (16°C) or will be corrected to the volume at 60°F (16°C) using ASTM D1250 for asphalts. Net certified scale weights or weights based on certified volumes in the case of rail shipments will be used as a basis of measurement, subject to correction when asphalt material has been lost from the car or the distributor, wasted, or otherwise not incorporated in the work. When asphalt materials are shipped by truck or transport, net certified weights by volume, subject to correction for loss or foaming, will be used for computing quantities.
<b>Cement</b>	Cement will be measured by the ton (kg) or hundredweight (km).
<b>Structure</b>	Structures will be measured according to neat lines shown on the plans or as altered to fit field conditions.
<b>Timber</b>	Timber will be measured by the thousand feet board measure (MFBM) actually incorporated in the structure. Measurement will be based on nominal widths and thicknesses and the extreme length of each piece.
<b>Plates and Sheets</b>	The thickness of plates and galvanized sheet used in the manufacture of corrugated metal pipe, metal plate pipe culverts and arches, and metal cribbing will be specified and measured in decimal fraction of inch.
<b>Miscellaneous Items</b>	When standard manufactured items are specified such as fence, wire, plates, rolled shapes, pipe conduit, etc., and these items are identified by gauge, unit weight, section dimensions, etc., such identification will be considered to be nominal weights or dimensions. Unless more stringently controlled by tolerances in cited specifications, manufacturing tolerances established by the industries involved will be accepted.
<b>Scales</b>	<p>Scales must be tested for accuracy and serviced before use. Scales for weighing materials which are required to be proportioned or measured and paid for by weight shall be furnished, erected, and maintained by the Contractor, or be certified permanently installed commercial scales. Platform scales shall be installed and maintained with the platform level and rigid bulkheads at each end.</p> <p>Scales shall be accurate within 0.5% of the correct weight throughout the range of use. The Contractor shall have the scales checked under the observation of the RPR before beginning work and at such other times as requested. The intervals shall be uniform in spacing throughout the graduated or marked length of the beam or dial and shall not exceed 0.1% of the nominal rated capacity of the</p>

Term	Description
	<p>scale, but not less than one pound (454 grams). The use of spring balances will not be permitted.</p> <p>In the event inspection reveals the scales have been “overweighing” (indicating more than correct weight) they will be immediately adjusted. All materials received subsequent to the last previous correct weighting-accuracy test will be reduced by the percentage of error in excess of 0.5%.</p> <p>In the event inspection reveals the scales have been under-weighing (indicating less than correct weight), they shall be immediately adjusted. No additional payment to the Contractor will be allowed for materials previously weighed and recorded.</p> <p>Beams, dials, platforms, and other scale equipment shall be so arranged that the operator and the RPR can safely and conveniently view them.</p> <p>Scale installations shall have available ten standard 50-pound (2.3 km) weights for testing the weighing equipment or suitable weights and devices for other approved equipment.</p> <p>All costs in connection with furnishing, installing, certifying, testing, and maintaining scales; for furnishing check weights and scale house; and for all other items specified in this subsection, for the weighing of materials for proportioning or payment, shall be included in the unit contract prices for the various items of the project.</p>
<b>Rental Equipment</b>	<p>Rental of equipment will be measured by time in hours of actual working time and necessary traveling time of the equipment within the limits of the work. Special equipment ordered in connection with extra work will be measured as agreed in the change order or supplemental agreement authorizing such work as provided in paragraph 90-05 <i>Payment for Extra Work</i>.</p>
<b>Pay Quantities</b>	<p>When the estimated quantities for a specific portion of the work are designated as the pay quantities in the contract, they shall be the final quantities for which payment for such specific portion of the work will be made, unless the dimensions of said portions of the work shown on the plans are revised by the RPR. If revised dimensions result in an increase or decrease in the quantities of such work, the final quantities for payment will be revised in the amount represented by the authorized changes in the dimensions.</p>

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

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

**90-03 Compensation for altered quantities.** When the accepted quantities of work vary from the quantities in the proposal, the Contractor shall accept as payment in full, so far as contract items are concerned, payment at the original contract price for the accepted quantities of work actually completed and accepted. No allowance, except as provided for in Section 40, paragraph 40-02, *Alteration of Work and Quantities*, will be made for any increased expense, loss of expected reimbursement, or loss of anticipated profits suffered or claimed by the Contractor which results directly from such alterations or indirectly from their own unbalanced allocation of overhead and profit among the contract items, or from any other cause.

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

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

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

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

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

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

a. Retainage will not be withheld on this project. No retainage will be withheld by the Owner from progress payments due the prime Contractor. Retainage by the prime or subcontractors is prohibited, and no retainage will be held by the prime from progress due subcontractors.

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

c. When at least 95% of the project work has been completed to the satisfaction of the RPR, the RPR shall, at the Owner's discretion and with the consent of the surety, prepare estimates of both the contract value and the cost of the remaining work to be done.

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

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

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

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

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

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

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

No partial payment will be made for stored or stockpiled living or perishable plant materials.

The Contractor shall bear all costs associated with the partial payment of stored or stockpiled materials in accordance with the provisions of this paragraph.

**90-08 Payment of withheld funds.** At the Contractor's option, if an Owner withholds retainage in accordance with the methods described in paragraph 90-06 *Partial Payments*, the Contractor may request that the Owner deposit the retainage into an escrow account. The Owner's deposit of retainage into an escrow account is subject to the following conditions:

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



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

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

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

**90-09 Acceptance and final payment.** When the contract work has been accepted in accordance with the requirements of Section 50, paragraph 50-15, *Final Acceptance*, the RPR will prepare the final estimate of the items of work actually performed. The Contractor shall approve the RPR's final estimate or advise the RPR of the Contractor's objections to the final estimate which are based on disputes in measurements or computations of the final quantities to be paid under the contract as amended by change order or supplemental agreement. The Contractor and the RPR shall resolve all disputes (if any) in the measurement and computation of final quantities to be paid within 30 calendar days of the Contractor's receipt of the RPR's final estimate. If, after such 30-day period, a dispute still exists, the Contractor may approve the RPR's estimate under protest of the quantities in dispute, and such disputed quantities shall be considered by the Owner as a claim in accordance with Section 50, paragraph 50-16, *Claims for Adjustment and Disputes*.

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

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

**90-10 Construction warranty.**

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

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

See technical specifications for additional equipment with extended warranties.

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

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

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

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

**g.** With respect to all warranties, express or implied, from subcontractors, manufacturers, or suppliers for work performed and materials furnished under this contract, the Contractor shall: (1) Obtain all warranties that would be given in normal commercial practice; (2) Require all warranties to be executed, in writing, for the benefit of the Owner, as directed by the Owner, and (3) Enforce all warranties for the benefit of the Owner.

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

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

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

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

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

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

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

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

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

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

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

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

**k.** Security for Construction Warranty.

**l.** Equipment commissioning documentation submitted, if required.

See Section 01770 for additional closeout procedures.

## END OF SECTION 90

## **Section 150 General Provisions Addendum**

### **150-10 GENERAL PROVISIONS ADDENDUM - Section 10 Definition of Terms**

Whenever the following terms are used in these specifications, in the contract, in any documents or other instruments pertaining to construction of the project where these specifications govern, the intent and meaning shall be interpreted as follows; and whenever one of the following capitalized words, terms or phrases is used herein, it shall be interpreted or construed first as defined in Specification Section GP-10, second as defined below, third according to its generally accepted meaning in the construction industry, and fourth according to its common and customary usage.

#### **150-10-101 ACCESS ROAD**

As defined in GP-10 and shall further be defined to include “or an internal roadway for construction or maintenance.”

#### **150-10-102 ADDENDA**

Written or graphic instructions issued prior to the opening of Proposals, which clarify, correct or change the bidding documents or the Contract Documents.

#### **150-10-103 AIRPORT OPERATIONS or OPERATIONS**

Depending on use, airport operations may refer to a department of the Airport Authority or the movement of aircraft on, or approaching the airfield.

#### **150-10-104 BID ITEMS**

The proposal provides for quotation of a price, for one or more bid items, which may be lump sum bid prices, alternate bid prices, unit bid prices, or a combination thereof. No payment will be made for items not set up in the proposal, unless otherwise provided by contract amendment. Bidders are cautioned that they should include in the prices quoted for various bid items all necessary allowances for the performance of all work required for the satisfactory completion of the project.

#### **150-10-105 BUILDER**

A term to be used interchangeably with “Contractor.”

#### **150-10-106 CONTRACT AMENDMENT**

A term to be used interchangeably with “Change order.”

#### **150-10-107 CONTRACT FOR PROFESSIONAL SERVICES**

A written agreement between the Owner and a Professional for provision of services and related items required to design, engineer or program manage all or part of a Project.

#### **150-10-108 DEFECTIVE**

An adjective which when modifying the word Work refers to Work that is unsatisfactory, faulty or deficient, or 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 the Program Manager's recommendation of final payment.

#### **150-10-109 DRAWINGS**

A term to be used interchangeably with “Plans.”

#### **150-10-110 ENGINEER or PROFESSIONAL**

As defined in GP-10 and shall further be defined to include “Engineer will not supervise, direct, control, or have authority over or be responsible for Contractors 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 performance of the Work. Allan & Hoshall is the Engineer for this Project.”

#### **150-10-111 FINAL COMPLETION**

The stage of construction when the Work has been 100% completed including all punch list items, record drawings, O&M manuals, lien waivers, maintenance training, warranties, consent of surety to final payment, and all other required closeout documentation.

#### **150-10-112 GP**

Abbreviation for General Provision.

#### **150-10-113 HAZARDOUS SUBSTANCES**

The term "Hazardous Substance" shall have the same meaning and definition as set forth in the Comprehensive Environmental Response Compensation and Liability Act as amended, 42 U.S.C. § 6901 *et seq.*, and regulations promulgated thereunder (collectively "CERCLA") and any corresponding state or local law or regulation, and shall also include: (a) any Pollutant or Contaminant as those terms are defined in CERCLA; (b) any Solid Waste or Hazardous Constituent as those terms are defined by, or are otherwise identified by, the Resource Conservation and Recovery Act as amended, 42 U.S.C. § 6901 *et seq.*, and regulations promulgated thereunder (collectively "RCRA") and any corresponding state or local law or regulation; (c) crude oil, petroleum and fractions of distillates thereof; (d) any other material, substance or chemical defined, characterized or regulated as toxic or hazardous under any applicable law, regulation, ordinance, directive or ruling; and (e) any infectious or medical waste as defined by any applicable federal or state laws or regulations.

#### **150-10-114 INTENTION OF TERMS**

As defined in GP-10 and shall further be defined to include “The use of any such term shall not be effective to assign to Program Manager any duty or authority to supervise or direct the furnishing or performance of the work. Wherever in the specifications or on the drawings the words "install," "furnish," "provide," or words of like import are used, they mean the Contractor shall install, furnish, or provide, as the case may be complete and ready for Owner's use.”

#### **150-10-115 LUMP SUM PRICE**

The dollar amount for which a Contractor agrees to perform the Work or a specific component of the Work as set forth in a Contract for construction.

#### **150-10-116 MAJOR SUBCONTRACTOR**

A major subcontractor shall be any subcontractor who is responsible for 15 percent or more of the full amount of the contract.

#### **150-10-117 OWNER or SPONSOR**

As defined in GP-10 and shall further be defined to include “The Owner shall mean the Memphis-Shelby County Airport Authority.”

#### **150-10-118 PARTIAL COMPLETION**

The stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents when the Owner can satisfactorily occupy or beneficially use a finite portion of completed Work for its intended purpose. Partial completion and acceptance of a finite portion of the work will in no way imply the overall project is substantially complete or start of the project warranty.

#### **150-10-119 PROGRAM MANAGER**

The individual, partnership, firm, or corporation duly authorized by the Owner (sponsor) to be responsible for engineering supervision during construction and acting directly or through an authorized representative. The term Program Manager means the person, person or organization named by the Owner to act as their representative. Program Manager will not supervise, direct, control, or have authority over or be responsible for Contractors 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 performance of the Work. All authority granted to the Engineer by these construction documents shall also be available to the Program Manager, at the discretion of the Owner. Parsons Transportation Group, Inc is the Program Manager for this Project.

#### **150-10-120 PUNCHLIST ITEM**

Any item of work, in whole or in part, which the Program Manager has identified as being unsatisfactory after an inspection of the project. A punch-list item may be further classified as being either "major" or "minor". A "major" punch-list item is defined as any punch-list item the correction of which is, in the Program Manager's determination, necessary for the Owner to use the completed project for its intended purpose. A "minor" punch-list item is defined as any punch-list item not classified as "major" by the Program Manager.

#### **150-10-121 SHOP DRAWINGS**

All drawings, diagrams, illustrations, schedules and other data which are specifically prepared by or for the Contractor to illustrate some portion of the Work and all illustrations, brochures, standard schedules, performance charts, instructions, diagrams and other information prepared by a supplier, manufacturer, subcontractor or fabricator and submitted by the Contractor to illustrate material or equipment for some portion of the Work.

#### **150-10-122 SITE**

The geographical location of a Project, usually defined by legal boundary lines, and the location characteristics including, but not limited to, grades and lines of streets, alleys, pavements and adjoining structures, rights-of-way, restrictions, easements, encroachments, zoning, deed restrictions, existing buildings and improvements, and service and utility lines.

#### **150-10-123 SUBSTANTIAL COMPLETION**

The stage in the progress of the Work when the Work is substantially complete in accordance with the Contract Documents and the Owner can occupy or beneficially use satisfactorily completed Work for its intended purpose.

## **150-20 GENERAL PROVISIONS ADDENDUM - PROPOSAL REQUIREMENTS AND CONDITIONS**

### **150-20-01 ADVERTISEMENT (NOTICE TO BIDDERS)**

General Provisions 20-01 shall include: “See Section LEGAL NOTICE TO BIDDERS for the ADVERTISEMENT notifying prospective Bidders of this project.”

### **150-20-05 INTERPRETATION OF ESTIMATED PROPOSAL QUANTITIES**

General Provisions 20-05 shall include: “The proposal provides for quotation of a price, for one or more bid items, which may be lump sum bid prices, alternate bid prices, unit bid prices, or a combination thereof. No payment will be made for items not set up in the proposal, unless otherwise provided by contract amendment. Bidders are cautioned that they should include in the prices quoted for various bid items all necessary allowances for the performance of all work required for the satisfactory completion of the project.”

### **150-20-07 PREPARATION OF PROPOSAL.**

General Provisions 20-07 shall include “The bidder shall state the unit price and extension, written in ink or typed, for which he proposes to do each pay item furnished in the proposal. In case of conflict between the unit price and extension, the unit price, unless obviously incorrect, shall govern.”

### **150-20-09 IRREGULAR PROPOSALS**

General Provisions 20-09 item f) shall include:

- f.** If the proposal does not meet the DBE participation requirement specified in Section DBE REQ.

### **150-20-10 BID GUARANTEE.**

General Provisions 20-10 shall include

“Each proposal shall be accompanied by either a cashier's check or a certified check drawn on a solvent bank, or a Bidder's bond executed by the Bidder and a surety company acceptable to the Memphis-Shelby County Airport Authority, in the amount of not less than five (5) percent of the total bid price, made payable without conditions to the Memphis-Shelby County Airport Authority, as a guarantee that if the proposal is accepted, the Bidder will enter into a contract and execute a Performance and Payment Bond with legally responsible surety within ten (10) days after contract award is made by the Memphis-Shelby County Airport Authority. Bidder's Bond (if used) shall be executed on the form prescribed within these documents.

“In the event that the Bidder's proposal is accepted and the contract is awarded by the Memphis-Shelby County Airport Authority, and the Bidder fails or refuses to execute the contract and furnish the required Performance and Payment Bond within ten (10) days after such award is made by the Memphis-Shelby County Airport Authority, unless given a written extension of time by the Memphis-Shelby County Airport Authority, then the Bidder will be considered as having abandoned his proposal, and his proposal guarantee will be retained by the Memphis-Shelby County Airport Authority as liquidated damages and not as a penalty, IT NOW BEING AGREED that the amount of the proposal guarantee is a fair estimate of the amount of damages that the Memphis-Shelby County Airport Authority will sustain in case the Bidder fails to enter into the contract and furnish the required Performance and Payment Bond within ten (10) days after receiving notice of such award.”

### **150-20-14 DISQUALIFICATION OF BIDDERS.**

General Provisions 20-14 item d) shall include:

- d.** Failure to show evidence of possessing a valid state of Tennessee Contractor's License, as required by law.

## **150-20-15 EXPLANATIONS AND INTERPRETATIONS OF CONTRACT DOCUMENTS**

All explanations desired by Bidders regarding the meaning or interpretation of the drawings and specifications must be requested with sufficient time allowed for a written reply to reach them before the submission of their bids. Oral explanation or instructions will not be given. All necessary explanations or interpretations will be made in the form of written addenda to the specifications or drawings, and will be furnished to all Bidders, and the receipt thereof shall be acknowledged by each Bidder on his proposal.

## **150-20-16 DBE REQUIREMENTS**

All Bidders shall submit with his/her proposal the DBE's Assurance Statement/Letter of Intent for each DBE subcontractor (subcontractors' signatures not required) Subcontractors' bids to the Prime Contractor with items included in the bid either circled and/or highlighted, DBE's Current Certification for each DBE Subcontractor, Respondent DBE Goals Accomplishment Statement, and Information on All Firms that Provide Bids or Quotes, which have been provided in the bid envelope. There must be one DBE's Assurance Statement/Letter of Intent for each proposed DBE subcontractor properly completed and signed by the Bidder.

Within 24 hours of the proposal submittal deadline, all Bidders shall submit the DBE's Assurance Statement/Letter of Intent for each DBE subcontractor (subcontractors' signatures required). There must be one DBE's Assurance Statement/Letter of Intent for each proposed DBE subcontractor properly completed and signed by the DBE subcontractor, and if applicable the 2nd/3rd Tier Subcontractor's, and the Bidder.

See specification section DISADVANTAGED BUSINESS ENTERPRISE (DBE) REQUIREMENTS for additional proposal requirements and conditions.

## **150-40 GENERAL PROVISIONS ADDENDUM - SCOPE OF WORK**

### **150-40-04 EXTRA WORK.**

General Provisions 40-04 shall include “When determined by the Program Manager to be in the Owner's best interest, the Owner may order the Contractor to proceed with extra work by time and materials as provided in Section GP-150-90.”



## **150-50 GENERAL PROVISIONS ADDENDUM - CONTROL OF WORK**

### **150-50-04 COOPERATION OF CONTRACTOR.**

General Provisions 50-04 shall include “The Owner shall allocate the work and designate the sequence of construction in case of controversy between contractors.”

## **150-70 GENERAL PROVISIONS ADDENDUM - LEGAL REGULATIONS AND RESPONSIBILITY TO PUBLIC**

### **150-70-01 LAWS TO BE OBSERVED.**

General Provisions 70-01 shall include “Applicable laws, ordinances, regulations, orders, and decrees shall be considered as MINIMUM requirements, and everything shown or specified in excess of these minimum requirements shall be installed in excess thereof, as shown or specified. No instructions given in the contract documents shall be construed as an authorization to violate any law, ordinance, regulation, order, or decree.

“If the Contractor observes that the drawings or specifications are at variance with any applicable law, ordinance, regulation, order, or decree, he shall immediately notify the Program Manager in writing, and obtain the Program Manager's decision before proceeding with the portion of the work involved.

“The Contract shall be governed by the law of the State of Tennessee. Any action brought which involves the Contract, the Work or the Project shall be brought and determined in accordance with the Laws of the State of Tennessee.”

### **150-70-14 CONTRACTOR'S RESPONSIBILITY FOR WORK**

General Provisions 70-14 shall include “The Program Manager shall not be responsible for the methods and means employed by the Contractor in the performance of the Contractor's work. The Program Manager shall have no responsibility for the safety of workmen and others who may be injured during the course of the Contractor's work.”

### **150-70-21 CONTINUANCE OF WORK NOTWITHSTANDING DISPUTES, ETC.**

Unless otherwise agreed in writing, the Contractor shall, notwithstanding any dispute, proceeding, or litigation, proceed forthwith in accordance with the Program Manager's written decision and/or direction and shall continue the Work and maintain its progress. The Owner shall continue to make payments to the Contractor to the extent that the sums due and owing the Contractor are not in dispute, in accordance with the Contract Documents.

### **150-70-22 SCOPE OF PROGRAM MANAGER’S RESPONSIBILITIES TO CONTRACTOR AND OWNER**

The Program Manager is to act as Owner’s representative, and shall have the duties and responsibilities and the rights and authority assigned to Program Manager in the Contract in connection with completion of the Work in accordance with the Contract. Neither the Program Manager’s authority to act under the Contract, nor any decision made by him in good faith either to exercise or not to exercise authority under the Contract, shall give rise to any duty or responsibility of the Program Manager to the Contractor, any Subcontractor, any of their agents or employees. However, nothing contained herein shall exculpate in any manner nor relieve the Program Manager of his duties and responsibilities to the Owner in accordance with the Contract and in accordance with any other agreements between the Program Manager and Owner establishing the Program Manager’s duties and responsibilities to properly administer the Contract and to correctly apply the requirements of the Contract to the Work.

## **150-80 GENERAL PROVISIONS ADDENDUM - PROSECUTION AND PROGRESS**

### **150-80-01 SUBLETTING OF CONTRACT**

General Provisions 80-01 shall include “The Contractor shall obtain prior approval from the Owner before subcontracting any portion of this contract. Only those subcontractors who are known for doing quality, first class airport work of the type required of the subcontract will be approved by the Owner. For each proposed subcontract, the Contractor shall supply the Program Manager with the subcontractor's name, the amount of the subcontract, their previous, related experience, their available appropriate equipment both owned and leased, and their available personnel. The Contractor shall also submit to the Program Manager those items of the contract to be performed directly by his own organization. The amounts of these items and the amounts of all items awarded to all subcontractors shall correspond to the contract price for the entire project. The Owner reserves the right to withhold approval of any subcontractor who, in the Owner's opinion, is not qualified to perform the work. If the Owner withholds approval of a subcontractor the Contractor shall be required to find an alternate subcontractor that meets the approval of the Owner or he shall perform the work himself. In either event, contract pay items shall not be adjusted. The contract will not be signed until all major subcontractors have been approved by the Owner. In case of approval, the Contractor shall file copies of all subcontracts with the Program Manager.”

### **150-80-07 DETERMINATION AND EXTENSION OF CONTRACT TIME**

General Provisions 80-07 shall include “Time extension for delays caused by the effects of inclement weather are justified only when rains or other excessive inclement weather conditions or related adverse soil conditions prevent the Contractor from productively performing critical activities of work resulting in:

1. The Contractor being unable to work at least 50% of the normal work day on pre-determined critical path items due to adverse weather conditions or;
2. The Contractor being required to make major repairs to the work damaged by excessive weather, provided that the damage was not attributable to the Contractor's negligence or failure to perform, and provided that the Contractor was unable to work an available day as defined under GP-10.

“The Contractor will be granted a time extension based on weather days in excess of the anticipated days during the original contract completion. After the new contract completion date has been established by the Program Manager, additional anticipated days as identified by SC-120 Section 3.05 paragraph E for the months covered within the contract extension period will be granted. Once the Contractor reaches the revised completion date and has not completed the project due to additional weather delays, the Contractor will be granted, only the verified lost weather days leading to the revised contract completion. No other weather days will be granted beyond the established final completion date.

“If the Contractor finds it impossible for reasons beyond his/her control to complete the work within the contract time as specified or as extended he may, within ten (10) days after commencement of the cause of delay make a written request to the Program Manager for an extension of time setting forth the reasons which he believes will justify the granting of his/her request; otherwise, such claim will be waived. The Contractor's plea that insufficient time was specified is not a valid reason for extension of time. If the Program Manager finds that the work was delayed because of conditions beyond the control and without the fault of the Contractor, he may recommend the Owner extend the time for completion in such amount as the conditions justify. The extended time for completion shall then be in full force and effect, the same as though it were the original time for completion. Should the contract time require extension it shall be by change order or supplemental agreement”

### **150-80-09 DEFAULT AND TERMINATION OF CONTRACT**

General Provisions 80-09 shall include “The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause. Upon receipt of written notice from the Owner of such termination for the Owner's convenience, the Contractor shall:

- a. Cease operations as directed by the Owner in the notice;

- b. Take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and
- c. Except for the Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing Subcontractors and purchase orders and enter into no further Subcontracts and purchase orders.

“In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment from the Owner for Work executed and for proven loss with respect to materials, equipment, tools and construction equipment and machinery, including reasonable overhead, profit and damages.”

## **150-90 GENERAL PROVISIONS ADDENDUM - MEASUREMENT AND PAYMENT**

### **150-90-05 PAYMENT FOR EXTRA WORK OR TIME AND MATERIALS WORK**

General Provisions 90-05 shall include:

“EXTRA Work and TIME and MATERIALS Work will be paid in accordance with the paragraphs below and will include documented costs for labor, labor burden, insurance and taxes, materials, equipment, plus a set allowance for combined overhead and profit to be included in the total cost to the Owner. The Contractor is responsible for preparing detailed daily reports documenting all labor, material, and equipment charges incurred and signed by both Contractor and Program Manager for all TIME and MATERIALS work.

When the change order or supplemental agreement authorizing extra work or time and materials work is prepared, compensation will be based on actual expended labor, equipment, and materials costs as follows:

**a. Labor.** For all labor (skilled and unskilled) and foremen in direct charge of a specific time and materials item, the Contractor shall receive the rate of wage (or scale) for every hour that such labor or foreman is actually engaged in the specified time and materials work. Such wage (or scale) shall be the same U.S. Secretary of Labor wage determination as is included in the originally awarded contract.

The Contractor shall receive the actual costs paid to, or on behalf of workers by reason of subsistence and travel allowances, health and welfare benefits, pension fund benefits or other benefits, when such amounts are required by collective bargaining agreement or other employment contract generally applicable to the classes of labor employed on the work.

The Contractor shall submit an audited labor burden percentage for review and approval which, after approval, will also be paid to the Contractor based upon actual labor costs expended. The Contractor's audited labor burden rate will include any and all insurance costs not paid by OCIP, unemployment insurance contributions, and social security taxes paid on the employees behalf. The Contractor shall furnish satisfactory evidence of the rate or rates paid for such insurance and taxes.

**c. Materials.** For materials accepted by the Program Manager and used exclusively for the Extra or Time and Materials Work, the Contractor shall receive the actual cost of such materials delivered on the work, including transportation charges paid by him (exclusive of machinery rentals as hereinafter set forth) and applicable sales or use tax.

**d. Equipment.** For any machinery or special equipment (other than small tools) including fuel, lubricants, and transportation costs, the use of which has been authorized by the Program Manager, the Contractor shall receive the current published "Blue Book" rental rates for the actual time that such equipment is committed to the work.

**e. Miscellaneous.** No additional allowance will be made for general superintendence, the use of small tools, or other costs for which no specific allowance is herein provided.

The Contractor and the Program Manager shall compare records of the cost of TIME AND MATERIALS WORK at the end of each day. Agreement shall be indicated by signature of the Contractor and the Program Manager or their duly authorized representatives. Failure to obtain the Program Manager's signature shall constitute a waiver on the part of the Contractor of any right to collect reimbursement for such costs.

No payment will be made for work performed on an EXTRA WORK or TIME AND MATERIALS basis until the Contractor has furnished the Program Manager with itemized statements and all required backup documentation of the cost of such extra or time and materials work.

The fixed percentage allowance for combined overhead and profit to be added to the total of the labor, materials, and equipment costs above will be based on the following schedule:

- a. For the Contractor, for Work performed by the Contractor's own forces, ten percent (10%) of the cost.
- b. For the Contractor, for Work performed by the Contractor's Subcontractor, five percent (5%) of the amount due the Subcontractor.
- c. For each Subcontractor or Sub-subcontractor involved, for Work performed by that Subcontractor's or Sub-subcontractor's own forces, fifteen percent (15%) of the cost.
- d. For each Subcontractor, the Work performed by the Subcontractor's Subcontractor, five percent (5%) of the amount due the Subcontractor's Subcontractor.

The total payment will be based on the total documented labor, material, and equipment cost plus the fixed percentages for combined overhead and profit specified above. This total payment shall constitute full compensation for all items of expense not specifically provided for the extra work or time and materials work.

#### **150-90-07 PAYMENT FOR MATERIALS ON HAND**

General Provisions 90-07 shall include "Request for partial payments must be accompanied by a completed, accurate stored material work sheet. The stored material work sheet will be supplied by the Program Manager upon request by the Contractor."

**END OF SECTION GP-150**

## **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 Program Manager. 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 Program Manager or Contractor as specified in the specifications.

A Quality Control (QC)/Quality Assurance (QA) workshop with the Engineer, Program Manager, Contractor, subcontractors, testing laboratories, and Owner 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 Program Manager 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 Program Manager prior to the start of any production, construction, or off-site fabrication. The written CQCP shall be submitted to the Program Manager for review and approval at least 14 calendar days before the CQCP Workshop. The Contractor's CQCP and QC testing laboratory must be approved in writing by the Program Manager 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 on-site** employee of the Contractor, or a consultant engaged by the Contractor. The CQCPA must have a minimum of five (5) years of experience in QC pavement construction with prior QC experience on a project of comparable size and scope as the contract.

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

- (1) Professional Engineer with one (1) year of airport paving experience.
- (2) Engineer-in-training with two (2) years of airport paving experience.
- (3) National Institute for Certification in Engineering Technologies (NICET) Civil Engineering Technology Level IV with three (3) years of airport paving experience.
- (4) An individual with four (4) years of airport paving experience, with a Bachelor of Science Degree in Civil Engineering, Civil Engineering Technology or Construction.

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

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

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

- (1) Inspection of all materials, construction, plant, and equipment for conformance to the technical specifications, and as required by paragraph 100-6.
- (2) Performance of all QC tests as required by the technical specifications and paragraph 100-8.
- (3) Performance of tests for the Program Manager 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 General Contract Provision 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, Item P-404, Item S-401, and Item S-402 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*:

- 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 Program Manager 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 Program Manager 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 (as needed or required)

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 Program Manager 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 Program Manager 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 Program Manager.** All items of material and equipment are subject to inspection and/or observation by the Program Manager 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 Program Manager at the site for the same purpose.

Inspection and/or observations by the Program Manager 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 Program Manager 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 Program Manager will recommend the Owner take the following actions:

- (1) Order the Contractor to replace ineffective or unqualified QC personnel or subcontractors and/or
- (2) Order the Contractor to stop operations until appropriate corrective actions are taken.

### **METHOD OF MEASUREMENT**

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

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

### **BASIS OF PAYMENT**

**100-14 Payment will be made under:**

Item C-100-14.1 Contractor Quality Control Program (CQCP) – per lump sum

### **REFERENCES**

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

National Institute for Certification in Engineering Technologies (NICET)

ASTM International (ASTM)

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

**END OF ITEM C-100**

**ISSUED FOR BID**

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**ISSUED FOR BID**

**Item C-102****Temporary Air and Water Pollution, Soil Erosion, and Siltation Control****DESCRIPTION**

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

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

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

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

**MATERIALS**

**102-2.1 Grass.** Grass that will not compete with the grasses sown later for permanent cover per Item T-901 shall be a quick-growing species suitable to the area providing a temporary cover. Selected grass species shall not create a wildlife attractant. No clover, rye or wheat products shall be used.

**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. 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 Program Manager 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 Program Manager 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 Program Manager.

**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 sodding 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 Program Manager 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 Program Manager.

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 Program Manager. 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 Program Manager, the work shall be performed by the Contractor and the cost shall be incidental to this item.

The Program Manager 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 3 feet above the ground surface. Posts shall be set no more than 6 feet 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 overlap and securely sealed. A trench shall be excavated approximately 6 inches deep by 6 inches 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 Program Manager.

## METHOD OF MEASUREMENT

**102-4.1** Temporary erosion and pollution control work required will be performed as scheduled or directed by the Program Manager. Completed and accepted work will be measured as follows:

- a. Installation and removal of silt fence will be measured by the linear foot.
- b. Catch basin sediment traps will be measured by each.



- c. Filter sock check dams will be measured by each.
- d. Construction entrances will be measured by each.

**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 Program Manager and measured as provided in paragraph 102-4.1 will be paid for under the following items. All items of work shall include installation, maintenance, silt removal as necessary, and removal of the item upon completion.

Item C-102-5.1	Silt fence – per linear feet
Item C-102-5.2	Catch basin sediment trap – per each
Item C-102-5.3	Filter sock check dam – per each
Item C-102-5.4	Inlet protection – per each
Item C-102-5.5	Construction entrance – per each

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 Program Manager 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	<i>Hazardous Wildlife Attractants on or Near Airports</i>
AC 150/5370-2	<i>Operational Safety on Airports During Construction</i>

#### ASTM International (ASTM)

ASTM D6461	<i>Standard Specification for Silt Fence Materials</i>
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#### United States Department of Agriculture (USDA)

FAA/USDA Wildlife Hazard Management at Airports, A Manual for Airport Personnel

### **END OF ITEM C-102**

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**Item C-105**  
**Mobilization / Demobilization**

**105-1 Description.** This item of work shall consist of, but is not limited to, work and operations necessary for the movement of personnel, equipment, material and supplies to and from the project site for work on the project except as provided in the contract as separate pay items.

**105-2 Mobilization limit.** Mobilization shall be limited to **5** percent of the total project cost.

**105-3 Demobilization limit.** Demobilization shall be per the stated allowance.

**105-4 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.

**METHOD OF MEASUREMENT**

**105-5 Mobilization.** Based upon the contract lump sum price for "Mobilization" partial payments will be allowed as follows:

- a. With first pay request, 34%.
- b. With second pay request, and additional 33%.
- c. With third pay request, the final 33%.

**105-6 Demobilization.** Based upon the stated allowance for "Demobilization" payment will be allowed as follows:

- a. With final pay request, 100%.

**BASIS OF PAYMENT**

**105-6 Payment will be made under:**

- |                |                                |
|----------------|--------------------------------|
| Item C-105-6.1 | Mobilization – per lump sum    |
| Item C-105-6.2 | Demobilization – per allowance |

**REFERENCES**

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

Office of Federal Contract Compliance Programs (OFCCP)

Executive Order 11246, as amended

EEOC-P/E-1 – Equal Employment Opportunity is the Law Poster

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United States Department of Labor, Wage and Hour Division (WHD)

WH 1321 – Employee Rights under the Davis-Bacon Act Poster

**END OF ITEM C-105**

ISSUED FOR BID

## ITEM C-110 METHOD OF ESTIMATING PERCENTAGE OF MATERIAL WITHIN LIMITS (PWL)

**110-1 General.** When the specifications provide for acceptance of material based on the method of estimating percentage of material within specification limits (PWL), the PWL will be determined in accordance with this section. All test results for a lot will be analyzed statistically to determine the total estimated percent of the lot that is within specification limits. The PWL is computed using the sample average ( $\bar{X}$ ) and sample standard deviation ( $S_n$ ) of the specified number ( $n$ ) of sublots for the lot and the specification tolerance limits,  $L$  for lower and  $U$  for upper, for the particular acceptance parameter. From these values, the respective Quality index,  $Q_L$  for Lower Quality Index and/or  $Q_U$  for Upper Quality Index, is computed and the PWL for the lot for the specified  $n$  is determined from Table 1. All specification limits specified in the technical sections shall be absolute values. Test results used in the calculations shall be to the significant figure given in the test procedure.

There is some degree of uncertainty (risk) in the measurement for acceptance because only a small fraction of production material (the population) is sampled and tested. This uncertainty exists because all portions of the production material have the same probability to be randomly sampled. The Contractor's risk is the probability that material produced at the acceptable quality level is rejected or subjected to a pay adjustment. The Owner's risk is the probability that material produced at the rejectable quality level is accepted.

It is the intent of this section to inform the Contractor that, in order to consistently offset the Contractor's risk for material evaluated, production quality (using population average and population standard deviation) must be maintained at the acceptable quality specified or higher. In all cases, it is the responsibility of the Contractor to produce at quality levels that will meet the specified acceptance criteria when sampled and tested at the frequencies specified.

**110-2 Method for computing PWL.** The computational sequence for computing PWL is as follows:

- a. Divide the lot into  $n$  sublots in accordance with the acceptance requirements of the specification.
- b. Locate the random sampling position within the subplot in accordance with the requirements of the specification.
- c. Make a measurement at each location, or take a test portion and make the measurement on the test portion in accordance with the testing requirements of the specification.
- d. Find the sample average ( $\bar{X}$ ) for all subplot test values within the lot by using the following formula:

$$\bar{X} = (x_1 + x_2 + x_3 + \dots + x_n) / n$$

Where:  $\bar{X}$  = Sample average of all subplot test values within a lot

$x_1, x_2, \dots, x_n$  = Individual subplot test values

$n$  = Number of subplot test values

- e. Find the sample standard deviation ( $S_n$ ) by use of the following formula:

$$S_n = [(d_1^2 + d_2^2 + d_3^2 + \dots + d_n^2)/(n-1)]^{1/2}$$

Where:  $S_n$  = Sample standard deviation of the number of subplot test values in the set

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$d_1, d_2, \dots, d_n$  = Deviations of the individual subplot test values  $x_1, x_2, \dots$  from the average value  $\bar{X}$

that is:  $d_1 = (x_1 - \bar{X}), d_2 = (x_2 - \bar{X}) \dots d_n = (x_n - \bar{X})$

$n$  = Number of subplot test values

**f.** For single sided specification limits (i.e., L only), compute the Lower Quality Index  $Q_L$  by use of the following formula:

$$Q_L = (\bar{X} - L) / S_n$$

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 (i.e., L and U), compute the Quality Indexes  $Q_L$  and  $Q_U$  by use of the following formulas:

$$Q_L = (\bar{X} - L) / S_n$$

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

$n = 4$

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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  $n = 4$ .

$$PWL = 98$$

#### 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. ( $U = 5.0$ )

$$Q_U = (U - X) / S_n$$

$$Q_U = (5.00 - 3.57) / 1.12$$

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$$Q_U = 1.2702$$

7. Determine  $P_U$  by entering Table 1 with  $Q_U = 1.29$  and  $n = 4$ .

$$P_U = 93$$

8. Calculate Air Voids PWL

$$PWL = (P_L + P_U) - 100$$

$$PWL = (97 + 93) - 100 = 90$$

### EXAMPLE OF OUTLIER CALCULATION (REFERENCE ASTM E178)

**Project:** Example Project

**Test Item:** Item P-401, Lot A.

#### A. Outlier Determination for Mat Density.

1. Density of four random cores taken from Lot A arranged in descending order.

$$A-3 = 99.30$$

$$A-4 = 98.35$$

$$A-2 = 97.55$$

$$A-1 = 96.60$$

2. From ASTM E178, Table 1, for  $n=4$  an upper 5% significance level, the critical value for test criterion = 1.463.

3. Use average density, standard deviation, and test criterion value to evaluate density measurements.

a. For measurements greater than the average:

If (measurement - average)/(standard deviation) is less than test criterion, then the measurement is not considered an outlier.

For A-3, check if  $(99.30 - 97.95) / 1.15$  is greater than 1.463.

Since 1.174 is less than 1.463, the value is not an outlier.

b. For measurements less than the average:

If (average - measurement)/(standard deviation) is less than test criterion, then the measurement is not considered an outlier.

For A-1, check if  $(97.95 - 96.60) / 1.15$  is greater than 1.463.

Since 1.135 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:

$$\text{Greater than } (97.95 + 1.463 \times 1.15) = 99.63\%$$

OR

$$\text{less than } (97.95 - 1.463 \times 1.15) = 96.27\%.$$



**Table 1. Table for Estimating Percent of Lot Within Limits (PWL)**

Percent Within Limits (P <sub>L</sub> and P <sub>U</sub> )	Positive Values of Q (Q <sub>L</sub> and Q <sub>U</sub> )							
	n=3	n=4	n=5	n=6	n=7	n=8	n=9	n=10
99	1.1541	1.4700	1.6714	1.8008	1.8888	1.9520	1.9994	2.0362
98	1.1524	1.4400	1.6016	1.6982	1.7612	1.8053	1.8379	1.8630
97	1.1496	1.4100	1.5427	1.6181	1.6661	1.6993	1.7235	1.7420
96	1.1456	1.3800	1.4897	1.5497	1.5871	1.6127	1.6313	1.6454
95	1.1405	1.3500	1.4407	1.4887	1.5181	1.5381	1.5525	1.5635
94	1.1342	1.3200	1.3946	1.4329	1.4561	1.4717	1.4829	1.4914
93	1.1269	1.2900	1.3508	1.3810	1.3991	1.4112	1.4199	1.4265
92	1.1184	1.2600	1.3088	1.3323	1.3461	1.3554	1.3620	1.3670
91	1.1089	1.2300	1.2683	1.2860	1.2964	1.3032	1.3081	1.3118
90	1.0982	1.2000	1.2290	1.2419	1.2492	1.2541	1.2576	1.2602
89	1.0864	1.1700	1.1909	1.1995	1.2043	1.2075	1.2098	1.2115
88	1.0736	1.1400	1.1537	1.1587	1.1613	1.1630	1.1643	1.1653
87	1.0597	1.1100	1.1173	1.1192	1.1199	1.1204	1.1208	1.1212
86	1.0448	1.0800	1.0817	1.0808	1.0800	1.0794	1.0791	1.0789
85	1.0288	1.0500	1.0467	1.0435	1.0413	1.0399	1.0389	1.0382
84	1.0119	1.0200	1.0124	1.0071	1.0037	1.0015	1.0000	0.9990
83	0.9939	0.9900	0.9785	0.9715	0.9671	0.9643	0.9624	0.9610
82	0.9749	0.9600	0.9452	0.9367	0.9315	0.9281	0.9258	0.9241
81	0.9550	0.9300	0.9123	0.9025	0.8966	0.8928	0.8901	0.8882
80	0.9342	0.9000	0.8799	0.8690	0.8625	0.8583	0.8554	0.8533
79	0.9124	0.8700	0.8478	0.8360	0.8291	0.8245	0.8214	0.8192
78	0.8897	0.8400	0.8160	0.8036	0.7962	0.7915	0.7882	0.7858
77	0.8662	0.8100	0.7846	0.7716	0.7640	0.7590	0.7556	0.7531
76	0.8417	0.7800	0.7535	0.7401	0.7322	0.7271	0.7236	0.7211
75	0.8165	0.7500	0.7226	0.7089	0.7009	0.6958	0.6922	0.6896
74	0.7904	0.7200	0.6921	0.6781	0.6701	0.6649	0.6613	0.6587
73	0.7636	0.6900	0.6617	0.6477	0.6396	0.6344	0.6308	0.6282
72	0.7360	0.6600	0.6316	0.6176	0.6095	0.6044	0.6008	0.5982
71	0.7077	0.6300	0.6016	0.5878	0.5798	0.5747	0.5712	0.5686
70	0.6787	0.6000	0.5719	0.5582	0.5504	0.5454	0.5419	0.5394
69	0.6490	0.5700	0.5423	0.5290	0.5213	0.5164	0.5130	0.5105
68	0.6187	0.5400	0.5129	0.4999	0.4924	0.4877	0.4844	0.4820
67	0.5878	0.5100	0.4836	0.4710	0.4638	0.4592	0.4560	0.4537
66	0.5563	0.4800	0.4545	0.4424	0.4355	0.4310	0.4280	0.4257
65	0.5242	0.4500	0.4255	0.4139	0.4073	0.4030	0.4001	0.3980
64	0.4916	0.4200	0.3967	0.3856	0.3793	0.3753	0.3725	0.3705
63	0.4586	0.3900	0.3679	0.3575	0.3515	0.3477	0.3451	0.3432
62	0.4251	0.3600	0.3392	0.3295	0.3239	0.3203	0.3179	0.3161
61	0.3911	0.3300	0.3107	0.3016	0.2964	0.2931	0.2908	0.2892
60	0.3568	0.3000	0.2822	0.2738	0.2691	0.2660	0.2639	0.2624
59	0.3222	0.2700	0.2537	0.2461	0.2418	0.2391	0.2372	0.2358
58	0.2872	0.2400	0.2254	0.2186	0.2147	0.2122	0.2105	0.2093
57	0.2519	0.2100	0.1971	0.1911	0.1877	0.1855	0.1840	0.1829
56	0.2164	0.1800	0.1688	0.1636	0.1607	0.1588	0.1575	0.1566
55	0.1806	0.1500	0.1406	0.1363	0.1338	0.1322	0.1312	0.1304
54	0.1447	0.1200	0.1125	0.1090	0.1070	0.1057	0.1049	0.1042
53	0.1087	0.0900	0.0843	0.0817	0.0802	0.0793	0.0786	0.0781
52	0.0725	0.0600	0.0562	0.0544	0.0534	0.0528	0.0524	0.0521
51	0.0363	0.0300	0.0281	0.0272	0.0267	0.0264	0.0262	0.0260
50	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

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Percent Within Limits (P <sub>L</sub> and P <sub>U</sub> )	Negative Values of Q (Q <sub>L</sub> and Q <sub>U</sub> )							
	n=3	n=4	n=5	n=6	n=7	n=8	n=9	n=10
49	-0.0363	-0.0300	-0.0281	-0.0272	-0.0267	-0.0264	-0.0262	-0.0260
48	-0.0725	-0.0600	-0.0562	-0.0544	-0.0534	-0.0528	-0.0524	-0.0521
47	-0.1087	-0.0900	-0.0843	-0.0817	-0.0802	-0.0793	-0.0786	-0.0781
46	-0.1447	-0.1200	-0.1125	-0.1090	-0.1070	-0.1057	-0.1049	-0.1042
45	-0.1806	-0.1500	-0.1406	-0.1363	-0.1338	-0.1322	-0.1312	-0.1304
44	-0.2164	-0.1800	-0.1688	-0.1636	-0.1607	-0.1588	-0.1575	-0.1566
43	-0.2519	-0.2100	-0.1971	-0.1911	-0.1877	-0.1855	-0.1840	-0.1829
42	-0.2872	-0.2400	-0.2254	-0.2186	-0.2147	-0.2122	-0.2105	-0.2093
41	-0.3222	-0.2700	-0.2537	-0.2461	-0.2418	-0.2391	-0.2372	-0.2358
40	-0.3568	-0.3000	-0.2822	-0.2738	-0.2691	-0.2660	-0.2639	-0.2624
39	-0.3911	-0.3300	-0.3107	-0.3016	-0.2964	-0.2931	-0.2908	-0.2892
38	-0.4251	-0.3600	-0.3392	-0.3295	-0.3239	-0.3203	-0.3179	-0.3161
37	-0.4586	-0.3900	-0.3679	-0.3575	-0.3515	-0.3477	-0.3451	-0.3432
36	-0.4916	-0.4200	-0.3967	-0.3856	-0.3793	-0.3753	-0.3725	-0.3705
35	-0.5242	-0.4500	-0.4255	-0.4139	-0.4073	-0.4030	-0.4001	-0.3980
34	-0.5563	-0.4800	-0.4545	-0.4424	-0.4355	-0.4310	-0.4280	-0.4257
33	-0.5878	-0.5100	-0.4836	-0.4710	-0.4638	-0.4592	-0.4560	-0.4537
32	-0.6187	-0.5400	-0.5129	-0.4999	-0.4924	-0.4877	-0.4844	-0.4820
31	-0.6490	-0.5700	-0.5423	-0.5290	-0.5213	-0.5164	-0.5130	-0.5105
30	-0.6787	-0.6000	-0.5719	-0.5582	-0.5504	-0.5454	-0.5419	-0.5394
29	-0.7077	-0.6300	-0.6016	-0.5878	-0.5798	-0.5747	-0.5712	-0.5686
28	-0.7360	-0.6600	-0.6316	-0.6176	-0.6095	-0.6044	-0.6008	-0.5982
27	-0.7636	-0.6900	-0.6617	-0.6477	-0.6396	-0.6344	-0.6308	-0.6282
26	-0.7904	-0.7200	-0.6921	-0.6781	-0.6701	-0.6649	-0.6613	-0.6587
25	-0.8165	-0.7500	-0.7226	-0.7089	-0.7009	-0.6958	-0.6922	-0.6896
24	-0.8417	-0.7800	-0.7535	-0.7401	-0.7322	-0.7271	-0.7236	-0.7211
23	-0.8662	-0.8100	-0.7846	-0.7716	-0.7640	-0.7590	-0.7556	-0.7531
22	-0.8897	-0.8400	-0.8160	-0.8036	-0.7962	-0.7915	-0.7882	-0.7858
21	-0.9124	-0.8700	-0.8478	-0.8360	-0.8291	-0.8245	-0.8214	-0.8192
20	-0.9342	-0.9000	-0.8799	-0.8690	-0.8625	-0.8583	-0.8554	-0.8533
19	-0.9550	-0.9300	-0.9123	-0.9025	-0.8966	-0.8928	-0.8901	-0.8882
18	-0.9749	-0.9600	-0.9452	-0.9367	-0.9315	-0.9281	-0.9258	-0.9241
17	-0.9939	-0.9900	-0.9785	-0.9715	-0.9671	-0.9643	-0.9624	-0.9610
16	-1.0119	-1.0200	-1.0124	-1.0071	-1.0037	-1.0015	-1.0000	-0.9990
15	-1.0288	-1.0500	-1.0467	-1.0435	-1.0413	-1.0399	-1.0389	-1.0382
14	-1.0448	-1.0800	-1.0817	-1.0808	-1.0800	-1.0794	-1.0791	-1.0789
13	-1.0597	-1.1100	-1.1173	-1.1192	-1.1199	-1.1204	-1.1208	-1.1212
12	-1.0736	-1.1400	-1.1537	-1.1587	-1.1613	-1.1630	-1.1643	-1.1653
11	-1.0864	-1.1700	-1.1909	-1.1995	-1.2043	-1.2075	-1.2098	-1.2115
10	-1.0982	-1.2000	-1.2290	-1.2419	-1.2492	-1.2541	-1.2576	-1.2602
9	-1.1089	-1.2300	-1.2683	-1.2860	-1.2964	-1.3032	-1.3081	-1.3118
8	-1.1184	-1.2600	-1.3088	-1.3323	-1.3461	-1.3554	-1.3620	-1.3670
7	-1.1269	-1.2900	-1.3508	-1.3810	-1.3991	-1.4112	-1.4199	-1.4265
6	-1.1342	-1.3200	-1.3946	-1.4329	-1.4561	-1.4717	-1.4829	-1.4914
5	-1.1405	-1.3500	-1.4407	-1.4887	-1.5181	-1.5381	-1.5525	-1.5635
4	-1.1456	-1.3800	-1.4897	-1.5497	-1.5871	-1.6127	-1.6313	-1.6454
3	-1.1496	-1.4100	-1.5427	-1.6181	-1.6661	-1.6993	-1.7235	-1.7420
2	-1.1524	-1.4400	-1.6016	-1.6982	-1.7612	-1.8053	-1.8379	-1.8630
1	-1.1541	-1.4700	-1.6714	-1.8008	-1.8888	-1.9520	-1.9994	-2.0362

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### **REFERENCES**

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

ASTM International (ASTM)

ASTM E178                      Standard Practice for Dealing with Outlying Observations

**END OF ITEM C-110**

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**ITEM S-100****SPECIAL TECHNICAL PROVISIONS – SAFETY & SECURITY****DESCRIPTION**

**100-1.1 Description.** This shall consist of furnishing all labor, materials, equipment, and miscellaneous items, the performance of any work, project operations, or document preparation to comply with the safety and security requirements of the project and airport. The Contractor shall familiarize themselves, all employees and all subcontractors accessing the project work site with the safety and security requirements contained herein and throughout the project documents in order to ensure safety and security throughout the process of construction. The Construction Safety and Phasing Plan (CSPP) is specifically made a part of this Contract. Any deviation from the requirements established within this specification or the CSPP will be sufficient cause for Contract termination. Reference the project Construction Safety and Phasing Plan (CSPP) for details.

**100-1.2 Safety Plan Compliance Document.** At the time of the project award, prior to the issuance of the Notice to Proceed (NTP), the Contractor shall develop and submit a Safety Plan Compliance Document (SPCD).

This document shall outline the Contractor's work processes and methods utilized to meet the safety and security requirements outlined in the CSPP. The SPCD shall detail, but not be limited to, how the Contractor plans to maintain safety and security of both the Contractor's operations and the integrity of airport landside and airside operations during the prosecution of the contract work. The SPCD shall also detail the procedures to be followed in the event of an emergency or accident.

The SPCD must include a certified statement by the Contractor indicating its understanding of operations, safety, and security requirements outlined in the project plan set and CSPP. The statement shall assert that the Contractor understands these requirements and will not deviate from the approved CSPP and SPCD without prior written approval from the Airport.

The submitted SPCD shall be subject to the approval of the Owner and Project Manager and shall reflect any change as may be deemed necessary prior to approval and acceptance. The development of the required SPCD shall be considered incidental to S-100-6.9 *Project Safety & Security*

**100-1.3 Contractor Representation.** The Contractor shall appoint an on-site representative to serve as the Safety and Security Manager to ensure required safety and security protocols are followed and enforced for the duration of the contract. The Safety and Security Manager shall ensure that all personnel accessing the project site are familiar with the safety and security procedures as well as the regulations for operating at the airport.

The appointed individual(s) shall have the authority to represent the Contractor on safety and security compliance issues and authorized to make field decisions on the Contractor's behalf. The appointed individuals shall be especially knowledgeable regarding the requirements for operating in an active airfield environment at the airport and with the CSPP and SPCD. The appointed individual(s) shall be available 24-hours a day in the event of a project related construction safety or security emergency and for maintaining construction hazard lighting and barricades. The individual(s) shall be able and capable of responding within a reasonable amount of time from initial contact. These representatives shall be listed and position formalized in the SPCD.

**CONTRACTOR ACCESS**

**100-2.1 Special Access Requirements.** For any construction activity inside the security fence shown on

the plans, special access requirements and procedures apply as detailed in the Special Conditions, SC-240 Airport Security Requirements. When a portion of the security fence must be removed to gain access or to perform the work, the Contractor must be able to continuously control the movement of personnel into the Restricted Area, maintain Airfield Operations Area (AOA) fence line integrity at all times, and shall restore the security fence to a condition approved by the Owner before leaving the site.

The Contractor's access to the project site shall be as shown in the project plan set. No other points of access shall be allowed without prior approval from the Owner and Project Manager. Vehicle and pedestrian access routes and entry points onto the airfield must be controlled at all times to prevent inadvertent or unauthorized entry of persons, vehicles, or animals onto the AOA or deviation from the approved haul routes. The Airport will coordinate requirements for vehicle operations with the affected airport tenants, Contractor and the FAA air traffic manager. The Contractor shall maintain a list of Contractor and Subcontractor employees and vehicles authorized to access and operate on the project site.

All construction vehicles and personnel shall be restricted to the immediate work areas specified by the contract for this project. These areas include the haul routes into the work areas, the designated contractor staging and equipment storage areas, the soil disposal areas, and any pavement areas under construction. Use of alternate haul routes or staging areas by the contractor shall not be permitted without prior notification and approval by the Owner and the Program Manager.

**100-2.2 Vehicle Operation.** No privately-owned vehicles shall be allowed onto the AOA. Contractors shall park privately owned vehicles in the designated Contractor staging or parking areas.

The Contractor is required to sign and mark all equipment in conformance with FAA Advisory Circular 150/5210-5D, *Painting, Marking, and Lighting of Vehicles Used on an Airport*. At a minimum, the company logo or name as well as beacons or orange and white checkerboard flags are required on all contractor vehicles accessing the Airport AOA. Beacons are mandatory for each vehicle operating on the airfield during night-time hours. Checkerboard flags will not be permitted as a substitute for beacons on vehicles operating at night.

Beacons and flags must be maintained to standards and in good working and operational condition. Beacons must be located on the uppermost part of the vehicle structure, visible from any direction, and flash 75 +/- 15 flashes per minute. Flags shall be 3' by 3' with alternating 1' by 1' international orange and white squares and shall be replaced by the contractor if they become faded, discolored, or ragged as determined by Airport Operations or the Program Manager.

**100-2.3 Vehicle & Pedestrian Access.** The Contractor's access to the site shall be as indicated in the project plan set. No other points of access to the site or AOA shall be allowed without prior approval from the Program Manager. Vehicle and Pedestrian access routes and entry points onto the airfield must be controlled at all time to prevent inadvertent or unauthorized entry of people, vehicles, or animals onto the AOA or deviation from approved haul routes by the Contractor, their subconsultants, or material delivery drivers. The Program Manager and Airport shall coordinate vehicle operations with affected airport tenants, contractors, the FAA air traffic manager, and airport staff. The Contractor shall maintain a list of personnel accessing the secure areas of the airfield through their controlled access points and all personnel operating on the project site.

**100-2.4 Material Deliveries.** All material suppliers, subcontractors and visitors to the work site are obligated to follow the same safety and security operating procedures as the 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. The Contractor shall not use the Airport address for any delivery but shall use the street address appropriate to the location of the entrance of the work site.

**100-2.5 Plastic Safety Fence.** A plastic fence, as detailed in the drawings, shall be furnished at the

locations as indicated in the drawings and/or as directed by the Program Manager. Fence shall be fabricated of high-density polyethylene (HDPE) in a diamond link pattern, 4 feet tall, and OSHA orange in color. Fence shall have metal T-post except when within the glide slope and localizer critical areas where it shall have wood posts. All plastic fence, including posts, shall be removed from the project site at the project completion.

**100-2.6 Guard House.** The Contractor will be required to submit on, obtain approval on, provide and move or locate the guardhouse to those locations shown on the plans or as directed by the Program Manager for each temporary AOA fence line penetration. The Contractor will be responsible for bringing the guard house up to the standards specified in Specification SC-240, if needed and directed by the Program Manager. The Contractor shall maintain the guard house for the duration of the Contract, including repair of air conditioning, heating, lighting, removal of garbage, and cutting of grass around the guard house. The Contractor shall provide a portable toilet facility for the exclusive use of the gate guard. See SC-240 for additional requirements. Upon completion of work thus eliminating the need of Guard House(s), the Contractor shall remove Guard Houses from the site.

**100-2.7 Crossing Gate Arm.** Crossing gate arms shall be furnished by the Contractor and approved by the Program Manager prior to use. The gate arms will be used at the guard houses that will be stationed at each active taxiway crossing and at the AOA fence line. Two arms per one taxiway crossing are required. (One arm on each side of the taxiway crossing). Gate arms shall be Delta Scientific Corporation MG139, or approved equal. All gate crossing arms (contractor furnished) shall be removed from the project site at the project completion.

**100-2.8 Traffic Control.** All temporary modifications to public access roads or airport service roads and the signage associated with the construction haul road as shown in the plans including but not limited to removal and replacement of curb and gutter, installation of temporary pavement and base, removal of temporary pavement and base and restoration of median to its original or proposed new configuration upon project completion. Traffic control shall include but not be limited to the following devices shown in the plans: temporary signage, removal of pavement markings, temporary pavement markings, final pavement markings, drums with type 'C' warning lights, or other materials as indicated on the plans and/or as directed by the Program Manager to ensure safe exit and entry to the site. All traffic control devices and their installation shall meet the standard prescribed in the State of Tennessee Manual on Uniform Traffic Control Devices and shall comply with the most recent version of the State of Tennessee Standard Specifications for Road and Bridge Construction Section 712 Temporary Traffic Control.

## **CONSTRUCTION SEQUENCING AND COORDINATION**

**100-3.1 Construction Coordination.** Pre-Construction conferences and Pre-work meetings shall be used to introduce airport operational safety and security elements specific to the project and individual work items throughout the duration of construction operations. In addition, construction progress meetings, scope and/or schedule changes, and meetings with the FAA Air Traffic Organization (ATO) will be coordinated as required through the performance of the contract.

Contact information for key construction, Airport, Project Manager and Engineer personnel will be distributed prior to the start of construction. Daily notifications/communications of construction issues and progress will be held as necessary between the Airport staff, the Program Manager, the Engineer, and Contractor. The Airport will brief the FAA and tenants as needed. Communication between the airport staff and tenants and the construction personnel shall be primarily through the Program Manager. If the airport staff and tenants are not able to contact the Program Manager, they may contact the designated Contractor Safety & Security Representative that will be on call 24-hours a day.

**100-3.2 Construction Sequencing.** The Contractor shall prepare a construction schedule and submit to the Program Manager, no later than 15 days after the date of execution of the Contract. The schedule shall be a fully detailed critical path method (CPM) schedule. Reference the project Special Conditions.

**102-4.3 Closing Surfaces.** The Contractor shall acquaint his supervisors and employees with the sequence of construction and its relationship to airport activity and aircraft operations that are inherent to the Airport

and project work area(s). No runway, taxiway, apron or airport roadway shall be closed without approval of the Owner and/or Program Manager, to enable necessary NOTAMS and/or advisories to airport fixed based operators (FBOs), tenants and users. The Contractor shall contact the Program Manager a minimum of ten (10) days prior to any requested closure.

Any construction activity within 250-feet of the centerline of an active runway or within 93-feet of the centerline of an active taxiway or apron requires the closure of the affected area. These safety areas are shown on the phasing plan.

The Program Manager will arrange for an inspection prior to the return to service of any facility that has been closed for work, on or adjacent thereto, or that has been used for a crossing point or haul route by the Contractor.

The Contractor will be required to coordinate stockpile locations and heights with the Program Manager for the project site and all staging/storage areas. FAA restrictions affects the allowable height for equipment or stockpiles.

**100-4.4 Low Profile Barricades (Type 1).** Low Profile Barricade Type I - 10" x 10" x 96" low profile type I barricades as detailed in the drawings shall be furnished by the Contractor. The Contractor shall furnish red flashing and red steady burn lights meeting FAA standards for installation on Contractor Furnished low profile barricades. The lights as installed in the field will longitudinally alternate between steady burn and flashing and shall be maintained for the project duration. The lights will become the property of the Contractor upon completion of the project and shall be removed off of airport property. Multiple installations and removals will be required of the Contractor; however, the Contractor will be paid for only the initial installation. All low-profile barricades will become the property of the Contractor upon completion of the project and shall be removed off of airport property.

**100-4.5 Reflective Cone.** Reflective cones with red flashing lights that meet FAA standards, as detailed in the drawings, shall be furnished to the jobsite and maintained for project duration. Multiple installations and removals will be required of the Contractor; however, the Contractor will be paid for only the initial installation. The cones with lights will become the property of the Contractor upon completion of the project and shall be removed off of airport property.

**100-4.6 Portable Concrete Barrier Rail (Type III).** Concrete jersey barricade Type III shall be as detailed in the drawings and shall be furnished by the Contractor. The Contractor shall furnish red flashing and red steady burn lights meeting FAA standards. The lights as installed in the field will longitudinally alternate between steady burn and flashing and shall be maintained for the project duration. Lights shall be placed a maximum of 25' apart and at all corners. Concrete barriers shall be spaced a maximum of 3 feet apart unless otherwise directed by the Program Manager. Multiple installations and removals will be required of the Contractor; however, the Contractor will be paid for only the initial installation. All concrete barricades and lights will become the property of the Contractor upon completion of the project and shall be removed off of airport property.

**100-4.7 PORTABLE LIGHTED RUNWAY CLOSURE MARKER.** The portable lighted runway closure marker shall meet or exceed FAA Technical Report DOT/FAA/CT-TN87/3 with the following requirements:

- a) Minimum Visibility Range During Daytime VFR Use: 3 miles
- b) Minimum Visibility Range During Nighttime VFR Use: 6 miles

Acceptable manufacturers include (others may be submitted for approved as "an equal"):

Sherwin Industries	-Ph. 800-525-8876
Sweepster	-Ph. 800-291-5313
Batts, Inc.	-Advance, IN
Neubert Aero Corp.	-Tampa, FL

At the conclusion of the project, the Contractor shall deliver all Portable Lighted Runway Closure Markers to the Owner in a clean and like-new condition.



## FACILITIES

**100-4.7 Field Office Trailer.** A double wide office trailer, having a minimum size of 28'x60', heated and air-conditioned, shall be provided by the Contractor. The trailer shall be for the exclusive use of the Program Manager and Designer and shall be installed and operational within 45 days of NTP and shall remain in place for up to 45 days after project closeout. Each trailer shall have an enclosed restroom with sink and exhaust fan. The trailer shall have two offices on each end and a central conference room in the center with a minimum of three 110-volt outlets in each office and six in the conference room. Two offices shall have an exterior, solid core door with a dead bolt. In addition, the trailer shall be equipped with 3 telephone lines and 1 DSL internet connection. A compacted 6-inch gravel (P-209) parking area, 30' x 60' and driveway with corrugated metal pipe culvert shall be placed at the direction of the Program Manager. One water spigot and one exterior 110-volt outlet shall be provided near the entrance. Two halogen lamps shall be provided on each end of the trailer facing the parking area. The Program Manager shall approve the floor plan prior to procurement. The Program Manager shall approve the location of the trailer and layout of the parking lot. Any required office furniture will be included and reimbursed under the Office Equipment Allowance included under SC-30-6.

Set up of the trailer, including permits and fees, tie-downs, steps, sanitary sewer, water, telephone, DSL and power, shall meet all applicable building and Fire Department codes and is incidental to the item. Maintenance of the trailer including; cleaning three times a week, utility bills, repair of the trailer, furniture and HVAC, and pumping of the septic tank if not connected to the city system, shall be incidental to the item. Insurance shall be maintained on the trailer covering full replacement value, including contents, for damage or loss resulting from negligence, fire, acts of God or vandalism.

**100-4.8 Curing Facilities.** The Contractor shall provide initial curing facilities for P-501 beams in accordance with paragraph 501-5.1a.(3) and ASTM C 31. In addition, the initial curing facilities shall be a climate-controlled ground level (roll-off) trailer with sufficient space to hold a minimum of 8 storage tanks. The Contractor shall supply storage tanks deep enough to submerge beams in a vertical orientation. The specific construction of the curing tanks shall follow specifications given in ASTM C 511. The facility shall have tables that run the length of the trailer approximately 36 to 44 inches high to support the beams off the floor. The initial curing facility and tables shall be constructed so that they can carry the live load from the concrete test beams. (Each beam will weigh approximately 70 pounds) The initial curing facilities shall also have a minimum of 2-110 volt outlets and sufficient lighting to do the necessary paperwork.

The facilities shall be in place and operational at least 60 days prior to placement of P-501 pavement. The maintenance of the facilities will be the responsibility of the Contractor, which will include but will not be limited to climate control, electricity, water, lighting, and water leaks. The Contractor shall be responsible for supplying necessary water and electricity to the facilities. The Contractor shall maintain ownership of the equipment and facilities upon completion of the project. The facilities shall remain in place and operational at least 28 days after the last P-501 pavement has been placed. The specified facilities will be for the sole use of the MSCAA Quality Assurance (QA) testing firm and the Project Manager.

## METHOD OF MEASUREMENT

**100-5.1 Plastic Safety Fence.** Plastic safety fence, including plastic tension wire, as detailed in the drawings, with metal T-posts or with wood posts, shall be furnished and installed at the locations indicated in the plans and/or as directed by the Program Manager, moved as necessary, and removed by Contractor, shall be measured for payment per linear foot.

**100-5.2 Guard House.** Guard houses, furnished by, installed, and maintained by the Contractor, shall be measured per each based on the initial installation of guard houses. Subsequent relocations of the guard house shall not be measured for payment.

**100-5.3 Low Profile Barricade (Type I).** Safety barricades furnished by, installed, and maintained by Contractor shall be measured for payment per each based on the initial installation of low profile barricades. Subsequent relocation of the barricades shall not be measured for payment. The Contractor furnished lights shall be considered incidental to the low-profile barricades.

**100-5.4 Field Office Trailer and Curing Facilities.** This item shall be measured as lump sum for providing the field office trailer and curing facilities in accordance with this specification.

**100-5.5 Crossing Gate Arm.** Crossing gate arms furnished by, installed, and maintained by Contractor shall be measured per each.

**100-5.6 Traffic Control.** Traffic Control shall be measured per lump sum.

**100-5.7 Project Safety & Security.** Safety and Security shall be measured as a lump sum item for all required equipment, installation or use of that equipment, and all operations, maintenance or incidentals required to properly maintain phased site safety and airfield security (including sweeper trucks, vacuum trucks, and flagman), unless otherwise indicated as a separate pay item under this specification. Safety and Security shall be furnished for the life of the Contract.

**100-5.8 Portable Lighted Runway Closure Maker.** Portable Lighted Runway Closure Maker furnished by, installed, maintained, fueled, and serviced by Contractor shall be measured per each unit as accepted by the Program Manager. The Maker shall become the property of the Owner upon completion of the Project.

### **BASIS OF PAYMENT**

**100-6.1 Plastic Safety Fence.** Plastic safety fence shall be furnished at the locations indicated in the drawings and/or as directed by the Program Manager. Maintenance shall be incidental and may include replacement of posts, replacement of fabric and/or reattachment of fabric to posts. All costs for safety fence, including installation, final demolition, and relocation, if required, is to be included in the unit price. The price shall be full compensation for transporting, furnishing materials, and maintenance, for all preparation, assembly, and installation, and for all labor, equipment, tools, and incidentals necessary to complete this item to the provisions and intent of the plans and specifications.

**100-6.2 Guard House.** Contractor furnished guard houses shall be installed on the project site and maintained for the duration of the project. The unit price includes relocating to the site, installation, and relocation throughout the duration (up to but not including the completion) of the project, final removal from the project site, portable toilet, maintenance, cleaning, lights, air conditioning and heat, chair, trash collection, utility hookups and all necessary appurtenances resulting in a useable guard house in accordance with section SC-240 of the project specifications, all utility connection fees, and monthly billings.

Payment will be made only once for each guard house used on the project, regardless if the guard house is moved. Guard house personnel shall be furnished by MSCAA. These prices shall be full compensation for transporting, furnishing materials, and maintenance, for all preparation, assembly, and installation, and for all labor, equipment, tools, and incidentals necessary to complete this item to the provision and intent of the plans and specifications.

**100-6.3 Low Profile Safety Barricade (Type I).** Low Profile Safety Barricades (Type I) shall be furnished at the locations indicated in the drawings and/or as directed by the Program Manager and shall include providing solar powered lights. The Contractor is also responsible for maintenance for the duration of the project, and removal at phase or project completion. Barricade removal and relocation from one location to another location will not be measured for payment. Upon project completion, the Contractor will remove barricades from the project site.

**100-6.4 Field Office Trailer and Curing Facilities.** The price shall be full compensation for furnishing the Field Office Trailer and Curing Facilities. Payment shall be made at the contract lump sum price for completing this item to the satisfaction of the Program Manager as specified in this specification.

**100-6.5 Crossing Gate Arm.** Contractor furnished crossing gate arm shall be installed and maintained for the duration of the phase and/or project as required for each AOA fence line penetration and for all active taxiway crossings. The unit price shall include furnishing, installing, maintaining, and relocating throughout the duration of the project. All contractor furnished crossing gate arms shall be removed from the project site upon project completion.

Payment will be made only once for each crossing gate arm used on the project, regardless if the crossing

gate arm is moved. The price shall be full compensation for transporting, furnishing materials, and maintenance, for all preparation, assembly, and installation, and for all labor, equipment, tools, and incidentals necessary to complete this item to the provision and intent of the plans and specifications.

**100-6.6 Traffic Control.** Traffic control shall be in accordance with the plans and/or as directed by the Program Manager and paid for at the contract unit price per lump sum installed. Maintenance shall be incidental. All costs for traffic control, including City of Memphis Street Cut Permit, final removal of traffic control items and equipment at completion, restoration of the roadway to its original configuration, is to be included in the cost of this item and will not be measured and paid for separately. The prices shall be full compensation for transporting, furnishing materials, and maintenance, for all preparation, assembly, and installation, and for all labor, equipment, tools, and incidentals necessary to complete this item to the provisions and intent of the plans and specifications.

**100-6.7 Project Safety & Security.** Payment shall be made for airport safety and security measures for personnel or materials related to this specification item and incidentally required to satisfy the specified objective(s) under item S-100-5.7, Project Safety & Security. This shall be full compensation for furnishing all materials and for all labor, equipment, tools, and incidentals necessary to satisfactorily complete the item.

**PARTIAL PAYMENTS.** Partial payments will be made in accordance with the following:

- a. With first pay request, 25%.
- b. When 25% or more of the original contract amount in dollars is earned, an additional 25%.
- c. When 50% or more of the original contract amount in dollars is earned, an additional 40%.

After Final Inspection, Staging area clean-up and delivery of all Project Closeout materials as required by General Provision, Section 90-11, the final 10%

**100-6.8 Portable Lighted Runway Closure Maker.** Payment shall be made per each Portable Lighted Runway Closure Maker furnished by, installed, maintained, fueled, and serviced by Contractor for the duration of the phase of construction that closed the affected runway. Price shall be full compensation for all equipment, materials, fuel and lubricants, tools and incidental necessary to furnish, install and maintain the item for the required time duration. The Maker shall become the property of the Owner upon completion of the Project.

Payment will be made under:

Item S-100-6.1	Plastic safety fence – per Linear Foot
Item S-100-6.2	Guard House (Contractor furnished) – per Each
Item S-100-6.3	Low Profile Barricade (Type 1) (Contractor furnished) – per Each
Item S-100-6.4	Field Office Trailer and Curing Facilities – per Lump Sum
Item S-100-6.5	Crossing Gate Arm – per Each
Item S-100-6.6	Traffic Control – per Lump Sum
Item S-100-6.7	Project Safety & Security – per Lump Sum
Item S-100-6.8	Portable Lighted Runway Closure Maker – per Each

**END OF ITEM S-100**

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**DIVISION 1 – SECTION 01100****SUMMARY OF THE WORK, SEQUENCE OF CONSTRUCTION & LIQUIDATED DAMAGES****PART 1 GENERAL**

Related Work:

1. Documents affecting work of this Section include, but are not necessarily limited to Division 0 and Division 1 and other Sections of these Specifications.

**1.01 SUMMARY****SUMMARY OF WORK**

- A. The "Project," of which the "Work" of this Contract is a part, is titled Taxiway Alpha West Reconstruction - Construction, MSCAA Project 18-1413-01.
- B. The "Work" of this Contract is defined in the Contract Documents to include, but not limited to, demolition of existing pavement and associated infrastructure, grading and drainage, underdrains, Portland cement concrete pavement including subgrade preparation, cement treated base, soil cement subbase, joint sealing, bituminous pavement, airfield signage and markings, airfield electrical lighting and underground ducts, earthwork, erosion control, sodding, and other efforts normally required for taxiway reconstruction.
- C. Airport Improvement Program Project: The work in this contract is included in an Airport Improvement Program Project (which project is subject to receipt of confirmation of federal funds) which is being undertaken and accomplished by the Owner in accordance with the terms and conditions of an agreement between the Memphis-Shelby County Airport Authority and the United States, under the provision of Title 49, United States Code, herein called Title 49, USC, pursuant to which the United States Government has agreed to pay a certain percentage of the costs of the project that are determined to be allowable project costs under that Act. The United States Government is not a party to this contract and no reference in this contract to the FAA or any representative thereof, or to any rights granted to the FAA or any representative thereof, or the United States Government, by the contract, makes the United States Government a party to this contract.
- E. FAA Inspection and Review: The Contractor shall allow any authorized representative of the FAA to inspect and review any work or materials used in the performance of this contract.
- F. Subcontracts: The Contractor shall insert in each of his subcontracts the provisions contained in paragraphs C. and D., of this section and also a clause requiring the subcontractors to include these provisions in any lower tier subcontracts which they may enter into, together with a clause requiring this insertion in any further subcontracts that may in turn be made.

**PART 2 PRODUCTS**

Not used.

**PART 3 EXECUTION****3.01 PROJECT PHASING AND COMPLETION**

- A. This is a fixed-duration Contract required to be substantially completed within 475 calendar days from the Notice to Proceed ("NTP") date. Furthermore, each phase has a required calendar day duration as

indicated in the Phasing Plans. The project scope of work is as stated in Paragraphs 1.01 (A) and (B) above. Final Completion of the project shall be within 60 days of the Substantial Completion Date.

“Substantial Completion” of the project shall be defined as the stage of construction when work is substantially completed. Substantial completion shall occur when: the Work is sufficiently complete in accordance with the Contract Documents, so the Owner can occupy or utilize the Work for its intended use; and when all acceptance testing completed; and when only minor punch list work remains to be done; and, if applicable, a certificate of occupancy has been issued. Substantial Completion will exclude record drawings, O&M manuals, lien waivers, maintenance training, warranties, consent of surety to final payment, and all other required closeout documentation. The Owner will, upon written request of the Contractor, issue a certificate establishing the substantial completion date at any time after substantial completion has occurred.

“Final Completion” of the project shall be defined as work that is 100% complete including all punch list items, record drawings, O&M manuals, lien waivers, maintenance training, warranties, consent of surety to final payment, and all other required closeout documentation. Final Completion shall include Demobilization.

“Demobilization” shall consist of all activities by the Contractor and subcontractors necessary for 100% completion of the work and final contract closeout as listed above and all cleanup work and operations, including but not limited to, removal of personnel, equipment, contractor-owned stockpiles, supplies, and incidentals from the project site; return of any and all airport-issued security identification badges; cleanup of all offices, buildings, batch plant, staging/lay-down areas, and other facilities; and restoration of all areas to preconstruction condition or better or to other condition as stipulated in the project plans and specifications; completion and delivery to the Owner of all contract closeout documentation and any other documentation request by Owner, including but not limited to, Operations and Maintenance Manuals, Warranties, Final Lien-waivers, Owner Controlled Insurance Program closeout paperwork, DBE paperwork, Final Project Record Documents and finalization of any and all punch list items. The Demobilization lump sum amount becomes fixed and will not change for the duration of contract.

- B. The actual NTP date will be negotiated and mutually agreed by both parties (Owner and Contractor) prior to issuance of the NTP. If mutual agreement cannot be reached between the parties, the Owner reserves the right to establish the actual Notice to Proceed date. The NTP letter will state the date on which the Contractor will begin construction and from which date contract time will be charged. Contractor shall be mobilized and on site ready for work on the date stated in the Notice to Proceed.
- C. “Mobilization” shall consist of all preparatory work and operations needed to begin construction activities on the date mutually agreed including but not limited to, movement of personnel, equipment, stockpiles, supplies and incidentals to the project site; the establishment of all offices, buildings, batch plant, staging/lay-down areas and other facilities necessary for work on the project; all other work and operations which must be performed or costs incurred prior to beginning work on the various items on the project site, and utility services for all offices, buildings, batch plant, staging/ lay-down areas, and other facilities. The Mobilization lump sum amount becomes fixed and will not change for the duration of contract.
- D. All days are calendar days.
- E. The work site will be available as described on the plans and applicable sections of these specifications. Unless noted otherwise in the phasing plans, work is permitted 24 hours per day, 7 days per week except that only non-noise producing activities shall be permitted between 11:00 PM and 6:00 AM, except with prior written approval of the Owner.
- F. The Contractor shall proceed with the work at such rate of progress to ensure full completion

within the specified total duration and phasing durations. It is expressly understood and agreed, by and between the Contractor and the Owner, that the contract time for the completion of the work described herein is a reasonable time, taking into consideration the average climatic and economic conditions and other factors prevailing in the locality of the work.

- G. If the Contractor experiences weather related delays, he shall submit a report documenting the weather conditions and delays, if any, experienced during any calendar month.
- H. If the Contractor is prevented from working due to any other legitimate reason he shall notify the Owner in writing as per the Lump Sum Construction Contract of the delay and request a corresponding increase in the number of contract days.
- I. The Owner shall be the sole judge as to whether or not a request for a contract time extension is legitimate.
- J. The Owner reserves the right to adjust limits of construction to accommodate the Owner's requirements for maintenance of Airport Operations and Public Traffic with minimum interruption during the construction of this project. Any required adjustment of limits of construction will be at no additional cost to the Owner.
- K. No pavement closures will be allowed between October 15<sup>th</sup> and January 15<sup>th</sup>. This is accounted for in the project duration.

### 3.02 LIQUIDATED DAMAGES

- A. The OWNER and the CONTRACTOR recognize that time is an essential element of this contract and that delay in completing this project will result in damages due to public inconvenience, obstruction to aviation and vehicular traffic, interference with businesses both on and off the airport, increased operational costs to airport users, and increased costs to the OWNER associated with engineering services, inspections, testing, and project administration. It is therefore agreed that in view of the difficulty of making a precise determination of such damages, the CONTRACTOR will pay the OWNER, sums of money in the amounts herein stipulated, not as a penalty, but as Liquidated Damages for not meeting the schedule for specific critical Project Milestones.
- B. If the CONTRACTOR fails to deliver equipment or materials, or perform any services within the times and dates specified in this Contract to achieve the established Milestones, or any extensions granted in writing, the CONTRACTOR shall pay to the OWNER as Liquidated Damages, the sums specified in Table 1, below:

<i>Milestone</i>	<i>Completion Date</i>	<i>Liquidated Damages</i>
Substantial Completion	475 days	\$3,000 per Day or any portion thereof
Phase 1A	60 days	\$5,000 per Day or any portion thereof
Phase 2B	60 days	\$5,000 per Day or any portion thereof
All Other Phases	See Phasing Plans	\$2,000 per Day or any portion thereof
Final Completion and Demobilization Phase	60 days	\$1,000 per Day or any portion thereof

- D. Application of Liquidated Damages is not a Change to the Contract. The application of any Liquidated Damages to one Milestone shall not effect a change in the subsequent Contract Milestone dates or relieve CONTRACTOR of his responsibility to meet all construction schedules. If multiple Milestone dates are missed, Liquidated Damages for more than one Milestone will be imposed concurrently.
- E. If Liquidated Damages are imposed, the OWNER shall deduct the same from any amounts due the CONTRACTOR at the time Liquidated Damages are imposed. If sufficient amounts are not due to the CONTRACTOR to cover such Liquidated Damages, then the OWNER shall invoice the CONTRACTOR for the amounts due to the OWNER. Such invoices shall become due and payable immediately upon receipt by the CONTRACTOR.
- F. Liquidated Damages are in addition to any other damages or penalties which may be assessed and withheld under other provisions of this contract.

### **3.03 COMPLETION BONUS**

NO completion bonus has been budgeted for this project.

**END OF SECTION 01100**



**DIVISION 1 – SECTION 01210****ALLOWANCES****PART 1 GENERAL****1.01 SUMMARY**

- A. To provide adequate budget and bonding to cover items not precisely determined by the Owner prior to bidding, allow within the proposed Contract Sum the amounts described in this Section.
- B. Unless stated otherwise herein, all allowances are to be paid as Time and Materials Work per GP-150.
- C. Related Work:
  - 1. Documents affecting Work of this Section include, but are not necessarily limited to, Division 0, Division 1 and other Sections of these Specifications.
  - 2. Other provisions concerning Allowances may be stated in other Sections of these Specifications.

**1.02 SPECIFIC ALLOWANCES – The following cash allowances are included within this Contract:**

- A. **Airfield Pavement Repair** – Due to existing condition of pavement located within the project footprint, the contractor may be required to perform partial or full panel repairs in later phases of the project. The cost of any authorized maintenance work will be paid through the cash allowance provided and must be submitted and approved before work is performed.

**END OF 01210**

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**DIVISION 1 – SECTION 01230****ALTERNATES****PART 1 GENERAL****1.01 SUMMARY**

- A. This selection includes identification of each Alternate by number, and describes the basic changes to be incorporated into the Work if a particular Alternate is made a part of the Work by specific provisions in the Agreement between the Owner and the Contractor.
- B. Related Work:
  - 1. Documents affecting Work of this Section include, but are not necessarily limited to, Division 0, Division 1 and other Sections of these Specifications.
  - 2. Materials and methods to be used in the Base Bid and in the Alternates also may be described on the Drawings and/or in pertinent other Sections of these Specifications.
  - 3. Method for stating the proposed Contract Sum is shown on the Bid Form.

**1.02 SUBMITTALS**

- A. All Alternates described in this Section are required to be reflected on the Bid Form as submitted by the Bidder.
- B. Do not submit Alternates other than as described in this Section.

**1.03 SELECTION OF ALTERNATES**

- A. Immediately after award of the Contract, or as soon thereafter as the Owner has made a decision on which, if any, of the Alternates will be selected, thoroughly and clearly advise necessary personnel and suppliers as to the nature of Alternates selected by the Owner.
- B. If the Owner elects to proceed on the basis of one or more of the described Alternates, make modifications to the Work required in providing the selected Alternate or Alternates to the approval of the Owner and at no additional cost to the Owner except as proposed in the Bid.

**1.04 ADVANCE COORDINATION**

- A. Immediately after award of the Contract, or as soon thereafter as the Owner has made a decision on which, if any, of the Alternates will be selected, thoroughly and clearly advise necessary personnel and suppliers as to the nature of Alternates selected by the Owner.

**PART 2        ALTERNATES** – The following alternates are included within this Contract:

- A.        None.

**END OF SECTION 01230**

**DIVISION 1 – SECTION 01250****AMENDMENT PROCEDURE****PART 1 GENERAL****1.01 SUMMARY**

- A. Make such changes in the Work, in the Contract Price, in the Contract Time, or any combination thereof, as are described in written Amendments signed by the Owner and the Contractor and issued after execution of the Construction Contract, in accordance with the provisions of this Section.
- B. Related work:
  - 1. Documents affecting work of this Section include, but are not necessarily limited to, Division 0, Division 1, and other Sections of these Specifications.
  - 2. Any proposal for a change in the Work shall include DBE participation consistent with the required DBE percentage for this Contract. If the Contractor is unable to meet said DBE percentage, a written justification of the good faith efforts made shall be submitted along with the response to the Engineer's or Owner's proposal request.
  - 3. Engineer or Owner supplemental instructions:
    - a. From time to time during progress of the Work the Engineer or Owner may issue supplemental instructions, which interpret the Contract Documents or order minor changes in the Work without change in Contract Sum or Contract Time.
    - b. Should the Contractor consider that a change in Contract Sum or Contract Time is required, he shall submit an itemized proposal to the Engineer or Owner immediately and before proceeding with the Work. If the proposal is found to be satisfactory and in proper order, the supplemental instructions in that event will be superseded by an Amendment.
  - 4. Proposal requests:
    - a. From time to time during progress of the Work the Engineer or Owner may issue a Request for Proposal (RFP) proposal request for an itemized quotation for changes in the Contract Price and/or Contract Time incidental to proposed modifications to the Contract Documents.
    - b. This will not be an Amendment, and will not be a direction to proceed with the changes described therein.

**1.02 QUALITY ASSURANCE**

- A. Include within the Contractor's quality assurance program such measures as are needed to assure familiarity of the Contractor's staff and employees with these procedures for processing Amendment data.

**1.03 PROCESSING PROPOSAL REQUESTS**

- A. Make timely written reply to the Engineer or Owner in response to each proposal request. Proposal requests will be numbered in sequence and dated.
  - 1. State proposed change in the Contract Sum, if any.
  - 2. State proposed change in the Contract Time of Completion, if any.
  - 3. Clearly describe other changes in the Work, if any, required by the proposed change or desirable therewith.
  - 4. State amount of DBE participation applicable to the proposed changes.
  - 5. Include full backup data such as subcontractor's letter of proposal or similar information.
  - 6. Submit this response in single copy.
- B. When cost or credit for the change has been agreed upon by the Owner and the Contractor, or the Owner has directed that cost or credit be determined in accordance with provisions of Division 0 and Division 1 Specifications, the Engineer or Owner will prepare an Amendment for execution by the Owner and Contractor.

**1.04 PROCESSING AMENDMENTS**

- A. Amendments will be numbered in sequence, and dated.
  - 1. The Amendment will describe the change or changes, will refer to the proposal requests or supplemental instructions involved, and will be signed by the Contractor and Owner, in sequence.
  - 2. The Engineer or Owner will issue two copies of each Amendment to the Contractor.
    - a. The Contractor shall promptly sign all copies and return all copies to the Engineer or Owner for further processing by the Owner.
    - b. The Engineer or Owner will forward all copies to the Owner with a request for complete processing.
    - c. The Owner will sign and return a copy to the Contractor for distribution.

**END OF SECTION 01250**

**DIVISION 1 – SECTION 01310****PRECONSTRUCTION CONFERENCE & PROGRESS MEETINGS****PART 1 PRECONSTRUCTION CONFERENCE****1.01 SUMMARY**

- A. To help clarify construction contract administration procedures, the Engineer or Owner will schedule a Preconstruction Conference prior to start of the Work, as described in this Section.
- B. Related Work:
  - 1. Documents affecting work of this Section include, but are not necessarily limited to, Division 0 and Division 1 Specification Sections.

**1.02 AGENDA AND MEETING SUMMARIES**

- A. To the maximum extent practicable, advise the Engineer or Owner at least 24 hours in advance of the Conference as to items to be added to the agenda.
- B. The Engineer or Owner will compile summaries of the Conference, and will furnish copies of the summaries to the Contractor. The Contractor may make and distribute such other copies as he wishes.

**1.03 QUALITY ASSURANCE**

- A. For those persons designated by the Contractor, his subcontractors, and suppliers to attend the Pre-Construction Conference, provide required authority to commit the entities they represent to schedules and solutions agreed upon in the Conference.

**1.04 PRECONSTRUCTION CONFERENCE**

- A. The Conference will be held at a time and date established by the Engineer or Owner. If requested by the Engineer or Owner, additional conferences will be held.
- B. Attendance:
  - 1. Insure attendance by authorized representatives of the Contractor and major Subcontractors.
  - 2. The Engineer or Owner will advise other interested parties, including the Owner, and request their attendance.
- C. Minimum agenda:
  - 1. Organizational arrangement of Contractor's forces and personnel and those of subcontractors, material suppliers, and the Engineer or Owner;
  - 2. Channels and procedures for communications;
  - 3. Construction schedule, including sequence of critical work;
  - 4. Contract Documents, including distribution of required copies of Drawings and revisions;
  - 5. Processing of Shop Drawings and other data submitted to the Engineer or Owner for

review;

6. Processing of field decisions and Change Orders;
7. Rules and regulations governing performance of the Work;
8. Procedures for safety and first aid, security, quality control, housekeeping, and related matters; and
9. Reports required and schedule for submittal.
10. Items requiring long lead time and special requirements.

## **PART 2 PROGRESS MEETINGS**

### **2.01 DESCRIPTION**

- A. Work included: To enable orderly review during progress of the Work, and to provide for systematic discussion of problems, the Engineer or Owner will conduct project meetings throughout the construction period.
- B. Related work:
  1. Documents affecting work of this Section include, but are not necessarily limited to, General Provisions, and other Sections of these Specifications.
  2. The Contractor's relations with his subcontractors and materials suppliers, and discussions relative thereto, are the Contractor's responsibility and normally are not part of project meetings content.

### **2.02 SUBMITTALS**

- A. Agenda items: To the maximum extent practicable, advise the Engineer or Owner at least 24 hours in advance of project meetings regarding items to be added to the agenda.
- B. Summaries:
  1. The Engineer or Owner will compile summaries of each project meeting, and will furnish copies to the Contractor and the Owner.
  2. Recipients of copies may make and distribute such other copies as they wish.

### **2.03 QUALITY ASSURANCE**

- A. For those persons designated by the Contractor to attend and participate in project meetings, provide required authority to commit the Contractor to solutions agreed upon in the project meetings.

## **PART 3 EXECUTION**

### **3.01 MEETING SCHEDULE**

- A. Project meetings will be held at times as determined by the Engineer or Owner.



- B. Coordinate as necessary to establish a mutually acceptable schedule for meetings.

### **3.02 MEETING LOCATION**

- A. The Engineer or Owner will establish the meeting location.

### **3.03 PROJECT MEETINGS**

- A. Attendance:

1. To the maximum extent practicable, assign the same person or persons to represent the Contractor at project meetings throughout progress of the Work.
2. Subcontractors, materials suppliers, and others may be invited to attend those project meetings in which their aspect of the Work is involved.

- B. Minimum agenda:

1. Review, revise as necessary, and approve summaries of previous meetings.
2. Review progress of the Work since last meeting, including status of outstanding submittals.
3. Identify problems which may impede planned progress.
4. Develop corrective measures and procedures to reestablish planned schedule.
5. Discuss other current business.

- C. Revisions to summaries:

1. Unless published summaries are challenged in writing prior to the next regularly scheduled progress meeting, they will be accepted as properly stating the activities and decisions of the meeting.
2. Persons challenging published summaries shall reproduce and distribute copies of the challenge to all indicated recipients of the particular set of summaries.
3. Challenge to summaries shall be settled as priority portion of "old business" at the next regularly scheduled meeting.

**END OF SECTION 01310**

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**DIVISION 1- SECTION 01320****SCHEDULES AND REPORTS****PART 1 GENERAL****1.01 SUMMARY**

- A. The work under this Contract shall be planned, scheduled and reported using computerized precedence diagram format of the Critical Path Method in calendar days, unless otherwise specifically provided in the Contract Documents. The Detailed Construction Schedule shall be developed by using the latest revision of Microsoft Project, or approved equal computer software.
- B. Related Work:
  - 1. Documents affecting work of this Section include, but are not necessarily limited to, other Sections of these Specifications.
  - 2. Other provisions concerning Schedules and Reports are stated to Specification Sections:
    - 01100 – Summary of Work, Sequence of Construction & Liquidated Damages
    - General Provision Section 60 - Control of Materials
    - General Provision Section 90 - Measurement and Payment

**PART 2 PRODUCTS**

Not Used.

**PART 3 EXECUTION****3.01 GENERAL REQUIREMENTS**

- A. The Detailed Construction Schedule shall be developed by using the latest revision of Microsoft Project, or approved equal computer software that is compatible with Owner's scheduling software.
- B. The primary objectives of the requirements of this section are:
  - 1. to insure adequate planning and execution of the Work by Contractor;
  - 2. to assist Owner and Engineer in evaluating the progress of the Work;
  - 3. to provide a mechanism or tool for use by the Owner, Engineer and Contractor in determining and monitoring any actions of the Contractor which may be required in order to comply with the requirements of the Contract relating to the timely completion of the various portions of the Work
- C. The Detailed Construction Schedule, defined in Paragraph 3.04, shall represent the Contractor's commitment and intended plan for completion of the Work in compliance with the Contract. The Contractor will not:
  - 1. Misrepresent to the Owner its planning, scheduling, and coordination of the work;
  - 2. Utilize schedules different from those provided to the Owner and Engineer for the direction, execution and coordination of the work;
  - 3. Utilize schedules which are not feasible or realistic; or

4. Prepare schedules, updates, revisions or reports which do not accurately reflect the Contractor's actual intent or the Contractor's reasonable and actual expectations as to: the sequences of activities, labor availability, productivity, or efficiency; expected or reasonably foreseeable inclement weather conditions; the percentage complete of any activity or path of activities; completion of any item of work or activity; projected dates of completion; delays, slippage, or problems encountered or expected and Subcontractor requests for time extensions,
- D. Once approved by the Engineer or Owner, the Detailed Construction Schedule will become the Schedule of Record for coordinating the work, scheduling the work, monitoring the work, issuing progress payments, evaluating time extension requests, and all other objectives listed in Paragraph 3.01.B. The Contractor is required to employ whatever means he deems necessary to implement the Detailed Construction Schedule and to comply with the requirements of this Section. Updates shall be provided to the Engineer or Owner at each construction progress meeting or as requested by the Engineer or Owner. Updates shall be both electronic media and hard copy.
- E. Contractor is responsible for determining the sequence of activities, the time estimates of the detailed construction activities and the means, methods, techniques and procedures to be employed. Each construction schedule shall represent the Contractor's best judgment of how he will prosecute the Work in compliance with the Contract.
- F. Contractor shall consult with his Subcontractors and Suppliers (if any) relating to the preparation of each construction schedule. Subcontractors shall receive copies of each construction schedule and shall be continually advised of any updates or revisions to each construction schedule as the Work progresses.
- G. When there are separate contractors working concurrently on Airport whose work must interface or be coordinated with the Work of Contractor, Contractor shall coordinate his activities with the activities of the separate contractors and shall, prior to the submission of any construction schedule to the Engineer or Owner, obtain written approval of his construction schedule by the separate contractors.
- H. To carry out the intent of this Section, the Contractor agrees that the reasonable exercise of any rights under this Section by the Engineer or Owner shall not be grounds for any claim by Contractor or any of his Suppliers, Subcontractors or Sub-subcontractors of alleged interference, lack of cooperation, delay, disruption, negligence or hindrance by Owner or Engineer, and Contractor covenants not to sue therefor.
- I. It is understood and agreed that the Detailed Construction Schedule, defined in Paragraph 3.04, is to represent Contractor's best plan and commitment for the Work; however, Contractor acknowledges that the Detailed Construction Schedule may have to be revised from time-to-time as progress proceeds. Contractor further acknowledges and agrees that the Owner and Engineer do not guarantee that:
  1. Any changes, modifications or adjustments to any schedule by Contractor can only be made by the written approval of the Engineer or Owner.
- J. It is understood and agreed that should the Engineer or Owner provide the Contractor, at Contractor's request, with any advice relating to the scheduling or coordination of the Work or any other matter that:
  1. Owner and Engineer shall not be liable to Contractor for any errors, omissions, negligence or deficiencies which may in any way occur because of same;
  2. Such advice is provided solely as aids in the development by Contractor of a

representation of Contractor's actual construction plan and schedule in accordance with the requirements of the Contract Documents, and Owner and Engineer shall not be liable to Contractor should Contractor rely on such advice or counsel to his detriment;

3. Such advice shall not relieve Contractor of any responsibility under Paragraph 3.01.E hereof for all construction means, methods techniques, sequences and procedures and for planning, scheduling and coordinating all portions of the Work; and
  4. Any advice provided by the Engineer or Owner or the lack or alleged untimeliness thereof will not in any way take the place of or relieve the Contractor of full responsibility for compliance with all requirements of the Contract, including, but not limited to the obligations to complete the Work within the Contract.
- K. Approval or acceptance by the Owner or Engineer of any Contractor's construction schedule, or any revisions or updates thereto, shall not relieve the Contractor of the responsibility for accomplishing the Work by the Project Substantial Completion date.
- L. Contractor shall be solely responsible for expediting the delivery of all materials and equipment to be furnished by him so that the progress of construction shall be maintained according to the currently approved construction schedule for the Work. Contractor shall notify the Owner or Engineer in writing, and in a timely and reasonable manner, whenever Contractor determines or anticipates that the delivery date of any material or equipment to be furnished by Contractor will be later than the delivery date indicated by the currently approved construction schedule, or the current update thereof as herein provided.

### **3.02 NOT USED**

### **3.03 DETAILED CONSTRUCTION SCHEDULE DRAFT**

- A. No later than two (2) weeks after the Notice to Proceed, the Contractor shall complete a draft of the Detailed Construction Schedule in accordance with the requirements of this Paragraph 3.03.

### **3.04 DETAILED CONSTRUCTION SCHEDULE**

- A. Contractor shall submit a Detailed Construction Schedule every two weeks, which has been completed to the satisfaction of the Owner or Engineer.
- B. The Detailed Construction Schedule shall represent the Contractor's commitment and intended plan for completion of the Work in compliance with the Contract.
- C. The Owner/Engineer reserves the right to require the Contractor to furnish such manpower, materials facilities and equipment and shall work such hours, including additional shifts and overtime operations as may be necessary, to insure completion of the Work or specified portions thereof within the specific dates as set forth in the Contract Documents. If it becomes apparent to the Owner or Engineer that the work, or any required portion thereof, will not be completed by any such dates, the Contractor shall undertake the following actions, at no additional cost to the Owner, and comply with the requirements as set forth in Section 01320, 3.07 and 3.08, in order to ensure that it complies with all completion requirements:
1. Increase the quantity of manpower, materials, trades, crafts, and equipment and facilities on the site;
  2. Increase the number of working hours per shift, shifts per working day, or any combination of the foregoing; and
  3. Reschedule activities to achieve maximum activity accomplishment.

### 3.05 DETAILED CONSTRUCTION SCHEDULE CONTENT

- A. The Detailed Construction Schedule shall consist of a time-scaled graphic representation of all activities, which are part of the Contractor's construction plan and an accompanying listing of each activity's dependencies and interrelationships.
- B. The Contractor shall anticipate and account for, as a minimum, the potential loss of the number of **calendar** days listed below for each calendar month due to weather and shall schedule the work accordingly.

January	12	July	6
February	10	August	6
March	9	September	4
April	6	October	5
May	8	November	6
June	5	December	10

The preceding days were derived from historical data provided by the National Climatic Data Center regarding rainfall at Memphis International Airport. They represent a number less than the actual number of days of measurable rainfall that can be expected to occur during a twenty-four (24) hour period for the months indicated. **The Contractor shall make his own determination as to the likely impact of weather on his operation and shall include as part of the Detailed Construction Schedule submission an accounting of how the impact of anticipated weather was determined and accounted for in the schedule.** These values listed above are the minimum number of weather related days the Contractor shall consider in developing his Detailed Construction Schedule. It is further understood that said calendar day period shall be derived through assuming that work will take place on a calendar day basis.

The Owner or Engineer will continually monitor the effects of weather and when found justified, grant time extensions, if required, at the end of the Contract. In the event less weather days are actually encountered than provided for in this section, those days will accrue to subsequent months of the phase or contract and be balanced against actual weather. In accordance with the Contract Documents weather days occurring during the extension beyond the original completion date will be compensated day for day, if justified. No weather days will be granted beyond the final Contract completion date as computed herein.

- C. All activity durations shall be given in calendar days.
- D. Contractor shall plan his operations and schedule the work to ensure that the critical path runs through on-site construction activities and that off-site procurement activities do not control the critical path of the Detailed Construction Schedule, unless approved in writing by the Owner or Engineer.

### 3.06 UPDATING OF CONSTRUCTION SCHEDULE/PROGRESS REPORTS

- A. The Detailed Construction Schedule will be reviewed and updated as needed during each project progress meeting.

### 3.07 RECOVERY SCHEDULE

- A. Should the updated Detailed Construction Schedule, at any time during Contractor's performance, show, in the sole opinion of the Owner or Engineer, that the Contractor is seven (7) or more days behind schedule for any location or category of work, or should Contractor be required to undertake actions under Paragraph 3.04.D hereof, the Contractor shall immediately prepare a

Recovery Schedule explaining and displaying how Contractor intends to reschedule his Work in order to regain compliance with the Approved Detailed Construction Schedule during the immediate subsequent pay period.

### **3.08 SCHEDULE REVISIONS**

- A. Should Contractor desire to or be otherwise required under the Contract to make modifications or changes in his method of operation, his sequence of Work or the durations of the activities in his Construction Schedule, he shall do so in accordance with Paragraph 3.04 of this specification. The approved Detailed Construction Schedule may only be revised by the written approval of the Owner or Engineer as provided herein.

**END OF SECTION 01320**

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**DIVISION 1 – SECTION 01321****CONSTRUCTION SURVEYING****PART 1 GENERAL****1.01 SUMMARY**

- A. This section describes the Owner's airport survey grid and surveying requirements.
- B. Related Work:
  - 1. Documents affecting work of this Section include, but are not necessarily limited to the General Provisions and other Sections of these Specifications.

**PART 2 PRODUCTS**

Not used.

**PART 3 EXECUTIONS****3.01 EXISTING SURVEY CONTROL MONUMENTS**

- A. The Owner has established an airport-wide survey grid consisting of both first order and second order survey monuments. The monuments are distributed both inside and outside the Air Operations Area fence.
- B. The monuments are tied to the Tennessee State Plane Coordinate System in U.S. Survey feet with the North American Datum, 1983.
- C. Survey control monuments typically, but not always, consist of aluminum disks stamped with identifying codes, set in concrete, and marked by orange witness posts.
- D. The Contractor may obtain the current Survey Control Monument Manual from the Program Manager.

**3.02 REQUIREMENTS**

- A. Contractor is responsible for all construction surveying.
- B. Any deviations from the existing grades shall be immediately reported to the Program Manager.
- C. Contractor shall tie the project to the survey grid as established by the monuments described in section 3.01.
- D. Contractor shall protect all survey monuments within the vicinity of the project and all survey monuments used for survey while they are occupied.
- E. The Contractor shall, at his expense, have a Tennessee Professional Land Surveyor replace any monument disturbed or destroyed by Contractor's construction activities (using first order techniques); replaced monuments shall be located at least ten feet, but not more than fifty feet, from the location of the disturbed monument. New monuments shall consist of aluminum disks stamped with an identifying code, set in concrete using a procedure approved by Program Manager, and marked by an orange witness post. Replaced-monument survey information shall be provided to Owner in exact format as contained within Owner's Survey Control Monument Manual.

**END OF SECTION 01321**

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**DIVISION 1- SECTION 01322****AERIAL PHOTOGRAPHS****PART 1 GENERAL****1.01 SUMMARY**

- A. Provide photographs taken at specified stages during construction, and in accordance with provisions of this Section.
- B. Related work:
  - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Provisions and other Sections of these Specifications.

**1.02 SUBMITTALS**

- A. Except as otherwise directed and paid for, submit one electronic file of each photograph.

**1.03 QUALITY ASSURANCE**

- A. Secure the services of a professional photographer who is skilled and experienced in construction photography and whose work samples are acceptable to the Engineer.
- B. Do not replace the photographer without the Engineer's written approval.

**PART 2 PRODUCTS****2.01 AERIAL PHOTOGRAPHS**

- A. Provide electronic files, at a quality and resolution capable of printing the photographs at a size up to 36" x 24".
- B. Record each electronic file's filename in a manner to show:
  - 1. Job number;
  - 2. Location from which photographed;
  - 3. Date of photograph;
- C. Do not permit photographs to be issued for any other purpose without specific written approval from the Engineer.

**PART 3 EXECUTION****3.01 AERIAL PHOTOGRAPHY**

- A. Except as otherwise specifically approved by the Engineer, make the photographs within three calendar days of the date of each Application for Payment.
  - 1. To the maximum extent practicable, make photographs at approximately the same time of day throughout progress of the Work.

2. When inclement weather is anticipated, consult with the Engineer and determine acceptable alternative arrangements.
- B. Except as otherwise specifically approved by the Engineer, take the photographs from four (4) directions. The photographs required shall be oblique aerial photographs. One shall be taken from the north, one from the south, one from the east and one from the west looking at the entire project, or as directed by the Engineer.
1. Select the locations to provide diversified overall views of the Work, from positions, which are expected to remain accessible throughout progress of the Work.
  2. Identify each location by word description, by marked drawing, or by such other means as acceptable to the Engineer, to enable future photographs to be taken from the same position.
  3. When so directed by the Engineer because of the stage of construction, change one or more of the locations as the Engineer directs.
- C. Make each photograph clear, in focus, with high resolution and sharpness, and with minimum distortion.

**END OF SECTION 01322**

**DIVISION 1 – SECTION 01325****DELAYS AND EXTENSIONS OF TIME****1.01 DESCRIPTION**

- A. Work included:
  - 1. Delays and extensions of time.
- B. Related Work:
  - 1. Documents affecting work of this Section include, but are not necessarily limited to the General Provisions, and other Sections of these Specifications.

**1.02 OBLIGATION OF OWNER AND PROGRAM MANAGER**

- A. Neither the Owner nor the Program Manager shall be obligated or liable to the Contractor for any damages, cost or expenses of any type which the Contractor, its subcontractors, sub-subcontractors, or any other person may incur as a result of any disruption or delay from any cause, regardless of the actual source of delay, whether avoidable or unavoidable, it being understood and agreed that the Contractor's sole and exclusive remedy in such event shall be an extension of the Contract Time, but in accordance with provisions of the Contract Documents.
- B. Except for weather delays, any claim for extension of time shall be made in writing to the Program Manager not more than ten (10) days after commencement of such delay, otherwise, such claim will be waived. The Contractor shall provide an estimate of the probable effect of such delay on the progress of the Work.
- C. The time during which the Contractor is delayed in performance of the work caused by the acts or omissions of the Owner, Program Manager or their employees or agents, or by acts of God, fires, floods, epidemics, quarantine restrictions, riots, civil commotions or freight embargoes, or other conditions beyond the Contractor's control which the Contractor could not have reasonably foreseen and provided against shall be added to the Contract Time; however, the Contractor must submit his claim for such delays in accordance with the requirements of this Section and any other applicable provisions of these Contract Documents in order to be considered for an extension of time.
- D. The Contract Time shall be adjusted only for changes in the work pursuant to GP-40, suspensions of the work, excusable delays or emergencies. Whenever the Contractor requests an extension of the Contract Time, the Contractor shall furnish such justification and supporting evidence as required by this section and such other and additional information as the Owner may deem necessary to determine whether the Contractor is entitled to an extension of the Contract Time. All such requests shall conform to all of the requirements of the Contract Documents, shall include evidence that the reasons for the requested Contract Time extension were beyond the control of the Contractor, and the Contractor shall bear the burden of substantiating and proving the necessity of an extension to the Contract Time. The Owner, with the assistance of the Program Manager, shall review all requests for Contract Time extensions and shall advise the Contractor of its decision and finding of fact in writing. If the Owner determines that the Contractor is entitled to an extension of the Contract Time, the length of the extension shall be based upon the currently approved detailed construction schedule and on all other relevant data, which data shall be incorporated into and from the basis for revision to the construction schedule.

The Contractor acknowledges and agrees that the actual delays due to said changes, suspension of the work, or excusable delays in activities which, according to the detailed construction schedule, do not affect the Contract Time, shall not affect the Contract Time, and therefore, cannot form the basis for an extension in the Contract Time or a change in the construction schedule.

- E. The Contractor shall be entitled to an extension of the Contract Time but no increase in the Contract sum, for delays arising from unforeseeable causes beyond the control and without the fault of negligence of the Contractor or its Subcontractors as follows:
  - 1. Acts of God, tornadoes, fires, blizzards, earthquakes, or floods that severely damages completed work or stored materials.
  - 2. Acts of the public enemy; acts of the state, federal or local governments in their sovereign capacities; and acts of a separate contractor in the performance of a separate contract with the Owner relating to this or another project.
- F. The Contractor shall not be entitled to any extension of Contract Time resulting from any condition or cause unless the Contractor strictly complies with the requirements of this Section and the Contractor must submit to the Program Manager within ten (10) days of the first instance of the delay a written request for an extension in the Contract Time which shall include the following information: (a) the nature of the delay; (b) the date of anticipated date of commencement of the delay; (c) activities on the schedule affected by the delay, and/or new activities created by the delay and their relationship with existing activities; (d) identification of persons or organizations or events responsible for the delay; and (e) recommended action to avoid or minimize the delay.
- G. No claim for delay shall be allowed and the Contractor waives any such claim if the Contractor fails to furnish the written request, required by this or other sections, within the period of time specified therein.

**END OF SECTION 01325**

**DIVISION 1 – SECTION 01330****SUBMITTALS****PART 1 GENERAL****1.01 SUMMARY**

- A. This section describes the process for handling Contractor submittals.
- B. Related work:
  - 1. Documents affecting work of this Section include, but are not necessarily limited to, Division 0, Division 1, and other Sections of these Specifications

**1.02 SUBMITTALS**

- A. Except as otherwise specified below, as soon as practicable after contract award and without causing delay in the work, submit at least 7 bound copies of submittals of all items for which submittals are specified in other sections, and for all major submittal equipment whether specified in other sections or not. Alternatively, all Submittals may be submitted electronically in lieu of hard copies, if possible. Each submittal shall be clearly marked with the project name, dated, and accompanied by a letter of transmittal listing all items included in the submittal and referencing the project specification page and article numbers applicable to each item.
  - 1. Submittals shall include all test results and/or certificate necessary to show that the item conforms to the standards specified. Such standards shall include ASTM, AASHTO, FAA, PCA, Federal Specifications or any other standard listed in these specifications.

**1.03 QUALITY ASSURANCE**

- A. Before submission to the Engineer or Owner, the Contractor shall check the submittals of all items furnished directly by him, and the applicable Subcontractor shall check the submittals of all items furnished by the Subcontractor involved, as follows: check the submittal drawings for completeness and compliance with the contract documents; check and verify all dimensions, field conditions certifications relating to the submittals and certify in writing that these checks have been made.
  - 1. The Engineer or Owner will return for resubmission, all submittals without the above specified approval and certification, and all submittals which in the Engineer's or Owner's opinion contain numerous discrepancies and/or have not been checked by the Contractor or Subcontractor.

**PART 2 PRODUCTS**

Not used.

**PART 3 EXECUTION****3.01 SUBMITTAL REVIEW**

- A. After the Owner or Engineer has reviewed the submittals, except as otherwise specified below, submittals will be dated, and three sets will be returned to the Contractor. If submittals are rejected, four sets will be returned to the Contractor, with indications of the required corrections and changes made on one of the sets. Make such corrections and changes as indicated. Resubmit

submittals as specified above, as often as required by the Engineer or Owner to complete the review. No correction or change indicated on submittals shall be considered as an order for extra work.

- B. Submittals reviewed by the Owner or Engineer will be a general review only, and acceptance will not relieve Contractor or Subcontractor of responsibility for accuracy of submittals, proper fitting, coordination, construction or work, and furnishing materials and work required by Contract but not indicated on submittals. Review of submittals shall not be construed as accepting departures from Contract requirements.
- C. Any material ordered, or work performed prior to obtaining an approved submittal shall be at the Contractor's risk and subject to rejection.

**END OF SECTION 01330**



**DIVISION 1 – SECTION 01351****STORAGE AND PROTECTION****PART 1 GENERAL****1.01 SUMMARY**

- A. Protect products scheduled for use in the Work by all means including, but not necessarily limited to, those described in this Section.
- B. Related Work:
  - 1. Documents affecting work of this Section include, but are not necessarily limited to, Division 0, and Division 1 of these Specifications.
  - 2. Additional procedures may also be prescribed in other Sections of these Specifications.

**1.02 QUALITY ASSURANCE**

- A. Include within the Contractor's quality assurance program such procedures as are required to assure full protection of work and materials.

**1.03 MANUFACTURERS' RECOMMENDATIONS**

- A. Except as otherwise approved by the Owner or Engineer, determine and comply with manufacturers' recommendations on product handling, storage, and protection.

**1.04 PACKAGING**

- A. Deliver products to the job site in their manufacturer's original container, with labels intact and legible.
  - 1. Maintain packaged materials with seals unbroken and labels intact until time of use.
  - 2. Promptly remove damaged material and unsuitable items from the job site, and promptly replace same with material meeting the specified requirements, at no additional cost to the Owner.
- B. The Owner or Engineer may reject as non-complying such material and products as do not bear identification satisfactory to the Owner or Engineer such as manufacturer, grade, quality, and other pertinent information.

**1.05 PROTECTION**

- A. Protect finished surfaces, materials, trenches, earthwork, etc. from weather, construction operations, etc.
- B. Maintain finished surfaces clean, unmarred, and suitably protected until accepted by the Owner.

**1.06 REPAIRS AND REPLACEMENTS**

- A. In event of damage, promptly make replacements and repairs to the approval of the Owner or Engineer and at no additional cost to the Owner.
- B. Additional time required to secure replacements and to make repairs will not be considered by the Owner or Engineer to justify an extension in the Substantial Completion Date.

**END OF SECTION 01351**

**SDIVISION 1 – SECTION 01353****RADIO COMMUNICATIONS****1.01 DESCRIPTION****A. Work Included**

1. Provide radio communication with Airport Control Tower.

**B. Documents affecting work of this Section include, but are not necessarily limited to General Provisions, and other Sections of these Specifications.****1.02 RADIO COMMUNICATIONS****A. When required by the Contract Documents, and when work under this Contract is in progress within the Air Operations Area (AOA), the Contractor's job superintendent or other authorized representative of the Contractor on the job site shall coordinate such work with the Program Manager.****B. Where required by the contract documents, the contractor will be required to obtain VHF handheld and/or mobile radios for monitoring and/or maintain 2-way communication to the Air Traffic Control Tower. Radios must be capable of transmitting and receiving frequencies within the Airband (118 to 136.975 MHz).****C. Contractor personnel monitoring and/or communicating on a VHF radio must have MSCAA Class 3 driving privileges or receive training from MSCAA Operations.****END OF SECTION 01353**

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**DIVISION 1 – SECTION 01455****QUALITY CONTROL AND QUALITY ASSURANCE TESTING PROGRAMS****PART 1 GENERAL****1.01 SUMMARY**

- A. This Section describes quality control and quality assurance testing and inspections required to be provided by the Contractor and the Owner.
- B. Related work:
  - 1. Documents affecting work of this Section include, but are not necessarily limited to, Division 0, Division 1 and other Sections of these Specifications.
  - 2. Requirements for testing are described in various Sections of these Specifications.

**1.02 QUALITY CONTROL and QUALITY ASSURANCE TESTING PROGRAMS**

- A. Contractor Quality Control Testing: At his own expense, the Contractor shall make separate arrangements for and be fully responsible for all quality control testing as required by the technical specifications and General Construction Items C-100.
- B. Owner Quality Assurance Testing: At no cost to the Contractor, the Owner will make arrangements for the services of an independent testing laboratory for quality assurance testing of work and materials. This testing is for the Owner's use only and will only be performed after the Contractor's quality control testing program has tested and approved materials and workmanship to be in full compliance with the quality standards of the Specifications. The Owner Quality Assurance testing services shall in no way relieve the Contractor of the responsibility for providing the quality materials, workmanship and testing required for compliance with these specifications.
- C. Determination of Specification Compliance: In all cases of conflicting test results, the Owner's quality assurance test results shall govern. All retesting shall be conducted by Owner's testing laboratory at the Contractor's expense. The amount and location of any retesting shall be as directed by the Owner or Engineer. Unsatisfactory work or materials shall be retested as often as necessary until retests indicate that the failed work or materials have achieved conformity with the Plans and Specifications. The Owner or Engineer shall make the final determination as to whether any work or materials, which do not conform to the Plans and Specifications upon initial testing, are to be removed from the site or reworked. The Owner or Engineer shall also make the final determination as to whether the retesting indicates that work or materials initially rejected have been corrected to meet the requirements of the Plans and Specifications. All removal, replacement, rolling, watering, aeration, reworking, etc. required to bring rejected work or materials into conformance with the Plans and Specifications shall be at the Contractor's expense.
- D. Retesting Expense: The Owner will bear the expense of the initial quality assurance testing of certain items of work or materials as required by the technical specifications. Any retesting of these items of work or materials which upon initial testing fail to meet the standards specified or indicated on the plans shall be at the Contractor's expense.
- E. Laboratory Inspection and Testing: If this contract requires laboratory inspection, testing, and stamping of concrete pipe, concrete fittings, or any other material, the cost of that laboratory inspection, testing, and stamping shall be borne by the Contractor and included in the cost of the work.

- F. Prior to starting concrete operations the Contractor shall name his source of supply for concrete materials and submit representative samples and reports of quality tests for approval.
- G. The Owner shall engage and pay for the services of an independent testing laboratory to perform the following services:
1. Slump test, ASTM C143, shall be taken with every set of cylinders and as often as required to provide the specified consistency of concrete.
  2. Determine air content with every set of cylinders, ASTM C231, or as required.
  3. Cast and test a set of at least 6 cylinders for each day's pour or for each 100 cubic yards or fraction thereof for each class of concrete. Cylinders shall be made and cured, ASTM C31, and tested, ASTM C39, in accordance with ASTM specifications for control tests. Cylinders shall be tested at 7 and 28 days. The Contractor shall provide insulated storage room with heat when necessary to store control cylinders and a protected space for storage of "field" cylinders which approximates the condition of curing of the concrete being sampled. Cylinders designated as "field" cylinders shall be used to determine safe stripping and loading of members. On all pours in excess of 25 cubic yards, continuous laboratory inspection shall be provided at the job site for checking materials, deliveries and concrete consistencies.
- H. The testing laboratory shall observe the materials and the manufacturer of concrete as specified and shall report to the Contractor and Designer the progress thereof. Also, when it appears that the material furnished and the work performed by the Contractor fails to fulfill the specified requirements and Contract, the testing laboratory shall direct the attention of the Contractor and Designer to such failure or infringement. Such observation shall not relieve the Contractor of any obligation to furnish acceptable materials or to provide the concrete quality in the structure that is in strict accordance with plans and specifications. The testing laboratory is not authorized to revoke, alter, relax, enlarge or release the requirements of the specifications, nor to issue instructions contrary to the plans and specifications; nor to approve or accept any portion of the work but in case of any dispute arising between the testing laboratory and the Contractor as to materials furnished or in the manner of performing the work, the testing laboratory shall have the authority to reject materials or suspend the work until the question at issue can be referred to the Designer. The testing laboratory shall not act as foreman or perform other duties for the Contractor. In no case shall any advice or oversight on the part of the testing laboratory relieve the Contractor of responsibility for completing the work in accordance with plans and specifications and the fulfillment of the Contract. The work will be observed as it progresses, but failure to report to the Designer any defective work or materials shall not in any way prevent later rejection when such a defect is discovered or obligate the Owner for final acceptance. Any expense incident to the investigation and determination of actual quality of any questionable material shall be borne by the Contractor.
- I. In the event that concrete tests fail to meet strength requirements of these specifications the designer may require, at no additional cost to the Owner, tests in accordance with the "Standard Method of Obtaining and Testing Drilled Cores and Sawed Beams of Concrete", ASTM C42, or order load tests in accordance with Chapter 20 of the ACI Building Code 318, to be made on the portions of the structure containing questionable concrete. Suitable appliances and methods of loading the measuring shall be provided by the Contractor under the direction of the testing laboratory. The portions of the structure which are found by the Designer to contain defective concrete shall be removed and reconstructed in a satisfactory manner at the Contractor's expense. Concrete strength tests are to conform to Chapter 5 of the ACI Building Code 318.
- J. The laboratory shall have free access to material stockpiles, batching and mixing plants, and job site. The Contractor shall provide adequate assistance to the laboratory in securing specified samples for tests.

- K. Contractor shall give the Designer and laboratory reasonable notice before beginning any pours (at least 24 hours).
- L. The laboratory shall supply a daily report of concrete and materials testing and inspection to the designer (two copies) and Contractor (one copy).
- M. Concrete batched away from the job and delivered in mixer or agitator trucks shall conform to requirements of ASTM C94.
- N. Sampling and Testing:
1. All materials shall be sampled, tested in accordance with appropriate ASTM Standards, and approved before inclusion in any work on this project.
  2. Samples for testing shall be furnished by the Contractor.
  3. Rejected material shall be immediately removed from the site.
- O. Standards: Comply with the following applicable standards:
1. ACI 211.1R: "Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete."
  2. ACI 211.2 "Standard Practice for Selecting Proportions for Structural Lightweight Concrete."
  3. ACI 301R: "Standard Specifications for Structural Concrete for Buildings".
  4. ACI 304R: "Guide for Measuring, Mixing, Transporting, and Placing Concrete."
  5. ACI 305R: "Hot Weather Concreting."
  6. ACI 306R: "Cold Weather Concreting."
  7. ACI 308R: "Standard Practice for Curing Concrete."
  8. ACI 318: "Building Code Requirements for Structural Concrete and Commentary."
- P. Examine the substrate, formwork, and the conditions under which concrete reinforcement is to be placed, and correct conditions which would prevent proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected.
- Q. Inspection: Before placement of concrete, the Owner's Representative shall observe the placement of all reinforcing and give his approval.

**END OF SECTION 01455**

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**DIVISION 1 – SECTION 01500****CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS****PART 1 GENERAL****1.01 SUMMARY**

- A. This Section describes construction facilities and temporary controls required for the Work.
- B. Related work:
  - 1. Documents affecting work of this Section include, but are not necessarily limited to, Division 0 and Division 1 Specifications,

**1.02 REQUIREMENTS**

- A. Provide construction facilities and temporary controls needed for the Work including, but not necessarily limited to:
  - 1. Sanitary facilities;
  - 2. Temporary fencing of materials, laydown yards or the construction site, if required.

**1.03 DELIVERY, STORAGE, AND HANDLING**

- A. Maintain temporary facilities and controls in proper and safe condition throughout progress of the Work.

**PART 2 PRODUCTS****2.01 UTILITIES**

- A. Water:
  - 1. Provide necessary temporary piping and water supply and, upon completion of the Work, remove such temporary facilities.
  - 2. Provide and pay for water used in construction.
- B. Electricity:
  - 1. Provide necessary temporary wiring and, upon completion of the Work, remove such temporary facility.
  - 2. Provide area distribution boxes located so that the individual trades may furnish and use 100 ft maximum length extension cords to obtain power and lighting at points where needed for work, inspection, and safety.
  - 3. Provide and pay for electricity used in construction.
- C. Heating: Provide, maintain and pay for heat necessary for proper conduct of operations needed in the Work.
- D. Telephone:

1. Make necessary arrangements and pay costs for installation and operation of telephone service to the Contractor's office at the site.
2. Make the telephone available to the Program Manager for use in connection with the Work.

## **2.02 FIELD OFFICES AND SHEDS**

### **A. Sanitary facilities:**

1. Provide temporary sanitary facilities in the quantity required for use by all personnel.
2. Maintain in a sanitary condition at all times.

## **2.03 ENCLOSURES**

- A. Provide and maintain for the duration of construction all scaffolds, tarpaulins, canopies, warning signs, steps, platforms, bridges, and other temporary construction necessary for proper completion of the Work in compliance with pertinent safety and other regulations.

## **2.04 TEMPORARY FENCING**

- A. If indicated provide and maintain for the duration of construction a temporary fence of design and type needed to prevent entry onto the Work by the public.

## **2.05 REMOVING AND REPLACING FENCES, SOD, ETC.**

- A. Where required to install the Work, carefully remove and store all interfering fences, mailboxes, culverts, etc. After installation of work and backfilling, reinstall these items and restore them to at least the conditions, which existed prior to the commencement of work, using materials and workmanship to match those of the original construction and installation.
- B. Carefully remove and store all interfering shrubbery, trees, sod, flowers, and other planting, sufficiently in advance of construction. After installation of work and backfilling, reset and restore these items to at least the conditions that existed prior to the commencement of work.

# **PART 3 EXECUTION**

## **3.01 MAINTENANCE AND REMOVAL**

- A. Maintain temporary facilities and controls as long as needed for safe and proper completion of the Work.
- B. Remove such temporary facilities and controls as rapidly as progress of the Work will permit, or as directed by the Owner or Engineer.

## **3.02 DUST CONTROL**

- A. During construction, haul roads and other disturbed construction areas shall be watered as required to prevent dust from damaging and/or becoming a nuisance to the terminal and other buildings, automobiles, aircraft, and residential and other built-up areas surrounding the project site.

**END OF SECTION 01500**

**DIVISION 1 - SECTION 01600****PRODUCT REQUIREMENTS****PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

- A. Drawings, Contract, Division 0 and Division 1 Specification Sections apply to this Section.

**1.2 SUMMARY**

- A. This Section specifies administrative and procedural requirements governing Contractor's selection of products for use in Project.
- B. Related Sections: Following Sections contain requirements that relate to this Section:
1. Division 1 Section "Reference Standards and Definitions" specifies the applicability of industry standards to products specified.
  2. Division 1 Section 01320 specifies requirements for submittal of the Contractor's Construction Schedule and the Submittal Schedule.
  3. Division 1 Section "Product Substitution Procedures" specifies administrative procedures for handling requests for substitutions made after award of the Contract.

**1.3 DEFINITIONS**

- A. Definitions used in this Article are not intended to change meaning of other terms used in Contract Documents, such as "specialties," "systems," "structure," "finishes," "accessories," and similar terms. Such terms such are self-explanatory and have well recognized meanings in construction industry.
1. **"Products"** are items purchased for incorporation in Work, whether purchased for Project or taken from previously purchased stock. Term "product" includes terms "material," "equipment," "system," and terms of similar intent.
    - a. "Named Products" are items identified by manufacturer's product name, including make or model designation, indicated in manufacturer's published product literature, that is current as of date of Contract Documents.
    - b. "Foreign Products," as distinguished from "domestic products," are items substantially manufactured (50% or more of value) outside of United States and its possessions; or produced or supplied by entities substantially owned (more than 50%) by persons who are not citizens of nor living within United States and its possessions.
  2. **"Materials"** are products that are substantially shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form part of Work.
  3. **"Equipment"** is a product with operational parts, whether motorized or manually operated, that requires service connections such as wiring or piping.

**1.4 SUBMITTALS**

- A. **Product List:** Prepare list showing products specified in tabular form acceptable to Program Manager. Include generic names of products required. Include manufacturer's name and proprietary product names for each item listed.
1. Coordinate product list with Contractor's Construction Schedule and Schedule of Submittals.
  2. **Form:** Prepare product list with information on each item tabulated under following column headings:
    - a. Related Specification Section number.
    - b. Generic name used in Contract Documents.
    - c. Proprietary name, model number and similar designations.
    - d. Manufacturer's name and address.
    - e. Supplier's name and address.
    - f. Installer's name and address.
    - g. Projected delivery date, or time span of delivery period.
  3. **Initial Submittal:** Within 30 days after date of commencement of Work, submit 3 copies of an initial product list. Provide written explanation for omissions of data and for known variations from Contract requirements.
    - a. At Contractor's option, initial submittal may be limited to product selections and designations that must be established early in Contract period.
  4. **Completed List:** Within 60 days after date of commencement of Work, submit 3 copies of completed product list. Provide written explanation for omissions of data and for known variations from Contract requirements.
  5. **Engineer's Action:** Engineer will review and the Program Manager will respond in writing to Contractor within 2 wks of receipt of completed product list. No response within this period constitutes no objection to listed manufacturers or products but does not constitute a waiver of the requirement that products comply with Contract Documents. Engineer's review will include a list of unacceptable product selections, containing a brief explanation of reasons for this action.
- B. **Source Limitations:** To fullest extent possible, provide products of same kind, from single source.
1. When specified products are available only from sources that do not or cannot produce quantity adequate to complete project requirements in timely manner, consult with Program Manager for determination by the Engineer of most important product qualities before proceeding. Qualities may include attributes relating to visual appearance, strength, durability, or compatibility. When determination has been made, select products from sources that produce products that possess these qualities, to fullest extent possible.
- C. **Compatibility of Options:** When Contractor is given option of selecting between 2 or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.
1. Each Contractor is responsible for providing products and construction methods that are compatible with products and construction methods of other separate Contractors.
  2. If dispute arises between Contractors over concurrently selectable, but incompatible products, Engineer will determine which products shall be retained and which are incompatible and must be replaced.
- D. **Foreign Product Limitations:** Except under 1 or more of following conditions, provide domestic products, not foreign products, for inclusion in the Work:

1. No available domestic product complies with Contract Documents.
  2. Domestic products that comply with Contract Document are only available at prices or terms that are substantially higher than foreign products that also comply with Contract Documents.
- E. Nameplates: Except for required labels and operating data, do not attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products which will be exposed to view in occupied spaces or on exterior.
- F. Labels: Locate required product labels and stamps on a concealed surface or, where required for observation after installation, on an accessible surface that is not conspicuous.
- G. Equipment Nameplates: Provide permanent nameplate on each item of service-connected or power-operated equipment. Locate on an easily accessible surface which is inconspicuous in occupied spaces. Nameplate shall contain following information and other essential operating data:
1. Name of product and manufacturer.
  2. Model and serial number.
  3. Capacity.
  4. Speed.
  5. Ratings.

## **1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING**

- A. Deliver, store and handle products according to manufacturer's recommendations, using means and methods that will prevent damage, deterioration, and loss, including theft.
1. Schedule delivery to minimize long-term storage at site and to prevent overcrowding of construction spaces.
  2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft and other losses.
  3. Deliver products to site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting and installing.
  4. Inspect products upon delivery to ensure compliance with Contract Documents, and to ensure that products are undamaged and properly protected.
  5. Store products at site in manner that will facilitate inspection and measurement of quantity or counting of units.
  6. Store heavy materials away from Project structure in manner that will not endanger supporting construction.  
Store products subject to damage by elements above ground, under cover in weathertight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.

## **PART 2 - PRODUCTS**

### **2.1 PRODUCT SELECTION**

- A. General Product Requirements: Provide products that comply with Contract Documents, that are undamaged and, unless otherwise indicated, new at time of installation.
1. Provide products complete with all accessories, trim, finish, safety guards and other devices and details needed for complete installation and for intended use and effect.
  2. Standard Products: Where available, provide standard products of types that have been produced and used successfully in similar situations on other projects.

- B. Product Selection Procedures: Product selection is governed by Contract Documents and governing regulations, not by previous Project experience. Procedures governing product selection include following:
1. Proprietary Specification Requirements: Where only a single product or manufacturer is named, provide product indicated. No substitutions will be permitted.
  2. Semiproprietary Specification Requirements: Where 2 or more products or manufacturers are named, provide 1 of products indicated. No substitutions will be permitted.
    - a. Where products or manufacturers are specified by name, accompanied by term "or equal," or "or approved equal" comply with Contract Document provisions concerning "substitutions" to obtain approval for use of an unnamed product.
  3. Compliance with Standards, Codes and Regulations: Where Specifications only require compliance with an imposed code, standard or regulation, select product that complies with standards, codes or regulations specified.
  4. Visual Matching: Where Specifications require matching an established Sample, Engineer's decision will be final on whether proposed product matches satisfactorily.
    - a. Where no product available within specified category matches satisfactorily and complies with other specified requirements, comply with provisions of Contract Documents concerning "substitutions" for selection of matching product in another product category.
  5. Visual Selection: Where specified product requirements include phrase "...as selected from manufacturer's standard colors, patterns, textures..." or similar phrase, select product and manufacturer that complies with other specified requirements. Engineer will select color, pattern and texture from product line selected.
  6. Allowances: Refer to individual Specification Sections and "Allowance" provisions in Division 1 for allowances that control product selection, and for procedures required for processing such selections.

## 2.2 ASBESTOS-FREE REQUIREMENTS

- A. The Contractor shall not use any asbestos containing material (ACM) at any time during the Project. The Contractor shall verify that all materials used on the Project are asbestos-free materials.
- B. During the course of the Project, the Contractor shall routinely check products utilized on-site to ensure only asbestos-free products are utilized.
- C. If the Owner suspects the presence of asbestos, the Owner will sample the suspect material to verify that no ACM was utilized. This testing shall be performed at the expense of the Owner. If ACM is subsequently found during the sampling, the Contractor shall remove and replace the product or material at his/her sole expense. No adjustment of the Contract Schedule will be provided to account for delays associated with removal and/or replacement of ACM. The Contractor shall reimburse Owner for any and all costs associated with the original testing and/or any re-testing that may be necessary.
- D. Upon completion, a notarized certification statement shall be provided by the Contractor to the Owner certifying that all materials associated with this Project are asbestos free. See Specification 01771 Closeout Documents for certification document. If the Contractor does not submit the required asbestos-free certification, the Authority shall have a complete building survey performed by a qualified testing firm within the Project's location. The cost of the survey and any subsequent removal/replacement of any ACM shall be deducted from the Contractor's final payment at the sole discretion of the Owner.

**PART 3 - EXECUTION**

**3.1 INSTALLATION OF PRODUCTS:**

- A. Comply with manufacturer's instructions and recommendations for installation of products in applications indicated. Anchor each product securely in place, accurately located and aligned with other Work.
  - 1. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration until time of Substantial Completion.

**END OF SECTION 01600**

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**DIVISION 1 - SECTION 01630**  
**PRODUCT SUBSTITUTION PROCEDURES**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings, Contract, Division 0 and Division 1 Specification Sections apply to this Section.

**1.2 SUMMARY**

- A. This Section specifies administrative and procedural requirements for handling requests for substitutions made after award of Contract.
- B. Contractor's Construction Schedule and Schedule of Submittals are included under Section 01320.
- C. Standards: Refer to Section "Reference Standards and Definitions" for applicability of industry standards to products specified.
- D. Procedural requirements governing Contractor's selection of products and product options are included under Section "Product Requirements."
- E. Program Manager's policy is to reject requests for substitution unless paragraph "Substitutions" under Article "Definitions" applies.

**1.3 DEFINITIONS**

- A. Definitions used in this Article are not intended to change or modify meaning of other terms used in Contract Documents.
- B. Substitutions: Requests for changes in products, materials, equipment, and methods of construction required by Contract Documents proposed by Contractor after award of Contract are considered requests for "substitutions." Following are not considered substitutions:
  - 1. Revisions to Contract Documents requested by Owner or Program Manager.
  - 2. Specified options of products and construction methods included in Contract Documents.
  - 3. Contractor's determination of and compliance with governing regulations and orders issued by governing authorities.

**1.4 SUBMITTALS**

- A. Substitution Request Submittal: Requests for substitution will be considered if received within 30 days after commencement of Work. Requests received more than 30 days after commencement of Work may be considered or rejected at discretion of Program Manager.
  - 1. Submit 3 copies of each request for substitution for consideration. Submit requests on forms included at end of this Section.

2. Identify product, or fabrication or installation method to be replaced in each request. Include related Specification Section and Drawing numbers. Provide complete documentation showing compliance with requirements for substitutions, and the following information, as appropriate:
  - a. Product Data, including Drawings and descriptions of products, fabrication and installation procedures.
  - b. Samples, where applicable or requested.
  - c. Detailed comparison of significant qualities of proposed substitution with those of Work specified. Significant qualities may include elements such as size, weight, durability, performance and visual effect.
  - d. Coordination information, including list of changes or modifications needed to other parts of Work and to construction performed by Owner and separate Contractors, that will become necessary to accommodate proposed substitution.
  - e. Statement indicating substitution's effect on Contractor's Construction Schedule compared to schedule without approval of substitution. Indicate effect of proposed substitution on the overall Substantial Completion of the project.
  - f. Cost information, including proposal of net change, if any in Contract Sum.
  - g. Certification by Contractor that substitution proposed is equal-to or better in every significant respect to that required by Contract Documents, and that it will perform adequately in application indicated. Include Contractor's waiver of rights to additional payment or additional Contract time, that may subsequently become necessary because of failure of substitution to perform adequately.

## **PART 2 - PRODUCTS**

### **2.1 SUBSTITUTIONS**

- A. Conditions: Contractor's substitution request will be received and considered by Program Manager when one or more of following conditions are satisfied, as determined by Program Manager; otherwise requests will be returned without action except to record noncompliance with these requirements.
  1. Extensive revisions to Contract Documents are not required.
  2. Proposed changes are in keeping with general intent of Contract Documents.
  3. Request is timely, fully documented and properly submitted.
  4. Request is directly related to an "or equal" clause or similar language in Contract Documents.
  5. Specified product or method of construction cannot be provided within Contract Time. Request will not be considered if product or method cannot be provided as result of failure to pursue Work promptly or coordinate activities properly.
  6. Specified product or method of construction cannot receive necessary approval by governing authority, and requested substitution can be approved.
  7. Substantial advantage is offered the Owner, in terms of cost, time, energy conservation or other considerations of merit, after deducting offsetting responsibilities Owner may be required to bear. Additional responsibilities for Owner may include additional compensation to Program Manager and Engineer for redesign and evaluation services, increased cost of other construction by Owner or separate Contractors, and similar considerations.
  8. Specified product or method of construction cannot be provided in manner that is compatible with other materials, and where Contractor certifies that substitution will overcome incompatibility.
  9. Specified product or method of construction cannot be coordinated with other materials, and where Contractor certifies that proposed substitution can be coordinated.
  10. Specified product or method of construction cannot provide warranty required by Contract Documents and where Contractor certifies that proposed substitution provide required warranty.

- B. Contractor's submittal to the Program Manager and Engineer's acceptance of Shop Drawings, Product Data or Samples that relate to construction activities not complying with Contract Documents does not constitute an acceptable or valid request for substitution, nor does it constitute approval.
- C. See next page for "Request for Substitution" form.

**REQUEST FOR SUBSTITUTION**

To:

Attention:

From:

\_\_\_\_\_  
Name of Company\_\_\_\_\_  
Address\_\_\_\_\_  
City, State, Zip Code\_\_\_\_\_  
Phone

Fully answer all information requested below. Failure to answer any item may cause rejection of request for substitution. If requested by Program Manager, submit information about manufacturer and vendor history, financial stability, distribution and support systems. Use one form for each product requested. Only first product listed will be considered on forms with more than one product listed.

Specification Section Number: \_\_\_\_\_ Drawing Number: \_\_\_\_\_

Para Number: \_\_\_\_\_ Detail Number: \_\_\_\_\_

Specified Product: \_\_\_\_\_

Proposed Substitution: \_\_\_\_\_

Answer the following questions. Attach an explanation sheet on your company's letterhead when required.

Does the proposed substitution affect dimensions indicated on Drawings?

No \_\_\_\_\_ Yes \_\_\_\_\_ (If yes, explain below).

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Does the proposed substitution require changes in Drawings and/or design or installation changes?

No \_\_\_\_\_ Yes \_\_\_\_\_

If yes, is the cost of these changes included in the proposed amount? No \_\_\_\_\_ Yes \_\_\_\_\_

Does the proposed substitution affect other trades? No \_\_\_\_\_ Yes \_\_\_\_\_

(If yes, explain who and how)

01630

Page 4

**ISSUED FOR BID**

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If the proposed product does affect the work of other trades, has the cost impact on their work been included in the price of the proposed substitution?

No \_\_\_\_\_ Yes \_\_\_\_\_

Does the proposed product's guarantee differ from that of the specified product's?

No \_\_\_\_\_ Yes \_\_\_\_\_ (If yes, explain below).

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Why is this proposal for substitution being submitted? List reasons below.

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Attach a listing of 3 projects using proposed substitution completed within the past 5 yrs in geographic and climatic region of Project. One of applications shall have been in service for at least 3 yrs.

Attach product data/brochures and Vendor Qualification Form for the specified and substitute product.

Undersigned has examined Construction Documents, is familiar with specified product, understands indicated application of product, and understands design intent of Engineer. Undersigned states that proposed substitution complies with Construction Documents and will perform at least equally to specified product within limitations stated above. Undersigned accepts responsibility for coordinating application and installation of proposed substitution and waives all claims for additional costs resulting from incorporation of proposed substitution into Project or its subsequent failure to perform according to specified requirements.

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

Typed \_\_\_\_\_ Signature \_\_\_\_\_

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

**END OF SECTION 01630**

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**DIVISION 1 – SECTION 01700****FIELD ENGINEERING****PART 1 GENERAL****1.01 SUMMARY**

- A. Provide such field engineering services as are required for proper completion of the Work including, but not necessarily limited to:

1. Establishing and maintaining lines and levels;
2. Structural design of shores, forms, and similar items provided by the Contractor as part of his means and methods of construction.

All field engineering is incidental to the Item for which it applies. No direct pay will be made for field engineering.

- B. Related work:

1. Documents affecting work of this Section include, but are not necessarily limited to, Division 0, Division 1 and other Sections of these Specifications.
2. Additional requirements for field engineering may be described in other Sections of these Specifications.

**1.02 SUBMITTALS**

- A. Upon request of the Owner or Engineer, submit:

1. Data demonstrating qualifications of persons proposed to be engaged for field engineering services.
2. Documentation verifying accuracy of field engineering work.
3. Certification, signed by the Contractor's retained field engineer, certifying that elevations and locations of improvements are in conformance or nonconformance with requirements of the Contract Documents.

**1.03 QUALITY ASSURANCE**

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

**1.04 PROCEDURES**

- A. In addition to other procedures directed by the Contractor for proper performance of the Contractor's responsibilities:

1. Locate and protect control points before starting work on the site.
2. Preserve permanent reference points during progress of the Work.
3. Prior to commencing any work requiring location or grades, the Contractor shall establish

temporary bench marks (TBMs) at an interval not to exceed 1000 feet. TBMs are to be located in areas not anticipated to be disturbed by construction. Provide the Owner or Engineer copies of field notes, including peg test of level, and a listing of the adjusted coordinates and elevations of all TBMs.

4. Do not change or relocate reference points or items of the Work without specific approval from the Owner or Engineer.
5. Promptly advise the Owner or Engineer when a reference point is lost or destroyed, or requires relocation because of other changes in the Work.
  - a. Upon direction of the Owner or Engineer, require the field engineer to replace reference stakes or markers.
  - b. Locate such replacements according to the original survey control.

**END OF SECTION 01700**



**DIVISION 1 – SECTION 01720**  
**PROJECT RECORD DOCUMENTS**

**PART 1        GENERAL**

**1.01       SUMMARY**

- A.       Throughout progress of the Work, maintain an accurate record of changes in the Contract Documents, as described in paragraph 3.01 below and, upon completion of the Work, transfer the recorded changes to a set of Record Documents, as described in paragraph 3.02 below. This shall include Record Drawings.
- B.       Related work:
  - 1.       Documents affecting work of this Section include, but are not necessarily limited to, General Provisions and the Technical Sections of these Specifications.
  - 2.       Other requirements affecting Project Record Documents may appear in pertinent other Sections of these Specifications.

**1.02       SUBMITTALS**

- A.       The Program Manager's review of the current status of Project Record Documents is a prerequisite to the Program Manager's approval of requests for progress payments and request for final payment under the Contract.
- B.       Prior to submitting each Application for Payment, secure the Program Manager's review of the current status of the Project Record Documents.
- C.       The final project Record Documents must be submitted to the Program Manager and secure approval before final payment for demobilization can occur.

**1.03       QUALITY ASSURANCE**

- A.       Delegate the responsibility for maintenance of Record Documents to one person on the Contractor's staff as approved by the Program Manager.
- B.       Accuracy of records:
  - 1.       Thoroughly coordinate changes within the Record Documents, making adequate and proper entries on each page of Specifications and each sheet of Drawings and other Documents where such entry is required to show the change properly.
  - 2.       Accuracy of records shall be such that future searches for items shown in the Contract Documents may rely reasonably on information obtained from the approved Project Record Documents.
- C.       Make entries within 24 hours after receipt of information that the change has occurred.

**1.04       DELIVERY, STORAGE, AND HANDLING**

- A.       Maintain the job set of Record Documents completely protected from deterioration and from loss and damage until completion of the Work and transfer of all recorded data to the final Project Record Documents.

- B. In the event of loss of recorded data, use any means necessary to again secure the data needed to comply with this section.
  - 1. Such means shall include, if necessary in the opinion of the Program Manager, removal and replacement of concealing work or materials by Contractor at Contractor's expense.

## **PART 2 PRODUCTS**

### **2.01 RECORD DOCUMENTS**

- A. Job set: Promptly following the Notice to Proceed, secure from the Program Manager at no charge to the Contractor one complete set of all Documents comprising the Contract.

## **PART 3 EXECUTION**

### **3.01 MAINTENANCE OF JOB SET**

- A. Immediately upon receipt of the job set described in Paragraph 2.01-A above, identify each of the Documents with the title, "RECORD DOCUMENTS - JOB SET."
- B. Preservation:
  - 1. Considering the Contract completion time, the probable number of occasions upon which the job set must be taken out for new entries and for examination, and the conditions under which these activities will be performed, devise a suitable method for protecting the job set to the approval of the Program Manager.
  - 2. Do not use the job set for any purpose except entry of new data and for review by the Program Manager, until start of transfer of data to final Project Record Documents.
  - 3. Maintain the job set at the site of Work or at another site as designated by the Program Manager.
- C. Making entries on Drawings:
  - 1. Using an erasable colored pencil (not ink or indelible pencil), clearly describe the change by graphic line and note as required.
  - 2. Date all entries.
  - 3. Call attention to the entry by a "cloud" drawn around the area or areas affected.
  - 4. In the event of overlapping changes, use different colors for the overlapping changes.
- D. Make entries in the pertinent other Documents as approved by the Program Manager.
- E. Drawings shall clearly show actual installed locations, depth, and sizes of:
  - 1. Pipe work of all descriptions below ground outside of building and structures, including locations of culverts, storm & sewer lines, water lines, cleanouts, manholes, inlets, hydrants, and underground valves.
  - 2. Underground electrical conduits, electrical ducts, and directly buried conductors light cables, FAA cables including locations of pull and junction boxes, electric manholes and handholes, pad mounted electrical equipment, utility poles, electrical outlets, and lighting fixtures.

3. All existing underground facilities unearthed by Contractors operations not accurately shown on the drawing.

F. Conversion of schematic layouts:

1. In some cases on the Drawings, arrangements of conduits, circuits, piping, ducts, and similar items, is shown schematically and is not intended to portray precise physical layout.
  - a. Final physical arrangement is determined by the Contractor, subject to the Program Manager's review.
  - b. However, design of future modifications of the facility may require accurate information as to the final physical layout of items, which are shown only schematically, on the Drawings. This information will be provided by the Contractor.
2. Show on the job set of Record Drawings, by dimension accurate to within one half foot, the centerline of each run of items such as are described in subparagraph 3.01-E above.
  - a. Clearly identify the item by accurate note such as "24 inch R.C. pipe drain", "4" conduit" and the like.
  - b. Show, by symbol or note, the vertical location of the item ("36 inches deep"), "exposed," and the like.
  - c. Make all descriptive identification so that it may be related reliably to the Specifications.
3. The Program Manager may waive the requirements for conversion of schematic layouts where, in the Program Manager's judgment, conversion serves no useful purpose. However, do not rely upon waivers being issued except as specifically issued in writing by the Program Manager.

### 3.02 FINAL PROJECT RECORD DOCUMENTS

- A. The purpose of the final Project Record Documents is to provide factual information regarding all aspects of the Work, both concealed and visible, to enable future modification of the Work to proceed without lengthy and expensive site measurement, investigation, and examination.
- B. Approval of recorded data prior to transfer to Program Manager:
  1. Secure the Program Manager's review of all recorded data.
  2. Make required revisions.
- C. Transfer of data to other Documents:
  1. If the Documents other than Drawings have been kept clean during progress of the Work, and if entries thereon have been orderly to the approval of the Program Manager, the job set of those Documents other than Drawings will be accepted as final Record Documents.
  2. If any such Document is not so approved by the Program Manager, secure a new copy of that Document from the Program Manager at the Program Manager's usual charge for reproduction and handling, and carefully transfer the change data to the new copy to the

approval of the Program Manager.

D. Review and submittal:

1. Submit the completed set of Project Record Documents to the Program Manager as described in Paragraph 1.02-C above.
2. Participate in review meetings as required.
3. Make required changes and promptly deliver the final Project Record Documents to the Program Manager.

**3.03 CHANGES SUBSEQUENT TO ACCEPTANCE**

- A. The Contractor has no responsibility for recording changes in the Work subsequent to Final Completion, except for changes resulting from work performed under Warranty.

**END OF SECTION 01720**

**DIVISION 1 – SECTION 01741****CLEANING****PART 1 GENERAL****1.01 SUMMARY**

- A. Throughout the construction period, maintain the site in a standard of cleanliness including mowing of grass as described in this Section. All demolition or construction debris (FOD) shall be confined within the work site at all times.
- B. Related work:
  - 1. Documents affecting work of this Section include, but are not necessarily limited to, Division 0, Division 1 and other Sections of these Specifications.
  - 2. In addition to the standards described in this Section, comply with requirements for cleaning as described in pertinent other Sections of these Specifications.
  - 3. In addition to the standards described in this Section, comply with pertinent requirements of governmental agencies having jurisdiction.

**1.02 QUALITY ASSURANCE**

- A. Conduct a daily inspection, and more often if necessary, to verify that cleanliness requirements are being met.
- B. In addition to the standards described in this Section, comply with pertinent requirements of governmental agencies having jurisdiction.

**PART 2 PRODUCTS****2.01 CLEANING MATERIALS AND EQUIPMENT**

- A. Provide required personnel, equipment, and materials needed to maintain the specified standard of cleanliness.
- B. In addition to the standards described in this Section, comply with pertinent requirements of governmental agencies having jurisdiction.

**2.02 COMPATIBILITY**

- A. Use only cleaning materials and equipment compatible with the surface being cleaned and as recommended by the manufacturer of the material.

**PART 3 EXECUTION****3.01 PROGRESS CLEANING**

- A. General:
  - 1. Retain stored items in an orderly arrangement allowing maximum access, not impeding traffic or drainage, and providing required protection of materials.

2. Do not allow accumulation of scrap, debris, waste material, and other items not required for construction of this Work.
  3. Inspect all haul vehicles leaving the site to make sure no debris can fall from the vehicle during transportation.
  4. Provide adequate storage for all items awaiting removal from the job site, observing requirements for fire protection and protection of the ecology.
- B. Site:
1. Daily, and more often if necessary, inspect the site and pick up all scrap, debris, and waste material. Remove such items to the place designated for their storage. Contractor shall document all daily inspections.
  2. Weekly, and more often if necessary, remove, completely, all accumulated scrap, debris, and waste material from the site.
  3. Maintain the site in a neat and orderly condition at all times.
  4. Mowing of grass within the construction limits is required at a minimum of every two (2) weeks during the active growing season, or as directed by the Engineer or Owner.

### **3.02 FINAL CLEANING**

- A. "Clean," for the purpose of this section, and except as may be specifically provided otherwise, shall be interpreted as meaning the level of cleanliness generally provided by material sweepers and vacuums.
- B. Prior to completion of the Work, remove from the job site all tools, surplus materials, equipment, scrap, debris, and waste. Conduct final progress cleaning as described in Article 3.01 above.
- C. Site:
1. Unless otherwise specifically directed by the Owner or Engineer, broom clean paved areas on the site and public paved areas adjacent to the site.
  2. Completely remove resultant debris. Use of vacuums shall be used as required or as directed by Program Manager.
- D. Schedule final cleaning as approved by the Owner or Engineer to enable the Owner to accept a completely clean Work.

### **3.03 CLEANING DURING OWNER'S OCCUPANCY**

- A. Should the Owner occupy the Work or any portion thereof, prior to its completion by the Contractor, and acceptance by the Owner, responsibilities for interim and final cleaning shall be as determined by the Engineer or Owner in accordance with the Division 0 and Division 1 Specifications.

**3.04 INTERVENTION OF OWNER**

- A. If the Contractor fails to clean up any debris which is deposited as a result of construction/demolition operations, or fails to mow grass as stipulated, the Airport Authority will, after attempting one notification, immediately do so and the cost thereof will be charged to the Contractor at the rate of two hundred and fifty dollars (\$250.00) per hour, per machine and per person additively. The Contractor shall assume full responsibility for failure to perform clean up operations required.

**END OF SECTION 01741**

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**DIVISION 1 - SECTION 01770****CONTRACT CLOSEOUT****PART 1 - GENERAL****1.01 SECTION INCLUDES**

- A. Procedures and requirements for closing out the Work.
  - 1. Closeout submittals.
  - 2. Final cleaning.
  - 3. Record Documents.
  - 4. Substantial completion.
  - 5. Final inspection.
  - 6. Final payment.
  - 7. Warranties.

**1.02 RELATED REQUIREMENTS AND SECTIONS**

- A. Section 01100 - Summary of Work, Sequence of Construction & Liquidated Damages.

**1.03 CLOSEOUT SUBMITTALS**

- A. Record documents of the constructed work.
- B. Warranties: This Section and applicable Sections of these Specifications.
- C. Contractors Affidavit of Payment of Debts and Claims and Contractors Affidavit of Release of Liens.
- D. Consent of Surety to Final Payment.
- E. As-built drawings.

**1.05 FINAL CLEANING**

- A. Clean work and storage areas free of trash. Broom clean and hose wash walks and pavements.

**1.06 RECORD DOCUMENTS**

- A. Definition:
  - 1. Dimensioned drawings showing in-place components and systems measured as accurately as practicable.
  - 2. Product data and other documents clearly identifying proprietary product and equipment incorporated into the Work.
- B. Maintain at job site one record copy of:
  - 1. Contract Drawings and As-built Drawings.
  - 2. Project Manual.
  - 3. Addenda.
  - 4. Approved shop drawings.

5. Contract Modifications.
  6. Field test records.
  7. Meeting minutes (notes).
- C. Make documents available at all times for inspection by Engineer and Owner.
- D. Marking Devices:
1. Use colored felt marking pens for marking prints and product data.
- E. Label each document "PROJECT RECORD" in 1" high printed letters.
- F. Record information concurrent with construction progress. Do not conceal any work until required information has been recorded.
- G. Submittal of Record Documents:
1. At completion of the Work, deliver Record Documents to Owner or Engineer with request for Final Payment.
  2. Accompany submittal with transmittal letter indicating:
    - a. Date
    - b. Project title
    - c. Contractor's name and address
    - d. Title and number of each record document
  3. Submit one reproducible copy and one electronic copy of Record Documents, and provide one copy of other Record Documents.
  4. Provide one AutoCAD Diskette

#### **1.07 SUBSTANTIAL COMPLETION**

- A. When Contractor considers the Work to be substantially complete as defined in Conditions of the Contract, Contractor shall prepare and submit a list (punch list) of items to be completed or corrected. Upon receipt of Contractor's list, Owner or Engineer will decide if the Work is substantially complete and, if necessary, will prepare a supplemental list (punch list) of items to be completed or corrected.
- B. Failure to include items on the punch list does not alter responsibility of Contractor to complete work according to Contract Documents.
- C. Before Owner or Engineer issues a Certificate of Substantial Completion, Contractor shall provide certificate of Use and Occupancy and evidence of approval from applicable governing authorities.

#### **1.08 FINAL INSPECTION**

- A. When Owner or Engineer receives written notice that the Work is ready for final inspection, and when final application for payment is received, Owner or Engineer shall promptly inspect to determine if the Work complies with the Contract Documents.
- B. Provide Owner or Engineer with written status report of each punch list item before final inspection.

#### **1.09 FINAL PAYMENT**

- A. Final payment will be made to contractor by Owner within 45 days after:
1. Completion of the Work.

2. Acceptance by Owner and Engineer of all work performed under the Contract.
3. Receipt of Project Record Documents.
4. Receipt of O & M data, manufacturer's instructions, service manual, parts manual, warranties, and other closeout submittals specified. O & M data must include a list of recommended vendors for any non-standard replacement parts and must include a detailed Preventative Maintenance guide with a schedule of suggested efforts.
5. Preparation by Contractor and approval of Owner of final statement of cost of the completed Work. Final statement shall indicate:
  - a. Original Contract Sum.
  - b. Previous Change Orders.
  - c. Deductions for liquidated damages.
  - d. Other applicable adjustments to Contract Sum.
  - e. Total Contract Sum as adjusted.
  - f. Previous Payments.
  - g. Final payment remaining due.
6. Upon completion by Contractor of work covered by Contract Documents, and before final payment to Contractor for work performed, Contractor shall deliver to Owner an affidavit, indicating that all labor and material used on or for execution of the Work has been paid.

#### **1.10 WARRANTIES**

- A. Provide duplicate notarized copies of warranties required by Contract Documents. Accumulate executed documents by subcontractors, suppliers, and manufacturers; provide table of contents and assemble in binder with durable plastic cover properly titled.
- B. Warranties are in addition to and not a limitation of other rights Owner may have against Contractor under the Contract Documents.
- C. Contractor shall bear costs of correcting work not complying with warranty requirements.
- D. Duration of warranties required by individual Sections shall indicate minimum times and shall not relieve Contractor of obligations required under applicable statutes or other Conditions of the Contract.
  1. Warranty period begins on date of Substantial Completion. On Phased Projects, warranty period for all phases will begin at substantial completion of final phase except where modified by Conditions of the Contract.
  2. Warranties are non-prorated unless stated otherwise in these Specifications.
- E. Manufacturer's warranties shall be backed by assets of manufacturer and not a third party.
- F. Warranties shall be transferable.
- G. Submit warranties to Owner or Engineer for verification and submittal to Owner with Contractor's final Application for Payment.
- H. Re-submit warranties that do not comply with Contract Documents.

#### **PART 2 - PRODUCTS (not applicable)**

#### **PART 3 - EXECUTION (not applicable)**

**END OF SECTION 01770**



**DIVISION 1 – SECTION 01771**  
**AFFIDAVIT OF CONTRACTOR**

STATE OF \_\_\_\_\_

COUNTY OF \_\_\_\_\_

\_\_\_\_\_, being duly sworn according to Law,  
 (Name of Affiant)

deposes and says that he is the \_\_\_\_\_ of  
 (Title)

\_\_\_\_\_, the Contractor, in a  
 (Name of Contractor)

Construction contract entered into between the Contractor and Memphis-Shelby County Airport Authority, the Owner, for the construction of Taxiway Alpha West Reconstruction - Construction, MSCAA Project No. 18-1413-01, and that he is authorized to and does make this Affidavit on behalf of said Contractor in order to induce the Owner to make payment to the Contractor, in accordance with the provisions of the said Construction Contract.

Affiant further says that all persons who have furnished materials, labor, and equipment in connection with the construction of the facilities have been paid in full, and that the names of all manufacturers, materialmen, subcontractors and DBE subcontractors that furnished any material and/or services in connection with such construction and the kind of kinds of material and/or services so furnished are as listed hereinafter.

Affiant further certifies that he/she is familiar with the materials used in the construction of and incorporated into, the Project referenced above and attests that no asbestos-containing materials, either friable or otherwise, were used in the process of constructing or incorporated into the construction of the Project.

\_\_\_\_\_  
 (Signature of Affiant)

Sworn to and subscribed before me this \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_.

\_\_\_\_\_  
 (Notary Public)

My commission expires: \_\_\_\_\_

Name of Entity

Kind of Material and/or Service

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**ISSUED FOR BID**

**END OF SECTION 01771**

**DIVISION 1 – SECTION 01772****FINAL LIEN WAIVER AND RELEASE  
PRIME CONTRACTOR****STATE OF TENNESSEE  
COUNTY OF SHELBY**

The undersigned \_\_\_\_\_ (hereinafter “Contractor”) has entered into a Contract with the Memphis-Shelby County Airport Authority (“Owner”) for the construction of improvements known as the:

Taxiway Alpha West Reconstruction - Construction  
Memphis International Airport  
MSCAA Project No. 18-1413-01 (hereinafter “the Project”).

Upon the receipt of the sum of \$\_\_\_\_\_, the undersigned forever waives and releases any and all liens or claims of liens it has upon the foregoing described real property on account of labor, materials, equipment or services furnished for said Project. The undersigned certifies that all payments have been made for all work/materials performed to date for all subcontractors and suppliers with the exception of the amount due as a result of the payment amount shown above; and, that all subcontractors and suppliers will be paid all balances due upon receipt of the payment amount shown above. Further, the undersigned does hereby waive, release and relinquish any and all claims or demands against the Owner and Engineer of the above-described Project, the right to assert a mechanic’s and materialmen’s lien and/or any claim for quantum meruit or unjust enrichment, additional work, verbal agreements, increased cost, scheduling damages, including, but not limited to damages for delay, disruption, acceleration and/or interference, whether existing now or arising in the future.

The undersigned certifies and warrants that it has complied with all federal, state and local tax laws, including Social Security laws and Unemployment Compensation laws and workers’ compensation laws insofar as applicable to the performance of the Project. Further, the undersigned certifies and warrants that it has paid all of its subcontractors, vendors, and materialmen for services rendered in connection with the construction and improvement of the Project and that all labor, materials and equipment are free and clear of claims, security interests, indebtedness or encumbrances. The undersigned agrees to indemnify and hold harmless the Owner and the Engineer from and against any and all claims, damages, losses and expenses, including but not limited to, attorney’s fees, arising out of or resulting from any non-payment by the undersigned to any subcontractor, laborer, vendor or materialman for the Project.

As of this date, no mechanics’ or materialmen’s liens have been filed of record arising out of or related to the work performed by the undersigned.

Given under hand and seal this \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

**CONTRACTOR**

\_\_\_\_\_

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

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



**STATE OF TENNESSEE  
COUNTY OF SHELBY**

Before me, a notary public of the state and county mentioned, personally appeared \_\_\_\_\_, with whom I am personally acquainted, and who, upon oath, acknowledged such person to be \_\_\_\_\_, an officer authorized to execute the instrument, of \_\_\_\_\_, the within named bargainor, a corporation, and that such officer, as such \_\_\_\_\_, executed the foregoing instrument for the purposes therein contained, by personally signing the name of the corporation as \_\_\_\_\_.

Witness my hand and seal, at office, this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

\_\_\_\_\_  
Notary Public

My Commission Expires:

\_\_\_\_\_

**END OF SECTION 01772**

**DIVISION 1 – SECTION 01774**  
**CONTRACTOR WARRANTY FORM**

PROJECT: MSCAA Project No. 18-1413-01, Taxiway Alpha West Reconstruction - Construction

LOCATION: Memphis International Airport, Shelby County, Tennessee

OWNER: Memphis-Shelby County Airport Authority

We \_\_\_\_\_, Contractor  
(Company Name)

for the above-reference project, do hereby warrant all labor and materials furnished and work performed are in accordance with the Contract Documents and authorized modifications thereto, and will be free from defects due to defective materials or workmanship for a period of one year.

This warranty commences on \_\_\_\_\_ and expires on \_\_\_\_\_.

This warranty covers that portion of the project described below:

**ALL MATERIALS, LABOR, AND EQUIPMENT IN CONNECTION WITH THE CONSTRUCTION OF THE FACILITIES OF THE ABOVE REFERENCED CONTRACT.**

The Contractor shall promptly correct all defective Work to comply with the Contract Documents whether observed before or after the substantial completion date and whether or not fabricated, installed or completed. The Contractor shall bear all costs of correcting defective Work.

If, within one (1) year after the substantial completion date, or within such longer period of time as may be prescribed by law or by the terms of any applicable special guarantee or warranty required by the Contract Documents, any of the Work is found to be defective and not in accordance with the Contract Documents, the Contractor shall correct it promptly after receipt of a written notice from the Owner, or the Engineer to do so.

All defective or non-conforming Work shall be removed from the site of the Work if necessary, and the Work shall be corrected to comply with the Contract Documents without cost to the Owner. The Contractor also shall bear the cost of making good all work of other contractors destroyed or damaged by removal or correction of the defective Work of Contractor.

If the Contractor fails to timely and properly correct defective Work, the Owner may correct it and hold the Contractor liable for all costs, expenses and damages, including attorney's fees and litigation costs incurred by Owner in correcting it.

In addition to the foregoing warranty, a warranty period of one (1) year shall apply under the same terms and conditions as the original warranty, to any work, supplied in correction of defective work under warranty pursuant to the provisions of this Section 17.04 and the Contractor shall assign to the Owner any warranties, including extended warranties, which are available in connection with the performance of such correction of defective Work. The warranty period shall commence on the date the Owner accepts the corrective Work of the Contractor.

DATE: \_\_\_\_\_ FOR: \_\_\_\_\_  
(Company Name)

BY: \_\_\_\_\_

TITLE: \_\_\_\_\_

**END OF SECTION 01774**

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**DIVISION 1 – SECTION 01775****CONSENT OF SURETY COMPANY TO FINAL PAYMENT**

To: Memphis-Shelby County Airport Authority  
2491 Winchester Road, Suite 113  
Memphis, TN. 38116-3856

Regarding Contract for: Taxiway Alpha West Reconstruction - Construction

Project: 18-1413-01

Dated: \_\_\_\_\_

CONTRACTOR: \_\_\_\_\_

In accordance with the provisions of the Contract between the Owner and the Contractor as indicated above, the

\_\_\_\_\_  
(here insert name and address of Surety Company)

\_\_\_\_\_, SURETY COMPANY,

on bond of \_\_\_\_\_

(here insert name and address of Contractor)

\_\_\_\_\_, CONTRACTOR,

hereby approves of the final payment to the Contractor, and agrees that final payment to the Contractor shall not relieve the Surety Company of any of its obligations to Memphis-Shelby County Airport Authority, OWNER.

IN WITNESS WHEREOF,  
the Surety Company has hereunto set its hand this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_

\_\_\_\_\_  
Surety Company

\_\_\_\_\_  
Signature of Authorized Representative

Attest:  
(Seal):

\_\_\_\_\_  
Title

**END OF SECTION 01775**

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**DIVION 1 – SECTION 01783****ELECTRICAL CHARACTERISTICS, CAPACITIES AND WIRING DIAGRAMS****PART 1 GENERAL****1.01 SUMMARY**

- A. This section describes the electrical characteristics, sizes, capacities, ratings and wiring diagrams required of electrically operated equipment.
- B. Related work:
  - 1. Documents affecting work of this Section include, but are not necessarily limited to Division 0, Division 1 and other Sections of these Specifications.

**1.02 SUBMITTALS**

- A. Furnish with each item of electrically operated equipment a wiring diagram showing all necessary electrical connections required to operate the equipment properly, in accordance with drawing and specification requirements.
- B. Furnish a composite wiring diagram showing all necessary interlock and related wiring between the various items of electrically operated equipment and their controls, as required to operate interlocked equipment as specified in other sections of these specifications and as indicated.

**1.03 CAPACITIES, RATINGS, SIZES, AND OTHER REQUIREMENTS NOT SPECIFIED:**

- A. For all items of material and/or equipment, the capacities, ratings, sizes, and other requirements thereof not specified shall be as indicated on the Contract drawings.
- B. Where capacities, ratings, sizes, and other requirements for materials and/or equipment is neither specified nor indicated on the Contract drawings, refer each case to the Owner or Engineer before ordering the materials and/or equipment involved, or proceeding with the work involved. The Owner's or Engineer's decision shall govern.

**1.04 ELECTRICAL CHARACTERISTICS AND SIZES OF ELECTRICALLY OPERATED EQUIPMENT**

- A. Each electrically operated item furnished under this contract shall operate proper on the electrical supply to which it is to be connected, as indicated on the electrical drawings.
- B. All electrically operated equipment shall operate on a 60 hz alternating current supply, unless otherwise indicated. Prior to delivery to the job site, it shall be the joint responsibility of the Contractor under the applicable section and the equipment supplier to determine from the electrical drawings the characteristics of the electrical supply indicated to each individual electrically operated item, and to furnish each electrically operated item accordingly.
  - 1. Where electrical characteristics are specified hereinafter, verify them from the electrical drawings. In the case of discrepancy between the specifications and the electrical drawings, the Electrical drawings shall govern.
  - 2. Where electrical characteristics cannot be determined from the electrical drawings, refer each case to the Owner or Engineer, and the Owner's or Engineer's decision shall govern.

**END OF SECTION 01783****ISSUED FOR BID**01783  
Page 1

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**DIVISION 1 – SECTION 01784**

**MANUFACTURER'S SUPERVISION**

**1.01 DESCRIPTION**

A. Work included:

1. Furnishing Manufacturer's Supervision

B. Related Work:

1. Documents affecting work of this Section include, but are not necessarily limited to Division 0, Division 1, and other Sections of these Specifications.

**1.02 SERVICES**

- A. Furnish the services of authorized qualified manufacturer's representatives as required to supervise the installation, testing, initial starting, adjusting, and initial operation of each equipment item or any other item designated by the Contract Documents and included in this Contract.

**END OF SECTION 01784**



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**Item P-101****Preparation/Removal of Existing Pavements****DESCRIPTION**

**101-1** This item shall consist of preparation of existing pavement surfaces for overlay, surface treatments, removal of existing pavement, and other miscellaneous items. The work shall be accomplished in accordance with these specifications and the applicable plans.

**EQUIPMENT AND MATERIALS**

**101-2** All equipment and materials shall be specified here and in the following paragraphs or approved by the Program Manager. The equipment shall not cause damage to the pavement to remain in place.

**CONSTRUCTION****101-3.1 Removal of existing pavement.**

The Contractor's removal operation shall be controlled to not damage adjacent pavement structure, and base material, cables, utility ducts, pipelines, or drainage structures which are to remain under the pavement.

**a. Concrete pavement removal.** Full depth saw cuts shall be made perpendicular to the slab surface. The Contractor shall saw through the full depth of the slab including any dowels at the joint, removing the pavement and installing new dowels as shown on the plans and per the specifications. Where the perimeter of the removal limits is not located on the joint and there are no dowels present, the perimeter shall be saw cut the full depth of the pavement. The pavement inside the saw cut shall be removed by methods which will not cause distress in the pavement which is to remain in place. Concrete slabs that are damaged by under breaking shall be repaired or removed and replaced as directed by the Program Manager.

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. The material to be removed shall be milled.

**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 Program Manager. 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 Program Manager. Fill all cracks greater than 1/4 inch (6 mm) wide) with a crack sealant per ASTM D6690. The crack sealant, preparation, and application shall be compatible with the surface treatment/overlay to be used. To minimize contamination of the asphalt with the crack sealant, underfill the crack sealant a minimum of 1/8 inch, not to exceed 1/4 inch. Any excess joint or crack sealer shall be removed from the pavement surface.

**101-3.3 Removal of Foreign Substances/contaminates prior to overlay and/or remarking.**

Removal of foreign substances/contaminates from existing pavement that will affect the bond of the new treatment shall consist of removal of rubber, fuel spills, oil, crack sealer, at least 90% of paint, and other foreign substances from the surface of the pavement. Areas that require removal are designated on the plans and as directed by the Program Manager in the field during construction.

High-pressure water or rotary grinding may be used. 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 Program Manager 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 Program Manager.

Removal of foreign substances shall not proceed until approved by the Program Manager. 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 Program Manager. 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 Program Manager until the material is dense and no movement or marks are visible. The material shall not be placed in lifts over 4 inches 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 Program Manager. 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 Program Manager shall layout the area to be milled with a straightedge in increments of 1-foot (30 cm) widths. The area to be milled shall cover only the failed area. Any excessive area that is milled because the Contractor doesn't have the appropriate milling machine, or areas that are damaged because of his negligence, shall be repaired by the Contractor at the Contractor's Expense.

**b. Profiling, grade correction, or surface correction.** The milling machine shall have a minimum width of 7 feet and it shall be equipped with electronic grade control devices that will cut the surface to the grade specified. The tolerances shall be maintained within +0 inch and -1/4 inch 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 in areas designated on the plans.

**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 Program Manager. 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 Program Manager, that the method used cleans the joint and does not damage the joint.

**101-3.8.1 Removal of Existing Joint Sealant.** All existing joint sealants will be removed by plowing or use of hand tools. Any remaining sealant and or debris will be removed by use of wire brushes or other tools as necessary. Resaw joints removing no more than 1/16 inch (2 mm) from each joint face. Immediately after sawing, flush out joint with water and other tools as necessary to completely remove the slurry.

**101-3.8.2 Cleaning prior to sealing.** Immediately before sealing, joints shall be cleaned by removing any remaining laitance and other foreign material. Allow sufficient time to dry out joints prior to sealing. Joint surfaces will be surface-dry prior to installation of sealant.

**101-3.8.3 Joint sealant.** Joint material and installation will be in accordance with Item P-605.

**101-3.9 Preparation of Cracks in Flexible Pavement prior to sealing.** Prior to application of sealant material, clean and dry the joints of all scale, dirt, dust, old sealant, curing compound, moisture and other foreign matter. The Contractor shall demonstrate, in the presence of the Program Manager, that the method used cleans the cracks and does not damage the pavement.

**101-3.9.1 Preparation of Crack.** Widen crack with router by removing a minimum of 1/16 inch from each side of crack. Immediately before sealing, cracks will be blown out with a hot air lance combined with oil and water-free compressed air.

**101-3.9.2 Removal of Existing Crack Sealant.** Existing sealants will be removed by routing. Following routing any remaining debris will be removed by use of a hot lance combined with oil and water-free compressed air.

**101-3.9.3 Crack Sealant.** Crack sealant material and installation will be in accordance with Item P-605.

**101-3.9.4 Removal of Pipe and other Buried Structures.**

a. **Removal of Existing Pipe Material.** Remove the types of pipe as indicated on the plans. The pipe material shall be legally disposed of off-site in a timely manner following removal. Trenches shall be backfilled with material equal to or better in quality than adjacent embankment. Trenches under paved areas must be compacted to 95% of ASTM D1557, when outside of 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 Program Manager, 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 D1557, when outside of paved areas must be compacted to 95% of ASTM D698.

## METHOD OF MEASUREMENT

**101-4.1 Pavement removal.** The unit of measurement for pavement removal shall be the number of square yards removed by the Contractor. Any pavement removed outside the limits of removal because the pavement was damaged by negligence on the part of the Contractor shall not be included in the measurement for payment. No direct measurement or payment shall be made for saw cutting. Saw cutting shall be incidental to pavement removal. Dowel bar installation shall be incidental to pavement removal.

**101-4.2 Joint and crack repair.** The unit of measurement for joint and crack repair shall be the linear foot (meter) of joint.

**101-4.3 Removal of Foreign Substances/contaminates.** The unit of measurement for foreign Substances/contaminates removal shall be the square foot.

**101-4.4 Spalled and failed asphalt pavement repair.** The unit of measure for failed asphalt pavement repair shall be square foot.

**101-4.5 Concrete Spall Repair.** The unit of measure for concrete spall repair shall be the number of square feet. The location and average depth of the patch shall be determined and agreed upon by the Program Manager and the Contractor.

**101-4.6 Removal of Pipe and other Buried Structures.** The unit of measurement for removal of pipe and other buried structures will be made at the contract unit price for each completed and accepted item. This price shall be full compensation for all labor, equipment, tools, and incidentals necessary to complete this item in accordance with paragraph 101-3.9.4.

**101-4.7 Miscellaneous Demolition.** The lump sum price for Miscellaneous Demolition shall include all required demolition not specifically covered by other pay items in this section. The pay item shall include, but is not limited to: underdrain pipe, cleanouts and outlet structures; electrical conduit (both DEB and concrete encased).

## BASIS OF PAYMENT

**101-5.1 Payment.** Payment shall be made at contract unit price for the unit of measurement as specified above. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all excavation, demolition, debris removal and disposal, labor, equipment, tools, and incidentals necessary to complete this item.

- Item P-101-5.01 Demolition of Existing RCP Storm Drain Pipe – per linear foot
- Item P-101-5.02 Demolition of Existing Headwall (All Sizes and Types) – per each
- Item P-101-5.03 Demolition of Manhole (All Sizes) – per each
- Item P-101-5.04 Demolition of Inlet (All sizes and Types) – per each
- Item P-101-5.05 Miscellaneous Demolition – per lump sum
- Item P-101-5.06 Demolition of Existing Light Fixture (base and flush mounted) – per each
- Item P-101-5.07 Remove Existing Light Fixture and Transformer (flush mounted) – per each
- Item P-101-5.08 Demolition of Electrical Handhole – per each
- Item P-101-5.09 Demolition of Duct Bank – per linear foot
- Item P-101-5.10 Demolition of Concrete Sign Base – per each
- Item P-101-5.11 Remove and Store Lighted Sign with Transformer – per each

## **REFERENCES**

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

### **Advisory Circulars (AC)**

AC 150/5380-6	Guidelines and Procedures for Maintenance of Airport Pavements.
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### **ASTM International (ASTM)**

ASTM D6690	Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements
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**END OF ITEM P-101**

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**ITEM P-152****EXCAVATION 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 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 section(s) shown on the plans.

**152-1.2 CLASSIFICATION**

All material excavated shall be classified as defined below:

**a. Unclassified Excavation (Earthwork).** Unclassified excavation shall consist of the excavation and disposal of all on-site material, regardless of its nature, which is not otherwise classified. Suitable material shall be used in fill areas and shaped and compacted as specified herein. All excess suitable material shall be deposited on airport property in the location designated by the Engineer.

**b. Undercut Excavation.** This item shall include the excavation of unstable subgrade material as determined by the Engineer. It shall be the Contractor's responsibility to perform proof-rolling and/or comparative efforts on the existing subgrade prior to authorization for undercutting. Materials used to replace "undercut" areas shall be obtained from the grading operations, from offsite borrow or shall be granular backfill as further defined herein.

**c. Unsuitable Excavation.** This item shall include the excavation of: any materials containing vegetable or organic matter, such as muck, peat, organic silt, sod, or garbage; materials containing rubbish, trash or debris; or materials containing waste material such as bulky waste, commercial solid waste, construction and demolition waste, domestic waste, farming waste, and industrial waste. Petroleum impacted soil and hazardous waste shall NOT be considered to be unsuitable material. This item DOES NOT include clearing or clearing and grubbing waste as defined in P-151. Unsuitable material shall be disposed of off airport property at Contractor's expense.

The following paragraphs further define some of the above listed wastes:

**Bulky Wastes:** large items of solid waste such as white goods, furniture, autos or large auto parts, trees, branches, stumps, and other oversize wastes whose large size precludes or complicates their handling by normal collection, processing or disposal methods.

**Commercial Solid Wastes:** all types of solid waste generated by stores, offices, restaurants, warehouses, and other manufacturing activities, excluding domestic and industrial waste.

**Construction and Demolition Wastes:** wastes other than special wastes, resulting from construction, remodeling, repair and demolition of structures and from road building. Such wastes include but are not limited to bricks, concrete and other masonry materials, rock and lumber, road spoils, rebar, asphalt, and paving material. These types of wastes are not associated with, and shall not be paid for as, demolition of the airfield as required for this project, unless directed otherwise by the Engineer.

**Domestic Wastes:** any solid waste (including garbage and trash derived from households [including single and multiple residences], hotel and motels, bunkhouses, ranger stations, crew quarters, campgrounds, picnic grounds, and day-use recreation areas).

**Farming Wastes:** the wastes (except dead animals) from the customary and generally accepted activities, practices and procedures that farmers adopt, use, or engage in during the production and harvesting of agricultural crops which include agronomic, horticultural, and silvicultural crops. However, the term does NOT include special wastes such as waste oils or other lubricants, unused fertilizers, or pesticide containers or residues.



Hazardous Wastes: means hazardous waste as defined in RCRA.

Industrial Wastes: solid wastes produced in, or generated by, industrial or manufacturing processes. The term does NOT include commercial, domestic, mining, hazardous waste regulated under subtitled C of RCRA, or oil and gas waste.

**d. 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 Contractor furnished pits off airport property. No material shall be excavated or brought on airport property without written permission from the Engineer. Borrow material from non-approved pits will not be eligible for payment. Borrow excavation shall be further classified as follows:

- (1) "Select borrow excavation" shall be classified as "ML" or "CL" soil in accordance with ASTM D-2487 (Unified Soils Classifications System) and shall have the properties given in the following table. If required the Contractor shall blend materials from the Contractor furnished pits to achieve these properties.

Soil Type	Liquid Limit <sup>1</sup>	Plasticity Index <sup>1</sup>	CBR <sup>2</sup>
ML	No Limit	No Limit	Min 6
CL	Max 45	10 to 24	Min 6

1. When tested in accordance with ASTM D-4318.
2. When remolded to the density which will be obtained during construction, soaked and tested in accordance with ASTM D-1883.

- (2) "Unclassified borrow excavation" shall be any soil not classified as "unsuitable" per Section 152-1.2(c) and which can be readily placed and compacted in embankments.

**e. Pavement Excavation.** This item shall include the full depth removal and disposal of existing bituminous or Portland Cement Concrete (PCC) pavement, abandoned bituminous or PCC pavement or existing bituminous or PCC shoulder pavement to proper subgrade elevation. Existing base and/or subbase may be stabilized or un-stabilized. Excavation shall be made to such depths as required to allow placement of new pavement section. Dispose of all excavated material off airport property unless otherwise directed by the Engineer.

### 152-1.3 GRANULAR STONE BACKFILL

Granular backfill stone shall be CR-610 crushed stone.

## CONSTRUCTION METHODS

### 152-2.1 General

Stripping will be required within all areas to receive embankment that are not presently covered by pavement or building foundation. The minimum depth of stripping shall be four (4) inches and the maximum depth shall be to the limits of the root zone. The suitability of material to be placed in embankments shall be subject to approval by the Engineer. All unsuitable material shall be disposed of in Contractor furnished disposal areas off airport property. All waste areas shall be graded to allow positive drainage of the area and of adjacent areas. The surface elevation of waste areas shall not extend above the surface elevation of adjacent usable areas of the airport, unless specified on the plans or approved by the Engineer.

When the Contractor's excavating operations encounter artifacts of historical or archaeological significance, the operations shall be temporarily discontinued. At the direction of the Engineer, 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.

Those areas outside of the construction areas in which the top layer of soil material has become compacted, by hauling or other activities of the Contractor shall be scarified and disked to a depth of 4 inches (100 mm), in order to loosen and pulverize the soil.

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 require removal or relocation and are not shown on the plans or addressed the specifications, the Contractor shall notify the Engineer, who shall arrange for their removal if necessary. The Contractor shall, at his/her own expense, 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. When drainage pipes cross project phase limits, temporary ditches will be required unless directed otherwise by the Engineer. Positive drainage at the site must be maintained at all times.

### **152-2.2 EXCAVATION**

No excavation shall be started until the work has been staked out and the existing ground cross-sectioned by the Contractor on a maximum 50' X 50' survey grid for both horizontal and vertical grade control. All suitable excavated material shall be used in the formation of embankment, subgrade, or for other purposes shown on the plans. All unsuitable material shall be disposed of off airport property. Fine grading in preparation for paving shall not commence until the work has been staked out by the Contractor on a minimum 25' x 25' grid.

In pavement areas of any type to be removed and replaced, the existing pavement shall be sawed full-depth along the limits of construction. Existing free pavement edges shall be "nicked" as required to provide a straight vertical face. Pavement to be removed shall be carefully excavated to prevent damage to existing pavement to remain. The Contractor shall replace at this expense any pavement damaged outside the limits of demolition shown. The Contractor shall use a hoe-ram or other approved equipment for pavement demolition. The use of the crane and "head-ache" ball method of demolition is prohibited.

When the volume of the excavation exceeds that required to construct the embankments to the grades indicated, the excess shall be used to grade the areas of ultimate development or disposed of as directed. When the volume of excavation is not sufficient for constructing the fill to the grades indicated, the deficiency shall be obtained from borrow areas.

The Contractor shall perform all bracing, sheathing, or shoring necessary to implement and protect all excavations as required for safety, conformance to governing laws, or to prevent damage to surrounding items or features. The cost of said bracing, sheathing, and shoring shall be included in the unit price bid for the item requiring excavation.

The grade shall be maintained so that the surface is well drained at all times. When necessary, temporary drains and drainage ditches shall be installed to intercept or divert surface water that may affect the work. Positive, effective drainage must be maintained at all times.

The removal of existing structures and utilities required to permit the orderly progress of work will be accomplished as shown. All existing foundations shall be excavated to a minimum of 12" below the top of subgrade or as indicated on the plans, and the material disposed off airport property. All foundations thus excavated shall be backfilled with suitable material and compacted as specified herein.

**a. Selective Grading.** When selective grading is indicated on the plans, the more suitable material as designated by the Engineer shall be used in constructing the embankment or in capping the building or 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 so that it can be measured for payment for re-handling as specified in paragraph 3.3.

**b. Undercutting.** Excavation of unstable but otherwise suitable material shall be paid for as "Undercut Excavation". Unstable undercut excavation shall be disposed off airport property. The excavated area shall be refilled with suitable material, obtained from the grading operations or, if approved by the Engineer, replaced with borrow material or compacted granular backfill. Borrow material or granular material used to backfill undercut areas will be measured for payment, if the undercut has been authorized by the Engineer. Back filling of undercut areas with material obtained from grading operations (unclassified excavation) will not be measured for additional payment but considered incidental to grading operations.

Excessive moisture content alone shall not constitute a reason for classifying any material as unstable undercut excavation. Material that is too wet for compaction but otherwise suitable as determined by the Engineer shall be aerated, dried, and compacted at Contractor's expense. Soils which become wet from percolation of ground water after drying may be considered for undercut excavation. The Contractor shall protect all subgrade and embankment areas from excessive moisture. Such protection may include, but is not limited to, providing positive drainage and sealing off the surface of embankment areas with a smooth wheeled roller prior to rain events. The cost of said protection will be incidental to the contract cost in embankments constructed under this project. Soils excavated due to percolation of ground water shall be dried and reused in the embankment or stockpiled on airport property as directed by the Engineer.

**c. Unsuitable Excavation.** Excavation of hardpan, loose rock or other unsuitable material shall be paid for as "Undercut Excavation". Unsuitable materials shall be excavated to a minimum depth of 12 inches (300 mm), or to the depth specified by the Engineer, below the subgrade. Muck, peat, matted roots, or other yielding material, unsatisfactory for subgrade foundation, shall be removed to the depth directed. Unsuitable materials shall be disposed of at locations off-airport property. The excavated area shall be refilled with suitable material, obtained from the grading operations or, if approved by the Engineer, replaced with borrow material or compacted granular backfill. Borrow material or granular material used to backfill unsuitable excavated areas will be measured for payment, if the excavation has been authorized by the Engineer. Back filling of unsuitable excavated areas with material obtained from grading operations (unclassified excavation) will not be measured for additional payment but considered incidental to grading operations.

**d. Bridge Lifts.** In unstable subgrade excavation areas where continued excavation of unstable subgrade soil does not expose firm or stable materials, the exposed foundation materials shall be stabilized by placement of 24 inches maximum of granular backfill material meeting the requirements of Section 152-1.3. The bridge lift shall be compacted by making passes with a crawler tractor of comparable size to a caterpillar D-8 crawler with dozer blade. The bridge lift shall be continuously compacted until sufficiently stable to support embankment construction equipment. The bridge lift shall be evaluated for stability by proof-rolling in the presence of the Engineer.

### 152-2.3 SUBGRADE PREPARATION

The Contractor shall be responsible for processing the top 12" of subgrade under all areas to be paved. Subgrade preparation shall consist of bringing the dirt material to within -0% to +3% of the proper moisture content, compacting the material to the specified density, and shaping the finished surface to the indicated lines and grades. If excess moisture exists, the Contractor shall disk and aerate the subgrade to produce a moisture content within -0% to +3% of optimum. The top 12" of subgrade under areas to be paved shall be compacted average density of not less than 97% of the maximum density as determined by ASTM D-1557 (Modified Proctor) with no single density test taken less than 95%. Yielding or unstable subgrade material shall be reprocessed or undercut and properly backfilled as directed by the Engineer.

If proper compaction techniques or adequate moisture control are not maintained by the Contractor, compactive efforts shall be repeated until satisfactory results are obtained.

The in-place field density shall be determined in accordance with ASTM D 1556 or ASTM D 2922 and D 3017. 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. The finished grading operations,

conforming to the typical cross section, shall be completed and maintained at least 100 feet ahead of the paving operations or as directed by the Engineer.

The Contractor shall be responsible for conducting laboratory and field density and moisture control tests at his expense to determine when Contractor is ready for Owner acceptance testing to begin. The Owner's testing laboratory will conduct all acceptance testing for determining compliance with specified density. Any retesting due to the failure of initial testing shall be performed by the Owner's laboratory at Contractor expense.

#### **152-2.4 BORROW EXCAVATION**

It shall be the Contractor's responsibility to locate and obtain off-site borrow material. This material must be approved by the Engineer. The Contractor shall notify the Engineer, at least 15 days prior to beginning the excavation, so necessary measurements and tests can be made. All unsuitable material shall be disposed of by the Contractor. All borrow pits shall be opened up to expose the vertical face of various strata of acceptable material to enable obtaining a uniform product. Borrow pits shall be excavated to regular lines to permit accurate measurements, and they shall be drained and left in a neat, presentable condition with all slopes dressed uniformly.

#### **152-2.5 DRAINAGE EXCAVATION**

Drainage excavation shall consist of excavating for drainage ditches such as intercepting; inlet or outlet, for temporary levee construction; or for any other type as designed or as shown on the plans. The work shall be performed in the proper sequence with the other construction. All satisfactory material shall be placed in fills; unsuitable material shall be placed in waste areas or as directed. Intercepting ditches shall be constructed prior to starting adjacent excavation operations. All necessary work shall be performed to secure a finish true to 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.

#### **152-2.6 PREPARATION OF EMBANKMENT AREA**

a. Where an embankment is to be constructed all sod and vegetable matter shall be removed from the surface upon which the embankment is to be placed to a minimum depth as specified in Paragraph 152-2.1. The Contractor shall then process the top 6" of areas to be embanked. Processing shall consist of bringing the material to within -0% to +3% of the proper moisture content, compacting the material to the specified density, and shaping the finished surface to the indicated lines and grades. If excess moisture exists, the Contractor shall disk and aerate the surface to produce a moisture content within -0% to +3% of optimum. The top 6" of areas to be embanked shall be compacted to a density of not less than 95% of the maximum density as determined by ASTM D-1557 (Modified Proctor).

The stability of the prepared areas shall be evaluated by proof-rolling. The Contractor shall provide a Caterpillar 637E scraper, empty, or approved equal, with tires inflated as per manufacturer's recommendations. Soils must be at a moisture content of +/- 2 percent of the optimum for this evaluation. Soils displaying elastic behavior under the proof-rolling evaluation shall be deemed stable and ready for embankment construction. Soils may be described as exhibiting elastic behavior when they are firm, unyielding, and exhibiting a stable surface under proof-rolling. Soils may be described as exhibiting plastic behavior when they are yielding and not firm, and exhibit undulating and rutting under proof-rolling. Such plastic soils shall be rejected. The distinction as to whether said soils are elastic or plastic shall be at the discretion of the Engineer.

If the soils display plastic behavior and are determined by the Engineer to be unstable, the unstable soils shall be removed and replaced as directed by the Engineer to a maximum depth of 24 inches. If the subgrade continues to display plastic behavior and is determined by the Engineer to be unstable, the Engineer may direct that a bridge lift be constructed.

**b. (Not Used)**

**c. Benching.** During the construction of embankments where fill materials must be placed on natural and/or man-made slopes steeper than 4:1 (horizontal to vertical), the existing slopes shall be benched at maximum vertical distances of 5 feet with minimum bench widths of 15 feet and maximum back slopes of 2:1 (horizontal to vertical). Where existing slopes approach 2:1 (horizontal to vertical) the back slope shall be near vertical.

**d. Payment.** No direct payment shall be made for the work performed under this section.

## **152-2.7 FORMATION OF EMBANKMENTS**

Embankments shall be formed in successive horizontal layers of not more than 8 inches (200 mm) in loose depth for the full width of the cross section, unless otherwise approved by the Engineer.

The grading operations shall be conducted, and the various soil strata shall be placed, to produce a soil structure as shown on the typical cross section or as directed. Materials such as brush, hedge, roots, stumps, grass and other organic matter, shall not be incorporated or buried in the embankment.

Operations on earthwork shall be suspended at any time when satisfactory results cannot be obtained because of rain, freezing, or other unsatisfactory conditions of the field. The Contractor shall drag, blade, or slope the embankment to provide proper surface drainage.

The material in the layer shall be within +/-2 percent of optimum moisture content before rolling to obtain the prescribed compaction. In order to achieve a uniform moisture content throughout the layer, wetting or drying of the material and manipulation shall be required when necessary. Should the material be too wet to permit proper compaction or rolling, all work on all of the affected portions of the embankment shall be delayed until the material has dried to the required moisture content. Sprinkling of dry material to obtain the proper moisture content shall be done with approved equipment that will sufficiently distribute the water. Sufficient equipment to furnish the required water shall be available at all times. Samples of all embankment materials for testing, both before and after placement and compaction, shall be taken by the Contractor for each 2,400 square yards of each lift. Based on these tests, the Contractor shall make the necessary corrections and adjustments in methods, materials or moisture content in order to achieve the correct embankment density.

For all embankments rolling operations shall be continued until the embankment is compacted to an average density of not less than 97% of the maximum density as determined by ASTM D 1557 with no single density test taken less than 95% of the maximum density determined by ASTM D 1557.

In areas of permanent seeding or sodding, no compaction will be required on the top 4 inches (100 mm).

The in-place field density shall be determined in accordance with ASTM D 1556 or ASTM D 2922 and D 3017.

Compaction areas shall be kept separate, and no layer shall be covered by another until the proper density is obtained.

During construction of the embankment, the Contractor shall route his/her equipment at all times, both when loaded and when empty, over the layers as they are placed and shall distribute the travel evenly over the entire width of the embankment. The equipment shall be operated in such a manner that hardpan, cemented gravel, clay, or other chunky soil material will be broken up into small particles and become incorporated with the other material in the layer.

In the construction of embankments, layer placement shall begin in the deepest portion of the fill; as placement progresses, layers shall be constructed approximately parallel to the finished pavement grade line.

When rock and other embankment material are excavated at approximately the same time, the rock shall be incorporated into the outer portion of the embankment and the other material shall be incorporated under the future paved areas. Stones or fragmentary rock larger than 1 inch in their greatest dimensions will not be allowed in the top 6 inches (150 mm) of the subgrade. Excessive amounts of stone or clippings from CTB and Soil Cement shall not be incorporated within the top 12" of the surface in areas to be turfed.

When the excavated material consists predominantly of rock fragments of such size that the material cannot be placed in layers of the prescribed thickness without crushing, pulverizing or further breaking down the pieces, such material shall be removed from the job site as "unsuitable material" excavation

Frozen material shall not be placed in the embankment nor shall embankment be placed upon frozen material.

No extra payment will be made for reworking material to obtain specified density even in the event that areas which have been initially accepted for compaction require reworking due to rainfall, drying out or other reasons. There shall be no separate measurement for payment of compacted embankment and filling operations and all costs incidental to placing in layers, blending, compacting, diskings, watering, mixing, sloping, and other necessary operations for construction of embankments. All costs for embankment construction shall be included in the cost of P-152 pay items as described herein.

#### **152-2.8 DRAINAGE AND UTILITY TRENCHES**

Compaction of drainage and utility trenches, whether resulting from new construction or demolition of existing, shall be compacted in accordance with the paragraph 152-2.7. The cost of compaction of trenches shall be incidental to the item for which it is constructed. Contractor will backfill and compact any settlement in such trenches, either during construction or the warranty period, at no additional compensation.

#### **152-2.9 FINISHING AND PROTECTION OF SUBGRADE**

After the excavation/embankment/backfilling has been completed the subgrade shall be conditioned by removing any soft or other unstable material that will not compact properly. The resulting areas and all other low areas, holes or depressions shall be brought to grade with suitable select material. Subgrade processing as per Paragraph 2.3 shall then be performed to provide a thoroughly compacted subgrade shaped to the lines and grades shown on the plans.

Grading of the subgrade shall be performed so that it will drain readily. The Contractor shall take all precautions necessary to protect the subgrade from damage. He/she shall limit hauling over the finished subgrade to that which is essential for construction purposes.

All ruts or rough places that develop in a completed subgrade shall be smoothed and recompacted. The Engineer reserves the right to limit the size and/or weight of loads hauled over the compacted subgrade, if excess damage occurs.

No subbase, base or surface courses shall be placed on the subgrade until the subgrade has been reviewed by the Engineer.

#### **152-2.10 HAUL**

All hauling will be considered a necessary and incidental part of the work. Its cost shall be considered by the Contractor and included 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.

#### **152-2.11 TOLERANCES**

In those areas upon which a subbase or a base course is to be placed, the top of the subgrade shall be of such smoothness that, when tested with a 16-foot straightedge applied parallel and at right

angles, it shall not show any deviation in excess of 1/2-inch, or shall not be more than 0.05-foot from true grade as established by grade hubs or pins. Any deviation in excess of these amounts shall be corrected loosening, pulverizing, adding or removing materials, reshaping and reprocessing the subgrade.

On other areas, the surface shall be of such smoothness that it will not vary more than 0.10 foot (0.03 m) from true grade as established by grade hubs. Any deviation in excess of this amount shall be corrected by loosening, adding or removing materials, reshaping, and re-compaction by sprinkling and rolling.

#### **152-2.12 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 proper and final section of finished construction, the material shall be stockpiled at approved locations. Stockpiles shall not be placed within 200 feet of runway pavement or 75 feet of taxiway pavement and shall not be placed on areas that subsequently will require any excavation or embankment. If, in the judgment of the Program Manager, 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 rehandling.

Upon completion of grading operations, stockpiled topsoil shall be handled and placed as directed, or as required in Item T-905.

No direct payment will be made for topsoil as such under Item P-152. The quantity removed and placed directly or stockpiled shall be paid for at the contract unit price per cubic yard (cubic meter) for "Unclassified Excavation."

When stockpiling of topsoil and later rehandling of such material is directed by the Program Manager, the material so rehandled shall be paid for at the contract unit price per cubic yard (cubic meter) for "Topsoiling," as provided in Item T-905.

#### **152-2.13 ACCEPTANCE TESTING**

The Contractor shall be responsible for conducting laboratory and field density and moisture control tests at his/her expense to determine when the Contractor is ready for Owner acceptance testing to begin. The Owner shall be responsible for all acceptance testing for determining compliance with the specifications. Any retesting due to the failure of initial testing shall be performed at Contractor expense by the acceptance testing company. Refer to Section 01410 for further information.

Existing subgrade compaction will be accepted for density on a lot basis. A lot of subgrade compaction shall consist of five density tests, where each test represents approximately 500 cubic yards of material. If operational conditions cause a day's production to be terminated before five tests have been made, then the lot shall include tests made on adjacent area(s) at the same layer, until five tests are made. The locations for testing will be determined by the Engineer on a random basis in accordance with the procedures contained in ASTM D 3665. The lot of subgrade compaction will be accepted when both of the following conditions are met: (1) the average of all density tests taken within the lot equals or exceeds the specified average requirement, and (2) no single density test taken within the lot is less than the minimum allowable specified. Lots not meeting both of these requirements shall be rejected.

Embankment compaction will be accepted for density on a lot basis. A lot of embankment construction shall consist of five density tests, where each test represents approximately 500 cubic yards of material. If operational conditions cause a day's production to be terminated before five tests have been made, then the lot shall include tests made on adjacent embankment area(s) at the same layer, until five tests are made. The locations for testing will be determined by the Engineer on a random basis in accordance with the procedures contained in ASTM D 3665. The lot of embankment construction will be accepted when both of the following conditions are met: (1) the average of all

density tests taken within the lot equals or exceeds the specified average requirement, and (2) no single density test taken within the lot is less than the minimum allowable specified. Lots not meeting both of these requirements shall be rejected.

#### **152-2.14 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.

### **METHOD OF MEASUREMENT**

#### **152-3.1 UNCLASSIFIED EXCAVATION (EARTHWORK)**

Unclassified excavation (earthwork) shall be measured by the cubic yard and shall be computed by the average end areas of design cross sections or the comparison of digital terrain model (DTM) surfaces for computation of neat line design quantities. The end area is that bound by the original ground line established by field cross-sections and the final theoretical pay line established by cross-sections shown on the plans, subject to verification by the Program Manager.

#### **152-3.2 UNDERCUT EXCAVATION AND UNSUITABLE MATERIALS EXCAVATION**

The quantity of undercut excavation and unsuitable materials excavation shall be the number of neat cubic yards measured of the undercut area or unsuitable material area as designated by the Engineer in its original position, excavated and properly disposed of.

#### **152-3.3 BORROW EXCAVATION**

Borrow excavation, as defined in Section 152-1.2(d), shall be measured by the cubic yard in its original position and shall be computed by the average end areas of borrow pit cross sections or the comparison of digital terrain model (DTM) surfaces for computation of neat line quantities. The end area is that bound by the original ground line established by field cross-sections and the final excavation pay line established by cross-sections, subject to verification by the Program Manager.

#### **152-3.4 PAVEMENT EXCAVATION**

Pavement excavation, as defined in Section 152-1.2(e), will be paid on the basis of the number of square yards of the various types specified, measured in its original position. Pavement excavation shall full depth and shall include bituminous courses, portland concrete courses, stabilized and/or un-stabilized base courses and stabilized and/or un-stabilized subbase courses.

#### **152-3.5 COLD MILLING**

The unit of measure for cold milling shall be 1.5 inches of milling per square yard. The location and average depth of the cold milling shall be as shown on the plans. If the initial cut does not correct the condition, the Contractor shall re-mill the area and will be paid for the total depth of milling.

#### **152-3.6 SUBGRADE PROCESSING**

Subgrade Preparation, as defined in Section 152-2.3, will be paid on the basis of the number of square yards.

#### **152-3.7 GRANULAR STONE BACKFILL**



The granular stone backfill to be measured and paid for shall be the number of cubic yards measured in its final position as approved and accepted by the Program Manager.

### **BASIS OF PAYMENT**

#### **152-4.1 UNCLASSIFIED EXCAVATION**

For "Unclassified Excavation (Earthwork)" payment shall be made at the contract unit price per cubic yard. This price shall be full compensation for furnishing all materials, water, labor, surveying, equipment, maintenance of drainage across construction phase lines, tools, hauling, and incidentals necessary to complete the item.

#### **152-4.2 UNDERCUT EXCAVATION AND UNSUITABLE MATERIALS EXCAVATION**

For "Undercut Excavation" and for "Unsuitable Materials Excavation" payment shall be made at the contract unit price per cubic yard. This price shall be full compensation for all materials, equipment, labor, tools and incidentals necessary to complete the item and dispose of material off airport property regardless of the depth encountered. Only the areas authorized by the Engineer shall be paid for.

#### **152.4.3 PAVEMENT EXCAVATION**

For "Pavement Excavation" payment shall be made at the contract unit price per square yard of the various types indicated. This price shall be full compensation for furnishing all materials, labor, equipment, tools and incidentals necessary to excavate, load, transport and dispose of the material off site, including any tipping or dump fees.

#### **152.4.4 SUBGRADE PROCESSING**

Subgrade Preparation shall be made at the contract unit price per square yard. This price shall be full compensation for furnishing all materials, water, labor, surveying, equipment, maintenance of drainage across construction phase lines, tools, hauling, and incidentals necessary to complete the item.

#### **152-4.5 GRANULAR STONE BACKFILL**

For "Granular stone backfill" payment shall be made at the contract unit price per cubic yard. This price shall be full compensation for furnishing all materials, labor, equipment, tools, hauling, and incidentals necessary to complete the item.

#### **152.4.6 CONFLICTS**

In the event of conflict in the interpretation of these pay items with other sections of these Specifications, Paragraphs 152-3.1 through 152-4.5 shall govern.

#### **Payment will be made under:**

Item P-152-4.01	Unclassified Excavation, per cubic yard
Item P-152-4.02	Undercut Excavation and Disposal, per cubic yard
Item P-152-4.03	Unsuitable Material Excavation and Disposal, per cubic yard
Item P-152-4.04	Borrow Excavation, per cubic yard
Item P-152-4.05	Pavement Excavation, mill asphalt 1.5", per square yard
Item P-152-4.06	Pavement Excavation, full depth Gravel Roadway, per square yard
Item P-152-4.07	Pavement Excavation, full depth Asphalt Roadway, per square yard
Item P-152-4.08	Pavement Excavation, full depth asphalt taxiway shoulder, per square yard
Item P-152-4.09	Pavement Excavation, full depth asphalt taxiway, per square yard
Item P-152-4.10	Pavement Excavation, full depth airfield Portland cement concrete pavement, per square yard

Item P-152-4.11	Granular stone backfill for undercut and unsuitable material, per cubic yard
Item P-152-4.12	Pavement excavation, mill asphalt 1.5" for haul route repair, per square yard
Item P-152-4.13	Subgrade Processing, per square yard

#### **TESTING REQUIREMENTS**

ASTM D 698	Test for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5-pound (2.49 kg) Rammer and 12-inch (305 mm) Drop
ASTM D 1556	Test for Density of Soil In Place by the Sand-Cone Method
ASTM D 1557	Test for Laboratory Compaction Characteristics of Soil Using Modified Effort
ASTM D 2167	Test for Density and Unit Weight of Soil In Place by the Rubber Balloon Method.
ASTM D 2922	Test for Density by Nuclear Method.
ASTM D 3017	

**END OF ITEM P-152**

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**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, or crushed gravel and shall be free from coatings of clay, silt, organic material, clay lumps or balls or other deleterious materials or coatings. The method used to produce the crushed gravel shall result in the fractured particles in the finished product as consistent and uniform as practicable. Fine aggregate portion, defined as the portion passing the No. 4 sieve shall consist of fines from the coarse aggregate crushing operation. The fine aggregate shall be produced by crushing stone, or gravel that meet the coarse aggregate requirements for wear and soundness. Aggregate base material requirements are listed in the following table.

**CRUSHED AGGREGATE BASE MATERIAL REQUIREMENTS**

<b>Material Test</b>	<b>Requirement</b>	<b>Standard</b>
<b>Course Aggregate</b>		
Resistance to Degradation	Loss: 45% maximum	ASTM C131
Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate	Loss after 5 cycles: 12% maximum using Sodium sulfate – or – 18% maximum using magnesium sulfate	ASTM C88
Percentage of Fractured Particles	Minimum 90% by weight of particles with at least two fractured faces and 98% with at least one fractured face <sup>1</sup>	ASTM D5821
Flat Particles, Elongated Particles, or Flat and Elongated Particles	10% maximum, by weight, of flat, elongated, or flat and elongated particles <sup>2</sup>	ASTM D4791
<b>Fine Aggregate</b>		
Liquid Limit	Less than or equal to 25	ASTM D4318
Plasticity Index	Not more than five (5)	ASTM D4318

<sup>1</sup> The area of each face shall be equal to at least 75% of the smallest mid-sectional area of the piece. When two fractured faces are contiguous, the angle between the planes of fractures shall be at least 30 degrees to count as two fractured faces.

<sup>2</sup> A flat particle is one having a ratio of width to thickness greater than five (5); an elongated particle is one having a ratio of length to width greater than five (5).

**209-2.2 GRADATION REQUIREMENTS**

The gradation of the aggregate base material shall meet the requirements of the gradation given in the following table when tested per ASTM C117 and ASTM C136. The gradation shall be well graded from coarse to fine and shall not vary from the lower limit on one sieve to the high limit on an adjacent sieve or vice versa.

#### GRADATION OF AGGREGATE BASE

Sieve Size	Design Range Percentage by Weight passing	Contractor's Final Gradation	Job Control Grading Band Tolerances <sup>1</sup> (Percent)
2 inch (50 mm)	100		0
1-1/2 inch (38 mm)	95-100		±5
1 inch (25 mm)	70-95		±8
3/4 inch (19 mm)	55-85		±8
No. 4 (4.75 mm)	30-60		±8
No. 40 <sup>2</sup> (0.45 mm)	10-30		±5
No. 200 <sup>2</sup> (0.075 mm)	0-10		±3

<sup>1</sup> 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.

<sup>2</sup> 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 Program Manager 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 Program Manager.

#### 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 Program Manager, that the materials, equipment, and construction processes meet the requirements of the specification. The sequence and manner of rolling necessary to obtain specified density requirements shall be determined. The maximum compacted thickness may be increased to a maximum of 12 inches upon the Contractor's demonstration that approved equipment and operations will uniformly compact the lift to the specified density. The Program Manager 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 Program Manager. 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 Program Manager.

### **209-3.2 PREPARING UNDERLYING SUBGRADE AND/OR SUBBASE**

The underlying subgrade and/or subbase shall be checked and accepted by the Program Manager 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 Program Manager 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 Program Manager, to a uniform thickness and width. The equipment shall have positive thickness controls to minimize the need for additional manipulation of the material. Dumping from vehicles that require re-handling shall not be permitted. Hauling over the uncompacted base course shall not be permitted.

The aggregate shall meet gradation and moisture requirements prior to compaction. The base course shall be constructed in lifts as established in the control strip, but not less than 4 inches nor more than 12 inches of compacted thickness.

When more than one lift is required to establish the layer thickness shown on the plans, the construction procedure described here shall apply to each lift. No lift shall be covered by subsequent lifts until tests verify that compaction requirements have been met. The Contractor shall rework, re-compact and retest any material placed which does not meet the specifications at the Contractor's expense.

### **209-3.5 COMPACTION**

Immediately after completion of the spreading operations, compact each layer of the base course, as specified, with approved compaction equipment. The number, type, and weight of rollers shall be

sufficient to compact the material to the required density within the same day that the aggregate is placed on the subgrade.

The field density of each compacted lift of material shall be at least 100% of the maximum density of laboratory specimens prepared from samples of the base material delivered to the jobsite. The laboratory specimens shall be compacted and tested in accordance with ASTM D1557. The moisture content of the material during placing operations shall be within  $\pm 2$  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 and rising. Work on base course shall not be conducted when the subgrade or subbase is wet or frozen or the base material contains frozen material.

### **209-3.7 MAINTENANCE**

The base course shall be maintained in a condition that will meet all specification requirements. When material has been exposed to excessive rain, snow, or freeze-thaw conditions, prior to placement of additional material, the Contractor shall verify that materials still meet all specification requirements. Equipment may be routed over completed sections of base course, provided that no damage results and the equipment is routed over the full width of the completed base course. Any damage resulting to the base course from routing equipment over the base course shall be repaired by the Contractor at the Contractor's expense.

### **209-3.8 SURFACE TOLERANCES**

After the course has been compacted, the surface shall be tested for smoothness and accuracy of grade and crown. Any portion lacking the required smoothness or failing in accuracy of grade or crown shall be scarified to a depth of at least 3 inches, reshaped and recompact to grade until the required smoothness and accuracy are obtained and approved by the Program Manager. Any deviation in surface tolerances shall be corrected by the Contractor at the Contractor's expense. The smoothness and accuracy requirements specified here apply only to the top layer when base course is constructed in more than one layer.

- a. **Smoothness.** The finished surface shall not vary more than 3/8-inch when tested with a 12-foot straightedge applied parallel with and at right angles to the centerline. The straightedge shall be moved continuously forward at half the length of the 12-foot straightedge for the full length of each line on a 50-foot grid.
- b. **Grade.** The grade and crown shall be measured on a 50-foot grid and shall be within +0 and 1/2 inch of the specified grade.

### **209-3.9 ACCEPTANCE SAMPLING AND TESTING**

Crushed aggregate base course shall be accepted for density and thickness on an area basis. Two tests shall be made for density and thickness for each 1,200 square yds. Sampling locations will be determined on a random basis per ASTM D3665.

- a. **Density.** The Program Manager shall perform all density tests.

Each area shall be accepted for density when the field density is at least 100% of the maximum density of laboratory specimens compacted and tested per ASTM D1557. The in-place field density shall be determined per ASTM D1556 or ASTM D6938 using Procedure A, the direct transmission method, and ASTM D6938 shall be used to determine the moisture content of the material. The machine shall be calibrated in accordance with ASTM D6938. If the specified density is not attained, the area represented by the failed test must be reworked and/or 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 in diameter that extend through the base. The thickness of the base course shall be within +0 and -1/2 inch of the specified thickness as determined by depth tests taken by the Contractor in the presence of the Program Manager for each area. Where the thickness is deficient by more than 1/2-inch, the Contractor shall correct such areas at no additional cost by scarifying to a depth of at least 3 inches, adding new material of proper gradation, and the material shall be blended and 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 of material actually constructed and accepted by the Program Manager 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 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 cubic yard                   |
| Item P-209-5.2 | Crushed Aggregate Base Course (8-inches thick) – per square yard |

## REFERENCES

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

### ASTM International (ASTM)

- |           |  |
|-----------|--|
| ASTM C29  | Bulk Density ("Unit Weight") and Voids in Aggregate  |
| ASTM C88  | Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate                                      |
| ASTM C117 | Materials Finer than 75-μm (No. 200) Sieve in Mineral Aggregates by Washing                                |
| ASTM C131 | Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine |
| ASTM C136 | Sieve or Screen Analysis of Fine and Coarse Aggregates   |



ASTM C142	Clay Lumps and Friable Particles in Aggregates
ASTM D75	Sampling Aggregates
ASTM D698	Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft <sup>3</sup> (600 kN-m/m <sup>3</sup> ))
ASTM D1556	Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D1557	Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft <sup>3</sup> (2700 kN-m/m <sup>3</sup> ))
ASTM D2167	Density and Unit Weight of Soil in Place by the Rubber Balloon Method
ASTM D2419	Sand Equivalent Value of Soils and Fine Aggregate
ASTM D3665	Random Sampling of Construction Materials
ASTM D4318	Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D4491	Water Permeability of Geotextiles by Permittivity
ASTM D4643	Determination of Water Content of Soil and Rock by Microwave Oven Heating
ASTM D4751	Determining Apparent Opening Size of a Geotextile
ASTM D4791	Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate
ASTM D5821	Determining the Percentage of Fractured Particles in Coarse Aggregate
ASTM D6938	In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
ASTM D7928	Particle-Size Distribution (Gradation) of Fine-Grained Soils Using the Sedimentation (Hydrometer) Analysis

American Association of State Highway and Transportation Officials (AASHTO)

M288	Geosynthetic Specification for Highway Applications
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**END OF ITEM P-209**

**Item P-220****Cement Treated Soil Base Course****DESCRIPTION**

**220-1.1** This item shall consist of constructing a base course by uniformly mixing soil, cement, and water. The mixed material shall be spread, shaped, and compacted in accordance with these specifications and in conformity to the dimensions and typical cross-section shown on the plans. Tests shall be required for each approved soil included within the treated layer.

Runway, taxiway, or apron pavements shall be built in a series of parallel lanes using a plan that reduces the number of longitudinal and transverse joints to a minimum.

**MATERIALS**

**220-2.1 Cement.** Cement shall conform to the requirements of ASTM C150, Type I, IA, II, or IIA or ASTM C595, Type IS, IS(A), IP or IL.

**220-2.2 Water.** Water used in mixing or curing shall be from potable water sources. Other sources shall be tested in accordance with ASTM C1602 prior to use.

**220-2.3 Soil.** The soil for this work shall consist of on-site materials and shall be free of roots, sod, weeds, and stones larger than 2-1/2 inches (60 mm) with a sulfate content of less than 0.3%.

**220-2.4 Asphalt material.** The types, grades, controlling specifications, and application temperatures for the asphalt materials used for curing the soil-cement shall be P-603.

**MIX DESIGN**

**220-3.1 Proportions.** Before the start of base course construction, tests shall be made on the soil or soil-aggregate material to be stabilized to determine the quantity of cement required for the mix design.

Test specimens containing various amounts of cement shall be compacted per ASTM D558, and the optimum moisture determined for each test specimen. Samples at the optimum moisture shall be subjected to the wet-dry and the freeze-thaw test in accordance with ASTM D559 and ASTM D560, respectively.

Cement shall be added at an application rate of 8 percent of dry unit weight of soil.

**CONSTRUCTION METHODS**

**220-4.1 Control Strip.** The first half-day of construction shall be considered the control strip. The Contractor shall demonstrate, in the presence of the Program Manager, 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 Program Manager 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 Program Manager. 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 Program Manager.

**220-4.2 Weather limitations.** The material shall not be mixed or placed while the atmospheric temperature is below 40°F (4°C) or when conditions indicate that the temperature may fall below 40°F (4°C) within 24 hours, or when the weather is foggy or rainy, or to soils that are frozen or contain frost, or when the underlying material is frozen.

**220-4.3 Maintenance.** The material 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 their expense.

**220-4.4 Equipment.** The course may be constructed with any equipment that will meet the requirements for soil pulverization, cement application, mixing, water application, incorporation of materials, compaction, finishing, and curing specified here.

**220-4.5 Preparation.** The area to be stabilized shall be graded and shaped to conform to the lines, grades and cross-section shown on the plans. Any soft or yielding areas in the subgrade shall be removed and replaced with acceptable soil and compacted to the specified density.

**220-4.6 Pulverization.** After completion of moist-mixing, the soil for the base course shall be pulverized so that 100% by dry weight passes a 1-inch (25.0 mm) sieve and a minimum of 80% passes a No. 4 (4.75 mm) sieve.

**220-4.7 Cement application, mixing, and finishing.** Mixing of the soil, cement, and water shall be accomplished by the mixed-in-place method. Shape pulverized material to the cross-section indicated. Cement shall be applied so that when uniformly mixed with the soil, the specified cement content is obtained, and a sufficient quantity of cement-treated soil is produced to construct a compacted cement-treated course conforming to the lines, grades, and cross-section indicated. Immediately after the cement has been distributed, it shall be mixed with the soil. The cement shall not be mixed below the required depth. Continue mixing until the cement has been sufficiently blended with the soil to prevent the formation of cement balls when water is applied. Determine moisture content of the mixture immediately after completion of mixing of the soil and cement. Provide water supply and pressure distributing equipment that will permit the application within three (3) hours of all mixing water on the section being processed. Incorporate water in the mix so that concentration of water near the surface does not occur. After all mixing water has been applied, continue mixing until the water is uniformly distributed throughout the full depth of the mixture. Do not apply cement if the soil moisture content exceeds the optimum moisture content specified for the cement-treated mixture. After mixing is complete, the proportions of the mixture shall be in accordance with the approved mix design.

**220-4.8 Compaction.** Compaction of the course shall begin within 30 minutes after mixing the cement into the subgrade. All compaction operations shall be completed within 2 hours from the start of mixing.

The field density of the compacted mixture shall be at least 98% of the maximum density as determined by ASTM D558. The in-place moisture content shall be determined in accordance with ASTM D2216. The moisture content of the mixture at the start of compaction shall be within  $\pm 2$  percentage points of the optimum moisture content. Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

**220-4.9 Finishing and curing.** After the final lift or course of treated subgrade has been compacted, it shall be brought to the required lines and grades in accordance with the typical sections.

Finished portions of treated subgrade shall be protected to prevent equipment from marring, permanently deforming, or damaging completed work.

Not later than 24 hours after completion of final finishing, the surface shall be cured by application of an emulsified asphalt uniformly applied to the surface of the completed base course at the rate of approximately 0.2 gallons per square yard (0.91 l/m<sup>2</sup>). The curing material shall be maintained and applied as needed by the Contractor during the 7-day protection period.

Sufficient protection from freezing shall be provided for at least 7 days after its construction or as approved by the Program Manager.

**220-4.10 Construction limitations.** At the end of each day's construction and/or when operations after application of the cement are interrupted for more than 30 minutes, a straight transverse construction joint shall be formed by a header or by cutting back into the compacted material to form a true vertical face.

Completed portions may be opened to light traffic, if approved by the Program Manager, and provided the curing is not impaired.

**220-4.11 Surface tolerance.** In those areas on which a subbase or base course is to be placed, the surface shall be tested for smoothness and accuracy of grade and crown. Any portion lacking the required smoothness or failing in accuracy of grade or crown shall be scarified to a depth of at least 3 inches (75 mm), reshaped and re-compacted to grade until the required smoothness and accuracy are obtained and approved by the Program Manager. The Contractor shall perform all final smoothness and grade checks in the presence of the Program Manager. 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  $\pm 3/8$  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  $\pm 0.05$  feet (15 mm) of the specified grade.

**220-4.12 Acceptance sampling and testing.** Cement Treated Solid Base course shall be accepted for density and thickness on an area basis. Two test will be made for density and thickness for each 1200 square yards, but not less than four (4) tests per day of production. Sampling locations will be determined on a random basis per ASTM D3665.

**a. Density.** The Program Manager shall perform all density tests.

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. The in-place moisture content shall be determined in accordance with ASTM D2216. Perform in-place density test immediately after completion of compaction to determine degree of compaction. Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified. If the specified density is not attained, the area represented by the failed test must be reworked and/or recompacted at the Contractor's expense 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 Program Manager for each subplot. Where the thickness is deficient by more than  $1/2$ -inch (12 mm), the material shall be removed to full depth and replaced, at Contractor's expense.

## METHOD OF MEASUREMENT

**220-5.1** The quantity of cement treated soil base course shall be the number of square yards (square meter) of completed and accepted base course.

### BASIS OF PAYMENT

**220-6.1** Payment shall be made at the contract unit price per square yard (m<sup>2</sup>) for cement treated soil base course. This price shall be full compensation for furnishing all materials including cement and asphaltic curing material, and for all preparation, delivering, placing, and mixing of these materials; and for all labor, equipment, tools and incidentals necessary to complete the item.

Payment will be made under:

Item P-220-6.1	Cement treated subgrade (12" thick)- per square yard
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### REFERENCES

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

ASTM International (ASTM)

ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C150	Standard Specification for Portland Cement
ASTM C1602	Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
ASTM C1632	Standard Practice for Making and Curing Soil-Cement Compression and Flexure Test Specimens in the Laboratory <sup>1</sup>
ASTM C1633	Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders
ASTM D558	Standard Test Methods for Moisture-Density (Unit Weight) Relations of Soil-Cement Mixtures
ASTM D559	Standard Test Methods for Wetting and Drying Compacted Soil-Cement Mixtures
ASTM D560	Standard Test Methods for Freezing and Thawing Compacted Soil-Cement Mixtures
ASTM D977	Standard Specification for Emulsified Asphalt
ASTM D1556	Standard Test Method for Density and Unit Weight of Soil In-Place by the Sand Cone Method
ASTM D2027	Standard Specification for Cutback Asphalt (Medium-Curing Type)
ASTM D2028	Standard Specification for Cutback Asphalt (Rapid-Curing Type)
ASTM D2397	Standard Specification for Cationic Emulsified Asphalt
ASTM D2487	Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D6938	Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

**END OF ITEM P-220**

**ITEM P-304****CEMENT-TREATED AGGREGATE BASE COURSE (CTB)****DESCRIPTION****304-1.1**

This item shall consist of a cement-treated base (CTB) course composed of mineral aggregate and cement, uniformly blended and mixed with water. The mixed material shall be spread and shaped with a mechanical spreader, and compacted with rollers in accordance with these specifications and in conformance to the lines, grades, dimensions, and cross-sections shown on the plans.

**MATERIALS****304-2.1 AGGREGATE**

The aggregate shall be select granular materials, comprised of crushed or uncrushed gravel and/or stone, or recycled cement concrete. The material shall be free of roots, sod, and weeds. The crushed or uncrushed aggregate shall consist of hard, durable particles meeting the requirements in the table below.

**CEMENT TREATED AGGREGATE BASE MATERIAL REQUIREMENTS**

<b>Material Test</b>	<b>Requirement</b>	<b>Standard</b>
<b>Coarse Aggregate Portion (retained on the No. 4 (4.75 mm) sieve)</b>		
Resistance to Degradation	Loss: 40% maximum	ASTM C131
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
Flat Particles, Elongated Particles, or Flat and Elongated Particles <sup>1</sup>	10% maximum, by weight, for fraction retained on the 1/2-inch (12.5mm) sieve and 10% maximum, by weight, for the fraction passing the 1/2-inch (12.5 mm) sieve	ASTM D4791
Clay lumps and friable particles	Less than or equal to 3 percent	ASTM C142
<b>Fine Aggregate Portion (Passing the No. 40 (425µm) sieve)</b>		
Liquid limit	Less than or equal to 25	ASTM D4318
Plasticity Index	Not more than 6	ASTM D4318

<sup>1</sup> A flat particle is one having a ratio of width to thickness greater than five (5); an elongated particle is one having a ratio of length to width greater than five (5).

**304-2.2 GRADATION REQUIREMENTS**

The aggregate shall conform to the gradation(s) shown in the table below per ASTM C136. A dense, well-graded aggregate blend that meets the requirements of the table shall be selected by the Contractor and used in the final mix design. The final aggregate blend shall be well graded from coarse to fine within the limits designated in the table and shall not vary from the low limit on one sieve to the high limit on adjacent sieves, or vice versa.

**AGGREGATE GRADATION FOR CTB MATERIAL**

<b>Sieve Size</b>	<b>Design Range Percentage by Weight Passing</b>	<b>Contractor's Final Gradation</b>	<b>Job Control Grading Band Tolerances for Contractor's Final Gradation (%)</b>
2 inch (50 mm)	100		±0
1 inch (25.0 mm)	90-100		±5
No. 4 (4.75 mm)	45-95		±8
No. 10 (2.00 mm)	37-80		±8
No. 40 (425 µm)	15-50		±5
No. 200 (75 µm)	0-15		±3

For Contractor quality control, sample the aggregate stockpile in accordance with ASTM D75 and perform gradation tests in accordance with ASTM C136 a minimum of once per week during production of CTB.

**304-2.3 SAMPLING AND TESTING**

- a. **Aggregate base materials.** The Contractor shall take samples of the aggregate base stockpile in accordance with ASTM D75 to verify initial aggregate base requirements and gradation. Material shall meet the requirements in paragraphs 304-2.1 and 304-2.2. This sampling and testing will be the basis for approval of the aggregate base quality requirements.

**304-2.4 CEMENT**

Cement shall conform to the requirements of ASTM C150, Type I/II, low alkali (less than 0.6% equivalent alkali) or ASTM C595 Type IL low reactivity option.

**304-2.5 NOT USED****304-2.6 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.

**304-2.7 CURING MATERIALS**

Curing material shall be: 1.) a white-pigmented, liquid membrane-forming compound conforming to ASTM C309, Type 2, Class A or Class B (wax-based) where placed under concrete pavement, or 2.) an emulsified asphalt conforming to ASTM D977 where placed under asphalt pavement.

**304-2.8 SAND BLOTTER**

Sand shall be applied, when required, to prevent tracking of the emulsion curing materials. The sand material shall be clean, dry, and non-plastic.

**COMPOSITION OF MIXTURE****304-3.1 GENERAL**

The CTB material shall be composed of a mixture of aggregate, cementitious material, and water. Fly ash or slag cement may be used as a partial replacement for cement.

### **304-3.2 MIX DESIGN**

The mix design shall use a cement content that, when tested in the laboratory per ASTM D1633, produces a 7-day compressive strength between 300 pounds per square inch minimum and 750 pounds per square inch maximum. Avoid higher strengths due to potential to cause shrinkage and reflective cracks.

Wet-dry and/or freeze-thaw tests shall be performed in accordance with ASTM D559 and ASTM D560 respectively. The weight loss for each type of test shall not exceed 14% after 12 cycles.

The mix design shall include a complete list of materials, including type, brand, source, and amount of cement, fine aggregate, coarse aggregate, water, and cementitious additives.

Should a change be made in aggregate sources or type of cement, or if cementitious additives are added or deleted from the mix, production of the CTB mix shall be stopped and a new mix design shall be submitted

### **304-3.3 SUBMITTALS**

At least 30 days prior to the placement of the CTB, the Contractor shall submit certified test reports to the Program Manager for those materials proposed for use during construction, as well as the mix design information for the CTB material. Tests older than six (6) months shall not be used. The certification shall show the ASTM or AASHTO specifications or tests for the material, the name of the company performing the tests, the date of the tests, the test results, and a statement that the material did or did not comply with the applicable specifications. The submittal package shall include the following:

- a. Source(s) of materials, including aggregate, cement, cementitious additives, curing, and bond-breaking materials.
- b. Physical properties of the aggregates, cement, cementitious additives, curing, and bond-breaking materials.
- c. Mix design:
  - Mix identification number
  - Aggregate gradation
  - Cement content
  - Water content
  - Cementitious materials content
  - Compaction and strength results
  - Laboratory compaction characteristics (maximum dry density and optimum moisture content)
  - Compressive strength at seven (7) days
  - Wet-dry and/or freeze thaw weight loss

No CTB material shall be placed until the submittal is accepted in writing by the Program Manager.

During production, the Contractor shall submit batch tickets for each delivered load.

## **EQUIPMENT**

### **304-4.1 MIXING**

The mixer shall be a batch or continuous-flow type stationary mixer that produces a well-blended, uniform mixture of aggregate, cement, water, and pozzolan. The mixer shall be equipped with



calibrated metering and feeding devices that introduce the aggregate, cement, water, and cementitious additives (if used) into the mixer in the specified quantities.

The Program Manager shall have free access to the plant at all times for inspection of the plant's equipment and operation and for sampling the CTB mixture.

#### **304-4.2 HAULING**

The CTB material shall be transported from the plant to the job site in trucks or other hauling equipment having beds that are smooth, clean, and tight. Truck bed covers shall be provided and used to protect the CTB from weather. CTB material that becomes wet during transport shall be rejected.

#### **304-4.3 PLACING**

CTB material shall be placed with a mechanical spreader capable of receiving, spreading, and shaping the mixture without segregation into a uniform layer or lift. The equipment shall be equipped with a strike-off plate and end gates capable of being adjusted to the layer thickness and width.

#### **304-4.4 COMPACTION**

The number, type, and weight of rollers and/or compactors shall be sufficient to compact the mixture to the required density.

### **CONSTRUCTION METHODS**

#### **304-5.1 CONTROL STRIP**

The first half-day of construction shall be considered the control strip. The Contractor shall demonstrate, in the presence of the Program Manager, that the materials, equipment, and construction processes meet the requirements of the specification. 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 Program Manager. Upon acceptance of the control strip by the Program Manager, 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 Program Manager.

#### **304-5.2 WEATHER LIMITATIONS**

The CTB shall not be placed on frozen surfaces or when weather conditions will detrimentally affect quality of the finished course. Apply cement when the ambient temperature is a minimum of 40°F and rising and aggregate are not frozen or contain frost. If ambient temperature falls below 40°F protect completed CTB areas against freezing.

The Contractor should stop operations prior to and during rain allowing time to cover and protect any freshly placed material. Areas damaged by rain shall be replaced at the Contractor's expense.

#### **304-5.3 MAINTENANCE**

Completed portions of the cement-stabilized area may be opened to local traffic provided the curing process is not impaired and to other traffic after the curing period has elapsed, provided that the cement-stabilized course has hardened sufficiently to prevent surface marring or distortion by equipment or traffic. Protect finished portions of cement stabilized base from traffic of equipment used in constructing adjoining sections in a manner to prevent marring or damaging completed work. The CTB shall be protected from freezing until covered.

#### **304-5.4 PREPARATION OF UNDERLYING COURSE**

The underlying course shall be checked by the Program Manager before placing and spreading operations are started. Prior to placing the material, the final grade should be firm, moist and free of frost. Use of chemicals to eliminate frost will not be permitted. The underlying course shall be wetted in advance of placing the CTB layer.

#### **304-5.5 GRADE CONTROL**

Grade control between the edges of the CTB shall be accomplished at intervals of 50 feet on the longitudinal grade and at 25 feet on the transverse grade.

#### **304-5.6 PLACING**

The CTB mixture shall be deposited on the moistened subgrade or subbase and spread into a uniform layer of specified width and thickness that, when compacted and trimmed, conforms to the required line, grade, and cross-section. The longitudinal joints shall be located so there is 1) no offset, when concrete surface layer, or 2) a 2 foot minimum offset, when asphalt surface layer, from planned joints in any overlying layer. Placement of the material shall begin along the centerline of the pavement on a crowned section or on the highest elevation contour of a pavement with variable cross slope.

The Contractor shall install the CTB layer in single compacted layer no greater than 8 inches thick.

#### **304-5.7 COMPACTION**

All compaction operations shall be completed within 2 hours from the start of mixing. The field density of the compacted mixture shall be at least 98% of the maximum density in accordance with paragraph 304-6.1a. At the start of compaction, the moisture content shall be within  $\pm 2$  percentage points of the specified optimum moisture. Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

#### **304-5.8 FINISHING**

After compaction, shape the surface of the CTB layer to the specified lines, grades, and cross-section. During the finishing process, the surface shall be kept moist by means of fog-type sprayers. Compaction and finishing shall produce a smooth, dense surface, free of ruts, cracks, ridges, and loose material.

#### **304-5.9 CONSTRUCTION LIMITATIONS**

All placement, compaction, and finishing operations shall be completed within two (2) hours from the start of mixing. Material not completed within the 2-hour time limit shall be removed and replaced at the Contractor's expense.

At the end of each day's construction and/or when operations are interrupted for more than 30 minutes, a straight transverse construction joint shall be formed by a header or by cutting back into the compacted material to form a true vertical face.

Completed portions may be opened to light traffic, if approved by the Program Manager, and provided the curing is not impaired.

#### **304-5.10 CURING**

The compacted and finished CTB shall be cured with the approved curing agents as soon as possible, but in no case later than two (2) hours after completion of the finishing operations. Curing material(s) shall meet the requirements in paragraph 304-2.7. The layer shall be kept moist using a moisture-retaining cover or a light application of water until the curing material is applied.

- a. **Under concrete.** The surface of the CTB layer shall be uniformly sprayed with a liquid membrane-forming curing compound at the rate of one gallon to not more than 100 square feet to obtain a uniform cover over the surface. Hand spraying of odd widths or shapes and CTB surfaces exposed by the removal of forms is permitted.
- b. **Under asphalt.** The entire surface of the CTB layer shall be uniformly sprayed with an asphalt emulsion at a rate of between 0.15 and 0.30 gallons per square yard; the exact temperature and rate of application being that required to achieve complete and uniform coverage without runoff. Apply sand at  $\pm 5$  pounds per square yard, as necessary, to treated surfaces requiring protection from traffic.

The curing seal shall be maintained and protected until the pavement is placed. If the surface of the finished CTB and/or the curing seal becomes damaged, additional curing material shall be applied at the time it is damaged or when the damage is first observed.

### 304-5.11 SURFACE TOLERANCE

The Contractor shall perform smoothness and grade checks in the presence of the Program Manager. Any area not meeting smoothness and grade shall be corrected by the Contractor at the Contractor's expense.

- a. **Smoothness.** The finished surface shall not vary more than  $\pm 3/8$ -inch when tested with a 12-foot straightedge applied parallel with and at right angles to the centerline, and, moved continuously forward at half the length of the 12-foot straightedge for the full length of each line on a 50-foot grid.
- b. **Grade.** The grade shall be measured on a 50-foot grid and shall be within  $\pm 0.05$  feet of the specified grade.

### 304-5.12 BOND-BREAKER

Where placed under concrete, the surface of the CTB shall be coated with a de-bonding material applied in a quantity sufficient to prevent bonding of the concrete pavement to the base course. The Contractor shall be responsible for selecting the de-bonding material and application rate. The de-bonding material shall be approved by the Program Manager.

## MATERIAL ACCEPTANCE

### 304-6.1 ACCEPTANCE SAMPLING AND TESTING

Cement Treated 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 1,200 square yards, but not less than four (4) tests per day of production. Sampling locations will be determined on a random basis per ASTM D3665.

- a. **Density testing.** CTB samples representing the material placed shall be taken to establish density and moisture requirements in accordance with ASTM D558. Additional CTB samples will be taken as necessary to verify density and moisture requirements. The Contractor shall perform all quality control density tests. Quality assurance testing will be performed by the Program Manager.

Each area shall be accepted for density when the field density is at least 98% of the maximum density of laboratory specimens. The in-place field density shall be determined in accordance with ASTM D6938, Procedure A, direct transmission method. The in-place moisture content shall be determined in accordance with ASTM D2216. Perform in-place density test immediately after completion of compaction to determine degree of compaction. If the material fails to meet the density requirements, compaction shall continue or the material shall be

removed and replaced at the Contractor's expense. Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

- b. Thickness.** Thickness shall be determined by measuring the depth of core holes in the CTB at random locations, per ASTM D3665. Quality assurance testing will be performed by the Program Manager. The resulting core holes shall be filled by the Contractor with CTB or non-shrink grout.

When the thickness measurement is deficient by more than 1/2 inch, the area represented by the tests shall be removed and replaced at the Contractor's expense.

## METHOD OF MEASUREMENT

### 304-7.1

The quantity of cement-treated base course will be determined by measurement of the number of square yards of CTB actually constructed and accepted by the Program Manager as complying with the plans and specifications.

## BASIS OF PAYMENT

### 304-8.1

Payment shall be made at the contract unit price per square yard for cement-treated base course. This price shall be full compensation for furnishing all materials, including cement; for all preparation, manipulation, placing, and curing of these materials; and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item L-304-8.1	Cement-Treated Base Course (8-inch thick) – per square yard
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## REFERENCES

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

ASTM International (ASTM)

ASTM C88	Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
ASTM C150	Portland Cement
ASTM C131	Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C136	Sieve or Screen Analysis of Fine and Coarse Aggregate
ASTM C174	Measuring Thickness of Concrete Elements Using Drilled Concrete Cores
ASTM C309	Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C595	Blended Hydraulic Cements
ASTM C618	Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete

ASTM C989	Slag Cement for Use in Concrete and Mortars
ASTM C1602	Mixing Water Used in the Production of Hydraulic Cement Concrete
ASTM D75	Sampling Aggregates
ASTM D558	Moisture-Density (Unit Weight) Relations of Soil-Cement Mixtures
ASTM D559	Wetting and Drying Compacted Soil-Cement Mixtures
ASTM D560	Freezing and Thawing Compacted Soil-Cement Mixtures
ASTM D977	Emulsified Asphalt
ASTM D1633	Compressive Strength of Molded Soil-Cement Cylinders
ASTM D2397	Cationic Emulsified Asphalt
ASTM D3665	Random Sampling of Construction Materials
ASTM D3666	Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials
ASTM D4318	Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D6938	In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

**END OF ITEM P-304**

**ITEM P-401**  
**HOT MIX ASPHALT (HMA)**

**DESCRIPTION**

**401-1.1**

This item shall consist of pavement courses composed of mineral aggregate and asphalt binder mixed in a central mixing plant and placed on a prepared base or stabilized course in accordance with these specifications and shall conform to the lines, grades, thicknesses, and typical cross-sections shown on the plans. Each course shall be constructed to the depth, typical section, and elevation required by the plans and shall be rolled, finished, and approved before the placement of the next course.

**MATERIALS**

**401-2.1 AGGREGATE**

Aggregates shall consist of crushed stone, crushed gravel, crushed slag, screenings, natural sand, and mineral filler, as required. The aggregates should have no known history of detrimental pavement staining due to ferrous sulfides, such as pyrite. Coarse aggregate is the material retained on the No. 4 sieve. Fine aggregate is the material passing the No. 4 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.

**COURSE AGGREGATE MATERIAL REQUIREMENTS**

<b>Material Test</b>	<b>Requirement</b>	<b>Standard</b>
Resistance to Degradation	Loss: 40% maximum	ASTM C131
Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate	Loss after 5 cycles: 12% maximum using Sodium sulfate - <b>or</b> - 18% maximum using magnesium sulfate	ASTM C88
Clay lumps and friable particles	0.3% maximum	ASTM C142
Percentage of Fractured Particles	Minimum 75% by weight of particles with at least two fractured faces and 85% with at least one fractured face <sup>1</sup>	ASTM D5821
Flat, Elongated, or Flat and Elongated Particles	8% maximum, by weight, of flat, elongated, or flat and elongated particles at 5:1 <sup>2</sup>	ASTM D4791
Bulk density of slag <sup>3</sup>	Weigh not less than 70 pounds per cubic foot	ASTM C29

<sup>1</sup> The area of each face shall be equal to at least 75% of the smallest mid-sectional area of the piece. When two fractured faces are contiguous, the angle between the planes of fractures shall be at least 30 degrees to count as two fractured faces.

<sup>2</sup> A flat particle is one having a ratio of width to thickness greater than five (5); an elongated particle is one having a ratio of length to width greater than five (5).

<sup>3</sup> Only required if slag is specified.

**b. Fine Aggregate.** Fine aggregate shall consist of clean, sound, tough, durable, angular shaped particles produced by crushing stone, slag, or gravel and shall be free from coatings of clay, silt, or other objectionable matter. Natural (non-manufactured) sand may be used to obtain

the gradation of the fine aggregate blend or to improve the workability of the mix. Fine aggregate material requirements are listed in the table below.

#### FINE AGGREGATE MATERIAL REQUIREMENTS

Material Test	Requirement	Standard
Liquid Limit	25 maximum	ASTM D4318
Plasticity Index	4 maximum	ASTM D4318
Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate	Loss after 5 cycles: 10% maximum using Sodium sulfate - or - 15% maximum using magnesium sulfate	ASTM C88
Clay lumps and friable particles	0.3% maximum	ASTM C142
Sand equivalent	45 minimum	ASTM D2419
Natural Sand	0% to 15% maximum by weight of total aggregate	ASTM D1073

c. **Sampling.** ASTM D 75 shall be used in sampling coarse and fine aggregate.

#### 401-2.2 MINERAL FILLER

Mineral filler (baghouse fines) may be added in addition to material naturally present in the aggregate. Mineral filler shall meet the requirements of ASTM D242.

#### MINERAL FILLER REQUIREMENTS

Material Test	Requirement	Standard
Plasticity Index	4 maximum	ASTM D4318

#### 401-2.3 ASPHALT BINDER

Asphalt binder shall conform to ASTM D6373 Performance Grade (PG) 76-22.

#### ASPHALT BINDER PG PLUS TEST REQUIREMENTS

Material Test	Requirement	Standard
Elastic Recovery	75% minimum	ASTM D6084 <sup>1</sup>

<sup>1</sup> Follow procedure B on RTFO aged binder.

#### 401-2.4 ANTI-STRIPPING AGENT

Any anti-stripping agent or additive (anti-strip) shall be heat stable and shall not change the asphalt binder grade beyond specifications. Anti-strip shall be an approved material of the Department of Transportation of the State in which the project is located.

## **COMPOSITION**

### **401-3.1 COMPOSITION OF MIXTURE(S)**

The asphalt mix shall be composed of a mixture of aggregates, filler and anti-strip agent if required, and asphalt binder. The aggregate fractions shall be sized, handled in separate size groups, and combined in such proportions that the resulting mixture meets the grading requirements of the job mix formula (JMF).

### **401-3.2 JOB MIX FORMULA (JMF) LABORATORY**

The laboratory used to develop the JMF shall possess a current certificate of accreditation, listing D3666 from a national accrediting authority and all test methods required for developing the JMF; and be listed on the accrediting authority's website. A copy of the laboratory's current accreditation and accredited test methods shall be submitted to the Program Manager prior to start of construction.

### **401-3.3 JOB MIX FORMULA (JMF)**

No asphalt mixture shall be placed until an acceptable mix design has been submitted to the Program Manager for review and accepted in writing. The Program Manager's review shall not relieve the Contractor of the responsibility to select and proportion the materials to comply with this section.

When the project requires asphalt mixtures of differing aggregate gradations and/or binders, a separate JMF shall be submitted for each mix. Add anti-stripping agent to meet tensile strength requirements.

The JMF shall be prepared by an accredited laboratory that meets the requirements of paragraph 401-3.2. The asphalt mixture shall be designed using procedures contained in Asphalt Institute MS-2 Mix Design Manual, 7th Edition. Samples shall be prepared and compacted using a Marshall compactor in accordance with ASTM D6926.

Should a change in sources of materials be made, a new JMF must be submitted to the Program Manager for review and accepted in writing before the new material is used. After the initial production JMF has been approved by the Program Manager 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 Program Manager, will be borne by the Contractor.

The Program Manager may request samples at any time for testing, prior to and during production, to verify the quality of the materials and to ensure conformance with the applicable specifications.

The JMF shall be submitted in writing by the Contractor at least 30 days prior to the start of paving operations. The JMF shall be developed within the same construction season using aggregates proposed for project use.

The JMF shall be dated, and stamped or sealed by the responsible professional Engineer of the laboratory and shall include the following items as a minimum:

- a. Manufacturer's Certificate of Analysis (COA) for the asphalt binder used in the JMF in accordance with paragraph 401-2.3. Certificate of asphalt performance grade is with modifier already added, if used and must indicate compliance with ASTM D6373. For plant modified asphalt binder, certified test report indicating grade certification of modified asphalt binder.
- b. Manufacturer's Certificate of Analysis (COA) for the anti-stripping agent if used in the JMF in accordance with paragraph 401-2.4.
- c. Certified material test reports for the course and fine aggregate and mineral filler in accordance with paragraphs 401-2.1.
- d. 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.

- e. Specific Gravity and absorption of each coarse and fine aggregate.
- f. Percent natural sand.
- g. Percent fractured faces.
- h. Percent by weight of flat particles, elongated particles, and flat and elongated particles (and criteria).
- i. Percent of asphalt.
- j. Number of blows or gyrations
- k. Laboratory mixing and compaction temperatures.
- l. Supplier-recommended field mixing and compaction temperatures.
- m. Plot of the combined gradation on a 0.45 power gradation curve.
- n. 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.
- o. Tensile Strength Ratio (TSR).
- p. Type and amount of Anti-strip agent when used.
- q. Asphalt Pavement Analyzer (APA) results.
- r. Date the JMF was developed. Mix designs that are not dated or which are from a prior construction season shall not be accepted.
- s. Percentage and properties (asphalt content, asphalt binder properties, and aggregate properties) of reclaimed asphalt mix pavement (RAP) in accordance with paragraph 401-3.4.

**TABLE 1. ASPHALT DESIGN CRITERIA**

Test Property	Value	Test Method
Number of blows or gyrations	75	
Air voids (%)	3.5	ASTM D3203
Percent voids in mineral aggregate (VMA), minimum	See Table 2	ASTM D6995
Tensile Strength Ratio (TSR) <sup>1</sup>	not less than 80 at a saturation of 70-80%	ASTM D4867
Asphalt Pavement Analyzer (APA) <sup>2</sup>	Less than 10mm @ 4000 passes	AASHTO T340 at 250 psi hose pressure at 64°C test temperature

<sup>1</sup> Test specimens for TSR shall be compacted at  $7 \pm 1.0$  % air voids. In areas subject to freeze-thaw, use freeze-thaw conditioning in lieu of moisture conditioning per ASTM D4867.

- <sup>2</sup> AASHTO T340 at 100 psi hose pressure at 64°C test temperature may be used in the interim. If this method is used the required Value shall be less than 5 mm @ 8000 passes.

The mineral aggregate shall be of such size that the percentage composition by weight, as determined by laboratory sieves, will conform to the gradation or gradations specified in Table 2 when tested in accordance with ASTM C136 and ASTM C117.

The gradations in Table 2 represent the limits that shall determine the suitability of aggregate for use from the sources of supply; be well graded from coarse to fine and shall not vary from the low limit on one sieve to the high limit on the adjacent sieve, or vice versa.

**TABLE 2. AGGREGATE – ASPHALT PAVEMENTS**

<b>Sieve Size</b>	<b>Percentage by Weight Passing Sieve</b>
1 inch	--
3/4 inch	100
1/2 inch	90 – 100
3/8 inch	72 – 88
No. 4	53 – 73
No. 8	38 – 60
No. 16	26 – 48
No. 30	18 – 38
No. 50	11 – 27
No. 100	6 – 18
No. 200	3 – 6
<b>Minimum Voids in Mineral Aggregate (VMA)<sup>1</sup></b>	15.0
<b>Asphalt percent:</b>	
Stone or gravel	5.0 – 7.5
Slag	6.5 – 9.5
<b>Recommended Minimum Construction Lift Thickness</b>	2 inch

- <sup>1</sup> To achieve minimum VMA during production, the mix design needs to account for material breakdown during production.

#### **401-3.4 RECYCLED ASPHALT PAVEMENT (RAP)**

Reclaimed asphalt shall consist of reclaimed asphalt pavement (RAP), coarse aggregate, fine aggregate, mineral filler, and asphalt. The RAP shall be of a consistent gradation and asphalt content and properties. When RAP is fed into the plant, the maximum RAP size shall not exceed one inch. The reclaimed asphalt pavement mix shall be designed using procedures contained in the Asphalt Institute MS-2 Mix Design Manual, 7th Edition. The percentage of asphalt in the RAP shall be established for the mixture design according to ASTM D2172 using the appropriate dust correction procedure. The JMF shall meet the requirements of paragraph 401-3.3. **RAP shall only be used for shoulder surface course mixes.** The amount of RAP shall be limited to 30 percent. In addition to the requirements of paragraph 401-3.3, the JMF shall indicate the percent of reclaimed asphalt pavement and the percent and grade of new asphalt binder. For the PG graded asphalt binder selected in 401-2.3, adjust as follows:

- a. For 0-20% RAP, there is no change in virgin asphalt binder content.

- b. For >20 to 30% RAP, select asphalt binder one grade softer, i.e., PG 64-22 would soften to PG 58-28.

RAP containing Coal Tar shall not be used. Coal Tar surface treatments must be removed prior to recycling underlying asphalt material.

Recycled asphalt shingles (RAS) shall not be used.

#### **401-3.5 CONTROL STRIP**

Full production shall not begin until an acceptable control strip has been constructed and accepted in writing by the Program Manager. The Contractor shall prepare and place a quantity of asphalt according to the JMF. The underlying grade or pavement structure upon which the control strip is to be constructed shall be the same as the remainder of the course represented by the control strip.

The Contractor will not be allowed to place the control strip until the Contractor quality control program (CQCP), showing conformance with the requirements of paragraph 401-5.1, has been accepted, in writing, by the Program Manager.

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 401-4.14 using the same procedure that will be used during production. The cold joint for the control strip will be an exposed construction joint at least four (4) hours old or when the mat has cooled to less than 160°F (71°C). The equipment used in construction of the control strip shall be the same type, configuration and weight to be used on the project.

The control strip will be considered acceptable by the Program Manager if the gradation, asphalt content, and VMA are within the action limits specified in paragraph 401-5.5a; and Mat density greater than or equal to 94.5%, air voids 3.5% +/- 1%, and joint density greater than or equal to 92.5%.

If the control strip is unacceptable, necessary adjustments to the JMF, plant operation, placing procedures, and/or rolling procedures shall be made and another control strip shall be placed. Unacceptable control strips shall be removed at the Contractor's expense.

The control strip will be considered one lot for payment based upon the average of a minimum of 3 samples (no sublots required for control strip). Payment will only be made for an acceptable control strip in accordance with paragraph 401-8.1 using a lot pay factor equal to 100.

### **CONSTRUCTION METHODS**

#### **401-4.1 WEATHER LIMITATIONS**

The asphalt shall not be placed upon a wet surface or when the surface temperature of the underlying course is less than specified in Table 4. The temperature requirements may be waived by the Program Manager, if requested; however, all other requirements including compaction shall be met.

**TABLE 4. SURFACE TEMPERATURE LIMITATIONS OF UNDERLYING COURSE**

Test Property	Value	Test Method
	°F	°C
3 inches or greater	40	4
Greater than 2 inches But less than 3 inches	45	7

#### **401-4.2 ASPHALT PLANT**

Plants used for the preparation of asphalt shall conform to the requirements of American Association of State Highway and Transportation Officials (AASHTO) M156 including the following items. Requirements for all plants include:

- (a) **Inspection of Plant.** The Program Manager, or Program Manager'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 Program Manager determines there is an excessive heat loss, segregation, or oxidation of the asphalt mixture due to temporary storage, temporary storage shall not be allowed.

#### **401-4.3 AGGREGATE STOCKPILE MANAGEMENT**

Aggregate stockpiles shall be constructed in a manner that prevents segregation and intermixing of deleterious materials. Aggregates from different sources shall be stockpiled, weighed and batched separately at the asphalt batch plant. Aggregates that have become segregated or mixed with earth or foreign material shall not be used.

A continuous supply of materials shall be provided to the work to ensure continuous placement.

#### **401-4.4 HAULING EQUIPMENT**

Trucks used for hauling asphalt shall have tight, clean, and smooth metal beds. To prevent the asphalt from sticking to the truck beds, the truck beds shall be lightly coated with a minimum amount of paraffin oil, lime solution, or other material approved by the Program Manager. Petroleum products shall not be used for coating truck beds. Each truck shall have a suitable cover to protect the mixture from adverse weather. When necessary, to ensure that the mixture will be delivered to the site at the specified temperature, truck beds shall be insulated or heated and covers shall be securely fastened.

##### **401-4.4.1 MATERIAL TRANSFER VEHICLE (MTV)**

Material transfer vehicles used to transfer the material from the hauling equipment to the paver, shall use a self-propelled, material transfer vehicle with a swing conveyor that can deliver material to the paver without making contact with the paver. The MTV shall be able to move back and forth between the hauling equipment and the paver providing material transfer to the paver, while allowing the paver to operate at a constant speed. The Material Transfer Vehicle will have remixing and storage capability to prevent physical and thermal segregation. Use of a MTV is required for runway and taxiway construction on pavements designed for aircraft weighing 100,000 lbs. or more. The use of a MTV is optional for shoulder construction.

#### **401-4.5 ASPHALT PAVERS**

Asphalt pavers shall be self-propelled with an activated heated screed, capable of spreading and finishing courses of asphalt that will meet the specified thickness, smoothness, and grade. The paver shall have sufficient power to propel itself and the hauling equipment without adversely affecting the finished surface. The asphalt paver shall be equipped with a control system capable of automatically maintaining the specified screed grade and elevation.

If the spreading and finishing equipment in use leaves tracks or indented areas, or produces other blemishes in the pavement that are not satisfactorily corrected by the scheduled operations, the use of such equipment shall be discontinued.

The paver shall be capable of paving to a minimum width specified in paragraph 401-4.12.

**401-4.6 ROLLERS**

The number, type, and weight of rollers shall be sufficient to compact the asphalt to the required density while it is still in a workable condition without crushing of the aggregate, depressions or other damage to the pavement surface. Rollers shall be in good condition, clean, and capable of operating at slow speeds to avoid displacement of the asphalt. All rollers shall be specifically designed and suitable for compacting asphalt concrete and shall be properly used. Rollers that impair the stability of any layer of a pavement structure or underlying soils shall not be used.

**401-4.7 DENSITY DEVICE**

The Contractor shall have on site a density gauge during all paving operations in order to assist in the determination of the optimum rolling pattern, type of roller and frequencies, as well as to monitor the effect of the rolling operations during production paving. The Contractor shall supply a qualified technician during all paving operations to calibrate the gauge and obtain accurate density readings for all new asphalt. These densities shall be supplied to the Program Manager upon request at any time during construction. No separate payment will be made for supplying the density gauge and technician.

**401-4.8 PREPARATION OF ASPHALT BINDER**

The asphalt binder shall be heated in a manner that will avoid local overheating and provide a continuous supply of the asphalt binder to the mixer at a uniform temperature. The temperature of unmodified asphalt binder delivered to the mixer shall be sufficient to provide a suitable viscosity for adequate coating of the aggregate particles, but shall not exceed 325°F (160°C) when added to the aggregate. The temperature of modified asphalt binder shall be no more than 350°F (175°C) when added to the aggregate.

**401-4.9 PREPARATION OF MINERAL AGGREGATE**

The aggregate for the asphalt shall be heated and dried. The maximum temperature and rate of heating shall be such that no damage occurs to the aggregates. The temperature of the aggregate and mineral filler shall not exceed 350°F (175°C) when the asphalt binder is added. Particular care shall be taken that aggregates high in calcium or magnesium content are not damaged by overheating. The temperature shall not be lower than is required to obtain complete coating and uniform distribution on the aggregate particles and to provide a mixture of satisfactory workability.

**401-4.9 PREPARATION OF ASPHALT MIXTURE**

The aggregates and the asphalt binder shall be weighed or metered and mixed in the amount specified by the JMF. The combined materials shall be mixed until the aggregate obtains a uniform coating of asphalt binder and is thoroughly distributed throughout the mixture. Wet mixing time shall be the shortest time that will produce a satisfactory mixture, but not less than 25 seconds for batch plants. The wet mixing time for all plants shall be established by the Contractor, based on the procedure for determining the percentage of coated particles described in ASTM D2489, for each individual plant and for each type of aggregate used. The wet mixing time will be set to achieve 95% of coated particles. For continuous mix plants, the minimum mixing time shall be determined by dividing the weight of its contents at operating level by the weight of the mixture delivered per second by the mixer. The moisture content of all asphalt upon discharge shall not exceed 0.5%.

**401-4.11 APPLICATION OF PRIME AND TACK COAT**

Immediately before placing the asphalt mixture, the underlying course shall be cleaned of all dust and debris.

A prime coat in accordance with Item P-602 shall be applied to aggregate base prior to placing the asphalt

mixture.

A tack coat shall be applied in accordance with Item P-603 to all vertical and horizontal asphalt and concrete surfaces prior to placement of the first and each subsequent lift of asphalt mixture.

#### **401-4.11 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 Program Manager.

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 Program Manager that every lot of each lift meets the grade tolerances of paragraph 401-6.2d before the next lift can be placed.

Edges of existing asphalt pavement abutting the new work shall be saw cut and the cut off material and laitance removed. Apply a tack coat in accordance with P-603 before new asphalt material is placed against it.

The speed of the paver shall be regulated to eliminate pulling and tearing of the asphalt mat. Placement of the asphalt mix shall begin along the centerline of a crowned section or on the high side of areas with a one way slope unless shown otherwise on the laydown plan as accepted by the Program Manager. The asphalt mix shall be placed in consecutive adjacent lanes having a minimum width of 12 feet except where edge lanes require less width to complete the area. Additional screed sections attached to widen the paver to meet the minimum lane width requirements must include additional auger sections to move the asphalt mixture uniformly along the screed extension.

The longitudinal joint in one course shall offset the longitudinal joint in the course immediately below by at least one foot; however, the joint in the surface top course shall be at the centerline of crowned pavements. Transverse joints in one course shall be offset by at least 10 feet from transverse joints in the previous course. Transverse joints in adjacent lanes shall be offset a minimum of 10 feet (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 Program Manager 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 Program Manager, and if it can be demonstrated in the laboratory, in the presence of the Program Manager, 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 Program Manager, shall be removed and replaced at the Contractor's expense. The area shall be removed by saw cutting and milling a minimum of the construction lift thickness as specified in paragraph 401-3.3, Table 2 for the approved mix design. The area to be removed and replaced shall be a minimum width of the paver and a minimum of 10 feet long.

#### **401-4.12 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.

#### **401-4.13 JOINTS**

The formation of all joints shall be made to ensure a continuous bond between the courses and obtain the required density. All joints shall have the same texture as other sections of the course and meet the requirements for smoothness and grade.

The roller shall not pass over the unprotected end of the freshly laid asphalt except when necessary to form a transverse joint. When necessary to form a transverse joint, it shall be made by means of placing a bulkhead or by tapering the course. The tapered edge shall be cut back to its full depth and width on a straight line to expose a vertical face prior to placing the adjacent lane. In both methods, all contact surfaces shall be coated with an asphalt tack coat before placing any fresh asphalt against the joint.

Longitudinal joints which have been left exposed for more than four (4) hours; the surface temperature has cooled to less than 175°F (80°C); or are irregular, damaged, uncompacted or otherwise defective shall be cut back with a cutting wheel or pavement saw a maximum of 3 inches to expose a clean, sound, uniform vertical surface for the full depth of the course. All cutback material and any laitance produced from cutting joints shall be removed from the project. Asphalt tack coat in accordance with P-603 shall be applied to the clean, dry joint prior to placing any additional fresh asphalt against the joint. The cost of this work shall be considered incidental to the cost of the asphalt.

#### **401-4.15 SAW-CUT GROOVING**

Saw-cut grooving is not required.

#### **401-4.16 DIAMOND GRINDING**

Diamond grinding shall be completed prior to pavement grooving. Diamond grinding shall be accomplished by sawing with saw blades impregnated with industrial diamond abrasive.

Diamond grinding shall be performed with a machine designed specifically for diamond grinding capable of cutting a path at least 3 feet wide. The saw blades shall be 1/8-inch wide with a sufficient number of blades to create grooves between 0.090 and 0.130 inches wide; and peaks and ridges approximately 1/32 inch higher than the bottom of the grinding cut. The actual number of blades will be determined by the Contractor and depend on the hardness of the aggregate. Equipment or grinding procedures that cause ravels, aggregate fractures, spalls or disturbance to the pavement will not be permitted. Contractor shall demonstrate to the Program Manager that the grinding equipment will produce satisfactory results prior to making corrections to surfaces. Grinding will be tapered in all directions to provide smooth transitions to areas not requiring grinding. The slurry resulting from the grinding operation shall be continuously

removed and the pavement left in a clean condition. The Contractor shall apply a surface treatment per P-608 to all areas that have been subject to grinding.

#### **401-4.17 NIGHTTIME PAVING REQUIREMENTS**

The Contractor shall provide adequate lighting during any nighttime construction. A lighting plan shall be submitted by the Contractor and approved by the Program Manager prior to the start of any nighttime work. All work shall be in accordance with the approved CSPP and lighting plan.

### **CONTRACTOR QUALITY CONTROL**

#### **401-5.1 GENERAL**

The Contractor shall develop a Contractor Quality Control Program (CQCP) in accordance with Item C-100. No partial payment will be made for materials without an approved CQCP.

#### **401-5.2 CONTRATOR QUALITY CONTROL (QC) FACILITIES**

The Contractor shall provide or contract for testing facilities in accordance with Item C-100. The Program Manager shall be permitted unrestricted access to inspect the Contractor's QC facilities and witness QC activities. The Program Manager will advise the Contractor in writing of any noted deficiencies concerning the QC facility, equipment, supplies, or testing personnel and procedures. When the deficiencies are serious enough to be adversely affecting the test results, the incorporation of the materials into the work shall be suspended immediately and will not be permitted to resume until the deficiencies are satisfactorily corrected.

#### **401-5.3 CONTRACTOR QC TESTING**

The Contractor shall perform all QC tests necessary to control the production and construction processes applicable to these specifications and as set forth in the approved CQCP. The testing program shall include, but not necessarily be limited to, tests for the control of asphalt content, aggregate gradation, temperatures, aggregate moisture, field compaction, and surface smoothness. A QC Testing Plan shall be developed as part of the CQCP.

**a. Asphalt Content.** A minimum of two tests shall be performed per day in accordance with ASTM D6307 or ASTM D2172 for determination of asphalt content. When using ASTM D6307, the correction factor shall be determined as part of the first test performed at the beginning of plant production; and as part of every tenth test performed thereafter. The asphalt content for the day will be determined by averaging the test results.

**b. Gradation.** Aggregate gradations shall be determined a minimum of twice per day from mechanical analysis of extracted aggregate in accordance with ASTM D5444, ASTM C136, and ASTM C117.

**c. Moisture Content of Aggregate.** The moisture content of aggregate used for production shall be determined a minimum of once per day in accordance with ASTM C566.

**d. Moisture Content of Asphalt.** The moisture content shall be determined once per day in accordance with AASHTO T329 or ASTM D1461.

**e. Temperatures.** Temperatures shall be checked, at least four times per day, at necessary locations to determine the temperatures of the dryer, the asphalt binder in the storage tank, the asphalt at the plant, and the asphalt at the job site.

**f. In-Place Density Monitoring.** The Contractor shall conduct any necessary testing to ensure that the specified density is being achieved. A nuclear gauge may be used to monitor the pavement density in accordance with ASTM D2950.



**g. Smoothness for Contractor Quality Control.** The Contractor shall perform smoothness testing in transverse and longitudinal directions daily to verify that the construction processes are producing pavement with variances less than 1/4 inch in 12 feet, identifying areas that may pond water which could lead to hydroplaning of aircraft. If the smoothness criterion is not met, appropriate changes and corrections to the construction process shall be made by the Contractor before construction continues

The Contractor may use a 12-foot "straightedge", a rolling inclinometer meeting the requirements of ASTM E2133 or rolling external reference device that can simulate a 12-foot straightedge approved by the Program Manager. Straight-edge testing shall start with one-half the length of the straightedge at the edge of pavement section being tested and then moved ahead one-half the length of the straightedge for each successive measurement. Testing shall be continuous across all joints. The surface irregularity shall be determined by placing the freestanding (unleveled) straightedge on the pavement surface and allowing it to rest upon the two highest spots covered by its length, and measuring the maximum gap between the straightedge and the pavement surface in the area between the two high points. If the rolling inclinometer or external reference device is used, the data may be evaluated using either the FAA profile program, ProFAA, or FHWA ProVal, using the 12-foot straightedge simulation function.

Smoothness readings shall not be made across grade changes or cross slope transitions. The transition between new and existing pavement shall be evaluated separately for conformance with the plans.

**(1) Transverse measurements.** Transverse measurements shall be taken for each day's production placed. Transverse measurements shall be taken perpendicular to the pavement centerline each 50 feet or more often as determined by the Program Manager. The joint between lanes shall be tested separately to facilitate smoothness between lanes.

**(2) Longitudinal measurements.** Longitudinal measurements shall be taken for each day's production placed. Longitudinal tests shall be parallel to the centerline of paving; at the center of paving lanes when widths of paving lanes are less than 20 feet; and at the third points of paving lanes when widths of paving lanes are 20 ft. or greater. When placement abuts previously placed material the first measurement shall start with one half the length of the straight edge on the previously placed material.

Deviations on the final surface course in either the transverse or longitudinal direction that will trap water greater than 1/4 inch shall be corrected with diamond grinding per paragraph 401-4.16 or by removing and replacing the surface course to full depth. Grinding shall be tapered in all directions to provide smooth transitions to areas not requiring grinding. All areas in which diamond grinding has been performed shall be subject to the final pavement thickness tolerances specified in paragraph 401-6.1d(3). Areas that have been ground shall be sealed with a surface treatment in accordance with Item P-608. To avoid the surface treatment creating any conflict with runway or taxiway markings, it may be necessary to seal a larger area.

Control charts shall be kept to show area of each day's placement and the percentage of corrective grinding required. Corrections to production and placement shall be initiated when corrective grinding is required. If the Contractor's machines and/or methods produce significant areas that need corrective actions in excess of 10 percent of a day's production, production shall be stopped until corrective measures are implemented by the Contractor.

**h. Grade.** Grade shall be evaluated daily to allow adjustments to paving operations when grade measurements do not meet specifications. As a minimum, grade shall be evaluated prior to and after the placement of the first lift and after placement of the surface lift.

Measurements will be taken at appropriate gradelines (as a minimum at center and edges of paving lane) and longitudinal spacing as shown on cross-sections and plans. The final surface of the pavement will not vary from the gradeline elevations and cross-sections shown on the plans

by more than 1/2 inch vertically and 0.1 feet laterally. The documentation will be provided by the Contractor to the Program Manager 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 less than the thickness specified on the plans. Grinding shall be in accordance with paragraph 401-4.16.

The Contractor shall repair low areas or areas that cannot be corrected by grinding by removal of deficient areas to the depth of the final course plus 1/2 inch and replacing with new material. Skin patching is not allowed.

#### 401-5.4 SAMPLING

When directed by the Program Manager, the Contractor shall sample and test any material that appears inconsistent with similar material being sampled, unless such material is voluntarily removed and replaced or deficiencies corrected by the Contractor. All sampling shall be in accordance with standard procedures specified.

#### 401-5.5 CONTROL CHARTS

The Contractor shall maintain linear control charts for both individual measurements and range (i.e. difference between highest and lowest measurements) for aggregate gradation, asphalt content, and VMA. The VMA for each day will be calculated and monitored by the QC laboratory.

Control charts shall be posted in a location satisfactory to the Program Manager 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 Program Manager may suspend production or acceptance of the material.

**a. Individual Measurements.** Control charts for individual measurements shall be established to maintain process control within tolerance for aggregate gradation, asphalt content, and VMA. The control charts shall use the job mix formula target values as indicators of central tendency for the following test parameters with associated Action and Suspension Limits:

#### CONTROL CHART LIMITS FOR INDIVIDUAL MEASUREMENTS

<u>Sieve</u>	<u>Action Limit</u>	<u>Suspension Limit</u>
3/4 inch	±6%	±9%
1/2 inch	±6%	±9%
3/8 inch	±6%	±9%
No. 4	±6%	±9%
No. 16	±5%	±7.5%
No. 50	±3%	±4.5%
No. 200	±2%	±3%
<b>Asphalt Content</b>	±0.45%	±0.70%
<b>Minimum VMA</b>	-0.5%	-1.0%

**b. Range.** Control charts shall be established to control gradation process variability. The range

shall be plotted as the difference between the two test results for each control parameter. The Suspension Limits specified below are based on a sample size of  $n = 2$ . Should the Contractor elect to perform more than two tests per lot, the Suspension Limits shall be adjusted by multiplying the Suspension Limit by 1.18 for  $n = 3$  and by 1.27 for  $n = 4$ .

#### CONTROL CHART LIMITS BASED ON RANGE

<u>Sieve</u>	<u>Suspension Limit</u>
1/2 inch	±11%
3/8 inch	±11%
No. 4	±11%
No. 16	±9%
No. 50	±6%
No. 200	±3.5%
<b>Asphalt Content</b>	<b>±0.8%</b>

**c. Corrective Action.** The CQCP shall indicate that appropriate action shall be taken when the process is believed to be out of tolerance. The Plan shall contain rules to gauge when a process is out of control and detail what action will be taken to bring the process into control. As a minimum, a process shall be deemed out of control and production stopped and corrective action taken, if:

- (1) One point falls outside the Suspension Limit line for individual measurements or range; or
- (2) Two points in a row fall outside the Action Limit line for individual measurements.

#### 401-5.6 QUALITY CONTROL REPORTS

The Contractor shall maintain records and shall submit reports of QC activities daily, and in accordance with Item C-100.

#### MATERIAL ACCEPTANCE

##### 401-6.1 ACCEPTANCE SAMPLING AND TESTING

Unless otherwise specified, all acceptance sampling and testing necessary to determine conformance with the requirements specified in this section will be performed by the Program Manager at no cost to 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 D6926.

**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 Program Manager will cut minimum 5 inch diameter samples in accordance with ASTM D5361. The Contractor shall furnish all tools, labor, and materials for cleaning, and filling the cored pavement. Laitance produced by the coring operation shall be removed immediately after coring, and core holes shall be filled within one day after sampling in a manner acceptable to the Program Manager.

**(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 Program Manager to determine the extent of unbonded areas. Unbonded areas shall be removed by milling and replaced at no additional cost as directed by the Program Manager.

**(3) Thickness.** Thickness of each lift of surface course will be evaluated by the Program Manager 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 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 Program Manager to circumscribe the deficient area.

**(4) Mat Density.** One core shall be taken from each subplot. Core locations will be determined by the Program Manager in accordance with ASTM D3665. Cores for mat density shall not be taken closer than one foot from a transverse or longitudinal joint. The bulk specific gravity of each cored sample will be determined in accordance with ASTM D2726. The percent compaction (density) of each sample will be determined by dividing the bulk specific gravity of each subplot sample by the TMD for that subplot.

**(5) Joint Density.** One core centered over the longitudinal joint shall be taken for each subplot that has a longitudinal joint. Core locations will be determined by the Program Manager in accordance with ASTM D3665. The bulk specific gravity of each core sample will be determined in accordance with ASTM D2726. The percent compaction (density) of each sample will be determined by dividing the bulk specific gravity of each joint density sample by the average TMD for the lot. The TMD used to determine the joint density at joints formed between lots will be the lower of the average TMD values from the adjacent lots.

#### 401-6.2 ACCEPTANCE CRITERIA

**a. General.** Acceptance will be based on the implementation of the Contractor Quality Control Program (CQCP) and the following characteristics of the asphalt and completed pavements: air voids, mat density, joint density, and grade.

**b. Air Voids and Mat Density.** Acceptance of each lot of plant produced material for mat density and air voids will be based on the percentage of material within specification limits (PWL). If the PWL of the lot equals or exceeds 90%, the lot will be acceptable. Acceptance and payment will be determined in accordance with paragraph 401-8.1.

**c. Joint Density.** Acceptance of each lot of plant produced asphalt for joint density will be based on the PWL. If the PWL of the lot is equal to or exceeds 90%, the lot will be considered acceptable. If the PWL is less than 90%, the Contractor shall evaluate the reason and act accordingly. If the PWL is less than 80%, the Contractor shall cease operations and until the reason for poor compaction has been determined. If the PWL is less than 71%, the pay factor for the lot used to complete the joint will be reduced by five (5) percentage points. This lot pay factor reduction will be incorporated and evaluated in accordance with paragraph 401-8.1.

**d. Grade.** The final finished surface of the pavement shall be surveyed to verify that the grade elevations and cross-sections shown on the plans do not deviate more than 1/2 inch vertically or 0.1 feet laterally.

Cross-sections of the pavement shall be taken at a minimum 50-foot longitudinal spacing, at all longitudinal grade breaks, and at start and end of each lane placed. Minimum cross-section grade points shall include grade at centerline,  $\pm 10$  feet of centerline, and edge of taxiway pavement.

The survey and documentation shall be stamped and signed by a licensed surveyor. Payment for sublots that do not meet grade for over 25% of the subplot shall not be more than 95%.

#### 401-6.3 PERCENTAGE OF MATERIAL WITHIN SPECIFICATION LIMITS (PWL)

The PWL will be determined in accordance with procedures specified in Item C-110. The specification tolerance limits (L) for lower and (U) for upper are contained in Table 5.

**TABLE 5. ACCEPTANCE LIMITS FOR AIR VOIDS AND DENSITY**

Test Property	Pavements Specification Tolerance Limits	
	L	U
<b>Air VoidsTotal Mix (%)</b>	2.0	5.0
<b>Surface Course Mat Density (%)</b>	92.8	--
<b>Base Course Mat Density (%)</b>	92.0	--
<b>Joint density (%)</b>	90.5	--

**a. Outliers.** All individual tests for mat density and air voids will be checked for outliers (test criterion) in accordance with ASTM E178, at a significance level of 5%. Outliers will be discarded, and the PWL will be determined using the remaining test values. The criteria in Table 5 is based on production processes which have a variability with the following standard deviations: Surface Course Mat Density (%), 1.30; Base Course Mat Density (%), 1.55; Joint Density (%), 1.55.

The Contractor should note that (1) 90 PWL is achieved when consistently producing a surface course with an average mat density of at least 94.5% with 1.30% or less variability, (2) 90 PWL is achieved when consistently producing a base course with an average mat density of at least 94.0% with 1.55% or less variability, and (3) 90 PWL is achieved when consistently producing joints with an average joint density of at least 92.5% with 1.55% or less variability.

#### 401-6.4 RESAMPLING PAVEMENT FOR MAT DENSITY

**a. General.** Resampling of a lot of pavement will only be allowed for mat density, and then, only if the Contractor requests same, in writing, within 48 hours after receiving the written test results from the Program Manager. A retest will consist of all the sampling and testing procedures contained in paragraphs 401-6.1d and 401-6.2b. Only one resampling per lot will be permitted.

- (1) A redefined PWL will be calculated for the resampled lot. The number of tests used to calculate the redefined PWL will include the initial tests made for that lot plus the retests.

(2) The cost for resampling and retesting shall be borne by the Contractor.

**b. Payment for Resampled Lots.** The redefined PWL for a resampled lot will be used to calculate the payment for that lot in accordance with Table 6.

**c. Outliers.** Check for outliers in accordance with ASTM E178, at a significance level of 5%.

## METHOD OF MEASUREMENT

### 401-7.1 MEASUREMENT

Asphalt surface shall be measured by the number of square feet of asphalt used in uniform thickness pavement in the accepted work. In-place field measurements will be used to determine the basis for the area.

## BASIS OF PAYMENT

### 401-8.1 PAYMENT

Payment for a lot of asphalt meeting all acceptance criteria as specified in paragraph 401-6.2 shall be made based on results of tests for mat density and air voids. Payment for acceptable lots shall be adjusted according to paragraph 401-8.1c for mat density and air voids; and paragraph 401-6.2c for joint density, subject to the limitation that:

**a.** The total project payment for plant mix asphalt pavement shall not exceed 100 percent of the product of the contract unit price and the total number of square feet of asphalt used in the accepted work.

**b.** The price shall be compensation for furnishing all materials, for all preparation, mixing, and placing of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

**c. Basis of Adjusted Payment.** The pay factor for each individual lot shall be calculated in accordance with Table 6. A pay factor shall be calculated for both mat density and air voids. The lot pay factor shall be the higher of the two values when calculations for both mat density and air voids are 100% or higher. The lot pay factor shall be the product of the two values when only one of the calculations for either mat density or air voids is 100% or higher. The lot pay factor shall be the lower of the two values when calculations for both mat density and air voids are less than 100%. If PWL for joint density is less than 71% then the lot pay factor shall be reduced by 5% but be no higher than 95%.

For each lot accepted, the adjusted contract unit price shall be the product of the lot pay factor for the lot and the contract unit price. Payment shall be subject to the total project payment limitation specified in paragraph 401-8.1a. Payment in excess of 100% for accepted lots of asphalt shall be used to offset payment for accepted lots of asphalt pavement that achieve a lot pay factor less than 100%.

Payment for sublots which do not meet grade in accordance with paragraph 401-6.2d after correction for over 25% of the subplot shall be reduced by 5%.

**TABLE 6. PRICE ADJUSTMENT SCHEDULE <sup>1</sup>**

Percentage of Material within the Specification Limits (PWL)	Lot Pay Factor (Percent of Contract Unit Price)
96 – 100	106
90 – 95	PWL + 10

75 – 89	0.5-PWL + 55
55 – 74	1.4*PWL – 12
Below 55	Reject <sup>2</sup>

- <sup>1</sup> Although it is theoretically possible to achieve a pay factor of 106% for each lot, actual payment above 100% shall be subject to the total project payment limitation specified in paragraph 401-8.1a.
- <sup>2</sup> The lot shall be removed and replaced. However, the Program Manager may decide to allow the rejected lot to remain. In that case, if the Program Manager and Contractor agree in writing that the lot shall not be removed, it shall be paid for at 50% of the contract unit price and the total project payment shall be reduced by the amount withheld for the rejected lot.

Payment will be made under:

Item P-401-8.1	Bituminous Surface Course (5-inch thick) – per square yard
Item P-401-8.2	Bituminous Base Course (4-inch thick) – per square yard
Item P-401-8.3	Bituminous Surface Course Overlay (1.5-inch thick) – per square yard

## REFERENCES

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

ASTM International (ASTM)

ASTM C29	Bulk Density ("Unit Weight") and Voids in Aggregate
ASTM C88	Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
ASTM C117	Materials Finer than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C127	Density, Relative Density (Specific Gravity) and Absorption of Coarse Aggregate
ASTM C131	Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C136	Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C142	Clay Lumps and Friable Particles in Aggregates
ASTM C566	Total Evaporable Moisture Content of Aggregate by Drying
ASTM D75	Sampling Aggregates
ASTM D242	Mineral Filler for Bituminous Paving Mixtures
ASTM D946	Penetration-Graded Asphalt Cement for Use in Pavement Construction
ASTM D979	Sampling Asphalt Paving Mixtures
ASTM D1073	Fine Aggregate for Asphalt Paving Mixtures

ASTM D1188	Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Coated Samples
ASTM D2172	Quantitative Extraction of Bitumen from Asphalt Paving Mixtures
ASTM D1461	Moisture or Volatile Distillates in Asphalt Paving Mixtures
ASTM D2041	Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
ASTM D2419	Sand Equivalent Value of Soils and Fine Aggregate
ASTM D2489	Estimating Degree of Particle Coating of Bituminous-Aggregate Mixtures
ASTM D2726	Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures
ASTM D2950	Density of Bituminous Concrete in Place by Nuclear Methods
ASTM D3203	Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures
ASTM D3381	Viscosity-Graded Asphalt Cement for Use in Pavement Construction
ASTM D3665	Random Sampling of Construction Materials
ASTM D3666	Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials
ASTM D4318	Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D4552	Classifying Hot-Mix Recycling Agents
ASTM D4791	Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate
ASTM D4867	Effect of Moisture on Asphalt Concrete Paving Mixtures
ASTM D5361	Sampling Compacted Asphalt Mixtures for Laboratory Testing
ASTM D5444	Mechanical Size Analysis of Extracted Aggregate
ASTM D5821	Determining the Percentage of Fractured Particles in Coarse Aggregate
ASTM D6084	Elastic Recovery of Bituminous Materials by Ductilometer
ASTM D6307	Asphalt Content of Hot Mix Asphalt by Ignition Method
ASTM D6373	Performance Graded Asphalt Binder
ASTM D6752	Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Automatic Vacuum Sealing Method
ASTM D6926	Preparation of Bituminous Specimens Using Marshall Apparatus
ASTM D6927	Marshall Stability and Flow of Bituminous Mixtures



- ASTM D6995 Determining Field VMA based on the Maximum Specific Gravity of the Mix (Gmm)
- ASTM E11 Woven Wire Test Sieve Cloth and Test Sieves
- ASTM E178 Dealing with Outlying Observations
- ASTM E1274 Measuring Pavement Roughness Using a Profilograph
- ASTM E950 Measuring the Longitudinal Profile of Traveled Surfaces with an Accelerometer Established Inertial Profiling Reference
- ASTM E2133 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 Requirements for Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures.
- AASHTO T329 Moisture Content of Hot Mix Asphalt (HMA) by Oven Method
- AASHTO T324 Hamburg Wheel-Track Testing of Compacted Asphalt Mixtures
- AASHTO T 340 Determining the Rutting Susceptibility of Hot Mix Asphalt (APA) Using the Asphalt Pavement Analyzer (APA)

Asphalt Institute (AI)

- Asphalt Institute Handbook MS-26, Asphalt Binder
- Asphalt Institute MS-2 Mix Design Manual, 7th Edition
- AI State Binder Specification Database

Federal Highway Administration (FHWA)

- Long Term Pavement Performance Binder Program

Advisory Circulars (AC)

- AC 150/5320-6 Airport Pavement Design and Evaluation

FAA Orders

- 5300.1 Modifications to Agency Airport Design, Construction, and Equipment Standards

Software

FAARFIELD

**END OF ITEM P-401**

**Item P-403****Asphalt Mix Pavement Course (Shoulder & Service Road)****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**

<b>Material Test</b>	<b>Requirement</b>	<b>Standard</b>
Resistance to Degradation	Loss: 40% maximum	ASTM C131
Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate	Loss after 5 cycles: 12% maximum using Sodium sulfate - or - 18% maximum using magnesium sulfate	ASTM C88
Clay lumps and friable particles	0.3% maximum	ASTM C142
Percentage of Fractured Particles	Minimum 75% by weight of particles with at least two fractured faces and 85% with at least one fractured face <sup>1</sup>	ASTM D5821
Flat, Elongated, or Flat and Elongated Particles	8% maximum, by weight, of flat, elongated, or flat and elongated particles with a value of 5:1 <sup>2</sup>	ASTM D4791
Bulk density of slag <sup>3</sup>	Weigh not less than 70 pounds per cubic foot	ASTM C29.

<sup>1</sup> The area of each face shall be equal to at least 75% of the smallest mid-sectional area of the piece. When two fractured faces are contiguous, the angle between the planes of fractures shall be at least 30 degrees to count as two fractured faces.

<sup>2</sup> A flat particle is one having a ratio of width to thickness greater than five (5); an elongated particle is one having a ratio of length to width greater than five (5).

<sup>3</sup> Only required if slag is specified.

**b. Fine aggregate.** Fine aggregate shall consist of clean, sound, tough, durable, angular shaped particles produced by crushing stone, slag, or gravel and shall be free from coatings of clay, silt, or other objectionable matter. Natural (non-manufactured) sand may be used to obtain the gradation of the aggregate blend or to improve the workability of the mix. Fine aggregate material requirements are listed in the table below.

**Fine Aggregate Material Requirements**

<b>Material Test</b>	<b>Requirement</b>	<b>Standard</b>
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**

<b>Material Test</b>	<b>Requirement</b>	<b>Standard</b>
Plasticity Index	4 maximum	ASTM D4318

**403-2.3 Asphalt binder.** Asphalt binder shall conform to ASTM D6373 Performance Grade (PG) 76-22.

**Asphalt Binder PG Plus Test Requirements**

<b>Material Test</b>	<b>Requirement</b>	<b>Standard</b>
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.

**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 Program Manager 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 Program Manager for review and accepted in writing. The Program Manager'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 a Marshall compactor in accordance with ASTM D6926.

Should a change in sources of materials be made, a new JMF must be submitted to the Program Manager for review and accepted in writing before the new material is used. After the initial production JMF has been approved by the Program Manager 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 Program Manager, will be borne by the Contractor.

The Program Manager 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 <sup>1</sup>	not less than 80 at a saturation of 70-80%	ASTM D4867
Asphalt Pavement Analyzer (APA) <sup>2</sup>	Less than 10 mm @ 4000 passes	AASHTO T340 at 250 psi hose pressure at 64°C test temperature

<sup>1</sup> Test specimens for TSR shall be compacted at  $7 \pm 1.0$  % air voids. In areas subject to freeze-thaw, use freeze-thaw conditioning in lieu of moisture conditioning per ASTM D4867.

<sup>2</sup> AASHTO T340 at 100 psi hose pressure at 64°C test temperature may be used in the interim. If this method is used the required Value shall be less than 5 mm @ 8000 passes

The mineral aggregate shall be of such size that the percentage composition by weight, as determined by laboratory sieves, will conform to the gradation or gradations specified in Table 2 when tested in accordance with ASTM C136 and ASTM C117.

The gradations in Table 2 represent the limits that shall determine the suitability of aggregate for use from the sources of supply, be well graded from coarse to fine and shall not vary from the low limit on one sieve to the high limit on the adjacent sieve, or vice versa.

**Table 2. Aggregate - Asphalt Pavements**

<b>Sieve Size</b>	<b>Percentage by Weight Passing Sieve</b>
1 inch (25.0 mm)	--
3/4 inch (19.0 mm)	100
1/2 inch (12.5 mm)	90-100
3/8 inch (9.5 mm)	72-88
No. 4 (4.75 mm)	53-73
No. 8 (2.36 mm)	38-60
No. 16 (1.18 mm)	26-48
No. 30 (600 µm)	18-38
No. 50 (300 µm)	11-27
No. 100 (150 µm)	6-18
No. 200 (75 µm)	3-6
<b>Voids in Mineral Aggregate (VMA)<sup>1</sup></b>	15
<b>Asphalt Percent:</b>	
Stone or gravel	5.0-7.5
Slag	6.5-9.5
<b>Recommended Minimum Construction Lift Thickness</b>	2 inch

<sup>1</sup>To achieve minimum VMA during production, the mix design needs to account for material breakdown during production.

The aggregate gradations shown are based on aggregates of uniform specific gravity. The percentages passing the various sieves shall be corrected when aggregates of varying specific gravities are used, as indicated in the Asphalt Institute MS-2 Mix Design Manual, 7th Edition.

**403-3.4 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. 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 20 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 Program Manager. 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 Program Manager.

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 Program Manager 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 Program Manager, 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 Program Manager, or Program Manager'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 Program Manager 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 Program Manager. 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 Program Manager 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 Program Manager.

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 Program Manager 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 Program Manager. The asphalt mix shall be placed in consecutive adjacent lanes having a minimum width of 12 feet except where edge lanes require less width to complete the area. Additional screed sections attached to widen the paver to meet the minimum lane width requirements must include additional auger sections to move the asphalt mixture uniformly along the screed extension.

The longitudinal joint in one course shall offset the longitudinal joint in the course immediately below by at least 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 from transverse joints in the previous course. Transverse joints in adjacent lanes shall be offset a minimum of 10 feet. On areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impractical, the asphalt may be spread and luted by hand tools.

The Program Manager 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 Program Manager, and if it can be demonstrated in the laboratory, in the presence of the Program Manager, 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 Program Manager, shall be removed and replaced at the Contractor's expense. The area shall be removed by saw cutting and milling a minimum of the construction lift thickness as specified in paragraph 401-3.3, Table 2 for the approved mix design. The area to be removed and replaced shall be a minimum width of the paver and a minimum of 10 feet long.

**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 Program Manager 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 Program Manager 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 Program Manager shall be permitted unrestricted access to inspect the Contractor's QC facilities and witness QC activities. The Program Manager will advise the Contractor in writing of any noted deficiencies concerning the QC facility, equipment, supplies, or testing personnel and procedures. When the deficiencies are serious enough to be adversely affecting the test results, the incorporation of the materials into the work shall be suspended immediately and will not be permitted to resume until the deficiencies are satisfactorily corrected.

**403-5.3 Quality Control (QC) testing.** The Contractor shall perform all QC tests necessary to control the production and construction processes applicable to these specifications and as set forth in the approved CQCP. The testing program shall include, but not necessarily be limited to, tests for the control of asphalt content, aggregate gradation, temperatures, aggregate moisture, field compaction, and surface smoothness. A QC Testing Plan shall be developed as part of the CQCP.

**a. Asphalt content.** A minimum of two tests shall be performed per day in accordance with ASTM D6307 or ASTM D2172 for determination of asphalt content. When using ASTM D6307, the correction factor shall be determined as part of the first test performed at the beginning of plant production; and as part of every tenth test performed thereafter. The asphalt content for the day will be determined by averaging the test results.

**b. Gradation.** Aggregate gradations shall be determined a minimum of twice per lot from mechanical analysis of extracted aggregate in accordance with ASTM D5444 and ASTM C136, and ASTM C117.

**c. Moisture content of aggregate.** The moisture content of aggregate used for production shall be determined a minimum of once per lot in accordance with ASTM C566.

**d. Moisture content of asphalt.** The moisture content of the asphalt shall be determined once per lot in accordance with AASHTO T329 or ASTM D1461.

**e. Temperatures.** Temperatures shall be checked, at least four times per lot, at necessary locations to determine the temperatures of the dryer, the asphalt binder in the storage tank, the asphalt at the plant, and the asphalt at the job site.

**f. In-place density monitoring.** The Contractor shall conduct any necessary testing to ensure that the specified density is being achieved. A nuclear gauge may be used to monitor the pavement density in accordance with ASTM D2950.

**g. Smoothness for Contractor Quality Control.**

The Contractor shall perform smoothness testing in transverse and longitudinal directions daily to verify that the construction processes are producing pavement with variances less than ¼ inch in 12 feet, identifying areas that may pond water which could lead to hydroplaning of aircraft. If the smoothness criteria is not met, appropriate changes and corrections to the construction process shall be made by the Contractor before construction continues.

The Contractor may use a 12-foot (3.7 m) straightedge or a rolling inclinometer meeting the requirements of ASTM E2133. Straight-edge testing shall start with one-half the length of the straightedge at the edge of pavement section being tested and then moved ahead one-half the length of the straightedge for each successive measurement. Testing shall be continuous across all joints. The surface irregularity shall be determined by placing the freestanding (unleveled) straightedge on the pavement surface and allowing it to rest upon the two highest spots covered by its length, and measuring the maximum gap between the straightedge and the pavement surface in the area between the two high points. If the rolling inclinometer is used, the data may be evaluated using the FAA profile program, ProFAA, using the 12-foot straightedge simulation function.

Smoothness readings shall not be made across grade changes or cross slope transitions. The transition between new and existing pavement shall be evaluated separately for conformance with the plans.

**(1) Transverse measurements.** Transverse measurements shall be taken for each day's production placed. Transverse measurements will be taken perpendicular to the pavement centerline each 50 feet (15 m) or more often as determined by the Program Manager. 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 vertically and 0.1 feet (30 mm) laterally. The documentation will be provided by the Contractor to the Program Manager 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 Program Manager, 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 Program Manager 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 Program Manager 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 Program Manager at no cost to 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 D6926.

**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 Program Manager will cut minimum 5 inches 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 Program Manager.

**(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 Program Manager to determine the extent of unbonded areas. Unbonded areas shall be removed by milling and replaced at no additional cost as directed by the Program Manager.

**(3) Thickness.** Thickness of each lift of surface course will be evaluated by the Program Manager 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 Program Manager to circumscribe the deficient area.

**(4) Mat density.** One core shall be taken from each subplot. Core locations will be determined by the Program Manager 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 Program Manager in accordance with ASTM D3665. The bulk specific gravity of each core sample will be determined in accordance with ASTM D2726. The percent compaction (density) of each sample will be determined by dividing the bulk specific gravity of each joint density sample by the average TMD for the lot. The TMD used to determine the joint density at joints formed between lots will be the lower of the average TMD values from the adjacent lots.

#### **403-6.2 Acceptance criteria.**

**a. General.** Acceptance will be based on the implementation of the Contractor Quality Control Program (CQCP) and the following characteristics of the asphalt and completed pavements: air voids, mat density, joint density, grade.

**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 or 0.1 feet (30 mm) laterally.

Cross-sections of the pavement shall be taken at a minimum 50-foot longitudinal spacing and at all longitudinal grade breaks. Minimum cross-section grade points shall include grade at centerline,  $\pm 10$  feet of centerline, and edge of runway taxiway pavement.

The survey and documentation shall be stamped and signed by a licensed surveyor. Payment for sublots that do not meet grade for over 25% of the subplot shall not be more than 95%.

#### **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 Program Manager. 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 Bituminous Surface Course - Shoulder (2.5" thick) - per square yard

Item P-403-8.2	Bituminous Base Course - Shoulder (2.5" thick) - per square yard
Item P-403-8.3	Bituminous Surface Course – Service Road (2" thick) - per square yard
Item P-403-8.4	Bituminous Surface Course Overlay – Haul Road Repair (1.5" thick) - per square yard

## REFERENCES

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

### ASTM International (ASTM)

ASTM C29	Standard Test Method for Bulk Density ("Unit Weight") and Voids in Aggregate
ASTM C88	Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
ASTM C117	Standard Test Method for Materials Finer than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C127	Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Coarse Aggregate
ASTM C131	Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C142	Standard Test Method for Clay Lumps and Friable Particles in Aggregates
ASTM C183	Standard Practice for Sampling and the Amount of Testing of Hydraulic Cement
ASTM C566	Standard Test Method for Total Evaporable Moisture Content of Aggregate by Drying
ASTM D75	Standard Practice for Sampling Aggregates
ASTM D242	Standard Specification for Mineral Filler for Bituminous Paving Mixtures
ASTM D946	Standard Specification for Penetration-Graded Asphalt Cement for Use in Pavement Construction
ASTM D979	Standard Practice for Sampling Bituminous Paving Mixtures
ASTM D1073	Standard Specification for Fine Aggregate for Bituminous Paving Mixtures
ASTM D1074	Standard Test Method for Compressive Strength of Bituminous Mixtures
ASTM D1461	Standard Test Method for Moisture or Volatile Distillates in Bituminous Paving Mixtures
ASTM D2041	Standard Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
ASTM D2172	Standard Test Method for Quantitative Extraction of Bitumen from Bituminous Paving Mixtures
ASTM D2419	Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate
ASTM D2489	Standard Practice for Estimating Degree of Particle Coating of Bituminous-Aggregate Mixtures



ASTM D2726	Standard Test Method for Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures
ASTM D2950	Standard Test Method for Density of Bituminous Concrete in Place by Nuclear Methods
ASTM D3203	Standard Test Method for Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures
ASTM D3381	Standard Specification for Viscosity-Graded Asphalt Cement for Use in Pavement Construction
ASTM D3665	Standard Practice for Random Sampling of Construction Materials
ASTM D3666	Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials
ASTM D4125	Standard Test Methods for Asphalt Content of Bituminous mixtures by the Nuclear Method
ASTM D4318	Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D4552	Standard Practice for Classifying Hot-Mix Recycling Agents
ASTM D4791	Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate
ASTM D4867	Standard Test Method for Effect of Moisture on Asphalt Concrete Paving Mixtures
ASTM D5444	Standard Test Method for Mechanical Size Analysis of Extracted Aggregate
ASTM D5581	Standard Test Method for Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus (6 inch-Diameter Specimen)
ASTM D5821	Standard Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate
ASTM D6307	Standard Test Method for Asphalt Content of Hot-Mix Asphalt by Ignition Method
ASTM D6373	Standard Specification for Performance Graded Asphalt Binder
ASTM D6752	Standard Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Automatic Vacuum Sealing Method
ASTM D6925	Standard Test Method for Preparation and Determination of the Relative Density of Hot Mix Asphalt (HMA) Specimens by Means of the SuperPave 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**

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**Item P-407****Asphalt Treated Permeable Base Course (ATPB)****DESCRIPTION****407-1.1**

This item shall consist of an asphalt treated permeable base composed of mineral aggregate, and asphalt cement mixed in a central mixing plant and placed on a prepared subgrade or subbase course in accordance with these specifications and shall conform to the lines, grades, thickness, and typical cross sections shown in the plans.

**MATERIALS****407-2.1 Aggregate.**

The aggregate shall consist of clean, sound, hard, durable, angular particles of crushed gravel or crushed stone and shall meet the gradation requirements of ASTM C33 Size 57. Fine aggregate shall consist of natural sand or manufactured sand meeting the requirements of ASTM C33. The aggregate shall meet the material requirements in the table below.

### Aggregate Material Requirements

Material Test	Requirement	Standard
<b>Coarse Aggregate</b>		
Resistance to Degradation	Loss: 40% maximum	ASTM C131
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
Fractured Faces	90% by weight of particles with at least 2 fractured faces	ASTM D5821
Flat Particles, Elongated Particles, or Flat and Elongated Particles <sup>1</sup>	10% maximum, by weight, for fraction retained on the 3/8 inch (9.5mm) sieve and 10% maximum, by weight, for the fraction passing the 3/8-inch (9.5 mm) sieve	ASTM D4791
Clay lumps and friable particles	Less than or equal to 3 percent	ASTM C142
<b>Fine Aggregate</b>		
Clay lumps and friable particles	Less than or equal to 3 percent	ASTM C142
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

<sup>1</sup> A flat particle is one having a ratio of width to thickness greater than five (5); an elongated particle is one having a ratio of length to width greater than five (5).

#### 407-2.2 Sampling and testing.

**a. Aggregate base materials.** The Contractor shall take samples of the aggregate base stockpile in accordance with ASTM D75 to verify initial aggregate base requirements and gradation. Material shall meet the requirements in paragraph 407-2.1. This sampling and testing will be the basis for approval of the aggregate base quality requirements.

**407-2.3 Asphalt binder.** Asphalt binder shall conform to ASTM D6373 Performance Grade (PG) 67-22.

**407-2.4 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.

**407-2.5 Bond Breaker.** Choke stone shall be an ASTM C33 Number 89 stone.

**407-2.6 Separation Geotextile.** Not used.

### COMPOSITION OF MIXTURE

**407-3.1 Mix design.** The Mix Design shall be composed of a mixture of open graded aggregate, a  
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minimum of 0.5% antistrip agent and asphalt binder. An acceptable mix will have between 2 – 3.5% asphalt, sufficient to cover 95% of mixture with a shiny black appearance with minimal draindown at 200°F, and will bind the compacted mix. When the aggregates are blended and mixed with the asphalt cement at 250°F and compacted at 150°F with 35 blows of a standard Marshall hammer, the JMF shall have a permeability of not less than 500 ft/day nor more than 1,500 ft/day when tested with constant head permeability test ASTM D 2434/AASHTO T 215.

**407-3.2 Submittals.** At least 30 days prior to the placement of the ATPB, the Contractor shall submit certified test reports to the Program Manager for those materials proposed for use during construction, as well as the job mix design information for the material. The submittal package shall include the following:

- a. Sources of materials, including aggregate, asphalt binder, additives, and bond-breaking materials (if used).
- b. Physical properties of the aggregates, asphalt binder, antistrip agent and bond-breaking materials.
- c. Percent of asphalt
- d. Amount of antistrip agent
- e. Permeability of JMF

The job mix tolerances shown in the follow Table shall be applied to the job mix formula to establish a job control grading band. The full tolerances will still apply if application of the job mix tolerances results in a job control grading band outside the master grading band.

#### **Job Mix Formula Tolerances**

(Based on a Single Test)

<b><u>Material</u></b>	<b><u>Tolerance - Plus or Minus</u></b>
Aggregate passing No. 4 sieve or larger	5 percent
Aggregate passing No. 8 and No. 30 sieves	4.0 percent
Aggregate passing No. 20 sieve	2.0 percent
Bitumen	0.40 percent
Temperature of mix	20° F

If a change is made in any component or in the source of the materials of the bituminous mix, a new job mix formula shall be established and approved by the Program Manager before any additional material on the project is produced and placed. When unsatisfactory results or other conditions make it necessary, the Program Manager may establish a new job mix formula.

No drainable ATPB material shall be placed until the submittal is accepted in writing by the Program Manager. During production, the Contractor shall submit batch tickets for each delivered load.

#### **CONSTRUCTION METHODS**

**407-4.1 Control strip.** The contractor shall produce, place and compact a control strip of at least 250 ft. The Contractor shall demonstrate, in the presence of the Program Manager, that the materials, equipment, and construction processes meet the requirements of the specification. 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 Program Manager. Upon acceptance of the control strip by the Program Manager, 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 Program Manager.

When additional effort beyond that provided by the paver is required to seat the aggregate, additional compaction shall not be initiated until mixture has cooled to below 175°F (or lower as determined during construction of the test strip). One to two passes of a self-propelled, steel-wheel static roller with weight between 5 and 12 tons (4.5 to 10.9 metric tons) is usually sufficient. The roller shall be in good condition and shall be capable of reversing without backlash and of compacting the ATPB without undue displacement or excessive crushing of the aggregate. The actual rolling pattern and sequence shall be established during placement of the control strip and approved by the Program Manager. In areas inaccessible to the paver and roller, hand operated vibrator-plate compactors may be used to seat the aggregate.

The control strip ATPB layer shall be considered acceptable when aggregate is completely coated with asphalt cement with minimal evidence of crushing; the surface is firm, unyielding and stable under construction traffic; and the layer meets the field permeability per paragraph 407-3.1.

**407-4.2 Weather limitations.** The ATPB material shall not be mixed or placed while the air temperature is below 40°F. The ATPB shall not be placed on frozen underlying courses or mixed when aggregate is frozen. The ATPB may not be placed when rainfall is occurring or where rain is imminent.

**407-4.3 Equipment.** All equipment necessary to mix, transport, place, compact, and finish the ATPB material shall be furnished by the Contractor and approved by the Program Manager. The equipment will be inspected by the Program Manager prior to the start of construction operations.

**407-4.4 Preparation of the underlying course.** The underlying course shall be checked and accepted by the Program Manager before placing operations begin. Prior to placing the material, the final grade should be firm, moist and free of frost. Use of chemicals to eliminate frost will not be permitted.

**407-4.5 Mixing.** The batch plant site, layout, equipment, and provisions for transporting material shall assure a continuous supply of material to the work. Stockpiles shall be constructed in a manner that prevents segregation and intermixing of deleterious materials. Free access to the plant must be provided to the Program Manager at all times for inspection of the plant's equipment and operation and for sampling the ATPB mixture and its components.

**407-4.6 Hauling.** The ATPB mixture shall be transported from the plant to the job site in trucks or other hauling equipment having beds that are smooth and clean. Truck bed covers shall be provided to protect the ATPB during transport from rain.

**407-4.7 Placing.** The ATPB material shall be placed using an asphalt paver. The ATPB shall be installed in a single 4 inch lift. The ATPB material shall be placed at a temperature between 175°F and 250°F.

**407-4.8 Compaction.** Compaction shall be withheld until the mixture has cooled to 150°F to 175°F. The ATPB material shall be compacted using the approved compaction equipment and roller pattern/sequence, as determined in the approved control strip. Sufficient rollers shall be furnished to handle the output of the plant. If the rolling pattern/sequence results in undue displacement of the surface, or causes crushing of the aggregate, work shall be stopped until the cause(s) can be determined and corrections are made. The roller shall not pass over the unprotected end of the freshly laid mixture except when necessary to form a transverse joint.

**407-4.9 Joints.** The formation of all joints shall be made in such a manner as to ensure a continuous bond between old and new sections of the course. All joints shall present the same texture and smoothness as other sections of the course. Transverse joints shall be formed by placement of a

bulkhead or by tapering the mixture. Tapered joints shall be cut back full depth and width creating a vertical joint before placing additional mixture against the joint. Joints which are irregular, damaged shall be cut back to expose a clean, sound surface for full depth of course.

**407-4.10 Quality Control.** The Contractor shall perform tests for smoothness, grade, gradation and asphalt content daily. Asphalt content and gradation must be within job tolerances or appropriate steps taken to maintain production control within tolerances. Any area not meeting smoothness and grade shall be corrected by the Contractor at the Contractor's expense. The Contractor shall provide gradation, asphalt content, smoothness and grade data to the Program Manager on a daily basis.

**a. Asphalt Content.** Determine asphalt content a minimum of two times per day in accordance with ASTM D6307 or ASTM D2172.

**b. Gradation.** Determine aggregate gradation a minimum of two times per day from mechanical analysis of extracted aggregate in accordance with ASTM D5444, ASTM C136 and ASTM C117.

**c. Smoothness.** The finished surface shall not vary more than  $\pm 3/8$ -inch when tested with a 12-foot straightedge applied parallel with and at right angles to the centerline, and moved continuously forward at half the length of the 12-foot straightedge for the full length of each line on a 50-foot grid. The Contractor shall correct any high spots more than  $3/8$  inch in 12-foot with a grinding machine or remove and replace the material at the Contractor's expense.

**d. Grade.** The grade shall be measured on a 50-foot grid and shall be within  $\pm 0.05$  feet of the specified grade. When the surface is more than  $1/2$  inch above the grade shown in the plans, the surface shall be corrected at the Contractor's expense to an elevation that falls within a tolerance of  $1/4$  inch.

**407-4.11 Field Permeability.** One test shall be performed by the Contractor in the presence of the Program Manager for 1200 square yards. Test locations will be determined on a random basis in accordance with ASTM D3665. The permeability of the base will be determined in accordance with ASTM C1701. If it can be demonstrated that a 1 gallon container of water will flow through the layer within approximately 1 minute the Program Manager can waive additional permeability testing.

**407-4.12 Bond breaker.** Prior to placing the overlaying concrete pavement a bond breaker shall be placed on the surface to prevent bonding per 407-2.5.

**407-4.13 Maintenance.** The completed drainable base shall be maintained by the Contractor in a condition to meet all specification requirements until the pavement has been placed. Placement of the next higher pavement layer shall be made as soon as practicable but no more than thirty (30) calendar days after placement of the drainage layer. The ATPB shall not be opened to traffic until the mixture has cooled to ambient temperature. Traffic on ATPB should be kept to a minimum to avoid rutting or displacement of the ATPB. Limit traffic on ATPB to equipment needed to construct next higher pavement layer.

## MATERIAL ACCEPTANCE

**407-5.1 Sampling and testing.** All acceptance sampling and testing necessary to determine conformance with the requirements specified in this section will be performed by the Program Manager for each 1200 square yards. Sampling locations will be determined by the Program Manager on a random basis per ASTM D3665. Only the areas of the ATPB meeting the thickness requirements shall be measured for payment

**a. Thickness.** One core shall be drilled by the Program Manager for thickness determination for each 1200 square yards. Thickness will be determined by measuring the depth of core hole. The Contractor shall be responsible for filling the core holes as directed by the Program Manager.



### METHOD OF MEASUREMENT

**407-6.1 Measurement.** The quantity of ATPB to be paid for shall be the number of square yards of material placed, and accepted in the completed base course.

### BASIS OF PAYMENT

**407-7.1 Payment.** Payment will be made at the contract unit price per square yard for ATPB at the specified thickness as measured by Program Manager. This price shall be full compensation for furnishing all materials, for all preparation, mixing, placing, compacting, curing, and placement of overlaying bond breaker; and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item P-407-7.1 Asphalt treated permeable base course (ATPB) (4" thick) - per square yard.

### REFERENCES

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

ASTM C33	Standard Specification for Concrete Aggregates
ASTM D75	Standard Practice for Sampling Aggregates
ASTM C88	Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
ASTM C131	Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C142	Standard Test Method for Clay Lumps and Friable Particles in Aggregates
ASTM D448	Standard Classification for Sizes of Aggregate for Road and Bridge Construction
ASTM D2434	Standard Test Method for Permeability of Granular Soils (Constant Head)
ASTM D3665	Standard Practice for Random Sampling of Construction Materials
ASTM C1701	Standard Test Method for Infiltration Rate of In Place Pervious Concrete American Association of State Highway and Transportation Officials (AASHTO)
M288	Standard Specification for Geosynthetic Specification for Highway Applications
T215	Standard Method of Test for Permeability of Granular Soils (Constant Head)

### END ITEM P-407

**ITEM P-501****CEMENT CONCRETE PAVEMENT****DESCRIPTION**

**501-1.1** This work shall consist of pavement composed of cement concrete, with reinforcement and without reinforcement, constructed on a prepared underlying surface in accordance with these specifications and shall conform to the lines, grades, thickness, and typical cross-sections shown on the plans. The terms cement concrete, hydraulic cement concrete, and concrete are interchangeable in this specification.

**MATERIALS****501-2.1 AGGREGATES**

- a. Reactivity.** Fine and Coarse aggregates to be used in PCC on this project shall be tested and evaluated by the Contractor for alkali-aggregate reactivity in accordance with both ASTM C1260 and ASTM C1567. Tests must be representative of aggregate sources which will be providing material for production. ASTM C1260 and ASTM C1567 tests may be run concurrently.

**(1)** Coarse aggregate and fine aggregate shall be tested separately in accordance with ASTM C1260, however, the length of test shall be extended to 28 days (30 days from casting). Tests must have been completed within 6 months of the date of the concrete mix submittal.

**(2)** The combined coarse and fine aggregate shall be tested in accordance with ASTM C1567, modified for combined aggregates, using the proposed mixture design proportions of aggregates, cementitious materials, and/or specific reactivity reducing chemicals. If the expansion does not exceed 0.10% at 28 days, the proposed combined materials will be accepted. If the expansion is greater than 0.10% at 28 days, the aggregates will not be accepted unless adjustments to the combined materials mixture can reduce the expansion to less than 0.10% at 28 days, or new aggregates shall be evaluated and tested.

**(3)** If lithium nitrate is proposed for use with or without supplementary cementitious materials, the aggregates shall be tested in accordance with Corps of Engineers (COE) Concrete Research Division (CRD) C662 in lieu of ASTM C1567. If lithium nitrate admixture is used, it shall be nominal 30%  $\pm$ 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.

<b>Fine Aggregate Material Requirements</b>		
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	[ 45 ] minimum	ASTM D2419
Fineness Modulus (FM)	$2.50 \leq FM \leq 3.40$	ASTM C136
<b>Limits for Deleterious Substances in Fine Aggregate for Concrete</b>		
Clay lumps and friable particles	1.0% maximum	ASTM C142
Coal and lignite	0.5% using a medium with a density of Sp. Gr. of 2.0	ASTM C123
Total Deleterious Material	1.0% maximum	

**c. Coarse aggregate.** The maximum size coarse aggregate shall be 1-1/2-inch.

Aggregates delivered to the mixer shall be clean, hard, uncoated aggregates consisting of crushed stone, crushed or uncrushed gravel, air-cooled iron blast furnace slag, crushed recycled concrete pavement, or a combination. The aggregates shall have no known history of detrimental pavement staining. Steel blast furnace slag shall not be permitted. Coarse aggregate material requirements and deleterious limits are shown in the table below; washing may be required to meet aggregate requirements.

**COARSE AGGREGATE MATERIAL REQUIREMENTS**

<b>Material Test</b>	<b>Requirement</b>	<b>Standard</b>
Resistance to Degradation	Loss: 40% maximum	ASTM C131
Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate	Loss after 5 cycles: 12% maximum using Sodium sulfate - or - 18% maximum using magnesium sulfate	ASTM C88
Flat, Elongated, or Flat and Elongated Particles	8% maximum, by weight, of flat, elongated, or flat and elongated particles at 5:1 for any size group coarser than 3/8 (9.5 mm) sieve <sup>1</sup>	ASTM D4791
Bulk density of slag <sup>2</sup>	Weigh not less than 70 pounds per cubic foot (1.12 Mg/cubic meter)	ASTM C29
D-cracking (Freeze-Thaw) <sup>3</sup>	Durability factor $\geq 95$	ASTM C666 ]

<sup>1</sup> A flat particle is one having a ratio of width to thickness greater than five (5); an elongated particle is one having a ratio of length to width greater than five (5).

<sup>2</sup> Only required if slag is specified.

<sup>3</sup> Coarse aggregate may only be accepted from sources that have a 20-year service history for the same gradation to be supplied with no history of D-Cracking. Aggregates that do not have a 20-year record of service free from major repairs (less than 5% of slabs replaced) in similar conditions without D-cracking shall not be used unless the material currently being produced has a durability factor greater than or equal to 95 per ASTM C666. The Contractor shall submit a current certification and test results to verify the aggregate acceptability. Test results will only be accepted from a State Department of Transportation (DOT) materials laboratory or an accredited laboratory. Certification and test results which are not dated or which are over one (1) year old or which are for different gradations will not be accepted.

The amount of deleterious material in the coarse aggregate shall not exceed the following limits:

**LIMITS FOR DELETERIOUS SUBSTANCES IN COARSE AGGREGATE**

<b>Deleterious material</b>	<b>ASTM</b>	<b>Percentage by Mass</b>
Clay Lumps and friable particles	ASTM C142	1.0
Material finer than No. 200 sieve (75 µm)	ASTM C117	1.0 <sup>1</sup>
Lightweight particles	ASTM C123 using a medium with a density of Sp. Gr. of 2.0	0.5
Chert <sup>2</sup> (less than 2.40 Sp Gr.)	ASTM C123 using a medium with a density of Sp. Gr. of 2.40)	1.0 <sup>3</sup>
Total of all deleterious Material		3.0 <sup>1</sup>

<sup>1</sup> The limit for material finer than 75-µm is allowed to be increased to 1.5% for crushed aggregates consisting of dust of fracture that is essentially free from clay or shale. Test results supporting acceptance of increasing limit to 1.5% with statement indicating material is dust of fracture must be submitted with Concrete mix. Acceptable techniques to characterizing these fines include methylene blue adsorption or X-ray diffraction analysis. The total of all deleterious materials increases up to 3.5%.

<sup>2</sup> Chert and aggregates with less than 2.4 specific gravity.

<sup>3</sup> The limit for chert may be limited to 0.1 percent by mass in areas subject to severe freeze and thaw.

**d. Combined aggregate gradation.** This specification is targeted for a combined aggregate gradation developed following the guidance presented in United States Air Force Engineering Technical Letter (ETL) 97-5: Proportioning Concrete Mixtures with Graded Aggregates for Rigid Airfield Pavements. Base the aggregate grading upon a combination of all the aggregates (coarse and fine) to be used for the mixture proportioning. Three aggregate sizes may be required to achieve an optimized combined gradation that will produce a workable concrete mixture for its intended use. Use aggregate gradations that produce concrete mixtures with well-graded or optimized aggregate combinations. The Contractor shall submit complete mixture information necessary to calculate the volumetric components of the mixture. The combined aggregate grading shall meet the following requirements:

**(1)** The materials selected and the proportions used shall be such that when the Coarseness Factor (CF) and the Workability Factor (WF) are plotted on a diagram as described in paragraph 501-2.1d(4) below, the point thus determined shall fall within the parallelogram described therein.

**(2)** The CF shall be determined from the following equation:

$$CF = \frac{\text{(cumulative percent retained on the 3/8 in. (9.5 mm) sieve)(100)}}{\text{(cumulative percent retained on the No. 8 (2.36 mm) sieve)}}$$

**(3)** The WF is defined as the percent passing the No. 8 (2.36 mm) sieve based on the combined gradation. However, WF shall be adjusted, upwards only, by 2.5 percentage points for each 94 pounds (42 kg) of cementitious material per cubic meter yard greater than 564 pounds per cubic yard (335 kg per cubic meter).

**(4)** A diagram shall be plotted using a rectangular scale with WF on the Y-axis with units from 20 (bottom) to 45 (top), and with CF on the X-axis with units from 80 (left side) to 30 (right side). On this diagram a parallelogram shall be plotted with corners at the following coordinates (CF-75, WF-28), (CF-75, WF-40), (CF-45, WF-32.5), and (CF-45, WF-44.5). If the point determined by the intersection of the computed CF and WF does not fall within the above parallelogram, the grading of each size of aggregate used and the proportions selected shall be changed as necessary. The point determined by the plotting of the CF and WF may

be adjusted during production  $\pm 3$  WF and  $\pm 5$  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**

<b>Sieve Size</b>	<b>Contractor's Concrete mix Gradation (Percent passing by weight)</b>
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 $\mu$ m)	*
No. 50 (300 $\mu$ m)	*
No. 100 (150 $\mu$ m)	*

### 501-2.2 CEMENT

Cement shall conform to the requirements of ASTM C150 Type I, low alkali (less than 0.6% equivalent alkali) or ASTM C595 Type IL low reactivity option.

### 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 Program Manager.
- 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**

Premolded joint filler for isolation joints shall conform to the requirements of ASTM D1751 or ASTM D1752 and shall be where shown on the plans. The filler for each joint shall be furnished in a single piece for the full depth and width required for the joint, unless otherwise specified by the Program Manager. 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 Program Manager.

#### **501-2.6 STEEL REINFORCEMENT**

Reinforcing shall consist of welded steel wire fabric conforming to the requirements of ASTM A884. Welded wire fabric shall be furnished in flat sheets only.

#### **501-2.7 DOWEL AND TIE BARS**

Dowel bars shall be plain steel bars conforming to ASTM A615 and shall be free from burring or other deformation restricting slippage in the concrete.

- a. **Dowel Bars.** Before delivery to the construction site each dowel bar shall be epoxy coated per ASTM A1078, Type 1, with a coating thickness after curing greater than 10 mils. Patched ends are not required for Type 1 coated dowels. The dowels shall be coated with a bond-breaker recommended by the manufacturer. Dowel sleeves or inserts are not permitted. Grout retention rings shall be fully circular metal or plastic devices capable of supporting the dowel until the grout hardens.
- b. **Tie Bars.** Tie bars shall be deformed steel bars and conform to the requirements of ASTM A615. Tie bars designated as Grade 60 in ASTM A615 or ASTM A706 shall be used for construction requiring bent bars.

#### **501-2.8 Water**

Water used in mixing or curing shall be potable. If water is taken from other sources considered non-potable, it shall meet the requirements of ASTM C1602.

#### **501-2.9 MATERIAL FOR CURING CONCRETE**

Curing materials shall conform to one of the following specifications:

- a. Liquid membrane-forming compounds for curing concrete shall conform to the requirements of ASTM C309, Type 2, Class A, or Class B.
- b. White polyethylene film for curing concrete shall conform to the requirements of ASTM C171.
- c. White burlap-polyethylene sheeting for curing concrete shall conform to the requirements of ASTM C171.
- d. Waterproof paper for curing concrete shall conform to the requirements of ASTM C171.

**501-2.10 ADMIXTURES**

Admixtures shall conform to the following specifications:

- a. **Air-entraining admixtures.** Air-entraining admixtures shall meet the requirements of ASTM C260 and shall consistently entrain the air content in the specified ranges under field conditions. The air-entraining agent and any water reducer admixture shall be compatible.
- b. **Water-reducing admixtures.** Water-reducing admixture shall meet the requirements of ASTM C494, Type A, B, or D.
- c. **Other admixtures.** The use of set retarding and set-accelerating admixtures shall be approved by the Program Manager 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 <sub>3</sub> (Lithium Nitrate)	30 ±0.5
SO <sub>4</sub> (Sulfate Ion)	0.1 (max)
Cl (Chloride Ion)	0.2 (max)
Na (Sodium Ion)	0.1 (max)
K (Potassium Ion)	0.1 (max)

The lithium nitrate admixture dispensing and mixing operations shall be verified and certified by the lithium manufacturer's representative.

**501-2.11 EPOXY-RESIN**

All epoxy-resin materials shall be two-component materials conforming to the requirements of ASTM C881, Class as appropriate for each application temperature to be encountered, except that in addition, the materials shall meet the following requirements:

- a. Material for use for embedding dowels and anchor bolts shall be Type IV, Grade 3.
- b. Material for use as patching materials for complete filling of spalls and other voids and for use in preparing epoxy resin mortar shall be Type III, Grade as approved.
- c. Material for use for injecting cracks shall be Type IV, Grade 1.
- d. Material for bonding freshly mixed Portland cement concrete or mortar or freshly mixed epoxy resin concrete or mortar to hardened concrete shall be Type V, Grade as approved.

**501-2.12 BOND BREAKER**

Not required.

**CONCRETE MIX****501-3.1. GENERAL**

No concrete shall be placed until an acceptable concrete mix has been submitted to the Program Manager for review and the Program Manager has taken appropriate action. The Program Manager'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 Program Manager prior to start of construction.

### **501-3.3 CONCRETE MIX PROPORTIONS**

Develop the mix using the procedures contained in Portland Cement Association (PCA) publication, "Design and Control of Concrete Mixtures." Concrete shall be proportioned to achieve a 28-day flexural strength that meets or exceeds the acceptance criteria contained in paragraph 501-6.6 for a flexural strength of 650 psi per ASTM C78.

The minimum cementitious material shall be adequate to ensure a workable, durable mix. The minimum cementitious material (cement plus fly ash, or slag cement) shall be 500 pounds per cubic yard. 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 for slip-form placement. For fixed-form placement, the slump shall not exceed 3 inches. For hand placement, the slump shall not exceed 4 inches.

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 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 Program Manager for approval.

The Program Manager 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 Program Manager at least thirty (30) days prior to the start of operations. The submitted concrete mix shall not be more than one hundred eighty (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 Program Manager.

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.
- d. **Ultrafine fly ash (UFFA) and ultrafine pozzolan (UFP).** UFFA and UFP may be used in the concrete mix with the Program Manager's approval. When UFFA and UFP is used as a partial replacement for cement, the replacement rate shall be determined from laboratory trial mixes, and shall be between 7% and 16% by weight of the 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 4.5%. 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 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 Program Manager, 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 Program Manager, 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 Program Manager. Acceptable control strips will meet edge slump tolerance and surface acceptable with little or no finishing, air content within action limits, strength equal to or greater than requirements of P501-3.3. The control strip will be considered one lot for payment (no sublots required for control strip). Payment will only be made for an acceptable control strip in accordance with paragraph 501-8.1 using a lot pay factor equal to 100.

### **501-4.2 EQUIPMENT**

The Contractor is responsible for the proper operation and maintenance of all equipment necessary for handling materials and performing all parts of the work to meet this specification.

- a. Plant and equipment.** The plant and mixing equipment shall conform to the requirements of ASTM C94 and/or ASTM C685. Each truck mixer shall have attached in a prominent place a manufacturer's nameplate showing the capacity of the drum in terms of volume of mixed concrete and the speed of rotation of the mixing drum or blades. The truck mixers shall be examined daily for changes in condition due to accumulation of hard concrete or mortar or wear of blades. The pickup and throwover blades shall be replaced when they have worn down 3/4 inch (19 mm) or more. The Contractor shall have a copy of the manufacturer's design on hand showing dimensions and arrangement of blades in reference to original height and depth.

Equipment for transferring and spreading concrete from the transporting equipment to the paving lane in front of the finishing equipment shall be provided. The equipment shall be specially manufactured, self-propelled transfer equipment which will accept the concrete outside the paving lane and will spread it evenly across the paving lane in front of the paver and strike off the surface evenly to a depth which permits the paver to operate efficiently.

- b. Finishing equipment.**

- (1) Slip-form.** The standard method of constructing concrete pavements shall be with an approved slip-form paving equipment designed and operated to spread, consolidate, screed, and finish the freshly placed concrete in one complete pass of the machine so that the end result is a dense and homogeneous pavement which is achieved with a minimum of hand finishing. The paver-finisher shall be a heavy duty, self-propelled machine designed specifically for paving and finishing high quality concrete pavements.

- (2) Fixed-form.** On projects requiring less than 2,000 square yards 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 Program Manager. Hand screeding and float finishing may only be used on small irregular areas as allowed by the Program Manager.

- 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 Program Manager.

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 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 Program Manager. The top face of the form shall not vary from a true plane more than 1/8 inch in 10 feet, and the upstanding leg shall not vary more than 1/4 inch. 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 Program Manager. The forms shall extend the full depth of the pavement section.

#### **501-4.3 FORM SETTING**

Forms shall be set to line and grade as shown on the plans, sufficiently in advance of the concrete placement, to ensure continuous paving operation. Forms shall be set to withstand, without visible spring or settlement, the impact and vibration of the consolidating and finishing equipment. Forms shall be cleaned and oiled prior to the concrete placement.

#### **501-4.4 BASE SURFACE PREPARATION PRIOR TO PLACEMENT**

Any damage to the prepared base, subbase, and subgrade shall be corrected full depth by the Contractor prior to concrete placement. The underlying surface shall be entirely free of frost when concrete is placed. The prepared grade shall be moistened with water, without saturating, immediately ahead of concrete placement to prevent rapid loss of moisture from concrete.

#### **501-4.5 HANDLING, MEASURING, AND BATCHING MATERIAL**

Aggregate stockpiles shall be constructed and managed in such a manner that prevents segregation and intermixing of deleterious materials. Aggregates from different sources shall be stockpiled, weighed and batched separately at the concrete batch plant. Aggregates that have become segregated or mixed with earth or foreign material shall not be used. All aggregates produced or handled by hydraulic methods, and washed aggregates, shall be stockpiled or binned for draining at least 12 hours before being batched. Store and maintain all aggregates at a uniform moisture content prior to use. A continuous supply of materials shall be provided to the work to ensure continuous placement.

**501-4.6 MIXING CONCRETE**

The concrete may be mixed at the work site, in a central mix plant or in truck mixers. The mixer shall be of an approved type and capacity. Mixing time shall be measured from the time all materials are placed into the drum until the drum is emptied into the truck. All concrete shall be mixed and delivered to the site in accordance with the requirements of ASTM C94 or ASTM C685.

Mixed concrete from the central mixing plant shall be transported in truck mixers, truck agitators, or non-agitating trucks. The elapsed time from the addition of cementitious material to the mix until the concrete is discharged from the truck should not exceed 30 minutes when the concrete is hauled in non-agitating trucks, nor 90 minutes when the concrete is hauled in truck mixers or truck agitators. In no case shall the temperature of the concrete when placed exceed 90°F (32°C). Retempering concrete by adding water or by other means will not be permitted. With transit mixers additional water may be added to the batch materials and additional mixing performed to increase the slump to meet the specified requirements provided the addition of water is performed within 45 minutes after the initial mixing operations and provided the water/cementitious ratio specified is not exceeded.

**501-4.7 WEATHER LIMITATIONS ON MIXING AND PLACING**

No concrete shall be mixed, placed, or finished when the natural light is insufficient, unless an adequate and approved artificial lighting system is operated.

- a. Cold weather.** Unless authorized in writing by the Program Manager, 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 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 Program Manager 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 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. 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, based on the average of four field cured specimens per 2,000 cubic yards 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 Program Manager.

- 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 Program Manager.

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 Program Manager.

If a lack of consolidation of the hardened concrete is suspected by the Program Manager, referee testing may be required. Referee testing of hardened concrete will be performed by the Program Manager by cutting cores from the finished pavement after a minimum of 24 hours curing. The Program Manager shall visually examine the cores for evidence of lack of consolidation. Density determinations will be made by the Program Manager based on the water content of the core as taken. ASTM C642 shall be used for the determination of core density in the saturated-surface dry condition. When required, referee cores will be taken at the minimum rate of one for each 500 cubic yards (382 m<sup>3</sup>) 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 from their designated position and shall be true to line with not more than 1/4-inch variation in 10 feet. The surface across the joints shall be tested with a 12-foot straightedge as the joints are finished and any irregularities in excess of 1/4 inch 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 premolded 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 Program Manager. Dowel 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



±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 Program Manager.

**(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 before drilling begins. Holes 1/8 inch greater in diameter than the dowels shall be drilled into the hardened concrete using rotary-core drills. Rotary-percussion drills may be used, provided that excessive spalling does not occur. Spalling beyond the limits of the grout retention ring will require modification of the equipment and operation. Depth of dowel hole shall be within a tolerance of ±1/2 inch 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 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 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 Program Manager, may be used in accordance with the manufacturers 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 Program Manager'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 in depth. Any imperfections resulting from the texturing operation shall be corrected to the satisfaction of the Program Manager.

- 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 to not more than 150 square feet. 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 Program Manager, 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 continuously 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 Program Manager.

#### **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, shall be repaired with an approved grout, as directed by the Program Manager.

Honeycombed areas that extend into the slab greater than a depth of 1 inch 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**

Not used.

#### **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 Program Manager. 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 Program Manager.

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, 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 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 Program Manager, 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 Program Manager 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 have a diameter of 2 inches to 4 inches, 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 Program Manager 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 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 Program Manager. 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 Program Manager. 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 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 either side of the joint and essentially parallel to the original joints, shall be treated as follows.

**(1) Full depth cracks and original joint not cracked.** The full-depth crack shall be treated as the new joint and the original joint filled with an epoxy resin.

**i. Full-depth crack.** The joint sealant reservoir for the crack shall be formed by sawing to a depth of 3/4 inches (19 mm),  $\pm 1/16$  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 Program Manager.

**ii. Original joint.** If the original joint sealant reservoir has been sawed out, the reservoir and as much of the lower saw cut as possible shall be filled with epoxy resin, Type IV, Grade 2, thoroughly tooled into the void using approved procedures.

If only the original narrow saw cut has been made, it shall be cleaned and pressure injected with epoxy resin, Type IV, Grade 1, using approved procedures.

Where a parallel crack goes part way across paving lane and then intersects and follows the original joint which is cracked only for the remained of the width, it shall be treated as specified above for a parallel crack, and the cracked original joint shall be prepared and sealed as originally designed.

**(2) Full depth cracks and original joint cracked.** If there is any place in the lane width where a parallel crack and a cracked portion of the original joint overlap, the entire slab containing the crack shall be removed and replaced.

**d. Removal and replacement of full slabs.** Make a full depth cut perpendicular to the slab surface along all edges of the slab with a concrete saw cutting any dowels or tie-bars. Remove damaged slab protecting adjacent pavement from damage. Damage to adjacent slabs may result in removal of additional slabs as directed by the Program Manager 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 1/2 the slab depth, and less than 25% of the length of the adjacent joint shall be repaired as follows:

- i. Make a vertical saw cut at least 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.
- ii. Remove unsound concrete and at least 1/2 inch (12 mm) of visually sound concrete between the saw cut and the joint or crack with a light chipping hammer.
- iii. Clean cavity with high-pressure water jets supplemented with compressed air as needed to remove all loose material.
- iv. Apply a prime coat of epoxy resin, Type III, Grade I, to the dry, cleaned surface of all sides and bottom of the cavity, except any joint face.
- v. Fill the cavity with low slump concrete or mortar or with epoxy resin concrete or mortar.
- vi. An insert or other bond-breaking medium shall be used to prevent bond at all joint faces.
- vii. A reservoir for the joint sealant shall be sawed to the dimensions required for other joints, or as required to be routed for cracks. The reservoir shall be thoroughly cleaned and sealed with the sealer specified for the joints.

(3) Spalls deeper than 1/2 of the slab depth or spalls longer than 25% of the adjacent joint require replacement of the entire slab.

- f. **Diamond grinding of Concrete surfaces.** Diamond grinding shall be completed prior to pavement grooving. Diamond grinding of the hardened concrete should not be performed until the concrete is at least 14 days old and has achieved full minimum strength. Equipment that causes ravels, aggregate fractures, spalls or disturbance to the joints will not be permitted. The depth of diamond grinding shall not exceed 1/2 inch (13 mm) and all areas in which diamond grinding has been performed will be subject to the final pavement thickness tolerances specified.

Diamond grinding shall be performed with a machine specifically designed for diamond grinding capable of cutting a path at least 3 feet (0.9 m) wide. The saw blades shall be 1/8-inch (3-mm) wide with sufficient number of flush cut blades that create grooves between 0.090 and 0.130 inches (2 and 3.5 mm) wide; and peaks and ridges approximately 1/32 inch (1 mm) higher than the bottom of the grinding cut. The Contractor shall determine the number and type of blades based on the hardness of the aggregate. Contractor shall demonstrate to the Program Manager 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 Program Manager shall be permitted unrestricted access to inspect the Contractor's QC facilities and

witness QC activities. The Program Manager 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 Program Manager as part of the CQCP.

The Program Manager 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 Program Manager, and if it can be demonstrated in the laboratory, in the presence of the Program Manager, 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 1/4 inch in 12 feet, identifying areas that may pond water which could lead to hydroplaning of aircraft. If the smoothness criterion is not met, appropriate changes and corrections to the construction process shall be made by the Contractor before construction continues

The Contractor may use a 12-foot straightedge, a rolling inclinometer meeting the requirements of ASTM E2133 or rolling external reference device that can simulate a 12-foot straightedge approved by the Program Manager. Straight-edge testing shall start with one-half the length of the straightedge at the edge of pavement section being tested and then moved ahead one-half the length of the straightedge for each successive measurement. Testing shall be continuous across all joints. The surface irregularity shall be determined by placing the freestanding (unleveled) straightedge on the pavement surface and allowing it to rest upon the two highest spots covered by its length, and measuring the maximum gap between the straightedge and the pavement surface in the area between the two high points. If the rolling inclinometer or external reference device is used, the data may be evaluated using the FAA profile program, ProFAA, or FHWA profile program ProVal, using the 12-foot straightedge simulation function.

Smoothness readings shall not be made across grade changes or cross slope transitions. The transition between new and existing pavement shall be evaluated separately for conformance with the plans.

**(1) Transverse measurements.** Transverse measurements shall be taken for each day's production placed. Transverse measurements shall be taken perpendicular to the pavement centerline each 50 feet or more often as determined by the Program Manager. The joint between lanes shall be tested separately to facilitate smoothness between lanes.

**(2) Longitudinal measurements.** Longitudinal measurements shall be taken for each day's production placed. Longitudinal tests shall be parallel to the centerline of paving; at the center of paving lanes when widths of paving lanes are less than 20 feet; and at the third points of paving lanes when widths of paving lanes are 20 ft or greater.

Deviations on the final surface course in either the transverse or longitudinal direction that will trap water greater than 1/4 inch shall be corrected with diamond grinding per paragraph 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 gradelines (as a minimum at center and edges of paving lane) and longitudinal spacing as shown on cross-sections and plans. The final surface of the pavement will not vary from the gradeline elevations and cross-sections shown on the plans by more than 1/2 inch vertically and 0.1 feet laterally. The documentation will be provided by the Contractor to the Program Manager by the end of the following working day.

Areas with humps or depression 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 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 Program Manager 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 Program Manager may halt production or acceptance of the material.

- a. Fine and coarse aggregate gradation.** The Contractor shall record the running average of the last five gradation tests for each control sieve on linear control charts. Superimposed on the control charts shall be the action and suspension limits. Gradation tests shall be performed by the Contractor per ASTM C136. The Contractor shall take at least two samples per lot to check the final gradation. Sampling shall be per ASTM D75 from the flowing aggregate stream or conveyor belt.
- b. Slump and air content.** The Contractor shall maintain linear control charts both for individual measurements and range (that is, difference between highest and lowest measurements) for slump and air content in accordance with the following Action and Suspension Limits.
- c. Combined gradation.** The Contractor shall maintain a control chart plotting the coarseness factor and workability factor on a chart in accordance with paragraph 501-2.1d.

**Control Chart Limits<sup>1</sup>**

Control Parameter	Individual Measurements	
	Action Limit	Suspension Limit
Gradation <sup>2</sup>	*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%

<sup>1</sup> Control charts shall developed and maintained for each control parameter indicated.

<sup>2</sup> Control charts shall be developed and maintained for each sieve size.

<sup>3</sup> 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, 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 will be performed by the Program Manager. 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, 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 Program Manager 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 [3,800 square yards]. Each lot will be divided into approximately equal sublots with individual sublots between 400 to 600 cubic yards [760 to 1140 square yards]. Where three sublots are produced, they will constitute a lot. Where one or two sublots are produced, they will be incorporated into the previous or next lot. Where more than one plant is simultaneously producing concrete for the job, the lot sizes will apply separately for each plant.

#### **501-6.4 PARTIAL LOTS**

When operational conditions cause a lot to be terminated before the specified number of tests have been made for the lot or for overages or minor placements to be considered as partial lots, the following procedure will be used to adjust the lot size and the number of tests for the lot.

Where three sublots have been produced, they will constitute a lot. Where one or two sublots have been produced, they will be incorporated into the next lot or the previous lot and the total number of sublots will be used in the acceptance criteria calculation, that is,  $n=5$  or  $n=6$ .

#### **501-6.5 ACCEPTANCE SAMPLING AND TESTING**

##### **a. Strength.**

**(1) Sampling.** One sample will be taken for each subplot from the concrete delivered to the job site. Sampling locations will be determined by the Program Manager in accordance with random sampling procedures contained in ASTM D3665. The concrete will be sampled in accordance with ASTM C172.

**(2) Test Specimens.** The Program Manager 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 Program Manager 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 Program Manager for each subplot. Sampling locations will be determined by the Program Manager 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 in diameter neatly cut with a core drill. The Contractor will furnish all tools, labor, and materials for filling the cored hole. Core holes will be filled by the Contractor with a non-shrink grout approved by the Program Manager within one day after sampling.

**(2) Testing.** The thickness of the cores will be determined by the Program Manager 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 Program Manager in accordance with paragraph 501-6.6.

**501-6.6 ACCEPTANCE CRITERIA**

**a. General.** Acceptance will be based on the following characteristics of the completed pavement discussed in paragraph 501-6.5b:

- (1) Strength**
- (2) Thickness**
- (3) Grade**
- (4) Profilograph smoothness**
- (5) Adjustments for repairs**

Acceptance for strength, thickness, and grade, will be based on the criteria contained in accordance with paragraph 501-6.6b(1), 501-6.6b(2), and 501-6.6b(3), respectively. Acceptance for profilograph smoothness will be based on the criteria contained in paragraph 501-6.6b(4).

Production quality must achieve 90 PWL or higher to receive full 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)**

<b>Strength</b>	$0.93 \times \text{strength specified in paragraph 501-3.3}$
<b>Thickness</b>	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 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.** The final profilograph shall be the full length of the project to facilitate testing of roughness between lots. The Contractor, in the presence of the Program Manager shall perform a profilograph roughness test on the completed project with a profilograph meeting the requirements of ASTM E1274 or a Class I inertial profiler meeting ASTM E950. Data and results shall be provided within 48 hrs of profilograph roughness tests.

The pavement shall have an average profile index less than 15 inches per mile per 1/10 mile. The equipment shall utilize electronic recording and automatic computerized reduction of data to indicate "must grind" bumps and the Profile Index for the pavement using a 0.2-inch blanking band. The bump template must span one inch with an offset of 0.4 inches. The profilograph must be calibrated prior to use and operated by a factory or State DOT approved, trained operator. Profilograms shall be recorded on a longitudinal scale of one inch equals 25 feet and a vertical scale of one inch equals one inch. Profilograph shall be performed one foot right and left of project centerline and 15 feet right and left of project centerline. Any areas that indicate "must grind" shall be corrected with diamond grinding per paragraph 501-4.19f or by removing and replacing full depth of surface course, as directed by the Program Manager. Where corrections are necessary, a second profilograph run shall be performed to verify that the corrections produced an average profile index of 15 inches per mile per 1/10 mile or less.

**(5) Adjustments for repair.** Sublots with spall repairs, crack repairs, or partial panel replacement, will be limited to no more than 95% payment.

**(6) Adjustment for grinding.** For sublots with grinding over 25% of a subplot, payment will be reduced 5%.

## METHOD OF MEASUREMENT

**501-7.1** Concrete pavement shall be measured by the number of square yards of plain or 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, smoothness, and thickness tests. Payment for acceptable lots of concrete pavement shall be adjusted in accordance with paragraph 501-8.1a for strength and thickness; 501-8.1b for repairs; 501-8.1c for grinding; and 501-8.1d for smoothness, subject to the limitation that:

The total project payment for concrete pavement shall not exceed 100 percent of the product of the contract unit price and the total number of square yards of concrete pavement used in the accepted work (See Note 1 under the Price Adjustment Schedule table below).

Payment shall be full compensation for all labor, materials, tools, equipment, and incidentals required to complete the work as specified herein and on the drawings.

- a. Basis of adjusted payment.** The pay factor for each individual lot shall be calculated in accordance with the Price Adjustment Schedule table below. A pay factor shall be calculated for both strength and thickness. The lot pay factor shall be the higher of the two values when calculations for both strength and thickness are 100% or higher. The lot pay factor shall be the product of the two values when only one of the calculations for either strength or thickness is 100% or higher. The lot pay factor shall be the lower of the two values when calculations for both strength and thickness are less than 100%.

**Price Adjustment Schedule<sup>1</sup>**

<b>Percentage of Materials Within Specification Limits (PWL)</b>	<b>Lot Pay Factor (Percent of Contract Unit Price)</b>
96 – 100	106
90 – 95	PWL + 10
75 – 90	0.5 PWL + 55
55 – 74	1.4 PWL – 12
Below 55	Reject <sup>2</sup>

<sup>1</sup> Although it is theoretically possible to achieve a pay factor of 106% for each lot, actual payment in excess of 100% shall be subject to the total project payment limitation specified in paragraph 501-8.1.

<sup>2</sup> 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.** The Contractor will receive full payment when the profilograph average profile index is in accordance with paragraph 501-6.6b(4). When the final average profile index for the entire length of pavement does not exceed 15 inches per mile per 1/10 mile, payment will be made at the contract unit price for the completed pavement.

**e. Payment.**

Payment shall be made under:

Item P-501-8.1 Concrete Pavement (Plain and Reinforced; 19 inch thick) – per square yard

## REFERENCES

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

### ASTM International (ASTM)

ASTM A184	Standard Specification for Welded Deformed Steel Bar Mats for Concrete Reinforcement
ASTM A615	Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM A704	Standard Specification for Welded Steel Plain Bar or Rod Mats for Concrete Reinforcement
ASTM A706	Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement
ASTM A775	Standard Specification for Epoxy-Coated Steel Reinforcing Bars
ASTM A884	Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement
ASTM A934	Standard Specification for Epoxy-Coated Prefabricated Steel Reinforcing Bars
ASTM A996	Standard Specification for Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement
ASTM A1035	Standard Specification for Deformed and Plain, Low-Carbon, Chromium, Steel Bars for Concrete Reinforcement
ASTM A1064	Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
ASTM A1078	Standard Specification for Epoxy-Coated Steel Dowels for Concrete Pavement
ASTM C29	Standard Test Method for Bulk Density ("Unit Weight") and Voids in Aggregate
ASTM C31	Standard Practice for Making and Curing Concrete Test Specimens in the Field
ASTM C33	Standard Specification for Concrete Aggregates
ASTM C39	Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C70	Standard Test Method for Surface Moisture in Fine Aggregate
ASTM C78	Standard Test Method for Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading)
ASTM C88	Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
ASTM C94	Standard Specification for Ready-Mixed Concrete
ASTM C114	Standard Test Methods for Chemical Analysis of Hydraulic Cement
ASTM C117	Standard Test Method for Materials Finer than 75- $\mu$ m (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C123	Standard Test Method for Lightweight Particles in Aggregate



ASTM C136	Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C131	Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C138	Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete
ASTM C142	Standard Test Method for Clay Lumps and Friable Particles in Aggregates
ASTM C143	Standard Test Method for Slump of Hydraulic-Cement Concrete
ASTM C150	Standard Specification for Portland Cement
ASTM C171	Standard Specification for Sheet Materials for Curing Concrete
ASTM C172	Standard Practice for Sampling Freshly Mixed Concrete
ASTM C173	Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
ASTM C174	Standard Test Method for Measuring Thickness of Concrete Elements Using Drilled Concrete Cores
ASTM C227	Standard Test Method for Potential Alkali Reactivity of Cement-Aggregate Combinations (Mortar-Bar Method)
ASTM C231	Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C260	Standard Specification for Air-Entraining Admixtures for Concrete
ASTM C295	Standard Guide for Petrographic Examination of Aggregates for Concrete
ASTM C309	Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C311	Standard Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use in Portland Cement Concrete
ASTM C494	Standard Specification for Chemical Admixtures for Concrete
ASTM C566	Standard Test Method for Total Evaporable Moisture Content of Aggregates by Drying
ASTM C595	Standard Specification for Blended Hydraulic Cements
ASTM C618	Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
ASTM C642	Standard Test Method for Density, Absorption, and Voids in Hardened Concrete
ASTM C666	Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing
ASTM C685	Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing
ASTM C881	Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete

ASTM C989	Standard Specification for Slag Cement for Use in Concrete and Mortars
ASTM C1017	Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete
ASTM C1064	Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete
ASTM C1077	Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation
ASTM C1157	Standard Performance Specification for Hydraulic Cement
ASTM C1260	Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)
ASTM C1365	Standard Test Method for Determination of the Proportion of Phases in Portland Cement and Portland-Cement Clinker Using X-Ray Powder Diffraction Analysis
ASTM C1567	Standard Test Method for Determining the Potential Alkali-Silica Reactivity of Combinations of Cementitious Materials and Aggregate (Accelerated Mortar-Bar Method)
ASTM C1602	Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
ASTM D75	Standard Practice for Sampling Aggregates
ASTM D1751	Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
ASTM D1752	Standard Specification for Preformed Sponge Rubber and Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction
ASTM D2419	Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate
ASTM D3665	Standard Practice for Random Sampling of Construction Materials
ASTM D4791	Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate
ASTM E178	Standard Practice for Dealing with Outlying Observations
ASTM E1274	Standard Test Method for Measuring Pavement Roughness Using a Profilograph
ASTM E2133	Standard Test Method for Using a Rolling 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<sup>th</sup> 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****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 Program Manager 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 or above, and the temperature has not been below 35°F 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 Program Manager.

**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 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, with a pressure range of 25 to 75 psi and with an allowable variation from the specified rate of not more than  $\pm 5\%$ , 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 Program Manager.

### **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 depending on the base course surface texture. The type of asphalt material and application rate shall be approved by the Program Manager 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 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 Program Manager. 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 Program Manager 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. 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 for emulsified asphalt prime coat. This price shall be full compensation for furnishing all materials and for all preparation, delivering, and applying the materials, and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

Item P-602-5.1 Emulsified Asphalt Prime Coat (@ 0.3 gal/ sq yd) – per gallon

**REFERENCES**

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

ASTM International (ASTM)

ASTM D2995	Standard Practice for Estimating Application Rate and Residual Application Rate of Bituminous Distributors
ASTM D3628	Standard Practice for Selection and Use of Emulsified Asphalts

**END OF ITEM P-602**

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**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 Program Manager 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 or above; the temperature has not been below 35°F 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 Program Manager.

**603-3.2 EQUIPMENT**

The Contractor shall provide equipment for heating and applying the emulsified asphalt material. The emulsion shall be applied with a manufacturer-approved computer rate-controlled asphalt distributor. The equipment shall be in good working order and contain no contaminants or diluents in the tank. Spray bar tips must be clean, free of burrs, and of a size to maintain an even distribution of the emulsion. Any type of tip or pressure source is suitable that will maintain predetermined flow rates and constant pressure during the application process with application speeds under eight (8) miles per hour or seven hundred (700) feet per minute.

The equipment will be tested under pressure for leaks and to ensure proper set-up before use to verify truck set-up (via a test-shot area), including but not limited to, nozzle tip size appropriate for application, spray-bar height and pressure and pump speed, evidence of triple-overlap spray pattern, lack of leaks, and any other factors relevant to ensure the truck is in good working order before use.

The distributor truck shall be equipped with a minimum 12-foot spreader spray bar with individual nozzle control with computer-controlled application rates. The distributor truck shall have an easily accessible thermometer that constantly monitors the temperature of the emulsion, and have an operable mechanical tank gauge that can be used to cross-check the computer accuracy. If the distributor is not equipped with an operable quick shutoff valve, the prime operations shall be started and stopped on building paper.



The distributor truck shall be equipped to effectively heat and mix the material to the required temperature prior to application as required. Heating and mixing shall be done in accordance with the manufacturer's recommendations. Do not overheat or over mix the material.

The distributor shall be equipped with a hand sprayer.

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 Program Manager.

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 Program Manager prior to application.

**Emulsified Asphalt**

<b>Surface Type</b>	<b>Residual Rate, gal/SY</b>	<b>Emulsion Application Bar Rate, gal/SY</b>
<b>New Asphalt:</b>	0.02-0.05	0.03-0.07
<b>Existing Asphalt:</b>	0.04-0.07	0.06-0.11
<b>Milled Surface:</b>	0.04-0.08	.0.06-0.12
<b>Concrete:</b>	0.03-0.05	0.05-0.08

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 Program Manager. 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 Program Manager 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. Volume shall be corrected to the volume at 60°F (16°C) in accordance with ASTM D1250. The emulsified asphalt material paid for will be the measured quantities used in the accepted work, provided that the measured quantities are not 10% over the specified application rate. Any amount of emulsified asphalt material more than 10% over the specified application rate for each application will be deducted from

the measured quantities, except for irregular areas where hand spraying of the emulsified asphalt material is necessary. Water added to emulsified asphalt will not be measured for payment.

### **BASIS OF PAYMENT**

#### **603.5-1**

Payment shall be made at the contract unit price per gallon of emulsified asphalt material. This price shall be full compensation for furnishing all materials, for all preparation, delivery, and application of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item P-603-5.1	Emulsified Asphalt Tack Coat (@ 0.05 gal/sq yd) per gallon
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### **REFERENCES**

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

ASTM International (ASTM)

ASTM D1250	Standard Guide for Use of the Petroleum Measurement Tables
ASTM D2995	Standard Practice for Estimating Application Rate and Residual Application Rate of Bituminous Distributors
ASTM D3628	Standard Practice for Selection and Use of Emulsified Asphalts

**END ITEM P-603**

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**ITEM P-605****JOINT SEALANTS FOR PAVEMENTS****DESCRIPTION****605-1.1**

This item shall consist of providing and installing a resilient and adhesive joint sealing material capable of effectively sealing joints in pavement; joints between different types of pavements; and cracks in existing pavement.

**MATERIALS****605-2.1 JOINT SEALANTS**

Joint sealant materials shall meet the requirements of the following:

1. Concrete Pavement Joints – a low modulus, cold applied, silicone sealant in conformance with ASTM D5893.
2. Bituminous Shoulder-Concrete Pavement Interface Joint – a hot-poured, jet fuel resistant, sealant for concrete and asphalt in conformance with ASTM D6690.

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 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 and rising at the time of application of the poured joint sealing material. Do not apply sealant if moisture is observed in the joint.

If pavement must open to traffic prior to placement of the sealant, Contractor shall temporarily fill the joint with a jute or nylon rope immediately after the joint is sawed. The rope should be slightly larger

than the joint and should be forced into the joint so that the top of the rope is 1/8 inch below the pavement surface. The rope shall be removed immediately prior to cleaning.

### 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, 14 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.** The Contractor must demonstrate sandblasting equipment including the air compressor, hose, guide and nozzle size, under job conditions, before approval in accordance with paragraph 605-3.3. The Contractor shall demonstrate, in the presence of the Program Manager, that the method cleans the joint and does not damage the joint.
- c. **Waterblasting equipment.** The Contractor must demonstrate waterblasting equipment including the pumps, hose, guide and nozzle size, under job conditions, before approval in accordance with paragraph 605-3.3. The Contractor shall demonstrate, in the presence of the Program Manager, that the method cleans the joint and does not damage the joint.
- d. **Hand tools.** Hand tools may be used, when approved, for removing defective sealant from a crack and repairing or cleaning the crack faces. Hand tools should be carefully evaluated for potential spalling effects prior to approval for use.
- e. **Hot-poured sealing equipment.** The unit applicators used for heating and installing ASTM D6690 joint sealant materials shall be mobile and shall be equipped with a double-boiler, agitator-type kettle with an oil medium in the outer space for heat transfer; a direct-connected pressure-type extruding device with a nozzle shaped for inserting in the joint to be filled; positive temperature devices for controlling the temperature of the transfer oil and sealant; and a recording type thermometer for indicating the temperature of the sealant. The applicator unit shall be designed so that the sealant will circulate through the delivery hose and return to the inner kettle when not in use.
- f. **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 Program Manager, that the method cleans the joint and does not damage the joint.

- a. **Sawing.** All joints shall be sawed in accordance with specifications and plan details. Immediately after sawing the joint, the resulting slurry shall be completely removed from joint and adjacent area by flushing with a jet of water, and by use of other tools as necessary.
- b. **Sealing.** Immediately before sealing, the joints shall be thoroughly cleaned of all remaining laitance, curing compound, filler, protrusions of hardened concrete, old sealant and other foreign material from the sides and upper edges of the joint space to be sealed. Cleaning shall

be accomplished by sandblasting, or waterblaster only if permitted by the Engineer, as specified in paragraph 605-3.2. The newly exposed concrete joint faces and the pavement surface extending a minimum of 1/2 inch from the joint edge shall be 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 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 Program Manager before sealing is allowed. Sealants shall be installed in accordance with the following requirements:

Immediately preceding, but not more than 50 feet ahead of the joint sealing operations, perform a final cleaning with compressed air. Fill the joints from the bottom up to 1/4 inch  $\pm$  1/16 inch below the top of pavement surface; or bottom of groove for grooved pavement. Remove and discard excess or spilled sealant from the pavement by approved methods. Install the sealant in such a manner as to prevent the formation of voids and entrapped air. In no case shall gravity methods or pouring pots be used to install the sealant material. Traffic shall not be permitted over newly sealed pavement until authorized by the Program Manager. When a primer is recommended by the manufacturer, apply it evenly to the joint faces in accordance with the manufacturer's instructions. Check the joints frequently to ensure that the newly installed sealant is cured to a tack-free condition within the time specified.

#### **605-3.5 INSPECTION**

The Contractor shall inspect the joint sealant for proper rate of cure and set, bonding to the joint walls, cohesive separation within the sealant, reversion to liquid, entrapped air and voids. Sealants exhibiting any of these deficiencies at any time prior to the final acceptance of the project shall be removed from the joint, wasted, and replaced as specified at no additional cost to the airport.

#### **605-3.6 CLEAN-UP**

Upon completion of the project, remove all unused materials from the site and leave the pavement in a clean condition.

### **METHOD OF MEASUREMENT**

**605-4.1** No measurement will be made for the direct payment of sealing of joints required in the construction of concrete pavements. The cost of furnishing and installing joint sealing material shall be considered as a subsidiary obligation in the completion of the construction.

**BASIS OF PAYMENT**

**605-5.1** No direct payment will be made for sealing of joints. The cost of all required joint sealing will be included in the applicable paving items for which it is a component part. The contract unit price for paving 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.

**REFERENCES**

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

## ASTM International (ASTM)

ASTM D789	Standard Test Method for Determination of Relative Viscosity of Polyamide (PA)
ASTM D5249	Standard Specification for Backer Material for Use with Cold- and Hot-Applied Joint Sealants in Portland-Cement Concrete and Asphalt Joints
ASTM D5893	Standard Specification for Cold Applied, Single Component, Chemically Curing Silicone Joint Sealant for Portland Cement Concrete Pavements
ASTM D6690	Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt

## Advisory Circulars (AC)

AC 150/5340-30	Design and Installation Details for Airport Visual Aids
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**END ITEM P-605**

**ITEM P-610****CONCRETE FOR MISCELLANEOUS STRUCTURES****DESCRIPTION****610-1.1**

This item shall consist of concrete and reinforcement, as shown on the plans, prepared and constructed in accordance with these specifications. This specification shall be used for all concrete other than airfield pavement which are cast-in-place.

**MATERIALS****610-2.1 GENERAL**

Only approved materials, conforming to the requirements of these specifications, shall be used in the work. Materials may be subject to inspection and tests at any time during their preparation or use. The source of all materials shall be approved by the Program Manager 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 Program Manager. 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

Coarse aggregate may only be accepted from sources that have a 20-year service history for the same gradation to be supplied with no history of D-Cracking. Aggregates that do not have a 20-year record of service free from major repairs (less than 5% of slabs replaced) in similar conditions without D-cracking shall not be used unless the material currently being produced has a durability factor greater than or equal to 95 per ASTM C666. The Contractor shall submit a current certification and test results to verify the aggregate acceptability. Test results will only be accepted from a State Department of Transportation (DOT) materials laboratory or an accredited laboratory. Certification and test results which are not dated or which are over one (1) year old or which are for different gradations will not be accepted.

Crushed granite, calcite cemented sandstone, quartzite, basalt, diabase, rhyolite or trap rock are considered to meet the D-cracking test requirements but must meet all other quality tests specified in Item P-501.

#### 610-2.3 FINE AGGREGATE

The fine aggregate for concrete shall meet all fine aggregate requirements of ASTM C33.

#### 610-2.4 CEMENT

Cement shall conform to the requirements of ASTM C150 Type I low alkali cement (less than 0.6% equivalent alkalis) or ASTM C595 Type IL low reactivity option.

#### 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 Program Manager.
- 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 Program Manager 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 Program Manager 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 Program Manager. 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 PREMOLED JOINT MATERIAL**

Premolded joint material for expansion joints shall meet the requirements of ASTM D1751.

**610-2.9 JOINT FILLER**

The filler for joints shall meet the requirements of Item P-605, unless otherwise specified.

**610-2.10 STEEL REINFORCEMENT**

Reinforcing shall consist of welded steel wire fabric conforming to the requirements of ASTM A1064, ASTM A844 or bar mats conforming to the requirements of ASTM A184 or ASTM A704.

**610-2.11 MATERIALS FOR CURING CONCRETE**

Curing materials shall conform to one of the following: 1) waterproof paper meeting the requirements of ASTM C171, 2) clear or white polyethylene sheeting meeting the requirements of ASTM C171, or 3) white-pigmented liquid membrane-forming compound, Type 2, Class B meeting the requirements of 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 Program Manager.

### **610-3.2 CONCRETE MIXTURE**

The concrete shall develop a compressive strength of 4000 psi in 28 days as determined by test cylinders made in accordance with ASTM C31 and tested in accordance with ASTM C39. The concrete shall contain not less than 470 pounds of cementitious material per cubic yard. The water cementitious ratio shall not exceed 0.45 by weight. The air content of the concrete shall be 5% +/- 1.2% as determined by ASTM C231 and shall have a slump of not more than 4 inches as determined by ASTM C143.

### **610-3.3 MIXING**

Concrete may be mixed at the construction site, at a central point, or wholly or in part in truck mixers. The concrete shall be mixed and delivered in accordance with the requirements of ASTM C94 or ASTM C685.

The concrete shall be mixed only in quantities required for immediate use. Concrete shall not be mixed while the air temperature is below 40°F without the Program Manager's 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 or more than 100°F. The Contractor shall be held responsible for any defective work, resulting from freezing or injury in any manner during placing and curing, and shall replace such work at his expense.

Retempering of concrete by adding water or any other material is not permitted.

The rate of delivery of concrete to the job shall be sufficient to allow uninterrupted placement of the concrete.

### **610-3.4 FORMS**

Concrete shall not be placed until all the forms and reinforcements have been inspected and approved by the Program Manager. 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 Program Manager. Concrete shall be placed as soon as practical after mixing, but in no case later than one (1) hour after water has been added to the mix. The method and manner of placing shall avoid segregation and displacement of the reinforcement. Troughs, pipes, and chutes shall be used as an aid in placing concrete when necessary. The concrete shall not be dropped from a height of more than 5 feet (1.5 m). Concrete shall be deposited as nearly as practical in its final position to avoid segregation due to rehandling or flowing. Do not subject concrete to procedures which cause segregation. Concrete shall be placed on clean, damp surfaces, free from running water, or on a properly consolidated soil foundation.

**610-3.9 VIBRATION**

Vibration shall follow the guidelines in American Concrete Institute (ACI) Committee 309R, Guide for Consolidation of Concrete.

**610-3.10 JOINTS**

Joints shall be constructed as indicated on the plans.

**610-3.11 FINISHING**

All exposed concrete surfaces shall be true, smooth, and free from open or rough areas, depressions, or projections. All concrete horizontal plane surfaces shall be brought flush to the proper elevation with the finished top surface struck-off with a straightedge and floated.

**610-3.12 CURING AND PROTECTION**

All concrete shall be properly cured in accordance with the recommendations in American Concrete Institute (ACI) 308R, Guide to External Curing of Concrete. The concrete shall be protected from damage until project acceptance.

**610-3.13 COLD WEATHER PLACING**

When concrete is placed at temperatures below 40°F, 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, 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 Program Manager 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 Program Manager, shall be removed and replaced at the Contractor's expense. Defective work includes, but is not limited to, uneven dimensions, honeycombing and other voids on the surface or edges of the concrete.

**METHOD OF MEASUREMENT****610-5.1**

Concrete shall be considered incidental and no separate measurement shall be made.

**BASIS OF PAYMENT****610-6.1**

No separate payment will be made for concrete, reinforcing steel, joint filler, or any other items required by this section. These items shall be included in the unit prices of the items of which they are a part.

**REFERENCES**

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

ASTM International (ASTM)

ASTM A184	Standard Specification for Welded Deformed Steel Bar Mats for Concrete Reinforcement
ASTM A615	Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM A704	Standard Specification for Welded Steel Plain Bar or Rod Mats for Concrete Reinforcement

ASTM A706	Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement
ASTM A775	Standard Specification for Epoxy-Coated Steel Reinforcing Bars
ASTM A884	Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement
ASTM A934	Standard Specification for Epoxy-Coated Prefabricated Steel Reinforcing Bars
ASTM A1064	Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
ASTM C31	Standard Practice for Making and Curing Concrete Test Specimens in the Field
ASTM C33	Standard Specification for Concrete Aggregates
ASTM C39	Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C94	Standard Specification for Ready-Mixed Concrete
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C114	Standard Test Methods for Chemical Analysis of Hydraulic Cement
ASTM C136	Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C143	Standard Test Method for Slump of Hydraulic-Cement Concrete
ASTM C150	Standard Specification for Portland Cement
ASTM C171	Standard Specification for Sheet Materials for Curing Concrete
ASTM C172	Standard Practice for Sampling Freshly Mixed Concrete
ASTM C231	Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C260	Standard Specification for Air-Entraining Admixtures for Concrete
ASTM C309	Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C311	Standard Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use in Portland-Cement Concrete
ASTM C494	Standard Specification for Chemical Admixtures for Concrete
ASTM C618	Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
ASTM C666	Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing
ASTM C685	Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing
ASTM C989	Standard Specification for Slag Cement for Use in Concrete and Mortars
ASTM C1017	Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete

ASTM C1077	Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation
ASTM C1157	Standard Performance Specification for Hydraulic Cement
ASTM C1260	Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)
ASTM C1365	Standard Test Method for Determination of the Proportion of Phases in Portland Cement and Portland-Cement Clinker Using X-Ray Powder Diffraction Analysis
ASTM C1602	Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
ASTM D1751	Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Asphalt Types)
ASTM D1752	Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction

## American Concrete Institute (ACI)

ACI 305R	Hot Weather Concreting
ACI 306R	Cold Weather Concreting
ACI 308R	Guide to External Curing of Concrete
ACI 309R	Guide for Consolidation of Concrete

**END OF ITEM P-610**

**ITEM P-620****RUNWAY AND TAXIWAY MARKING****DESCRIPTION****620-1.1**

This item shall consist of the preparation and painting of numbers, markings, and stripes on the surface of runways, taxiways, and aprons, in accordance with these specifications and at the locations shown on the plans, or as directed by the Program Manager. The terms “paint” and “marking material” as well as “painting” and “application of markings” are interchangeable throughout this specification.

**MATERIALS****620-2.1 MATERIALS ACCEPTANCE**

The Contractor shall furnish manufacturer’s certified test reports for materials shipped to the project. The certified test reports shall include a statement that the materials meet the specification requirements. This certification along with a copy of the paint manufacturer’s surface preparation; marking materials, including adhesion, flow promoting and/or floatation additive; and application requirements must be submitted and approved by the Program Manager prior to the initial application of markings. The reports can be used for material acceptance or the Program Manager may perform verification testing. The reports shall not be interpreted as a basis for payment. The Contractor shall notify the Program Manager upon arrival of a shipment of materials to the site. All material shall arrive in sealed containers that are easily quantifiable for inspection by the Program Manager.

**620-2.2 MARKING MATERIALS****TABLE 1 – MARKING MATERIALS**

<b>Paint<sup>1</sup></b>				<b>Glass Beads<sup>2</sup></b>	
<b>Type</b>	<b>Color</b>	<b>Fed Std. 595 Number</b>	<b>Application Rate Maximum</b>	<b>Type</b>	<b>Application Rate Minimum</b>
I	White	37925	115 ft <sup>2</sup> /gal	I, Gradation A	7 lb/gal
I	Yellow	33538 or 33655	115 ft <sup>2</sup> /gal	I, Gradation A or III where indicated	7 lb/gal or 10 lb/gal
I	Red	31136	115 ft <sup>2</sup> /gal	I, Gradation A	5 lb/gal
I	Pink	1 part 31136 to 2 parts 37925	115 ft <sup>2</sup> /gal	I, Gradation A	5 lb/gal
I	Black	37038	115 ft <sup>2</sup> /gal	None	None

<sup>1</sup> See paragraph 620-2.2a

<sup>2</sup> See paragraph 620-2.2b

- a. Paint.** Paint shall be waterborne in accordance with the requirements of this paragraph. Paint colors shall comply with Federal Standard No. 595.

**Waterborne.** Paint shall meet the requirements of Federal Specification TT-P-1952F, Type I. The non-volatile portion of the vehicle for all paint types shall be composed of a 100% acrylic polymer as determined by infrared spectral analysis.



- b. Reflective media.** Glass beads for white and yellow paint shall meet the requirements for Federal Specification TT-B-1325D Type I, Gradation A, except Type III beads shall be used on runway hold position markings.

Glass beads for red and pink paint shall meet the requirements for Type I, Gradation A.

Glass beads shall be treated with all compatible coupling agents recommended by the manufacturers of the paint and reflective media to ensure adhesion and embedment.

Glass beads shall not be used in black paint.

Type III glass beads shall not be used in red and pink paint.

## CONSTRUCTION METHODS

### 620-3.1 WEATHER LIMITATIONS

Painting shall only be performed when the surface is dry, and the ambient temperature and the pavement surface temperature meet the manufacturer's recommendations in accordance with paragraph 620-2.1. Painting operations shall be discontinued when the ambient or surface temperatures does not meet the manufacturer's recommendations. Markings shall not be applied when the wind speed exceeds 10 mph unless windscreens are used to shroud the material guns. Markings shall not be applied when weather conditions are forecasts to not be within the manufacturers' recommendations for application and dry time.

### 620-3.2 EQUIPMENT

Equipment shall include the apparatus necessary to properly clean the existing surface, a mechanical marking machine, a bead dispensing machine, and such auxiliary hand-painting equipment as may be necessary to satisfactorily complete the job.

The mechanical marker shall be an atomizing spray-type or airless type marking machine with automatic glass bead dispensers suitable for application of traffic paint. It shall produce an even and uniform film thickness and appearance of both paint and glass beads at the required coverage and shall apply markings of uniform cross-sections and clear-cut edges without running or spattering and without over spray. The marking equipment for both paint and beads shall be calibrated daily.

### 620-3.3 PREPARATION OF SURFACES

Immediately before application of the paint, the surface shall be dry and free from dirt, grease, oil, laitance, or other contaminants that would reduce the bond between the paint and the pavement. Use of any chemicals or impact abrasives during surface preparation shall be approved in advance by the Program Manager. After the cleaning operations, sweeping, blowing, or rinsing with pressurized water shall be performed to ensure the surface is clean and free of grit or other debris left from the cleaning process.

- a. Preparation of new pavement surfaces.** The area to be painted shall be cleaned by broom, blower, water blasting, or by other methods approved by the Program Manager to remove all contaminants, including PCC curing compounds, minimizing damage to the pavement surface.
- b. Preparation of pavement to remove existing markings.** Existing pavement markings shall be removed by sand or shot blasting, or by other methods approved by the Program Manager minimizing damage to the pavement surface. Painting over the marking will not be allowed except on asphalt surfaces when approved by the Program Manager. Sand/shot and removed paint shall be vacuumed from the pavement surface immediately and disposed of off airport property at an approved disposal site. After removal of markings on asphalt pavements, apply a fog seal or seal coat to 'block out' the removal area to eliminate 'ghost' markings.

- c. Preparation of pavement markings prior to remarking.** Prior to remarking existing markings, loose existing markings must be removed minimizing damage to the pavement surface, with a method approved by the Program Manager. After removal, the surface shall be cleaned of all residue or debris.

Prior to the application of markings, the Contractor shall certify in writing that the surface is dry and free from dirt, grease, oil, laitance, or other foreign material that would prevent the bond of the paint to the pavement or existing markings. This certification along with a copy of the paint manufactures application and surface preparation requirements must be submitted to the Program Manager prior to the initial application of markings.

#### **620-3.4 LAYOUT OF MARKINGS**

The proposed markings shall be laid out in advance of the paint application. The locations of markings to receive glass beads shall be shown on the plans.

#### **620-3.5 APPLICATION**

A period of 3 days (72 hours) shall elapse between placement of surface course or seal coat and application of the permanent paint markings. Paint shall be applied at the locations and to the dimensions and spacing shown on the plans. Paint shall not be applied until the layout and condition of the surface has been approved by the Program Manager.

The edges of the markings shall not vary from a straight line more than 1/2 inch in 50 feet, and marking dimensions and spacing shall be within the following tolerances:

#### **MARKING DIMENSIONS AND SPACING TOLERANCE**

<b>Dimension and Spacing</b>	<b>Tolerance</b>
36 inch or less	±1/2 inch
greater than 36 inch to 6 feet	±1 inch
greater than 6 feet to 60 feet	±2 inch
greater than 60 feet	±3 inch

The paint shall be mixed in accordance with the manufacturer's instructions and applied to the pavement with a marking machine at the rate shown in Table 1. The addition of thinner will not be permitted.

Glass beads shall be distributed upon the marked areas at the locations shown on the plans to receive glass beads immediately after application of the paint. A dispenser shall be furnished that is properly designed for attachment to the marking machine and suitable for dispensing glass beads. Glass beads shall be applied at the rate shown in Table 1. Glass beads shall not be applied to black paint. Glass beads shall adhere to the cured paint or all marking operations shall cease until corrections are made. Different bead types shall not be mixed. Regular monitoring of glass bead embedment and distribution should be performed.

#### **620-3.6 APPLICATION--PREFORMED THERMOPLASTIC AIRPORT PAVEMENT MARKINGS**

Preformed thermoplastic pavement markings not used.

#### **620-3.7 CONTROL STRIP**

Prior to the full application of airfield markings, the Contractor shall prepare a control strip in the presence of the Program Manager. The Contractor shall demonstrate the surface preparation method and all striping equipment to be used on the project. The marking equipment must achieve the prescribed application rate of paint and population of glass beads (per Table 1) that are properly embedded and evenly distributed across the full width of the marking. Prior to acceptance of the control strip, markings must be evaluated during darkness to ensure a uniform appearance.

### 620-3.8 RETRO-REFLECTANCE

Reflectance shall be measured with a portable retro-reflectometer meeting ASTM E1710 (or equivalent). A total of 6 readings shall be taken over a 6 square foot area with 3 readings taken from each direction. The average shall be equal to or above the minimum levels of all readings which are within 30% of each other.

#### MINIMUM RETRO-REFLECTANCE VALUES

Material	Retro-reflectance mcd/m <sup>2</sup> /lux		
	White	Yellow	Red
Initial Type I	300	175	35
Initial Type III	600	300	35
Initial Thermoplastic	225	100	35
All materials, remark when less than <sup>1</sup>	100	75	10

<sup>1</sup> Prior to remarking determine if removal of contaminants on markings will restore retro-reflectance

### 620-3.9 PROTECTION AND CLEANUP

After application of the markings, all markings shall be protected from damage until dry. All surfaces shall be protected from excess moisture and/or rain and from disfiguration by spatter, splashes, spillage, or drippings. The Contractor shall remove from the work area all debris, waste, loose reflective media, and by-products generated by the surface preparation and application operations to the satisfaction of the Program Manager. The Contractor shall dispose of these wastes in strict compliance with all applicable state, local, and federal environmental statutes and regulations.

## METHOD OF MEASUREMENT

### 620-4.1 PAVEMENT MARKING (Reflective)

The quantity of pavement markings (reflective) to be paid for shall be the neat lines as measured in position by the number of square feet performed in accordance with the specifications and accepted by the Program Manager. The area to be measured will be the surface area of the paint and will not include gaps, spaces, or black border paint.

### 620-4.2 NON-MOVEMENT MARKINGS

The quantity of Non-Movement Markings to be paid for shall be per linear foot in position performed in accordance with the specifications and accepted by the Program Manager. The length to be measured will be the actual full length of markings installed (full width of the Non-Movement Marking detail) including the required gaps, spaces, and black border paint.

### 620-4.3 TAXIWAY/TAXIWAY INTERMEDIATE HOLDING PATTERN MARKINGS

The quantity of Taxiway/Taxiway Intermediate Holding Pattern Markings to be paid for shall be per linear foot in position performed in accordance with the specifications and accepted by the Program Manager. The length to be measured will be the actual full length of markings installed (full width of the Taxiway/Taxiway Intermediate Holding Pattern Marking detail) including the required gaps, spaces, and black border paint.

#### **620-4.4 ILS CRITICAL AREA HOLD LINE MARKING**

The quantity of ILS Critical Area Hold Line Markings to be paid for shall be per linear foot in position performed in accordance with the specifications and accepted by the Program Manager. The length to be measured will be the actual full length of markings installed (full width of the ILS Critical Area Hold Line Marking detail) including the required gaps, spaces, and black border paint.

#### **620-4.5 RUNWAY HOLDING POSITION MARKINGS**

The quantity of Runway Holding Position Markings to be paid for shall be per linear foot in position performed in accordance with the specifications and accepted by the Program Manager. The length to be measured will be the actual full length of markings installed (full width of the Runway Holding Position Marking detail) including the required gaps, spaces, and black border paint.

#### **620-4.6 ENHANCED CENTERLINE MARKINGS**

The quantity of Enhanced Centerline Markings to be paid for shall be per linear foot in position performed in accordance with the specifications and accepted by the Program Manager. The length to be measured will be the actual full length of markings installed (full width of the Enhanced Centerline Marking detail) including the required gaps, spaces, and black border paint.

#### **620-4.7 GEOGRAPHIC POSITION MARKINGS**

The quantity of Geographic Position Markings shall be per each as measured in position, at each location. Each location shall include pink background, black inscription, white ring, and black ring border for a single holding position sign. No adjacent centerline pavement marking or hold bar marking is included.

#### **620-4.8 EXISTING PAINT MARKING REMOVAL**

The quantity of existing pavement markings removed to be paid for shall be the neat lines as measured in position by the number of square feet. The area to be measured will be the surface area of the removed paint and will not include gaps or spaces of unpainted areas.

### **BASIS OF PAYMENT**

#### **620-5.1**

Payment shall be made at the contract unit price per square foot for Pavement Marking (reflective); per linear foot for Non-Movement Marking, Taxiway/Taxiway Intermediate Holding Pattern Markings, ILS Critical Area Hold Line Marking, and Runway Holding Position Marking; and per each for Geographic Position Markings. These prices shall be full compensation for furnishing all materials and all labor, equipment, tools, and incidentals necessary to complete the item, complete in place, and accepted by the Program Manager in accordance with these specifications. This price shall include layout, cleaning of surfaces prior to painting, glass beads, protection of surfaces and in-pavement fixtures prior to and during painting, cleaning of surfaces of in-pavement fixtures after paint, required touch-ups, disposal of excess paint, and black borders. No separate payment will be made for black border paint markings and shall be considered incidental to the item(s) of which it is a part.

#### **620-5.2**

Payment shall be made at the contract unit price per square foot for removal of existing paint markings as indicated in the plans or as required by the Program Manager.

Payment will be made under:

Item P-620-5.1	Pavement Marking (reflective) – per square foot
Item P-620-5.2	Non-Movement Markings – per linear foot
Item P-620-5.3	Taxiway/Taxiway Intermediate Holding Pattern Markings – per linear foot
Item P-620-5.4	ILS Critical Area Hold Line Marking – per linear foot
Item P-620-5.5	Runway Holding Position Marking - per linear foot
Item P-620-5.6	Enhanced Centerline Marking - per linear foot
Item P-620-5.7	Geographic Position Marking – per each
Item P-620-5.8	Existing Paint Marking Removal – per square foot

### REFERENCES

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

ASTM International (ASTM)

ASTM D476	Standard Classification for Dry Pigmentary Titanium Dioxide Products
ASTM D968	Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive
ASTM D1652	Standard Test Method for Epoxy Content of Epoxy Resins
ASTM D2074	Standard Test Method for Total, Primary, Secondary, and Tertiary Amine Values of Fatty Amines by Alternative Indicator Method
ASTM D2240	Standard Test Method for Rubber Property - Durometer Hardness
ASTM D7585	Standard Practice for Evaluating Retroreflective Pavement Markings Using Portable Hand-Operated Instruments
ASTM E303	Standard Test Method for Measuring Surface Frictional Properties Using the British Pendulum Tester
ASTM E1710	Standard Test Method for Measurement of Retroreflective Pavement Marking Materials with CEN-Prescribed Geometry Using a Portable Retroreflectometer
ASTM E2302	Standard Test Method for Measurement of the Luminance Coefficient Under Diffuse Illumination of Pavement Marking Materials Using a Portable Reflectometer
ASTM G154	Standard Practice for Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Nonmetallic Materials

## Code of Federal Regulations (CFR)

40 CFR Part 60, Appendix A-7, Method 24

Determination of volatile matter content, water content, density,  
volume solids, and weight solids of surface coatings

29 CFR Part 1910.1200 Hazard Communication

## Federal Specifications (FED SPEC)

FED SPEC TT-B-1325DBeads (Glass Spheres) Retro-Reflective

FED SPEC TT-P-1952F Paint, Traffic and Airfield Marking, Waterborne

FED STD 595 Colors used in Government Procurement

## Commercial Item Description

A-A-2886B Paint, Traffic, Solvent Based

## Advisory Circulars (AC)

AC 150/5340-1 Standards for Airport Markings

AC 150/5320-12 Measurement, Construction, and Maintenance of Skid Resistant  
Airport Pavement Surfaces**END OF ITEM P-620**

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**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 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 R73	Standard Practice for Evaluation of Precast Concrete Drainage Productions
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 C655	Standard Specification for Reinforced Concrete D-Load 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.** Rubber gaskets for rigid pipe shall conform to the requirements of ASTM C443. Rubber gaskets for PVC pipe, polyethylene, and polypropylene pipe shall conform to the



requirements of ASTM F477. Rubber gaskets for zinc-coated steel pipe and precoated galvanized pipe shall conform to the requirements of ASTM D1056, for the "RE" closed cell grades. Rubber gaskets for steel reinforced thermoplastic ribbed pipe shall conform to the requirements of ASTM F477.

**701-2.5 Joint mortar.** Not used.

**701-2.6 Joint fillers.** Not used.

**701-2.7 Plastic gaskets.** Not used.

**701-2.8. Controlled low-strength material (CLSM).** Controlled low-strength material shall conform to the requirements of Item P-153. When CLSM is used, all joints shall have gaskets.

**701-2.9 Precast box culverts.** Manufactured in accordance with and conforming to ASTM C1433.

**701-2.10 Precast concrete pipe.** Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or another Program Manager approved third party certification program.

## CONSTRUCTION METHODS

**701-3.1 Excavation.** The width of the pipe trench shall be sufficient to permit satisfactory jointing of the pipe and thorough tamping of the bedding material under and around the pipe, but it shall not be less than the external diameter of the pipe plus 12 inches (300 mm) on each side. The trench walls shall be approximately vertical.

The Contractor shall comply with all current federal, state and local rules and regulations governing the safety of men and materials during the excavation, installation and backfilling operations. Specifically, the Contractor shall observe that all requirements of the Occupational Safety and Health Administration (OSHA) relating to excavations, trenching and shoring are strictly adhered to. The width of the trench shall be sufficient to permit satisfactory 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 Program Manager 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 rubber gaskets. Rubber ring gaskets shall be installed to form a flexible watertight seal.

**a. Concrete pipe.** Concrete pipe may be either bell and spigot or tongue and groove. Pipe sections at joints shall be fully seated and the inner surfaces flush and even. Concrete pipe joints shall be sealed with rubber gaskets meeting ASTM C443 when leak resistant joints are required.

**b. Metal pipe.** Metal pipe shall be firmly joined by form-fitting bands conforming to the requirements of ASTM A760 for steel pipe and AASHTO M196 for aluminum pipe.

**c. PVC, Polyethylene, or Polypropylene pipe.** Joints for PVC, Polyethylene, or Polypropylene pipe shall conform to the requirements of ASTM D3212 when leak resistant joints are required. Joints for PVC and Polyethylene pipe shall conform to the requirements of AASHTO M304 when soil tight joints are required. Fittings for polyethylene pipe shall conform to the requirements of AASHTO 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 manufacturer's 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 relaid or replaced at the Contractor's expense. Evaluation of any damage to RCP shall be evaluated based on AASHTO R73.

Overfill material shall be placed and compacted in layers as required to achieve compaction to at least 95 percent standard proctor per ASTM D698. The soil shall contain no debris, organic matter, frozen material, or stones with a diameter greater than one half the thickness of the compacted layers being placed.

#### **701-3.7 Inspection Requirements**

An initial post installation inspection shall be performed by the Contractor no sooner than 30 days after completion of installation and final backfill. Clean or flush all lines prior to inspection.

Use a camera with lighting suitable to allow a clear picture of the entire periphery of the pipe interior. Center the camera in the pipe both vertically and horizontally and be able to pan and tilt to a 90-degree angle with the axis of the pipe rotating 360 degrees. Use equipment to move the camera through the pipe that will not obstruct the camera's view or interfere with proper documentation of the pipe's condition. The video image shall be clear, focused, and relatively free from roll, static, or other image distortion qualities that would prevent the reviewer from evaluating the condition of the pipe.

Incorporate specific inspection requirements for the various types of pipes beneath the general inspection requirements.

Reinforced concrete pipe shall be inspected, evaluated, and reported on in accordance with ASTM C1840, "Standard Practice for Inspection and Acceptance of Installed Reinforced Concrete Culvert, Storm Drain, and Storm Sewer Pipe." Any issues reported shall include still photo and video documentation. The zoom ratio shall be provided for all still or video images that document any issues of concern by the inspection firm.

Flexible pipes shall be inspected for rips, tears, joint separations, soil migration, cracks, localized buckling, settlement, alignment, and deflection. Determine whether the allowable deflection has been exceeded by use of a laser profiler for internal pipe diameters of 48 inches or less, or direct measurement for internal pipe diameters greater than 48 inches. Laser profile equipment shall utilize low barrel distortion video equipment. Deflection of installed pipe shall not exceed the limits provided in the table below, as a percentage of the average inside diameter of the pipe.

Maximum Allowable Pipe Deflection

Type of Pipe	Maximum Allowable Deflection (%)
Corrugated Metal Pipe	5
Concrete Lined CMP	3
Thermoplastic Pipe	5
Fiberglass	5

If deflection readings in excess of the allowable deflection are obtained, remove the pipe with excessive deflection and replace with new pipe. Repair or replace any pipe with cracks exhibiting displacement across the crack, bulges, creases, tears, spalls, or delaminations. The report for flexible pipe shall include as a minimum, the deflection results and final post installation inspection report. The inspection report shall include: a copy of all video taken, pipe location identification, equipment used for inspection, inspector name, deviation from design line and grade, and inspector's notes.

### METHOD OF MEASUREMENT

**701-4.1** The length of pipe shall be measured in linear feet of pipe in place, completed, and accepted. It shall be measured along the centerline of the pipe from end or inside face of structure to the end or inside face of structure, whichever is applicable. All fittings shall be included in the footage as typical pipe sections in the pipe being measured.

**701-4.2.** Precast box culverts shall be measured by individual unit and size.

### BASIS OF PAYMENT

These prices shall fully compensate the Contractor for furnishing all materials including bedding material and for all preparation, excavation, and installation of these materials; and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made at the contract unit price per linear foot for each class and size of pipe.

Item 701-5.1	24 inch Reinforced Concrete Pipe (Class V) per linear foot
Item 701-5.2	36 inch Reinforced Concrete Pipe (Class V) per linear foot
Item 701-5.3	48 inch Reinforced Concrete Pipe (Class V) per linear foot
Item 701-5.4	18 inch Corrugated Metal Pipe (2-2/3 x 1/2, 16 gage) per linear foot
Item 701-5.5	12 inch Reinforced Concrete Pipe (Class III) per linear foot

### REFERENCES

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

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
	ISSUED FOR BID

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
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**END ITEM D-701**

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**Item D-705****Pipe Underdrains for Airports****DESCRIPTION**

**705-1.1** This item shall consist of the construction of pipe drains in accordance with these specifications and in reasonably close conformity with the lines and grades shown on the plans.

**MATERIALS**

**705-2.1 General.** Materials shall meet the requirements shown on the plans and specified below.

**705-2.2 Pipe.** The pipe shall be of the type called for on the plans or in the proposal and shall be in accordance with the following appropriate requirements.

	American Association of State Highway and Transportation Officials (AASHTO) M196 Standard Specification for Corrugated Aluminum Pipe for Sewers and Drains
AASHTO M252	Standard Specification for Corrugated Polyethylene Drainage Pipe
AASHTO M304	Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Wall Drain Pipe and Fittings Based on Controlled Inside Diameter
ASTM F758	Standard Specification for Smooth-Wall Poly (Vinyl Chloride) (PVC) Plastic Underdrain Systems for Highway, Airport, and Similar Drainage
ASTM F794	Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe & Fittings Based on Controlled Inside Diameter
ASTM F949	Standard Specification for Poly (Vinyl Chloride) (PVC) Corrugated Sewer Pipe with a Smooth Interior and Fittings

**705-2.3 Joint mortar.** Pipe joint mortar shall consist of one part by volume of 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.

**705-2.4 Elastomeric seals.** Elastomeric seals shall conform to the requirements of ASTM F477.

**705-2.5 Porous backfill.** Porous backfill shall be free of clay, humus, or other objectionable matter, and shall conform to the gradation in Table 1 when tested in accordance with ASTM C136.

**Table 1. Gradation of Porous Backfill**

Sieve Designation (square openings)	Percentage by Weight Passing Sieves
	Porous Material No. 2
1-1/2 inch (37.5 mm)	100
1 inch (25.0 mm)	90-100
3/8 inch (9.5 mm)	25-60
No. 4 (4.75 mm)	5-40
No. 8 (2.36 mm)	0-20
No. 16 (1.18 mm)	*
No. 50 (300 µm)	*
No. 100 (150 µm)	*



When two courses of porous backfill are specified in the plans, the finer of the materials shall conform to particle size tabulated herein for porous material No. 1. The coarser granular material shall meet the gradation given in the tabulation for porous material No. 2.

**705-2.6 Granular material.** Granular material used for backfilling shall conform to the requirements of ASTM D2321 for Class IA, IB, or II materials.

**705-2.7 Filter fabric.** The filter fabric shall conform to the requirements of AASHTO M288 Class 2 or equivalent.

**Table 2. Fabric Properties**

Fabric Property	Test Method	Test Requirement
Grab Tensile Strength, lbs	ASTM D4632	125 min
Grab Tensile Elongation %	ASTM D4632	50 min
Burst Strength, psi	ASTM D3785	125 min
Trapezoid Tear Strength, lbs	ASTM D4533	55 min
Puncture Strength, lbs	ASTM D4833	40 min
Abrasion, lbs	ASTM D4886	15 max loss
Equivalent Opening Size	ASTM D4751	70-100
Permittivity sec <sup>-1</sup>	ASTM D4491	0.80
Accelerated Weathering (UV Stability) (Strength Retained - %)	ASTM D4355 *(500 hrs exposure)	70

**705-2.8 Controlled low-strength material (CLSM).** CLSM is not used

### CONSTRUCTION METHODS

**705-3.1 Equipment.** All equipment required for the construction of pipe underdrains shall be on the project, in good working condition, and approved by the Program Manager before construction is permitted to start.

**705-3.2 Excavation.** The width of the pipe trench shall be sufficient to permit satisfactory jointing of the pipe and thorough tamping of the bedding material under and around the pipe, but shall not be less than the external diameter of the pipe plus 6 inches (150 mm) on each side of the pipe. The trench walls shall be approximately vertical.

Where rock, hardpan, or other unyielding material is encountered, it shall be removed below the foundation grade for a depth of at least 4 inches (100 mm). The excavation below grade shall be backfilled with selected fine compressible material, such as silty clay or loam, and lightly compacted in layers not over 6 inches (150 mm) in uncompacted depth to form a uniform but yielding foundation.

Where a firm foundation is not encountered at the grade established, due to soft, spongy, or other unstable soil, the unstable soil shall be removed and replaced with approved granular material for the full trench width. The Program Manager shall determine the depth of removal necessary. The granular material shall be compacted to provide adequate support for the pipe.

Excavated material not required or acceptable for backfill shall be disposed of by the Contractor as directed by the Program Manager. The excavation shall not be carried below the required depth; if this occurs, the trench shall be backfilled at the Contractor's expense with material approved by the Program Manager and compacted to the density of the surrounding material.

The pipe bedding shall be constructed uniformly over the full length of the pipe barrel, as required on the plans. The maximum aggregate size shall be 1 inch when the bedding thickness is less than 6

inches, and 1-1/2 inch when the bedding thickness is greater than 6 inches. Bedding shall be loosely placed, uncompacted material under the middle third of the pipe prior to placement of the pipe.

The Contractor shall do trench bracing, sheathing, or shoring necessary to perform and protect the excavation as required for safety and conformance to federal, state and local laws. Unless otherwise provided, the bracing, sheathing, or shoring shall be removed by the Contractor after the backfill has reached at least 12 inches (300 mm) over the top of the pipe. The sheathing or shoring shall be pulled as the granular backfill is placed and compacted to avoid any unfilled spaces between the trench wall and the backfill material. The cost of bracing, sheathing, or shoring, and the removal of same, shall be included in the unit price bid per foot (meter) for the pipe.

### **705-3.3 Laying and installing pipe.**

**a. Concrete pipe.** The laying of the pipe in the finished trench shall be started at the lowest point and proceed upgrade. When bell and spigot pipe is used, the bells shall be laid upgrade. If tongue and groove pipe is used, the groove end shall be laid upgrade. Holes in perforated pipe shall be placed down, unless otherwise shown on the plans. The pipe shall be firmly and accurately set to line and grade so that the invert will be smooth and uniform. Pipe shall not be laid on frozen ground.

Pipe which is not true in alignment, or which shows any settlement after laying, shall be taken up and re-laid by the Contractor at no additional expense. Making adjustments in grade by exerting force on the barrel of the pipe with excavating equipment, by lifting and dropping the pipe, or by lifting the pipe and packing bedding material under it shall be prohibited. If the installed pipe section is not to grade, the pipe section shall be completely removed, the grade corrected, and the pipe rejoined."

**b. Metal pipe.** The metal pipe shall be laid with the separate sections joined firmly together with bands, with outside laps of circumferential joints pointing upgrade, and with longitudinal laps on the sides. Any metal in the pipe or bands that is not protected thoroughly by galvanizing shall be coated with a suitable asphaltum paint.

During installation, the asphalt-protected pipe shall be handled without damaging the asphalt coating. Any breaks in the bitumen or treatment of the pipe shall be refilled with the type and kind of bitumen used in coating the pipe originally.

**c. PVC, fiberglass, or polyethylene pipe.** PVC or polyethylene pipe shall be installed in accordance with the requirements of ASTM D2321. Perforations shall meet the requirements of AASHTO M252 or AASHTO M294 Class 2, unless otherwise indicated on the plans. The pipe shall be laid accurately to line and grade. Fiberglass per ASTM D3839 Standard Guide for Underground Installation of "Fiberglass" (Glass-Fiber Reinforced Thermosetting-Resin) Pipe.

**d. All types of pipe.** The upgrade end of pipelines, not terminating in a structure, shall be plugged or capped as approved by the Program Manager.

Unless otherwise shown on the plans, a 4-inch (100 mm) bed of granular backfill material shall be spread in the bottom of the trench throughout the entire length under all perforated pipe underdrains.

Pipe outlets for the underdrains shall be constructed when required or shown on the plans. The pipe shall be laid with tight-fitting joints. Porous backfill is not required around or over pipe outlets for underdrains. All connections to other drainage pipes or structures shall be made as required and in a satisfactory manner. If connections are not made to other pipes or structures, the outlets shall be protected and constructed as shown on the plans.

**e. Filter fabric.** The filter fabric shall be installed in accordance with the manufacturer's recommendations, or in accordance with the AASHTO M288 Appendix, unless otherwise shown on the plans.

**705-3.4 Mortar.** The mortar shall be of the desired consistency for caulking and filling the joints of the pipe and for making connections to other pipes or to structures. Mortar that is not used within 45 minutes after water has been added shall be discarded. Retempering of mortar shall not be permitted.

**705-3.5 Joints in concrete pipe.** When open or partly open joints are required or specified, they shall be constructed as indicated on the plans. The pipe shall be laid with the ends fitted together as designed. If bell and spigot pipe is used, mortar shall be placed along the inside bottom quarter of the bell to center the following section of pipe.

The open or partly open joints shall be surrounded with granular material meeting requirements of porous backfill No. 2 in Table 1 or as indicated on the plans. This backfill shall be placed so its thickness will be not less than 3 inches (75 mm) nor more than 6 inches (150 mm), unless otherwise shown on the plans.

When the original material excavated from the trench is impervious, commercial concrete sand or granular material meeting requirements of porous backfill No. 1 shall surround porous backfill No. 2 (Table 1), as shown on the plans or as directed by the Program Manager.

When the original material excavated from the trench is pervious and suitable, it may be used as backfill in lieu of porous backfill No. 1, when indicated on the plans or as directed by the Program Manager.

#### **705-3.6 Embedment and Backfill**

**a. Earth.** All trenches and excavations shall be backfilled soon after the pipes are installed, unless additional protection of the pipe is directed. The embedment material shall be select material from excavation or borrow and shall be approved by the Program Manager. The select material shall be placed on each side of the pipe out to a distance of the nominal pipe diameter and one foot (30 cm) over the top of the pipe and shall be readily compacted. It shall not contain stones 3 inches (75 mm) or larger in size, frozen lumps, chunks of highly plastic clay, or any other material that is objectionable to the Program Manager. The material shall be moistened or dried, as required to aid compaction. Placement of the embedment material shall not cause displacement of the pipe. Thorough compaction under the haunches and along the sides to the top of the pipe shall be obtained.

The embedment material shall be placed in loose layers not exceeding 6 inches (150 mm) in depth under and around the pipe. Backfill material over the pipe shall be placed in lifts not exceeding 8 inches (200 mm). Successive layers shall be added and thoroughly compacted by hand and pneumatic tampers, approved by the Program Manager, until the trench is completely filled and brought to the planned elevation. Embedment and backfilling shall be done to avoid damaging top or side of the pipe.

In embankments and other unpaved areas, the backfill shall be compacted per Item P-152 to the density required for embankments in unpaved areas. Under paved areas, the subgrade and any backfill shall be compacted per Item P-152 to the density required for embankments for paved areas.

**b. Granular backfill.** When granular backfill is required, placement in the trench and about the pipe shall be as shown on the plans. The granular backfill shall not contain an excessive amount of foreign matter, nor shall soil from the sides of the trench or from the soil excavated from the trench be allowed to filter into the granular backfill. When required by the Program Manager, a template shall be used to properly place and separate the two sizes of backfill. The backfill shall be placed in loose layers not exceeding 6 inches (150 mm) in depth. The granular backfill shall be compacted by hand and pneumatic tampers to the requirements as given for embankment. Backfilling shall be done to avoid damaging top or side pressure on the pipe. The granular backfill shall extend to the elevation of the trench or as shown on the plans.

When perforated pipe is specified, granular backfill material shall be placed along the full length of the pipe. The position of the granular material shall be as shown on the plans. If the original material excavated from the trench is pervious and suitable, it shall be used in lieu of porous backfill No. 1.

If porous backfill is placed in paved or adjacent to paved areas before grading or subgrade operations is completed, the backfill material shall be placed immediately after laying the pipe. The depth of the granular backfill shall be not less than 12 inches (300 mm), measured from the top of the underdrain. During subsequent construction operations, a minimum depth of 12 inches (300 mm) of backfill shall be maintained over the underdrains. When the underdrains are to be completed, any unsuitable material shall be removed exposing the porous backfill. Porous backfill containing objectionable material shall be removed and replaced with suitable material. The cost of removing and replacing any unsuitable material shall be at the Contractor's expense.

If a granular subbase blanket course is used which extends several feet beyond the edge of paving to the outside edge of the underdrain trench, the granular backfill material over the underdrains shall be placed in the trench up to an elevation of 2 inches (50 mm) above the bottom surface of the granular subbase blanket course. Immediately prior to the placing of the granular subbase blanket

course, the Contractor shall blade this excess trench backfill from the top of the trench onto the adjacent subgrade where it can be incorporated into the granular subbase blanket course. Any unsuitable material that remains over the underdrain trench shall be removed and replaced. The subbase material shall be placed to provide clean contact between the subbase material and the underdrain granular backfill material for the full width of the underdrain trench.

**c. Controlled low-strength material (CLSM).** CLSM is not used

**705-3.7 Flexible Pipe Ring Deflection** The flexible pipe shall be inspected by the Contractor during and after installation to ensure that the internal diameter of the pipe barrel has not been reduced by more than 5 percent. For guidance on properly sizing mandrels, refer to ASTM D3034 and ASTM F679 appendices.

**705-3.8 Connections.** When the plans call for connections to existing or proposed pipe or structures, these connections shall be watertight and made to obtain a smooth uniform flow line throughout the drainage system.

**705-3.9 Cleaning and restoration of site.** After the backfill is completed, the Contractor shall dispose of all surplus material, soil, and rubbish from the site. Surplus soil may be deposited in embankments, shoulders, or as directed by the Program Manager. Except for paved areas of the airport, the Contractor shall restore all disturbed areas to their original condition.

### METHOD OF MEASUREMENT

**705-4.1** The quantity of pipe underdrains shall be made at the contract unit price per linear foot complete, including porous backfill and filter fabric.

### BASIS OF PAYMENT

**705-5.1** Payment will be made at the contract unit price per linear foot (meter) for pipe underdrains of the type, class, and size designated.

These prices shall be full compensation for furnishing all materials and for all preparation, excavation, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item D-705-5.1	4 inch perforated underdrain pipe per linear foot
Item D-705-5.2	6 inch perforated underdrain pipe per linear foot
Item D-705-5.3	6 inch non-perforated underdrain outfall pipe per linear foot
Item D-705-5.4	Underdrain cleanout per each
Item D-705-5.5	Underdrain endwall per each

### REFERENCES

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

ASTM International (ASTM)

ASTM A760	Standard Specification for Corrugated Steel Pipe, Metallic Coated for Sewers and Drains
ASTM A762	Standard Specification for Corrugated Steel Pipe, Polymer Precoated for Sewers and Drains
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C144	Standard Specification for Aggregate for Masonry Mortar
ASTM C150	Standard Specification for Portland Cement

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ASTM C444	Standard Specification for Perforated Concrete Pipe
ASTM C654	Standard Specification for Porous Concrete Pipe
ASTM D2321	Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications
ASTM D3262	Standard Specification for "Fiberglass" (Glass-Fiber Reinforced Thermosetting Resin) Sewer Pipe
ASTM D4161	Standard Specification for "Fiberglass" (Glass-Fiber Reinforced Thermosetting Resin) Pipe Joints Using Flexible Elastomeric Seals
ASTM F477	Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe
ASTM F758	Standard Specification for Smooth Wall Poly (Vinyl Chloride) (PVC) Plastic Underdrain Systems for Highway, Airport, and Similar Drainage
ASTM F794	Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe & Fittings Based on Controlled Inside Diameter
ASTM F949	Standard Specification for Poly (Vinyl Chloride) (PVC) Corrugated Sewer Pipe with a Smooth Interior and Fittings
ASTM F2562	Specification for Steel Reinforced Thermoplastic Ribbed Pipe and Fittings for Non-Pressure Drainage and Sewerage

American Association of State Highway and Transportation Officials (AASHTO)

AASHTO M190	Standard Specification for Bituminous - Coated Corrugated Metal Culvert Pipe and Pipe Arches
AASHTO M196	Standard Specification for Corrugated Aluminum Pipe for Sewers and Drains
AASHTO M252	Standard Specification for Corrugated Polyethylene Drainage Pipe
AASHTO M288	Standard Specification for Geotextile Specification for Highway Applications
AASHTO M294	Standard Specification for Corrugated Polyethylene Pipe, 300- to 1500- mm (12- to 60-in.) Diameter
AASHTO M304	Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Wall Drain Pipe and Fittings Based on Controlled Inside Diameter
AASHTO MP20	Standard Specification for Steel-Reinforced Polyethylene (PE) Ribbed Pipe, 300- to 900-mm (12- to 36-in.) diameter
AASHTO	Standard Specifications for Highway Bridges

**END OF ITEM D-705**

**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 Program Manager.

**MATERIALS**

**751-2.1 Brick.** The brick shall conform to the requirements of ASTM C32, Grade MS.

**751-2.2 Mortar.** Mortar shall consist of one part Portland cement and two parts sand. The cement shall conform to the requirements of ASTM C150, Type I. The sand shall conform to the requirements of ASTM C144.

**751-2.3 Concrete.** Plain and reinforced concrete used in structures, connections of pipes with structures, and the support of structures or frames shall conform to the requirements of Item P-610.

**751-2.4 Precast concrete pipe manhole rings.** Precast concrete pipe manhole rings shall conform to the requirements of ASTM C478. Unless otherwise specified, the risers and offset cone sections shall have an inside diameter of not less than 36 inches (90 cm) nor more than 48 inches (120 cm). There shall be a gasket between individual sections and sections cemented together with mortar on the inside of the manhole. Gaskets shall conform to the requirements of ASTM C443.

**751-2.5 Corrugated metal.** Corrugated metal shall conform to the requirements of American Association of State Highway and Transportation Officials (AASHTO) M36.

**751-2.6 Frames, covers, and grates.** The castings shall conform to one of the following requirements:

- a. ASTM A48, Class 35B: Gray iron castings
- b. ASTM A47: Malleable iron castings
- c. ASTM A27: Steel castings
- d. ASTM A283, Grade D: Structural steel for grates and frames
- e. ASTM A536, Grade 65-45-12: Ductile iron castings
- f. ASTM A897: Austempered ductile iron castings

All castings or structural steel units shall conform to the dimensions shown on the plans and shall be designed to support the loadings, aircraft gear configuration and/or direct loading, specified.

Each frame and cover or grate unit shall be provided with fastening members to prevent it from being dislodged by traffic but which will allow easy removal for access to the structure.

All castings shall be thoroughly cleaned. After fabrication, structural steel units shall be galvanized to meet the requirements of ASTM A123.

**751-2.7 Steps.** The steps or ladder bars shall be gray or malleable cast iron or galvanized steel. The steps shall be the size, length, and shape shown on the plans and those steps that are not galvanized shall be given a coat of asphalt paint, when directed.

**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 directed by the Program Manager. 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 Program Manager 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 Program Manager. 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 Program Manager. No concrete or reinforcing steel shall be placed until the Program Manager 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. Retempering 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 Program Manager before the concrete is placed.

All invert channels shall be constructed and shaped accurately to be smooth, uniform, and cause minimum resistance to flowing water. The interior bottom shall be sloped to the outlet.

**751-3.4 Precast concrete structures.** Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or another Program Manager 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 Program Manager, 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 Program Manager. 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 Program Manager. 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 Program Manager.

### **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 Program Manager.

**b.** Backfill shall not be placed against any structure until approved by the Program Manager. 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 Program Manager. 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      Type 2 Storm Drain Inlet - per each

## REFERENCES

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

### ASTM International (ASTM)

ASTM A27	Standard Specification for Steel Castings, Carbon, for General Application
ASTM A47	Standard Specification for Ferritic Malleable Iron Castings
ASTM A48	Standard Specification for Gray Iron Castings
ASTM A123	Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A283	Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates
ASTM A536	Standard Specification for Ductile Iron Castings
ASTM A897	Standard Specification for Austempered Ductile Iron Castings
ASTM C32	Standard Specification for Sewer and Manhole Brick (Made from Clay or Shale)
ASTM C144	Standard Specification for Aggregate for Masonry Mortar
ASTM C150	Standard Specification for Portland Cement
ASTM C443	Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets.
ASTM C478	Standard Specification for Precast Reinforced Concrete Manhole Sections
ASTM C913	Standard Specification for Precast Concrete Water and Wastewater Structures.

### American Association of State Highway and Transportation Officials (AASHTO)

AASHTO M36	Standard Specification for Corrugated Steel Pipe, Metallic-Coated, for Sewers and Drains
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**END OF ITEM D-751**

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**Item D-754****Concrete Gutters, Ditches, and Flumes****DESCRIPTION**

**754-1.1** This item shall consist of Portland cement concrete gutters, ditches, and flumes constructed in accordance with these specifications at the specified locations in accordance with the dimensions, lines, and grades as shown on the plans or as directed by the Program Manager.

**MATERIALS**

**754-2.1 Concrete.** Plain and reinforced concrete shall meet the requirements of Item P-610.

**754-2.2 Joints.** Joint filler materials and premolded joint material shall conform to Item P-605.

**CONSTRUCTION METHODS**

**754-3.1 Preparing subgrade.** Excavation shall be made to the required width and depth, and the subgrade upon which the item is to be built shall be compacted to a firm uniform grade. All soft and unsuitable material shall be removed and replaced with suitable approved material. When required, a layer of approved granular material, compacted to the thickness indicated on the plans, shall be placed to form a subbase. The underlying course shall be checked and accepted by the Program Manager before placing and spreading operations are started.

**754-3.2 Placing.** The forms and the mixing, placing, finishing, and curing of concrete shall conform to the requirements of Item P-610 and the following requirements.

The concrete shall be tamped until it is consolidated and mortar covers the top surface. The surface of the concrete shall be floated smooth and the edges rounded to the radii shown on the plans. Before the concrete is given the final finishing, the surface shall be tested with a 12-foot (3.7-m) straightedge, and any irregularities of more than 1/4 inch (6 mm) in 12-foot (3.7-m) shall be eliminated.

The concrete shall be placed with dummy-grooved joints as indicated but not to exceed 25 feet (7.5 m) apart and no section shall be less than 4 feet (1.2 m) long.

Expansion joints of the type called for in the plans shall be constructed to replace dummy groove joints at a spacing of approximately 100 feet (30 m). When the gutter is placed next to concrete pavement, expansion joints in the gutter shall be located opposite expansion joints in the pavement. When a gutter abuts a pavement or other structure, an expansion joint shall be placed between the gutter and the other structure.

Forms shall not be removed within 24 hours after the concrete has been placed. Minor defects shall be repaired with mortar containing one (1) part cement and two (2) parts fine aggregate.

Depositing, compacting, and finishing the item shall be conducted to build a satisfactory structure. If any section of concrete is found to be porous, or is otherwise defective, it shall be removed and replaced by the Contractor without additional compensation.

**754-3.3 Backfilling.** After the concrete has set sufficiently, the spaces adjacent to the structure shall be refilled to the required elevation with material specified on the plans and compacted by mechanical equipment to at least 90% of the maximum density as determined by ASTM D698. The in-place density shall be determined in accordance with ASTM D1556.

**754-3.4 Cleaning and restoration of site.** After the backfill is completed, the Contractor shall dispose of all surplus material, dirt, and rubbish from the site. Surplus dirt may be deposited in embankments, shoulders, or as ordered by the Program Manager. The Contractor shall restore all disturbed areas to their original condition. The Contractor shall remove all tools and equipment, leaving the entire site free, clear and in good condition.

Performance of the work described in this section shall be considered as a subsidiary obligation of the Contractor, covered under the contract unit price for the structure.

#### **METHOD OF MEASUREMENT**

**754-4.1** Concrete Lined Swale shall be measured by the linear foot complete in place as shown on the plans or placed as ordered by the Program Manager.

**754-4.2** Concrete Apron Around Inlet shall be measured by the square foot complete in place as shown on the plans or placed as ordered by the Program Manager.

#### **BASIS OF PAYMENT**

**754-5.1** Payment for Concrete Lined Swale will be made at the contract unit price per linear foot. This price shall be full compensation for furnishing all materials including gravel foundation and for all preparation, excavation, and placing the materials, and for all labor, equipment, tools, and incidentals necessary to complete the structure.

**754-5.2** Payment for Concrete Apron Around Inlet will be made at the contract unit price per square foot. This price shall be full compensation for furnishing all materials including gravel foundation 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-754-5.1	Concrete Lined Swale - per linear foot
Item D-754-5.2	Concrete Apron Around Inlet - per square foot

#### **REFERENCES**

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

ASTM International (ASTM)

ASTM D698	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lb/ft <sup>3</sup> (600 kN-m/m <sup>3</sup> ))
ASTM D1556	Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method

#### **END OF ITEM D-754**

**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 Program Manager.

**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 in height shall be mowed to a height of 3 inches 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**

Lime shall be ground limestone containing not less than 85% of total carbonates, and shall be ground to such fineness that 90% will pass through a No. 20 (850 µm) mesh sieve and 50% will pass through a No. 100 (150 µm) mesh sieve. Coarser material will be acceptable, providing the rates of application are increased to provide not less than the minimum quantities and depth specified in the special provisions on the basis of the two sieve requirements above. Dolomitic lime or a high magnesium lime shall contain at least 10% of magnesium oxide. Lime shall be applied at the rate of 4,000 lb/acre. All liming materials shall conform to the requirements of ASTM C602.

**904-2.3 FERTILIZER**

Fertilizer shall be standard commercial fertilizers supplied separately or in mixtures containing the percentages of total nitrogen, available phosphoric acid, and water-soluble potash. They shall be applied at the rate and to the depth specified, and shall meet the requirements of applicable state laws. They shall be furnished in standard containers with name, weight, and guaranteed analysis of contents clearly marked thereon. No cyanamide compounds or hydrated lime shall be permitted in mixed fertilizers.

The fertilizers may be supplied in one of the following forms:

- a. A dry, free-flowing fertilizer suitable for application by a common fertilizer spreader;
- b. A finely-ground fertilizer soluble in water, suitable for application by power sprayers; or
- c. A granular or pellet form suitable for application by blower equipment.

Fertilizers shall be 13-13-13 commercial fertilizer and shall be spread at the rate of 1,000 lbs. per acre to a minimum depth of 3 inches.

#### **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 Program Manager 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 Program Manager before the various operations are started. The Contractor shall demonstrate to the Program Manager 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 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 by discing, raking, or other suitable methods. Any stones larger than 2 inches 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 Program Manager, 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. Sod sections or strips shall be cut in uniform widths, not less than 10 inches, and in lengths of not less than 18 inches, 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 Program Manager, provided the sod bed is watered to moisten the soil to a depth of at least 4 inches 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 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 in length and have a cross-sectional area of not less than 3/4 sq. inch. 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 Program Manager. 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 Program Manager, and shall then be sodded as specified in paragraph 904-3.5.



**METHOD OF MEASUREMENT****904-4.1**

This item shall be measured on the basis of the area in square yards 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 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-904-5.1	Sodding - per square yard
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**REFERENCES**

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

ASTM International (ASTM)

ASTM C602	Agricultural Liming Materials
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Advisory Circulars (AC)

AC 150/5200-33	Hazardous Wildlife Attractants on or Near Airports
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FAA/United States Department of Agriculture

Wildlife Hazard Management at Airports, A Manual for Airport Personnel

**END OF ITEM T-904**

**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 Program Manager.

**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 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 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 Program Manager 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 Program Manager 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 Program Manager, to a minimum depth of 2 inches to facilitate bonding of the topsoil to the covered subgrade soil. The surface of the area to be topsoiled shall be cleared of all stones larger than 2 inches in any diameter and all litter or other material which may be detrimental to proper bonding, the rise of capillary moisture, or the proper growth of the desired planting. Limited areas, as shown on the plans, which are too compact to respond to these operations shall receive special scarification.

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 Program Manager. 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 Program Manager. The topsoil shall be spread on areas already tilled and smooth-graded, or stockpiled in areas approved by the Program Manager. Any topsoil stockpiled by the Contractor shall be rehandled and placed without additional compensation. Any topsoil that has been stockpiled on the site by others, and is required for topsoil purposes, shall be removed and placed by the Contractor. The sites of all stockpiles and areas adjacent thereto which have been disturbed by the Contractor shall be graded if required and put into a condition acceptable for seeding.

When suitable topsoil is secured off the airport site, the Contractor shall locate and obtain the supply, subject to the approval of the Program Manager. The Contractor shall notify the Program Manager sufficiently in advance of operations in order that necessary measurements and tests can be made. The Contractor shall remove the topsoil from approved areas and to the depth as directed. The topsoil shall be hauled to the site of the work and placed for spreading, or spread as required. Any topsoil hauled to the site of the work and stockpiled shall be rehandled and placed without additional compensation.

**905-3.4 PLACING TOPSOIL**

The topsoil shall be evenly spread on the prepared areas to a uniform depth of 2 inches after compaction, unless otherwise shown on the plans or stated in the special provisions. Spreading shall not be done when the ground or topsoil is frozen, excessively wet, or otherwise in a condition detrimental to the work. Spreading shall be carried on so that turfing operations can proceed with a minimum of soil preparation or tilling.

After spreading, any large, stiff clods and hard lumps shall be broken with a pulverizer or by other effective means, and all stones or rocks (2 inches 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 Program Manager. 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 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 of topsoil measured in the stockpile. Topsoil shall be measured by volume in cubic yards computed by the method of end areas.

**905-4.2**

Topsoil obtained off the site shall be measured by the number of cubic yards of topsoil measured in its original position and stripped or excavated. Topsoil shall be measured by volume in cubic yards computed by the method of end areas.

**BASIS OF PAYMENT****905-5.1**

Payment will be made at the contract unit price per cubic yard for topsoil (obtained on the site). This price shall be full compensation for furnishing all materials and for all preparation, placing, and spreading of the materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

**905-5.2**

Payment will be made at the contract unit price per cubic yard 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	Topsoiling (4 inches thick) – per square yard
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**REFERENCES**

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

ASTM International (ASTM)

ASTM C117	Materials Finer than 75 $\mu$ m (No. 200) Sieve in Mineral Aggregates by Washing
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Advisory Circulars (AC)

AC 150/5200-33	Hazardous Wildlife Attractants on or Near Airports
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FAA/United States Department of Agriculture

Wildlife Hazard Management at Airports, A Manual for Airport Personnel

**END OF ITEM T-905**

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T-905  
Page 3

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**ITEM L-100****GENERAL PROVISIONS – ELECTRICAL  
(Non-Standard FAA Specification)****DESCRIPTION****100-1.1 GENERAL**

This item is intended to supplement the specifications for the Airfield Electrical, Lighting, and Lighting Control requirements of this contract.

It is the intent and meaning of the Plans and Specifications that the Contractor shall provide an electrical installation that is operational and complete, including all items and appurtenances necessary, reasonably incidental, or customarily included, even though each and every item is not specifically named or shown.

It is the intent that junction cans, junction can plazas, light bases (transformer housings), handholes, pullboxes, and manholes shall be constructed to drain. It additionally is the intent that conduit and duct banks shall be constructed to drain where practicable. The Contractor is responsible for verifying the intended drainage capability of these systems.

**QUALITY ASSURANCE****100-2.1 APPLICABLE CODES AND STANDARDS**

- a. Codes. All electrical work shall conform to the requirements and recommendations of the latest edition of the National Electrical Code. In conflicts among drawings, specifications and codes, the most stringent requirements shall govern.
- b. Standards. The specifications and standards of the following organizations are by reference made part of these specifications and all electrical work, unless otherwise indicated, shall comply with their requirements and recommendations wherever applicable:

Institute of Electrical and Electronic Engineers (IEEE)  
American National Standards Institute (ANSI)  
American Society for Testing and Materials (ASTM)  
Insulated Power Cable Engineers Association (ICEA)  
National Bureau of Standards (NBS)  
National Electrical Contractor's Association (NECA)  
National Electrical Manufacturer's Association (NEMA)  
National Fire Protection Association (NFPA)  
Underwriter's Laboratories, Inc. (UL)  
National Electrical Safety Code (NESC)  
Building Industry Consulting Service International (BICSI)

**100-2.2 REQUIREMENTS OF REGULATORY AGENCIES**

Airport lighting equipment and materials covered by FAA specifications shall be approved under the Airport Lighting Equipment Certification Program described in Advisory Circular (AC) 150/5345-53, Latest Addendum. All advisory circulars referenced in these specifications shall be the latest edition.

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 Program Manager. The requirements and recommendations of the latest edition of the Occupational Safety and Health Act are by reference made a part of these specifications and all electrical work shall comply with those requirements and recommendations wherever applicable.

**100-2.3 WORKMANSHIP AND PERSONNEL REQUIREMENTS**

The following requirements shall be met:

- a. All electrical work shall be performed by workmen skilled in the electrical trade and licensed for the electrical work by the State of Tennessee.
- b. A licensed Master Electrician will be required for the issuance of a building permit for constructing, installing, altering, maintaining, repairing or replacing any electrical wiring, apparatus, or equipment on any voltage level in the jurisdiction of the Airport.
- c. A licensed Master Electrician is required to be on the job site whenever any electrical work is performed. Any airfield electrical work or associated electrical installations shall be accomplished under the direct supervision of a licensed Journeyman Electrician.
- d. To insure compliance with Paragraph c. above, only a documented Electrical work force with a ratio of a maximum of three apprentices for each licensed Journeyman Electrician shall be allowed to work on the airfield electrical systems.
- e. Contractor shall prepare documentation associated with the electrical work force confirming adherence to the requirements of Paragraph d. above. These documents shall be submitted to the Program Manager for approval. Also, any work force changes or revisions which affect compliance with paragraph d. above shall also be submitted to the Program Manager for approval.
- f. Every airfield lighting cable splicer shall be qualified in making cable splices and terminations on cables rated above 1,000 volts AC. The Contractor shall submit for approval of the Program Manager proof of the qualifications of each proposed cable splicer for the 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.
- g. At least fourteen (14) days prior to performing any cable splicing/terminating, Contractor shall submit to the Program Manager a written list of proposed cable splicing/terminating personnel, including written evidence that the proposed personnel have had a minimum of two (2) hours of technical training by authorized splice/termination kit manufacturer personnel. Approved training shall include a thorough review of kit components and splicing/terminating techniques and procedures. Field splices shall only be installed by technicians approved by the Program Manager.
- h. In addition, each trained cable splicer shall be required to install a splice and a connector on type and size of the cable to be used under this contract. Sample connections shall be accomplished in accordance with the manufacturer's instructions and in the presence of the Program Manager.
- i. All equipment operators and other specialty personnel working on the job site in conjunction with the electrical installations shall each be experienced personnel in his/her line of work.

**100-2.4 EQUIPMENT, MATERIAL AND INSTALLATION REQUIREMENTS**

The Contractor shall furnish and install all materials, equipment, accessories, connections and incidental items in accordance with the approved recommendations of the manufacturer and the best practices of the trade to provide a complete installation, operational and ready for use by the Owner.

All equipment and materials shall be new, unless specifically noted otherwise, and shall bear the manufacturer's name, trademark and ASME, UL, and/or other labels in every case where a standard has been established for the particular item.

Where applicable, equipment shall be FAA approved design of a standard product of a manufacturer regularly engaged in the production of the required type of equipment, and shall be supported by a service organization reasonably convenient to the site, as determined by the Program Manager.

The Contractor shall promptly notify the Program Manager in writing of any conflict between any requirements of the Contract Documents and equipment manufacturer's directions and shall obtain written instructions from the Program Manager before proceeding with the work. Should the Contractor perform any work that does not comply with the manufacturer's directions or written resolution from the Program Manager, Contractor shall bear all costs arising in correcting deficiencies caused by this non-compliance.

After review of equipment submittals, and instructions by the Program Manager to proceed, equipment installations may require arrangements or connections different from those shown on the drawings. It is the responsibility of the Contractor to install the equipment to operate properly. The Contractor shall provide any additional equipment and/or materials required for installations to operate in accordance with the intent of the drawings and specifications.

It is the responsibility of the Contractor to insure that items installed fit the space available with adequate room for proper equipment operation and maintenance. Contractor shall make field measurements to ascertain space requirements, including those for connections, and shall furnish and install such sizes and shapes of equipment that the final installation provides a complete and operational system that complies with the requirements of the drawings and specifications.

The Contractor shall be responsible for coordinating proper location of roughing in and connections by other trades. Changes associated with coordination requirements shall be made at no increase in the Contract amount or additional costs to other trades.

The Contractor shall support work and equipment plumb, rigid, and true to line. The Contractor shall determine how equipment, fixtures, conduit, etc., are to be installed, as required by codes, drawings and specifications. Foundations, bolts, inserts, stands, hangers, brackets and accessories required for proper support shall be provided by the Contractor, whether or not specifically indicated on the drawings.

Uniform illumination levels for similar lighting systems throughout the airfield shall be installed. Contractor shall insure illumination levels for installed airfield edge or centerline lighting systems do not vary from illumination levels of similar airfield lighting systems because of a faulty installation of the system installed in this project.

## **100-2.5 SUBMITTALS**

Checking of submittals by Program Manager is done only as an aid to the Contractor and approval of submittals shall not relieve Contractor of responsibility for any errors or omissions in the submittals, nor shall it relieve the Contractor of total responsibility for proper and complete execution of the job. Submittal packages which do not contain the below indicated information will be rejected.

- a. Submit manufacturer's data or shop drawings of the following items, where applicable to this contract, giving full information concerning the dimensions, materials, and other information required to define compliance with the specifications. Other items to be submitted listed in the specification sections.

All 5KV L-824C Cable  
Isolation Transformers  
Counterpoise Wire  
Joint Sealers  
L-823 Connectors  
Splice Kits  
Identification Tags

Series Cutout  
Fixture Bases  
Wiring Devices  
Current Transformers  
Wireways  
Potential Transformers  
Junction Boxes and Accessories



Dry Type Transformers	Electrical Enclosures
Fixture Setting Jig	Handholes/Pull Boxes and Accessories
Ground Rods	PVC Conduit
Guidance Sign Foundation	Galvanized Rigid Steel Conduit
Airfield Lighting Fixtures	Airfield Fixture Lamps
Fixture Broken Bolt Removal/Repair Process	Fixture Installation and Location
Conduit and Cable Straps	Airfield Guidance Sign Shop Drawings
High Performance Grout	Wire Pulling Lubricant
Tape	3/8-16 Stainless Steel Bolts

- b. When requested by the Program Manager, Contractor shall submit samples of these items for approval. Contractor shall also submit for approval equipment/installation diagrams required by project specifications and/or requested by the Program Manager.
- c. Contractor submittal package shall include a typewritten list indicating each bid item, with a breakdown of all item components and all parts that are assembled or associated with bid item installation. Submittal package list shall indicate: (1) Bid item number, (2) Part numbers of associated item components, as required and (3) Reference page number where item and components information is located in the submittal package. An example of this procedure is shown below:

Bid Item #	Description	Ref. Page #
(XX)	(Bid Item Description) (P/N) - (Item Component #1) (P/N) - (Item Component #2) (P/N) - (Item Component #3) etc . . .	(YY) (YY) (YY) (YY)
Where: (XX) = Bid Item Number (YY) = Reference Page Number in Submittal Package (P/N) = Manufacturer Part Number		

## 100-2.6 INSPECTION AND TESTING

All work performed by the Contractor shall be subject to periodic inspections by the Program Manager to verify that the installation is in compliance with the applicable requirements of these specifications.

System and component testing of airfield lighting shall be performed as specified in individual sections. Test results shall be evaluated by the Program Manager based upon the criteria indicated.

Any installation found which does not conform to the required technical provisions of these specifications, or any specimen which does not meet the test criteria defined in individual sections shall be immediately removed by the Contractor and then replaced at Contractor's expense. When required, testing shall be performed on the new specimen in place to verify compliance with the test criteria.

## CONSTRUCTION PROVISIONS

### 100-3.1 GENERAL

To enhance personnel safety and avoid contractual problems, the Contractor shall comply with the following electrical work provisions when operating within the Airport Operations Area (AOA).

- a. **Existing Underground Utilities.** At least forty-eight (48) hours prior to beginning any excavation within the AOA, locations of all utility lines and FAA cables in the construction

area will be identified and marked with surveyor flags by appropriate utility and FAA personnel, respectively. The Contractor shall be responsible for maintaining the location flags. Any flags displaced shall be replaced by the Contractor. The Contractor shall coordinate with the Program Manager any additional prior notification time required during weekend and/or holiday work periods.

Also at least forty-eight (48) hours prior to beginning any excavation within the AOA, the Program Manager will request the Airport Operations to generally identify Airport circuits in proposed excavation areas. The Contractor shall coordinate with the Program Manager any additional prior notification time required during weekend and/or holiday work periods.

The above noted line identification information shall not relieve the Contractor of the responsibility of accurately locating underground lines to avoid unplanned disruptions or disturbing of installation or operation of underground lines in construction areas. Contractor shall use cable tracing equipment or other methods at their disposal that are approved by the Program Manager in order to pinpoint line locations. Excavation shall not proceed until all underground lines have been identified to the satisfaction of the Program Manager. Contractor shall hand excavate in areas of Airport underground electrical lines to avoid disturbing the circuits.

Repair of underground lines damaged by the Contractor shall be the sole responsibility of the Contractor. If Contractor is unable to obtain qualified personnel to perform repairs in a timely manner, the necessary repair work on the damaged underground lines may be performed by Owner furnished electricians on a reimbursable basis only. Cost of any repairs or work performed by Owner furnished electricians to correct damage caused by the Contractor shall be reimbursed to Owner by the Contractor prior to the project substantial completion date. The Contractor shall coordinate reimbursement procedures with the Program Manager.

- b. Lockout Procedure.** Contractor shall adhere to requirements of Owner's Lockout Procedure.
- c. Re-energizing Circuits.** No circuit shall be energized without the approval of the Owner's airfield electrical staff. The Contractor shall thoroughly coordinate all circuitry work with the Owner's staff.

### 100-3.2 TEMPORARY AND BYPASS CIRCUIT PROVISIONS

During construction, temporary or bypass wiring or cable installations may be required to maintain operation of certain equipment and/or airfield lighting circuits, as indicated in Construction Documents and/or as specified. Temporary/bypass circuit installations shall adhere to provisions indicated below.

- a. General Requirements.** Contractor shall review the requirements in the specifications and Construction Documents, including, but not restricted to: Phasing Plans, Demolition Plans and Wiring Schematics or Block Diagrams. Contractor shall determine locations, sizes and quantities of temporary/bypass wiring and conduits required for project construction.

At least 14 days prior to commencement of installation of temporary/bypass wiring, the Contractor shall submit a layout of proposed temporary/bypass conduits and circuits to the Program Manager for review and approval, including proposed installation protection provisions.

- b. Equipment and Materials.** Temporary/bypass wiring shall meet the requirements of Item L-108, Installation of Underground Cable for Airports, and shall also conform to the Construction Plans. Temporary/bypass wiring shall be identified at junction points with clear heat shrink or brass tags as approved by the Program Manager.

Installation of temporary/bypass wiring shall include installation of counterpoise wiring, ground rods, and incidentals indicated in Item L-108, Installation of Underground Cable for

Airports.

- c. Installation.** Temporary/bypass circuits shall be installed with due consideration to personnel safety and circuit protection against physical damage. Provisions of Paragraph 100-3.1 shall be applicable to temporary/bypass wiring installations. All damage to existing circuits as a result of Contractor action or inaction shall be corrected accordingly at the Contractor's expense.

Temporary/bypass high voltage lighting system cables shall be placed in conduit and buried a minimum of two feet to minimize accidental personnel or equipment contact with circuits.

If burial is not practical, as determined by the Program Manager, temporary/bypass cables shall be installed in galvanized rigid conduit unless otherwise specifically authorized by the Program Manager. Conduit shall be protected from damage by vehicles with suitable fencing, barriers and/or adequately sized boards or timbers. The conduit shall be securely fastened to the pavement surface and not to the conduit protective barriers. The galvanized conduit shall also be electrically grounded. This may be accomplished by securely bonding to the nearest available ground rod or other structure. Temporary/bypass circuits that must cross active aircraft pavement may be installed in a pavement sawkerf if a detail for the sawkerf is shown on the plans for this purpose.

Temporary/bypass circuits shall be removed immediately upon completion of construction or purpose for which the wiring was installed. Upon removal of boards or timbers fastened to the pavement surface to protect temporary/bypass circuits, the Contractor shall repair the pavement with materials and methods approved by the Program Manager. Temporary/bypass cable and counterpoise shall be removed and discarded off the Airport by the Contractor, unless used, in place, as a permanent installation. Underground conduits installed for temporary/bypass circuits shall be removed, unless Contractor is authorized by the Program Manager to abandon in place. All abandoned conduits thus authorized shall be indicated on the As-built/Record Drawings. Any temporary/bypass cable removed from initial installation shall not be re-used for any airport temporary or permanent high voltage installation. Cable re-use is not allowed to minimize the possibility of a damaged cable being re-installed on an active airport circuit.

### **100-3.3 EXISTING ELECTRICAL EQUIPMENT AND MATERIALS**

The Contractor shall remove all existing wiring and electrical equipment made unnecessary by the new installation. All materials removed remain property of the Owner unless otherwise noted on the plans. The Contractor shall coil conductors and sort materials according to type, class and/or size, and store or dispose of materials as directed by the Program Manager. Underground circuiting shall not be abandoned in place without approval of the Program Manager. All abandoned cable thus authorized shall be noted on the As-Built/Record Drawings

### **100-3.4 POWER SERVICE CONTINUITY**

Contractor shall provide the labor, materials and supervision necessary to maintain full capacity power service continuity when connection or modifications are made to existing systems and facilities. Contractor shall not interrupt service without prior consent of the Program Manager, and a definite understanding of time and duration of outage must be agreed upon. All outages will take place at a time for minimum disruption of facility activity.

### **100-3.5 AS-BUILT DRAWINGS**

The Contractor shall maintain a set of as-built drawings on the job site. Contractor shall mark on the as-built drawings all work details, alterations installed to meet site conditions and changes made by Change Notices, including all abandoned conduit and cable left in place. As-built drawings shall be kept available for inspection by the Program Manager at all times.

Airfield wiring verification diagrams shall be maintained throughout the project and later submitted to the Program Manager upon completion. These field wiring diagrams shall depict the exact routing and number of cable installed in each conduit originating from the airfield lighting vaults and extending to each manhole, handhole, pullbox, junction can, junction can plaza, sign, and lighting fixture for each new circuit or circuit revision.

## **METHOD OF MEASUREMENT AND BASIS OF PAYMENT**

### **100-4.1 MEASUREMENT AND PAYMENT**

- a.** All items covered in this section, excluding temporary wiring and temporary conduit, will not be measured or paid directly, but will be considered subsidiary to the bid items. Connector kits are considered incidental to the cable systems; no separate payment will be made unless specifically included in the proposal for the purpose of furnishing and installing connector kits for future isolation transformer/fixture installations.
- b.** Temporary wiring, inclusive of temporary conduit, counterpoise, ground rods, and incidentals, both left in place as permanent installations and temporary/bypass circuits installed and removed as specified within these project contract documents, shall be paid for at the contract unit price per linear foot of the specified cable under Item L 108, Installation of Underground Cable for Airports. Price shall be full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the item.

**END OF ITEM L-100**

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**ITEM L-104****GENERAL ELECTRICAL SAFETY REQUIREMENTS**  
(Non-Standard FAA Specification)**104-1.1 PURPOSE**

The purpose of this item is to establish a minimum standard for safety guidelines necessary to protect aircraft, passengers, crews, the general public, all workers and vehicles involved in their daily tasks. The Contractor shall be responsible for implementing and supplementing these standards to meet the jobsite requirements for safety.

**104-1.2 FAA ADVISORY CIRCULARS**

The Contractor shall comply with all applicable requirements of the below listed Advisory Circulars, Latest Edition, standards and related reading:

A/C 150/5200-18	Airport Safety Self-Inspection
A/C 150/5210-5	Painting, Marking and Lighting of Vehicles used on an Airport
A/C 150/5340-18	Standards for Airport Sign Systems.
A/C 150/5340-26	Maintenance of Airport Visual Aid Facilities.
A/C 150/5340-30	Design and Installation Details For Airport Visual Aids.
A/C 150/5370-2	Operational Safety on Airports During Construction.
ANSI C2	National Electrical Safety Code.
NFPA 70	National Electrical Code.
NFPA 70E	Std. for Electrical Safety Requirements for Employee Work Places.
	Occupational Safety and Health Standards for the Construction Industry 29 CFR Part 1926/1910.

The Contractor is responsible for obtaining and using the latest edition of the referenced FAA Advisory Circulars and related standards. This list is not all-inclusive, but is offered as a convenience to the Contractor.

**104-1.3 GENERAL SAFETY PROVISIONS**

The Contractor shall take all appropriate measures to establish and maintain the safety and health of employees performing work under this Contract. The Contractor shall meet with the Program Manager to develop a mutual understanding relative to administration of the safety plan. The Contractor is subject to applicable federal, state and local laws, regulations, ordinances, codes and orders relating to safety and health in effect on the date of this Contract. The Contractor's attention is further directed to the regulations issued by the Secretary of Labor pursuant to the Contract Work Hours and Safety Standards Act and the Safety and Health Regulations for construction. The Contractor shall comply with the Secretary's Regulations as applicable and shall comply with specific requirements stated. As a minimum, work place safety shall comply with NFPA 70E Standard for Electrical Safety Requirements for Employee Work Places, OSHA, Federal, State and Local Requirements. Where a conflict in code requirements occurs, the most stringent requirement shall govern.

During the performance of work under this Contract, the Contractor shall also comply with procedures prescribed for control and safety of persons visiting the project site.

The Contractor is responsible for his personnel and for familiarizing each of his subcontractors with safety requirements.

The Contractor shall advise the Program Manager of any special safety restriction he has established so that Owner's personnel can be notified of these restrictions.

#### **104-1.4 FIRE PREVENTION AND PROTECTION**

All tools producing sparks or heat, open-flame heating devices, operations utilizing such devices, etc., shall be in accordance with the Local Fire Department and the Owner's Burn Permit procedures. Work shall not start until all requirements of the Burn Permit procedures are met.

Open-flame heating devices will not be permitted except as approved in writing. Such permission will not be granted unless the Contractor has taken reasonable precautions to make such devices safe. Approval for these open fires and open-flame heating devices, if granted, will in no way relieve the Contractor from the responsibility for any damage incurred because of fires. Burning trash, brush or wood on the project site will not be permitted.

Flammable liquids shall be stored and handled in accordance with the Flammable and Combustible Liquids Code, NFPA 30.

Open fires and salamanders will not be permitted in construction areas.

Smoking will not be permitted within the Air Operations Area (AOA) and in areas such as paint storage, fuel storage, and posted no smoking areas.

Welding, flame cutting, melting and other such operations in all operating areas, shall not be permitted until approved by the Program Manager at the beginning of each workday. The Program Manager 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 under any circumstance.

The Contractor shall provide the necessary fire fighting equipment and fire prevention methods, and, before operations begin, clear all welding and cutting operations with the Program Manager.

A contractor's employee shall be assigned as fire watch for every welding and burning operation. This employee shall be equipped with 2 full 15 pound carbon dioxide fire extinguishers and shall check all areas around and below the welding or burning operation for fires. This employee shall continue this check for at least 60 minutes after the completion of the welding or burning operation.

The Contractor shall discontinue all burning, welding, or cutting operations, one hour prior to the end of the normal workday. The Contractor shall provide a workman to remain at the site for one hour after discontinuing these operations. This workman shall make a thorough inspection of the area for possible sources of latent combustion. Any unsafe conditions shall be corrected.

During operations involving possible fire hazard, the Contractor shall notify the Program Manager and not proceed until clearance is obtained in writing. The Program Manager may request a standby from the Fire Station. However, this does not relieve the Contractor of his responsibility for welding and cutting safety.

**104-1.5 TEMPORARY EXITS AND ENTRANCES**

Temporary exits, entrances and passageways shall be equipped with adequate fire protection to provide for the safety of Owner personnel and representatives.

**104-1.6 SWITCHING**

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, unless otherwise authorized in writing by the Program Manager.

**104-1.7 REMOVAL OF EQUIPMENT**

When permanently removing equipment, the electrical wiring, conduit and control boxes shall be removed to the source of feed, unless otherwise specified or indicated.

After equipment has been removed, the electrical wiring diagrams, schematics, etc., shall be marked to show the change.

Conduit not removed shall have a pull string installed.

**104-1.8 OTHER SAFETY REQUIREMENTS**

See Item L-100, General Provisions - Electrical. 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.

Unplug portable electrical hand tools when not in use to prevent inadvertent operation of equipment left plugged into an energized receptacle. Before maintaining or repairing any electrical equipment, such equipment shall be disconnected from the power source. The Contractor shall 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.

The Contractor shall not use metal ladders when working on electrical equipment.

**EXCAVATION****104-2.1 EXCAVATION OPERATIONS**

The Contractor's methods of excavation, means of earth support, and manner of backfill shall be conducted with consideration for the safety of persons and work area, and to prevent damage to adjacent pavement, utilities, structures and other facilities. Such damage may include settlement, lateral movement, undermining and washout. 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 trench and adjacent or surrounding areas.

The Contractor and all subcontractors performing trench excavation on this contract shall comply with the Occupational Safety and Health Administration's (OSHA) trench excavation safety standards, 29 C.F.R., s.1926.650, subpart P, including all subsequent revisions or updates to these standards as adopted by the Department of Labor and Employment Security (DLES). The Contractor shall consider all available geotechnical information in his design of the trench excavation safety system. Inspections required by OSHA trench excavation safety standards shall be provided and documented by the Contractor. A copy



of the documentation shall be submitted to the Program Manage.

## **PROTECTION OF WORK**

### **104-3.1 PROTECTION OF WORK**

The Contractor shall provide adequate stand-by mechanical equipment for emergency use.

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. Barricades shall be erected immediately around manhole openings when covers are removed or opened.

For personnel safety and to prevent possible interruption of major utility services encountered during excavation, the following procedures shall be followed:

- a.** 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 along with the various departments of the Memphis-Shelby County Airport Authority and Tennessee One Call System, Inc. as prescribed by state law. The contractor shall provide the owner, the Designer and the Program Manage with a copy of the receipt of said written notification to each of the utility companies or MSCAA departments. This requirement is in addition to any other state laws regarding public notification prior to excavation.
- b.** Prior to performing any excavation work or any surface penetrations greater than 6 inches (such as driving stakes more than 6 inches into the ground) on any ground surface, the Contractor shall obtain from the Program Manage, local utilities, etc., the current up-to-date subsurface utility drawing of the particular area to be worked on.
- c.** 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.
- d.** The Contractor shall stake out all subsurface utilities i.e., high voltage cables, communication cables, pipelines, 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.
- e.** After hand exposure of cable or pipelines, the Contractor shall obtain agreement from the Program Manage, Agency/Utility on how much closer to cable or pipe the excavations can be permitted.
- f.** A marker tape printed with the words "CAUTION ELECTRIC BELOW," "CAUTION COMMUNICATION BELOW," "CAUTION WATER LINE BELOW," "CAUTION SEWER LINE BELOW," etc., as applicable, shall be installed 8 inches below grade over the underground utility. Color to be in accordance with the local standard. Caution tape for electrical lines shall be in accordance with Item L-110 and the plans.
- g.** The Contractor shall notify the Program Manage 72 hours prior to the start of excavation work or surface penetration, to enable the Program Manage 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 Program Manage of his intention to

initiate work.

**h.** After all existing utilities have been located and marked or 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 subsurface utility until Contractor has hand excavated down to expose the utility to fix its exact location.

**i.** No digging, dirt moving or other heavy equipment shall physically enter any approved construction area before all 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 Program Manage. No repair shall be attempted without approval.

**j.** To protect subsurface utilities, provide a minimum 1-inch thick steel plate cover over electrical duct, cables and other subsurface utilities when heavy equipment is being used in the area.

**k.** The requirements listed above shall be considered incidental to the item for which the excavation is required.

## **SAFETY TAGGING AND LOCKOUT**

### **104-4.1 SAFETY WITH ELECTRICAL CIRCUITS AND EQUIPMENT**

No one may work on an energized circuit without written permission from the Contractor's project manager. The Contractor's project manager shall review the circumstances and the necessary safety precautions with the Program Manage prior to giving permission for the "hot" work. The Contractor assumes all liability in connection with any work on energized circuits.

No one may disconnect or cause to be disconnected any electrical circuit before permission is requested from and granted by the MSCAA Senior Airfield Electrician or authorized representative through the Program Manage.

Identification markings on building light and power distribution circuits shall not be relied on for established safe work conditions. Always verify the proper safe "de-energized" conditions with properly operating test equipment.

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 MSCAA Senior Airfield Electrician or his authorized representative, and, if applicable, FAA SMD SSC and the Air Traffic Control Tower.

Work shall not commence on any circuit until:

- a.** The circuit is correctly identified in the presence of the Electrical Contractor's Superintendent or Foreman, the Program Manage, MSCAA Senior Airfield Electrician or authorized representative.
- b.** After identity of the circuit is established, and the circuit disconnected, the time and date shall be recorded by the Program Manage.

- c. The switch shall be locked in the open position or opened in a manner, which will prevent accidental restoration.
- d. The circuit shall be tagged with an approved red warning tag by the Electrical Contractor's Superintendent. The tag shall state, the Company's name, the Electrician's name responsible for the disconnection, date and time and the project name and bid package number.

Restoration shall be accomplished and tags removed only by the Electrical Contractor's Superintendent in the presence of the Electrical Maintenance Manager, or authorized representative.

The Program Manager shall record time, date and operational status of circuit after restoration.

No circuit shall be disconnected or unplugged before color code identification by taping.

No circuit shall be disconnected at power source before proper safety precautions are taken to prevent accidental restoration.

When possible, circuits shall be restored by the same person who disconnected the circuit. When not possible, the MSCAA Senior Airfield Electrician or authorized representative shall perform restoration.

- e. As a minimum the Lock/Tag/Try procedure shall comply with NFPA 70E and all MSCAA Lockout Procedure requirements.

#### **104-4.2 MISCELLANEOUS REGULATIONS**

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.

In hazardous locations, regardless of class, all electrical tools and extension cords shall be of a type approved for use in such areas.

No counterpoise conductors (or any other conductors) may be joined, connected, or affixed to any terminal, grounding electrode, or other point of attachment by any method except those approved by the Program Manager. All counterpoise or grounding systems, when severed or damaged, shall be immediately repaired by the Contractor in accordance with Item L-108 and inspected by the Program Manager.

No high voltage switch shall be engaged or disengaged under load.

All backhoes, cranes, etc., shall be enclosed by cones, safety pylons, or other approved markers and rope festooned between the pylons.

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 Program Manager.

**METHOD OF MEASUREMENT****104-5.1**

The cost of the work described in this section is incidental to other sections and shall be included with its applicable system. The Contractor shall assess the overall requirements for all temporary conduit, cables, splices, lock-outs, and all other necessary temporary work necessary to construct the project as shown in the contract drawings. This item shall include all testing, troubleshooting, maintenance and other consequential work required to maintain the airfield lighting and signage affected by this Contract within the limits of work area to the satisfaction of the Program Manage.

**BASIS OF PAYMENT****104-6.1**

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. This item includes furnishing all material; all preparation, installation, connections, and subsequent removal of the temporary materials and equipment; and all labor, equipment, tools and all incidentals necessary to complete this item. This item includes all excavation, backfill and other materials; splice kits, tape, lockout devices, marking tape, and appurtenances necessary to complete these items to facilitate the temporary provisions and final installation of the new systems, all to the satisfaction of the Program Manage. This item includes the installation, maintenance and removal of all temporary airfield lighting and signage required for the duration of the project not specifically paid for in another pay item.

**END OF ITEM L-104**

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**ITEM L-106****SUBMITTALS AND RECORD DOCUMENTS**

(Non-Standard FAA Specification)

**DESCRIPTION****106-1.1 GENERAL**

The items described in this section are applicable to all electrical work by this Contractor. Where the contract special conditions or general provisions also apply, the stricter of the documents shall apply. Coordinate the requirements of all L-series specifications with this section.

**106-1.2 SCOPE**

This section 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 in this item.

**106-2.1 REQUIREMENTS FOR SHOP DRAWINGS AND SAMPLES**

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.

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.

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.

Prior to the installation of any material and equipment, and within 30 days of Contract Award, the Contractor shall provide to the Program Manage all submittals as required by the Contract Documents. The submittal shall be complete and made in one submission in the format required by this item. Partial submissions will not be reviewed or considered.

The Contractor shall perform no portion of the work, nor purchase any materials, requiring review of submittals until the relevant submittal has been reviewed by the Program Manage.

The Contractor shall review, stamp with his approval and submit to the Program Manage seven (7) prints of shop drawings, eight (8) copies of submittal books and three (3) sets of samples where required, as described in this item, within thirty (30) days of notice to proceed. With prior approval from the Program Manage, Contractor may submit the above information electronically in lieu of the hard copies specified.

If the Contractor desires to substitute materials, methods or to deviate from the requirements of the Contract Documents, the Contractor shall separately submit all deviations from the requirements of the Contract Documents in Shop Drawings or Samples. The submission shall direct in writing the specific attention of the Program Manage to the deviations, and shall contain all required data and supporting

documentation necessary for an evaluation of the proposed deviation. Any submission or deviation not identified as heretofore mentioned shall be rejected and require resubmission. Separate written approval of all deviations by the Program Manage for all design related deviations and by the Program Manage for all other deviations is required before the Contractor may perform the work covered by such deviation.

If approval is given, the Contractor will not be excused from producing work in conformity with Contract requirements. If a trial use establishes the work does not meet the Contract requirements, the Contractor shall take such action as the Program Manage determines necessary. No change in Contract Time will be made as a result of changes made under this Subparagraph. By requesting a deviation, the Contractor makes the representations contained in this Section.

#### **106-2.1.1**

Substitutions will only be considered after bid date only if the following conditions are met and allowed by other sections of these specifications.

- a.** A written request for substitution is submitted no later than 15 days after notice to proceed for construction is awarded to the Contractor.
- b.** Request for substitution includes appropriate credit to the project cost. This credit must be submitted with request for substitution in order for substitution to receive any consideration.
- c.** Samples are to be submitted for all substituted light fixtures, wiring devices and any and all other items deemed necessary by the Program Manage to determine that the substituted item meets all specifications and requirements before approval of substitutions can be made.
- d.** Samples shall be submitted within 21 days after the award of the contract.
- e.** Request for substitution shall include the name of the material or equipment for which it is to be substituted, drawings, cuts, performance and that data or any other data or information necessary for the Program Manage to determine that the equipment meets all specifications and requirements.
- f.** Where permitted and approved, must conform to space requirements. Substitutions that cannot meet space requirements, which is the Installer's responsibility whether approved or not, shall be replaced at the Contractor's expense. Any modifications of related systems, as a result of the substitution, shall be made at the Contractor's expense.
- g.** Represents that it has personally investigated the proposed substitution and determined that the proposed substitution equivalent or superior in all respects to the specified method or equipment.
- h.** Represents that it will provide a warranty for the substitution identical in all respects to the warranty for the specified method or equipment.
- i.** Represents that it will coordinate the installation of the accepted substitute, making changes as may be required for the work to be complete in all respects at no additional costs to the Owner.

The Program Manage shall be the sole judge of whether the proposed "or equivalent" is suitable for use.

**106-2.1.2**

Substitutions will be considered prior to bid date only if all the following conditions are met:

- a. A written request has been submitted to the Program Manage for approval not later than 2 days after the pre-bid conference date.
- b. Samples are to be submitted for all substituted light fixtures, wiring devices and any and all other items deemed necessary by the Program Manage to determine that the substituted item meets all specifications and requirements before approval of substitutions can be made.
- c. Samples shall be submitted with the written request for deviation/substitution.
- d. Request for substitution shall include the name of the material or equipment for which it is to be substituted, drawings, cuts, performance and that data or any other data or information necessary for the Program Manage to determine that the equipment meets all specifications and requirements.
- e. Where permitted and approved, must conform to space requirements. Substitutions that cannot meet space requirements, which is the Contractor's responsibility whether approved or not, shall be replaced at the Contractor's expense. Any modifications of related systems, as a result of the substitution, shall be made at the Contractor's expense.
- f. Represents that it has personally investigated the proposed substitution and determined that the proposed substitution equivalent or superior in all respects to the specified method or equipment.
- g. Represents that it will provide a warranty for the substitution identical in all respects to the warranty for the specified method or equipment.
- h. Represents that it will coordinate the installation of the accepted substitute, making changes as may be required for the work to be complete in all respects at no additional costs to the Owner.
- i. Substitution is approved and included in an addendum.

The Program Manager shall be the sole judge of whether the proposed "or equivalent" is suitable for use.

**106-2.1.3**

By approving and submitting Shop Drawings and Samples, the Contractor thereby represents that it 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.

Unless otherwise stated in the Contract Documents the Program Manager will review and approve Shop Drawings and Samples within fifteen (15) days after receipt, but only for conformance with the design concept of the project and with the information given in the Contract Documents. The Program Manager's approval of a separate item shall not indicate approval of an assembly in which the item functions.

The Contractor shall make any corrections required by the Program Manager and shall resubmit the



required number of corrected shop drawings or new samples until approved. The Contractor shall direct specific attention in writing or on resubmitted shop drawings to revisions other than the corrections requested by the Program Manager on previous submissions.

The Program Manager'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 Program Manager in writing of such deviation at the time of submission and the Program Manager has given written approval to the specific deviation. The Program Manager's approval shall not relieve the Contractor from responsibility for errors or omissions in the shop drawings or samples.

The submittals will be reviewed for design intent and general compliance with the information contained in the drawings and specifications. 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 his work and supplying a complete and operational system.

Samples, upon request, shall be submitted after written notice of acceptance and approval has been made of each substitution. The Program Manager reserves the right to reject the sample should the sample not meet the requirement of the contract documents.

#### **106-2.2 SUBMITTAL BOOKS**

Submittal books shall consist of a hard cover, view or presentation type, 3-ring binder sized to hold 8 1/2" x 11 sheets. Each binder is to be adequately sized to comfortably hold required submittals. Minimum spine size to be 1", maximum spine size to be 3" (provide additional binders if 3" size is not sufficient to properly hold submittals). Each binder shall be adequately sized to hold the submittal information plus an additional 25% of the submittal sheet count.

Binder covers to have outer clear vinyl pocket on front and back cover (to hold 8 1/2" x 11" sheet) and on spine (to hold spine width x 11" sheet). Binders shall be K & M Company Stock No. VB11-25 presentation binders or approved equivalent. Provide correct designation of project in each pocket, see "EXAMPLES" Figure 1 included at the end of this section. Description sheet is to be white with black letters, minimum of 11" high and full width of pocket. Description is to describe project and match project drawing/spec description.

#### **106-2.3 SUBMITTAL BOOK CONTENTS**

Submittal books to include:

- a. First sheet(s) in book shall be a photocopy of the cover sheet see Figure 1.
- b. The second sheet shall be a table of contents.
- c. The third sheet shall be prepared and filled out by Contractor and shall list project addresses, see Figure 2.
- d. The fourth sheet shall also be filled out by Contractor and list project information for project, Figure 3.
- e. Provide Wilson Jones, reinforced clear, ring binder indexes, 5 tab No. WJ-54125 or approved equivalent with the appropriate specification section number, and a typed index for each section.

- f. Submittals consisting of marked catalog sheets or shop drawings shall be inserted in the binder in proper order. Submittal data shall be presented in a clear 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 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 boldly and clearly made with arrows or circles (highlighting is not acceptable).
- g. Shop Drawings: Drawings to include identification of project and names of Program Manager (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 4 x 2 1/2 inches, near title block for the Program Manager's stamp imprint.
  - 8. Point-to-point wiring diagrams.
  - 9. Conduit/raceway rough-in drawings.
  - 10. See specific sections of specifications for further requirements.

#### **106-2.4 SUBMITTAL BOOKS PRODUCT DATA**

Technical data is required for all items as called for in the specifications regardless if item furnished is as specified.

- a. Submit technical data verifying that the item submitted complies with the requirements of the specifications. 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 specifications. Furnish drawings, or diagrams, dimensioned and in correct scale, covering equipment, showing arrangement of components and overall coordination.
- b. In order to facilitate review of product data, insofar as practicable, they shall be noted, indicating by cross reference the contract drawings, note, and/or specification paragraph numbers where item(s) occur in the contract documents. At the end of each section insert a copy of the applicable specification.
- c. See specific sections of specifications for further requirements.

#### **106-2.5 PROCESSING SUBMITTALS**

Submit a minimum of eight (8) submittal books with separate tag marking on each copy for the Owner (3), Program Manager (3), Contractor and Subcontractor (2) (See other sections/divisions of these specifications for additional quantity requirements.)

The General Contractor shall review the submittal books before submitting to the Program Manager. No request for payment will be considered until the submittal book has been reviewed and submitted for

approval.

Submit under provisions of the General Requirements of the Contract and this section of the specifications, whichever is the more stringent.

**Product Data:** For standard manufactured materials, products and items, submit one (1) copy or sets of data (per book). If submittal is rejected, re-submittal shall contain same quantity of new data.

**Shop Drawings:** For custom fabricated items and systems shop drawings, initially submit a transparency (suitable for reproduction) together with two (2) prints made there from. When submittal is acceptable, furnish one (1) print per book made from the accepted transparency.

**Acceptance:** When returned to Contractor, the front of each submittal section will be marked with the Program Manager's stamp. If box marked "Submit Specified Item", "Rejected" or "Revise and Resubmit" is checked, submittal is not approved and Contractor is to correct and resubmit as noted. Contractor is to comply with notation making necessary corrections on submittal and resubmit for final record.

If submittal is marked "Make Corrections Noted" the Contractor shall make the necessary corrections to the submitted items. Re-submittal is necessary. If the submittal is marked "No Exception Taken" the Program Manager took no exceptions to the submitted items. Corrections or comments made on the shop drawings during this review do not relieve contractor from compliance with requirements of the drawings and specifications. 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 his or her work with that of all other trades and performing all work in a safe and satisfactory manner.

Note that the approval of shop drawings or other information submitted in accordance with the requirements herein before specified, does not assure that the Program Manager, or any other Owner's, Representative, attests to the dimensional accuracy or dimensional suitability of the material or equipment involved, the ability of the material or equipment involved or the Mechanical/Electrical performance of equipment. Approval of shop drawings does not invalidate the plans and specifications if in conflict unless a letter requesting such a change is submitted and approved on the Program Manager's letterhead.

#### **106-2.6 DELAYS**

Contractor is responsible for delays in the project accruing directly or indirectly from late submissions or resubmissions of shop drawings or product data.

#### **106-2.7 RE-SUBMITTALS**

The Program Manager shall be reimbursed cost to review re-submittals subsequent to the second submittal.

### **RECORD DOCUMENTS**

#### **106-3.1 PROGRESS AND RECORD DRAWING**

Keep two sets of blue line prints on the job and neatly mark up design drawings each day as components are installed. Different colored pencils shall be used to differentiate each system of electrical work. Green colored pencil shall be used to denote deletions. No "white-out" or eradication fluid shall be used

on the record documents. All items on progress drawings shall be shown in actual location installed. Drawings shall be inspected weekly for compliance and accuracy. Project payments shall be withheld if the marked-up drawings are not current.

All underground ducts, conduits, drains, ground grids, force mains, etc., (all underground utilities) installed by this Contractor or located by this Contractor during the construction of this project shall be surveyed. The data shall be sufficient to accurately relocate the utility at a later date. The data shall include North-South and East-West coordinates and an elevation. This data shall be recorded on the record drawings.

All manholes and other structures installed by this Contractor shall be surveyed. Each corner of the structure shall be located by a North-South and East-West coordinate and an elevation. This data shall be recorded on the record drawings.

Change the equipment schedules to agree with items actually furnished. At the end of the project, all changes shall be transferred to a set of reproducible transparencies of the design drawings marked "As Built" and dated and stamped by the Contractor.

Prior to request for final payment, furnish a set of "As Built" prints to the Program Manager for approval. The final prints shall be professionally drafted to indicate "As Built" conditions to the Program Manager. The prints shall be stamped "As Built" and signed and dated by the Contractor's Electrical Superintendent.

The Contractor's failure to produce representative "As Built" drawings in accordance with requirements specified herein shall be cause for the Program Manager to produce such "As Built" drawings and the Contractor shall reimburse Program Manager for all costs to produce a set of "As Built" drawings to the Owner's satisfaction.

Complete and sign the Progress and Record Document Certification Form in Figure 4 and submit with the Operation and Maintenance Manual. Submit one form for each Contractor/Subcontractor providing as-built information, include a copy of each form in the O & M Manuals.

## **DISPLAY DRAWINGS**

### **106-3.2 REQUIREMENTS FOR DISPLAY DRAWINGS**

An "as constructed" control and field-wiring diagrams shall be displayed in the vault. It shall be size D (36" wide by 24" high) minimum framed and installed. In addition to the wiring diagram (showing actual connections between the system components), a "schematic" diagram shall be provided. The schematic diagram shall show the electrical interrelationship among the different systems components in the simplest way possible without being cluttered with actual wiring. It shall show the path of the signal flow or the power flow. These drawings shall be submitted to the Program Manager for approval.

## **OPERATION AND MAINTENANCE MANUALS**

### **106-4.0 REQUIREMENTS FOR OPERATION AND MAINTENANCE MANUALS**

Within each major division of work, each specification section in the Contract Documents which require submission of O & M information shall be individually identified by a typed index tab. The Contractor shall provide six (6) copies of manufacturer's manuals in book form as required by this item, for all installed equipment. As a minimum, it shall contain the following:

- a. Safety precautions used while maintaining the equipment.

- b. Theory of circuit and system operation.
- c. Complete schematic and interconnecting wiring diagrams
- d. 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.
- e. Recommended preventive maintenance, including care, cleaning, lubrication, service intervals, etc.
- f. Troubleshooting procedures.
- g. Physical characteristics (weight, size, mounting dimensions, etc.).
- h. Installation instructions.
- i. Operating instruction
- j. Recommended spare parts and usage for a 1 year period.
- k. Submit for checking purposes a specific set of written operating instructions on each item, which requires instructions to operate. After approval, provide one copy for insertion in each Operation and Maintenance Manual.
- l. Submit for approval maintenance information consisting of manufacturer's printed instructions and parts list for each major item of equipment. After approval, insert information in each Operations and Maintenance Manuals. Detailed schematic diagrams shall be furnished for all electrical/electronic equipment.
- m. Bill of materials.
- n. Physical layout plans.
- o. Equipment supplier list.
- p. Panel schedules shall be submitted with the respective panel data.
- q. Special instructions
- r. Service maintenance contracts including the name, address and 24-hour phone number and contact of Manufacturer's authorized repair company.

There shall be no system for which there are no schematic/wiring diagrams.

#### **106-4.1 OPERATION AND MAINTENANCE MANUALS**

O & M Manuals shall consist of hard cover, view or presentation type, 3-ring binders sized to hold 8 1/2" x 11" sheets. Each binder is to be adequately sized to comfortably hold required submittals. Minimum spline size to be 1" maximum spline size to be 3" (provide additional binders if 3" size is not sufficient to properly hold submittals). Each binder shall be adequately sized to hold the submittal information plus an additional 25% of the submittal sheet count.

Binder covers to have outer clear vinyl pocket on front and back cover (to hold 8 1/2" x 11" sheet) and on spine (to hold spine width x 11" sheet). Binders shall be K & M Company Stock No. VB11-25 presentation binders or approved equivalent. Provide correct designation of project in each pocket. Description sheet is to be white with black letters, minimum of 11" high and full width of pocket. Description is to describe project and match pocket drawing/spec description. Description is to include submittal type, i.e. one (1) for Airfield Lighting System Materials (black).

#### **106-4.2 OPERATION AND MAINTENANCE MANUAL CONTENTS**

O & M Manuals to include:

- a. First sheet in binder shall be similar to the example cover sheet shown in Figure 1 except that it shall be titled "O & M Manuals".
- b. The second sheet shall be a table of contents.
- c. The third sheet shall be filled out by Contractor and shall list project address, see Figure 2.
- d. The fourth sheet shall also be filled out by Contractor and list project information for project, see Figure 3.
- e. Provide Wilson Jones, reinforced, clear, ring binder indexes, 5 tab No. WJ-54125 or approved equivalent with the appropriate specification section number, and typed index for each section.
- f. Shop Drawings: Shop drawings shall be a copy of the final and approved shop drawings submitted as required in Item L-106-2. These shall be inserted in binder in proper order. Each catalog sheet shall clearly identify where the product is used and the drawing identification for equipment. Clear vinyl pockets shall be provided for insertion of shop drawings.
- g. Product data and/or catalog sheets shall be a copy of the final and approved submittal submitted as required in Item L-106-2. These shall be inserted in binder proper order. Each catalog sheet shall clearly identify where the product is used and the drawing identification for equipment.
- h. Warranty/Guarantee: Provide copy of warranty/guarantee and letters of certification, in respective location in O & M Manual binder. Original warranty/guarantee is to be incorporated into separate project warranty book with warranty/guarantees provided for other sections and divisions of the specification and submitted for Program Manager /Owner approval.
- i. Performance Verification and Demonstration to Owner (See form in L-131).
- j. Tabulated Data (see form in L-131).
- k. Required Check-Out Memos (see form in L-131).
- l. Progress and Record Drawing Certification (see Figure 4).

#### **106-4.3 PROCESSING O & M MANUALS**

Submit four (4) sets of O & M Manuals. The General Contractor shall review the manuals before submitting to the Program Manager. Mark 3 sets for the Owner and 1 set for the MSCAA Senior Airfield Electrician.

**106-4.4 DELAYS**

The Contractor is responsible for delays in job project accruing directly or indirectly from late submissions or resubmissions of the Operation and Maintenance Manuals.

**106-4.5 RE-SUBMITTALS**

The Program Manager shall be reimbursed the cost to review Operation and Maintenance Manual re-submittals subsequent to the second submittal.

**METHOD OF MEASUREMENT****106-5.1**

The items described in this section are incidental to other sections and shall not be measured for payment.

**BASIS OF PAYMENT****106-6.1**

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 in the respective bid item of which it is a component part.

***"EXAMPLE"***

**MEMPHIS-SHELBY COUNTY  
AIRPORT AUTHORITY**

**MEMPHIS  
INTERNATIONAL  
AIRPORT**

**MSCAA PROJECT NO. 18-1413-01**

**TAXIWAY ALPHA WEST RECONSTRUCTION**

**AIRFIELD ELECTRICAL SUBMITTAL BOOK**

**FIGURE 1**

ISSUED FOR BID



**PROJECT ADDRESSES**

OWNER:

PHONES:

CONSULTING ENGINEER:

ELECTRICAL CONSULTING ENGINEER:

GENERAL CONTRACTOR:

SUBCONTRACTORS:

SUPPLIERS:

**FIGURE 2**

**PROJECT INFORMATION**

Contractor shall fill in the blanks below and insert in the Submittal Books. Submit one (1) sheet for each major division of Work.

Project Name: \_\_\_\_\_

Specification Division Number & Name: \_\_\_\_\_

Subcontractor: \_\_\_\_\_

Contact: \_\_\_\_\_ Phone #: \_\_\_\_\_

Date Project Bid: \_\_\_\_\_

Project Start Date: \_\_\_\_\_

Days Allowed for Construction: \_\_\_\_\_

Target Completion: \_\_\_\_\_

Substantial Completion  
Certification Date: \_\_\_\_\_

	DATE SUBMITTED	DATE SUBMITTED
Closeout Documentation Manual:	_____	_____
Owner Performance Verification and Demonstrations:	_____	_____
Manufacturer's Performance Verification Memos:	_____	_____
Manufacturer's Test Data:	_____	_____
Record Documents:	_____	_____

**FIGURE 3**

**PROGRESS AND RECORD DRAWING CERTIFICATION**

This form shall be completed and submitted with the Record Documents. Submit one form for each Contractor/Subcontractor providing as-built information. Include a copy of this form in the Closeout Documentation Manual.

Project Name: \_\_\_\_\_

Specification Division Number & Name: \_\_\_\_\_

The Contractor's and Subcontractor's signatures below certify that the attached drawings and specifications were marked and revised as items were installed/changed, during the course of construction, and that these documents represent an accurate "Record-As Built" condition of the work as actually installed.

\_\_\_\_\_  
(Name of General Contractor)

\_\_\_\_\_  
(Signature, Title, Date)

\_\_\_\_\_  
(Name of Subcontractor)

\_\_\_\_\_  
(Signature, Title, Date)

**FIGURE 4****END OF ITEM L-106**

**ITEM L-108****UNDERGROUND POWER CABLE FOR AIRPORTS****DESCRIPTION****108-1.1**

This item shall consist of furnishing and 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, if applicable. 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 Program Manager. This item shall not include the installation of duct banks or conduit (except as otherwise noted herein for temporary jumper cable), 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 Advisory Circular (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 Program Manager.
- c. Manufacturer's certifications shall not relieve the Contractor of the responsibility to provide materials per these specifications and acceptable to the Program Manager. Materials supplied and/or installed that do not comply with these specifications shall be removed (when directed by the Program Manager) 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 Program Manager 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 Program Manager, to determine compliance with the plans and specifications. The Contractor's submittals shall be electronically submitted in pdf format. The Program Manager 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 per paragraph 108-3.10e with isolation transformers connected in new series circuits and new segments of existing series circuits through the end of the contract warranty period when tested in accordance with AC 150/5340-26, Maintenance Airport Visual Aid Facilities, paragraph 5.1.3.1., Insulation Resistance Test.

## **108-2.2 CABLE**

Underground cable for airfield lighting facilities (runway and taxiway lights and signs) shall conform to the requirements of AC 150/5345-7, Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits latest edition and shall be subject to approval by the MSCAA Airfield Electrical Supervisor. 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, nonshielded, 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, nonshielded, with cross-linked polyethylene insulation. L-824 conductors for use on the L-830 secondary airfield lighting series circuits shall be sized per 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 degree C for installation in conduit and RHW-2, 75 degree C for direct burial installations. Conductors for parallel (voltage) circuits shall be type and size and installed in accordance with NFPA-70, National Electric Code.

Unless noted otherwise, all 600-volt and less non-airfield lighting conductor sizes are based on a 75 degree C, THWN-2, 600 volt insulation, copper conductors, not more than three single insulated conductors, in raceway, in free air. The conduit/duct sizes are based on the use of THWN-2, 600 volt insulated conductors. The Contractor shall make the necessary increase in conduit/duct sizes for other types of wire insulation. In no case shall the conduit/duct size be reduced. The minimum power circuit wire size shall be #12 AWG.

Conductor sizes may have been adjusted due to voltage drop or other engineering considerations. Equipment provided by the Contractor shall be capable of accepting the quantity and sizes of conductors shown in the Contract Documents. All conductors, pigtails, cable step-down adapters, cable step-up adapters, terminal blocks and splicing materials necessary to complete the cable termination/splice shall be considered incidental to the respective pay items provided.

Cable type, size, number of conductors, strand and service voltage shall be as specified in the Contract Document.

## **108-2.3 BARE COPPER WIRE (COUNTERPOISE, BARE COPPER WIRE GROUND AND GROUND RODS)**

Wire for counterpoise or ground installations for airfield lighting systems shall be No. 6 AWG bare solid copper wire for counterpoise and/or No. 6 AWG bare stranded copper wire for grounding bond wire per ASTM B3 and ASTM B8. 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 shall in no case be less than 8 feet long and 5/8 inch in diameter.

#### 108-2.4 CABLE CONNECTIONS

In-line connections or splices of underground primary cables shall be of the type called for on the plans, and shall be one of the types listed below. No separate payment will be made for cable connections.

- a. **The Cast Splice.** A cast splice, employing a plastic mold and using epoxy resin equivalent to that manufactured by 3M Company, "Scotchcast" Kit No. 82-B, or an approved equivalent, used for potting the splice is acceptable. The cast splice shall not be used for L-824 Type C cable.
- 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-proof 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 Program Manager 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 wide) and Scotch 130C linerless rubber splicing tape (2 inch 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 Company, 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 Program Manager. 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 Program Manager. When the work affecting the circuit is complete, the circuit's insulation resistance shall be checked again, in the presence of the Program Manager. The Contractor shall record the results on forms acceptable to the Program Manager. 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 magnetic tape shall be polyethylene film with a metalized foil core and shall be 3 – 6 inches wide. Detectable tape is incidental to the respective bid item. Detectable marking 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 Program Manager 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 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 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 Program Manager.

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 in size. The cable circuit identification shall match the circuits noted on the construction plans.

Temporary jumper cable installation shall be protected. Temporary jumper cable and its installation through the existing conduit system or through temporary conduit, shall all be furnished, installed, and removed by the Contractor. Temporary jumper cable shall not be used in the permanent installation. Temporary conduit shall be provided where cable will remain longer than 45 days; otherwise, temporary cable shall be buried in turf areas. **Other methods may be used for short term or emergency situations only if approved by the MSCAA Airfield Electrical Supervisor.** Where cable in conduit is approved for temporary placement on the surface, the conduit shall be held in place in a manner approved by the Program Manager, and the Contractor shall provide temporary traffic protection for the cable and/or conduit. **Temporary jumper cable locations shall be marked sufficiently to prevent damage from construction equipment.**

### **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 Program Manager 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 Program Manager prior to any cable installation. If required by the Program Manager, pulling tension values for cable pulls shall be monitored by a dynamometer in the presence of the Program Manager. Cable pull tensions shall be recorded by the Contractor and reviewed by the Program Manager. 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 Program Manager, 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 manufacturer's instructions and to the satisfaction of the Program Manager.
- b. **Field-attached Plug-in Splices.** These shall be assembled per the manufacturer's instructions. These splices shall be made by plugging directly into mating connectors. The joint where the connectors come together shall be finished by one of the following methods: (1) wrapped with at least one layer of rubber or synthetic rubber tape and one layer of plastic tape, one-half lapped, extending at least 1-1/2 inches on each side of the joint (2) covered with heat shrinkable tubing with integral sealant extending at least 1-1/2 inches on each side of the joint or (3) on connector kits equipped with water seal flap; roll-over water seal flap to sealing position on mating connector.
- c. **Factory-Molded Plug-in Splices.** These shall be made by plugging directly into mating connectors. The joint where the connectors come together shall be finished by one of the following methods: (1) wrapped with at least one layer of rubber or synthetic rubber tape and one layer of plastic tape, one-half lapped, extending at least 1-1/2 inches on each side of the joint (2) covered with heat shrinkable tubing with integral sealant extending at least 1-1/2 inches on each side of the joint or (3) on connector kits equipped with water seal flap; roll-over water seal flap to sealing position on mating connector.
- d. **Taped or Heat-Shrunked 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 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 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 beyond all sides of the larger bonded area on all mating surfaces. Use a joint compound suitable for the materials used in the connection. Repair painted/coated surface to original condition after completing the connection.

### **108-3.6 BARE COUNTERPOISE WIRE INSTALLATION FOR LIGHTNING PROTECTION AND GROUNDING**

If shown on the plans or included in the job specifications, bare solid #6 AWG copper counterpoise wire shall be installed for lightning protection of the underground cables. The Engineer 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 conductor is centered over the cable/conduit/duct to be protected.

The counterpoise conductor shall be installed no less than 8 inches minimum or 12 inches 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.** When a metallic light base is used, the grounding electrode shall be bonded to the metallic light base or mounting stake with a No. 6 AWG bare, annealed or soft drawn, solid copper conductor.

Grounding electrodes may be rods, ground dissipation plates, radials, or other electrodes listed in the NFPA 70 (NEC) or NFPA 780.

Where raceway is installed by the directional bore, jack and bore, or other drilling method, the counterpoise conductor shall be permitted to be installed concurrently with the directional bore, jack and bore, or other drilling method raceway, external to the raceway or sleeve.

The counterpoise wire shall also be exothermically welded to ground rods installed as shown on the plans but not more than 500 feet apart around the entire circuit. The counterpoise system shall be continuous and terminate at the transformer vault or at the power source. It shall be securely attached to the vault or equipment external ground ring or other made electrode grounding system. The connections shall be made as shown on the plans and in the specifications.

Where an existing airfield lighting system is being extended or modified, the new counterpoise conductors shall be interconnected to existing counterpoise conductors at each intersection of the new and existing airfield lighting counterpoise systems.

**d. Parallel Voltage Systems.** Provide grounding and bonding in accordance with NFPA 70, National Electrical Code.

**108-3.7 COUNTERPOISE INSTALLATION ABOVE MULTIPLE CONDUITS AND DUCT BANKS**

Counterpoise wires shall be installed above multiple conduits/duct banks for airfield lighting cables, with the intent being to provide a complete area of protection over the airfield lighting cables. When multiple conduits and/or duct banks for airfield cable are installed in the same trench, the number and location of counterpoise wires above the conduits shall be adequate to provide a complete area of protection measured 45 degrees each side of vertical.

Where duct banks pass under pavement to be constructed in the project, the counterpoise shall be placed above the duct bank. Reference details on the construction plans.

**108-3.8 COUNTERPOISE INSTALLATION AT EXISTING DUCT BANKS**

When airfield lighting cables are indicated on the plans to be routed through existing duct banks, the new counterpoise wiring shall be terminated at ground rods at each end of the existing duct bank where the cables being protected enter and exit the duct bank. The new counterpoise conductor shall be bonded to the existing counterpoise system.

**108-3.9 EXOTHERMIC BONDING**

Bonding of counterpoise wire shall be by the exothermic welding process or equivalent method accepted by the Program Manager. Only personnel experienced in and regularly engaged in this type of work shall make these connections.

Contractor shall demonstrate to the satisfaction of the Program Manager, 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 also 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 Program Manager. The Contractor shall demonstrate the electrical characteristics to the satisfaction of the Program Manager. 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 Program Manager for approval. Earth resistance testing results shall be recorded on an approved form and testing shall be performed in the presence of the Program Manager. 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 Program Manager 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 Program Manager 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 25 ohms prior to establishing connections to other ground electrodes. The fall-of-potential ground impedance test shall be used, as described by American National Standards Institute/Institute of Electrical and Electronic Program Managers (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 Program Manager prior to performing the testing.

Two copies of tabulated results of all cable tests performed shall be supplied by the Contractor to the Program Manager. Where connecting new cable to existing cable, ground insulation 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**

Counterpoise wire installed in trench, or in duct, or in conduit encapsulation shall be measured by the number of linear feet installed, ready for operation, and accepted as satisfactory. Separate measurement shall be made for each counterpoise wire installed in trench, duct, or conduit encapsulation. The measurement for this item shall not include additional quantities required for slack.

### **108-4.2**

Cable, except temporary jumper cable, installed in duct or conduit shall be measured by the number of linear feet measured in place from center-to-center of light bases, sign base cans, junction cans, junction can plazas, handholes, or manholes along the conduit path, ready for operation, and accepted as satisfactory. Separate measurement shall be made for each cable installed in 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**

Temporary jumper cable shall be measured by the number of linear feet, as measured in place from center-to-center of light, sign, junction can, etc. along the cable path, exclusive of cable slack and loops, ready for operation, and accepted as satisfactory. Separate measurement shall be made for each cable installed, by various installation types, along the cable path.

#### **108-4.4**

No separate payment will be made for ground rods.

### **BASIS OF PAYMENT**

#### **108-5.1**

Payment will be made at the contract unit price for bare counterpoise wire installed in trench (direct-buried), duct, or in conduit encapsulation, in place by the Contractor and accepted by the Program Manager. This price shall be full compensation for furnishing all materials and for all preparation and installation of these materials, and for all labor, equipment, tools, and incidentals, including connections, splices, ground rods and ground connectors, necessary to complete this item.

#### **108-5.2**

Payment will be made at the contract unit price for cable installed in duct bank or conduit, in place by the Contractor and accepted by the Program Manager. This price shall be full compensation for furnishing all materials and for all preparation and installation of these materials, and for all labor, equipment, tools, and incidentals, including connections, L-823 connectors, and splices, necessary to complete this item.

#### **108-5.3**

Payment will be made at the contract unit price for temporary jumper cable installed, regardless of type of installation, in place by the Contractor and accepted by the Program Manager. This price shall include material and labor necessary for temporary jumper installation buried in turf, in temporary buried conduit, existing conduit, temporary surface mounted conduit or other manner approved by the Program Manager. 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, including trench and backfill, all L-823 connectors, conduit or other protection allowed by the Program Manager, counterpoise where directed, ground rods, and other incidentals necessary to complete this item. Temporary anchor methods and protection, removal of all temporary materials and restoration are also included.

Payment will be made under:

Item L-108-5.1	No. 8 AWG, 5kV, L-824, Type C Cable, Installed in Duct Bank or Conduit – per linear foot
Item L-108-5.2	No. 6 AWG, Solid, Bare Copper Counterpoise Wire, Installed with ground rods and connectors – per linear foot
Item L-108-5.3	No. 6 AWG, Solid, Bare Copper Ground, Installed with ground rods & connectors – per linear foot

Item L-108-5.4 NO. 8 L-824C 5kV Temporary jumper cable, Including counterpoise with ground rods & connectors, Trench & backfill, Conduit, Sawkerfs & sealant, or other protection, Installed & removed – per linear foot

### REFERENCES

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

#### Advisory Circulars (AC)

AC 150/5340-26	Maintenance of Airport Visual Aid Facilities
AC 150/5340-30	Design and Installation Details for Airport Visual Aids
AC 150/5345-7	L-824 Underground Electrical Cable for Airport Lighting Circuits
AC 150/5345-26	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	Soft or Annealed Copper Wire
ASTM B8	Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft
ASTM B33	Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes
ASTM D4388	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	Installation of Lightning Protection Systems

American National Standards Institute (ANSI)/Institute of Electrical and Electronics Program Managers (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**



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**ITEM L-110****AIRPORT UNDERGROUND ELECTRICAL DUCT BANKS AND CONDUITS****DESCRIPTION****110-1.1**

This item shall consist of underground electrical conduits and duct banks (single or multiple conduits encased in concrete or buried in sand) installed per this specification at the locations and per the dimensions, designs, and details shown on the plans. This item shall include furnishing and installing of all underground electrical duct banks and individual and multiple underground conduits and removal of existing duct banks. It shall also include all turfing trenching, backfilling, removal, and restoration of any paved or turfed areas; concrete encasement, mandrelling, pulling lines, duct markers, plugging of conduits, and the testing of the installation as a completed system ready for installation of cables per the plans and specifications. This item shall also include furnishing and installing conduits and all incidentals for providing positive drainage of the system. Verification of existing ducts is incidental to the pay items provided in this specification.

**EQUIPMENT AND MATERIALS****110-2.1 GENERAL**

- a. All equipment and materials covered by referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification when requested by the Program Manager.
- b. Manufacturer's certifications shall not relieve the Contractor of the responsibility to provide materials per these specifications and acceptable to the Program Manager. Materials supplied and/or installed that do not comply with these specifications shall be removed, when directed by the Program Manager 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 Program Manager 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. Clearly and boldly mark catalog documents 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 Program Manager, to determine compliance with the plans and specifications. The Contractor's submittals shall be electronically submitted in pdf format, tabbed by specification section. The Program Manager reserves the right to reject any and all equipment, materials or procedures that do not meet the system design and the standards and codes specified in this document.
- e. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

**110-2.2 STEEL CONDUIT**

Rigid galvanized steel conduit (RGS) 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 mils 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 mil of asphaltum sealer. When using PVC coated RGS conduit, care shall be exercised not to damage the factory PVC coating. Damaged PVC coating shall be repaired per the manufacturer's written instructions. In lieu of PVC coated RGS, corrosion wrap tape shall be permitted to be used where RGS is in contact with direct earth.

**110-2.3 PLASTIC CONDUIT**

Plastic conduit and fittings shall conform to the following requirements:

- UL 514B covers W-C-1094-Conduit fittings all types, classes 1 thru 3 and 6 thru 10.
- UL 514C covers W-C-1094-all types, Class 5 junction box and cover in plastic (PVC).
- UL 651 covers W-C-1094-Rigid PVC Conduit, types I and II, Class 4.
- UL 651A covers W-C-1094-Rigid PVC Conduit and high density polyethylene (HDPE) Conduit type III and Class 4.

Underwriters Laboratories Standards UL-651 and Article 352 of the current National Electrical Code shall be one of the following, as shown on the plans:

- a. Type I-Schedule 40 and Schedule 80 PVC suitable for underground use either direct-buried or encased in concrete.
- b. Type II-Schedule 40 PVC suitable for either above ground or underground use.
- c. Type III-Schedule 80 PVC suitable for either above ground or underground use either direct-buried or encased in concrete.
- d. Type III-HDPE pipe, minimum standard dimensional ratio (SDR) 11, suitable for placement with directional boring under pavement.

The type of solvent cement shall be as recommended by the conduit/fitting manufacturer.

**110-2.4 SPLIT CONDUIT**

Split conduit shall be pre-manufactured for the intended purpose and shall be made of steel or plastic.

**110-2.5 CONDUIT SPACERS**

Conduit spacers shall be prefabricated interlocking units manufactured for the intended purpose. They shall be of double wall construction made of high grade, high density polyethylene complete with interlocking cap and base pads. They shall be designed to accept No. 4 reinforcing bars installed vertically.

**110-2.6 CONCRETE**

Concrete shall be proportioned, placed, and cured per Item P-610, Concrete for Miscellaneous Structures.

**110-2.7 PRECAST CONCRETE STRUCTURES**

Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or another Program Manager approved third party certification program. Precast concrete structures shall conform to ASTM C478.

**110-2.8 FLOWABLE BACKFILL**

Flowable material used to backfill 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 wide. Detectable tape is incidental to the respective bid item.

**CONSTRUCTION METHODS****110-3.1 GENERAL**

The Contractor shall install underground duct banks and conduits at the approximate locations indicated on the plans. The Program Manager 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 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 per 100 feet. 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. Where under pavement, the top of the duct bank shall not be less than 18 inches below the top of subgrade; in other locations the top of the duct bank or underground conduit shall be not less than 18 inches 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 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 Program Manager 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 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.

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 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 sieve. Flowable backfill may alternatively be used.

Underground electrical warning (caution) tape shall be installed in the trench above all underground duct banks and conduits in unpaved areas. Contractor shall submit a sample of the proposed warning tape for approval by the Program Manager. If not shown on the plans, the warning tape shall be located six 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.

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 Program Manager, 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 Program Manager.

All excavation shall be unclassified and shall be considered incidental to Item L-110. Dewatering necessary for duct installation, and erosion control per Federal, State, and Local requirements is incidental to Item L-110.

Unless otherwise specified, excavated materials that are deemed by the Program Manager to be unsuitable for use in backfill or embankments shall be removed and disposed of off site.

Any excess excavation shall be filled with suitable material approved by the Program Manager 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:

- (1) Existing cables shall be located manually. Unearthed cables shall be inspected to assure absolutely no damage has occurred.
- (2) Trenching, etc., in cable areas shall then proceed with approval of the Program Manager, 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 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 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 beyond the edges of the pavement or 3 feet beyond any underdrains 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 thick prior to its initial set. The Contractor shall space the conduits not less than 3 inches 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 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 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 intervals. Spacers shall be in the proper sizes and configurations to fit the conduits. Locking collars and spacers shall be submitted to the Program Manager 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 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 wide tape, 8 inches minimum below grade, above all underground conduit or duct lines not installed under pavement. Utilize the 3-inch wide tape only for single conduit runs. Utilize the 6-inch wide tape for multiple conduits and duct banks. For duct

banks equal to or greater than 24 inches 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 Program Manager 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 Program Manager.

### **110-3.3 CONDUITS WITHOUT CONCRETE ENCASEMENT**

Trenches for single conduit lines shall be not less than 6 inches nor more than 12 inches 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 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 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 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 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 apart (measured from outside wall to outside wall) in a horizontal direction and not less than 6 inches 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 apart (measured from outside wall to outside wall) in a horizontal direction and not less than 6 inches 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 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 intervals. Spacers shall be in the proper sizes and configurations to fit the conduits. Locking collars and spacers shall be submitted to the Program Manager 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 square and 4-6 inches thick extending approximately 1 inch 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 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 Program Manager, 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 Program Manager. 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 Program Manager. The letters shall be 4 inches high and 3 inches wide with width of stroke 1/2-inch and 1/4-inch 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 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 "Excavation and Embankment" except that material used for backfill shall be select material not larger than 4 inches 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 Program Manager.

### **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 material used for backfill shall be select material not larger than 4 inches in diameter. In addition to the requirements of P-152, where duct banks are installed under pavement, one moisture/density test per lift shall be made for each 250 linear feet of duct bank or one work period's construction, whichever is less.

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 Program Manager.

### **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 or seeding as shown on the plans. The Contractor shall be held responsible for maintaining all disturbed surfaces and replacements until final acceptance. All restoration shall be considered incidental to the respective L-110 pay item. Following restoration of all trenching near airport movement surfaces, the Contractor shall thoroughly visually inspect the area for foreign object debris (FOD), and remove any such FOD that is found. This FOD inspection and removal shall be considered incidental to the pay item of which it is a component part.



**110-3.8 OWNERSHIP OF REMOVED CABLE**

Cable removed from conduit during the progress of work shall become the property of the Contractor and shall be removed off Airport property. Removed cable may be used for temporary/bypass circuits if condition is suitable and as allowed by the Program Manager.

**METHOD OF MEASUREMENT****110-4.1**

Underground conduits and duct banks shall be measured by the linear feet of conduits and duct banks installed, all measured in place, completed, and accepted. Drain lines shall be measured by the linear feet of drain line conduit installed, measured in place, completed, and accepted. Separate measurement shall be made for the various types and sizes.

**BASIS OF PAYMENT****110-5.1**

Payment will be made at the contract unit price per linear foot for each type and size of underground electrical conduit and duct bank completed and accepted, including trench and backfill with the designated material, and locator tape.

Payment will be made at the contract unit price per linear foot for drain line completed and accepted, including trench and backfill with the designated material, and shall also include termination at existing drainage structure, and turf restoration, where applicable.

Each unit price shall be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item per the provisions and intent of the plans and specifications.

Payment will be made under:

Item L-110-5.1	Concrete Encased Electrical Conduit, 1W-2" Sch. 40 PVC, installed under New Rigid Pavement — per linear foot
Item L-110-5.2	Concrete Encased Electrical Conduit, 1W-2" Sch. 40 PVC, installed under New Flexible Pavement — per linear foot
Item L-110-5.3	Concrete Encased Electrical Conduit, 1W-2" Sch. 40 PVC, installed in soil below subgrade or turf — per linear foot
Item L-110-5.4	DEB Drain Conduit, 1W-2" Sch. 40 PVC — per linear foot
Item L-110-5.5	Concrete Encased Electrical Duct Bank, 4W-4" Sch. 40 PVC, installed in soil below subgrade or turf — per linear foot

**REFERENCES**

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

## Advisory Circular (AC)

AC 150/5340-30                      Design and Installation Details for Airport Visual Aids

AC 150/5345-53                      Airport Lighting Equipment Certification Program

## ASTM International (ASTM)

ASTM A615                          Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement

## National Fire Protection Association (NFPA)

NFPA-70                              National Electric Code (NEC)

## Underwriters Laboratories (UL)

UL Standard 6                      Electrical Rigid Metal Conduit – Steel

UL Standard 514B                      Conduit, Tubing, and Cable Fittings

UL Standard 514C                      Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers

UL Standard 1242                      Electrical Intermediate Metal Conduit Steel

UL Standard 651                      Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings

UL Standard 651A                      Type EB and A Rigid PVC Conduit and HDPE Conduit

**END OF ITEM L-110**

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**ITEM L-111****AIRFIELD ELECTRICAL INSTALLATION TESTING**

(Non-Standard FAA Specification)

**DESCRIPTION****111-1.1**

This item shall consist of furnishing all equipment, materials and appliances necessary for testing of airfield lighting circuit installations and associated systems. Airfield lighting systems include airfield signage systems.

- a. The Contractor shall provide all electrical testing to confirm that lighting system installations associated with this project are acceptable. Contractor shall engage an independent agency to perform the Hi-Pot Test. The Contractor shall engage an Owner approved independent third party testing firm to perform specified photometric testing, with the Contractor providing specified testing assistance.
- b. Requirements under this item shall be coordinated with the Program Manager. Specification requirements for approvals, reviews, or other involvement of the Program Manager shall be transmitted by the Contractor through the Program Manager to the Designer.

**EQUIPMENT AND MATERIALS****111-2.1 GENERAL**

Equipment, 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 Program Manager.

**CONSTRUCTION METHODS****111-3.1 GENERAL**

The Contractor shall furnish all necessary equipment and appliances for testing installations as indicated below.

**111-3.2 GROUND ROD TESTING**

- a. Contractor shall provide equipment and personnel to measure the resistance to earth for all ground rods installed using Fall of Potential Method. Earth resistance measurement tests shall adhere to recommendations of IEEE Standard 142, latest edition. Contractor shall submit testing procedure and equipment and report form to the Program Manager for approval if not using the form included in Item L-131.
- b. Tests shall be administered as each rod is installed. Any rod which does not have a resistance to ground of 25 ohms or less shall be augmented by an additional rod not less than 6 feet away. Testing results shall be submitted to the Program Manager for approval.

**111-3.3 AIRFIELD LIGHTING CIRCUITS TESTING**

The Contractor shall notify the Program Manager and MSCAA Electrical Maintenance 48 hours prior to cable testing. All testing shall be conducted in the presence of the Program Manager and MSCAA Electrical Maintenance. All test results shall be simultaneously recorded by the Contractor and MSCAA Electrical Maintenance. Contractor shall provide test report information to the Program Manager and MSCAA Electrical Maintenance for approval. Test procedures for the following required tests, including field test report forms, shall be submitted to the Program Manager for approval prior to testing.

**a. Testing Requirements**

- (1) Testing Required for Existing Circuits and Existing Portions of Circuits to be Extended.** The existing circuits to be extended shall be subjected to Low Voltage Tests in accordance with paragraph b.(1) below. Tests shall be performed with the isolation transformers and other lighting system devices connected. Test results shall be submitted to the Program Manager for approval prior to extending or revising the existing circuit.
- (2) Testing Required for Existing Circuits with Circuit Modifications and/or Extensions Completed.** Each existing series circuit that has been modified and/or extended shall be subjected to Low Voltage Tests in accordance with paragraph b.(1) below. Tests shall be performed with the lighting isolation transformers and other lighting system devices connected. Circuits tested shall meet the requirements of paragraph c.(2) below. Any faults indicated by these tests shall be corrected before proceeding with additional testing. Test results shall be submitted to the Program Manager for approval.
- (3) Testing Required For New Circuits and New Portions of Existing Circuits.** Each new series circuit, or new segment of existing circuits being extended, modified, or replaced, shall be tested as follows:

  - (a)** After new cable with new connectors is installed and prior to connecting isolation transformers, the following tests shall be performed:

    - (i)** Low Voltage Continuity and Insulation Resistance (IR) Tests in accordance with paragraph b.(1) below to determine if the total insulation resistance of each circuit is satisfactory so that the series lighting circuit will operate without excessive leakage current when energized. Circuits tested shall meet the requirements of paragraph c.(3)(a) below. Any faults indicated by these tests shall be corrected before proceeding with additional testing. All test results shall be submitted to the Program Manager for approval.
    - (ii)** After meeting the requirements of paragraph a.(3)(a)(i) above, new circuits shall then be subjected to a Hi-Pot Test in accordance with paragraph b.(2) below. Circuits tested shall meet the requirements of paragraph c.(3)(b) below. Any faults indicated by the test shall be corrected before proceeding with additional testing. All test results shall be submitted to the Program Manager for approval.
  - (b)** New segments of existing circuits meeting the requirements of paragraph a.(3)(a) above shall then have the isolation transformers connected and shall again be subjected to the Low Voltage Continuity and Insulation Resistance (IR) Tests of paragraph b.(1). Any faults indicated by these tests shall be corrected before energizing the circuit. All test results shall be submitted to the Program Manager for approval.
- (4) All Circuits.** Upon completion of all wiring of each circuit, the Low Voltage Continuity

and Insulation Resistance (IR) Tests shall be performed on the completed circuit in accordance with paragraph b.(1) below. All isolation transformers and other lighting system devices shall be connected to the completed circuit. Circuits tested shall meet the requirements of paragraph c.(3)(a) below. Any faults indicated by these tests shall be corrected before proceeding with additional testing. All test results shall be submitted to the Program Manager for approval.

**b. Testing Procedures**

**(1) Low Voltage Tests.** Low Voltage Continuity and Insulation-Resistance (IR) Tests

- (a) Test Required.** As noted in paragraph a. above, circuits and segments of circuits shall be subjected to a low voltage continuity test and to a 2,500 volt Insulation-Resistance (IR) (megger) test. IR tests shall test the insulation resistance (to ground) of each lighting system conductor.
- (b) Test Equipment.** Contractor shall provide a 2,500 volt direct current Insulation Resistance test set for low voltage testing. Insulation Resistance test set shall be a 120V AC device, non-crank type, as manufactured by Associated Research Meg-Check, the James Biddle Megger, General Radio Megohmmeter, or approved equivalent. The Contractor shall be responsible for providing any required 120V AC power source at testing locations remote from available power. Equipment calibration information shall be readily available for review by the Program Manager if requested.
- (c) Test Procedures.** "Lock-Out Procedure" requirements established by the MSCAA Electrical Maintenance Department shall be followed. Test procedures for the required tests, including field test report forms, shall be submitted to the Program Manager for approval prior to testing.
  - 1. Test equipment grounding electrode shall be adjacent to the test equipment and be a part of/connected to the airfield grounding counterpoise/ground rod system.
  - 2. Verify that all devices and accessories connected to the cable are rated for the test voltage to be applied.
  - 3. Ground other cables in the same conduit as cable under test.
  - 4. Clean and isolate "remote" end of cable to be tested.
  - 5. Ground the cable for a minimum of one (1) minute prior to testing.
  - 6. Test cable.
  - 7. After testing is complete, cable shall be discharged to the grounding electrode using resistor designed for the purpose. Solidly ground the cable after discharge. Cable shall remain solidly grounded for a minimum of 5 minutes.
- (d) Test Results.** Cable specimens that do not meet the test criteria given in paragraphs c.(2) for existing circuits that have been modified and/or extended, and c.(3)(a), for new circuits and new segments of existing circuits, shall be considered unacceptable. Refer to paragraph d. below for cables not meeting testing requirements.

**(2) Hi-Pot Test.** DC High Potential/High Voltage Current Leakage Test

- (a) Test Required.** As noted in paragraph a. above, all circuits installed in conduit shall have all sections of new cable Hi-Pot Tested. A section may be comprised of multiple segments joined by L-823 connectors without isolation transformers installed.

- (b) **Test Agency.** All Hi-Pot tests shall be performed by an independent agency certified by the National Electrical Testing Association (NETA) with certified technicians using properly calibrated equipment and standard procedures. The independent agency must be approved by the MSCAA.
- (c) **Test Equipment.** The test instrument shall be a suitable high voltage test set which has a steady, filtered direct current output voltage. The high voltage test set shall include an accurate voltmeter and micrometer for reading the voltage applied to the circuit and resultant insulation leakage current. Voltages in excess of the test values specified below shall not be applied.
- (d) **Test Procedures.** "Lock-Out Procedure" requirements established by the MSCAA Electrical Maintenance Department shall be followed. Prepare cable and conduct test in accordance with IEEE 400 and NEMA WC-7 requirements and as required by testing agency. The Contractor shall comply with the following procedure:
1. Ground all conductors, except the one to be tested.
  2. Ensure adequate clearance of the tested specimen from grounded objects to prevent flashover.
  3. Carefully clean test conductor surface to remove any dust or other miscellaneous debris.
  4. "Corona-proof" the cable test specimen to minimize corona discharge.
  5. Secure test site and fence off perimeter for the safety of personnel working in the area.
  6. Perform Insulation Resistance testing of cable specimen immediately prior to Hi-Pot testing. Any cable that exhibits low insulation resistance readings is questionable and should be investigated before performing the DC Hi-Pot test.
  7. Connect the output of test set to cable specimen and attach the ground terminal of the set and an approved grounding electrode adjacent to the test equipment. Grounding electrode shall be a part of/connected to the airfield grounding counterpoise/ground rod system
  8. Bring the DC voltage up to the prescribed maximum test voltage of 15 kV in **five** equal steps. Raise the voltage at an even rate to obtain each required step in not less than 10 seconds. Hold the voltage at each step for 60 seconds. Read and record the leakage current at the end of each hold period.
  9. Hold the maximum test voltage of 15 kV for 10 minutes. Read and record the leakage current at 15 second intervals during the first 2 minutes and then every minute thereafter for the remainder of the test.
  10. Bring the test voltage control quickly and smoothly to zero. Read and record the voltage remaining on the cable after 30 seconds and again after one minute.
  11. Discharge the cable to the ground using a properly terminated resistor stick. When the test set voltmeter indicates zero volts on the cable, solidly ground the cable specimen and then disconnect the test set and resistor stick. Cable

specimen shall remain solidly grounded to the grounding electrode a minimum of 15 minutes.

12. Test each subsequent lighting cable segment/section/circuit in the same manner as described above.

13. During the tests, plot the leakage current versus the applied test voltage on appropriate graph paper to field verify the integrity of the cable insulation. Submit copies of the test data to the Program Manager, the Program Manager, and to MSCAA Electrical Maintenance for approval.

(e) **Test Results.** Cable specimens that do not meet the test criteria given in paragraph c. below shall be considered completely unacceptable. Refer to paragraph d. below for cables not meeting testing requirements.

(3) **For all Testing.** All existing and/or new cables, equipment, and materials damaged during testing shall be repaired and/or replaced by the Contractor at no additional cost to the MSCAA as directed by the Program Manager. Tests shall be performed and faulty installations corrected until satisfactory results are obtained. Exact correction procedures for specific faulty installation circumstances shall be as specified and approved by the Program Manager. The Contractor is not responsible for the repair of existing cables that are to be modified or extended that are deemed by the Program Manager to be faulty prior to modification of extension unless directed by the Contract Documents.

**c. Testing Results**

(1) **Existing Circuits and Existing Portions of Circuits to be Extended or Modified.** Low voltage continuity test results and insulation resistance test results shall be submitted to the Program Manager for determination of suitability for extension or modification and any remedial action that may be appropriate.

(2) **Existing Circuits and Existing Portions of Circuits that have been Extended or Modified.** Low Voltage Tests shall demonstrate to the satisfaction of the Program Manager the following:

- (i) All circuits are properly connected in accordance with the applicable wiring diagrams.
- (ii) All lighting power and control circuits are continuous and free from short circuits.
- (iii) All circuits are free from unspecified grounds.
- (iv) The insulation-resistance is equal to or greater than its original value prior to circuit modifications.

(3) **New Circuits and New Segments of Existing Circuits**

(a) Low Voltage Tests shall demonstrate to the satisfaction of the Program Manager the following:

- (i) All circuits are properly connected in accordance with the applicable wiring diagrams.
- (ii) All lighting power circuits are continuous and free from short circuits.



- (iii) All circuits are free from unspecified grounds.
- (iv) The insulation-resistance is equal to or greater than 1000 megohms for new circuits and new segments of existing circuits. Isolation transformers shall be connected. In addition, new circuits and new segments of existing circuits shall maintain an insulation resistance of not less than 500 megohms, with isolation transformers connected, through the end of the construction warranty period.
- (v) Insulation-resistance of cables of approximately the same length installed in same duct bank shall not show a comparison ratio of over 3 to 1.
- (b) Hi-Pot Tests shall demonstrate to the satisfaction of the Program Manager the following most significant insulation leakage current characteristics necessary to evaluate the condition of the cable:
  - (i) The leakage current increases in a linear function as the test voltage is increased between zero and the prescribed maximum test voltage.
  - (ii) The leakage current stabilizes or decreases to a slightly lower stable value after the maximum test voltage is obtained and during the maximum test voltage hold period.

**d. Deficient Testing Results (Circuits Not Meeting Requirements)**

**(1) Existing Circuits and Existing Portions of Circuits that have been Extended or Modified**

- (a) Cables that do not meet the test criteria of paragraph c.(2) above shall be considered unacceptable and shall not be energized until corrected.
- (b) If all "Lock-Out Procedure" requirements established by the MSCAA Electrical Maintenance Department have been satisfied by the Contractor and the Program Manager determines non-complying circuits or segments of circuits are the responsibility of the MSCAA, then the Contractor shall provide to the MSCAA Electrical Maintenance Department, through the Program Manager, all test reports identifying location of non-complying cables.

**(2) New Circuits and New Portions of Existing Circuits**

Cables that do not meet the test criteria of subparagraph c(3) above shall be considered unacceptable and shall not be energized until corrected.

**e. Submittal of Testing Data**

- (1) **Low Voltage Tests.** Contractor shall submit 5 copies of tests reports for approval of the Program Manager and MSCAA Electrical Maintenance. Report shall include all measured data including applied voltage, time length of voltage application and calculated megohms from each segment of cable in a circuit. Data shall show the calculations for acceptable leakage current from each cable section tested. The Low Voltage Tests data form shall also include, as a minimum:

DATE	CABLE NUMBER
START TIME	OPERATING VOLTAGE
END TIME	MAX. TEST VOLTAGE
CABLE B/M NO.	FROM EQUIPMENT
DESCRIPTION	TO EQUIPMENT
TEMP. MEASURE EQUIP. NO.	HUMID. MEASURE EQUIP. NO.
CALIBRATION DUE DATE	CALIBRATION DUE DATE
AMBIENT TEMPERATURE	RELATIVE HUMIDITY

- (2) **Hi-Pot Tests.** Contractor shall submit 5 copies of Hi-Pot Test reports for approval of the Program Manager and MSCAA Electrical Maintenance and 2 additional copies for distribution to the MSCAA Engineering Department. Report shall include all measured data including leakage current, applied voltage, time length of voltage application and calculated megohms from each portion (section) of cable within a circuit.

Data shall show the calculations for acceptable leakage current from each cable section tested. The Hi-Pot Test form shall also include, as a minimum:

DATE	CABLE NUMBER
START TIME	OPERATING VOLTAGE
END TIME	MAX. TEST VOLTAGE
CABLE B/M NO.	FROM EQUIPMENT
DESCRIPTION	TO EQUIPMENT
TEMP. MEASURE EQUIP. NO.	HUMID. MEASURE EQUIP. NO.
CALIBRATION DUE DATE	CALIBRATION DUE DATE
AMBIENT TEMPERATURE	RELATIVE HUMIDITY

#### 111-3.4 SYSTEM TESTS

After the airfield lighting systems installation is complete and at such times as the Program Manager may direct, the Contractor shall conduct airfield lighting systems operating tests for approval.

- a. The equipment shall be demonstrated to operate in accordance with the requirements of this specification. The test shall be performed in the presence of the Program Manager or authorized representative. The Contractor shall furnish all equipment and personnel required for the test.
- b. Each applicable control device in the control tower lighting panels 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 properly commands the corresponding circuit. Radio communication between the operator and the observers shall be provided by the Contractor.
- c. 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 1 hour. 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.
- d. If circuit regulators are installed under project construction, regulator output ampacity shall be adjusted for proper outputs in accordance with manufacturer's recommendations and requirements to insure proper circuit operation.
- e. Systems tests shall confirm by demonstration in service that all lighting circuits are in good

operating condition to the satisfaction of the Program Manager. If the tests are unsatisfactory, lighting systems installed shall be corrected and systems tests shall again be implemented.

### 111-3.5 PHOTOMETRIC TESTING

**a. General.** Photometric testing shall be furnished by an Owner approved independent third party testing firm. Photometric testing of the airfield lighting fixtures, taxiway centerline and edge lights installed under this contract shall be performed by a firm with demonstrated capability for field measurement of photometric performance of airfield lighting fixtures. The firm shall have experience in evaluating the test results against FAA standards and manufacturers' performance criteria. The firm shall demonstrate its capability by having performed similar work successfully at no less than 10 air carrier airports.

Photometric testing shall be performed at night with minimum interference with airport operations. Not more than 24 hours prior to starting the test, the Contractor shall clean and align all the light fixtures to assure that the system is ready for the photometric testing.

**b. Test System:** The photometric test system shall be comprised of:

- 1) An array of accurate measurement sensors configured to measure light from each light source as system moves away from that light source. There shall be no loss of accuracy at speeds up to at least 50mph.
- 2) A sensor to trigger measurements simultaneously from all sensors approximately every 4 inches.
- 3) The capability (including additional sensors) to accurately track the position of each measurement sensor relative to the specified main beam area of each light source being measured.
- 4) The capability to automatically calculate the average intensity (in candela) in the main beam area and estimate vertical and horizontal beam alignment (in degrees) by identifying the position of the brightest part of the light beam measured.
- 5) The capability to log data during surveys, display results and identify locations where the average main beam intensity is below agreed levels and/or the beam is mis-aligned either vertically or horizontally.

**c. Taxiway Access Time.** In order to minimize the impact on airport operations, the collection of data shall be undertaken while the survey system is traveling along the taxiway.

**d. Test Report.** Interim reports will be submitted periodically during the progress of the work so that corrective measures may be taken as necessary. If the corrective measures are made promptly, the circuits and fixtures involved will be retested during the scheduled period of field testing to assure that proper performance has been achieved. If the retesting cannot be done within this period, additional time and costs shall be borne by the Contractor.

The final test results shall be documented in a Final Report of which four copies shall be submitted to the Owner. The Final Report shall document the photometric testing and shall include the following:

- 1) Performance Bar Chart for each service. This provides a visual indication of overall performance for the service and identifies the relative position of sub-standard fixtures.
- 2) Colour Iso-candela diagrams of fixture light output for representative fixtures that have failed due to low light output or mis-alignment.

Each light source shall be uniquely identified using a combination of the following information:

- 1) Taxiway Reference / Direction
- 2) Service Type
- 3) Location Number (defining position along / across the taxiway service)
- 4) Taxiway Side (North / South / East / West)

**e. Spares.** The Contractor shall furnish spare lamps, lenses, and fixtures for use in correcting any deficiencies at no additional cost to the contract.

**f. Corrective Action.** The Contractor shall be responsible for correcting any deficient condition identified as a result of the photometric testing. If satisfactory corrective actions cannot be completed within the originally scheduled test period, necessary additional site visits by the testing firm shall be at the Contractor's expense.

### **111-3.6 FIBER OPTIC CABLE TESTING**

Provide all labor, tools, and equipment necessary to perform the fiber optic cable tests. Provide 72 hours prior notice of testing fiber optic cable to the MSCAA representative through the Program Manager. Conduct tests in the presence of the Program Manager and MSCAA representatives, as appropriate. Provide written test results.

- (a) Test fiber optic cables using an Optical Time Domain Reflectometer (OTDR), in accordance with paragraph (4) below. **Coordinate with the Program Manager to test existing cables between the nearest termination point prior to cutting cable in order to document existing cable condition.** Test cables at both 1310 nm and 1550 nm by OTDR on the cable spools prior to installation at the job site. Reject and replace cables having attenuation at wavelength greater than factory specifications.
- (b) Test fiber optic cables by OTDR after installation and termination. Reject and replace cables having attenuation at wavelength greater than maximum factory specifications or having a localized discontinuity in excess of 0.1dB.
- (c) Fiber optic cable testing with an OTDR shall be performed as follows:

The Contractor shall test all light guide cable prior to the installation of the cable. The Contractor shall assume all liability for the replacement of the cable should it be found defective at a later date.

- i. All fiber testing shall be performed on all fibers in the completed end to end system. Testing shall consist of a bidirectional end to end OTDR trace performed per TIA/EIA 455-61. The system loss measurements shall be provided at 1310 and 1550 nanometers for single mode fibers.
- ii. Fiber links shall have a maximum loss of: (allowable cable loss per km)(km of fiber in link) + (.4dB)(number of connectors) = maximum allowable loss.
- iii. Loss numbers for the installed link shall be calculated by taking the sum of the bidirectional measurements and dividing that sum by two.

Any link not meeting the requirements of the standard shall be brought into compliance by the Contractor, at no cost to the Owner.

### **METHOD OF MEASUREMENT**

**111-4.1** The items described in this section are incidental to other sections and shall not be measured for payment.

### **BASIS OF PAYMENT**

**111-5.1** 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 in the respective bid item of which it is a component part.

### **END OF ITEM L-111**

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**ITEM L-115****ELECTRICAL MANHOLES AND JUNCTION STRUCTURES****DESCRIPTION****115-1.1**

This item shall consist of electrical manholes and junction structures (hand holes, pull boxes, junction cans, etc.) installed per this specification, at the indicated locations and conforming to the lines, grades and dimensions shown on the plans or as required by the Program Manager. This item shall include the installation of each electrical manhole and/or junction structures with all associated excavation, backfilling, sheeting and bracing, concrete, reinforcing steel, ladders, appurtenances, testing, dewatering and restoration of surfaces to the satisfaction of the Program Manager including removal of existing manholes and junction structures as shown on the plans.

**EQUIPMENT AND MATERIALS****115-2.1 GENERAL**

- a. All equipment and materials covered by referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification when so requested by the Program Manager.
- b. Manufacturer's certifications shall not relieve the Contractor of the responsibility to provide materials per these specifications. Materials supplied and/or installed that do not comply with these specifications shall be removed (when directed by the Program Manager) 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 Program Manager for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify products or models applicable to this project. Indicate all optional equipment and delete any non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment to which they apply on each submittal sheet. Markings shall be made bold and clear with arrows or circles (highlighting is not acceptable). The Contractor is solely responsible for delays in the project that may accrue directly or indirectly from late submissions or resubmissions of submittals.
- d. The data submitted shall be sufficient, in the opinion of the Program Manager, to determine compliance with the plans and specifications. The Contractor's submittals shall be electronically submitted in pdf format, tabbed by specification section. The Program Manager 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.

### **115-2.2 CONCRETE STRUCTURES**

Concrete shall be proportioned, placed, and cured per Item P-610, Concrete for Miscellaneous Structures. Cast-in-place concrete structures shall be as shown on the plans.

### **115-2.3 PRECAST CONCRETE STRUCTURES**

Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or another engineer approved third party certification program. Provide precast concrete structures where shown on the plans.

Precast concrete structures shall be an approved standard design of the manufacturer. Precast units shall have mortar or bitumastic sealer placed between all joints to make them watertight. The structure shall be designed to withstand 75,000 lb wheel load per FAA AC 150/5320-6, unless otherwise shown on the plans. Openings or knockouts shall be provided in the structure as detailed on the plans.

Threaded inserts and pulling eyes shall be cast in as shown on the plans.

If the Contractor chooses to propose a different structural design, signed and sealed shop drawings, design calculations, and other information requested by the Program Manager shall be submitted by the Contractor to allow for a full evaluation by the Program Manager. The Program Manager shall review per the process defined in the General Provisions.

### **115-2.4 JUNCTION BOXES**

Junction boxes shall be L-867 Class 1 (non-load bearing) or L-868 Class 1 (load bearing) airport light bases that are encased in concrete. The light bases shall have a L-894 blank cover, gasket, and stainless steel hardware. All bolts, studs, nuts, lock washers, and other similar fasteners used for the light fixture assemblies must be fabricated from 316L (equivalent to EN 1.4404), 18-8, 410, or 416 stainless steel. If 18-8, 410, or 416 stainless steel is utilized it shall be passivated and be free from any discoloration. Covers shall be 3/8-inch thickness for L-867 and 3/4-inch thickness for L-868. All junction boxes shall be provided with both internal and external ground lugs.

### **115-2.5 MORTAR**

The mortar shall be composed of one part of cement and two parts of mortar sand, by volume. The cement shall be per the requirements in ASTM C150, Type I. The sand shall be per the requirements in ASTM C144. Hydrated lime may be added to the mixture of sand and cement in an amount not to exceed 15% of the weight of cement used. The hydrated lime shall meet the requirements of ASTM C206. Water shall be potable, reasonably clean and free of oil, salt, acid, alkali, sugar, vegetable, or other substances injurious to the finished product.

### **115-2.6 CONCRETE**

All concrete used in structures shall conform to the requirements of Item P-610, Concrete for Miscellaneous Structures.

### **115-2.7 FRAMES AND COVERS**

The frames shall conform to one of the following requirements:

- |                       |  |
|-----------------------|--|
| a. ASTM A48           | Gray iron castings                     |
| b. ASTM A47           | Malleable iron castings                |
| c. ASTM A27           | Steel castings                         |
| d. ASTM A283, Grade D | Structural steel for grates and frames |

- e. ASTM A536                      Ductile iron castings
- f. ASTM A897                      Austempered ductile iron castings

All castings specified shall withstand a maximum tire pressure of 250 psi and maximum load of 100,000 lbs.

#### **115-2.8 LADDERS**

Ladders, if specified, shall be galvanized steel or as shown on the plans.

#### **115-2.9 REINFORCING STEEL**

All reinforcing steel shall be deformed bars of new billet steel meeting the requirements of ASTM A615, Grade 60.

#### **115-2.10 BEDDING/SPECIAL BACKFILL**

Bedding or special backfill shall be as shown on the plans.

#### **115-2.11 FLOWABLE BACKFILL**

Flowable material used to backfill shall conform to the requirements of Item P-153, Controlled Low Strength Material.

#### **115-2.12 CABLE TRAYS**

Cable trays shall be of galvanized steel. Cable trays shall be located as shown on the plans.

#### **115-2.13 PLASTIC CONDUIT**

Plastic conduit shall comply with Item L-110, Airport Underground Electrical Duct Banks and Conduits.

#### **115-2.14 CONDUIT TERMINATORS**

Conduit terminators shall be pre-manufactured for the specific purpose and sized as required or as shown on the plans.

#### **115-2.15 PULLING-IN IRONS**

Pulling-in irons shall be manufactured with 7/8-inch diameter hot-dipped galvanized steel or stress-relieved carbon steel roping designed for concrete applications (7 strand, 1/2-inch diameter with an ultimate strength of 270,000 psi). Where stress-relieved carbon steel roping is used, a rustproof sleeve shall be installed at the hooking point and all exposed surfaces shall be encapsulated with a polyester coating to prevent corrosion.

#### **115-2.16 GROUND RODS**

Ground rods shall be one piece, copper clad steel. The ground rods shall be of the length and diameter specified on the plans, but in no case shall they be less than neither 8 feet long nor less than 5/8 inch in diameter.



## **CONSTRUCTION METHODS**

### **115-3.1 UNCLASSIFIED EXCAVATION**

It is the Contractor's responsibility to locate existing utilities within the work area prior to excavation. Damage to utility lines, through lack of care in excavating, shall be repaired or replaced to the satisfaction of the Program Manager without additional expense to the Owner.

The Contractor shall perform excavation for structures and structure footings to the lines and grades or elevations shown on the plans or as staked by the Program Manager. The excavation shall be of sufficient size to permit the placing of the full width and length of the structure or structure footings shown.

All excavation shall be unclassified and shall be considered incidental to Item L-115. Dewatering necessary for structure installation and erosion per federal, state, and local requirements is incidental to Item L-115.

Boulders, logs and all other objectionable material encountered in excavation shall be removed. All rock and other hard foundation material shall be cleaned of all loose material and cut to a firm surface either level, stepped or serrated, as directed by the Program Manager. All seams, crevices, disintegrated rock and thin strata shall be removed. When concrete is to rest on a surface other than rock, special care shall be taken not to disturb the bottom of the excavation. Excavation to final grade shall not be made until just before the concrete or reinforcing is to be placed.

The Contractor shall provide all bracing, sheeting and shoring necessary to implement and protect the excavation and the structure as required for safety or conformance to governing laws. The cost of bracing, sheeting and shoring shall be included in the unit price bid for the structure.

Unless otherwise provided, bracing, sheeting and shoring involved in the construction of this item shall be removed by the Contractor after the completion of the structure. Removal shall be effected in a manner that will not disturb or mar finished masonry. The cost of removal shall be included in the unit price bid for the structure.

After each excavation is completed, the Contractor shall notify the Program Manager. Structures shall be placed after the Program Manager has approved the depth of the excavation and the suitability of the foundation material.

Prior to installation the Contractor shall provide a minimum of 6 inches of sand or a material approved by the Program Manager as a suitable base to receive the structure. The base material shall be compacted and graded level and at proper elevation to receive the structure in proper relation to the conduit grade or ground cover requirements, as indicated on the plans.

### **115-3.2 CONCRETE STRUCTURES**

Concrete structures shall be built on prepared foundations conforming to the dimensions and form indicated on the plans. The concrete and construction methods shall conform to the requirements specified in Item P-610. Any reinforcement required shall be placed as indicated on the plans and shall be approved by the Program Manager before the concrete is placed.

### **115-3.3 PRECAST UNIT INSTALLATIONS**

Precast units shall be installed plumb and true. Joints shall be made watertight by use of sealant at each tongue-and-groove joint and at roof of manhole. Excess sealant shall be removed and severe surface projections on exterior of neck shall be removed.

### **115-3.4 PLACEMENT AND TREATMENT OF CASTINGS, FRAMES AND FITTINGS**

All castings, frames and fittings shall be placed in the positions indicated on the Plans or as directed by the Program Manager and shall be set true to line and to correct elevation. If frames or fittings are to be set in concrete or cement mortar, all anchors or bolts shall be in place and position before the concrete or mortar is placed. The unit shall not be disturbed until the mortar or concrete has set.

Field connections shall be made with bolts, unless indicated otherwise. Welding will not be permitted unless shown otherwise on the approved shop drawings and written approval is granted by the casting manufacturer. Erection equipment shall be suitable and safe for the workman. Errors in shop fabrication or deformation resulting from handling and transportation that prevent the proper assembly and fitting of parts shall be reported immediately to the Program Manager and approval of the method of correction shall be obtained. Approved corrections shall be made at Contractor's expense.

Anchor bolts and anchors shall be properly located and built into connection work. Bolts and anchors shall be preset by the use of templates or such other methods as may be required to locate the anchors and anchor bolts accurately.

Pulling-in irons shall be located opposite all conduit entrances into structures to provide a strong, convenient attachment for pulling-in blocks when installing cables. Pulling-in irons shall be set directly into the concrete walls of the structure.

### **115-3.5 INSTALLATION OF LADDERS**

Ladders shall be installed such that they may be removed if necessary. Mounting brackets shall be supplied top and bottom and shall be cast in place during fabrication of the structure or drilled and grouted in place after erection of the structure.

### **115-3.6 REMOVAL OF SHEETING AND BRACING**

In general, all sheeting and bracing used to support the sides of trenches or other open excavations shall be withdrawn as the trenches or other open excavations are being refilled. That portion of the sheeting extending below the top of a structure shall be withdrawn, unless otherwise directed, before more than 6 inches (150 mm) of material is placed above the top of the structure and before any bracing is removed. Voids left by the sheeting shall be carefully refilled with selected material and rammed tight with tools especially adapted for the purpose or otherwise as may be approved.

### **115-3.7 BACKFILLING**

After a structure has been completed, the area around it shall be backfilled in horizontal layers not to exceed 6 inches in thickness measured after compaction to the density requirements in Item P-152. Each layer shall be deposited all around the structure to approximately the same elevation. The top of the fill shall meet the elevation shown on the plans or as directed by the Program Manager.

Backfill shall not be placed against any structure until approval is given by the Program Manager. In the case of concrete, such approval shall not be given until tests made by the laboratory under supervision of the Program Manager establish that the concrete has attained sufficient strength to provide a factor of safety against damage or strain in withstanding any pressure created by the backfill or the methods used in placing it.

Where required, the Program Manager may direct the Contractor to add, at his own expense, sufficient water during compaction to assure a complete consolidation of the backfill. The Contractor shall be responsible for all damage or injury done to conduits, duct banks, structures, property or persons due to improper placing or compacting of backfill.

### **115-3.8 CONNECTION OF DUCT BANKS**

To relieve stress of joint between concrete-encased duct banks and structure walls, reinforcement rods shall be placed in the structure wall and shall be formed and tied into duct bank reinforcement at the time the duct bank is installed.

**115-3.9 GROUNDING**

A ground rod shall be installed in the floor of all concrete structures so that the top of rod extends 6 inches above the floor. The ground rod shall be installed within one foot of a corner of the concrete structure. Ground rods shall be installed prior to casting the bottom slab. Where the soil condition does not permit driving the ground rod into the earth without damage to the ground rod, the Contractor shall drill a 4-inch diameter hole into the earth to receive the ground rod. The hole around the ground rod shall be filled throughout its length, below slab, with Portland cement grout. Ground rods shall be installed in precast bottom slab of structures by drilling a hole through bottom slab and installing the ground rod. Bottom slab penetration shall be sealed watertight with Portland cement grout around the ground rod.

**115-3.10 CLEANUP AND REPAIR**

After erection of all galvanized items, damaged areas shall be repaired by applying a liquid cold-galvanizing compound per MIL-P-21035. Surfaces shall be prepared and compound applied per the manufacturer's recommendations.

**115-3.11 RESTORATION**

After the backfill is completed, the Contractor shall dispose of all surplus material, dirt and rubbish from the site. The Contractor shall restore all disturbed areas equivalent to or better than their original condition. All sodding, grading and restoration shall be considered incidental to the respective Item L-115 pay item.

The Contractor shall grade around structures as required to provide positive drainage away from the structure.

Areas with special surface treatment, such as roads, sidewalks, or other paved areas shall have backfill compacted to match surrounding areas, and surfaces shall be repaired using materials comparable to original materials.

Following restoration of all trenching near airport movement surfaces, the Contractor shall thoroughly visually inspect the area for foreign object debris (FOD), and remove any such FOD that is found. This FOD inspection and removal shall be considered incidental to the pay item of which it is a component part.

After all work is completed, the Contractor shall remove all tools and other equipment, leaving the entire site free, clear and in good condition.

**115-3.12 INSPECTION**

Prior to final approval, the electrical structures shall be thoroughly inspected for conformance with the plans and this specification. Any indication of defects in materials or workmanship shall be further investigated and corrected. The earth resistance to ground of each ground rod shall not exceed 25 ohms. Each ground rod shall be tested using the fall-of-potential ground impedance test per American National Standards Institute / Institute of Electrical and Electronic Engineers (ANSI/IEEE) Standard 81. This test shall be performed prior to establishing connections to other ground electrodes.

**115-3.13 MANHOLE ELEVATION ADJUSTMENTS**

The Contractor shall adjust the tops of existing manholes in areas designated in the Contract Documents to the new elevations shown. The Contractor shall be responsible for determining the exact height adjustment required to raise or lower the top of each manhole to the new elevations. The existing top elevation of each manhole to be adjusted shall be determined in the field and subtracted/added from the proposed top elevation.

The Contractor shall remove/extend the existing top section or ring and cover on the manhole structure or manhole access. The Contractor shall install precast concrete sections or grade rings of the required dimensions to adjust the manhole top to the new proposed elevation or shall cut the existing manhole walls to shorten the existing structure, as required by final grades. The Contractor shall reinstall the manhole top section or ring and cover on top and check the new top elevation.

The Contractor shall construct a concrete slab around the top of adjusted structures located in graded areas that are not to be paved. The concrete slab shall conform to the dimensions shown on the plans.

#### **115-3.14 DUCT EXTENSION TO EXISTING DUCTS**

Where existing concrete encased ducts are to be extended, the duct extension shall be concrete encased plastic conduit. The fittings to connect the ducts together shall be standard manufactured connectors designed and approved for the purpose. The duct extensions shall be installed according to the concrete encased duct detail and as shown on the plans.

### **METHOD OF MEASUREMENT**

#### **115-4.1**

Electrical manholes and junction structures shall be measured by each unit completed in place and accepted. The following items shall be included in the price of each unit: All required excavation and dewatering; sheeting and bracing; all required backfilling with on-site materials; restoration of all surfaces and finished grading and turfing; all required connections; temporary cables and connections; and ground rod testing.

### **BASIS OF PAYMENT**

#### **115-5.1**

The accepted quantity of electrical manholes and junction structures will be paid for at the Contract unit price per each, complete and in place. This price shall be full compensation for furnishing all materials and for all preparation, excavation, backfilling and placing of the materials, furnishing and installation of appurtenances and connections to duct banks and other structures as may be required to complete the item as shown on the plans and for all labor, equipment, tools and incidentals necessary to complete the structure.

Payment will be made under:

Item L-115-5.1	Aircraft-Rated Pullbox — per each
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### **REFERENCES**

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

American National Standards Institute / Insulated Cable Engineers Association (ANSI/ICEA)

ANSI/IEEE STD 81	IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System
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Advisory Circular (AC)

AC 150/5345-7	L-824 Underground Electrical Cable for Airport Lighting Circuits
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AC 150/5345-26	L-823 Plug and Receptacle, Cable Connectors
AC 150/5345-42	Airport Light Bases, Transformer Housings, Junction Boxes, and Accessories
AC 150/5340-30	Design and Installation Details for Airport Visual Aids
AC 150/5345-53	Airport Lighting Equipment Certification Program

## Commercial Item Description (CID)

A-A 59544	Cable and Wire, Electrical (Power, Fixed Installation)
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## ASTM International (ASTM)

ASTM A27	Steel Castings, Carbon, for General Application
ASTM A47	Ferritic Malleable Iron Castings
ASTM A48	Gray Iron Castings
ASTM A123	Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products
ASTM A283	Low and Intermediate Tensile Strength Carbon Steel Plates
ASTM A536	Ductile Iron Castings
ASTM A615	Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM A897	Austempered Ductile Iron Castings
ASTM C144	Aggregate for Masonry Mortar
ASTM C150	Portland Cement
ASTM C206	Finishing Hydrated Lime

## FAA Engineering Brief (EB)

EB #83	National Electric Code (NEC)
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## Mil Spec

MIL-P-21035	Paint High Zinc Dust Content, Galvanizing Repair
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## National Fire Protection Association (NFPA)

NFPA-70	National Electric Code (NEC)
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**END OF ITEM L-115**

**ITEM L-125****INSTALLATION OF AIRPORT LIGHTING SYSTEMS****DESCRIPTION****125-1.1 REQUIREMENTS**

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 PROGRAM MANAGER,

**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 PROGRAM MANAGER, Materials supplied and/or installed that do not comply with these specifications shall be removed, when directed by the Program Manager 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 Program Manager 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 Program Manager, to determine compliance with the plans and specifications. The Contractor's submittals shall be submitted in electronic PDF format, tabbed by specification section. The Program Manager reserves the right to reject any or all equipment, materials or procedures, which, in the Program Manager'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. In addition, all LED light fixtures, inclusive of all electronics, shall be guaranteed for a period of at least four (4) years from final acceptance. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

**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 used.****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**

DESCRIPTION	TYPE	CLASS	MODE	STYLE	BASE	FILTER	TRANSFORMER
Taxiway Centerline, Bidirectional	L-852C(L)	2	1	3	L-868	Green/Green	20/25W
Taxiway Clearance Bar	L-852C(L)	2	1	3	L-868	Yellow	10/15W
Taxiway Centerline, Bidirectional, Wide Beam	L-852D(L)	2	1	3	L-868	Green/Green or Green/Yellow	30/45W
Taxiway Centerline, Uni-directional, Wide Beam	L-852D(L)	2	1	3	L-868	Green	20/25W
Taxiway Centerline, Omnidirectional	L-852F	2	1	1	L-868	Yellow	200W
Taxiway Edge, Semiflush	L-852T(L)	2	1	3	L-868	Blue	20/25W

**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-858R	3	5	1	2	Mandatory instruction sign, white legend on red background
L-858Y	3	5	1	2	Direction sign, black legend on yellow background
L-585L	3	5	1	2	Taxiway location sign, yellow legend on black background

New L-858 signs shall be LED. Sign color shall be as shown on the SIGNAGE SCHEDULE in the drawings. Illuminated signs shall be internally lighted and electrically fed from a properly sized L-830 transformer. All signs shall be re-lampable without the use of tools. Legend and blank panels shall be easily removed for interchangeability.

Concrete foundations for all signs shall contain separate housings for transformers. A L-867B base (Class 1) with cover shall be utilized as shown on the drawings. Transformers shall not be housed under a leg of the sign.

All signs shall be furnished with tethers on each leg. The tethers shall be fabricated from 3/16" stainless steel aircraft cable with a formed eye on both ends and shall be of ample length to attach the sign (min. of 6" of slack) to the flange plate and allow the frangible coupling and disconnect plug to function properly. The bolting pattern, method of anchoring, etc., shall be per the sign manufacturer's recommendation.

The sign manufacturer shall submit to the Program Manager calculations showing the sign and anchoring methods will withstand a 200 MPH jet blast in accordance with Paragraph 4.1.2 of AC 150/5345-44, latest edition. The signs shall be supplied with the messages as shown on the sign schedule.

Each sign shall be furnished with an on-off toggle switch with weatherproof cover. The switch shall be used by maintenance personnel to de-energize the sign so maintenance work can be performed. The switch shall be located immediately adjacent to the load side of the L-823 disconnect plug. The weatherproof cover shall provide protection from driving rain and shall have a spring operated closing device. The weatherproof cover shall also provide physical protection for the switch handle.

Each lighted sign shall be furnished complete with the specified panels, mounting assemblies, frangible couplings, transformers, light base(s), and mounted on a foundation as indicated on the drawings to provide a complete functional sign.

**125-2.9 RUNWAY END IDENTIFIER LIGHT (REIL) – Not used.**

**125-2.10 PRECISION APPROACH PATH INDICATOR (PAPI) – Not used.**

**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 shall be provided as indicated or as required to accommodate the fixture or device installed thereon. Base plates, cover plates, and adapter plates shall be provided to accommodate various sizes of fixtures.

#### **125-2.13 ISOLATION TRANSFORMERS**

Isolation transformers shall be Type L-830, size as required for each installation. Transformer shall conform to AC 150/5345-47.

#### **125-2.14 HIGH-PERFORMANCE GROUT**

This product shall be Delcrete Elastomeric Concrete by The D.S. Brown Company, North Baltimore, Ohio, Telephone No. 419-257-3561, WaboCrete II by Watson Bowman Acme Corporation, Amherst, New York, Telephone No. 800-677-4922, or an approved equivalent. An equivalent, in order to be considered for approval, must meet or exceed the tensile strength, tensile stress, elongation, and hardness properties specifications of the products listed above under equivalent test conditions.

#### **125-2.15 BLOCKOUT**

Blockout of light base installed within 2-feet from a pavement joint shall be formed using a cylindrical fiber



form material (Round Concrete Form by Masco, Sonotube by Sonoco, or an approved equivalent), reinforcing, dowels, sand, plywood cover, and all incidentals. This blackout shall only be used when a base can centerline will be closer than two and one-half (2.5) feet to a concrete pavement joint. The fiber form blackout cylinder, materials, labor, equipment and all incidentals necessary to construct the blackout and to remove the plywood cover and sand, to prepare the blackout for installation of the light base, to install the flexible conduit connection, and to place the concrete backfill is included in the blackout, complete, pay item.

## INSTALLATION

### 125-3.1 GENERAL

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. General Light Base (Transformer Housing) Requirements

Stub-in conduit connections into existing light bases shall be Meyers Hub installation where required on the drawings and as noted on plan details.

Breakage of fixture hold down bolts normally and regularly occurs in the field during fixture removal or fixture installation. When breakage occurs, the Contractor shall adhere to the following requirements:

- (1) The Contractor shall submit a broken bolt removal procedure for approval of the PROGRAM MANAGER. Submittal shall include information about the planned broken bolt removal process and jig required to effectively drill and tap broken bolts, when necessary.
- (2) Whenever encountered, broken bolts shall be removed. Where drilling and tapping is required, a jig approved for use by the Program Manager shall be used. All broken bolts shall be replaced with 3/8"-16 stainless steel bolts. In the event that light bases are permanently damaged in the course of removing broken bolts, the Contractor shall be responsible for the immediate repair/replacement of the damaged light base. Permanent damage includes drilling of holes which exceed the required 3/8" bolt diameter and/or any "off centered" impressions that penetrate the inner lip of the existing bolt holes.
- (3) Use of "helicoils" is prohibited as a method of dealing with stripped bolt holes, unless specifically approved in extreme emergency conditions by the Program Manager.

All existing light bases shall be cleaned prior to the installation of replacement equipment for their final use. Cleaning shall include compressed air cleansing of the top flange prior to mounting either light fixtures, blank covers, or base plates on bases (transformer housings) at signs.

#### b. General Cable Installation Requirements. The primary cable shall enter the light base and transformer housing as shown on the drawings.

Primary cable slack shall be provided inside the light fixture base as specified in Item L-

108. In general, enough slack shall be left in the cable to permit installation above ground of the connections between the primary cable and the isolating transformer primary leads. A similar length of primary cable slack shall be provided for any unconnected cable installed in a fixture base can.

When more than one (1) circuit is installed within the lighting base, each cable shall bear its appropriate circuit identification marker.

The transformer secondary leads shall be connected to the lamp leads with a disconnecting plug and receptacle. The secondary connection shall not be taped; the cable connections to the isolating transformer's leads shall be made as specified in Item L-108.

Ends of cables shall be sealed with heat shrinkable tubing until the splice is made to prevent the entrance of moisture.

- c. **General Duct and Conduit Installation Requirements.** Trenching, installation of ducts and conduits, concrete backfilling, trench backfilling, installation of duct markers and the type of material used shall conform to Item L-110 and as shown on the drawings.
- d. **General Base and Light Fixture Toe-In Requirements.** On curved sections of taxiway, Contractor shall orient the axis of a unidirectional centerline light beam to intersect the taxiway true centerline path at a point equal to four times the light spacing on the curve. Measure this spacing along the chord of the curve. Orient the axis of bi-directional centerline light beams parallel to the tangent of the nearest point of the curve designated as the taxiway true centerline path. On straight sections of taxiway centerlines, the axis of the light beam shall be parallel to the centerline of the taxiway centerline path. The Contractor shall submit their written installation method to the Engineer for approval prior to installation to assure the proper alignment as the bases are being set.
- e. **General Light Fixture Bolt Installation.** Bolts for securing in-pavement light fixtures shall be tightened to the torque specified by the fixture manufacturer's specifications. All bolt holes shall be cleaned using compressed air immediately prior to installation of bolts. Threads on all bolts shall be coated with anti-seize compound approved for use on stainless steel. Bolts shall not extend past the threaded adapter ring or into the light base housing. Final tightening of bolts shall be performed with a properly calibrated torque wrench of the required range and verified by the PROGRAM MANAGER. Electrically or pneumatically operated wrenches shall not be used to achieve the final torque.
- f. **Installing Light Fixtures at Existing Bases.** At locations indicated on the drawings, the Contractor shall install light fixtures on existing fixture bases. This shall include providing the following items, as required and directed by the PROGRAM MANAGER,
  - (1) Remove and salvage existing base cover plates.
  - (2) Refurbish and prepare the base flange with flange rings or spacer rings, as required and directed by the Program Manager, in order to properly install the specified light fixture.
  - (3) Clean out and refurbish the interior of the bases, including conduits.
  - (4) Install primary airfield lighting circuit cable.
  - (5) Install fixture isolation transformers of specified rating and wattage.
  - (6) Furnish the correct size and number of new stainless steel bolts and install specified fixtures.

**g. Light Fixture and Base Installation in New Rigid Pavement Areas.**

- (1) Install light fixture base in accordance with the general requirements of paragraph 125-3.1 a., as shown on the plans, and as noted below.

Conduit and base trench shall be filled with a concrete slurry of well-graded aggregate mix with a maximum ASTM C33 No. 8 size coarse aggregate. This concrete shall have a minimum 28-day compressive strength of 4,000 psi and may have a slump of up to 4 inches. The aggregate (except gradation) and other material shall meet the requirements of Item P-610, Structural Portland Cement Concrete. See Light Base Installation in Rigid Pavement details shown in the plans.

Light base setting and leveling jig shall not be removed for 24 hours after placing the encapsulation or until a hard set has occurred when using a high performance grout encapsulation.

After installation of the light fixture, the azimuth of the light beam shall not vary more than  $\pm 1/2$  degree from the required direction. The elevation of the light fixture outside edge shall be flush with the surrounding surface elevation such that the elevation of the fixture is not more than +0 inches higher than or -1/16 inch lower than the elevation of the pavement. If this tolerance is not met, the Contractor shall, at its own expense, remove and replace the light base extension (top section) to the satisfaction of the Engineer.

In concrete light bases shall have one, two, or more 2-inch threaded metallic hubs for all required conduit entrances, as indicated on the plans. Grommets conduit entrances are strictly prohibited except where shown on the plans.

- (2) Assemble the light fixture in accordance with the manufacturer's instructions. Connect the secondary leads of the transformer to the fixture leads with a disconnecting plug and receptacle conforming to AC 150/5345-26, latest revision, without taping the joint. Install a lamp of the proper rating in the fixture. Level each fixture as recommended by the manufacturer.
- (3) Install cable, duct and conduit in accordance with the general requirements noted in paragraph 125-3.1 b. and c.

**h. Light Fixture and Base Installation in New Flexible Pavement Shoulder Areas.**

- (1) Install light fixture base in accordance with the general requirements noted in paragraph 125-3.1 a., as shown on the plans, and as noted below.

Following placement of compacted aggregate base course conduit and bottom base section shall be placed. Conduit trench shall be filled to the top of compacted base with a concrete slurry of well graded aggregate mix with a maximum ASTM C33 No. 8 size coarse aggregate. The concrete shall have a minimum cement content of five (5) sacks per cubic yard, a slump up to 4 inches, and shall have a minimum 28-day compressive strength of 3,000 psi. The aggregate and other material shall meet the requirements of Item P-610, Structural Portland Cement Concrete. Concrete shall be placed under and around the outside of the base as shown on the plans. After hardening of the concrete to the satisfaction of the PROGRAM MANAGER, the asphalt course layers shall be placed in accordance with their specification. After installation of the surface course, Contractor shall core to the light base bottom section and install the top extension with band ring using spacer rings between the bottom and top extension to set proper elevation. Contractor shall then place the final high performance nonshrink grout shown on the plans to complete the light base installation.

The Contractor may use alternate methods of installations, only if approved in writing by the Engineer. The placement of conduit prior to subgrade and base completion and setting of bases after placement of bituminous courses will not be allowed.

Submit planned installation process for approval of the Engineer.

- (2) Assemble the light fixture in accordance with the manufacturer's instructions. Connect the secondary leads of the transformer to the fixture leads with a disconnecting plug and receptacle conforming to AC 150/5345-26, latest revision, without taping the joint. Install a lamp of the proper rating in the fixture.
  - (3) Install cable, duct and conduit in accordance with the general requirements noted in paragraph 125-3.1 b. and c.
- i. **Guidance Signs.** Existing internally lighted L-858 signs shall be removed from the project site and stored by the Contractor until reuse or shall be furnished complete with legend, as identified on the drawings. Install concrete foundation, base, transformer, transformer base plate, conduit and cable entrances. Provide supports and tie devices for blast resistance.

Provide each lighted sign with an identification number in accordance with the plans by 1) affixing a retroreflective, self-adhesive vinyl label with 4-inch high characters on the sign end toward the associated pavement, and 2) provide, imbedded in the concrete encasement adjacent to each L-867 base for the sign, a 2 inch domed bronze identification marker disk with ¼-inch minimum height characters.

Bagging of signs and removal of bagging, as necessary during the progress of work, shall be incidental to sign installations and no separate payment shall be made.

### 125-3.2 TESTING

All lights shall be fully tested by continuous operation for not less than 24 hours as a completed system prior to acceptance. The test shall include operating the constant current regulator in each step not less than 10 times at the beginning and end of the 24-hour test. The fixtures shall illuminate properly during each portion of the test.

### 125-3.3 SHIPPING AND STORAGE

Equipment shall be shipped in suitable packing material to prevent damage during shipping. Store and maintain equipment and materials in areas protected from weather and physical damage. Any equipment and materials, in the opinion of the Program Manager, damaged during construction or storage shall be replaced by the Contractor at no additional cost to the owner. Painted or galvanized surfaces that are damaged shall be repaired in accordance with the manufacturer's recommendations.

### 125-3.4 ELEVATED AND IN-PAVEMENT LIGHTS

Water, debris, and other foreign substances shall be removed prior to installing fixture base and light.

A jig or holding device shall be used when installing each light fixture to ensure positioning to the proper elevation, alignment, level control, and azimuth control. Light fixtures shall be oriented with the light beams parallel to the runway or taxiway centerline and facing in the required direction. The outermost edge of fixture shall be level with the surrounding pavement. Surplus sealant or flexible embedding material shall be removed. The holding device shall remain in place until sealant has reached its initial set.

**METHOD OF MEASUREMENT****125-4.1**

The number of fixtures furnished, including transformers, to be paid for shall be measured per each for each type of fixture with transformer furnished, and accepted by the Program Manager.

**125-4.2**

The number of fixtures, with transformers, installed to be paid for shall be measured per each for every type of fixture with transformer installed, and accepted by the Program Manager.

**125-4.3**

The number of blank covers furnished and installed to be paid for shall be measured per each for the type and size of blank cover furnished, installed, and accepted by the Program Manager.

**125-4.4**

The number of fixture bases furnished and installed, with safety ground, to be paid for shall be measured per each for each type of fixture base furnished, installed, and accepted by the Program Manager.

**125-4.5**

The number of light base blockouts constructed to be paid for shall be measured per each installed, complete, and accepted by the Program Manager.

**125-4.6**

The measurement of guidance signs to be paid for shall be the number per each furnished, including transformer.

**125-4.7**

The measurement of sign bases, constructed-in-place, to be paid for shall be the number per square foot installed, and accepted by the Program Manager.

**125-4.8**

The number of signs, with transformers, installed to be paid for shall be measured per each for every sign with transformer installed, and accepted by the Program Manager.

**BASIS OF PAYMENT****125.5.1**

Payment will be made at the contract unit price for each complete unit furnished, installed, or furnished and installed by the Contractor, and accepted by the Project Manager. 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 the item.

**125-5.2**

Payment will be made at the contract unit price for each guidance sign furnished, including transformer. This payment will be full compensation for furnishing all materials, including transformer, seals, connectors, heat shrink kits, and other materials necessary for installation.

**125.5.3**

Payment will be made at the contract unit price per square foot of sign base, constructed-in-place, and accepted by the Project Manager. This payment will be full compensation for furnishing all materials, including L-867 base can and foundation concrete, and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item, made ready for guidance sign mounting and lighting.

**125-5.4**

Payment will be made at the contract unit price per each, for each guidance sign with transformer installed on new or existing sign base. This payment will be full compensation for furnishing all materials, including seals, connectors, heat shrink kits, and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

- L-125-5.01     Furnish L-852C LED Bidirectional Taxiway Centerline Fixture & Transformer – per each
- L-125-5.02     Furnish L-852C LED Taxiway Clearance Bar Fixture & Transformer – per each
- L-125-5.03     Furnish L-852D LED Bidirectional Taxiway Centerline Fixture & Transformer – per each
- L-125-5.04     Furnish L-852D LED Unidirectional Taxiway Centerline Fixture & Transformer – per each
- L-125-5.05     Furnish L-852F LED Omnidirectional Taxiway Centerline Fixture & Transformer – per each
- L-125-5.06     Furnish L-852T LED Taxiway Edge Fixture & Transformer – per each
- L-125-5.07     Install Fixture with Transformer, Complete – per each
- L-125-5.08     Furnish & Install L-868B 3/4 inch Blank Cover on Existing Base – per each
- L-125-5.09-1    Furnish & Install 2-Piece L-868B W/Band Ring & Multihole Adapter in New Rigid Pavement, Complete – per each
- L-125-5.09-2    Furnish & Install 2-Piece L-868B W/Band Ring & Multihole Adapter in New Flexible Pavement, Complete – per each
- L-125-5.10     Furnish Materials and Construct Light Base Blockout, Complete – per each
- L-125-5.11     Furnish L-858 LED Sign, 1 Face, 3 Module, w/Transformer – per each
- L-125-5.12     Sign Base, Constructed-In-Place, Complete – per square foot
- L-125-5.13     Install L-858 LED Sign on New or Existing Base, Complete – per each

**REFERENCES**

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

**Advisory Circulars (AC)**

AC 150/5340-18	Standards for Airport Sign Systems
AC 150/5340-26	Maintenance of Airport Visual Aid Facilities
AC 150/5340-30	Design and Installation Details for Airport Visual Aids
AC 150/5345-5	Circuit Selector Switch
AC 150/5345-7	Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits
AC 150/5345-26	Specification for L-823 Plug and Receptacle, Cable Connectors
AC 150/5345-42	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 150/5345-53	Airport Lighting Equipment Certification Program

**Engineering Brief (EB)**

EB No. 67	Light Sources Other than Incandescent and Xenon for Airport and Obstruction Lighting Fixtures
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**END OF ITEM L-125**

**ITEM L-131****DEMONSTRATIONS AND PERFORMANCE VERIFICATION**  
(Non-Standard FAA Specification)**131-1 GENERAL**

This item includes the furnishing of all labor, materials, equipment and services necessary to provide demonstrations, testing and performance verification necessary to show electrical system compliance to these specifications.

Demonstrations, testing, and performance verification, where compliance is required by other specifications or the plans, need not be redundantly performed.

**DEMONSTRATIONS****131-2.1 CHECK-OUT MEMO**

Where required by the plans and specifications provide Manufacturer assistance during the testing, start-up, performance verification, demonstrations and owner training. Complete the Check-Out Memo as shown on Figure 1 at the end of this specification section.

**131-2.2 SYSTEMS**

Demonstrate the essential features of the following electrical systems:

Airfield lighting fixtures  
Airfield lighted signage

Each system shall be demonstrated once, but only after completion of testing.

**131-2.3 DEMONSTRATION COORDINATION**

The demonstration shall be held upon completion of all systems, including testing, at a date to be agreed upon in writing by the Owner or its designated representative. The demonstration shall be held by the Contractor in the presence of the Owner and the Manufacturer's Representative.

**131-2.4 DEMONSTRATION REQUIREMENTS**

Prior to acceptance of the Work, the Contractor shall demonstrate to the Owner, or its designated representative, all features and functions of all systems and shall instruct the Owner in the proper operation of the systems. After testing is satisfactorily completed, each system shall be demonstrated once.

The demonstration shall consist of not less than the following:

- a. Point out the actual location of each component of the system and demonstrate its function and its relationship to other components within the system.
- b. Demonstrate the electrical systems by actual "start-stop" operation showing how to work controls, how to reset protective devices, how to replace fuses, and what to do in an emergency. Indicate each items relationship to the riser diagrams and drawings.



- c. Demonstrate communication, signal, alarm and detection systems by actual operation of the systems and show how to reset signal, alarm and detection devices.

The Contractor shall furnish the necessary trained personnel to perform the demonstration and instructions, and shall arrange to have the manufacturer's representatives present to assist with the demonstrations.

All functional and operational testing of protective interlocking, automatic controls; instrumentation, alarm systems, and all other field testing of the main systems will be completed before the systems are demonstrated.

### **131-2.5 DOCUMENTATION**

Submit five (5) copies of the Performance Verification and Demonstration to the Owner, signed by the Contractor, Subcontractor and Owner. Contractor shall insert one copy in each Operation and Maintenance Manual and shall insert the original in the Project Closeout Documentation Manual.

## **TESTING**

### **131-3.1 TESTS AND PERFORMANCE VERIFICATION**

Operate system for a 3-day period. Do performance verification work as required to show that the system is operating correctly in accordance with design. Supply instruments required to read data. Adjust system to operate at the required performance levels. Tabulate data for submission. Submit data on 8 1/2 x 11" sheets with time and name of checker. Where specific performance verification information is called for in the specifications, use copies of the sheets provided for recording readings. Data shall be submitted and approved before Check-Out Memos are signed or a request for final inspection is made. Submit data in Operation and Maintenance Manuals.

At completion of construction after all performance verification and testing information has been gathered, submitted, and approved, provide one copy of this information to the manufacturer's representative of the equipment. Work required under this section shall include having the representative examine the performance verification information, check the equipment in the field while it is operating, and sign a Check-Out Memo for a record. Submit five (5) copies of the memo on each major item of equipment. Approved memos shall be inserted in each Operation and Maintenance Manual with the performance verification information. Memos shall be submitted and approved before instruction to owner or a request for final inspection.

### **131-3.2 TESTS**

Airfield lighting cables shall be tested in accordance with Item L-108 and L-111. Also, photometric testing requirements are included in L-111. Record data.

The tests shall be performed and recorded in the presence of the Program Manager and the test results shall be placed in the Operation and Maintenance Manuals. All wires in conduit that are shorted or unintentionally grounded shall be replaced.

The resistance between ground and absolute earth shall be measured by the Electrical Contractor before equipment is placed in operation. Testing shall be performed on each ground rod installation before connecting the grounding conductor. The resistance between the ground rod and absolute earth shall not exceed 25 ohms, and shall be witnessed by the Program Manager. Testing shall be three-(3) point method in accordance with IEEE recommended practice. Record data on form similar to Figure 3. All

ground rods shall be tested.

Perform such tests as required by authorities having jurisdiction over the site, or other tests/inspections as required by other sections of this Specification.

There are no approved "repair" procedures for items that have failed testing other than complete replacement. Any other corrective measures shall be approved by the Program Manager. The addition of ground rod sections to the ground rods shall be considered replacement for this item.

### **131-3.3 CORRECTION OF ERRORS**

The Contractor shall immediately correct any errors or omissions in the work, which are discovered during testing. This shall include but not limited to, improper phasing resulting in reverse rotation, misinterpretations, incomplete grounding, damaged equipment or materials, or incomplete work the Contractor has already verified as being complete. The Contractor shall immediately replace, repair, or complete these errors and omissions as soon as they are presented to the Contractor, even if this requires disruption of the scheduled construction activities or work on an overtime basis. Failure to take immediate action or an excessive number of errors or omissions shall make the Contractor liable for the time lost by the Owner's operating forces, and any other personnel.

## **METHOD OF MEASUREMENT**

### **131-4.1**

The items described in this Section are incidental to other sections and shall not be measured for payment.

## **BASIS OF PAYMENT**

### **131-5.1**

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 in the respective bid item of which it is a component part.

**CHECK-OUT MEMO**

This form shall be completed and a copy provided to the Owner at the Owner's Performance Verification and Demonstration meeting. A copy shall also be included in the specification section of the O & M Manual for the equipment checked.

Project Name: \_\_\_\_\_

Type of Equipment Checked: \_\_\_\_\_

Equipment Number: \_\_\_\_\_

Name of Manufacturer: \_\_\_\_\_

Signature below by the manufacturer's authorized representative signifies that the equipment has been satisfactorily tested and checked out on the job by the manufacturer.

1. The attached Test Data and Performance Verification information was used to evaluate the equipment installation and operation.
2. The equipment is properly installed, has been tested by the manufacturer's authorized representative, and is operating satisfactorily in accordance with all requirements, except for items noted below.\*
3. Written operating and maintenance information has been presented to the Contractor, and gone over with him in detail.
4. Sufficient copies of all applicable operating and maintenance information, parts lists, lubrication checklists, and warranties have been furnished to the Contractor for insertion in the Operating and Maintenance Manuals.

Checked By: \_\_\_\_\_  
(Print or Type Name of Manufacturer's Representative)

\_\_\_\_\_  
(Address and Phone No. of Representative)

\_\_\_\_\_  
(Signature and Title of Representative)

\_\_\_\_\_  
(Date Checked)

Witnessed By: \_\_\_\_\_  
(Signature and Title of Contractor Rep)

\* Exceptions noted at time of check-out (use additional page if necessary):

**FIGURE 1**

**PERFORMANCE VERIFICATION AND DEMONSTRATION TO OWNER**

This form verifies that the Owner has been given a demonstration of the proper operation on the equipment or systems noted below:

Project Name: \_\_\_\_\_

Specification Division Number & Name: \_\_\_\_\_

Equipment/System Demonstrated: \_\_\_\_\_

Along with a complete demonstration of the equipment/system, these items have been reviewed at this demonstration and shall be included in the Operating and Maintenance Manuals, under the appropriate specification section:

- 1) Written operating instructions.
- 2) Test data and performance verification information as required by the installer and/or manufacturer.
- 3) Maintenance information published by manufacturer or equipment.
- 4) Check-out Memo signed by manufacturer's representative.
- 5) Printed warranties by manufacturer of equipment.
- 6) Explanation of the warranty/guarantee on the system.
- 7) Prints showing actual "As Built" conditions.

\_\_\_\_\_  
(Name of General Contractor)

\_\_\_\_\_  
(Signature, Title, Date)

\_\_\_\_\_  
(Name of Subcontractor)

\_\_\_\_\_  
(Signature, Title, Date)

Demonstration of the system/equipment in operation and of the maintenance procedures has been successfully completed.

**OWNER**

\_\_\_\_\_  
(Signature, Date)

\_\_\_\_\_  
(Owner's Department)

**FIGURE 2**

**GROUND ROD TEST INFORMATION**

GROUND ROD LOCATION: \_\_\_\_\_

PRIOR TO CONNECTION TO SYSTEM

GROUND: \_\_\_\_\_ (OHMS)

WEATHER CONDITIONS FOR PREVIOUS WEEK: \_\_\_\_\_

\_\_\_\_\_

AFTER CONNECTION TO SYSTEM

GROUND: \_\_\_\_\_ (OHMS)

TESTED BY: \_\_\_\_\_

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

PRPGRAM MANAGER: \_\_\_\_\_

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

**FIGURE 3**

**CABLE INSULATION RESISTANCE TEST RECORD**

Circuit Description: \_\_\_\_\_

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

Phase A to Ground \_\_\_\_\_ Megohms

Phase B to Ground \_\_\_\_\_ Megohms

Phase C to Ground \_\_\_\_\_ Megohms

Neutral to Ground \_\_\_\_\_ Megohms

Phase A to B \_\_\_\_\_ Megohms Phase A to Neutral \_\_\_\_\_ Megohms

Phase A to C \_\_\_\_\_ Megohms Phase B to Neutral \_\_\_\_\_ Megohms

Phase B to C \_\_\_\_\_ Megohms Phase C to Neutral \_\_\_\_\_ Megohms

Weather Conditions: \_\_\_\_\_

Temperature: \_\_\_\_\_

Circuit Condition Prior to Test: \_\_\_\_\_

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

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

Owner's Authorized Representative: \_\_\_\_\_

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

**FIGURE 4****END OF ITEM L-131**

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**MSCAA  
DESIGN GUIDE and CONSTRUCTION STANDARDS**

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## **Airfield Construction Standards**

### **A. Joints and Joint Sealants**

1. All joints to be beveled on new construction and reseal projects.
2. All concrete joint sealants to be a non-sag silicone or preformed material. Silicone is preferred on reseal projects.

### **B. Sodded Areas**

1. All safety areas are to be 100% sod.
2. All areas that have had earth disturbed shall be sodded and fertilized.
3. Any sodded area within 2' of an apron, pad or drainage structure shall be compacted to a minimum of 95% (Modified Proctor).

### **C. Drainage**

1. Concrete down drains should be installed on any area that is sloped for drainage.
2. Any drain pipes that travel outside the SIDA fence should have proper security grates installed.
3. Outlets should have a run off pad; concrete if preferred but asphalt is acceptable for aprons or run-off pads.
4. The sub-base for concrete down drains, drain inlets or outlets should be compacted to a minimum of 95% (Modified Proctor).
5. All drain and under drain joints or connections should be properly grouted or sealed. All drain inlets and manholes boxes entries shall be properly grouted or sealed inside and outside junction structure.

### **D. Concrete Aprons**

1. All sign bases, junction boxes and manholes on new construction are to have a minimum of a 6 ft. apron around the sign or structure, sloped away from the sign or structure.
2. Aprons should have a minimum thickness of 4".
3. Aprons should be flush with the structure bases and sloped to be flush with soil. The slope shall not exceed the FAA maximum.
4. The sub bases should be compacted for the structure bases and aprons to a minimum of 95% (Modified Proctor).

### **E. Perimeter Fence**

1. Perimeter fence shall be a minimum of 10' tall fabric and shall include three-stand, double-sided barbed wire and 18" diameter concentric razor wire secured at 12" spacing.
2. Perimeter fence shall include a 6' paved lane under the fence. This will eliminate washouts, animal intrusions, reduce maintenance, and allow easy inspections by Airport Police.
3. Rolling, automatic gate operators shall be commercially/industrially rated and designed for high-security environments. Operators for gates with openings less than 15 feet must

operate at a minimum speed of 20” per second. Operators for gates with openings 15 feet or wider must include variable frequency drives and operate at a minimum speed of 36” per second.

**F. Construction Contractors**

1. The Contractor shall maintain all sodded areas through the duration of the contract. The Contractor shall be responsible for the upkeep of contracted areas including grass cutting, rut repair and maintaining proper drainage ditches.
2. Security gates that are installed must be maintained and in good working order by the contractor for the duration of the contract.
3. All areas that were used by the contractor must be left in conditions that will not hinder the normal routine maintenance of Airfield; this includes, but is not limited to debris removal, grading, drainage, and re-seeding or sod.

## **Airfield Electrical Construction Standards**

### **A. General**

1. Work performed shall be accomplished by crews with a minimum of one licensed journeyman per three apprentices.
2. All temporary cable installations shall be protected either by burying cable in grass areas or by installation in conduit for above ground applications. Other methods may be used for short term or emergency situations if approved by the Airfield Maintenance Electrical Supervisor. Location of temporary cables shall be marked sufficiently to prevent damage from construction and maintenance equipment.
3. In all circumstances enough cable shall be provided at light cans, junction cans and hand holes so as to allow a minimum of 3 feet extending above ground for maintenance purposes. The exception to this is in the installation of taxiway centerline lights on SMGCS routes where two interleaved circuits are present in the same light can. In this instance only the circuit that is attached to the transformer in an individual light can, should have the extra conductor provided. This prevents the can from becoming cluttered unnecessarily.
4. Constant current series circuits shall be limited in capacity to a maximum of 20kW. Preferred capacity is 15kW or less.

### **B. Testing**

1. The contractor shall furnish all necessary equipment and appliances for testing the underground cable circuits after installation.
2. The contractor shall demonstrate that all lighting power and control circuits are continuous and free from short circuits and unspecified grounds.
3. The insulation resistance to ground of all non-grounded series circuits shall be not less than 500 M $\Omega$  and shall be maintained at the required level by the contractor during the term of the warranty period.
4. Each new series circuit, or new part of existing circuits being extended or replaced, shall be tested as follows:
  - i. Low voltage megger tests shall be performed to comply with (c.) above. Circuits shall then be subjected to a Hi-Pot test in accordance with engineer's specifications.
5. All new fixture installations may, at the owner's request, be subjected to photometric testing to certify performance in accordance with FAA specifications.

### **C. Constant Current Regulators**

1. The constant current regulators shall be magnetic designs; the susceptibility to extraneous signals of solid-state designs is not acceptable. The regulators shall not have solid-state controls in the series circuit and shall be designed to prohibit radio communications interference. The regulators shall limit transient current peaks without the use of solid-state series circuit controls with soft-on feature.
2. Each regulator shall include a true RMS ammeter, and ON/OFF/REMOTE switch and brightness controls.

3. In addition, the regulators shall be provided with SPDT contacts rated 2 amperes at 120 volts to indicate the following functions for remote monitoring:
4. REMOTE/LOCAL selected at control switch. Primary Power ON.
5. Constant current regulators, including standby regulators furnished or installed by the contractor shall be provided with seismic restraints and include all necessary equipment including control and monitoring equipment (Crouse-Hinds/Transtech digitrac units) to make the regulators operational.

#### **D. Marking and Labeling**

1. Wire identification. The contractor shall furnish and install self-sticking wire labels or identifying tags on all control wires at the point where they connect to the control equipment or to the terminal blocks.
2. Series circuit cables shall be identified with Thomas and Betts ty-rap #TY546MT or approved equivalent suitable for wet environments. Metal tags secured by tie wire or other means shall not be acceptable. All marking means shall be approved by the Airfield Maintenance Electrical Supervisor.
3. All conductors of series circuit conductors shall be marked with their circuit designation at all points where the conductor is accessible.
4. The contractor shall furnish and install engraved plastic labels on the cases of regulators, breakers, and distribution and control relay cases. All circuit breakers or other disconnecting means shall be marked and identified with their circuit designation.
5. Fiber optic runs should include #10 THWN stranded yellow tracer wire for locating purposes and connected in its entirety as a continuous conductor. Alternatively, armored fiber optic cables will be considered in lieu of tracer wire.
6. Underground electrical warning tape shall be installed above all underground conduit installations not concrete encased in unpaved areas. Warning tape shall be located as shown on the plans above the counterpoise wire.

#### **E. Lighting Cans, Junction Cans, Junction Can Plazas and Hand Holes**

1. Except in extreme cases where other means are not practical, manholes or hand holes larger than 4 feet x 4 feet x 4 feet deep shall not be used.
2. Hand holes shall be equipped with spring loaded/assisted hinged covers of a design easily opened by one person.
3. The preferred method of connectivity shall be by use of junction can plazas consisting of FAA L-868 cans installed in concrete plazas. Each can shall contain a single circuit with the designation of the circuit imprinted in a brass marker embedded in the concrete adjacent to the can. If deemed necessary, and at the approval of the Airfield Maintenance Electrical Supervisor, more than one circuit may be installed in a conduit/can. Can lids should be flush with concrete plazas with dam rings on the cans.
4. All ducts installed under paved areas shall be encased in concrete.
5. All unused conduits shall have the open ends plugged with removable tapered plugs and be provided with a pull rope equivalent to IDEAL Power-Fish pull line (200 lb strength)

6. Drain lines shall be installed to provide positive drainage to eliminate standing water in airfield lighting bases, junction cans, and hand holes in locations determined by the designer.
7. L-868 cans used for the installation of in-pavement lights shall be of a two-piece design with the top section including a multi-hole ring (VEGA #2419MEM) as manufactured by Jaquith Industries.
8. Fixture hold down bolts shall be all-thread stainless steel, type 304 or as recommended by the fixture manufacturer.
9. Fixture hold down bolts for in-pavement lights shall be tightened to the proper torque per fixture manufacture's specifications. All bolt holes shall be cleaned using a source of compressed air prior to installation of any bolts. Threads on all bolts shall be coated with anti-seize compound approved for use on stainless steel. Bolts shall not extend past the threaded adapter ring or into the can. Final tightening of the bolts shall be done using a properly calibrated torque wrench of the required range and verified by the engineer. Electrically or pneumatically operated wrenches shall not be used to achieve the final torque on bolts.
10. Lock washers installed on hold down bolts for all fixtures shall be two piece 316 or 316L stainless steel washer. CRC type washers shall not be acceptable.
11. All cans shall have factory-installed hubs. Grommet cans are **not** acceptable unless approved for the application by the Airfield Maintenance Electrical Supervisor. Stub-in connections into existing light bases shall be Meyers hub installation.

#### **F. Connectors**

1. L-823 connectors used to splice L-824 type C #8 AWG cables shall be Elastimold style 54-D4-D4 or equivalent. L-823 connectors shall be made waterproof by a double layer of rubber tape (scotch 23 or equal) covered by a double layer of plastic tape (scotch 88 or equal). Heat shrink, is not allowable. One-piece shrink kits that encapsulate the entire splice shall not be used. Provide Scotch 23/Scotch 88 waterproofing at center connection to extend 1-1/2" each side of break and at each end of splice kit.

#### **G. Fixtures**

1. Runway and taxiway elevated light fixtures shall use a quartz bi-pin type lamp of the minimum wattage required for the application unless LED fixtures are approved by Airfield Maintenance Electrical Supervisor.
2. In-pavement fixtures should be manufactured of aluminum and utilize no more than two lamps with a maximum total wattage of 100 watts per fixture. L-850C edge lights and fixtures used for stop bars and runway guard lights may exceed this wattage, however.

#### **H. Signs**

1. Signs should be re-lampable without the use of tools.
2. Concrete foundations for signs shall contain separate housings for transformers. Transformers shall not be housed under a leg of the sign or any portion of the sign. Sign power should be fed through the sign leg.

3. Where practical, signs should be style 5, size 3, and be installed on a dedicated circuit.
4. All signs installed on the airfield should be marked on each end with 4" vinyl reflective labels with the sign's designation as shown on the plans.

## **Facilities Construction Standards**

### **A. General**

1. All work shall comply with the applicable construction codes and MSCAA standards. The contractor shall be responsible for construction code permits and shall arrange for all code required inspections. Copies of permits shall be supplied to the Manager of Building Maintenance.
2. Utilities will not be interrupted without prior coordination and approval from the MSCAA Building Maintenance Manager, telephone number (901) 922-8615 or the Maintenance Service Desk at (901) 922-8040. Approval is required for each and every interruption. A minimum of a 24-hour notice is required for utility interruptions.
3. All salvaged equipment shall be returned to MSCAA at their designated location for their use or disposed of off-site as directed by MSCAA.
4. Asbestos Containing Materials (ACMs) are specifically prohibited without specific written approval from MSCAA. Any installation of ACMs without prior written approval must be removed immediately by the installer in accord with local ACM removal regulations.

### **B. Penetrations**

1. All concrete floor and roof penetrations must be accomplished by core drilling. Use of rotary hammer or other impact tools for this purpose is prohibited. Core drilling efforts must be coordinated with tenants occupying space below the cored floor slab. The contractor will be responsible for any damage resulting from core drilling.
2. Sealing of new and pre-existing floor penetrations must be filled full depth with hydraulic cement and sealed with epoxy or polyurethane caulk as noted under the Preferred Brands heading (pages 17 & 18). The installation shall be inspected by the MSCAA Development Division. Contractor shall coordinate with MSCAA Development Division for any x-ray or ultra-sound requirements for concrete floor/roof penetrations. No drilling through concrete beams unless approved by Development.
3. When drilling or core drilling through floors, walls, ceilings etc., the contractor is responsible for inspecting for electrical, plumbing, etc and is fully responsible for all repairs to anything damaged.
4. No drilling or ramset fastening is allowed in pan sections of the concrete structure. Any attachments installed above the ceiling will be suspended from the joist structure only.
5. No holes shall be drilled and no anchors shall be attached to the glazed brick, glazed wall tiles, or metal wall panels. Attachments shall be anchored in the mortar joints exclusively.
6. Penetrations through the roof are typically prohibited. When unavoidable, roof penetrations shall be coordinated with MSCAA and will be the responsibility of the contractor to restore the roof to such a condition as not to invalidate the roof warranty.
7. Hydraulic cement and core drill sealant shall be installed full depth. After curing, epoxy or polyurethane caulk shall be applied at the bottom of the plug and polyurethane caulk shall be applied at the top surface.

### **C. Signage**

1. Signage shall comply with the standards established by MSCAA and final approval shall be the responsibility of MSCAA Development Division.

### **D. Electrical**

1. Fiber optic runs should include #10 THWN stranded yellow tracer wire for locating purposes and connected in its entirety as a continuous conductor. Alternatively, armored fiber optic cables will be considered in lieu of tracer wire.
2. All electrical conductors will be installed in conduit and use of flex conduit is limited to runs of 6 feet or less. Conduit couplings and connectors utilizing setscrew fasteners are prohibited. Conduit shall be concealed from public view wherever possible. All conduits and electrical raceways shall contain an equipment grounding conductor.
3. All electrical conductors #14 AWG & larger shall be stranded copper wire unless otherwise approved in writing by MSCAA.
4. All emergency devices including emergency lights, exit lights, etc., shall be connected to emergency circuits. MSCAA does not allow battery packs.
5. MSCAA does not allow Bodine ballasts in fluorescent lighting fixtures. LED is preferred in all lay-in fixtures. Prior approval by Development must be received for use of fluorescent lay-in fixtures and the lamps shall be T8.
6. All use of cable trays is subject to MSCAA review and approval. Conduit installation must be independently supported and shall not be strapped to cable trays or any of the cable trays' support systems, including hangers and braces.
7. All equipment shall meet the appropriate UL listing for its intended purpose.
8. 23-kV rated cable shall conform to MLG&W standards. This requires cable having an aluminum or copper conductor, extruded conductor shield, ethylene propylene rubber insulation, extruded semi-conducting insulation shield, copper concentric neutral, and polyethylene jacket. The cable shall be suitable for direct burial, conduit/duct and aerial installations. All designers should re-verify MLG&W standards prior to publication of construction documents.

### **E. Mechanical**

1. The use of flex duct shall not exceed more than four (4) feet and banded with metal straps, no tape. Use of flex duct other than at the end of a line or connected to air diffusers must be approved by MSCAA.
2. Controls for the HVAC system shall be open architecture and compatible with the JCI Metasys Extended Architecture System.
3. VAV Boxes shall be pressure dependent, electronic controls with no auxiliary fan or local filter.
4. A copy of the test and balance report shall be submitted to MSCAA Development. An independent contractor shall perform the testing and complete the report.
5. The contractor shall align all motors to the associated pump, gearbox, fan, etc. MSCAA Development and Maintenance shall inspect alignment prior to acceptance. Maximum



allowable angular and parallel misalignment is 0.003.

6. Heat trace cables shall have indicator lights installed in a visible location that illuminate when the cables are in operation.

**7. UV lighting in HVAC and HEPA (MERV-14 Rating) filtration systems.**

**F. Plumbing**

1. Brass ball valves shall be installed at the water supply point of origin and in the ceiling directly above any newly installed plumbing fixture where a utility chase wall is not present. If a walk-in utility chase exists, then ball valves shall be installed in the accessible chase no more than five (5) feet above finished floor. There shall be no more than 4 plumbing fixtures on one ball valve. Brass valve tags shall be placed on all newly installed valves clearly identifying the origin and destination.

**G. Fire Alarm and Suppression Systems**

1. The fire suppression system shall interface with the airport's Simplex Fire Alarm System.
2. All dry sprinkler pipe and fittings must be galvanized. All grooves in piping shall be the correct depth per industry standards.
3. See section Facilities Construction Standards – Construction Contractors for additional requirements.

**H. Antennae**

1. All work shall comply with the applicable construction codes and MSCAA standards.
2. No antenna is permitted on the roof; it must be installed within the infrastructure on one of the antenna farms or roof mounted antenna racks or in very limited cases with prior approval parapet mounted. Proposed antenna locations must be approved by MSCAA Development.
3. Cables are not allowed on the roof or to run bare down a wall. A conduit from the parapet location down the wall with an LB connector into the wall below the spandrel beam is required. Parapet mount must be properly sealed to prevent leaks through the concrete. Any wall penetrations must also be sealed. Cables from antennas mounted on racks must utilize the conduit pathway at the rack location.
4. Cables above the ceiling must be independently supported from the roof structure and run by a licensed low voltage contractor, or a licensed electrical contractor, in accordance with applicable codes.
5. Installer shall be responsible for construction code permits and shall arrange for all code required inspections. Copies of permits shall be supplied to the Manager of Building Maintenance.
6. MSCAA Maintenance will not provide the escort for antenna work; either installer or Operator must be badged or tenant will have to escort antenna personnel.

**I. Miscellaneous**

1. Relocation and/or removal of any security device including CCTV cameras, access control

equipment, etc. must be approved by MSCAA Development.

2. Non-shrink grout shall be used with all tile work, up to four (4) feet in height, laid on top of an approved waterproofing membrane.
3. All 12" X 12" ceiling tile shall be installed with the arrow on the back of the tile pointing south.
4. All flammable gas and liquid systems that are piped into buildings shall be properly equipped with seismic shutoff valves. Seismic shutoff valves shall be designed and installed to comply with all governing code requirements, insurance requirements, and MSCAA Construction Standard requirements. In the case of conflict between the listed requirements, the most stringent shall apply.
5. For in-pavement loop installations, loop wire must meet IMSA Spec 51-7. Lead-in wire, if needed, must meet IMSA Spec 50-2. Loop wire shall be one continuous length with no splices from the junction box or control cabinet and back again. The wire shall be twisted by hand four twists per foot in the lead-in slot. Loops must be cut in a rectangular shape, with each 90 degree corner transected with a 45 degree cut to prevent over bending/stressing of the loop wire. Loop saw cuts should be ¼" to 3/8" wide and a minimum of 1½" deep in concrete and 2" deep in asphalt. Loop Lead-in saw cuts should be 3/8" wide and a minimum of 1½" deep in concrete and 2" deep in asphalt. Properly seal the saw cuts with Dow Corning 890 SL self-leveling sealant.
6. The terrazzo floor shall be protected during construction. The removal, cutting, disfigurement or covering of the Terrazzo floor shall be reviewed and approved by MSCAA Development.
7. Only black steel pipe is permitted for use on systems containing diesel fuel, including tank vent stack piping, tank fill piping, and tank drain piping. No other material, including galvanized pipe, is allowed.
8. 90° brushed stainless steel corner protectors shall be installed on all new interior wall construction. The protectors shall be type 304 grade stainless, 22 gauge, 44" tall, 1.5" wings with a 3/8" wall grip edge, and a 1" radius at the top. Protectors shall be installed on top of the cove base and be adhered to the wall with F-26 construction adhesive.
9. Fire rated solid wood blocking that extends from wall stud to wall stud shall be installed for support of framed openings, wall mounted cabinets, wall mounted door hardware, wall mounted monitors, plumbing fixtures, toilet partitions, toilet accessories, mirrors, etc. on all new construction walls or remodels, excluding brick or block walls.
10. All fryers in kitchens must include automated in-line used cooking oil containment systems for proper collection and disposal. Tenants will be responsible for installation, maintenance, and used cooking oil recycling.

#### **J. Construction Contractors**

1. Electrical work performed shall be accomplished by crews with a minimum of one licensed journeyman per three apprentices.
2. The Contractor shall be responsible for maintaining a clean construction site and any space used for the removal of debris. The contractor shall be responsible for repair of any damage

caused by construction to as good or better condition.

3. If directed by Development the Contractor shall erect a temporary wall around the construction site. All temporary walls shall be constructed of metal studs; anchored on bottom with double stick tape and anchored to the roof deck on top (attachment to ceiling tiles or grid is prohibited). The outside (public side) of the wall shall be finished floor to ceiling with 5/8" drywall with 2 coats of flat off white latex paint. The bottom of the wall shall be trimmed with 4" black cove base. A 2"x6" chair rail, blocked 2" off the wall, shall be installed 36" to center above finished floor. The chair rail shall be sanded and painted with two coats of bronze paint (PPG Pitt-Tech Acrylic High Gloss DTM Industrial Enamel – Bronze Tone). The Contractor shall retain responsibility during construction to maintain the wall for aesthetic and security issues. MSCAA Development Division shall approve its location, any attachments to terrazzo floors and all signage and/or graphics. For short durations and in areas of limited public visibility, temporary walls may consist of metal studs and BC grade plywood with a high build primer and premium latex paint; use of these materials is allowed only with specific approval from MSCAA Development Division.
4. Walk-off mats shall be used at all access points to the construction area to prevent tracking of dust and debris and is responsible for cleanup if any dirt, dust and/or debris gets outside their construction limits.
5. When accessible to the public, the schedule of construction efforts and removal of debris shall be coordinated so as not to disrupt other tenants or endanger the safety of the public. Final approval shall be the responsibility of MSCAA Development Division. Unless directed otherwise, working at MEM requires a badge; coordinate with MSCAA Operations Division for specific project requirements. For badging information, the Identification Office telephone number is (901) 922-8005.
6. The contractor shall inform MSCAA Development Division, telephone number (901) 922-8033 at least 48 hours prior to startup of construction.
7. A set of completed as-built drawings shall be supplied to Development upon completion of the project.
8. Fire Alarm System – the Contractor shall contact Simplex to verify that the designer worked with Simplex during the design. If design is the responsibility of the Contractor, Contractor shall contact Simplex to design the installation.
9. A pre-test of the modifications to the fire alarm system shall be conducted with Simplex and the Contractor. This pre-test must be scheduled and successfully completed at least 24 hours in advance of any test with the Memphis Fire Department. MSCAA's Development Maintenance and Communications will participate in the pre-test, so close coordination is required. A minimum of 72 hours advanced notification is required to both Simplex and MSCAA to schedule the pre-test. The pre-test must be performed after hours. Upon completion of the pre-test, Simplex will provide written confirmation of the successful completion of the pre-test, a copy of which is to be provided to the MFD fire marshal, and a copy is to be provided to MSCAA.
10. The test with the Memphis Fire Department for occupancy must be performed after hours and closely coordinated with MSCAA Development, Maintenance and t Communications. Provide MSCAA a copy of any documentation from MFD, including deficiencies noted

with the fire system, or approval of the system.

## **Painting Standards**

### **A. Airfield**

1. Airfield painting shall comply with the latest revision of the P-620 specification. Thermoplastic markings are not acceptable.

### **B. Roads**

1. Road painting shall comply with the latest revision of the TT-P-1952 specification. Thermoplastic markings are not acceptable.

### **C. Paint Vendors**

1. This vendor list is provided for reference only in regards to the specific products listed in the following paragraphs. The list is not exhaustive or exclusive as equivalent vendors will be considered by MSCAA Paint Shop.
2. PPG Architectural Finishes, Inc. (1525 Three Place, Memphis, TN, 38116)
3. Sherwin-Williams (3850 Lamar Avenue, Suite 1, Memphis, TN)
4. Farrell-Calhoun (3185 Millbranch Avenue, Memphis, TN)

### **D. Terminal, Concourses, and South Parking Garage**

1. Exterior White Fasciae, Cargo Docks, Ramp, Walls, and Columns
  - i. Sherwin-Williams Universal Primer (or equivalent)
  - ii. PPG Pitt-Tech Acrylic Satin – White
  - iii. Sherwin-Williams A-100 Acrylic Satin – White
2. Exterior CMU Walls
  - i. Block Filler
  - ii. PPG Pitt-Tech Acrylic Satin – White
  - iii. Sherwin-Williams A-100 Acrylic Satin – White
3. Interior Walls
  - i. Sherwin-Williams B31W4400 Promar 400 Interior Latex Semi-Gloss – White
  - ii. Farrell-Calhoun Acrylic Interior Semi-Gloss Latex Enamel 650 – Carriage House
  - iii. Offices (including Airport Police, most of Building Maintenance, and Cargo Building Offices): Farrell-Calhoun Acrylic Interior Semi-Gloss Latex Enamel 650 – Carriage House
  - iv. Offices (Mezzanine & Apron level concourse B): Farrell-Calhoun Interior Premium Eggshell Latex Enamel 370 – Snowglory
  - v. Gypsum Ceilings/Walls: Pittsburgh Paints PPG 1006-1 Color: Gypsum Various Sheens
  - vi. Aluminum Curtainwall: Valspar Sherwin Williams Fluorpon Special Color: Special White 391B495

4. Doors and Frames

- i. Brown Doors: Sherwin Williams Pro Industrial Acrylic Semi-Gloss – Kodiak Olive
- ii. Green Doors: Sherwin Williams Pro Industrial Acrylic Semi-Gloss – Blarney Stone
- iii. Brown Frames: Sherwin Williams Pro Industrial Acrylic Semi-Gloss – Bronze Tone
- iv. Grey Frames and doors: Farrell-Calhoun Interior Alkyd Enamel Semi-Gloss – Zen Retreat
- v. White Frames and doors (Concourse B): Farrell-Calhoun Interior Alkyd Enamel Semi-Gloss - Gypsum

5. Window Bases

- i. Farrell-Calhoun Acrylic Interior Semi-Gloss Latex Enamel 650 – Carriage House

6. Exterior Metal Structures

- i. Alkyd Industrial Gloss Enamel – White
- ii. Alkyd Industrial Gloss Enamel – Farrell Calhoun Zen Retreat

7. Interior Metal Structure (Concourse B)

- a. PT-2 Valspar Super Special White

8. Rotunda Columns (located in the “Y” of the B Concourse)

- a. PT-2 Valspar Super Special White

9. ID Office

- i. Walls: Farrell-Calhoun Interior Premium Eggshell Latex Enamel 370 – Carriage House
- ii. Doors and Frames: match Terminal & Concourses doors and frames

10. Management Work Room

- i. Walls: Farrell-Calhoun Interior Premium Eggshell Latex Enamel 370 – Carriage House
- ii. Doors and Frames: match Terminal & Concourses doors and frames

11. FIS

- i. Walls: Farrell-Calhoun Acrylic Interior Semi-Gloss Latex Enamel 650 – Carriage House
- ii. Doors: PPG Pitt-Tech Acrylic Satin DTM Industrial Enamel 90-475 – Quick Silver
- iii. Frames: PPG Pitt-Tech Acrylic Satin DTM Industrial Enamel 90-709/05 – Dark Silver

12. Painted Floors (Building Maintenance areas)

- i. Farrell-Calhoun Floor and Deck Enamel 702 – Medium Gray

**E. Administration Building**

1. Walls

- i. Ceilings: Farrell-Calhoun Interior Premium Eggshell Latex Enamel 370 – Zurich White

- ii. Walls: Farrell-Calhoun Interior Premium Eggshell Latex Enamel 370 – Carriage House
- 2. Interior Doors and Frames
  - i. Sherwin-Williams Semi-Gloss Oil Base 1019 – Grey Statue

**F. Airfield Maintenance Building**

- 1. Walls
  - i. Walls: Farrell-Calhoun Acrylic Interior Semi-Gloss Latex Enamel 650 – Carriage House
- 2. Doors and Frames
  - i. Doors: PPG Pitt-Tech Acrylic Satin DTM Industrial Enamel 90-475 – Quick Silver
  - ii. Frames: PPG Pitt-Tech Acrylic Satin DTM Industrial Enamel 90-709/05 – Dark Silver

**G. Miscellaneous**

- 1. De-Ice Tanks
  - i. Farrell-Calhoun Premium Alkyd Industrial Gloss Enamel 800 – White
- 2. Exterior Light, Sign Pole, Sign Bases, and Bollards
  - i. PPG Alkyd Industrial Enamel Gloss Z-Line – Bronze Tone
- 3. Ticket Spitters and Bollards
  - i. Farrell-Calhoun Premium Alkyd Industrial Gloss Enamel 800 – Safety Zone Yellow
- 4. Colored Metal Surfaces
  - i. Red: Farrell-Calhoun Premium Alkyd Industrial Gloss Enamel 800 – International Red
  - ii. Orange: Farrell-Calhoun Premium Alkyd Industrial Gloss Enamel 800 – International Orange
  - iii. Yellow: Farrell-Calhoun Premium Alkyd Industrial Gloss Enamel 800 – Safety Zone Yellow

## **Preferred Equipment**

### **A. Architectural Finishes**

1. Flooring: VCT – Armstrong
2. Cove Base
  - i. Terminal Building: Armstrong or Roppe
  - ii. Administration Building: Johnsonite Rubber 700 Series; 4” high; #24 Grey Haze
  - iii. Offices: Flexco Rubber wallflowers series; 4” high; #03 Charcoal
3. 4” Rubber Wall Base
  - i. Manufacturer: Roppe
  - ii. Color: 123 Charcoal
4. 3/8” Epoxy Terrazzo TZ-3
  - i. Manufacturer: Key Resin
  - ii. Color: KEY 100-1779 Gull Wing Grey
  - iii. Location: Concourse B
5. 3/8” Epoxy Terrazzo TZ-1
  - i. Manufacturer: Key Resin
  - ii. Color: KEY 001-563 White Diamond
  - iii. Location: Concourse B
6. 3/8” Epoxy Terrazzo TZ-2
  - i. Manufacturer: Key Resin
  - ii. Color: Key 28-27 Hearthstone
  - iii. Location: Concourse B
7. 3/8” Epoxy Terrazzo TZ-4
  - i. Manufacturer: Key Resin
  - ii. Color: KEY 100-675 Pewter
  - iii. Location: Concourse B
8. 3/8” Epoxy Terrazzo TZ-5
  - i. Manufacturer: Key Resin
  - ii. Color: KEY 100-2018 Whale Gray
  - iii. Location: Concourse B
9. 3/8” Epoxy Terrazzo TZ-6
  - i. Manufacturer: Key Resin



- ii. Color: KEY 001-563 White Diamond
- iii. Location: Concourse B
- 10. 3/8" Epoxy Terrazzo TZ-7
  - i. Manufacturer: Key Resin
  - ii. Color: KEY 001-754 Whiteish
  - iii. Location: Concourse A, B, & C Terminals
- 11. 3/8" Epoxy Terrazzo TZ-8
  - i. Manufacturer: Key Resin
  - ii. Color: KEY 012 Black
  - iii. Location: Concourse B
- 12. 3/8" Epoxy Terrazzo TZ-9
  - i. Manufacturer: Key Resin
  - ii. Color: KEY 001-753 White Glass
  - iii. Location: Concourse B
- 13. Accent Wall Tile T-1A
  - i. Manufacturer: Fireclay
  - ii. Product: Glazed Wall Tile White Clay Body (3"X12")
  - iii. Color: White Wash (V1)
  - iv. Grout Color: Laticrete #89 Smoke Grey
  - v. Location: Concourse B
- 14. Accent Wall Tile T-1B
  - i. Manufacturer: Fireclay
  - ii. Product: Glazed Wall Tile White Clay Body (3"X12")
  - iii. Color: Foggy Morning
  - iv. Grout Color: Laticrete #89 Smoke Grey
  - v. Location: Concourse B
- 15. Accent Wall Tile T-1C
  - i. Manufacturer: Fireclay
  - ii. Product: Glazed Wall Tile White Clay Body (3"X12")
  - iii. Color: Powder Blue
  - iv. Grout Color: Laticrete #89 Smoke Grey
  - v. Location: Concourse B
- 16. Accent Wall Tile T-1D

- i. Manufacturer: Fireclay
  - ii. Product: Glazed Wall Tile White Clay Body (3”X12”)
  - iii. Color: Mayan Blue
  - iv. Grout Color: Laticrete #89 Smoke Grey
  - v. Location: Concourse B
17. Accent Wall Tile T-1E
- i. Manufacturer: Fireclay
  - ii. Product: Glazed Wall Tile White Clay Body (3”X12”)
  - iii. Color: Martinique
  - iv. Grout Color: Laticrete #89 Smoke Grey
  - v. Location: Concourse B
18. Porcelain Tile T-2 (restroom Floor)
- i. Manufacturer: Casalgrande Padana
  - ii. Product: Balsaltina 18”X18” Naturale Finish
  - iii. Color: Linosa
  - iv. Grout Color: Laticrete #45 Raven
  - v. Location: Concourse B
19. Ceiling Tile
- i. Armstrong 2’ x 2’, Cortega Angled Tegular 704A (2’ x 2’ x 5/8”)
  - ii. Armstrong 2’ x 2’, Fissured Square Lay-in 756A (2’ x 2’ x 5/8”)
  - iii. Armstrong 2’ x 4’, Cortega Second Look 2765 (2’ x 4’ x 3/4”)
  - iv. Armstrong 44”X 48”, Optima Techzone
  - v. Armstrong 2’ X 2’, Ultima
20. Ceiling Grid: Armstrong Prelude
- i. Mains: 7300
  - ii. 4’ Ts: XL7348
  - iii. 2’ Ts: XL7328
  - iv. Wall mold: 7800
21. Ceiling Grid: Armstrong Suprafine XL
- i. Location: Concourse B
22. Ceiling Metal Panel:
- i. Accent Ceilings & Walls
  - ii. Perforated Aluminum Acoustic Backing Torsion Spring Hinged Pans

- iii. Color: Ultra White
- iv. Location: Concourse B
- 23. Ceiling Linear Metal
  - i. Accent Ceilings & Walls
  - ii. Pattern: Barcode
  - iii. Color: 8424 Walnut
  - iv. Location: Concourse B
- 24. Carpet (Hold Rooms)
  - i. Style Name: Resonance
  - ii. Style Number: J0118
  - iii. Color: 00406 Saddle
  - iv. Vendor: Continental Flooring (800-825-1221 Ext 206)
  - v. The pattern for the carpet is to run perpendicular to the concourse for hold room installations.
- 25. Carpet (Offices)
  - i. Style Name: Live Wire
  - ii. Style Number: 54733
  - iii. Color: 33506 Animated
  - iv. Vendor: Continental Flooring (800-825-1221 Ext 206)
- 26. Carpet (MEM Executive Offices)
  - i. Style Name: Ripple Effect
  - ii. Style Number: J0116
  - iii. Color: 00501 Laughs & Yawns
  - iv. Vendor: Continental Flooring (800-825-1221 Ext 206)
- 27. Carpet CPT-1 (Concourse B)
  - i. Manufacturer: Interface
  - ii. Product: Custom Soundwave Verse Sample
  - iii. No: 265317-005
- 28. Carpet Tile CPT-1A (Concourse B)
  - i. Manufacturer: Interface
  - ii. Product: Custom Groundwaves Verse Samples
  - iii. No: 265317-008
- 29. Carpet Tile CPT-1B (Concourse B)

- i. Manufacturer: Interface
  - ii. Product: Custom Off Line Sample
  - iii. No: 265317-007
- 30. Carpet Tile CPT-1 (Concourse B)
  - i. Manufacturer: Interface
  - ii. Product: Custom Off Line Sample
  - iii. No: 265317-002
- 31. Carpet Tile CPT-1D (Concourse B)
  - i. Manufacturer: Interface
  - ii. Product: Custom SL910 Sample
  - iii. No: 265317-013
- 32. Wood Paneling (Concourse B)
  - i. Strait Grain
  - ii. Species: White Oak
  - iii. Color: Custom
- 33. Quartz QZ-1 (Concourse B)
  - i. Manufacturer: Silestone
  - ii. Color: Blanco Maple
- 34. Quartz QZ-2 (Concourse B)
  - i. Manufacturer: Silestone
  - ii. Color: Cemento Spa. Polished Finish
- 35. Quartz QZ-3 (Concourse B)
  - i. Manufacturer: Cambria
  - ii. Color: Berwyn
- 36. Quartz QZ-4 (Concourse B)
  - i. Manufacturer: Cambria
  - ii. Color: Whitehall
- 37. Quartz QZ-5 (Concourse B)
  - i. Manufacturer: Silestone
  - ii. Color: Cemento Spa. Polished Finish
- 38. Quartz QZ-6 (Concourse B)
  - i. Manufacturer: Silestone
  - ii. Color: Whitehall

39. Quartz QZ-7 (Concourse B)
  - i. Manufacturer: Silestone
  - ii. Color: Whitehall
40. Curtain Wall (Concourse B)
  - i. Manufacturer: Kawneer
  - ii. Product: 1600 System 2
  - iii. Color: Interior Valspar Super Special White / Exterior Clear Anodized
41. Epoxy Flooring (Concourse B)
  - i. Manufacturer: BASF Building Systems
  - ii. Product: BASF Masterdeal 2500 LT Duty
  - iii. Color: Gray
42. Epoxy Flooring (Concourse B)
  - i. Manufacturer: Dex-O-Tex
  - ii. Product: Color Flake L
  - iii. Color: BX 520
43. Exterior Aluminum Composite Metal Paneling (Concourse B)
  - i. Manufacturer: Alucobond
  - ii. Product: Alucobond Plus – fire rated core
  - iii. Colors:
    1. Type 1: Titanium Metallic II
    2. Type 3A: Southwest Gold Metallic
    3. Type 3B: Harvest Gold Mica
    4. Type 3C: Driftwood Mica

## **B. Plumbing & Restrooms**

1. Flush valves: Sloan, Royal
2. Electronic flush valve retrofits:
  - i. Urinals: Zurn ZRK-C-3.5, 3.5 GPF
  - ii. Water Closets: Zurn ZRK-C-3.5, 3.5 GPF
3. Plumbing fixtures: Crane, American Standard, Kohler
4. Partitions: Accurate, Stainless Steel, No sight design, overhead braced, Continuous, Hinge type-Integral, Hinge In-swing/out-swing standard closed position, Floor mounted
5. Sinks: American Standard, 0355.012 Lucerne wall mounted Lav. sink w/4" centers

6. Service Sinks: 8" centers w/ ZURN Z841M1 Faucet
7. Urinals: 6501.010 wash brook urinal American Standard white. Zurn Retro Flush Valve.
8. Water Closets
  - i. Wall-mounted: American Standard 2257.103 af wall toilet 4 bolt wall mount, white
  - ii. Floor-mounted: Kohler K-4368
9. Lavatories
  - i. Non-ADA: American Standard, vandal resistant lavatory faucet with grid drain 2385.130 polished chrome
  - ii. ADA: Delta – 511-WFHDF
10. Faucets: Sloan Optima EBF-85M infrared
11. Water closet gaskets: Wade Part # M-8 for wall hung closets
12. Backflow devices: Watts
13. Water coolers: Halsey Taylor – model #HAC8FS-Q(SS) wall-mounted
14. Toilet Accessories: Bobrick
  - i. Recessed towel dispenser and waste receptacle: B-3961
  - ii. Surface mounted toilet tissue dispenser: B-2888
  - iii. Sanitary napkin disposal: B-270
  - iv. Heavy duty robe hook: B-2116
  - v. Handicap tilt mirror: B-293 (24" x 36")
  - vi. Grab bars: stainless steel with Snap Flange
15. Toilet Accessories: Non-Bobrick
  - i. Foam Dispenser – Spartan Chemical Company 975700
  - ii. Toilet paper dispenser: Shoreline 830 from Memphis Chemical (not for use in public restrooms)
  - iii. Toilet Seat Cover Cabinet: Franklin Brass #1988 (Stainless Steel)
16. Eye Wash Station: Bradley S19314F
17. Angle Stops: Brasscraft

### **C. Doors**

1. Exterior: Steelcraft Door; 16 gauge metal, galvanized; fully reinforced for door closer and continuous gear hinge; with 24" x 32" window prep (if specified)
  - a. Standard doors shall be 3.0' x 7.0'.
  - b. Jet Bridge doors shall be 4.0' x 7.0'.
2. Interior: 3070 (3.0' x 7.0') solid core wooden door with prep for continuous gear hinge; with 24" x 32" window prep (if specified)

3. Window Kits (if specified): Anemostat #LOPRO Visionlite 24"x32" with Tempered Glass
4. Metal Frames: Fit door openings to frame for a Steelcraft door or solid core wooden door with fully reinforced frame for door closer and continuous gear hinge
5. Threshold: Aluminum to fit door frame
6. Drip Caps: 16 ad if outside door
7. Closers:
  - a. Standard Doors: LCN model 4041, arm RW/ PA, finish to match existing areas adjustment size 1-6 PC 23
  - b. Jet Bridge Doors: Dorma 1816HT Series with smoke detector
8. Hinges:
  - a. New doors shall have reinforcement on the hinge side and hinges shall be continuous geared hinges by National Guard Products, Stanley, or PBB. Minimum 0.120-inch thick hinge leaves with minimum overall width of 4 inches; fabricated to full height of door and frame. Fabricate hinges non-handed and to template screw locations. Continuous hinges guaranteed for the life of the opening.
    1. At electrified hardware locations provide electric transfer continuous hinges with a 12" removable hinge modification accessible without de-mounting door from the frame and Molex standardized plug connectors to accommodate up to 12 wires. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Provide sufficient number of concealed wires to accommodate electric function of specified hardware. Preferred hardware is Von Duprin EPT10.
  - b. Existing doors without reinforcement on the hinge side shall use hinges by Stanley FBB 179-4.5 x 4.5 x USP x NRP
9. Lock Prep: Yale 6-pin lockset-PB5407LN 694X497 Finish – US 10B
10. Keyways: 6-pin LFIC Cores with SA keyway
11. Panic Hardware: Dorma 9000 Series or Von Duprin RX QEL 98NL-F
12. Flush Bolts: Trimco, Burns, or Ives. Provide manual flush bolts with top rod of sufficient length to allow bolt location approximately six feet from the floor. Furnish dust proof strikes for bottom bolts. Surface bolts to be 8" in length and U.L. listed for labeled fire doors.
13. Low voltage door operators: Dorma ED900 Series or LCN 9000 Series

#### **D. Electrical**

1. Wire: THHN or equal for insulation
2. VFDs: PowerFlex 400 by Allen-Bradley including latest harmonic distortion units w/ Metasys board
3. High Voltage Substations: General Electrical, Cutler Hammer
4. Panels, breakers, and contactors: Westinghouse, ITE (Siemens), Square D, Allen Bradley,

Cutler Hammer

5. Devices: Leviton, Bryant, P&S, Hubbell
6. Device Covers: Stainless Steel
7. Lighting: G.E, Phillips, Sylvania, Lithonia
8. Fittings (no Set screws, couplings, or connectors): Raco, Steel City
9. Conduit/Wire: No MC or BX cable other than 6' or less to be used as whips from junction box to item being fed

**E. Mechanical**

1. Heaters: Trane, McQuay
2. Electronic Controls: Johnson Controls (FEC, NAE, BACnet MS/TP), Barber Coleman, Trane, McQuay
3. Valves, Hot/Chill Water: Johnson Controls, Barber Coleman, Honeywell
4. AHUs: Trane
5. Boilers: Cleaver Brooks
6. Chillers: Trane
7. Pumps: Peerless, Bell & Gossett, Aurora, Ingersoll Rand, Pyramid Pump, Grundfos
8. VAV Boxes (All VAVs shall be pressure dependent with electronic controls): Environmental Tech, Varitrane Systems, Tuttle & Bailey
9. Electronic Thermostats: TE-6700, BACnet MS/TP, N2, Johnson Control
10. Cooling Towers: Marley, BAC

**F. Miscellaneous**

1. Joint Seals and Floor Penetration Seals: Evazote 380 E. S. P. with Hindered Amine Light Stabilizer
2. Automatic Perimeter Fence Gate Operators: HySecurity





**Memphis-Shelby County Airport Authority  
COMPREHENSIVE STORM WATER POLLUTION  
PREVENTION PLAN**

**For Contractors Performing  
Construction Activities at the  
Memphis International Airport  
Under Permits TNR10-0000 and TNR15-0091**

**Comprehensive Storm Water Pollution Prevention Plan**

**Appendix A: Figures**

**Appendix B: Permit and Forms**

**Appendix C: Best Management Practices**

**Appendix D: Spill Response Notification**

**Appendix E: Site Specific Information**

**Prepared By:  
Lori Morris, P.E.  
Manager of Environmental Services, MSCAA**

**Version 4  
August 2017**



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Appendix D	Spill Response Notification

**COMPREHENSIVE STORM WATER POLLUTION PREVENTION PLAN**  
**CERTIFICATION PAGE**

Name of Construction Project: All Construction Projects at Memphis International Airport (FY2017-FY2021)

Location of Facility: Memphis International Airport (MEM)  
2491 Winchester Road, Suite 113  
Memphis, Tennessee 38116-3856

**MANAGEMENT CERTIFICATION**

"I certify under penalty of law that this document and all attachments were prepared by me, or under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. As specified in Tennessee Code Annotated Section 39-16-702(a)(4), this declaration is made under penalty of perjury."

\_\_\_\_\_  
Signature: Mr. Terry Blue  
Memphis-Shelby County Airport Authority  
Vice-President, Operations

\_\_\_\_\_  
Date

**CONTRACTOR CERTIFICATION**

"I certify under penalty of law that I have reviewed this document, any attachments, and the SWPPP referenced above. Based on my inquiry of the construction site owner/developer identified above and/or my inquiry of the person directly responsible for assembling this NOI and SWPPP, I believe the information submitted is accurate. I am aware that this NOI, if approved, makes the above-described construction activity subject to NPDES permit number TNR100000, and that certain of my activities on-site are thereby regulated. I am aware that there are significant penalties, including the possibility of fine and imprisonment for knowing violations, and for failure to comply with these permit requirements. As specified in Tennessee Code Annotated Section 39-16-702(a)(4), this declaration is made under penalty of perjury."

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Printed Name

\_\_\_\_\_  
Title

\_\_\_\_\_  
Company Name

\_\_\_\_\_  
Phone Number

\_\_\_\_\_  
Company Address

## **1.0 INTRODUCTION**

The State of Tennessee Department of Environment and Conservation (TDEC) has authorized the discharges of storm water from all construction sites at the Memphis International Airport (MEM) under the Tennessee General Permit Number TNR10-0000 and the MEM Permit Tracking Number TNR15-0091, provided that the permit provisions are adhered to and the State of Tennessee (the State) receives formal application 30 days before groundbreaking from the parties responsible for a construction project at MEM. Under TNR10-0000 and TNR15-0091, both the Memphis-Shelby County Airport Authority (MSCAA) and the contractors performing the construction activities are responsible for complying with the permits. MSCAA has developed this Comprehensive Storm Water Pollution Prevention Plan (SWPPP) to assist contractors in complying with the provisions of TNR10-0000 and TNR15-0091 and to coordinate the compliance responsibilities of the contractors and subcontractors engaged in construction activities on properties owned or managed by MSCAA.

MSCAA originally obtained permit coverage and prepared a SWPPP under TNR10-0000 in 2001. On June 16, 2005, MSCAA obtained coverage under a new general permit and prepared a revised SWPPP (Version 2) dated June 2006. On May 24, 2011, MSCAA obtained coverage under a new general permit and prepared a revised SWPPP (Version 3) dated November 2011. On October 1, 2016, MSCAA received automatic coverage under the new general permit and has prepared this revised SWPPP (Version 4) dated February 2017. This SWPPP must be updated no later than 12 months following any new permit effective date.

### **1.1 Construction Activities at MEM**

MEM is an onshore air transportation facility located in the south-central area of the City of Memphis, Tennessee. Construction of taxiways, runways, parking areas, and terminals is ongoing. MEM is a full-scale air transportation facility with tenants that provide commercial passenger and freight service, aircraft maintenance, fueling, de-icing, storage for private aircraft, and executive flight services.

Of the 4,800 acres at MEM, up to 300 acres are expected to be disturbed by construction during the term of this permit. A significant portion of the construction will take place on currently impervious airport facilities being retrofitted. However, a net loss of pervious area at the airport is expected over the next 5 years.

## **1.2 Areas Covered Under TNR15-0091**

Construction projects covered under this permit include, but are not limited to, Concourse B Modernization, CONRAC facility construction, Centralized Deicing Pad construction, and Airfield Maintenance Building Construction that are underway. Equipment staging areas, materials storage areas, excavated materials holding and/or disposal areas and borrow areas are also covered, and are subject to all of the provisions of TNR15-0091, whether the areas are contiguous to the main construction area or at remote locations. These areas, the activities to be conducted in these areas, and the storm water pollution control measures to be implemented must be incorporated into the site-specific Erosion Prevention and Sediment Control Plan (EPSCP). When one or more of these areas are operated by and/or utilized by more than one contractor, the pollution control provisions for that area shall be coordinated so the effectiveness of the pollution control provisions are not compromised.

The following figures are incorporated as Appendix A of this SWPPP to adequately address the areas and projects covered under TNR15-0091. Both MSCAA construction projects and tenant construction projects are included.

- The first map in Appendix A is the *MEM Storm Drainage* map that shows storm drainage basins, outfalls, storm drainage features, tenants, and industrial National Pollutant Discharge Elimination System (NPDES) permit information.
- The second map in Appendix A is the *Airport Property Map* that depicts each parcel owned by the airport to ensure that any construction projects on MEM parcels outside the main airport activity area are covered under TNR15-0091. This map additionally serves as a site location map with roads and streams depicted.

## **1.3 Tennessee General Permit for Construction Activities Requirements**

TNR10-0000, included as Appendix B, authorizes the discharge of storm water from sites that are under construction, provided that the permit provisions are adhered to and TDEC receives formal application from the parties responsible for the construction. Under this general permit, both the owner/developer of the property and the contractors performing the construction activities are responsible for complying with the permit. MSCAA has developed this SWPPP to comply with the provisions of TNR10-0000 and to coordinate the compliance responsibilities of the contractors and subcontractors engaged in construction activities on properties owned or managed by MSCAA. MEM drains into water with Unavailable Parameters (Days Creek, Hurricane Creek and Nonconnah

Creek); therefore, all construction at MEM is subject to more stringent permit requirements for erosion and sediment control. These requirements are incorporated into this SWPPP.

The parties subject to this permit include the owner/developer of the construction site (MSCAA) and all contractors and subcontractors who have either the authority to make or modify the plans and specifications or the day-to-day responsibility for execution of the plans and/or compliance with the specifications. Table 1-1 summarizes TNR10-0000 permit requirements at MEM:

**Table 1-1  
 Permitted Storm Water Discharges**

<b>Discharges Covered</b>	<b>Permit #/ Tracking #</b>	<b>Permit Required Activities</b>
<b><i>Storm Water Associated with Construction Activity</i></b>		
Storm Water Under Construction General Permit (CGP)	TNR10-0000/ TNR15-0091	<p>Contractors must conduct all activities in compliance with the CGP, including but not limited to:</p> <ul style="list-style-type: none"> <li>• Sign Notice of Intent and Storm Water Pollution Prevention Plan (SWPPP), keep SWPPP onsite, and update SWPPP as needed;</li> <li>• Hire a qualified person to conduct biweekly erosion prevention and sediment control inspections (72 hours apart) and keep site inspector's certification onsite;</li> <li>• Make corrections to site before next rain event but in no case more than 7 days after the need is identified;</li> <li>• Update SWPPP within 7 days of correction to site;</li> <li>• Document twice-weekly inspections on Tennessee Department of Environment and Conservation form and maintain inspection file and SWPPP at the construction site or Memphis-Shelby County Airport Authority (MSCAA);</li> <li>• A quality assurance site assessment of erosion prevention and sediment controls must be conducted by a Professional Engineer or other qualified individual at each outfall involving drainage totaling 5 or more acres within a month of construction commencing at each portion of the site that drains the 5 or more acres;</li> <li>• Stabilize soils (temporary or permanent) 14 days after construction ceases;</li> <li>• Post a copy of the notice of permit coverage, contact information, project description and location of the SWPPP at the MSCAA;</li> <li>• Install and maintain a rain gauge at the site; and</li> <li>• Maintain a form onsite that tracks the acreage of disturbed area each day (no more than 50 acres may be disturbed at one time unless linear project).</li> </ul>



## 2.0 ACQUIRING PERMIT COVERAGE AT MEM

To acquire permit coverage under TNR15-0091, owner must:

- Submit a complete sub-project Notice of Intent (NOI) using the TNR15-0091 tracking number, along with a construction site map and site specific EPSCP (provided by project designer) with drawings:

**Construction Site map:** excerpt (8 ½" by 11" or 11" by 17") from the appropriate 7.5 minute United States Geological Survey (USGS) topographic map, with the proposed construction site centered. For additional information, see Section 3.1.

- The entire proposed construction area must be clearly identified (outlined in red) on this map.
- The total area to be disturbed (in acres) should be included on the map.
- Outline the boundaries of projects, developments and the construction site in relation to major roads, streams or other landmarks.
- Identify all outfalls where runoff will leave the property
- Identify stream(s) receiving the discharge, and storm sewer system(s) conveying the discharge from all site outfalls

**Site-specific EPSCP:** The plan showing the approximate location of each control measure along with a description of the timing during the construction process for implementing each measure (e.g., prior to the start of earth disturbance, as the slopes are altered and after major grading is finished). The different stages of construction (initial/major grading, installation of infrastructure, final contours, etc.) and the erosion preventions and sediment control measures that will be utilized during each stage should be depicted on multiple plan sheets (see Section 3.0).

- have a full understanding of this SWPPP and the requirements of TNR10-0000 and have the ability to be in compliance with permit terms and conditions.

### 2.1 Notice of Intent

To become an authorized party to this permit, owners wishing coverage must first develop an EPSCP specific to the construction activities being contracted and submit the site plan and a

properly signed NOI to the State and the City via MSCAA. The project designer will submit EPSCP drawings to MSCAA for review prior to TDEC submittal. An NOI is included at the end of Appendix B with the permit forms.

Contractors performing construction activities at MEM are required to be signatories on the NOI under TNR10-0000 and TNR15-0091 if they have either the authority to make or modify the plans and specifications or have the day-to-day responsibility for execution of the plans and/or compliance with the specifications. The MSCAA requires the following responsibilities of these signatories.

**The MSCAA must:**

- Ensure the project specifications the contractors develop meet the minimum requirements of Section 3.0 of this SWPPP and all other applicable conditions.
- Ensure that the site plan for the contracted project indicates the areas of the project where contractor has design control (including the ability to make modifications in specifications).
- Ensure all other permittees implementing portions of the SWPPP for their part of the project that will be impacted by any changes signatories make to the SWPPP are notified of such modifications in a timely manner.
- Ensure that all common facilities (e.g., sediment treatment basin and drainage structures) that are necessary for the prevention of erosion or control of sediment are maintained and effective until all construction is complete and all disturbed areas in the entire project are stabilized.
- If parties with day-to-day operational control of the construction site have not been identified at the time the SWPPP is initially developed, the MSCAA shall be considered to be the responsible party until such time the supplemental NOI is submitted, identifying the new operator(s). These new operators (e.g., general contractor, utilities contractors, subcontractors, erosion control contractors, hired commercial builders) are considered secondary permittees. The EPSCP must be updated to reflect the addition of new operators as needed to reflect operational or design control.

- Ensure that all operators on site have permit coverage and are complying with the SWPPP.

**Tenants and contractors with day-to-day operational control must:**

- Ensure that the SWPPP for portions of the project where they are operators meets the minimum requirements of Section 3.0 of the SWPPP and identify the parties responsible for implementation of control measures identified in the plan.
- Ensure that measures in the SWPPP are adequate to prevent erosion and control sediment that may result from their earth-disturbing activity.
- Permittees with operational control over only a portion of a larger construction project are responsible for compliance with all applicable terms and conditions of this permit as it relates to their activities on their portion of the construction site. This includes, but is not limited to, implementation of Best Management Practices (BMPs) and other controls required by the SWPPP.

NOIs must be filed at least 30 days prior to the start of the construction project activities or the addition of a new party to the permit. If there is a change in contractor responsibilities, a NOI must be filed at least 48 hours before responsibilities are transferred from one contractor to another. To the extent possible, all contractors filing NOIs for a scope of work should be joint signatories to a single NOI.

A NOI submitted for authorization to discharge under TNR10-0000 and TNR15-0091 shall be submitted by the contractor to MSCAA Manager of Environmental Services or MSCAA's construction management team (Parsons). Three original copies shall be submitted. MSCAA will review the NOI and site plan for completeness and, if they are found to be complete, forward original copies of the NOI and site plan to TDEC. A copy of the NOI will also be forwarded to the City of Memphis Department of Public Works Storm Water Program for notification purposes.

## **2.2 Storm Water Pollution Prevention Plan**

Owners and Contractors wishing to obtain coverage under a NPDES permit must develop and submit a site-specific EPSCP with their NOI. The project designer will submit the EPSCP for review and approval prior to submittal to TDEC. This SWPPP constitutes the comprehensive SWPPP addressing all construction-related activities from the date construction commences at MEM to the

date of termination of permit coverage. The SWPPP was developed, implemented, and updated according to the requirements in TNR10-0000. The SWPPP has been an effective tool since 2001 when coverage under TNR10-0000 was obtained at MEM. Because there is more than one operator at MEM, preparation and implementation of the SWPPP has been a cooperative effort. New operators with design and operational control of their portion of the construction site are required to adopt and implement this comprehensive SWPPP.

### **2.3 Permit Application Fees**

MSCAA has paid the permit application fee for all construction projects at MEM by submittal of a one-time maximum fee of \$7,500.00 for the maximum acreage permitted. Contractors and tenants do not need to pay permit application fees.

### **2.4 Notice of Coverage**

TDEC will review the NOI for completeness and will issue a Notice of Coverage (NOC) to the MSCAA for each project identified on the NOI form. Each project will be independently tracked by TDEC with a project tracking number. Before initiation of construction activities, copies of the NOI, this SWPPP, the EPSCP, and the NOC must be located at each construction site management office. The NOC must be posted along with the following information:

- Name, company name, e-mail address (if available), telephone number, and address of the project site owner or a local contact person;
- A brief description of the project; and
- The location of the SWPPP if the site is inactive or does not have an onsite location to store the plan.

Necessary copies of the NOC and the project-specific EPSCP will be distributed by MSCAA to all parties assigned responsibility for oversight of the construction project.

### **2.5 Notice of Termination**

Individual contractors who have completed their responsibilities must submit a Notice of Termination (NOT) to be relieved of their responsibilities under the permit. Upon completion of the project, MSCAA, in conjunction with the contractors covered by the permit, is to submit a NOT. NOT forms are included at the end of Appendix B with the permit forms. NOTs are to be submitted to the contracting official at MSCAA. MSCAA (via Parsons) will forward the NOTs to TDEC.

Contracted projects must retain permit coverage until all construction within the site (including, but not limited to, infrastructure, common areas, storm water drainage structures, sediment control basin, etc.), is completed, all disturbed soils have been finally stabilized, and temporary erosion and sediment control measures have been removed.

TDEC will notify MSCAA of the final decision within 30 days from receipt of a complete NOT and may deny termination of coverage if there are any existing deficiencies.

## **2.6 Permitted Discharges**

TNR10-0000 and TNR15-0091 authorize discharges of storm water from construction activities such as clearing, grading, filling, and excavation activities in preparation for paving or construction activities on projects sized 1-acre or greater. It also authorizes storm water discharges from support activities (e.g., equipment staging yards, material storage areas, excavated material disposal areas, borrow areas) provided that:

- the support activity is primarily related to a construction site that is covered under this permit;
- that the owner/contractor of the support activity is the same as the owner/contractor of the construction site;
- the support activity is not a commercial operation serving multiple unrelated construction projects by different contractors and does not operate beyond the completion of the construction activity at the last construction project it supports; and
- appropriate storm water pollution prevention controls and measures are identified in a SWPPP covering the discharges from the support activity areas.

The following non-storm water discharges from active construction sites are authorized by TNR10-0000 and TNR15-0091, provided the non-storm water component of the discharge is in compliance with the permit:

- dewatering of work areas of collected storm water and groundwater;

- waters used to wash vehicles (of dust and soil, not process materials such as concrete) where detergents are not used and detention and/or filtering is provided before the water leaves the site;
- water used to control dust;
- potable water sources including waterline flushings;
- routine external building wash-down that does not use detergents;
- uncontaminated groundwater or spring water; and
- foundation or footing drains where flows are not contaminated with process materials such as solvents.

Discharges of storm water or wastewater authorized by and in compliance with a different NPDES permit (other than this permit) may be mixed with discharges authorized by this permit. All non-storm water discharges authorized by this permit must be free of sediment or other solids and must not cause erosion of soil or the stream bank or result in sediment impacts to the receiving stream.

TNR10-0000 does not authorize storm water or other discharges that would result in a violation of State water quality standards (TDEC Rules, Chapters 1200-4-3, 1200-4-4). Such discharges constitute a violation of this TNR10-0000. Where a discharge is already authorized under the permit and the division determines the discharge to cause or contribute to the violation of applicable state water quality standards, the permitting authority will notify the operator of such violation(s). The permittee shall take all necessary actions to ensure future discharges do not cause or contribute to the violation of a water quality standard and shall document these actions in the SWPPP.

The construction activity shall be carried out in such a manner as to prevent violations of water quality criteria as stated in the TDEC Rules, Chapter 1200-4-3-.03. This includes but is not limited to the prevention of any discharge that causes a condition in which visible solids, bottom deposits, or turbidity impairs the usefulness of waters of the state for any of the uses designated for that water body by TDEC Rules, Chapter 1200-4-4. There shall be no distinctly visible floating scum, oil, or other matter contained in the storm water discharge. The storm water discharge must not cause an objectionable color contrast in the receiving stream. The storm water discharge must result in no materials in concentrations sufficient to be hazardous or otherwise detrimental to humans, livestock, wildlife, plant life, or fish and aquatic life in the receiving stream.

### **3.0 POLLUTION PREVENTION SITE PLAN DEVELOPMENT**

The grading, drainage, and erosion prevention and sediment control plans for each project at MEM are considered to be part of the overall site plan and must accompany the individual project's NOI submittal. Each construction project must calculate its post-construction runoff coefficient and, where appropriate, send a Geotechnical Report for the site with the site plans to the TDEC office with the job-specific NOI via the MSCAA.

Storm water leaving construction sites at MEM enters the MSCAA's storm sewer system going to either Days Creek or Hurricane Creek, which then enters Nonconnah Creek. In general, construction projects at MEM have an estimated post-construction runoff coefficient of 0.70.

The EPSCP must be prepared in accordance with good engineering practices and the latest edition of the Tennessee Erosion and Sediment Control Handbook. The handbook is designed to provide information to planners, developers, engineers, and contractors on the proper selection, installation, and maintenance of BMPs. In addition, tenants and contractors must consult the City of Memphis Storm Water Management Manual (SWMM) to ensure compliance with local storm water requirements. Appendix C of this SWPPP provides the current web site address to the TDEC Erosion and Sediment Control Handbook, as well as the SWMM. Because the receiving streams for MEM storm water discharges are water with unavailable parameters, beginning May 24, 2013, the EPSCP must be prepared by a person who, at a minimum, has completed the TDEC's *Level II Design Principles for Erosion Prevention and Sediment Control for Construction Sites* course. A copy of the certification or training record for inspector certification should be included with the EPSCP.

The EPSCP must:

- Identify all potential sources of pollution that are likely to affect the quality of storm water discharges from the construction site.
- Describe practices to be used to reduce pollutants in storm water discharges from the construction site.
- Assure compliance with the terms and conditions of this permit.



Once a definable portion of a project has been finally stabilized, the co-permittee and MSCAA may identify the stabilized area on the EPSCP. At that time, no further SWPPP or inspection requirements apply to that portion of the site (e.g., earth-disturbing activities around one of three buildings in a complex are done and the area is finally stabilized; 1 mile of a roadway or pipeline project is done and finally stabilized, etc.).

Plans and specifications for any building or structure, including the design of sediment basins or other sediment controls involving structural, hydraulic, hydrologic or other engineering calculations shall be prepared by a licensed professional engineer or landscape architect and stamped and certified in accordance with the Tennessee Code Annotated, Title 62, Chapter 2 and the rules of the Tennessee Board of Architectural and Engineering Examiners. Engineering design of sediment basins and other sediment controls must be included in SWPPPs for construction sites involving drainage to an outfall totaling 5 acres or more due to the receiving water having unavailable parameters status.

### **3.1 Site Description**

The EPSCP must provide a description of pollutant sources and other information as indicated:

- A description of all construction activities at the site (not just grading and street construction)
- The intended sequence of major activities that disturb soils for major portions of the site (e.g., grubbing, excavation, grading, utilities, and infrastructure installation, etc.)
- Estimates of the total area of the site and the total area that is expected to be disturbed by excavation, grading, filling, or other construction activities
- A description of the topography of the site including an estimation of the percent slope and the variation in percent slope found on the site; such estimation should be on the basis of a drainage area serving each outfall, rather than an entire project.
- Any data describing the soil (data may be referenced or summarized) and how the soil type will dictate the needed control measures and the expected quality of any discharge from the site

- An estimate of the runoff coefficient of the site after construction activities are completed and how the runoff will be handled to prevent erosion at the permanent outfall and receiving stream.
- An erosion prevention and sediment control map of the site with the proposed construction area clearly outlined. The map should indicate:
  - the boundaries of the permitted area;
  - drainage patterns and approximate slopes anticipated after major grading activities;
  - areas of soil disturbance;
  - an outline of areas that are not to be disturbed;
  - the location of major structural and nonstructural controls identified in the SWPPP;
  - the location of areas where stabilization practices are expected to occur;
  - surface waters including wetlands;
  - sinkholes;
  - and careful identification of outfall points intended for coverage under the general permit for storm water discharges from the site.
- A description of any discharge associated with industrial activity other than construction storm water that originates onsite and the location of that activity and its permit number.
- Identification of any stream or wetland on or adjacent to the project, a description of any anticipated alteration of these waters, and the permit number or the tracking number of the Aquatic Resources Alteration Permit or Section 401 Certification issued for the alteration.
- The name of the receiving water(s) and approximate size and location of affected wetland acreage at the site.
- If applicable, identify and outline the buffer zones established to protect waters of the state located within the boundaries of the project.
- For projects of more than 50-acres, the construction phases must be described. (No more than 50 acres may be disturbed at any one time.)

- If only a portion of the total acreage of the construction site is to be disturbed, then the protections employed to limit the disturbance must be discussed (i.e., caution fence, stream side buffer zones, etc.)
- Limits of disturbance shall be clearly marked in the SWPPP and areas to be undisturbed clearly marked in the field before construction activities begin.

### **3.2 Description of Storm Water Runoff Controls**

The EPSCP must include a description of appropriate erosion prevention and sediment controls and other BMPs that will be implemented at the construction site. The plan must clearly describe each major activity that disturbs soils for major portions of the site (e.g., grubbing, excavation, grading, utilities, and infrastructure installation, etc.) and indicate the following:

- Appropriate control measures and the general timing for the measures to be implemented during construction activities
- Which permittee is responsible for implementation of which controls

The EPSC plans must show the approximate location of each control measure along with a description of the timing during the construction process for implementing each measure (e.g., prior to the start of earth disturbance, as the slopes are altered and after major grading is finished). The different stages of construction (initial/major grading, installation of infrastructure, final contours, etc.) and the erosion prevention and sediment control measures that will be utilized during each stage should be depicted on multiple plan sheets (see following paragraphs). Half sheets are acceptable. One sheet showing all EPSCs that will be used during the life of the multi-phase project implementing different EPSC controls at each stage will not be considered complete.

For site disturbances less than 5-acres, at least two separate EPSC plan sheets must be developed. At least two stages must be identified, with associated EPSC measures addressed. The plan stages must be addressed separately in plan sheets, with each stage reflecting the conditions and EPSC measures necessary to manage storm water runoff, erosion and sediment during the initial land disturbance (initial grading) and the conditions and EPSC measures necessary to manage storm water, erosion and sediment at final grading.

For site disturbances more than 5-acres, at least three separate EPSC plan sheets must be developed. Three stages must be identified. The first plan sheet should reflect the conditions and EPSC measures necessary to manage storm water runoff, during the initial land disturbance (initial grading). The second plan sheet shall reflect the conditions and the EPSC measures necessary to manage storm water runoff from interim land disturbance activities. The third plan sheet shall reflect the conditions and EPSC measures necessary to manage storm water runoff, erosion and sediment at final grading.

### **3.3 Construction Sequencing**

In general, the construction sequence to be followed in order to reduce erosion and prevent sediment from leaving the construction site is:

- Install erosion control devices (i.e., ditch blocks, silt fencing).
- Remove existing topsoil (if re-grading site) to a minimum of 6 inches to a stockpile with erosion controls.
- Remove existing pavement.
- Grade and prepare subgrade for new building slab and/or paving.
- Construct new building and/or paving.
- Place earthen fill for side slopes from shoulder to existing grade.
- Clean out any ditch blocks/ponds.
- Sod areas of soil disturbance.

### **3.4 Erosion Prevention and Sediment Controls**

The following are the general TNR10-0000 and TNR15-0091 criteria that will be required for the development of the EPSCP:

- The construction-phase erosion prevention controls shall be designed to eliminate (or minimize if complete elimination is not possible) the dislodging and suspension of soil

in water. Sediment controls shall be designed to retain mobilized sediment on site to the maximum extent practicable.

- The design, inspection and maintenance of BMPs described in this SWPPP must be prepared in accordance with good engineering practices and at a minimum, must be consistent with the requirements and recommendations contained in the current edition of the Tennessee Erosion and Sediment Control Handbook. In addition, all control measures must be properly selected, installed, and maintained in accordance with the manufacturer's specifications (where applicable). All control measures selected must be able to slow runoff so that rill and gully formation is prevented. When steep slopes and/or fine particle soils are present at the site, additional physical or chemical treatment of storm water runoff may be required. Proposed physical and/or chemical treatment must be researched and applied according to the manufacturer's guidelines and fully described in the SWPPP. If periodic inspections or other information indicates a control has been used inappropriately, or incorrectly, the permittee must replace or modify the control for relevant site situations.
- If permanent or temporary vegetation is to be used as a control measure, then the timing of the planting of the vegetation cover must be discussed in the SWPPP. Planning for planting cover vegetation during winter months or dry months should be avoided.
- If you plan to add cationic treatment chemicals (see definitions) to stormwater and/or authorized non-stormwater prior to discharge, you may not submit your Notice of Intent (NOI) unless and until you notify an appropriate EFO (see section 2.8 above) in advance and the EFO authorizes coverage under this permit after you have included appropriate controls and implementation procedures designed to ensure that your use of cationic treatment chemicals will not lead to discharges that cause an exceedance of water quality standards.

Chemicals used for treating stormwater runoff must be shown to be non-toxic to sensitive aquatic species through a 48-hour or 96-hour acute toxicity test as reported in the product's Material Safety Data Sheets. The chemical feed rate shall be such that the effluent concentration of the product is lower than the LC50 toxicity value for sensitive aquatic species as reported in the products Safety Data Sheets. Calculations used to determine the

chemical feed rate so that runoff or effluent is not toxic to sensitive aquatic species shall also be included in the SWPPP. Chemicals used for treating stormwater runoff shall be applied in accordance with manufacturer specifications and securely stored on-site within the contractor's staging and storage area if not stored off-site or provided by others. Chemicals shall not be applied directly to any stream.

- If sediment escapes the permitted area, offsite accumulations of sediment that have not reached a stream must be removed at a frequency sufficient to minimize offsite impacts (e.g., fugitive sediment that has escaped the construction site and has collected in a street must be removed so that it is not subsequently washed into storm sewers and streams by the next rain and/or so that it does not pose a safety hazard to users of public streets). Permittees shall not initiate remediation/restoration of a stream without consulting the TDEC first. TNR00000 does not authorize access to private property. Arrangements concerning removal of sediment on adjoining property must be settled by the permittee with the adjoining landowner.
- Sediment should be removed from sediment traps, silt fences, sedimentation ponds, and other sediment controls as recommended in the Tennessee Erosion and Sediment Control Handbook, and must be removed when design capacity has been reduced by 50 percent.
- Litter, construction debris, and construction chemicals exposed to storm water shall be picked up prior to anticipated storm events or before being carried offsite by wind (e.g., forecasted by local weather reports), or otherwise prevented from becoming a pollutant source for storm water discharges (e.g., screening outfalls, daily pick-up, etc.). After use, materials used for erosion prevention and sediment control (such as silt fence) should be removed or otherwise prevented from becoming a pollutant source for storm water discharges.
- Erodible material storage areas (including but not limited to overburden and stockpiles of soil etc.) and borrow pits used primarily for the permitted project and which are contiguous to the site are considered a part of the site and shall be identified on the NOI, addressed in the SWPPP and included in the fee calculation.
- Pre-construction vegetative ground cover shall not be destroyed, removed or disturbed more than 14 days prior to grading or earth moving activities unless the area is seeded

and/subsequently temporarily or mulched or other temporary cover is permanently stabilized.

- Clearing and grubbing must be held to the minimum necessary for grading and equipment operation. Existing vegetation at the site should be preserved to the maximum extent practicable.
- Construction must be sequenced to minimize the exposure time of graded or denuded areas.
- Construction phasing is recommended on all projects regardless of size as a major practice for minimizing erosion and limiting sedimentation. Construction should be phased to keep the total disturbed area less than 50-acres at any one time. Areas of the completed phase must be stabilized within 14 days. No more than 50-acres of active soil disturbance should be planned at any time during the construction project. This includes offsite borrow or disposal areas that meet the conditions previously listed. However, the MSCAA historically negotiated an exception with TDEC because many MEM projects require more than 50 acres to be disturbed at one time. In the new permit, this exception has become standardized for linear projects, like those at MEM; therefore, the use of this exception has new requirements as shown in the following list. Even with this exception, MSCAA encourages tenants and contractors to make every effort to phase all projects at MEM.
  - The 50-acre limitation does not apply to linear construction projects (such as roadway, pipeline, and other infrastructure construction activities at MEM) if the following conditions are met:
    - Where no one area of active soil disturbance is greater than 50-acres and the various areas of disturbance have distinct receiving waters; or
    - Where contiguous disturbances amount to greater than 50-acres, but no one distinct water is receiving runoff from more than 50 disturbed acres; or
    - With the MSCAA's written concurrence, where more than 50 acres of disturbance is to occur and where one receiving water will receive runoff from more than 50 acres; or

- Where no one area of active soil disturbance is greater than 50-acres and the various areas of disturbance are more than 5 miles apart.
  - In order for a linear project at MEM to take advantage of the 50-acre rule exemption outlined in this paragraph, the contractor shall conduct monthly site assessments as described in Section 4.3 of this SWPPP until the site is permanently stabilized.
- Erosion prevention and sediment control measures must be in place and functional before earth moving operations begin and must be constructed and maintained throughout the construction period. Temporary measures may be removed at the beginning of the workday but must be replaced at the end of the workday.
- The following records shall be maintained on or near site: the dates when major grading activities occur; the dates when construction activities temporarily or permanently cease on a portion of the site; the dates when stabilization measures are initiated; inspection records and rainfall records. MSCAA maintains daily log books with this information; information is collected by the MSCAA contracted inspectors, via Parsons.
- Offsite vehicle tracking of sediments and the generation of dust shall be minimized. A stabilized construction access (a point of entrance/exit to a construction site) shall be described and implemented, as needed, to reduce the tracking of mud and dirt onto public roads by construction vehicles.
- Permittees shall maintain a rain gauge and daily rainfall records at the site, or use a reference site for a record of daily amount of precipitation.

#### **3.4.1 General Permit Requirements for Stabilization Practices**

The EPSCP shall include a description of interim and post-construction stabilization practices, including site-specific scheduling of the implementation of the practices. Site plans should ensure that existing vegetation is preserved where attainable and that disturbed portions of the site are stabilized. Site plans should comply with buffer zone requirements (for new construction only) for any projects in which construction activities, borrow, and/or fill are prohibited. Stabilization practices may include temporary seeding, permanent seeding, mulching, geotextiles, sod stabilization, vegetative buffer strips, protection of trees, preservation of mature vegetation, and other appropriate measures. Use of impervious surfaces for final stabilization in lieu of a



permanent vegetative cover should be avoided where practicable. No stabilization, erosion control, or sediment treatment measures are to be installed in a stream without obtaining a Section 404 Permit and an Aquatic Resource Alteration Permit, if such permits are required and appropriate.

Stabilization measures shall be initiated as soon as possible in portions of the site where construction activities have temporarily or permanently ceased. Temporary or permanent soil stabilization at the construction site (or a phase of the project) must be completed no later than 14 days after the construction activity in that portion of the site has temporarily or permanently ceased. In the following situations, temporary stabilization measures are not required:

- Where the initiation of stabilization measures is precluded by snow cover or frozen ground conditions or adverse soggy ground conditions. In this situation, stabilization measures shall be initiated as soon as practicable.
- Where construction activity on a portion of the site is temporarily ceased and earth disturbing activities will be resumed within 14 days.

Steep slopes (natural or created slope of 35 percent grade or greater) shall be temporarily stabilized no later than 7 days after construction activity on the slope has temporarily or permanently ceased.

Permanent stabilization with perennial vegetation (using native herbaceous and woody plants where practicable) or other permanently stable, non-eroding surface shall replace any temporary measures as soon as practicable. Unpacked gravel containing fines (silt and clay sized particles) or crusher runs will not be considered a non-eroding surface.

### 3.4.2 General Permit Requirements for Structural Practices

The EPSCP shall include a description of structural practices to divert flows from exposed soils, store flows, or otherwise limit runoff and discharge of pollutants from exposed areas of the site. Such practices may include silt fences, earth dikes, drainage swales, sediment traps, check dams, subsurface drains, pipe slope drains, level spreaders, storm drain inlet protection, rock outlet protection, reinforced soil-retaining systems, gabions, and temporary or permanent sediment basins. Structural controls shall not be placed in streams or wetlands except as authorized by a Section 404 Permit and/or Aquatic Resource Alteration Permit.

Erosion prevention and sediment control measures must be prepared in accordance with good engineering practices and the latest edition of the Tennessee Erosion and Sediment Control Handbook. In addition, erosion prevention and sediment controls shall be designed to minimize erosion and maximize sediment removal resulting from a 5-year, 24-hour storm due to the receiving stream being water with unavailable parameters (the design storm — see definition in text box to right), as a minimum, either from total rainfall in the designated period or the equivalent intensity. When clay and other fine particle soils or highly erodible soils are present at the construction site, chemical treatment of the stormwater runoff (cationic treatment chemicals) may be necessary to minimize the amount of sediment being discharged.

**“5-year design storm depths and intensities”** means the estimated design rainfall amounts, for any return period interval (i.e., 2-year, 5-year, 25-year, etc.) in terms of either 24-hour depths or intensities for any duration, can be found by accessing the following NOAA National Weather Service Atlas 14 data for Tennessee: [http://hdsc.nws.noaa.gov/hdsc/pfds/orb/tn\\_pfds.html](http://hdsc.nws.noaa.gov/hdsc/pfds/orb/tn_pfds.html).

Other data sources may be acceptable with prior written approval by TDEC Water Pollution Control.

For an onsite outfall which receives drainage from 10 or more acres, a minimum sediment basin volume that will provide treatment for a calculated volume of runoff from a 5-year, 24-hour storm

and runoff from each acre drained, or equivalent control measures as specified in the Tennessee Erosion and Sediment Control Handbook, shall be provided until final stabilization of the site. A drainage area of 10 acres or more includes both disturbed and undisturbed portions of the site or areas adjacent to the site, all draining through the common outfall. Where an equivalent control measure is substituted for a sediment retention basin, the equivalency must be justified to the division. Runoff from any undisturbed acreage should be diverted around the disturbed area and the sediment basin. Diverted runoff can be omitted from the volume calculation. Sediment storage expected from the disturbed areas must be included.

All calculations of drainage areas, runoff coefficients and basin volumes must be provided as a part of the EPSCP submittal. The discharge structure from a sediment basin must be designed to retain sediment during the lower flows. Muddy water to be pumped from excavation and work areas must be held in settling basins or filtered or chemically treated prior to its discharge into surface waters. Water must be discharged through a pipe, well-grassed or lined channel, or other equivalent means so that the discharge does not cause erosion and sedimentation. Discharged water must not cause an objectionable color contrast with the receiving stream.

### **3.5 Storm Water Management**

The EPSCP must be developed to ensure that measures have been completed that will be installed during the construction process to control pollutants in storm water discharges that will occur after construction operations have been completed. The plan should also consider measures that will be installed during the construction process to control pollutants and any increase in the volume of storm water discharges that will occur after construction operations have been completed. For steep slope sites, the plan will also consider measures that will be installed to dissipate the volume and energy of the storm water runoff to predevelopment levels. This permit only addresses the installation of storm water management measures and not the ultimate operation and maintenance of such structures after the construction activities have been completed, the site has undergone final stabilization, and the permit coverage has been terminated. Permittees are only responsible for the installation and maintenance of storm water management measures prior to final stabilization of the site and are not responsible for maintenance after storm water discharges associated with construction activity have been eliminated from the site. All construction at MEM must comply with the city of Memphis SWMM, available at [www.stormwatermatters.com](http://www.stormwatermatters.com), regarding requirements to limit the amount of post-construction runoff in order to minimize in-stream channel erosion in the receiving stream.

Construction storm water runoff management practices may include storm water detention structures (including ponds with a permanent pool); storm water retention structures; flow attenuation by use of open vegetated swales and natural depressions; infiltration of runoff onsite; and sequential systems (that combine several practices). Velocity dissipation devices shall be placed at discharge locations and along the length of any outfall channel to provide a non-erosive velocity flow from the structure to a water course so that the natural physical and biological characteristics and functions are maintained and protected (no significant changes in the hydrological regime of the receiving water). The EPSCP must include an explanation of the technical basis used to select the practices to control pollution where flows exceed predevelopment levels. The Tennessee Erosion and Sediment Control Handbook provides measures that can be incorporated into the design or implemented onsite to decrease erosive velocities. An Aquatic Resources Alteration Permit may be required if such velocity dissipation devices installed would alter the receiving stream and/or its banks.

### **3.6 Other Items Needing Control**

The EPSCP must also consider and describe the following other items potentially needing controls at the site:

- No solid materials, including building materials, shall be placed in waters of the state, except as authorized by a Section 404 Permit and/or Aquatic Resource Alteration Permit.
- Offsite vehicle tracking of sediments and the generation of dust shall be minimized. A stabilized construction access (a point of entrance/exit to a construction site) shall be described and implemented, as needed, to reduce the tracking of mud and dirt onto public roads by construction vehicles.
- Describe any waste disposal systems, sanitary sewer, or septic system onsite, and provide for the necessary sediment controls. Tenants and contractors must also comply with applicable state and/or local waste disposal sanitary sewer or septic system regulations for such systems to the extent that these are located within the permitted area.
- Describe construction and waste materials expected to be stored onsite with updates as appropriate. In addition, the EPSCP must consider the controls to be used to reduce pollutants from materials stored onsite, including storage practices to minimize exposure of the materials to storm water and spill prevention and response.

- Describe storm water sources from areas other than construction and a description of controls and measures that will be implemented at those sites.
- Describe measures necessary to prevent “taking” of legally protected aquatic threatened or endangered species and/or critical habitat (if applicable).

### **3.7 Best Management Practices**

All construction at MEM must comply with the most current TDEC Erosion and Sediment Control Handbook and City of Memphis Storm water Control Manual. See Appendix C for website address. MSCAA encourages implementation of a series of BMPs and recommends that storm water controls be designed to limit the discharge of storm water pollutants offsite to predevelopment levels to the maximum extent practicable (MEP). Due to colloidal clay soils in the Memphis area, sediment removal BMPs may not yield clear storm water.

Additionally, erosion prevention and sediment control measures must be maintained in good and effective operating condition. Maintenance needs identified by inspections or other means shall be addressed before the next storm event, but in no case more than 7 days after the need is identified. The EPSCP must provide maintenance requirements for BMPs. As a reference, the maintenance of typical measures is included in Appendix C.

## **4.0 INSPECTIONS**

Inspections of erosion controls must be performed to ensure proper maintenance and effectiveness of the devices.

### **4.1 Inspector Training and Certification**

Inspectors performing the required twice-weekly inspections must have at least 1 of the following credentials:

- a person with a valid certification from the "Fundamentals of Erosion Prevention and Sediment Control Level I" course,
- a licensed professional engineer or landscape architect,
- a Certified Professional in Erosion and Sediment Control (CPESC), or
- a person who has successfully completed the "Level II Design Principles for Erosion

A copy of the certification or training record for inspector certification is maintained at the MSCAA's Project Center.

An integral part of improving water quality at the airport is the training of those requesting coverage under TNR15-0091. To meet this need, MSCAA recommends the *Fundamentals of Erosion Prevention and Sediment Control Level I* course for its contractors. The Level I Fundamentals workshop is a one-day foundation-building course for individuals involved in land-disturbing activities and is intended for contractors, developers, plan preparers, reviewers, designers, engineers, and inspection and enforcement personnel from all levels of government. The fundamentals course aims to build a solid working knowledge of erosion and sedimentation processes and practices. Topics include Construction General Permit and related SWPPP requirements; function, installation, limitations, inspection, and maintenance of BMPs; roles of local officials and state government agencies involved in the permitting process; and basic hydrologic and erosion processes. The Level I Fundamentals workshop provides a Certificate of Completion with 7 hours of Professional Development Hours (PDH) credit upon successful completion of the short Course Certification Exam.

### **4.2 Schedule of Inspections**

Inspections must be performed at least twice every calendar week. Inspections must be performed at least 72 hours apart. Where sites or portions of construction sites have been temporarily stabilized or where runoff is unlikely due to winter conditions (e.g., site covered with snow or ice), or due to extreme drought, such inspection only has to be conducted once per month until thawing or participation results in runoff or construction activity resumes. Inspections requirements do not

apply to definable areas that have been finally stabilized. Written notification of the intent to change the inspection frequency and the justification for such request must be submitted to the local Environmental Field Office.

#### **4.3 Inspection Items**

- Qualified personnel, as defined in section 3.5.8.1 of the Permit (provided by the permittee or cooperatively by multiple permittees) shall inspect disturbed areas of the construction site that have not been finally stabilized, areas used for storage of materials that are exposed to precipitation, structural control measures, locations where vehicles enter or exit the site, and each outfall.
- Disturbed areas and areas used for storage of materials that are exposed to precipitation shall be inspected for evidence of, or the potential for, pollutants entering the site's drainage system. Erosion prevention and sediment control measures shall be observed to ensure that they are operating correctly.
- Outfall points (where discharges leave the site and/or enter waters of the state) shall be inspected to determine whether erosion prevention and sediment control measures are effective in preventing significant impacts to receiving waters. Where discharge locations are inaccessible, nearby downstream locations shall be inspected. Locations where vehicles enter or exit the site shall be inspected for evidence of offsite sediment tracking.

#### **4.4 Schedule for Corrections**

Based on the results of the inspection, any inadequate control measures or control measures in disrepair shall be replaced or modified, or repaired as necessary, before the next rain event if possible, but in no case more than 7 days after the need is identified.

Based on the results of the inspection, the site description identified in the SWPPP in accordance with section 3.5.1 of the Permit and pollution prevention measures identified in the SWPPP in accordance with section 3.5.2 of the Permit, shall be revised as appropriate, but in no case later than 7 days following the inspection. Such modifications shall provide for timely implementation of any changes to the SWPPP, but in no case later than 14 days following the inspection.

#### **4.5 Inspection Documentation**

All inspections shall be documented on this Construction Stormwater Inspection Certification form. Alternative inspection forms may be used as long as the form contents and the inspection certification language are, at a minimum, equivalent to the division's form and the permittee has obtained a written approval from the division to use the alternative form. The form must contain the printed name and signature of the inspector and the certification must be executed by a person who meets the signatory requirements of the permit. Inspection documentation will be maintained on site and made available to the division upon request. Inspection reports must be submitted to the division within 10 days of the request.

Trained certified inspectors shall complete inspection documentation to the best of their ability. Falsifying inspection records or other documentation or failure to complete inspection documentation shall result in a violation of this permit and any other applicable acts or rules.

#### **4.6 Site Assessment**

A site assessment must be conducted at each outfall involving drainage totaling 5 acres or more when discharging to waters with unavailable parameters or Exceptional Tennessee Waters (all MEM stormwater discharges to Exceptional Tennessee Waters). The site assessment must be conducted within a month of construction commencing at each portion of the site that drains the qualifying acreage of such portion of the site. The site assessment can take the place of one of the twice-weekly inspections.

The site assessment must be performed by individuals with following qualifications:

- A licensed professional engineer or landscape architect;
- A Certified Professional in Erosion and Sediment Control; or
- A person that has successfully completed the *Level II Design Principles for Erosion Prevention and Sediment Control for Construction Sites* course.

The site assessment will be performed to verify the installation, functionality and performance of the erosion protection and sediment control measures described in this Plan. Following the



site assessment, a thorough review and update (if applicable) of the SWPPP will be conducted; modifications of plans and specifications for any building or structure, including the design of sediment basins or other sediment controls shall be prepared by a licensed Professional Engineer or landscape architect.

The site assessment findings shall be documented and the documentation kept with the SWPPP at the site. At a minimum, the documentation shall include information included in the inspection form provided in Appendix B of this permit. The documentation, an assessment of any failing or unmaintained EPSC(s), causes of failure and any action necessary to bring the site into compliance with this permit. The documented quality assurance site assessments shall also indicate if all EPSC(s) have been installed as designed in the submitted SWPPP and EPSC plans and if not, measures that need to be taken so those EPSCs meet the design specifications in the submitted SWPPP and EPSC plans. The documentation must contain the printed name and signature of the individual performing the site assessment and the following certification:

"I certify under penalty of law that this report and all attachments are, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. *As specified in Tennessee Code Annotated Section 39-16-702(a)(4), this declaration is made under penalty of perjury.*"

The site assessment can take the place of one of the twice-weekly inspections. Additional site assessments may be required if TDEC observes site conditions that have potential of causing pollution to the waters of the state.

## **5.0 POLLUTION PREVENTION**

### **5.1 Non-Storm Water Discharges**

Construction projects at MEM may have some occasional non-storm water discharges that are authorized by the permit. The following non-storm water discharges from active construction sites are authorized by TNR00000 provided the non-storm water component of the discharge is combined with storm water discharges associated with construction activity, identified in the EPSCP with an appropriate pollution prevention measures and discharged through stable discharge structures. The estimated volume of the non-storm water component(s) of the discharge must be included in the design of all impacted control measures.

- Dewatering of work areas of collected storm water and ground water (filtering or chemical treatment may be necessary prior to discharge);
- Waters used to wash vehicles (of dust and soil, not process materials such as oils, asphalt or concrete) where detergents are not used and detention and/or filtering is provided before the water leaves site;
- Water used to control dust;
- Potable water sources including waterline flushings from which chlorine has been removed to the maximum extent practicable;
- Routine external building washdown that does not use detergents or other chemicals;
- Uncontaminated groundwater or spring water; and
- Foundation or footing drains where flows are not contaminated with pollutants (process materials such as solvents, heavy metals, etc.).

All non-storm water discharges authorized by this permit must be free of sediment or other solids and must not cause erosion of soil or the stream bank, or result in sediment impacts to the receiving stream.

There will be no pumping of any water standing on the outside of the erosion control structures. The water will be allowed to drain down naturally. One or more of the following will be used for dust control at the site:

- Exposing the minimum area possible of erodible earth
- Using water sprinkler trucks
- Using covered haul trucks
- Using dust palliatives or penetration asphalt on haul roads
- Storing construction materials and waste materials at an offsite location

## **5.2 Description of the Support Areas**

All support areas for construction projects at MEM will be included in the site plan. The support areas may be used to stockpile soils and construction debris, park construction equipment, stage construction materials, and house the construction offices of the contractors. In addition, the support areas may also be used to conduct routine maintenance of construction equipment during the project. Using the Memphis-Shelby County BMP Manual at [www.stormwatermatters.com](http://www.stormwatermatters.com), BMPs will be identified for each of the activities at the support areas to reduce the pollution from the support activities.

### **5.2.1 Soil Stockpiles**

Designated stockpile areas and other construction and waste materials to be stored onsite or in support areas will have erosion controls in place to prevent pollution. BMPs will be selected for each area.

### **5.2.2 Construction Debris**

Designated stockpile areas and other construction and waste materials to be stored onsite or in support areas will have erosion controls in place to prevent pollution. No solid materials will be discharged directly into storm water conveyance systems from support areas. BMPs will be selected for each area.

### **5.2.3 Hauling**

Offsite vehicle tracking of sediments will be minimized. Dust control is mandated by MSCAA and frequent sprinkling of traffic areas is required. BMPs will be selected for each area and activity.

#### **5.2.4 Construction Equipment Storage and Maintenance**

Construction equipment and contractor vehicles may be stored at the support areas. Inspections for leaking vehicles will be made periodically (weekly) and repairs will be made promptly. Routine maintenance, such as oil changes, filter changes, greasing, and minor repairs may be conducted at support areas. Equipment is to be taken offsite for major repairs. No oil containers or other liquids are stored at the support area. Any spills of oils or other liquids at the support area will be promptly cleaned up and disposed of properly. Fuel stored onsite will be contained in certified fuel tanks equipped with self-contained secondary containment. BMPs will be selected for each area and activity.

#### **5.2.5 Onsite Waste Disposal Systems, Sanitary Sewer, or Septic Systems**

Portable restrooms will be used at the support areas for the construction sites. No onsite waste disposal systems, sanitary sewer or septic systems, or other systems requiring sediment controls or any permits are to be installed.

#### **5.2.6 Fertilizer Application**

Soil analysis should be performed prior to the application of fertilizer to any portion of the site. Soil analysis shall include soil pH, buffer value, phosphorus, potassium, calcium, magnesium, calculated cation exchange capacity (CEC) and base saturation at a minimum. Soil samples should be representative of the area for which fertilizer will be applied. Sample type should be composite and should be collected in accordance with the guidance provided in the University of Tennessee Extension "Soil Testing" brochure PB1061, available at: <http://utextension.tennessee.edu/publications/Documents/PB1061.pdf>. Soil analysis results shall be used to determine correct fertilizer application rates to prevent the over-application of fertilizer to the site.

## **6.0 SENSITIVE ENVIRONMENTAL FEATURES**

### **6.1 Wetlands**

The only wetlands on MEM are located south of Shelby Drive at the former McKeller Park. There are currently no construction projects planned in the wetland areas. If construction activities are ever planned in the areas south of Shelby Drive, wetland issues will be addressed in detail.

### **6.2 Threatened and Endangered Species**

Threatened, and endangered species that are found throughout Shelby County include the Indiana bat — *Myotis sodalis* (Endangered), bald eagle— *Haliaeetus leucocephalus* (Threatened), wood stork — *Mycteria americana* (Endangered-single bird observed feeding 1988), turgid-blossom pearly mussel — *Epioblasma turgidula* (Endangered), and the Least tern — *Sterna antillarum* (Endangered). However, MEM does not support any of these state- or federally-listed threatened or endangered species or their critical habitat. Should habitat for any of these species be encountered, MSCAA will follow all TDEC requirements and the site plan will be modified to include protective measures acceptable to TDEC, MSCAA, and the contractor(s).

### **6.3 Total Maximum Daily Loads**

The SWPPP must include documentation supporting a determination of permit eligibility with regard to waters that have an approved total maximum daily load (TMDL) for a pollutant of concern, including:

- Identification of whether the discharge is identified, either specifically or generally, in an approved TMDL and any associated allocations, requirements, and assumptions identified for the discharge
- Summaries of consultation with TDEC on consistency of SWPPP conditions with the approved TMDL
- Measures taken to ensure that the discharge of pollutants from the site is consistent with the assumptions and requirements of the approved TMDL, including any specific wasteload allocation that has been established that would apply to the construction storm water discharge

The approved 2010 303(d) list includes TMDLs for pathogens in Hurricane Creek, Days Creek and Nonconnah Creek TN080121100711-2000 (all three are listed as water with unavailable parameters

for *Escherichia coli*). No TMDLs for siltation have been developed for these three receiving water bodies, although Nonconnah is listed as water with unavailable parameters for loss of biological integrity due to siltation. Hurricane Creek is listed as water with unavailable parameters for low dissolved oxygen, total phosphorus, and other anthropogenic substrate alterations. All three receiving waters are listed as water with unavailable parameters for total phosphorus and other anthropogenic substrate alterations.

Because there is no current TMDL for any of the receiving streams that would apply construction storm water discharges from MEM, there are no additional requirements at this time.

#### **6.4 Discharges to Water with Unavailable Parameters or Exceptional Tennessee Waters**

Discharges that would cause measurable degradation of waters with unavailable parameters or that would cause more than de minimis degradation of Exceptional Tennessee Waters are not authorized by this permit. Because the discharges from MEM flow to receiving streams which are impaired for loss of biological integrity due to siltation, low dissolved oxygen, total phosphorus, and other anthropogenic substrate alterations, the following SWPPP requirements must be met per Section 5.4 of the permit, in addition to the other requirements mentioned throughout this SWPPP:

- SWPPP must certify that EPSC measure used at the site are designed to control stormwater runoff generated by a 5-year, 24-hour storm event
- SWPPP must be prepared by a qualifying by individuals with following qualifications:
  - A licensed professional engineer or landscape architect;
  - A Certified Professional in Erosion and Sediment Control; or
  - A person that has successfully completed the *Level II Design Principles for Erosion Prevention and Sediment Control for Construction Sites* course.

For an on-site outfall in a drainage area totaling five or more acres, a minimum sediment basin volume that will provide treatment for a calculated volume of runoff from a 5 year, 24 hour storm and runoff from each acre drained; or equivalent control measures as specified in the Tennessee Erosion and Sediment Control Handbook, shall be provided until final stabilization of the site. The drainage area includes both disturbed and undisturbed portions of the site and areas adjacent to the site, all draining through a common outfall. Where an equivalent control measure is substituted for a sediment retention basin, the equivalency must be justified in the SWPPP narrative. Runoff

from any undisturbed acreage should be diverted around the disturbed area and the sediment basin. Diverted runoff can be omitted from the volume calculation. Sediment storage expected from the disturbed areas must be included and a marker installed signifying when sediment accumulation has reduced the wet storage volume by 50%. In a case that sediment marker is damaged by the volume of water or sediment, a best professional judgement should be used in evaluating sediment basin capacity.

For an on-site outfall in a drainage area totaling 3.5 - 4.9 acres, a minimum sediment trap volume that will provide treatment for a calculated volume of runoff from a 5-year, 24-hour storm and runoff from each acre drained, is recommended until final stabilization of the site. A drainage area of 3.5 - 4.9 acres includes both disturbed and undisturbed portions of the site or areas adjacent to the site, all draining through the common outfall. Runoff from any undisturbed acreage should be diverted around the disturbed area and the sediment trap. Diverted runoff can be omitted from the volume calculation. Sediment storage expected from the disturbed areas must be included and a marker installed signifying when sediment accumulation has reduced the wet storage volume by 50%.

In the event TDEC finds that a discharger is complying with the SWPPP but contributing to the impairment of a receiving stream, the director will notify the discharger in writing that the discharge is no longer eligible for coverage under the general permit. The permittee may update the SWPPP and implement the changes designed to eliminate further impairment of the receiving stream. If the permittee does not implement the SWPPP changes within 7 days of receipt of notification, the permittee will be notified in writing that continued discharges must be covered by an individual permit. To obtain the individual permit, the operator must file an individual permit application. The project must be stabilized until such time as the SWPPP is redeveloped and the individual permit is issued. No earth-disturbing activities, except those necessary for stabilization, are authorized to continue until the individual permit is issued.

## **6.5 Water Quality Riparian Buffer Zone Requirements for Discharges into Waters With Unavailable Parameters or Exceptional Waters**

A 60-foot natural riparian buffer zone adjacent to the receiving stream designated as waters with unavailable parameters shall be preserved, to the maximum extent practicable, during construction activities at the site. All three receiving streams are listed as waters with unavailable parameters for one or more reasons; however, the buffer zone requirement only applies to new construction sites. Buffer zones are **not** required at portions of the buffer where certain land uses exist, or where pre-approved construction planned prior to June 16, 2005, and are to remain in place, according to the rules cited in the text box at right.

For projects that could arise in the future that would be considered new construction, the water quality riparian buffer zone is required to protect waters of the state that are not wet weather conveyances (e.g., perennial and intermittent streams, rivers, lakes, wetlands) located within or immediately adjacent to the boundaries of the project, as identified using methodology from Tennessee's standard operating procedures for hydrologic determinations. Because of heavy sediment load associated with construction site runoff, water quality riparian buffers are not primary sediment control measures and should not be relied on as such. However, the primary purpose of water quality riparian buffers is additional pollutant removal. Stormwater discharges must enter the water quality riparian buffer zone as sheet flow, not as concentrated flow, where site conditions allow. Rehabilitation and enhancement of a natural buffer zone is allowed, if necessary, for improvement of to improve its effectiveness of protection of the waters of the state.

The water quality riparian buffer zone should be established between the top of stream bank and the disturbed construction area. The 60-foot criterion for the width of the buffer zone can be established on an average width basis at a project, as long as the minimum width of the buffer zone is more than 30-feet at any measured location.

Every attempt should be made for construction activities not to take place within the water quality riparian buffer zone and for any existing forested areas to be preserved. Where it is not practicable to maintain a full water quality riparian buffer, BMPs providing equivalent protection to a receiving stream as a natural water quality riparian buffer zone may be used at a construction site. Such equivalent BMPs shall be designed to be as effective in reduction of sediment in storm water runoff



as a natural buffer zone. Such equivalent BMPs are expected to be routinely used at construction projects typically located adjacent to surface waters. These projects include, but are not limited to sewer line construction, roadway construction, utility line or equipment installation, greenway construction, construction of a permanent outfall, or a velocity dissipating structure, etc.

This requirement does not apply to any valid Aquatic Resource Alteration Permits or equivalent permits issued by federal authorities. Memphis and Shelby County have established a 25-foot buffer zone from the top of bank for impoundments, pools, lakes, and wetlands.

## **7.0 SPILLS AND LEAKS**

The discharge of hazardous substances or oil in the storm water discharge(s) from the site will be prevented or minimized. Appendix D includes spill response notification and response resources. TNR10-0000 and TNR15-0091 do not relieve the contractor of the reporting requirements of Title 40 of the Code of Federal Regulations (CFR) Part 117 and 40 CFR 302. Where a release containing a hazardous substance, fuel, or oil in an amount equal to or in excess of a reportable quantity established under either 40 CFR 117 or 40 CFR 302 occurs during a 24-hour period:

1. The contractor is required to notify the National Response Center (NRC) ([800] 424-8802) and the Tennessee Emergency Management Agency (emergencies: [800] 262-3300; non-emergencies: [800] 262-3400) in accordance with the requirements of 40 CFR 117 and 40 CFR 302 as soon as he or she has knowledge of the discharge.
2. The contractor shall submit to the TDEC Memphis Field Office, 8383 Wolf Lake Drive, Bartlett, Tennessee, 38133, within 14 calendar days of knowledge of the release a written description of the release (including the type and estimate of the amount of material released), the date that such release occurred, the circumstances leading to the release, what actions were taken to mitigate effects of the release, and steps to be taken to minimize the chance of future occurrences.
3. This SWPPP must be modified within 14 calendar days of knowledge of the release to incorporate a description of the release, the circumstances leading to the release, and the date of the release. In addition, the plan must be reviewed to identify measures to prevent the reoccurrence of such releases and to respond to such releases, and the plan must be modified where appropriate.

Any spills or leaks of oils or other liquids will be promptly cleaned up and disposed properly regardless of their potential to be carried offsite by a storm event.

It should be noted that a reportable quantity of a fuel or other petroleum product is the quantity that will form a visible sheen (e.g., a very small quantity).

MSCAA's Manager of Environmental Services must be kept fully informed in a timely manner of all spills or leaks and the actions taken in response to them.

### ***Airport Spill Response Procedures***

The general procedure for cleaning up spills or releases of potential pollutants at the MEM is as follows:

All spills and releases of potential pollutants that might contaminate storm water are to be completely contained upon discovery and the source of the spill is to be identified and halted immediately. The spilled material is to be cleaned up immediately. Personnel involved in the cleanup shall take precautions to protect personal health and safety, as outlined in the Material Safety Data Sheet (MSDS) for the spilled substance. The spilled material and all disposable, contaminated cleanup equipment shall be disposed in the appropriate containers. Non-disposable cleanup equipment shall be thoroughly cleaned, with precautions taken to not spread contamination.

Responsible personnel must be informed of any spills or releases that occur at the facility. It is their responsibility to see that the release reporting requirements, detailed in Appendix D of this SWPPP, are followed, as applicable. Following a spill or release, the responsible personnel also have the responsibility for evaluating whether changes are needed in pollution prevention plans for the construction site and for implementing necessary modifications.

## **8.0 RISK IDENTIFICATION AND SUMMARY OF POTENTIAL POLLUTANT SOURCES**

### **8.1 Construction Activity**

All outfalls will be protected with erosion control devices to prevent sediment from leaving the construction site. Additionally, there will be upstream structural controls, such as ditch blocks, and nonstructural controls, such as sodding, in place.

### **8.2 Spills and Leaks**

Any spills or leaks of oils or other liquids on the construction site will be promptly cleaned up and disposed properly.

Construction site plans will denote the locations of all known underground fuel lines, storage tanks, and other utilities at the site. Previous ruptures of fuel lines have occurred during construction due to unknown, unmarked fuel line and vent pipe locations. Work has been conducted to mark all fuel line locations; however, if construction encounters a suspect stand pipe, possibly denoting the location of a vent pipe for an unmarked underground fuel line, work will stop in the immediate area until the pipe can be investigated and measures taken to ensure that any potential for a spill or leak has been mitigated.

### **8.3 Soil Stockpiles**

Designated stockpile areas and other construction and waste materials to be stored onsite or in support areas will have erosion controls in place to prevent pollution. BMPs will be implemented for each site.

### **8.4 Construction Debris**

Designated stockpile areas and other construction and waste materials to be stored onsite or in support areas will have erosion controls in place to prevent pollution. BMPs will be implemented for each site.

### **8.5 Hauling**

Offsite vehicle tracking of sediments will be minimized. Dust control is mandated by the MSCAA and frequent sprinkling of traffic areas is required. Airport roads, taxiways, ramps, and runways that become tracked with soil or sediment are promptly cleaned with mechanical sweepers. BMPs will be implemented for each site.

## **8.6 Construction Equipment Storage and Maintenance**

Construction equipment and contractor vehicles may be stored at the support areas. Inspections for leaking vehicles will be made periodically (weekly) and repairs will be made promptly. Routine maintenance, such as oil changes, filter changes, greasing, and minor repair may be conducted at support areas. Equipment is to be taken offsite for major repairs. No oil containers or other liquids are to be stored at the support area. Any spills of oils or other liquids at the support area will be promptly cleaned up and disposed of properly. Fuel stored onsite will be contained in certified fuel tanks equipped with self-contained secondary containment. BMPs will be implemented for each site.

## **8.7 Onsite Waste Disposal**

No wastes will be disposed at the construction site or the support area. All wastes will be transported offsite for proper disposal.

## **9.0 MANAGEMENT OF POST-CONSTRUCTION RUNOFF**

Due to the adequacy of the existing storm water management (collection and transport) systems, additional storm water management practices are not necessary due to the new construction at this site.

The MSCAA and its construction project engineers will review the construction plans for each construction project to assess the necessity for additional storm water management practices related to increased impervious area.

## **10.0 RECORD KEEPING AND INTERNAL REPORTING PROCEDURES**

The contractor responsible for each construction site will keep records of incidents such as spills or other discharges, along with other information describing the quality and quantity of storm water discharges. Records of spills, inspections, and maintenance activities will be maintained with the SWPPP.

MSCAA shall retain copies of the SWPPP and all reports required by this permit and records of all data used to complete the NOI for each construction site to be covered by TNR10-0000 and TNR15-0091, for a period of at least 1 year from the date the NOT is filed. This period may be extended by written request of TDEC.

Each contractor must retain a copy of the SWPPP (which includes TNR10-000 as Appendix B) at the construction site or other local location accessible to TDEC from the date construction commences to the date of final stabilization and submission of the NOT. The contractors with day-to-day operational control over pollution prevention plan implementation shall have a copy of the site plan available at a central location onsite for the use of all contractors and those identified as having responsibilities under the site plan whenever they are on the construction site. Once coverage is terminated, the permittee must maintain a copy of all records for a period of 3 years.

The contractor shall post a notice at the MSCAA Project Center with the following information:

- A copy of the NOC with the NPDES permit tracking number for the construction project;
- Name, company name, e-mail address (if available), telephone number and address of the project site owner/operator or a local contact person;
- A brief description of the project; and
- The location of the SWPPP.

The notice must be maintained in a legible condition. If posting this information near a main entrance is infeasible due to safety concerns, or not accessible to the public, the notice shall be posted in a local public building.

The contractor shall also retain following items/information in an appropriate location onsite:

- A rain gauge;
- A copy of twice-weekly inspection reports;
- A documentation of quality assurance site assessments; and
- A copy of the site inspector's Fundamentals of Erosion Prevention and Sediment Control Level 1 certification.



## **11.0 STORM WATER POLLUTION PREVENTION PLAN ADMINISTRATION**

### **11.1 Signature Requirements**

All NOIs shall be signed as follows:

For a municipality, state, federal, or other public agency: by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a federal agency includes (1) the chief executive officer of the agency, or (2) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of the U.S. Environmental Protection Agency [USEPA]).

Storm water pollution prevention plans, reports, certifications or other information submittals shall be signed by a person described above or by a duly authorized representative of that person.

A person is a duly authorized representative only if:

- The authorization is made in writing by a person described in the previous paragraphs and submitted to TDEC.
- The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of manager, contractor, superintendent, or position of equivalent responsibility or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position).
- If an authorization under this section is no longer accurate because a different contractor has responsibility for the overall operation of the construction site, a new NOI satisfying the requirements of this section must be submitted to the state prior to, or together with, any reports, information, or applications to be signed by an authorized representative.

### **11.2 Availability, State Review, and Modification of the SWPPP**

This SWPPP will be maintained by the contractor at the construction site trailer. A copy of the SWPPP has been submitted to the state for review and approval, as required by TNR10-0000 and TNR15-0091. This SWPPP shall be modified, if required by TDEC.

### **11.3 Storm Water Pollution Prevention Plan Update**

This SWPPP applies to specific construction projects at MEM and will be modified whenever:

- There is a change in the scope of the project that would be expected to have a significant effect on the discharge of pollutants to the waters of the state and that has not otherwise been addressed in the SWPPP.
- Inspections or investigations by site operators, local, state, or federal officials indicate the SWPPP is proving ineffective in eliminating or significantly minimizing pollutants, or is otherwise not achieving the general objectives of controlling pollutants in storm water discharges associated with construction activity.
- Any new operator (typically contractor and/or subcontractor) has been identified as needed to reflect operational or design control that will implement a measure of the SWPPP.
- Measures need to be included to prevent a negative impact to legally protected federal or state-listed fauna or flora (or species proposed for such protection).

Amendments to the SWPPP may be reviewed by the TDEC, the City of Memphis, or an authorized regulatory agency. In the event that a release of a reportable quantity of hazardous substances or oil occurs, this SWPPP will be reviewed. The review will identify measures to prevent the recurrence of such releases, and the SWPPP will be modified where appropriate to include these measures. In accordance with state regulations, all revisions and/or modifications to the SWPPP will be reviewed and certified by an official of MSCAA who meets the signatory requirements as previously described.



# **Memphis-Shelby County Airport Authority COMPREHENSIVE STORM WATER POLLUTION PREVENTION PLAN**

**For Contractors Performing  
Construction Activities at the  
Memphis International Airport  
Under Permits TNR10-0000 and TNR15-0091**

## **Comprehensive Storm Water Pollution Prevention Plan**

**Appendix A: Figures**

**Appendix B: Permit and Forms**

**Appendix C: Best Management Practices**

**Appendix D: Spill Response Notification**

**Appendix E: Site Specific Information**

**Version 4  
August 2017**



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MSCAA requires that all construction activity on airport property must be in compliance with TDEC and City of Memphis requirements. All recommended techniques and materials, along with guidelines on implementation and use are provided in the following documents:

MSCAA recommends that all Contractors working on MSCAA property become fully educated on the contents of this documents and request assistance from both organizations if questions or concerns arise.

TDEC Erosion and Sediment Control Handbook

<http://tnepsc.org/handbook.asp>

City of Memphis Storm Water Control website

[http://www.cityofmemphis.org/Portals/0/pdf\\_forms/001-Volume1\\_PolicyManual.pdf](http://www.cityofmemphis.org/Portals/0/pdf_forms/001-Volume1_PolicyManual.pdf)

MSCAA maintenance expectations, at a minimum, throughout the entire project:

#### **Temporary Seeding and Planting**

- Ensure proper calculation of seeding rate, based on seed purity and germination information
- Inspect frequently to verify that vegetation is growing
- Reseed areas to prevent sheet and rill erosion
- Spot seed in small areas

#### **Permanent Seeding and Planting**

- Ensure proper calculation of seeding rate, based on seed purity and germination information
- Inspect frequently to verify that vegetation is growing
- Reseed areas to prevent sheet and rill erosion
- Spot seed in small areas

## **Soil Binders**

- Apply according to manufacturer's specification
- Apply stabilizers/tackifiers with sufficient drying time before rainfall (typically 24 hours)
- Select a product that is best suited for the area installed (considering longevity, curing time, resistance to abrasion, and compatibility with existing vegetation)
- Soil binders must be maintained by reapplying in high traffic areas, after storm events, or after being in-place for an extended period.

## **Mulches**

- Inspection of the application should be performed along with other regularly scheduled erosion and sediment control inspections.
- Any areas that have washed out due to high storm water flows should be reconsidered for different BMP use, or at least retreated.
- Areas that have been disturbed by blowing wind should be retreated.
- Maintenance needs identified in inspections or by other means shall be accomplished before the next storm event if possible, but in no case more than 7 days after the need is identified.

## **Silt Fence**

Silt fence stake pockets should be placed on the uphill side of the sediment fence, so if the stitching of the pocket pulls out, the fabric will still drape against the stakes. The bottom of the fabric of the fence should be trenched into the ground, or else water and sediment can flow under the sediment fence. The silt fence should be placed on the contour, or else a "flume" will be created where flow and sediment can concentrate. A failure is likely to occur at such a concentration point and the flume will release concentrated flow and sediment down the face of the slope. Silt fence is designed for sheet flow only and should never be placed over concentrated flows, such as channels or streams. Silt fence is designed for relatively small drainage areas and should not be placed at the bottom of a large drainage area that will overwhelm the sediment fence in the first storm event.

- Sediment fences should be cleaned of accumulated sediment after each major storm, or when deposition is one-half of the barrier height.
- Breaks or overtopped areas should be replaced or repaired immediately. Fences should be repaired and the accumulated sediment dispersed to a stable area.
- Sediment fence should be removed when the area being protected is fully stabilized and prior to termination of permit coverage.

### **Storm Drain Inlet Protection**

Using inlet protection measures that divert flow, rather than filter flow, can result in flooding of adjacent areas, or overwhelming adjacent inlets. Common problems are bypassing of inlet protection due to insufficient packing of the ends of Biofilter bags and bypassing of the inlet protection due to overflow slots on drain inlet insert devices.

Inlet filters for storm drains should be inspected and cleaned after each significant storm event and repaired promptly. Sediment shall be removed after each significant storm event and deposited in a stable area where it will not be subject to erosion.

If the inlet protection device becomes clogged with sediment, it must be carefully removed from the inlet and either cleaned or replaced.

### **Temporary Sediment Basin**

- Constructing a basin that is too wide and not long enough can result in short-circuiting of the basin and discharge of sediment out of the basin.
- Temporary and post-construction sediment basins should be cleaned of accumulated sediment after every significant storm event, or when sediment reaches the basin capacity as designed in the EPSCP.
- Removed sediment shall be properly disposed in a stable area that is not susceptible to erosion.

### **Entrance/Exit Tracking Controls**

- While gravel for temporary construction entrances should be coarse enough to shake loose soil that adheres to the vehicles' wheels and undercarriage, it should not be so coarse and angular that it causes damage to tires.



- Stabilized gravel construction entrances shall be inspected for the transport of sediment onto public rights-of-way and any tracked sediment shall be removed immediately by vacuum sweeping and not washed off by water trucks. If tracking is an ongoing problem, a wheel wash facility should be added to the site.

### **Entrance/Exit Tire Wash**

- Installation of tire wash with other entrance/exit tracking controls to reduce sediment loading on tire wash

Remove accumulated sediment from tire wash

### **Diversion of Run-On**

- Diversion channels must be properly sized to convey design flows around disturbed soil areas or other areas of concern.
- Diversion measures must be maintained to remove debris and sediment, repair linings, and replace lost rip rap as needed.

### **Check Dams**

- Place check dams or barriers so that the abutments are at a higher elevation than the center of the barrier so that flow around the ends of the barrier does not occur. Trench the bottom of the check dam or barrier so that undermining of the barrier does not occur.
- Check dams should be checked for undermining and/or short-circuiting and repaired or replaced if necessary.
- Check dams should be cleaned after each significant storm event or when accumulated sediment reaches one-half the height of the check dam.
- Check dams should be keyed into the channel banks a minimum of 18 inches to prevent flow around the dam or as designed in the EPSCP.



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**IMMEDIATE RESPONSE PROCEDURES  
ON-SCENE PERSONNEL**

- 1. Initiate evacuation, if necessary.**
- 2. Notify MSCAA Environmental Manager at (901) 922-8754 or Airport Police at (901) 922-8298, and report the following information, if it is known or can reasonably be determined:**
  - Name of individual reporting spill
  - Location of spill
  - Number of injured personnel and number of injuries, if applicable
  - Substance spilled
  - Estimated amount spilled
  - Estimated rate at which material is currently spilling
  - Estimated time of spill occurrence
  - Extent of spill travel
  - Necessity of fire department to respond to protect life, property, and environment
  - Any additional pertinent information such as other potential hazards.
- 3. Stop spill flow when possible without undue risk of personal injury.**
- 4. Contain the spill using whatever means is readily available.**
- 5. Make spill scene OFF LIMITS to unauthorized personnel.**
- 6. Restrict all sources of ignition when flammable substances are involved.**
- 7. Report to the emergency spill response designee upon his/her arrival to the scene.**

## EMERGENCY NOTIFICATIONS AND RESPONSE RESOURCES

Table D-1 contains installation and local phone numbers that are to be used to alert personnel of the incident or to request additional assistance.

<b>Table D-1 Emergency Telephone Numbers</b>				
<b>Prioritized Contact List</b>	<b>Response Role</b>	<b>Contact Timeline</b>	<b>Day Phone</b>	<b>24-Hour Phone</b>
USEPA, Region 4, Emergency Response (24-hour Hotline)	Regulator	As indicated in Table D-2	(404) 562-8700	(404) 562-8700
U.S. Coast Guard, 8 <sup>th</sup> District Marine Safety Office (for coastal waters)	Regulator	As indicated in Table D-2	(901) 544-3912 x2122	(901) 544-3912 x2122 or (866) 777-2784
Tennessee Department of Environment & Conservation (TDEC) Memphis Office	Regulator	As indicated in Table D-2	(901) 371-3000	(800) 262-3300
TN Emergency Management Agency (TEMA) 24-hr	Regulator	As indicated in Table D-2	(800) 262-3300 or (615) 741-0001	(800) 262-3300
National Response Center www.nrc.uscg.mil	Receiver of all reports of spills to waters of the U.S., or potential to affect waters.	Immediately	(800) 424-8802	(800) 424-8802
City of Memphis Storm Water	Regulator	As indicated in Table D-2	(901) 576-4349	(901) 576-6721 (hotline)
City of Memphis POTW	Regulator	As indicated in Table D-2	(901) 353-2392	
Shelby County Storm Water Hotline	Regulator	As indicated in Table D-2	(901) 545-3870	
City of Memphis Fire Department and Local Emergency Planning Committee (LEPC) within 15 minutes of spill	Emergency Assistance	Immediately	911	911
	MFD Hazmat	As needed	(901) 320-5368	(901) 320-5368
City of Memphis Fire Department	Emergency Assistance	As needed	(901) 458-3311	(901) 458-3311
YOUR on call first responders	Spill Response Contractor	As needed	TBD	TBD
MLGW Emergency	Utility Issues	As needed	(901) 528-4465	(901) 528-4465
Local Health Department	Public Health Concerns	As needed	(901) 576-7600	(901) 576-7600

**Note:**

The NRC will notify the U.S. Coast Guard and USEPA.

## NOTIFICATION REQUIREMENTS

Table D-2 provides a cross-reference matrix that identifies specific release scenarios and associated reporting and notification requirements, including respective timeframes.

Table D-2 Notification Requirements				
Scenario #	Basis For Reporting	Agencies To Contact	Time Frame For Contact	Information To Be Provided
1	Discharge of Petroleum Product to the Grass/Soil — A 25-gallon or greater release of petroleum product to grassy or soil areas must be reported.	A	Within 24 hours	<ul style="list-style-type: none"> <li>• Location, source(s), time, and duration of the release</li> <li>• Chemical name or identity and of any substance involved in the release</li> <li>• Estimate of the quantity (pounds or gallons) released</li> <li>• The medium (land, water, or air) in which the release occurred or exists</li> <li>• Extent of the release</li> <li>• Any known or anticipated acute or chronic health risks with the release and advice regarding medical attention necessary for exposed individuals</li> <li>• Proper precautions to take as a result of the release or discharge, including evacuation and other proposed response actions</li> <li>• The name and telephone number of the person(s) to be contacted for further information</li> </ul>
2	Discharge of Petroleum Product to Surface Water — A discharge of petroleum product that violates 40 CFR 110.6 must be reported. This is basically any amount of petroleum product that reaches surface water (overland or through sewers).	A, B, C, D, E, G	Immediately	<p>Same as Scenario 1 with these additions:</p> <ul style="list-style-type: none"> <li>• Location of spill and name of receiving water</li> </ul> <p>Shelby County Code Section 30-62 requires a written report within 5 days to Memphis and Shelby Emergency Management Agency at: Manager, P.O. Box 111249, Memphis 38111. The following particulars must be included in the report:</p> <ul style="list-style-type: none"> <li>• A description of the discharge, including an estimate of the volume.</li> <li>• The exact dates, times, and duration of the discharge.</li> <li>• Steps being taken to eliminate and prevent recurrence.</li> <li>• A site drawing showing the location of the spill, direction of flow, and topographical grade of the property, the impacted watercourse(s), and the properties adjacent to the spill site.</li> </ul>

**Notes:**

- A Tennessee Emergency Management Agency — (800) 262-3300/Local TDEC Office (901) 368-7939
- B NRC — (800) 424-8802
- C USEPA, Region 4 — (404) 562-8700 (NRC will call)
- D U.S. Coast Guard, 8<sup>th</sup> District Marine Safety Office — (901) 544-3912 x2122 (NRC will call)
- E Memphis-Shelby Emergency Management Agency /City of Memphis Fire Department — (901) 458-1515 / 911
- F City of Memphis' WWTP — (901) 353-2392
- G City of Memphis or Shelby County Storm Water Hotline — City at (901) 576-6721 / County at (901) 545-3870

Table D-2 Notification Requirements				
Scenario #	Basis For Reporting	Agencies To Contact	Time Frame For Contact	Information To Be Provided
4	Discharge of Petroleum Product to Surface Water in Excess of 1,000 gal.— If the facility has a spill in 1,000 gal or has two spills that violate 40 CFR 110.6, a report to the USEPA Regional Administrator is required (40 CFR 112.4).	A, B, C, E, G  A, C	Immediately  Within 3 days of event that violates 40 CFR 112.4	Same as Scenario 2 Written report that describes: <ul style="list-style-type: none"> <li>• Name of facility</li> <li>• Name(s) of the owner or operator of the facility</li> <li>• Location of the facility</li> <li>• Date and year of initial facility operation</li> <li>• Maximum storage or handling capacity of the facility and normal daily throughput</li> <li>• Description of the facility, including maps, flow diagrams and topographic maps</li> <li>• A complete copy of the SPR Plan with any amendments</li> <li>• The cause(s) of such spill, including a failure analysis of system or subsystem in which failure occurred</li> <li>• The corrective actions and/or countermeasures taken, including an adequate description of equipment repairs and/or replacements</li> <li>• Additional preventive measures taken or contemplated to minimize the possibility of reoccurrence</li> <li>• Such other information as the Regional Administrator may reasonably require pertinent to the Plan or spill event</li> </ul>
5	Spill of Hazardous Substances in Excess of the Reportable Quantity — Table 302.4 (40 CFR 302.4 and Attachment K of this SPR) lists the spill quantity of hazardous substances that triggers reporting under 40 CFR 302. (Use "Final RQ" column) If a hazardous substance does not have a reportable quantity, use 100 pounds.	A, B, C, G  E	Immediately  Within 2 hours	<ul style="list-style-type: none"> <li>• Facility name and address</li> <li>• Reporter's name and phone number</li> <li>• Type and quantity of material spilled</li> <li>• Time of spill</li> <li>• Is spill continuing?</li> <li>• Location of spill</li> <li>• Current response action</li> </ul>
6	Discharge to Sanitary Sewer — Accidental spill of petroleum product, hazardous waste/material, or any other material which by reason of their nature or quantity are sufficient to cause fire or explosion or be injurious in any other way to the sewerage system or to the operation of the waste reclamation facilities.	A, E, F  B, E	Immediately  Immediately (depending upon substance and quantity)	<ul style="list-style-type: none"> <li>• Facility name and address</li> <li>• Reporter's name and phone number</li> <li>• Type and quantity of material spilled</li> <li>• Time of spill</li> <li>• Is spill continuing?</li> <li>• Location of spill</li> <li>• Current response action</li> </ul>

**Notes:**

- A Tennessee Emergency Management Agency — (800) 262-3300/Local TDEC Office (901) 368-7939  
B NRC — (800) 424-8802  
C USEPA, Region 4 — (404) 562-8700 (NRC will call)  
D U.S. Coast Guard, 8<sup>th</sup> District Marine Safety Office — (901) 544-3912 x2122 (NRC will call)  
E Memphis-Shelby Emergency Management Agency / City of Memphis Fire Department — (901) 458-1515 / 911  
F City of Memphis' WWTP — (901) 353-2392  
G City of Memphis or Shelby County Storm Water Hotline — City at (901) 576-6721 / County at (901) 545-3870



# **Memphis-Shelby County Airport Authority COMPREHENSIVE STORM WATER POLLUTION PREVENTION PLAN**

**For Contractors Performing  
Construction Activities at the  
Memphis International Airport  
Under Permits TNR10-0000 and TNR15-0091**

## **Comprehensive Storm Water Pollution Prevention Plan**

**Appendix A: Figures**

**Appendix B: Permit and Forms**

**Appendix C: Best Management Practices**

**Appendix D: Spill Response Notification**

**Appendix E: Site Specific Information**

**Version 4  
August 2017**





**MEMPHIS-SHELBY COUNTY AIRPORT AUTHORITY  
COMPREHENSIVE STORM WATER POLLUTION PREVENTION PLAN  
FOR CONTRACTORS PERFORMING — CONSTRUCTION ACTIVITIES AT THE  
MEMPHIS INTERNATIONAL AIRPORT  
UNDER PERMITS TNR10-0000 AND TNR15-0091**

**MEMPHIS-SHELBY COUNTY AIRPORT AUTHORITY  
COMPREHENSIVE STORM WATER POLLUTION PREVENTION PLAN  
FOR CONTRACTORS PERFORMING — CONSTRUCTION ACTIVITIES AT THE  
MEMPHIS INTERNATIONAL AIRPORT  
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**MEMPHIS-SHELBY COUNTY AIRPORT AUTHORITY  
COMPREHENSIVE STORM WATER POLLUTION PREVENTION PLAN  
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MEMPHIS INTERNATIONAL AIRPORT  
UNDER PERMITS TNR10-0000 AND TNR15-0091**



## **REPORT OF GEOTECHNICAL EXPLORATION**

### **Taxiway Alpha West Reconstruction Memphis International Airport Memphis, Tennessee**

*Prepared For:*

Allen & Hoshall

1661 International Drive, Suite 100

Memphis, Tennessee 38210

*Prepared By:*

K. S. Ware and Associates, L.L.C.

52 Lindsley Avenue, Suite 101

Nashville, Tennessee 37210

KSWA Project No. 100-19-0019

November 11, 2019



52 Lindsley Avenue, Suite 101  
Nashville, Tennessee 37210  
Phone: 615-255-9702

November 11, 2019

Mr. Harry Pratt, PE  
Allen & Hoshall  
1661 International Drive, Suite 100  
Memphis, Tennessee 38210

**Subject: Report of Geotechnical Engineering Services  
Taxiway Alpha West Reconstruction  
Memphis International Airport  
Memphis, Tennessee  
KSWA Project No. 100-19-0019**

Dear Mr. Pratt:

K. S. Ware & Associates, LLC (KSWA) is pleased to submit this report which provides the results of our pavement exploration for the Taxiway Alpha West Reconstruction project at the Memphis International Airport in Memphis, Tennessee. Our services were provided in general accordance with our proposal for Geotechnical Engineering Services dated December 18, 2018.

The attached report summarizes the project information provided to us, describes the site and subsurface conditions encountered, and details our geotechnical recommendations for the project. The Appendices include figures, descriptions of our field-testing procedures, and our field and laboratory test results.

We appreciate the opportunity to be of service to you on this project. Please contact us if you have any questions regarding this report. We look forward to serving as your geotechnical consultant on the remainder of this project.

Respectfully submitted,

**K. S. Ware and Associates, L.L.C.**

Bradley D. Kouchoukos, E.I.  
Staff Professional



Nathan Long, P.E., P.G.  
Senior Geotechnical Engineer

Enclosures: Report of Geotechnical Exploration

Distribution: File (1)

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FIELD CLASSIFICATION SYSTEM

SOIL CLASSIFICATION CHART

TEST BORING LOGS

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Appendix C - LABORATORY TEST RESULTS

## **1.0 INTRODUCTION**

### **1.1 PROJECT INFORMATION**

Our understanding of the project is based on information provided by Mr. Harry Pratt of Allen & Hoshall during multiple e-mail and telephone conversations throughout the project. The initial e-mail included a document titled "Exhibit A – Scope of Services", which provided general project information and general requirements for the geotechnical study.

The project consists of reconstructing approximately 4,125 linear feet of Taxiway Alpha West at the Memphis International Airport. The reconstruction will extend from Taxiway November at the west end of Taxiway Alpha to east of Taxiway Bravo. The project will also include tie-ins along Taxiways November, Charlie, Sierra, and Bravo and along the Signature Ramp. The reconstructed taxiway will consist of new concrete pavement with asphalt shoulders. We understand full depth replacement of the existing pavement including the cemented base material is planned. The new taxiways will be designed for ADG Group V, while the Signature Ramp will be designed as ADG Group IV. We have assumed final pavement surface elevations will be similar to existing pavement surface elevations.

### **1.2 PURPOSE AND SCOPE OF EXPLORATION**

The purpose of the exploration was to evaluate the subsurface conditions along the project alignment and provide geotechnical design recommendations for the project. Our scope of services was detailed in our proposal for Geotechnical Engineering Services, dated December 18, 2018.

Our geotechnical exploration services did not include sampling and testing of the soil, rock, surface water, groundwater, or air for the presence of environmental contaminants. Therefore, special procedures were not recommended for handling or managing sediments encountered during future construction or for handling the soil and rock samples from the borings in the geotechnical testing lab.

## **2.0 SITE GEOLOGY**

### **2.1 GEOLOGIC FORMATION**

Memphis International Airport is located in the Coastal Plain physiographic province. This province extends along the southeast and east coasts of the United States from the southern tip of Texas to the southern tip of Florida along the Gulf of Mexico and then extends north to New Jersey along the coast of the Atlantic Ocean. The Coastal Plain province generally lies along the coastal states but extends north from Louisiana and Mississippi through the eastern portions of Arkansas, the west portions of Tennessee, and the southern tip of Illinois. In Tennessee, the area between the Tennessee River and Mississippi River is considered to be part of the Coastal Plain province; there are three subcategories within this area. Starting from the east, along the western banks of the Tennessee River, is an approximately 10-mile wide section of hilly land which consists of sedimentary rocks overlain by residual soils (derived in place from weathering of the bedrock), alluvial soils (soils deposited by streams) locally, and about 4 feet of loess (wind-blown silts and clays). To the west of the hilly land is an area called the Tennessee Bottoms or the bottom land which extends to steep bluffs along the shores of the Mississippi River in Memphis. This area consists of rolling hills and streams formed from marine sediments consisting mainly of clays, silts and sands covered by loess at the surface. The loess can be up to 100 feet thick in the bluffs overlooking the Mississippi River; however, the loess can also be absent where streams have eroded these soils and filled the stream valley with alluvium. The third section is called the Mississippi Alluvial Plain. This area is west of the Tennessee Bottoms and consist of lowland areas, flood plains, and swamp land typically less than 300 feet above sea level.

The Surficial Geologic Map of the Southeast Memphis Quadrangle, Shelby County, Tennessee indicates the airport is underlain by loess and artificial fill. The late Pleistocene-aged loess deposits include wind-blown sediments consisting of generally of clayey silt brown and light-brown in color. These soils are relatively strong and stable when the water content is near the soil's Plastic Limit but become soft and unstable if the water content moves above the Plastic Limit. Artificial fill in Memphis typically consists of brown silt to clayey silt, but can also include construction debris, organics, and other deleterious materials. The strength, compressibility, and stability of artificial fill subgrades depend on the fill material type, lift thicknesses, water content, and compaction effort applied during placement.

### **2.2 SOIL SURVEY**

The soil survey of Shelby County, Tennessee, downloaded from the United States Department of Agriculture website<sup>1</sup> indicates the soil types across Taxiway Alpha consist of Graded land (Gr). This land type consists of developed areas that primarily consisted of Grenada, Loring, and Memphis soils prior to grading. Typical engineering classifications for these soils include clays (CL), clayey silts (ML), and non-plastic sands (SC) by the Unified Soil Classification System (USCS) classification and A-4, A-6 and A-7 by American Association of State Highway and Transportation Officials (AASHTO) classification.

1- <http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.asp>

### **3.0 EXPLORATION PROCEDURES AND FINDINGS**

#### **3.1 GENERAL**

We performed our subsurface exploration and field testing between May 8, 2019 and May 15, 2019, excluding the weekend days. Our proposed exploration consisted of coring through the existing pavement and cemented base material at 29 locations (13 coreholes and 16 borings) and extending the borings to a depth of 10 feet below existing grade. Due to limited access to the Memphis Airport property, we were unable to complete five of the proposed coreholes (C-3, C-5, C-6, C-11, and C-12) and two of the borings (B-7 and B-15).

The boring and corehole locations were marked in the field by Allen & Hoshall's surveying subcontractor prior to us arriving on-site. We had to offset some of the exploration locations due to underground utilities identified in the vicinity of the planned exploration locations. The corehole and boring locations shown on the Exploration Plan in Appendix A should be considered approximate. Additional discussion regarding the field procedures used during this exploration are provided in Appendix B.

#### **3.2 SURFACE AND SUBSURFACE CONDITIONS**

The existing Taxiway Alpha West consisted primarily of concrete pavement underlain by a thin layer of bituminous pavement and a cemented base material. The pavement surface generally slopes gradually downward away from the taxiway centerline towards the pavement edge.

##### Pavement Section

Each of the pavement cores, completed within Taxiway Alpha West, encountered an initial layer of concrete pavement ranging in thickness from approximately 16 to 21-½ inches. Below the surficial concrete, we encountered bituminous pavement ranging in thickness from about 2-½ to 5-½ inches. At the pavement cores completed within the Signature Ramp (C-2 and B-13), the concrete core consisted entirely of bituminous pavement with a thickness of approximately 22 and 22-½ inches, respectively. Below the bituminous pavement in the pavement cores completed within Taxiway Alpha West, we encountered a cemented base material ranging in thickness from 2 to 8-½ inches. We anticipate a cemented base material is present beneath the Signature Ramp as well; however, due to the limited number of borings completed within this area, it could not be confirmed that a cemented base material is present. We note that the cement treated base was not recovered during pavement coring, and we estimated the thickness based on the drilling observations. Table 1 on the following page includes the concrete pavement, bituminous pavement, and cemented base approximate thicknesses encountered at the 23 locations.

**Table 1: Pavement Section Thicknesses**

<b>Corehole / Boring No.</b>	<b>Concrete Pavement Thickness (in.)</b>	<b>Bituminous Pavement Thickness (in.)</b>	<b>Cemented Base Thickness (in.)</b>	<b>Total Pavement Thickness (in.)</b>
C-1	18.0	4.0	NA	NA
C-2	0.0	22.0	NA	NA
C-4	18.0	NA	NA	NA
C-7	18.0	2.5	NA	NA
C-8	21.5	NA	NA	NA
C-9	17.5	2.5	NA	NA
C-10	18.0	3.0	NA	NA
C-13	19.0	2.5	NA	NA
B-1	18.5	3.5	4.0	26.0
B-2	18.0	4.0	4.0	26.0
B-3	18.0	5.0	3.0	26.0
B-4	18.0	4.0	4.0	26.0
B-5	18.0	4.5	3.5	26.0
B-6	20.5	3.5	2.0	26.0
B-8	17.5	2.5	6.0	26.0
B-9	16.0	3.0	7.0	26.0
B-10	18.0	3.5	8.5	30.0
B-11	17.5	3.5	8.0	29.0
B-12	17.5	3.0	5.5	26.0
B-13	0.0	22.0	NA	22.5
B-14	18.0	3.0	3.0	24.0
B-16	19.0	3.0	2.0	24.0
<b>AVG</b>	<b>18.3**</b>	<b>3.3*</b>	<b>4.6</b>	<b>26.2</b>

\*Bituminous pavement thickness within coreholes should be considered as minimal values. Due to limitations of coring equipment and thickness of overlying concrete pavement, the exact total bituminous pavement thickness could not be confirmed.

\*\*Concrete pavement and bituminous pavement thickness averages neglect coring C-2 and boring B-13, which consisted entirely of bituminous pavement.

### Existing Fill

Beneath the pavement section, Borings B-6 and B-16 encountered existing fill to respective depths of 5-½ and 6 feet. The fill at Boring B-6 consisted of very loose sandy silt (ML), and the fill at Boring B-16 consisted of stiff lean clay (CL).

### Native Soils

Below the existing fill at Borings B-6 and B-16 and below the pavement section at the remaining borings, we encountered native soils to the boring termination depth of 10 feet. The native soils generally consisted of soft to stiff



lean clays (CL) with a layer of very loose to medium dense silt (ML) generally present in the borings between approximate depths of 5-½ and 8 feet.

#### Groundwater

The majority of the borings were dry during our exploration. However, we encountered groundwater at an approximate depth of 8 feet during drilling operations at Borings B-1 and B-3. We backfilled the borings upon completion for safety precautions, so delayed groundwater measurements were not taken. Groundwater levels will differ depending on the time of year, climatic conditions, and construction activities. Perched groundwater conditions may develop within the overburden soils during seasonal wet periods of the year and after heavy precipitation events.

## 4.0 LABORATORY TESTING

KSWA performed laboratory testing on representative split-spoon, Shelby tube, and bulk soil samples in general accordance with ASTM procedures. The laboratory testing included:

- Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass (ASTM D2216)
- Standard Test Methods of Liquid Limit, Plastic Limit, and Plasticity Index (ASTM D4318)
- Standard Test Method for Determining the Amount of Material Finer than 75- $\mu$ m (No. 200) Sieve in Soils by Washing (ASTM D1140)
- Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates (ASTM C136/C136M)
- Standard Test Method for Laboratory Compaction Characteristic of Soil Using Modified Effort (ASTM D1557)
- Standard Test Method for California Bearing Ratio (CBR) of Laboratory-Compacted Soils (ASTM D1883)

The moisture content data and Atterberg limit are presented on the individual boring logs in Appendix B. Laboratory test reports for grain size analysis, Modified Proctor, and CBR tests are within the Appendix C.

**Table 2: Summary of Soil Laboratory Test Results**

Boring No.	Sample Type	Sample Depth (ft)	Modified Proctor		CBR	LL (%)	PI (%)	Percent Passing #200 Sieve (%)	Unconfined Compression (psf)	USCS Class.
			Max. Dry Density (lbs/ft <sup>3</sup> )	Optimum Moisture (%)						
B-1	ST	6 to 8	-	-	-	NP	NP	98.0	1,440	ML
B-2/B-5	Bulk	0 to 10	116.5	13.9	9.5	36	14	89.1	-	CL
B-3	ST	6 to 8	-	-	-	NP	NP	98.1	1,920	ML
B-5	SS	3.5 to 5	-	-	-	42	24	91.0	-	CL
B-8/B-10	Bulk	0 to 10	118.2	12.6	7.0	33	10	97.0	-	CL
B-9	ST	3.5 to 5.5	-	-	-	NP	NP	81.4	-	ML
B-11	ST	6 to 8	-	-	-	NP	NP	99.0	1,420	ML
B-12	SS	3.5 to 5	-	-	-	37	13	92.3	-	CL
B-12	Bulk	0 to 10	120.9	12.2	6.0	33	11	71.3	-	CL
B-13	SS	3.5 to 5	-	-	-	35	13	93.3	-	CL

\*Bulk samples consist of soil material beneath pavement section and cemented base material

\*\*Unconfined compression strength test samples were determined to be silt (ML) based on grain size analysis and Atterberg Limit testing. It should be noted, unconfined compression strengths of silt (ML) may not be representative of the soils strength due to lack of cohesion.

## **5.0 GEOTECHNICAL CONSIDERATIONS**

### **5.1 GENERAL**

The conclusions and recommendations presented herein were developed based upon our engineering reconnaissance of the site, the field test results, a visual examination of the samples recovered, laboratory tests on selected samples, our understanding of the proposed construction, and our experience. The conclusions and recommendations presented in this report have been derived by relating the general principles of the discipline of geotechnical engineering to the proposed construction outlined in the Project Information section of this report. Because changes in surface, subsurface, and climatic conditions can occur, the use of this report must be restricted to this specific project.

Our understanding of the proposed design and construction is based on the documents provided to us at the time this report was prepared and information referenced in the Project Information section of this report. We recommend we be consulted to review the final design documents, plans, and specifications to check the conclusions and recommendations of this geotechnical report have been interpreted correctly. Any changes or modifications which are made in the field during the construction phase which alter site grading, structure locations, infrastructure, or other related site work should also be reviewed by our office.

If conditions which vary from the facts of this report are encountered in the field during construction, we recommend the Geotechnical Engineer of Record be contacted immediately to review the changed conditions in the field and make appropriate recommendations.

### **5.2 SUBGRADE SUITABILITY**

Based on the project information provided and the available subsurface data, it is our opinion the site is suitable for the planned reconstruction. The subgrade materials below the existing pavement generally consists of firm to stiff lean clay with some soft zones. Soft to firm soils are frequently unstable under a proofrolling load. Additionally, the moisture content of the near-surface soil samples was frequently higher than the optimum moisture content of the bulk samples tested. Soils with a relatively high moisture content are also frequently unstable under a proofrolling load.

The stability of the near-surface soils will likely be impacted by exposure to moisture and/or construction traffic, once the pavement materials have been stripped to prepare the site for construction. The near-surface soils consist of either existing fill or native loess. Loess is typically extremely sensitive to changes in moisture content. Dry loess materials are generally stable and will exhibit favorable strength characteristics. Conversely, when these soils are moist, as a result of local precipitation or climatic conditions, the soils become weak and unstable, particularly under repeated loading from heavy construction equipment. Also, due to the silt content of these soils, they can degrade rapidly even when favorable moisture conditions are present. Therefore, regardless of the time of year construction takes place, some remedial repair of weak subgrades will likely be required.

If construction occurs during warm, dry weather months, it may be possible to repair shallow instability through scarifying, moisture conditioning, and recompacting the upper 8 to 12 inches of subgrade. However, this process will

likely not be practical during cooler, wet weather months when moisture conditioning can be problematic. During wet weather, it may be necessary to undercut unstable soils and use a borrow source to haul in drier soils for backfilling. If widespread subgrade instability is present, stabilizing the subgrade with cement is an option that may be considered (cement stabilization is typically more cost-effective over larger areas). KSWA recommends that a budget be established for subgrade repairs consistent with the time of year construction takes place.

### **5.3 PAVEMENT DEMOLITION**

We understand that the taxiway pavements will be completely demolished and removed, which will include the underlying asphalt and cement treated base. We expect the amount of materials removed will be significant. The existing concrete can potentially be used for other functions, such as P-219 recycled concrete aggregate base, if the demolition methods allow for such crushing and gradation. Detailed analysis of the demolished materials would be required prior to use and approval.

## **6.0 GEOTECHNICAL EVALUATION & RECOMMENDATIONS**

As stated in the Project Information section of this report, we understand the airport plans to complete a full-depth reconstruction of the existing concrete pavement along Alpha West Taxiway and tie-ins at four intersecting taxiways and the Signature Ramp. If the information contained in Project Information section changes, we recommend KSWA be contacted to confirm our design and construction recommendations are appropriate, in consideration of the new available information.

### **6.1 GENERAL PAVEMENT RECOMMENDATIONS**

Based on our observations and classifications made in the field and tests performed in the laboratory, KSWA is providing the following pavement design parameters and general pavement recommendations.

As discussed in the previous section, remediation of soft to firm subgrade soil prior to final grading and paving should be expected. The stabilization method, the lateral extent, and the depth will depend on actual conditions exposed during construction and on actual grading plans for the pavement areas. On-site recommendations should be made by the geotechnical engineer-of-record or his representative. Additionally, we recommend that the upper 12 inches of the subgrade materials be compacted to at least 100 percent of the maximum dry density as determined by the modified Proctor test in accordance with Federal Aviation Administration's (FAA) Standard Specifications for Construction of Airports, dated December 21, 2018, Section 152-2.10.

### **6.2 PAVEMENT DESIGN RECOMMENDATIONS**

The design CBR and subgrade modulus values are highly dependent on the type of near surface material and the level of compaction. Based on the limited information obtained from our field exploration, our laboratory testing, and our experience with similar soil conditions, KSWA recommends using a CBR value of 7 and a subgrade modulus of 150 pounds per cubic inch (pci) for the existing subgrade compacted to 98 percent of the Modified Proctor (ASTM D1557) maximum dry density within the upper 12 inches of subgrade.

Pavements and base courses may be placed after the subgrade has been properly compacted, fine graded, and proofrolled as recommended in the Construction Considerations section of this report. All activities should be accomplished in accordance with FAA Standard Specifications for Construction of Airports. Actual pavement section thickness should be determined by the designer based on actual loads, traffic volume, and the owner's design life requirements.

Experience has shown most pavement failures are caused by localized soft spots in the subgrade or inadequate drainage. Proof rolling, under the observation of our geotechnical engineer, will greatly reduce the incidents of weak spots in the subgrade. However, the civil design must include proper drainage to reduce softening of the subgrade, frost damage, heaving, soil migration, and pumping failures. The pavement surface and subgrade should have a minimum slope of 2 percent. Water infiltrating the mineral aggregate base should be designed to drain into catch basins (through weep holes), out-slope areas, or drainage trenches.

The soils exposed at the pavement subgrade level may be moisture sensitive. Experience indicates there is typically an extensive time lag between the time grading is completed and pavement construction occurs (i.e. grading may occur during hot, dry weather and pavement construction may occur during wet, cool weather). Once grading has been performed, the subgrade may be disturbed throughout the construction process due to utility excavations, construction traffic, desiccation, or rainfall. As a result, the pavement subgrade may become unsuitable for pavement construction over time and corrective action may be required. The subgrade should be carefully evaluated at the time of pavement construction by proof rolling with a heavily-loaded tandem-axle dump truck. Particular attention should be given to high traffic areas that displayed distressed and to areas where backfilled trenches are located.

Design pavement section thicknesses are typically determined based on post-construction traffic loading conditions, which do not account for heavy construction traffic during the early stages of development. A partially constructed structural section subjected to heavy construction traffic can result in pavement deterioration and premature failure. Our experience indicates this pavement construction practice can result in pavements which will not perform as intended. Considering this information, several alternatives are available to mitigate the impact of heavy construction traffic on the pavement construction. These include using thicker sections to account for construction traffic, using some method of stabilization to improve the support characteristics of the pavement subsurface, or by routing heavy construction traffic around paved areas using a "haul road" constructed for that purpose.

Maintenance is essential to good long-term performance of rigid and flexible pavements. Any distressed areas should be repaired promptly to prevent the failure from spreading due to loading and water infiltration.

## 7.0 CONSTRUCTION CONSIDERATIONS

### 7.1 SITE PREPARATION

Site preparation should initially include removing the existing concrete pavement, underlying bituminous pavement, and underlying cemented base material. Additionally, any topsoil or soils containing organic content should be removed in their entirety from any new planned pavement areas. At the completion of these activities, the subgrade should be evaluated as follows:

- Recompacting the upper 12 inches of exposed subgrade materials to 95 percent of the maximum dry density (100 percent if within 12 inches of the final subgrade elevation).
- Perform proof rolling prior to any fill or base material placement in fill areas and/or following cuts to grade in cut areas.
- Proof rolling should be performed using a fully-loaded tandem-axle dump truck or other rubber-tired equipment judged suitable by the geotechnical engineer.
- Our geotechnical engineer or his representative should observe proof rolling activities.
- Remediate soft, organic, or yielding subgrade materials encountered during the proof rolling operations as recommended by our geotechnical engineer.

#### 7.1.1 Stabilization of Weak Soils

If areas of instability remain after scarifying and recompact the existing soil in place, other options may be considered for stabilizing weak subgrade areas. These options are briefly described below.

- Scarify and Recompact – It may be possible to stabilize near-surface soils that are unstable due to excessive moisture by scarifying the unstable soils, allowing them to dry, and recompact them in accordance with structural fill criteria. This process can be successful during hot, dry periods and when the construction schedule is flexible. Drying the soils can be problematic during cold, wet weather or when the construction schedule is not flexible.
- Undercut and Replace – This method involves the excavation of the soft/unstable soils until stiff soils are exposed. The undercut is then backfilled with compacted soil.
- Undercut and Stabilize with Geotextiles and/or Geogrids and Granular Fill – After the undercut surface has been made smooth, geotextiles and/or geogrids can be placed across the surface, followed by placement of granular fill (size and gradation of granular fill to be compatible with the geotextile/geogrid selected). Once a stable surface has been achieved, additional structural fill may be placed, if required.
- Stabilize with Cement or Lime Admixtures – Cement or lime stabilization is performed by a specialty contractor who mobilizes to the site, mixes the soils with cement or lime, and replaces and compacts these soils to the planned subgrade elevation. This stabilization method dries and treats the soils to provide a stable subbase.

As previously noted, the near-surface soils consist of loess. The stability of these soils is a function of the soil's water content. Experience indicates soils with water contents near the soil's Plastic Limit (usually in the teens) are typically strong and stable. Soils with water contents several points above the Plastic Limit are often weak and unstable. Some remedial subgrade work should be expected based on the water contents near ground level at the time of this exploration.

Protection of the subgrade is a critical issue for maintaining the stability of subgrades formed in loess. Positive surface drainage should be maintained throughout construction. Areas which break down because of construction traffic or exposure to moisture should be repaired to prevent the failed area from spreading. Heavy equipment such as concrete trucks should be restricted to using construction roads specifically prepared for that purpose. Such roads can consist of 2 or more feet of crushed stone or crushed concrete. Soil-cement is also a viable alternative.

## **7.2 COMPACTED FILL RECOMMENDATIONS**

Once the subgrade has been properly prepared, compacted fill may be placed in accordance with the recommendations provided below to attain final desired construction elevations. Fill operations should not begin until representative soil samples are collected and tested (allow 3 to 4 days for sampling and testing). The test results will be used to determine whether the proposed fill material meets the specified criteria and for quality control during grading. Fill placement and compaction should be observed by a geotechnical representative on a full-time basis. Our limited laboratory testing indicates most of the on-site soils meet the criteria recommended below. Materials from both on-site and off-site sources proposed for use as structural fill should meet the criteria provided below.

- Liquid Limit less than 50
- Plasticity Index less than 25
- Maximum dry density (ASTM D1557) of 95 pcf or greater
- Free of large rock fragments (greater than 3 inches in diameter) and organic materials (less than 5 percent by weight)
- Amount of rock fragments retained on a 3/4-inch sieve should be less than 30 percent by weight

Structural fill should be placed and compacted using the following criteria:

- Soil fill should be placed in lifts of uniform thickness. The loose lift thickness should not exceed the amount which can be properly compacted throughout its entire depth with the equipment available, usually no more than 8 inches for cohesive material. In confined areas such as utility trenches, lift thicknesses of 3 to 4 inches may be required to achieve the recommended degree of compaction.
- Fill should be properly keyed into stripped and scarified subgrades. The upper one foot of remaining materials in cut areas or in areas which do not receive more than one foot of new fill should be scarified and recompacted using the guidelines outlined in this report section.



- So a positive tie is created along the interface of engineered fill and sloping ground (steeper than 4H:1V), we recommend the host slope be benched as the fill is placed. For this project, benching is defined as grading a saw tooth or terrace configuration into the slope. In general, at a minimum, we recommend benches should be about three feet tall and a minimum of eight feet wide, although some modification to bench geometry is permissible based upon conditions observed at particular locations. Further, fill placement should begin at the bottom of the slope and the working fill surface should be maintained approximately horizontal.
- Fill should not be placed on frozen or saturated subgrades.
- Based on the FAA Standard Specifications for Construction of Airports, dated December 21, 2018, Section 152-2.10 Compaction requirements, the top 12 inches of the pavement subgrade must be compacted to not less than 100 percent of the maximum dry density as determined by the Modified Proctor (ASTM D1557) and to within 2 percent of optimum moisture content immediately prior to paving. Additionally, the subgrade in areas outside of the limits of the pavement areas should be compacted to a depth of 12 inches to a density not less than 95 percent of the maximum dry density as determined by a Standard Proctor (ASTM D698). Additionally, the compacted fill should be stable under the moving load of a loaded tandem-axle dump truck.
- Density tests should be performed at a frequency of no less than one test per 5,000 square feet for pavement areas for each fill layer placed, with a minimum of two tests per lift. For utility trenches, one density test should be performed every 50 linear feet for each one-foot thick fill layer placed, with a minimum of two tests per lift. Any areas not meeting the recommended compaction should be reworked and recompacted to achieve compliance. The recommended test frequencies are for preliminary planning and should be adjusted in the field to account for material variability, rate of placement, weather and other factors.
- The soils should be placed near (within two percent of) the optimum water content (ASTM D1557). Aeration (i.e., drying) is often necessary to bring fill materials to the required water content during wet and rainy periods. During dry periods, water may need to be added to achieve the proper water content for compaction. Clayey and silty soils may require aeration prior to compaction, even during dry periods. The water content testing performed during this exploration suggests some of the on-site soils are significantly above the optimum water contents.
- Soil slopes should be protected from erosion by seeding, sodding, or other means, and surface run-off should be diverted away from slopes. For erosion protection, grass or other vegetation should be established on permanent slopes as soon as practical.
- Compacted soil fill embankments should be constructed no steeper than a ratio of 3 horizontal to 1 vertical (i.e., 3H:1V). We also recommend permanent cut slopes be constructed no steeper than 3H:1V.
- Compacted fills should extend horizontally outside of planned pavement areas at least 10 feet before sloping.
- Cut and fill slopes should be regularly evaluated during the construction for indications of movement.
- Excavations should be constructed in accordance with applicable Occupational Safety and Health Administration (OSHA) regulations.

### **7.3 GENERAL EARTHWORK CONSIDERATIONS**

During earthwork operations, positive surface drainage should be maintained to prevent water from ponding on the exposed ground surface. The exposed subgrade may be rolled with a rubber-tired or steel drummed roller to improve surface run-off if precipitation is expected. Our geotechnical engineer should be consulted if the subgrade soils become excessively wet or dry, or frozen.

### **7.4 GROUNDWATER CONTROL RECOMMENDATIONS**

Groundwater was not generally encountered in the borings, except for Borings B-1 and B-3, which encountered groundwater at a depth of 8 feet below the existing ground surface. We anticipate in most cases, depending on seasonal conditions, any seepage encountered can be handled by conventional dewatering methods (i.e., pumping from small sumps located near the source or in collector areas). If larger quantities of groundwater are encountered, the Geotechnical Engineer should be contacted.

## **8.0 QUALIFICATIONS OF RECOMMENDATIONS**

The recommendations provided herein were developed in part using the subsurface information obtained from the pavement corings and soil test borings advanced at the site. Soil test borings depict the soil conditions only at the specific location and time at which they were completed. The soil conditions at other locations on the site or at other times may differ from those occurring at the boring locations.

The scope of this geotechnical exploration did not include assessment or exploration for the presence or absence of hazardous or toxic materials in the soil, rock, groundwater, surface water, or air within or beyond the site. Any statements in this report or indicated on the test boring logs regarding odors, staining of soils, or other unusual conditions observed are strictly for the information of KSWA's client.

KSWA's professional services were performed, findings obtained, and recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices. KSWA is not responsible for the conclusions, opinions, or recommendations made by others based upon the data included herein.

KSWA's services include retaining the soil samples obtained during this study for 30 days after report submittal. Further storage or transfer of the samples can be made at the Client's expense upon a written request.

# **APPENDIX A**

## EXPLORATION PLAN





<div>N</div> <div></div> <div>NOT TO SCALE</div>	JOB NO. 100-19-0019	Exploration Plan			LEGEND	<div><div>K. S. Ware &amp; Associates, L.L.C. Geotechnical • CEI • Environmental</div></div>	Figure 1
	CLIENT: Allen & Hoshall						
	PROJECT NAME: Taxiway Alpha West Reconstruction	Memphis International Airport Memphis, Tennessee					
	DATE: 6/12/19		DRAWN BY: BK	REVIEWED BY: NL			



# **APPENDIX B**

FIELD TESTING PROCEDURES  
FIELD CLASSIFICATION SYSTEM  
SOIL CLASSIFICATION CHART  
TEST BORING LOGS  
CORE PHOTOGRAPHS

# Field Testing Procedures

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## FIELD TESTING PROCEDURES

Drilling, sampling, and testing were conducted in general accordance with methods of the American Society for Testing and Materials (ASTM) or other widely-accepted geotechnical engineering standards. Descriptions of the procedures used during this exploration are provided below.

### BORING AND COREHOLE LOCATIONS AND ELEVATIONS

The boring and corehole locations were selected and marked in the field by the Client's surveying subcontractor prior to beginning our exploration. We located the exploration locations on the Exploration Location Plan by estimating distances and angles relative to on-site features. Surveying of boring and corehole coordinates was beyond the scope of our exploration and was performed by others.

### TEST BORINGS ASTM D 1586

Test borings were advanced using auger drilling techniques. At regular intervals, soil samples were obtained with a standard 1.4-inch I.D., 2.0-inch O.D., split-barrel sampler. The sampler was initially seated 6 inches to penetrate any loose cuttings 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 the *standard penetration resistance*, or N-value. Standard penetration resistance, when properly evaluated, is an index to the soil's strength and density. The criteria used during this exploration are presented on the Field Classification System sheet in this appendix. Representative portions of the soil samples obtained were placed in sealed containers and transported to our laboratory, where our engineer selected samples for laboratory testing.

The standard penetration tests were performed using an automatic hammer. The automatic hammer has a higher efficiency than the traditional rope and cathead hammer, thus yielding comparatively lower N-values. This reduction in N-value was accounted for during our engineering analysis. However, the consistencies presented on the boring logs were based on the customary relationships with N-value.

### BORING LOGS

The soil samples obtained during the drilling were visually classified using the USCS as a guide (reference Soil Classification Chart in Appendix B). The Test Boring Logs in Appendix B provide the soil descriptions and penetration resistances, and represent our interpretation of the conditions encountered at each boring location. The stratification lines indicated on the boring records represent the approximate boundaries between material types, but these transitions may be gradual. The boring logs were prepared based on the field logs and review of the laboratory classification test results. The USCS designations indicated on the boring logs are based on visual-manual evaluation of the samples unless otherwise defined by laboratory testing.

The boring logs indicate estimated interfaces between soil strata. The interfaces indicated represent the approximate interface location, but the actual transition between strata may be gradual. Water levels indicated on the boring logs represent the conditions only at the time each measurement was taken.

## FIELD CLASSIFICATION SYSTEM

### Sands and Gravels

No. of Blows	Relative Density
0-5	Very Loose
6-10	Loose
11-30	Medium dense
31-50	Dense
51+	Very Dense

### Silts and Clays

No. of Blows	Relative Consistency
0-2	Very Soft
3-4	Soft
5-9	Firm
10-15	Stiff
16-30	Very Stiff
31+	Hard

### Particle Size Identification

Boulders:	8-inch diameter or larger
Cobbles:	3- to 8-inch diameter
Gravel:	
Coarse:	1- to 3-inch
Medium:	0.50- to 1-inch
Fine:	0.25- to 0.50-inch
Sand:	
Coarse:	2.00-mm to 0.25-inch (diameter of pencil lead)
Medium:	0.074-mm to 2.00-mm (diameter of broom straw)
Fine:	0.042-mm to 0.074-mm (diameter of human hair)
Silt:	0.002-mm to 0.042-mm (Cannot see particles)
Clay:	<0.002-mm

### Relative Proportions

Descriptive Term	Percent
Trace	1-10
Little	11-20
Some	21-35
And	36-50

### Relative Quality of Rock Cores

Quality	RQD
Very Poor	0-25%
Poor	25-50%
Fair	50-75%
Good	75-90%
Excellent	90-100%

$$\text{RQD} = \frac{\text{Total length of core recovered in pieces 4 inches long or longer}}{\text{Total length of core run}} \times 100\%$$

### Rock Hardness

Very Soft	Rock disintegrates or easily compresses to touch; can be hard to very hard soil
Soft	Rock is coherent but breaks easily to thumb pressure at sharp edges and crumbles with firm hand pressure
Moderately Hard	Small pieces can be broken off along sharp edges by considerable hard thumb pressure; can be broken by light hammer blows
Hard	Rock cannot be broken by thumb pressure, but can be broken by moderate hammer blows
Very Hard	Rock can be broken by heavy hammer blows



# SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS  MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		(LITTLE OR NO FINES)		GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
		(APPRECIABLE AMOUNT OF FINES)		GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	SAND AND SANDY SOILS  MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		(LITTLE OR NO FINES)		SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES		SM	SILTY SANDS, SAND - SILT MIXTURES
		(APPRECIABLE AMOUNT OF FINES)		SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS  MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS  LIQUID LIMIT LESS THAN 50			ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS  LIQUID LIMIT GREATER THAN 50			MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

# KSWA BORING LOG



**BORING NO. B-01**

**PROJECT NAME: MSCAA Taxiway Alpha West**

**LOCATION: Memphis, TN**

**PROJECT NO.: 100-19-0019**

Sheet 1 of 1

Depth, feet	Graphic Log	Approx. Surface El. (feet, MSL): Location: See Exploration Plan	Samples	Recovery (%)	RQD (%)	SPT Values	N-Value	Pocket Pen (tsf)	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		MATERIAL DESCRIPTION										
		CONCRETE (18.5 inches)										
		ASPHALT (3.5 inches)	1.6									
		CEMENTED BASE (4 inches)	1.8									
		LEAN CLAY (CL), little sand (upper 6"), oxidation, reddish black nodules, gray-brown, firm, moist	2.2	100		50/2"						
4				83		2-2-3	5	2.0	26.2			
		SILT (ML), brown, loose, moist	5.5									
				83					30.2	NP	NP	NP
8		LEAN CLAY (CL), oxidation, black nodules, gray-brown, soft, v. moist to wet	8.0									
				100		2-2-2	4	3.0	30.2			
		BORING TERMINATED AT 10 FBGS	10.0									
12												
16												
20												

Completion Depth (ft.): **10.0**  
 Date Started: **5/10/19**  
 Date Completed: **5/10/19**  
 Drilled By: **Geotechnology**  
 Logged By: **K. Andrus**

Remarks: **Groundwater encountered at an approximate depth of 8 feet during drilling operations. CME 55 Drill Rig. 6" Flight Auger. Backfilled with sand and patched with concrete.**

# KSWA BORING LOG



**BORING NO. B-02**

**PROJECT NAME: MSCAA Taxiway Alpha West**

**LOCATION: Memphis, TN**

**PROJECT NO.: 100-19-0019**

Sheet 1 of 1

Depth, feet	Graphic Log	Approx. Surface El. (feet, MSL): Location: See Map	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	N-Value	Pocket Pen (tsf)	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
			CONCRETE (18 inches)										
			ASPHALT (4 inches)										
			CEMENTED BASE (4 inches)										
			LEAN CLAY (CL), with silt, black nodules, gray-brown, stiff, moist		100		50/2"			12.4			
4					78		2-4-6	10	3.0	23.5			
			SILT (ML), brown, v. loose, moist										
					89		2-2-2	4	2.0	30.3			
8			LEAN CLAY (CL), with silt, black nodules, oxidation, gray, firm, moist										
					78		1-2-3	5	2.0	31.1	35	22	13
			BORING TERMINATED AT 10 FBGS										
12													
16													
20													

Completion Depth (ft.): **10.0**  
 Date Started: **5/10/19**  
 Date Completed: **5/10/19**  
 Drilled By: **Geotechnology**  
 Logged By: **K. Andrus**

Remarks: **CME 55 Drill Rig. 6" Flight Auger. Bulk Sample taken. Backfilled with sand and patched with concrete. Dry upon completion.**

# KSWA BORING LOG



**BORING NO. B-03**

**PROJECT NAME: MSCAA Taxiway Alpha West**

**LOCATION: Memphis, TN**

**PROJECT NO.: 100-19-0019**

Sheet 1 of 1

Depth, feet	Graphic Log	Approx. Surface El. (feet, MSL): Location: See Map	Samples	Recovery (%)	RQD (%)	SPT Values	N-Value	Pocket Pen (tsf)	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		MATERIAL DESCRIPTION										
		CONCRETE (18 inches)										
		ASPHALT (5 inches)										
		CEMENTED BASE (3 inches)										
		LEAN CLAY (CL), black nodules, oxidation, light brown with gray streaking, firm, moist		0		50/2"						
4		SILT (ML), brown, loose, moist		78		2-4-4	8	4.5	25.6			
		LEAN CLAY (CL), black nodules, oxidation, brown with light gray mottling, soft, wet		88					28.9	NP	NP	NP
8		LEAN CLAY (CL), black nodules, oxidation, brown with light gray mottling, soft, wet		100		1-1-2	3	2.0	34.0			
		BORING TERMINATED AT 10 FBGS										
12												
16												
20												

Completion Depth (ft.): **10.0**  
 Date Started: **5/10/19**  
 Date Completed: **5/10/19**  
 Drilled By: **Geotechnology**  
 Logged By: **K. Andrus**

Remarks: **Groundwater encountered at an approximate depth of 8 feet during drilling operations. CME 55 Drill Rig. 6" Flight Auger. Backfilled with sand and patched with concrete.**

# KSWA BORING LOG



**BORING NO. B-04**

**PROJECT NAME: MSCAA Taxiway Alpha West**

**LOCATION: Memphis, TN**

**PROJECT NO.: 100-19-0019**

Sheet 1 of 1

Depth, feet	Graphic Log	Approx. Surface El. (feet, MSL): Location: See Map	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	N-Value	Pocket Pen (tsf)	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
			CONCRETE (18 inches)										
			ASPHALT (4 inches)										
			CEMENTED BASE (4 inches)										
			LEAN CLAY (CL), black nodulus, brown with gray streaking, firm, moist		100		50/1.5"			13.9			
4			SILT (ML), brown, v. loose, moist		67		2-2-4	6	2.5	26.0			
			LEAN CLAY (CL), black nodules, brown with gray streaking, soft, moist		94		1-1-2	3	1.5	30.3			
8			BORING TERMINATED AT 10 FBGS		100		1-2-2	4	1.5	31.5			
12													
16													
20													

Completion Depth (ft.): **10.0**  
 Date Started: **5/10/19**  
 Date Completed: **5/10/19**  
 Drilled By: **Geotechnology**  
 Logged By: **K. Andrus**

Remarks: **CME 55 Drill Rig. 6" Flight Auger. Backfilled with sand and patched with concrete. Dry upon completion.**

# KSWA BORING LOG



**BORING NO. B-05**

**PROJECT NAME: MSCAA Taxiway Alpha West**

**LOCATION: Memphis, TN**

**PROJECT NO.: 100-19-0019**

Sheet 1 of 1

Depth, feet	Graphic Log	Approx. Surface El. (feet, MSL): Location: See Map	Samples	Recovery (%)	RQD (%)	SPT Values	N-Value	Pocket Pen (tsf)	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		MATERIAL DESCRIPTION										
		CONCRETE (18 inches)										
		ASPHALT (4.5 inches)										
		CEMENTED BASE (3.5 inches)										
		LEAN CLAY (CL), rock fragments, gray, stiff, moist		67		25-6-5	11	4.5	22.5			
4		LEAN CLAY (CL), some silt, gray with brown mottling, firm, moist		72		1-2-3	5	2.25	28.8	42	18	24
		SILT (ML), brown, loose, moist		100		2-3-4	7	2.75	24.2			
8		LEAN CLAY (CL), black nodules, oxidation, gray with brown mottling, firm, moist		100		2-2-3	5	2.5	26.6			
		BORING TERMINATED AT 10 FBGS										
12												
16												
20												

Completion Depth (ft.): **10.0**  
 Date Started: **5/8/19**  
 Date Completed: **5/8/19**  
 Drilled By: **Geotechnology**  
 Logged By: **V. Gallagher**

Remarks: **CME 55 Drill Rig. 6" Flight Auger. Backfilled with sand and patched with concrete. Dry upon completion.**

# KSWA BORING LOG

**BORING NO. B-06**



**PROJECT NAME: MSCAA Taxiway Alpha West**

**LOCATION:** Memphis, TN

**PROJECT NO.: 100-19-0019**

Sheet 1 of 1

[illegible]

Completion Depth (ft.): **10.0**  
Date Started: **5/8/19**  
Date Completed: **5/8/19**  
Drilled By: **Geotechnology**  
Logged By: **V. Gallagher**

Remarks: **CME 55 Drill Rig. 6" Flight Auger. Backfilled with sand and patched with concrete. WoH=Weight of Hammer. Dry upon completion.**

# KSWA BORING LOG

**BORING NO. B-08**














**PROJECT NAME: MSCAA Taxiway Alpha West**

**LOCATION:** Memphis, TN

**PROJECT NO.: 100-19-0019**

Sheet 1 of 1

Depth, feet	Graphic Log	Approx. Surface El. (feet, MSL): Location: See Map	Samples	Recovery (%)	RQD (%)	SPT Values	N-Value	Pocket Pen (tsf)	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
MATERIAL DESCRIPTION												
		CONCRETE (17.5 inches)										
		1.5										
		ASPHALT (2.5 inches)										
		1.7										
		CEMENTED BASE (6 inches)										
		2.2										
		LEAN CLAY (CL), dark gray, firm, dry to moist		72		4-3-4	7	3.5	21.0			
		3.5										
4		LEAN CLAY (CL), oxidation, light gray-brown, firm, moist		89		3-3-4	7	2.0 - 2.5				
		5.5										
		SILT (ML), brown, loose, moist		94		2-4-4	8	2.0	25.7			
		8.0										
8		LEAN CLAY (CL), oxidation, light gray, firm, moist		94		2-2-3	5	2.5	26.3	33	23	10
		10.0										
		BORING TERMINATED AT 10 FBGS										

Completion Depth (ft.): **10.0**  
Date Started: **5/15/19**  
Date Completed: **5/15/19**  
Drilled By: **Geotechnology**  
Logged By: **K. Andrus**

Remarks: **CME 55 Drill Rig. 6" Flight Auger. Bulk Sample taken. Backfilled with sand and patched with concrete. Dry upon completion.**



# KSWA BORING LOG



**BORING NO. B-09**

**PROJECT NAME: MSCAA Taxiway Alpha West**

**LOCATION: Memphis, TN**

**PROJECT NO.: 100-19-0019**

Sheet 1 of 1

Depth, feet	Graphic Log	Approx. Surface El. (feet, MSL): Location: See Map	Samples	Recovery (%)	RQD (%)	SPT Values	N-Value	Pocket Pen (tsf)	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		MATERIAL DESCRIPTION										
		CONCRETE (16 inches)										
		ASPHALT (3 inches)	1.3									
		CEMENTED BASE (7 inches)	1.6									
		LEAN CLAY (CL), black nodules, dark gray, firm, moist	2.2									
		SILT (ML), brown, loose, moist	3.5									
4				67		3-5-3	8	3.5	20.2			
				100		1-4-5	9	2.0 - 2.5				
				15								
8		LEAN CLAY (CL), rock fragments, black nodules, oxidation, brown, stiff, moist	8.0									
				100		5-8-7	15	2.5 - 3.0	19.5			
		BORING TERMINATED AT 10 FBGS	10.0									
12												
16												
20												

Completion Depth (ft.): **10.0**  
 Date Started: **5/15/19**  
 Date Completed: **5/15/19**  
 Drilled By: **Geotechnology**  
 Logged By: **K. Andrus**

Remarks: **CME 55 Drill Rig. 6" Flight Auger. Backfilled with sand and patched with concrete. Dry upon completion.**

# KSWA BORING LOG

**BORING NO. B-10**



**PROJECT NAME: MSCAA Taxiway Alpha West**

**LOCATION:** Memphis, TN

**PROJECT NO.: 100-19-0019**

Sheet 1 of 1

[illegible]

Completion Depth (ft.): **10.0**  
Date Started: **5/14/19**  
Date Completed: **5/14/19**  
Drilled By: **Geotechnology**  
Logged By: **K. Andrus**

Remarks: **CME 55 Drill Rig. 6" Flight Auger. Bulk Sample taken. Backfilled with sand and patched with concrete. Dry upon completion.**

# KSWA BORING LOG

**BORING NO. B-11**











**PROJECT NAME: MSCAA Taxiway Alpha West**

**LOCATION:** Memphis, TN

**PROJECT NO.: 100-19-0019**

Sheet 1 of 1

Depth, feet	Graphic Log	Approx. Surface El. (feet, MSL): Location: See Map	Samples	Recovery (%)	RQD (%)	SPT Values	N-Value	Pocket Pen (tsf)	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		MATERIAL DESCRIPTION										
		CONCRETE (17.5 Inches)										
		1.5 ASPHALT (3.5 inches) 1.8										
		CEMENTED BASE (8 inches)										
		2.4 LEAN CLAY (CL), dark gray to brown, v. stiff, moist										
4		3.5 LEAN CLAY (CL), rock fragments, black nodules, gray to grown, stiff, moist		67		4-10-11	21	4.5	18.5			
		5.5 SILT (ML), brown, loose, moist		89		5-6-6	12	2.0 - 2.5				
		8.0 FAT CLAY (CH), oxidation, brown, soft, v. moist		88					26.2	NP	NP	NP
		10.0 BORING TERMINATED AT 10 FBGS		100		1-2-2	4	1.5	30.0			
20												

Completion Depth (ft.): 10.0  
Date Started: 5/14/19  
Date Completed: 5/14/19  
Drilled By: Geotechnology  
Logged By: K. Andrus

Remarks: CME 55 Drill Rig. 6" Flight Auger. Backfilled with sand and patched with concrete. Dry upon completion.

# KSWA BORING LOG

**BORING NO. B-12**



**PROJECT NAME: MSCAA Taxiway Alpha West**

**LOCATION:** Memphis, TN

**PROJECT NO.: 100-19-0019**

Sheet 1 of 1

[illegible]

Completion Depth (ft.): **10.0**  
Date Started: **5/14/19**  
Date Completed: **5/14/19**  
Drilled By: **Geotechnology**  
Logged By: **K. Andrus**

Remarks: **CME 55 Drill Rig. 6" Flight Auger. Bulk Sample taken. Backfilled with sand and patched with concrete. Dry upon completion.**

# KSWA BORING LOG

**BORING NO. B-13**



**PROJECT NAME: MSCAA Taxiway Alpha West**

**LOCATION:** Memphis, TN

**PROJECT NO.: 100-19-0019**

Sheet 1 of 1

[illegible]

Completion Depth (ft.): **10.0**  
Date Started: **5/8/19**  
Date Completed: **5/8/19**  
Drilled By: **Geotechnology**  
Logged By: **V. Gallagher**

Remarks: **CME 55 Drill Rig. 6" Flight Auger. Backfilled with sand and patched with concrete.**

# KSWA BORING LOG



## BORING NO. B-14

PROJECT NAME: MSCAA Taxiway Alpha West

LOCATION: Memphis, TN

PROJECT NO.: 100-19-0019

Sheet 1 of 1

Depth, feet	Graphic Log	Approx. Surface El. (feet, MSL): Location: See Map	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	N-Value	Pocket Pen (tsf)	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
			CONCRETE (18 inches)										
			ASPHALT (3 inches)										
			CEMENTED BASE (3 inches)										
			LEAN CLAY (CL), rock fragments, dark gray, stiff, moist		78		5-6-6	12	3.5				
4			SANDY LEAN CLAY (CL), rock fragments, dark brown, soft, moist		67		4-2-2	4	2.5	11.5			
			SILT (ML), brown, loose, moist		67		2-4-5	9	3.0	20.6			
8			LEAN CLAY (CL), black nodules, oxidation, gray, firm, moist		94		2-3-4	7	2.75	24.8			
			BORING TERMINATED AT 10 FBGS										
12													
16													
20													

Completion Depth (ft.): **10.0**  
 Date Started: **5/15/19**  
 Date Completed: **5/15/19**  
 Drilled By: **Geotechnology**  
 Logged By: **K. Andrus**

Remarks: **CME 55 Drill Rig. 6" Flight Auger. Backfilled with sand and patched with concrete. Dry upon completion.**

# KSWA BORING LOG



## BORING NO. B-16

PROJECT NAME: MSCAA Taxiway Alpha West

LOCATION: Memphis, TN

PROJECT NO.: 100-19-0019

Sheet 1 of 1

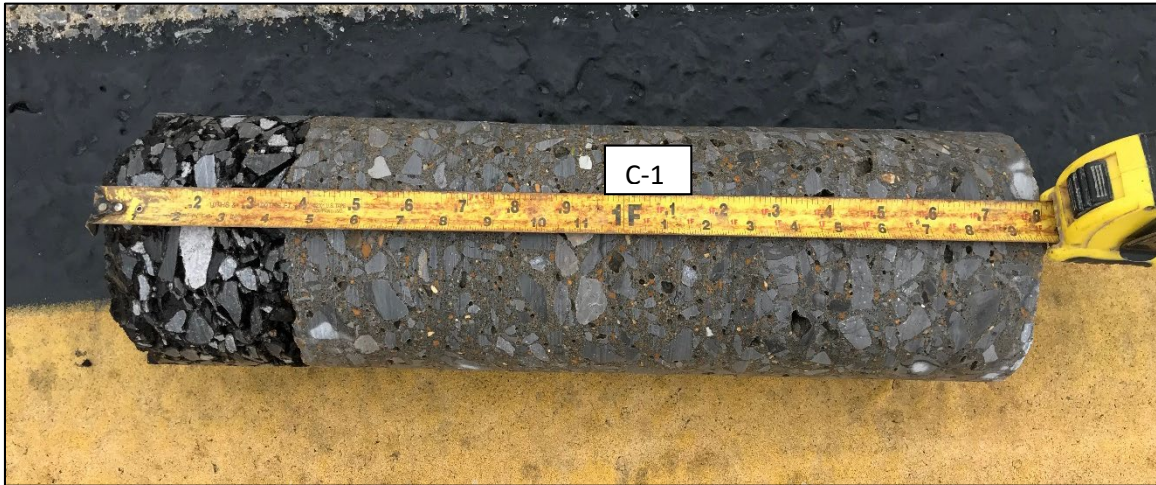
Depth, feet	Graphic Log	Approx. Surface El. (feet, MSL): Location: See Map	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	N-Value	Pocket Pen (tsf)	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
			CONCRETE (19 Inches)										
			ASPHALT (3 inches)										
			CEMENTED BASE (2 inches)										
			LEAN CLAY (CL), gray, stiff, moist (FILL)		67		3-7-6	13					
4			LEAN CLAY (CL), wood chips, black streaking, gray-brown, stiff, moist (FILL)		67		6-6-7	13	4.5	18.6			
			SILT (ML), brown, v. loose, moist		56		3-1-2	3	1.5	21.2			
8			LEAN CLAY (CL), oxidation, gray-brown, firm, moist to dry		67		2-3-4	7	2.5	22.4			
			BORING TERMINATED AT 10 FBGS										
12													
16													
20													

Completion Depth (ft.): **10.0**  
 Date Started: **5/14/19**  
 Date Completed: **5/14/19**  
 Drilled By: **Geotechnology**  
 Logged By: **K. Andrus**

Remarks: **CME 55 Drill Rig. 6" Flight Auger. Backfilled with sand and patched with concrete.**



PAVEMENT CORE PHOTOGRAPHS  
TAXIWAY ALPHA WEST RECONSTRUCTION  
MEMPHIS INTERNATIONAL AIRPORT  
PROJECT NO. 100-19-0019



**Photo 1:** Concrete Core Location C-1



**Photo 2:** Concrete Core Location C-2



**Photo 3:** Concrete Core Location C-4



PAVEMENT CORE PHOTOGRAPHS  
TAXIWAY ALPHA WEST RECONSTRUCTION  
MEMPHIS INTERNATIONAL AIRPORT  
PROJECT NO. 100-19-0019



Photo 4: Concrete Core Location C-7



Photo 5: Concrete Core Location C-8



Photo 6: Concrete Core Location C-9



PAVEMENT CORE PHOTOGRAPHS  
TAXIWAY ALPHA WEST RECONSTRUCTION  
MEMPHIS INTERNATIONAL AIRPORT  
PROJECT NO. 100-19-0019



Photo 7: Concrete Core Location C-10

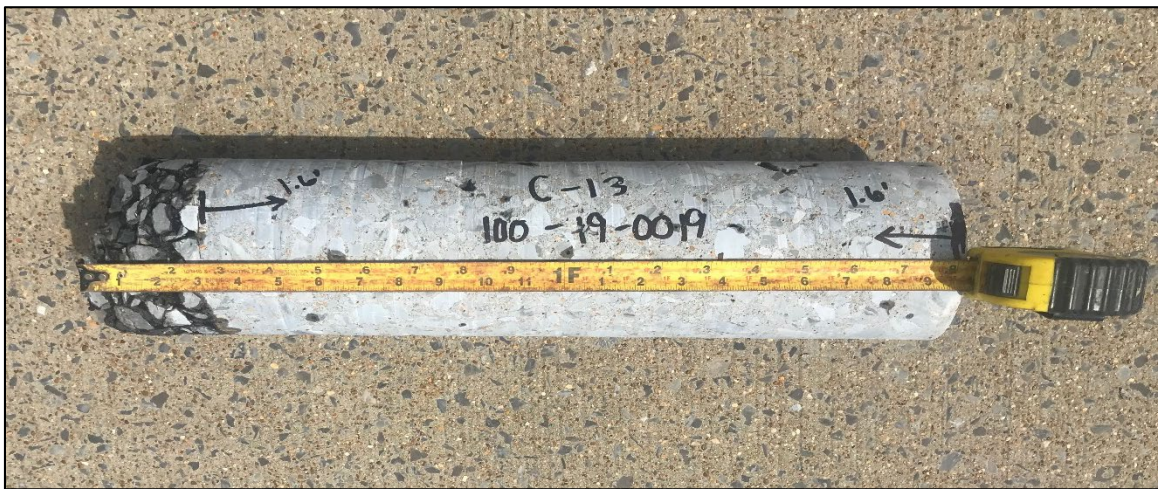


Photo 8: Concrete Core Location C-13

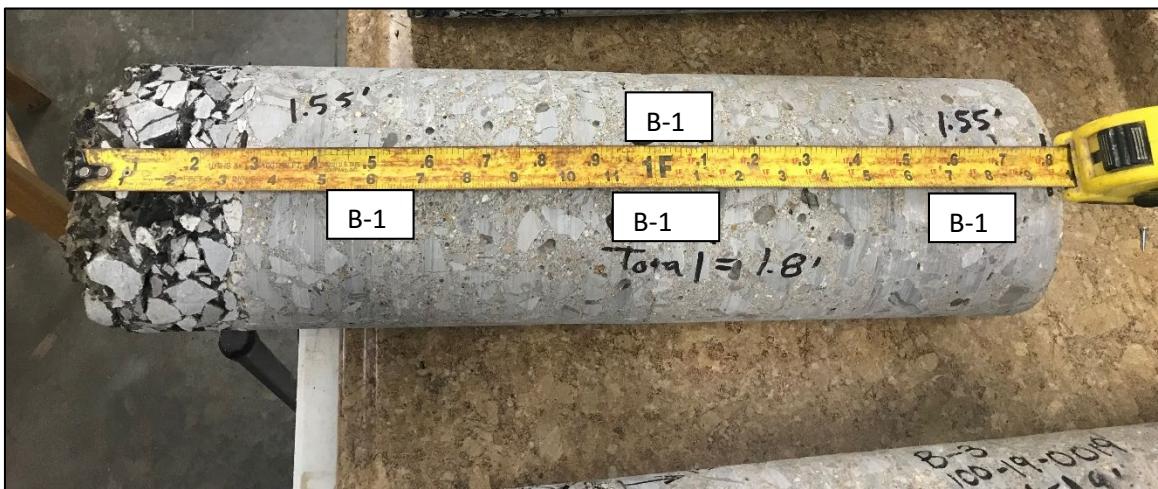


Photo 9: Concrete Core Location B-1



PAVEMENT CORE PHOTOGRAPHS  
TAXIWAY ALPHA WEST RECONSTRUCTION  
MEMPHIS INTERNATIONAL AIRPORT  
PROJECT NO. 100-19-0019



Photo 10: Concrete Core Location B-2



Photo 11: Concrete Core Location B-3



Photo 12: Concrete Core Location B-4



PAVEMENT CORE PHOTOGRAPHS  
TAXIWAY ALPHA WEST RECONSTRUCTION  
MEMPHIS INTERNATIONAL AIRPORT  
PROJECT NO. 100-19-0019



Photo 13: Concrete Core Location B-5



Photo 14: Concrete Core Location B-6



Photo 15: Concrete Core Location B-8



PAVEMENT CORE PHOTOGRAPHS  
TAXIWAY ALPHA WEST RECONSTRUCTION  
MEMPHIS INTERNATIONAL AIRPORT  
PROJECT NO. 100-19-0019



Photo 16: Concrete Core Location B-9

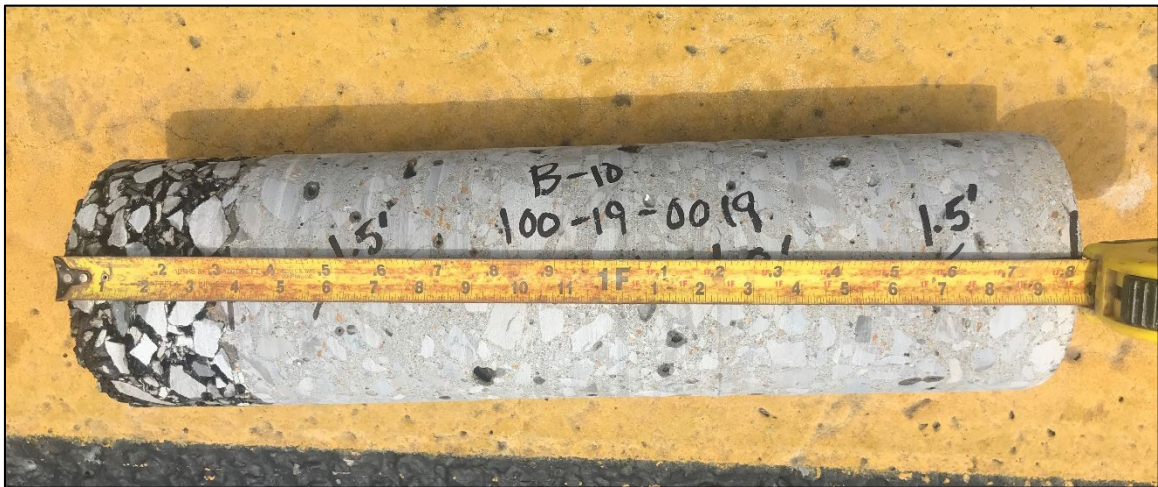


Photo 17: Concrete Core Location B-10

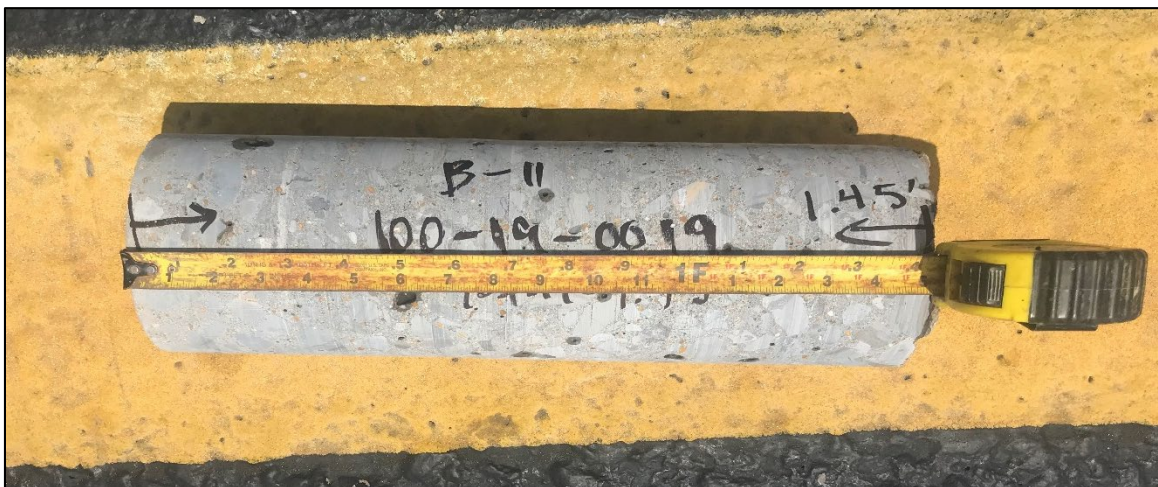


Photo 18: Concrete Core Location B-11



PAVEMENT CORE PHOTOGRAPHS  
TAXIWAY ALPHA WEST RECONSTRUCTION  
MEMPHIS INTERNATIONAL AIRPORT  
PROJECT NO. 100-19-0019

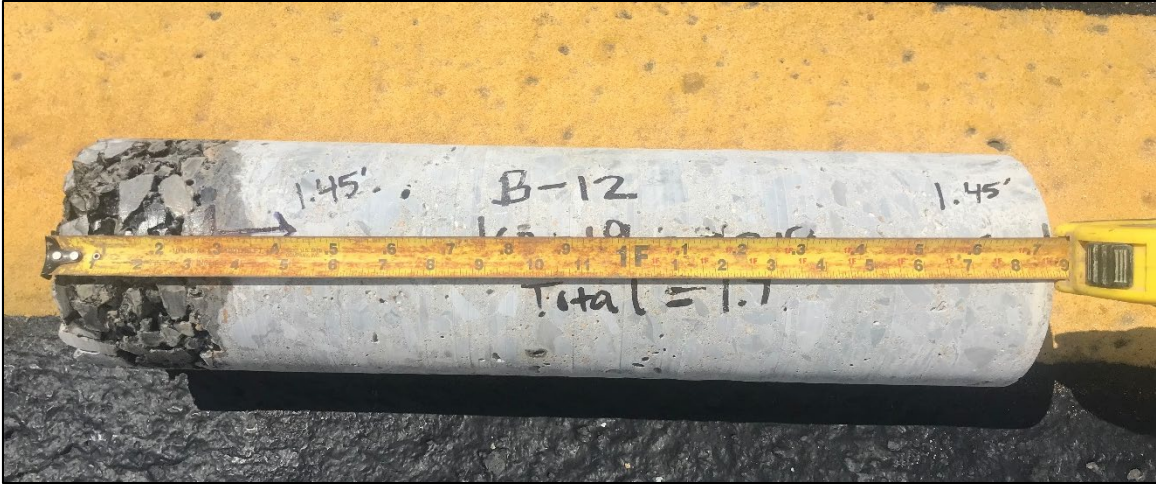


Photo 19: Concrete Core Location B-12



Photo 20: Concrete Core Location B-13



Photo 21: Concrete Core Location B-14



PAVEMENT CORE PHOTOGRAPHS  
TAXIWAY ALPHA WEST RECONSTRUCTION  
MEMPHIS INTERNATIONAL AIRPORT  
PROJECT NO. 100-19-0019



**Photo 22:** Concrete Core Location B-15



**Photo 23:** Concrete Core Location B-16

# **APPENDIX C**

## Laboratory Test Results



# GRAIN SIZE DISTRIBUTION

## ASTM D6913 - COARSE GRAIN SIZE

## ASTM D7928 - FINE GRAIN SIZE

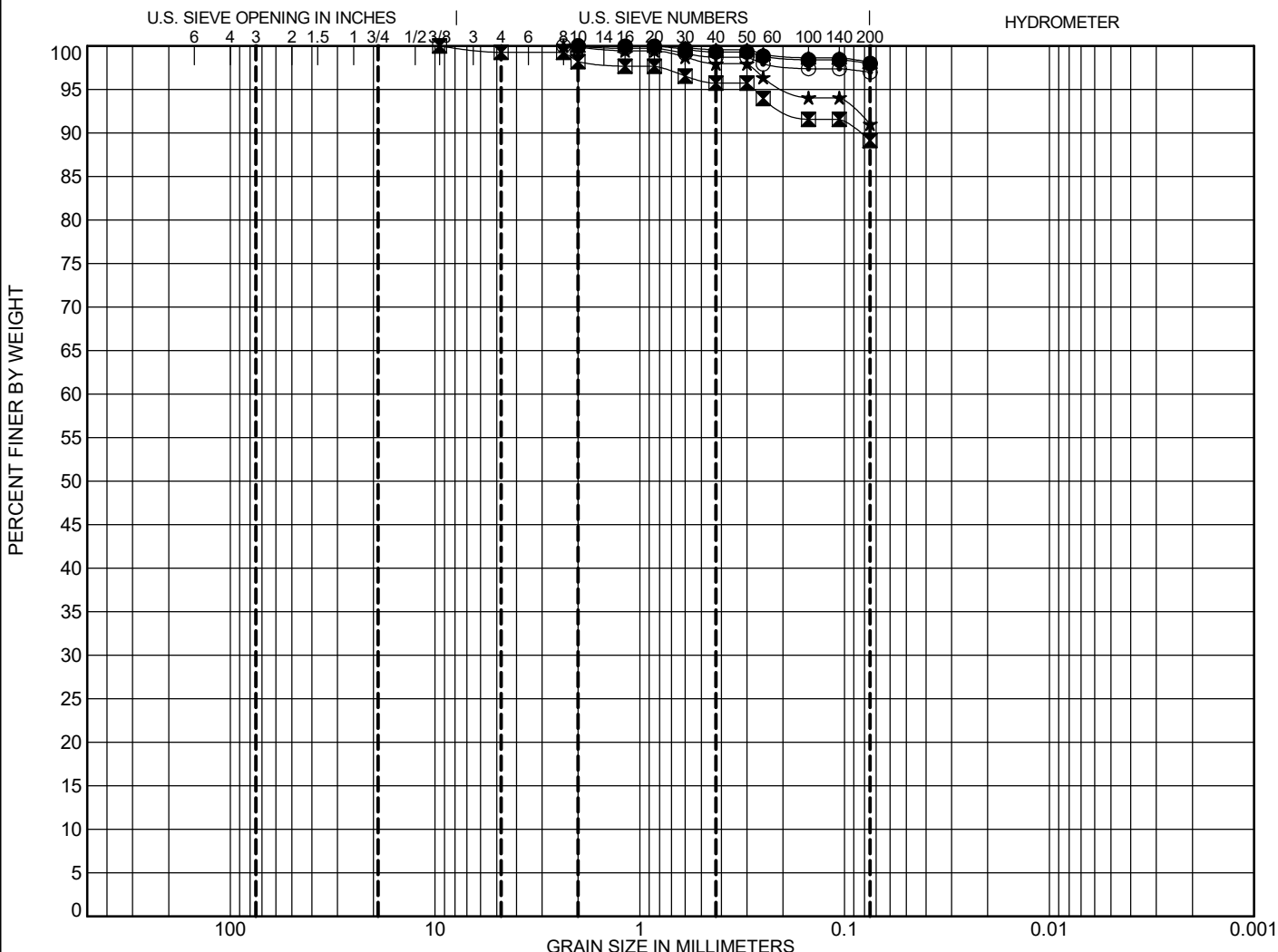
CLIENT: Allen & Hoshall

PROJECT NAME: MSCAA Taxiway Alpha West

PROJECT NUMBER 100-19-0019

PROJECT LOCATION: Memphis, TN

SOIL DESCRIPTION: Bulk sample from auger cuttings from depths of 2 to 10 feet



Specimen Identification	GRAVEL			SAND			SILT OR CLAY				
	coarse	fine		coarse	medium	fine					
● B-01, 6'	SILT (ML)						Spec. Grav.	LL	PL	PI	Cc
■ B-02, 10'	LEAN CLAY (CL)							NP	NP	NP	
▲ B-03, 6'	SILT (ML)							36	22	14	
★ B-05, 3.5'	LEAN CLAY (CL)							NP	NP	NP	
⊙ B-08, 10'	LEAN CLAY (CL)							42	18	24	
								33	23	10	
Specimen Identification	D <sub>100</sub>	D <sub>60</sub>	D <sub>30</sub>	D <sub>10</sub>	%Gravel	%Sand	%Silt	%Clay			
● B-01, 6'	2				0.0	2.0		98.0			
■ B-02, 10'	9.5				0.7	10.1		89.1			
▲ B-03, 6'	2				0.0	1.9		98.1			
★ B-05, 3.5'	2.36				0.0	9.0		91.0			
⊙ B-08, 10'	2.36				0.0	3.0		97.0			

TESTED BY: Z. Shannon

TEST DATE: 6/11/2019

REVIEWED BY: B. Kouchoukos

DATE: 6/12/2019

# GRAIN SIZE DISTRIBUTION

## ASTM D6913 - COARSE GRAIN SIZE

## ASTM D7928 - FINE GRAIN SIZE

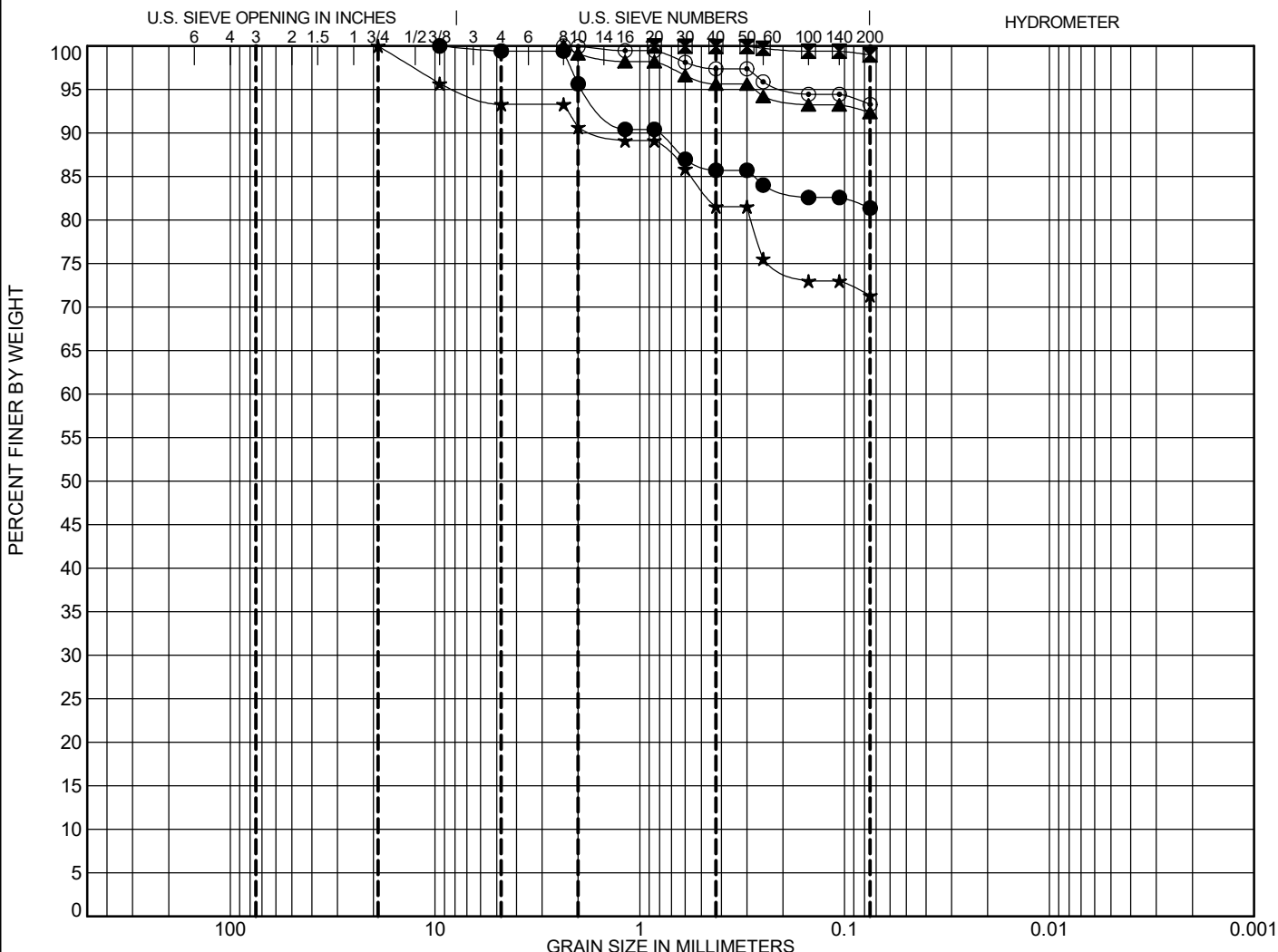
CLIENT: Allen & Hoshall

PROJECT NAME: MSCAA Taxiway Alpha West

PROJECT NUMBER 100-19-0019

PROJECT LOCATION: Memphis, TN

SOIL DESCRIPTION: \_\_\_\_\_



COBBLES	GRAVEL		SAND			SILT OR CLAY				
	coarse	fine	coarse	medium	fine					

Specimen Identification		Classification				Spec. Grav.	LL	PL	PI	Cc	Cu
●	B-09, 3.5'	SILT (ML)					NP	NP	NP		
☒	B-11, 6'	SILT (ML)					NP	NP	NP		
▲	B-12, 3.5'	LEAN CLAY(CL)					37	24	13		
★	B-12, 10'	LEAN CLAY with SAND(CL)					33	22	11		
⊙	B-13, 3.5'	LEAN CLAY(CL)					35	22	13		
Specimen Identification		D <sub>100</sub>	D <sub>60</sub>	D <sub>30</sub>	D <sub>10</sub>	%Gravel	%Sand	%Silt	%Clay		
●	B-09, 3.5'	9.5				0.6	18.0	81.4			
☒	B-11, 6'	0.85				0.0	1.0	99.0			
▲	B-12, 3.5'	2.36				0.0	7.7	92.3			
★	B-12, 10'	19				6.7	22.0	71.3			
⊙	B-13, 3.5'	2.36				0.0	6.7	93.3			

TESTED BY: Z. Shannon

TEST DATE: 6/11/2019

REVIEWED BY: B. Kouchoukos

DATE: 6/12/2019



K. S. Ware & Associates, L.L.C.  
Geotechnical • CEI • Environmental

54 Lindsley Avenue  
Nashville, Tennessee 37210  
Phone: (615) 255-9702  
Fax: (615) 256-5873

## ATTERBERG LIMITS (ASTM D4318)

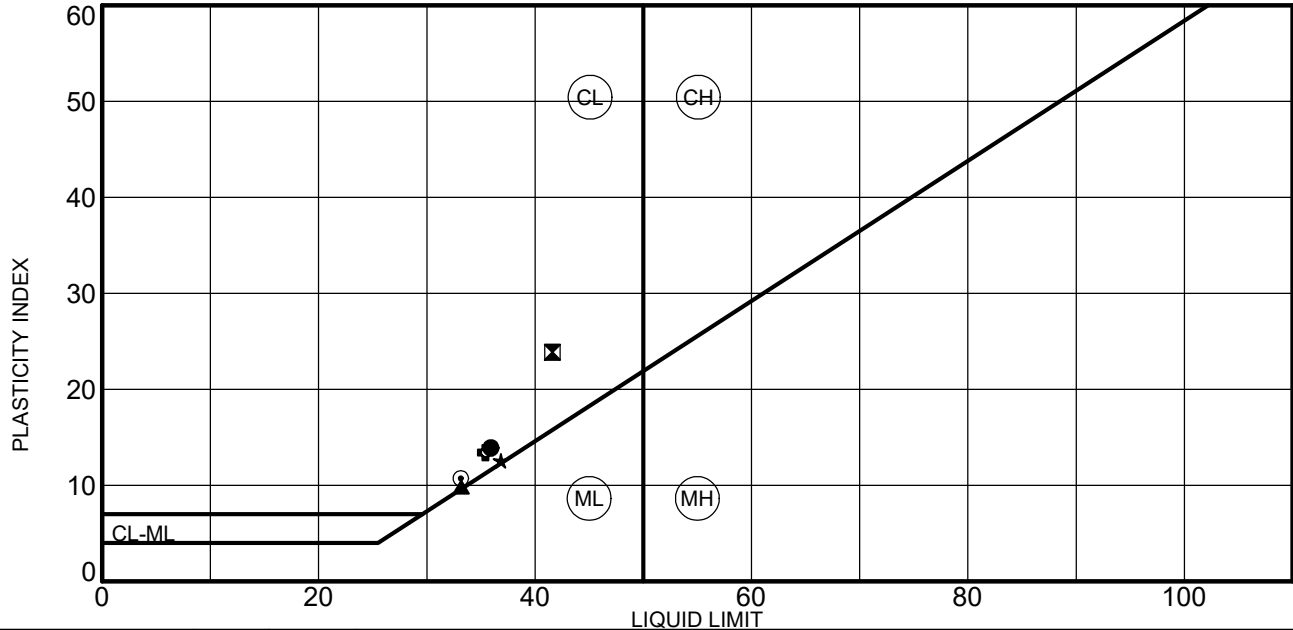
CLIENT: Allen & Hoshall

PROJECT NAME: MSCAA Taxiway Alpha West

PROJECT NUMBER 100-19-0019

PROJECT LOCATION: Memphis, TN

Equipment Used: Liquid Limit Device, Oven, Ohaus 3kg Scale, Metal Tares, Mortar and Pestle, Spatula, Plastic Grooving Tool



Specimen Identification	SAMPLE TYPE	LL	PL	PI	% Fines	Soil Description
● B-02, 10'	B	36	22	14	89	LEAN CLAY(CL)
⊠ B-05, 3.5'	SS	42	18	24	91	LEAN CLAY(CL)
▲ B-08, 10'	B	33	23	10	97	LEAN CLAY(CL)
★ B-12, 3.5'	SS	37	24	13	92	LEAN CLAY(CL)
⊙ B-12, 10'	B	33	22	11	71	LEAN CLAY with SAND(CL)
⊕ B-13, 3.5'	SS	35	22	13	93	LEAN CLAY(CL)
B-1, 6'	ST	NP	NP	NP	98	SILT(ML)
B-3, 6'	ST	NP	NP	NP	98	SILT(ML)
B-9, 3.5'	ST	NP	NP	NP	81	SILT(ML)
B-11, 6'	ST	NP	NP	NP	99	SILT(ML)

**Abbreviations:**  
NP = Non-plastic  
LL = Liquid Limit  
PL = Plastic Limit  
PI = Plasticity Index  
SS = Split Spoon  
ST = Shelby Tube  
G = Grab Sample  
B = Bulk Sample

TESTED BY: Z. Shannon

TEST DATE: 6/6/2019

REVIEWED BY: B. Kouchoukos

DATE: 6/11/2019

# MODIFIED PROCTOR (ASTM D1557)

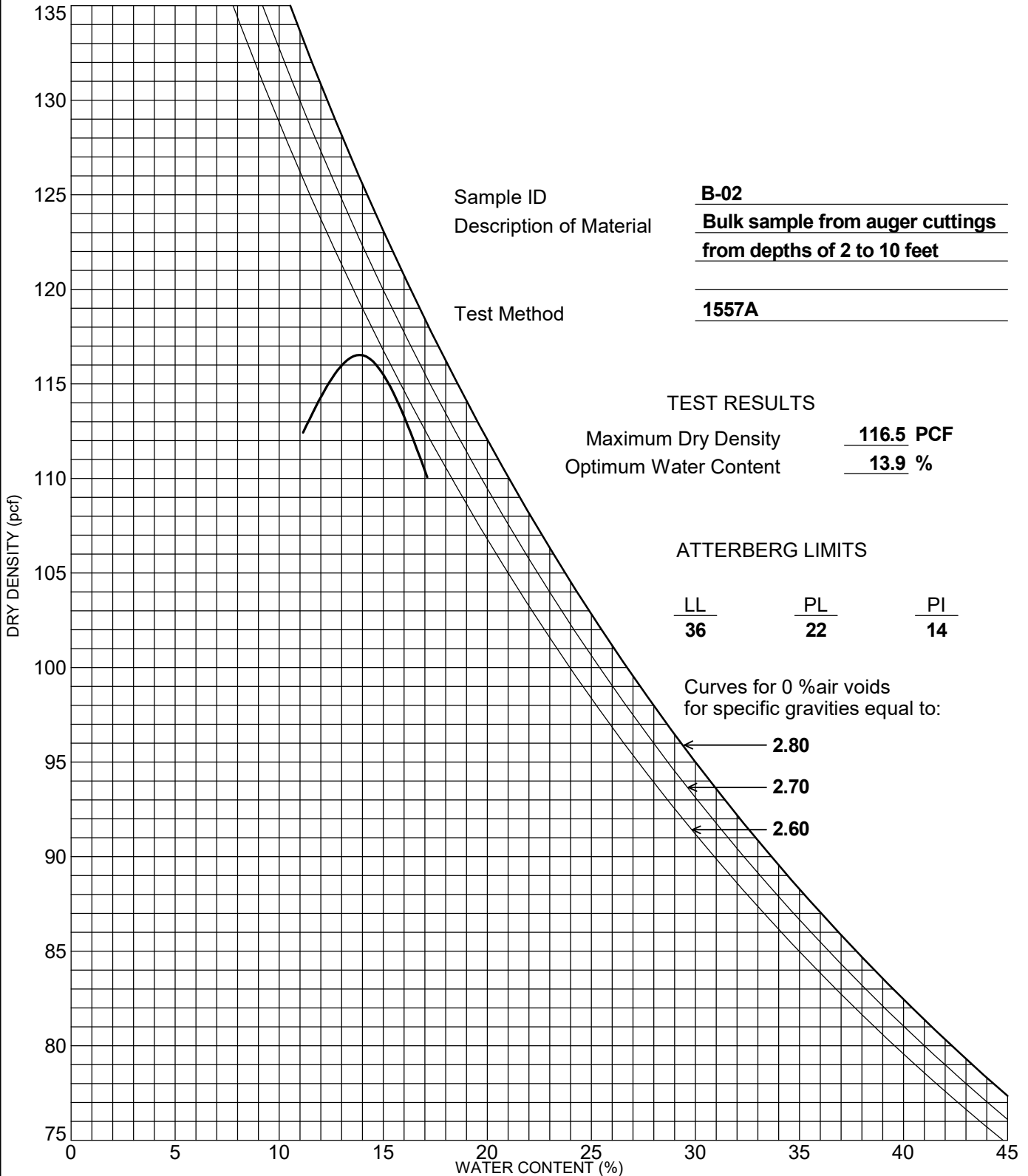
CLIENT: Allen & Hoshall

PROJECT NAME: MSCAA Taxiway Alpha West

PROJECT NUMBER 100-19-0019

PROJECT LOCATION: Memphis, TN

EQUIPMENT USED: Modified Hammer, 4 inch Mold, Ohaus 3 kilogram Scale, Oven, Ohaus 8 kilogram Scale



TESTED BY: Z. Shannon  
REVIEWED BY: B. Kouchoukos

TEST DATE: 5/23/2019  
DATE: 6/12/2019

SAMPLE RECEIVED: 5/21/2019

# MODIFIED PROCTOR (ASTM D1557)

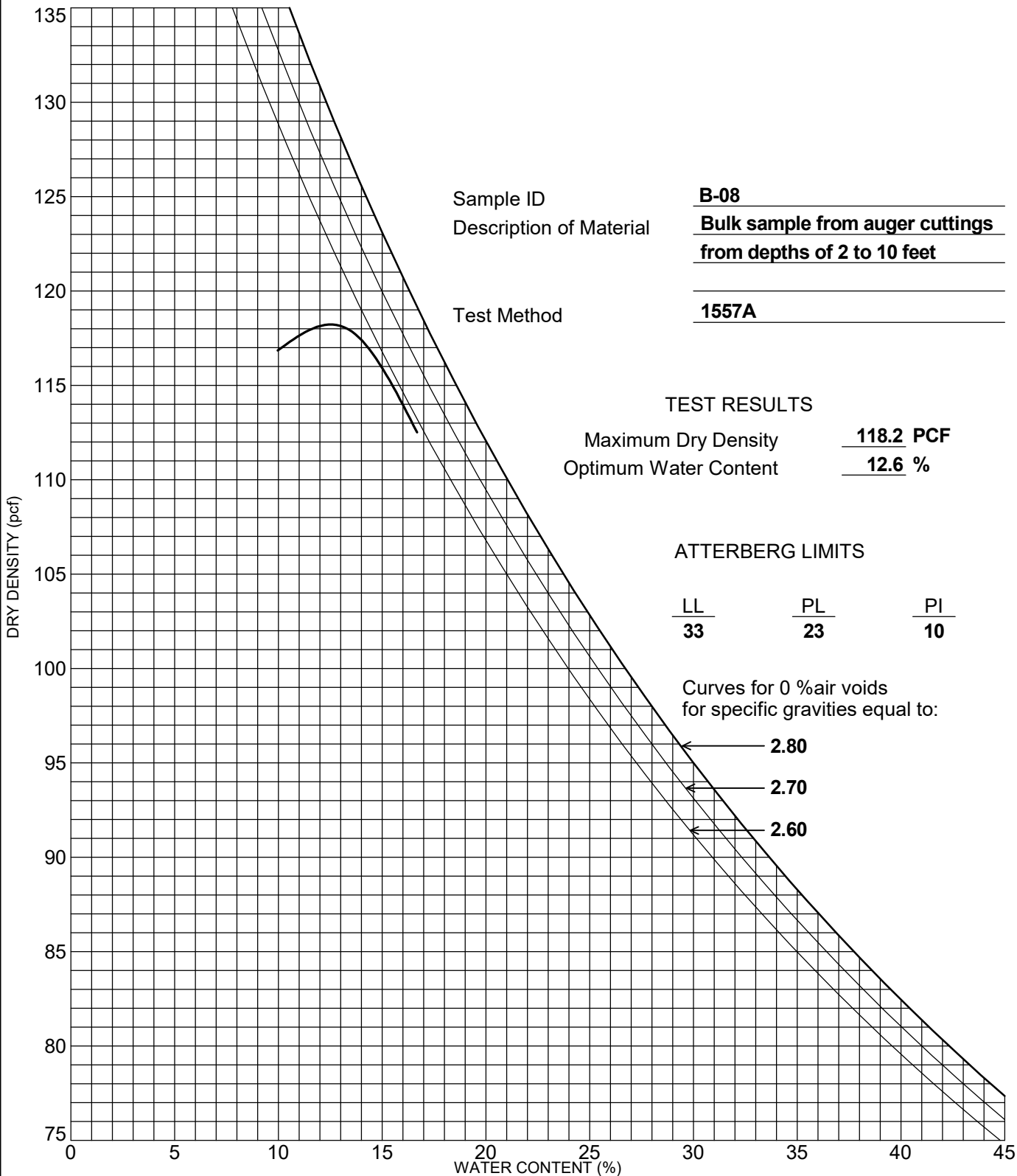
CLIENT: Allen & Hoshall

PROJECT NAME: MSCAA Taxiway Alpha West

PROJECT NUMBER 100-19-0019

PROJECT LOCATION: Memphis, TN

EQUIPMENT USED: Modified Hammer, 4 inch Mold, Ohaus 3 kilogram Scale, Oven, Ohaus 8 kilogram Scale



TESTED BY: Z. Shannon  
REVIEWED BY: B. Kouchoukos

TEST DATE: 6/5/2019  
DATE: 6/12/2019

SAMPLE RECEIVED: 5/21/2019

# MODIFIED PROCTOR (ASTM D1557)

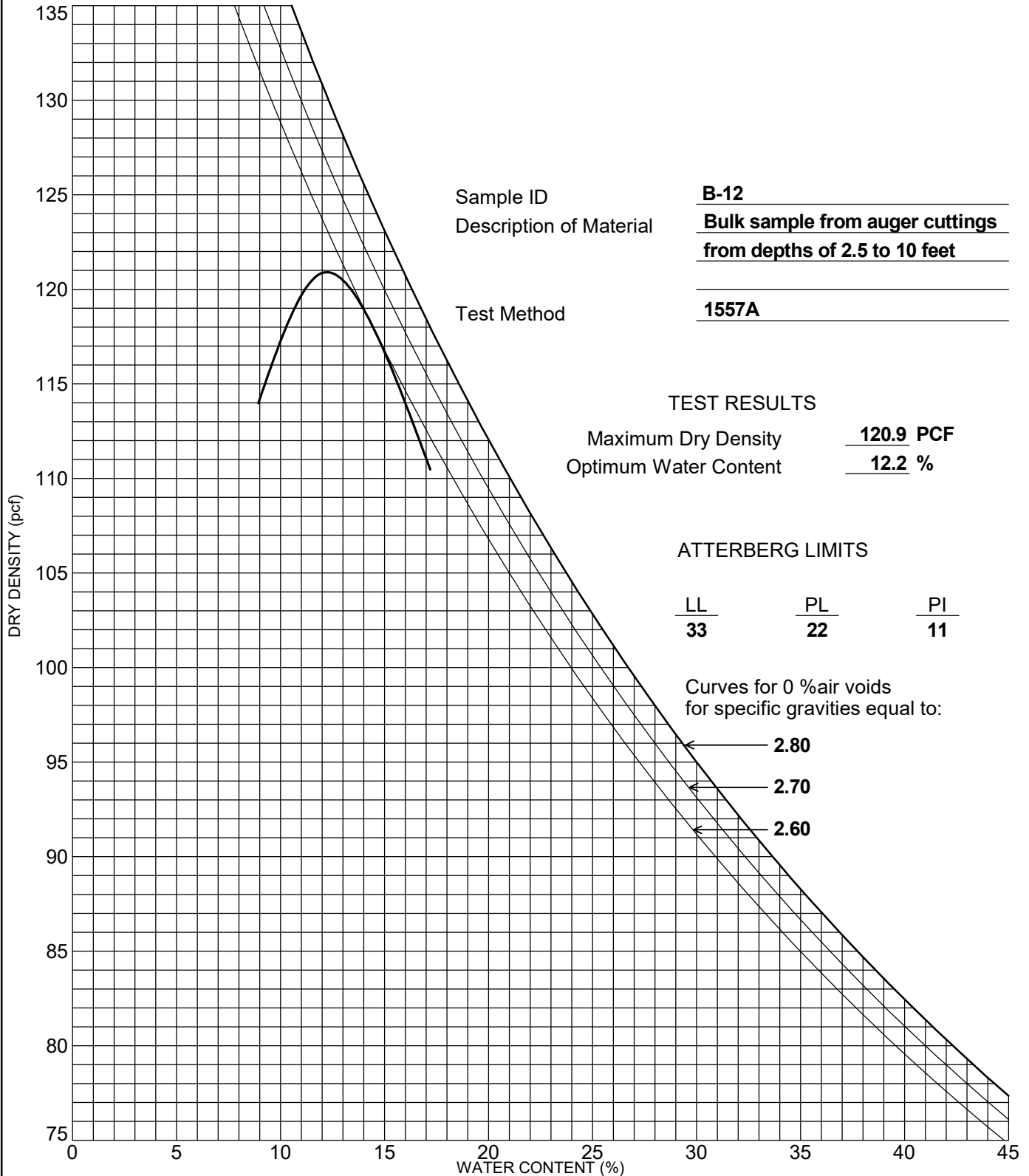
CLIENT: Allen & Hoshall

PROJECT NAME: MSCAA Taxiway Alpha West

PROJECT NUMBER 100-19-0019

PROJECT LOCATION: Memphis, TN

EQUIPMENT USED: Modified Hammer, 4 inch Mold, Ohaus 3 kilogram Scale, Oven, Ohaus 8 kilogram Scale



TESTED BY: Z. Shannon  
REVIEWED BY: B. Kouchoukos

TEST DATE: 6/5/2019  
DATE: 6/12/2019

SAMPLE RECEIVED: 5/21/2019

# UNCONFINED COMPRESSIVE STRENGTH TEST COHESIVE SOIL (ASTM D2166)

CLIENT: Allen & Hoshall

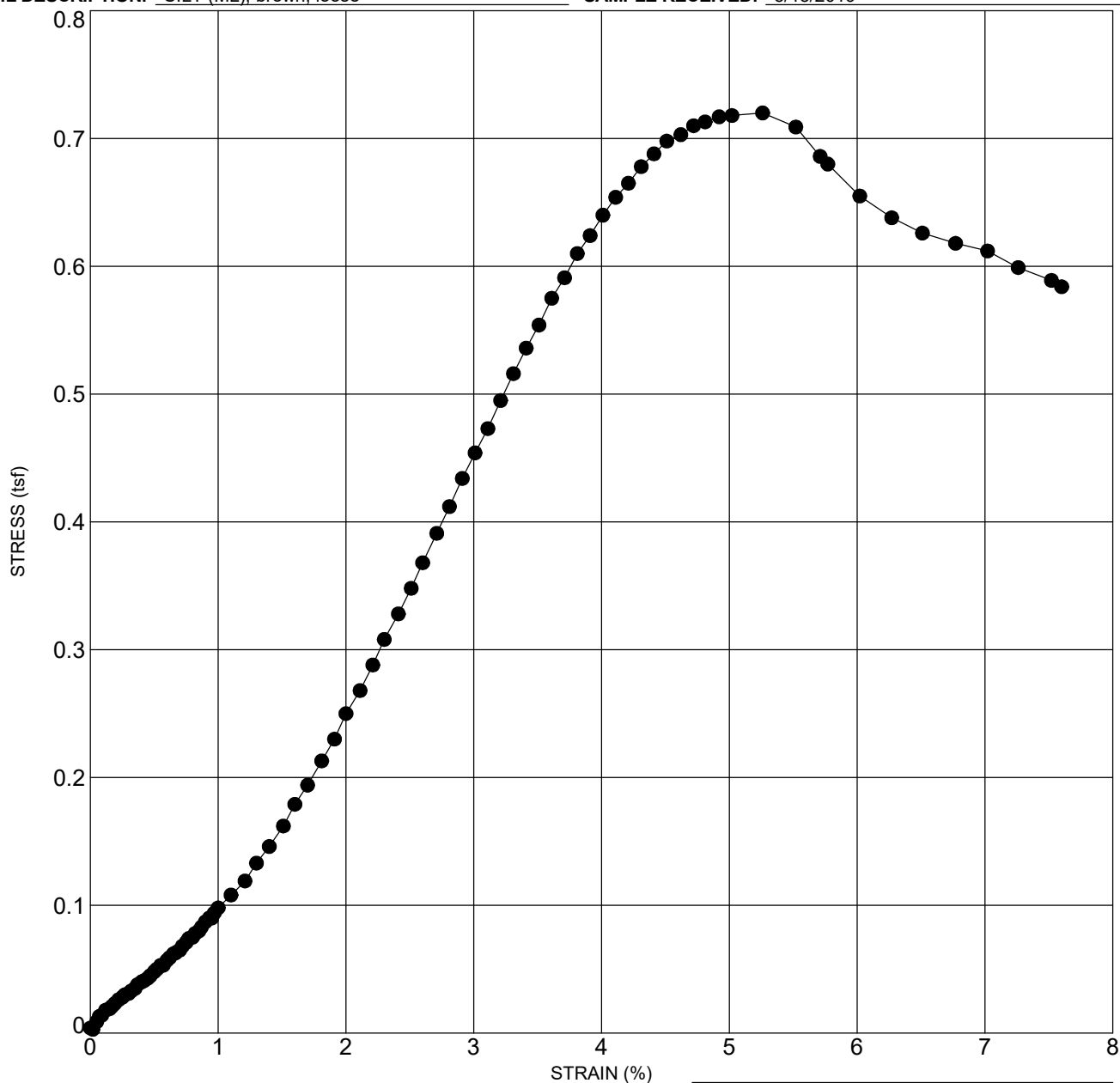
PROJECT NAME: MSCAA Taxiway Alpha West

PROJECT NUMBER 100-19-0019

PROJECT LOCATION: Memphis, TN

SOIL DESCRIPTION: SILT (ML), brown, loose

SAMPLE RECEIVED: 5/13/2019



SAMPLE: B-01

Diameter (in): 2.82

Strain at Failure (%): 5.26

Height (in): 5.52

Strength (tsf): 0.72

Ratio (h/d): 1.96

Dry Density (pcf): 93.40

LL: NP

Water Content (%): 30.15922

PL: NP

Rate of Strain to Failure (%/min): 1

-Dry Density and Moisture content data were obtained after compression testing

-Specimen was an intact ST sample

TESTED BY: Z. Shannon

TEST DATE: 6/11/2019

REVIEWED BY: B. Kouchoukos

APPROVED DATE: 6/14/2019



# UNCONFINED COMPRESSIVE STRENGTH TEST COHESIVE SOIL (ASTM D2166)

CLIENT: Allen & Hoshall

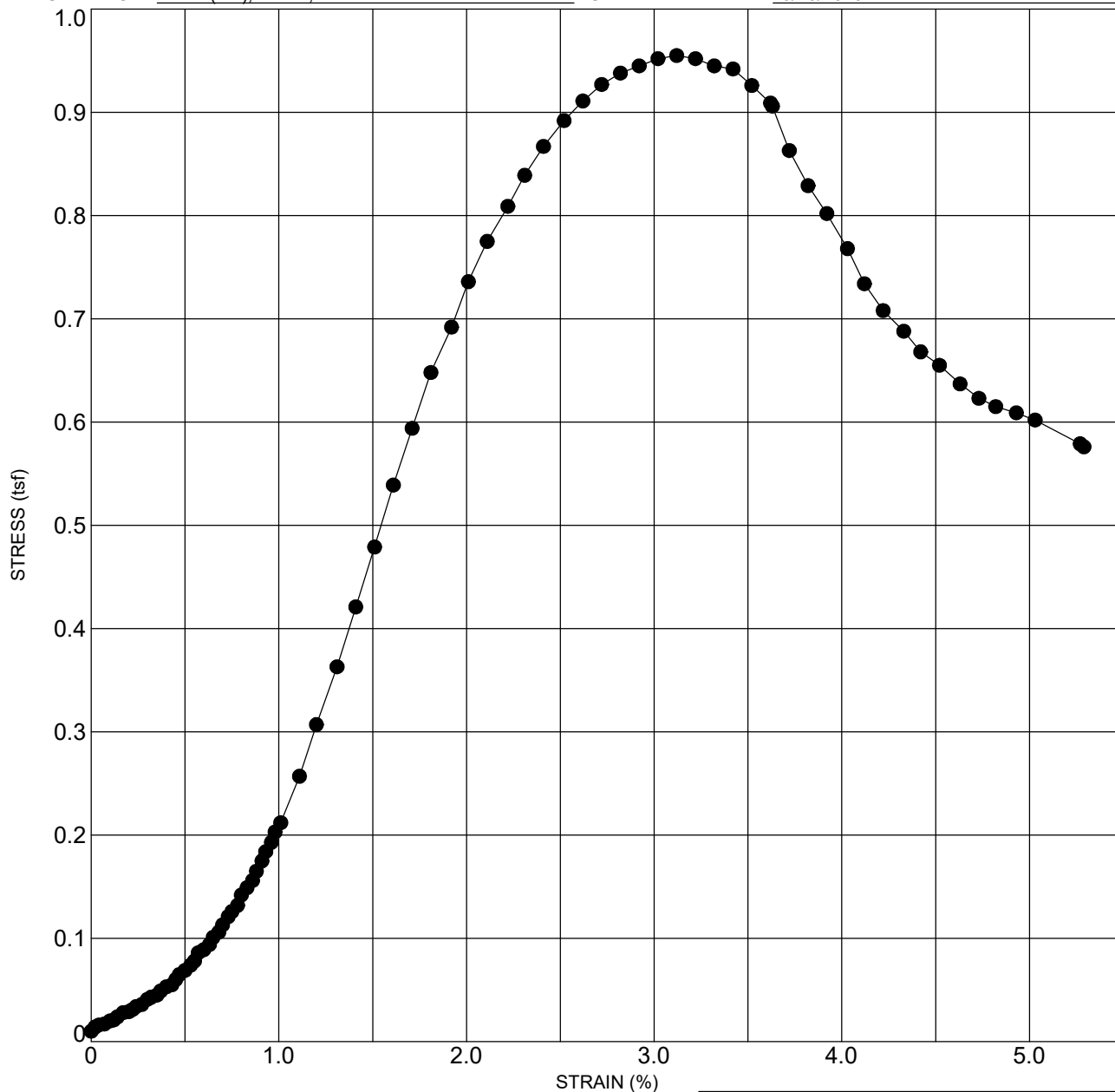
PROJECT NAME: MSCAA Taxiway Alpha West

PROJECT NUMBER 100-19-0019

PROJECT LOCATION: Memphis, TN

SOIL DESCRIPTION: SILT (ML), brown, loose

SAMPLE RECEIVED: 5/13/2019



SAMPLE: B-03

Diameter (in): 2.83

Strain at Failure (%): 3.12

Height (in): 5.51

Strength (tsf): 0.96

Ratio (h/d): 1.95

Dry Density (pcf): 96.00

LL: NP

Water Content (%): 28.90529

PL: NP

Rate of Strain to Failure (%/min): 1

-Dry Density and Moisture content data were obtained after compression testing

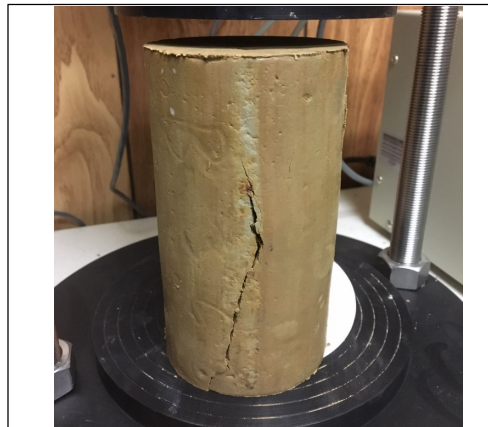
-Specimen was an intact ST sample

TESTED BY: Z. Shannon

TEST DATE: 6/11/2019

REVIEWED BY: B. Kouchoukos

APPROVED DATE: 6/14/2019





# UNCONFINED COMPRESSIVE STRENGTH TEST COHESIVE SOIL (ASTM D2166)

CLIENT: Allen & Hoshall

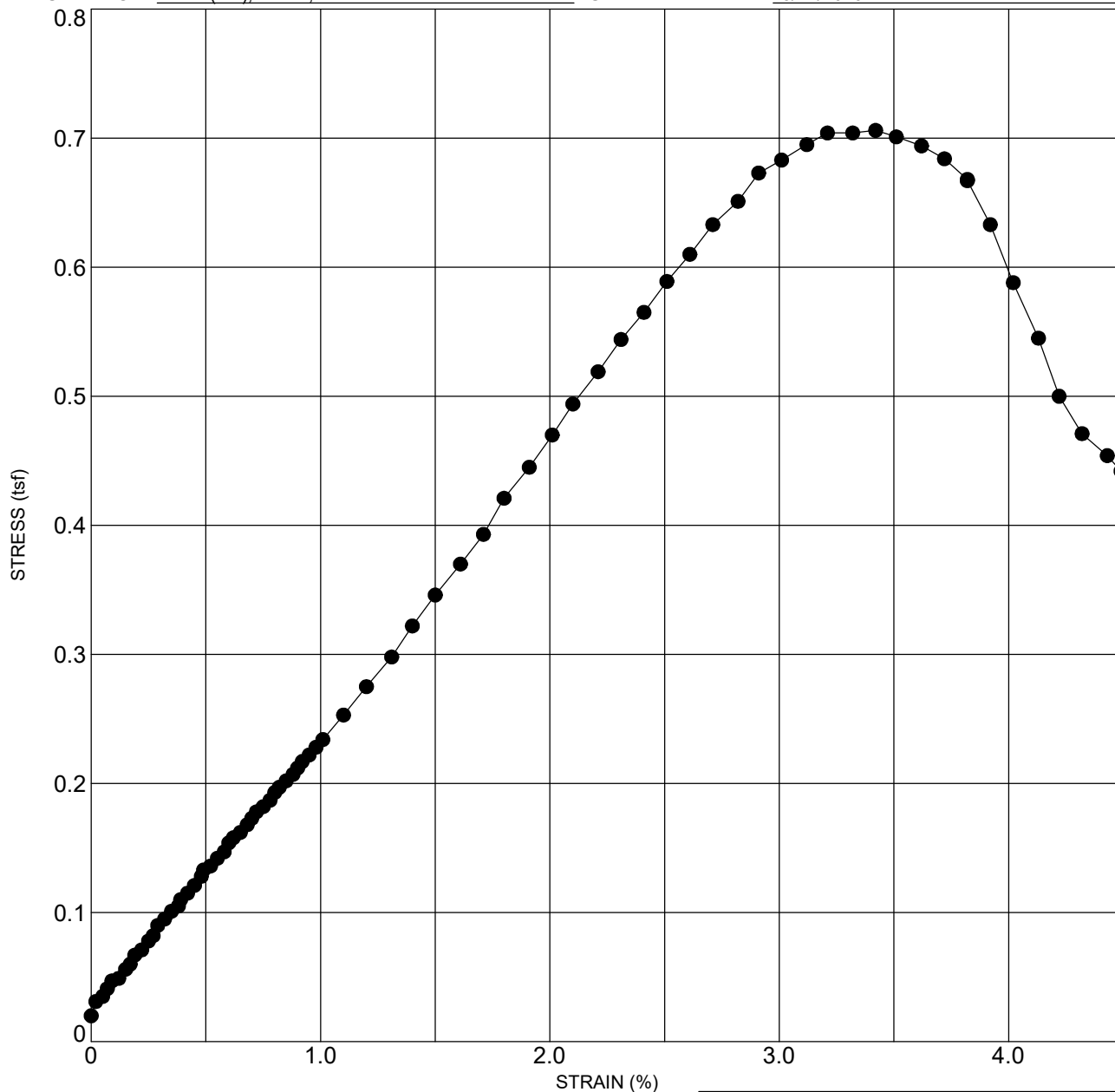
PROJECT NAME: MSCAA Taxiway Alpha West

PROJECT NUMBER 100-19-0019

PROJECT LOCATION: Memphis, TN

SOIL DESCRIPTION: SILT (ML), brown, loose

SAMPLE RECEIVED: 5/21/2019



SAMPLE: B-11

Diameter (in): 2.80

Strain at Failure (%): 3.42

Height (in): 5.54

Strength (tsf): 0.71

Ratio (h/d): 1.98

Dry Density (pcf): 95.60

LL: NP

Water Content (%): 26.23669

PL: NP

Rate of Strain to Failure (%/min): 1

-Dry Density and Moisture content data were obtained after compression testing

-Specimen was an intact ST sample

TESTED BY: Z. Shannon

TEST DATE: 6/11/2019

REVIEWED BY: B. Kouchoukos

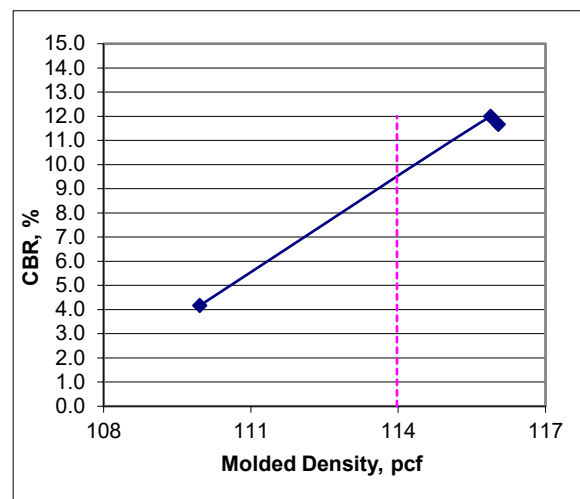
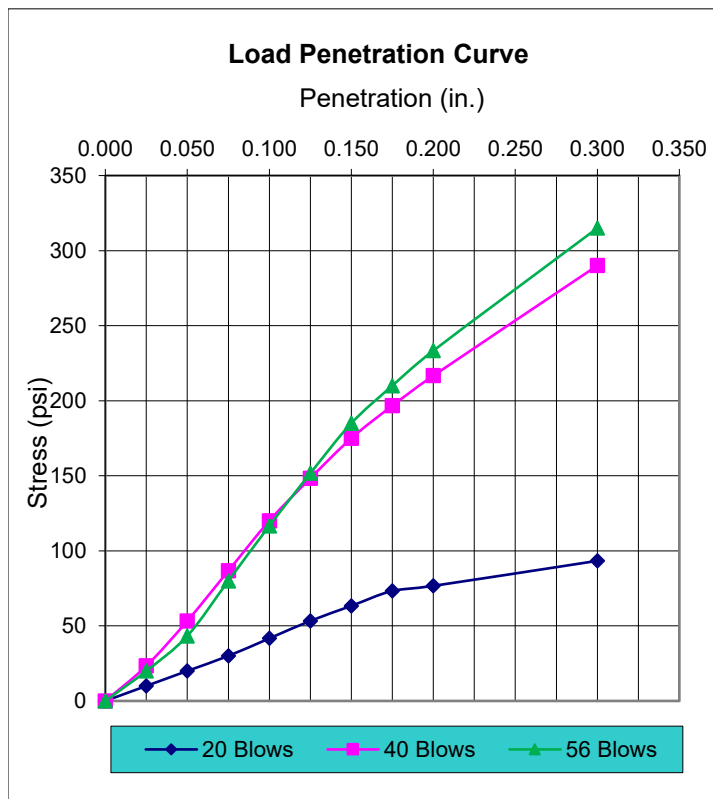
APPROVED DATE: 6/14/2019



## Report of California Bearing Ratio Test (ASTM D1883)

Project Name:	MSCAA	Proctor Type:	Modified
Project Number:	100-19-0019	Maximum Dry Density:	116.3
Sample ID:	B-2/B-5 Bulk	Optimum Moisture:	13.9
Date Received:	5/13/2019		
Sample Description:	LEAN CLAY (CL), brown, firm, moist		

Test # Blows	Pre-Test			Post-Test			CBR, %		Line Corr.	% Swell
	DD	% Max	%m	DD	% Max	%m	0.1"	0.2"		
20	110.0	94.5	13.1	104.6	90.0	25.3	4.2	4.2	0	2.574
40	115.9	99.6	12.7	113.5	97.6	18.6	12.0	11.7	0	1.702
56	116.0	99.8	13.6	113.4	97.5	19.7	11.7	12.3	0	1.942



**CBR\* = 9.5**

\* for 98% max DD and  
0.1 in. penetration

Submitted By:	Z. Shannon
Reviewed By:	B. Kouchoukos

Date:	6/11/2019
Date:	6/12/2019

K.S. Ware & Associates, LLC  
52 Lindsley Avenue, Suite 101  
Nashville, Tennessee 37210

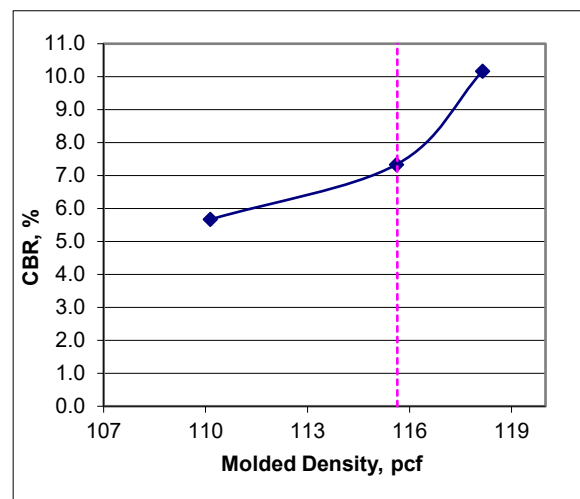
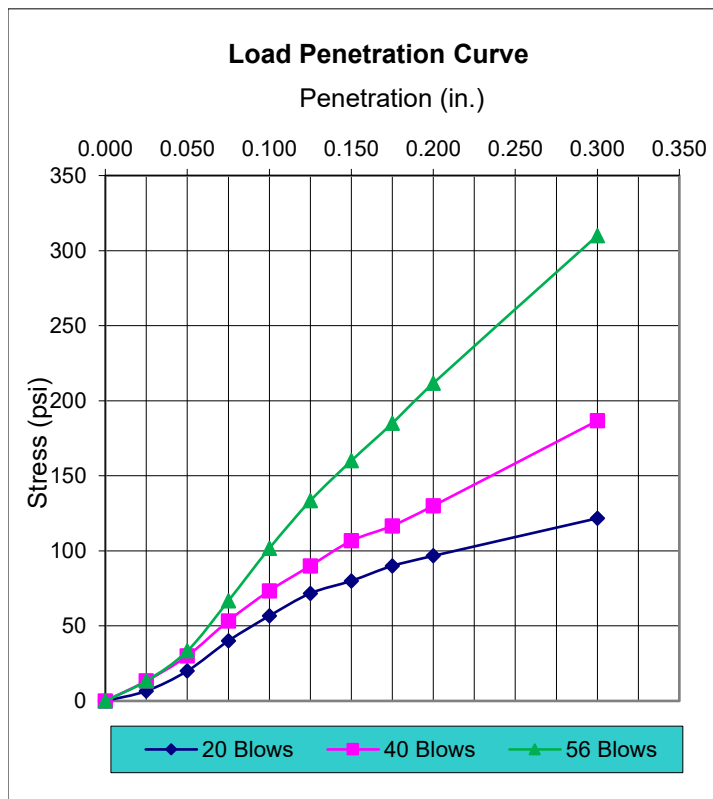
Phone (615) 255-9702  
Fax (615) 256-5873



## Report of California Bearing Ratio Test (ASTM D1883)

Project Name:	MSCAA	Proctor Type:	Modified
Project Number:	100-19-0019	Maximum Dry Density:	118.0
Sample ID:	B-8/B10	Optimum Moisture:	12.6
Date Received:	5/21/2019		
Sample Description:	LEAN CLAY (CL), brown, firm, moist		

Test # Blows	Pre-Test			Post-Test			CBR, %		Line Corr.	% Swell
	DD	% Max	%m	DD	% Max	%m	0.1"	0.2"		
20	110.1	93.3	13.6	107.6	91.2	21.8	5.7	5.3	0	1.942
40	115.6	98.0	13.0	112.7	95.5	20.0	7.3	7.1	0	2.225
56	118.1	100.1	13.0	114.7	97.2	19.3	10.2	10.7	0	1.876



**CBR\* = 7.0**

\* for 98% max DD and  
0.1 in. penetration

Submitted By:	Z. Shannon
Reviewed By:	B. Kouchoukos

Date:	6/11/2019
Date:	6/12/2019

K.S. Ware & Associates, LLC  
52 Lindsley Avenue, Suite 101  
Nashville, Tennessee 37210

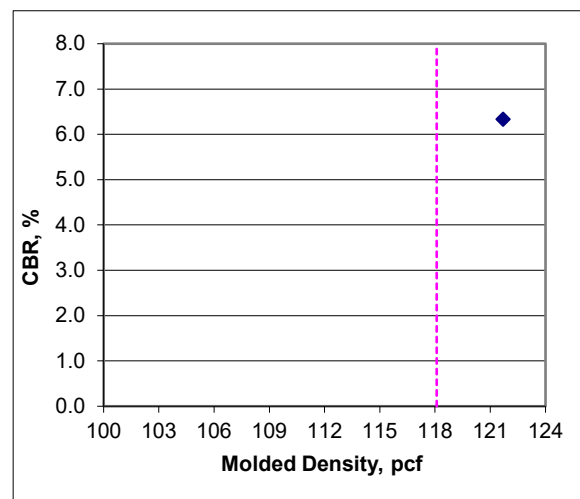
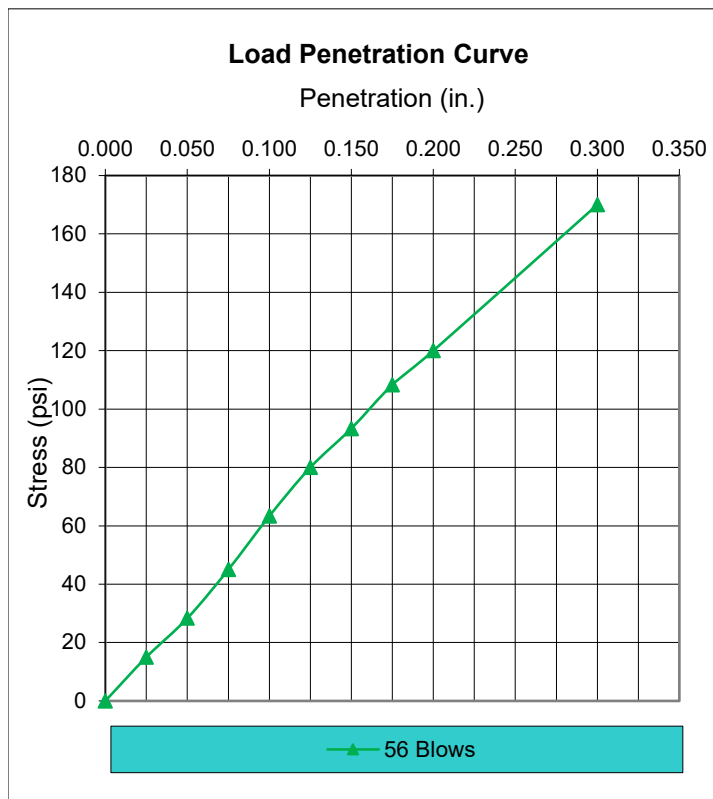
Phone (615) 255-9702  
Fax (615) 256-5873



## Report of California Bearing Ratio Test (ASTM D1883)

Project Name:	MSCAA	Proctor Type:	Modified
Project Number:	100-19-0019	Maximum Dry Density:	120.5
Sample ID:	B-12 Bulk	Optimum Moisture:	11.8
Date Received:	5/21/2019		
Sample Description:	LEAN CLAY (CL), brown, firm, moist		

Test # Blows	Pre-Test			Post-Test			CBR, %		Line Corr.	% Swell
	DD	% Max	%m	DD	% Max	%m	0.1"	0.2"		
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0
25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0
56	121.7	101.0	11.4	117.8	97.8	18.4	6.3	6.2	0	2.552



**CBR\* = 6.0**

\* for 98% max DD and  
0.1 in. penetration

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