

# PROJECT MANUAL

Including

**PROPOSAL, CONTRACT AND SPECIFICATIONS**

## **HANGAR DEVELOPMENT 2026 FOR BIDDING**

MORROW COUNTY AIRPORT  
CARDINGTON, OHIO

*prepared by*



**CRAWFORD, MURPHY & TILLY, INC.**  
ENGINEERS AND CONSULTANTS

MARCH 26, 2026

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## DIVISION 1

### NOTICE TO BIDDERS

Morrow County Board of Commissioners, in anticipation of receiving ODOT Aviation grant funding under the Airport Supplemental funding program, is inviting experienced contractors and suppliers to submit bid proposals for the Hangar Development 2026 project. All bids shall be submitted to the Morrow County Board of Commissioners' Purchasing Department, attention Mr. Jamie Brucker, and received by no later than 9:15 AM Local Time on Wednesday, April 22, 2026.

A complete set of Bid Documents may be obtained online at [www.questCDN.com](http://www.questCDN.com) using Quest Number 10084864 for a non-refundable charge of \$22.00. Contact QuestCDN.com at 952-233-1632 or [info@questcdn.com](mailto:info@questcdn.com) for assistance in membership and downloading this digital project information.

A non-mandatory Pre-Bid Meeting will be held on Thursday, April 9 2026, at 2:00 PM at the Morrow County Airport, Cardington, OH – Main FBO Terminal 4679 Township Rd 126, Cardington, OH 43315. Morrow County Board of Commissioners reserves the right to accept or reject any or all Bids without further action. Questions concerning this project shall be submitted in writing to Ben Cooley, Crawford Murphy & Tilly, at [bcooley@cmtengr.com](mailto:bcooley@cmtengr.com)

**Contract Work Items.** A general description of the project includes:

- Asphalt Pavement for taxiways
- Building Foundation Construction
- Electrical Service
- Construction of a 4-unit box hangar with one (1) truck-garage prefabricated metal building
- Pavement Markings
- Airfield Safety during Construction and implementation of the Construction Safety Phasing Plan

**Contract Time.** The Owner has established a contract performance time of 300 consecutive calendar days from the date of the Notice To Proceed for all project work with phasing as detailed in the plan sheet. All project work shall be substantially completed within the stated timeframe. This project is subject to liquidated damages as prescribed within the Project Manual.

**Bid Security.** Each Bid must be accompanied by a Bid Security pursuant to Chapter 1305 of the Ohio Revised Code, in the amount stated and payable to the order of the Owner. The Bid security shall be in the form of either

- A. A Bid Bond for the full amount of the Bid issued by a surety licensed to do business in the State of Ohio, or
- B. A certified check, cashier's check or letter of credit. Letter of credit shall be revocable only at the option of the Owner. The amount of the certified check, cashier's check, or letter of credit shall be equal to ten percent (10%) of the bid.

**Performance & Payment Bond.** The successful bidder will be required to furnish separate performance and payment bonds each in an amount equal to one-hundred (100) percent of the contract price at the time of contract execution.

**Award of Contract.** All proposals submitted in accordance with the instructions presented herein will be subject to evaluation. Bids may be held by the Morrow County Board of Commissioners for a period not to exceed 90 days from the date of the bid opening for the purpose of evaluating bids prior to award of contract. The right is reserved, as Morrow County Board of Commissioners may require, to reject any and all bids and to waive any informality or irregularity in the bids received.

Bidders must submit a bid for the Base Bid. Award of this contract will be made to the lowest responsive and responsible bidder.

Award of contract is contingent upon the Owner receiving state assistance from the ODOT Supplemental Direct Grant for General Aviation Airports.

**Sales Tax.** The Morrow County Board of Commissioners will provide sales tax-exempt documentation for the Contractor for necessary purchase of materials and equipment associated with the project used or supplied during construction.

**Submittal of Proposals.** Additional information and instructions for submitting a proposal are provided within the Instructions-to-Bidders.

Sealed bids shall be submitted to the Morrow County Board of Commissioners no later than **9:15AM Local Time on Wednesday, April 22, 2026.**

If submitted in person at the Terminal Building, the upper left-hand corner of the sealed envelope must identify the following information:

**CONTRACT PROPOSAL**

Bid of (Name of Contractor)

Project: Hangar Development 2026

For construction improvements at Morrow County Airport

Submitted by: 9:15 a.m. (local time), Wednesday, April 22, 2026

## DIVISION 2

### INSTRUCTIONS TO BIDDERS

This section contains excerpts of the bidding requirements from Section 20 and Section 30 of the General Provisions. The Bidder's attention is directed to Section 20 and Section 30 for more details.

#### **Owner and Owner's Representative**

The Owner as stated herein refers to the following agency: Morrow County Board of Commissioners.

The Owner's authorized representative as stated herein refers to the Owner's Consultant, Crawford, Murphy & Tilly, Inc., herein referred to as Engineer.

#### **Bidder Representations**

By submittal of a proposal (bid), the BIDDER represents the following:

- The Bidder has read and thoroughly examined the project documents
- The Bidder has a complete understanding of the terms and conditions required for the satisfactory performance of project work.
- The Bidder has fully informed themselves of the project site, the project site conditions and the surrounding area.
- The Bidder has familiarized themselves of the requirements of working on an operating airport and understands the conditions that may in any manner affect cost, progress or performance of the work
- The Bidder has correlated their observations with that of the project documents.
- The Bidder has found no errors, conflicts, ambiguities or omissions in the project documents, except as previously submitted in writing to the owner that would affect cost, progress or performance of the work.
- The Bidder is familiar with all applicable Federal, State and local laws, rules and regulations pertaining to execution of the contract and the project work.
- The Bidder has complied with all requirements of these instructions and the associated bid documents.

#### **Bid Documents/Project Manual**

The bid documents are comprised of the following: Notice to Bidders, Instructions-to-Bidders, General Provisions, Supplementary Provisions, Technical Specifications, Project Drawings, Proposal Form with attachments, Form of Contract Agreement, any authorized addenda issued by the Owner and any document incorporated in whole or in part by reference therein.

All documents comprising the Bid Documents are complementary to one another and together establish the complete terms, conditions and obligations of the successful bidder.

Those individual elements of the Contract Documents that are bound together shall also be referred to as the Project Manual. No part of the Project Manual that is bound may be removed or detached.

Prospective bidders may obtain a copy of the Project Manual and project drawings from the designated office identified within the Notice to Bidders.

#### **Modifications to Project Documents**

Modifications to the project documents may only be made by written addendum issued by the Owner or the Engineer. Verbal explanations, interpretations or comments made by the Owner or Owner's representative shall not be binding. Addenda will be transmitted to all known official plan holders. Each bidder shall certify at the time of bid submittal that they acknowledge receipt of all issued addenda.

#### **Errors and Discrepancies in Project Documents**

Should Bidder find an error, discrepancy, ambiguity or omission in the project documents prior to submittal of a proposal, the Bidder is obligated to contact the Owner or Engineer with written notice of the error, discrepancy, ambiguity or omission. The written notice shall identify the nature and location of the error, discrepancy, ambiguity or omission. Corrections or modifications to the project documents will only be made by written addendum as prescribed herein. By submittal of a Bid Proposal, Bidder represents that they have thoroughly reviewed the project

documents and that they have not identified any error, discrepancy, ambiguity or omission that would affect cost, progress or performance of the project work.

**Clarifications and Interpretations**

A bidder requiring a clarification or interpretation of the project documents shall make a written request to the Owner or Engineer. The Owner or Engineer must receive the written request a minimum of three (3) calendar days prior to the date of the bid opening.

**Interpretations of Estimated Proposal Quantities**

An estimate of quantities of work to be done and materials to be furnished under these specifications is stated within the contract documents. This estimate is a result of careful calculations and is believed to be correct. The estimated quantities are given as a basis for comparison of proposals and the award of contract. The Owner does not expressly or impliedly agree that the actual quantities involved will correspond exactly with the estimated quantities. The Bidder shall not plead misunderstandings 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 actual quantities of work performed or materials furnished in accordance with the plans and specifications. It is understood that the quantities and materials may be increased or decreased as hereinafter provided in the subsection titled "Alteration of Work and Quantities" of the general provisions without in any way invalidating the unit bid prices.

**Examination of Plans, Specifications and Site Conditions**

As stated within the "Bidder Representations" and reaffirmed herein, the Bidder is expected to carefully examine the site of the proposed work, the proposal, drawings, specifications, terms and conditions of the proposed agreement and the form of agreement. The Bidder shall satisfy themselves as to the character, quality, and quantities of work to be performed, materials to be furnished and as to the requirements of the proposed contract. The submission of a proposal shall be prima facie evidence that the Bidder has made such examination and is satisfied as to the conditions to be encountered in performing the work and as to the requirements of the proposed contract, plans and specifications.

Boring logs and other records of subsurface investigations and tests as appropriate may be available for inspection by the Bidder. It is understood and agreed that such subsurface information, whether included in the project drawings, specifications or otherwise made available to the Bidder, was obtained and is intended for the owner's design and estimating purposes only. Such information has been made available for the convenience of all bidders. It is further understood and agreed that Bidder is solely responsible for all assumptions, deductions, or conclusions which he or she may make from his or her examination of the boring logs and other records of subsurface investigations and tests that are furnished by the Owner.

**Form of Proposal**

All bid proposals shall be made on the forms provided by the Owner within the bound Project Manual. No bidder may submit more than one proposal. All proposals are to be written in ink and shall be clearly legible. All blank spaces in the proposal forms shall be legibly completed for each and every bid item. The Bidder shall not qualify any bid item. The Bidder shall initial any erasures and alterations made on the proposal form by the bidder.

The Bidder shall state the price of their bid in U.S. dollars and cents, in both written and numeral format. In the event of a discrepancy, the written value shall take precedence.

**Modification or Withdrawal of Bid Proposal**

Bidder may modify or withdraw their proposal at any point up to the specified time and date identified for receipt of proposals. Any request for bid withdrawal or modification by the Bidder that is received after the specified time and date for receipt of proposals will be returned unopened to the sender.

Any modification to a Bidder's proposal, subject to the time constraint noted herein, must be made on the proposal forms contained in the project manual. The Bidder's authorized representative must sign the modification. The modification shall be placed in a sealed envelope and the statement "Modification to Proposal" shall be legibly marked in the upper left hand corner. Withdrawal of a proposal may be made, subject to the time constraint noted herein, only with written confirmation under signature of the Bidder.

**Bid Security**

Each Bid must be accompanied by a Bid Security pursuant to Chapter 1305 of the Ohio Revised Code, in the amount stated and payable to the order of the Owner. The Bid security shall be in the form of either

- A. A Bid Bond for the full amount of the Bid issued by a surety licensed to do business in the State of Ohio, or

- B. A certified check, cashier's check or letter of credit. Letter of credit shall be revocable only at the option of the Owner. The amount of the certified check, cashier's check, or letter of credit shall be equal to ten percent (10%) of the bid.

**Evaluation of Proposals**

Bids may be held by the Morrow County Board of Commissioners for a period not to exceed 90 days from the date of the bid opening for the purpose of evaluating bids prior to award of contract. The right is reserved, as the Morrow County Board of Commissioners may require, to reject any and all bids and to waive any informality or irregularity in the bids received.

**Bid Informalities and Irregularities**

The Owner reserves the right to waive any informality or irregularity discovered in any proposal, which in the owner's judgment best serves the Owner's interest. In the situation where an extension of a unit price is found to be incorrect, the stated unit price and correct extension will govern. In the event of a discrepancy between the written and numeral values, the written value shall take precedence.

**Disqualification of Bid Proposals**

The Owner reserves the right to reject any or all bids, as determined to be in the best interest of the Owner. Causes for rejection of proposals include but are not limited to:

- Submittal of an irregular proposal;
- Submittal of more than one proposal from the same partnership, firm or corporation;
- Failure by Bidder to submit the bid prior to the stated time and date for receipt of bids;
- Failure by Bidder to furnish satisfactory bid guarantee;
- Failure by Bidder to provide all information required of the bid forms;
- Failure by Bidder to comply with the requirements of bid instructions;
- Determination by the Owner that Bidder is not qualified to accomplish the project work;
- Determination by the Owner that the Bidder has placed conditions on or qualified their proposal;
- Discovery of any alteration, interlineations or erasure of any project requirement by the Bidder;
- Inclusion of the Bidder on the "Excluded Parties Listing System" as maintained and published by the General Services Administration;
- Evidence of collusion among bidders.

**Notice of Award of Contract**

It is the intent of the Owner, after a period of review and evaluation, to award a contract to the responsible bidder that submits the best responsive proposal. The successful bidder will be informed their bid has been accepted through the Owner's issuance of a Notice of Award. The Notice of award shall not be construed as a binding agreement. The proper execution of a contract agreement shall serve as the binding agreement.

**Award of Alternates**

Unless specifically stated, the Owner reserves the right to accept options in any order or combination, which in the judgment of the Owner, best serves the Owner's interest.

**Performance and Payment Bonds**

The successful Bidder shall furnish separate performance and payment bonds each in the amount of 100% of the contract price. The bonds shall be made payable to the Owner as security for faithful performance of the contract and for the payment of all persons, firms or corporations to whom the Bidder may become legally indebted for labor, materials, tools, equipment or services in the performance of the project work. The form of the bond shall be that provided within the project manual. The current power of attorney for the person signing the bond as a representative of the surety shall be attached to the bonds.

The executed bonds shall be delivered to the Owner with the executed contracts. The bonds shall be issued by a solvent Surety, which is certified to operate within the State the project work is located and which is listed in the current issue of the U.S. Treasury Circular 570. If specifically requested by the Owner, the successful Bidder shall obtain and submit information on the surety's financial strength rating.

**Certificates of Insurance**

The successful Bidder shall furnish to the Owner all required certificates of insurance as specified with the project manual.

**Approval of the Contract**

Upon receipt of the Contract Agreement, Contract Bonds and Certificate of Insurance as executed by the successful Bidder, the Owner will complete execution of the contract conditioned upon the Owner's judgment that it remains in their best interest to enter into the Agreement.

Upon satisfactory execution of the contract by the successful Bidder and the Owner, all references to "Bidder" in the bid documents become equivalent to the term "Contractor".

## PROPOSAL FORM

**TO:** MORROW COUNTY BOARD OF COMMISSIONERS  
MORROW COUNTY AIRPORT

The undersigned, in compliance with the request for bids for construction of the following Project:

HANGAR DEVELOPMENT 2026

MORROW COUNTY AIRPORT ;

hereby proposes to furnish all labor, permits, material, machinery, tools, supplies and equipment to faithfully perform all work required for construction of the Project in accordance with the project manual, project drawings and issued Addenda within the specified time of performance at the rates and prices shown on the Schedule of Prices (1 page):

### ACKNOWLEDGEMENTS BY BIDDER

- a. By submittal of a proposal, the BIDDER acknowledges and accepts that the quantities established by the OWNER are an approximate estimate of the quantities required to fully complete the Project and that the estimated quantities are principally intended to serve as a basis for evaluation of bids. The BIDDER further acknowledges and accepts that payment under this contract will be made only for actual quantities and that quantities will vary in accordance with the General Provisions subsection entitled "Alteration of Work and Quantities".
- b. The BIDDER acknowledges and accepts that the Bid Documents are comprised of the documents identified within the Instructions to Bidders. The BIDDER further acknowledges that each the individual documents that comprise the Bid Documents are complementary to one another and together establishes the complete terms, conditions and obligations of the successful BIDDER.
- c. As evidence of good faith in submitting this proposal, the undersigned encloses a bid guaranty in the form of a certified check in the amount of 10% of the bid price or a bid bond for the full amount. The BIDDER acknowledges and accepts that refusal or failure to accept award and execute a contract within the terms and conditions established herein will result in forfeiture of the bid guaranty to the owner as a liquidated damage.
- d. The BIDDER acknowledges and accepts the OWNER'S right to reject any or all bids and to waive any minor informality in any Bid or solicitation procedure.
- e. The BIDDER acknowledges and accepts the OWNER'S right to hold all Proposals for purposes of review and evaluation and not issue a Notice of Award for a period not to exceed 90 calendar days from the stated date for receipt of bids.
- f. The undersigned agrees that upon written notice of award of contract, he or she will execute the contract within fourteen (14) days of the Notice of Award and furthermore and provide executed payment and performance bonds with the executed contracts. The undersigned accepts that failure to execute the contract and provide the required bonds within the stated timeframe shall result in forfeiture of the bid guaranty to the owner as a liquidated damage.
- g. Time of Performance: By submittal of this proposal, the undersigned acknowledges and agrees to commence work within ten (10) calendar days of the date specified in the written "Notice to Proceed" as issued by the OWNER. The undersigned further agrees to complete all Project work within **300 calendar days** from the commencement date specified in the Notice to Proceed, with phasing as detailed in the plan sheets.

- h. The undersigned acknowledges and accepts that for each and every Calendar day the project remains incomplete beyond the contract time of performance, the Contractor shall pay the non-penal amount of \$200.00 per Calendar day as a liquidated damage to the OWNER.

- i. The BIDDER, by submission of a proposal, acknowledges that award of this contract is subject to the provisions of Ohio Prevailing Wage. The BIDDER accepts the requirement to pay prevailing wages for each classification and type of worker as established in the attached wage rate determination as issued by the Ohio Department of Labor. The BIDDER further acknowledges and accepts their requirement to incorporate the provision to pay the established prevailing wages in every subcontract agreement entered into by the Bidder under this project.
- j. Compliance Reports (41 CFR Part 60-1.7): Within 30 days after award of this contract, the Contractor/Subcontractor shall file a compliance report (Standard Form 100) if s/he has not submitted a complete compliance report within 12 months preceding the date of award. This report is required if the Contractor/Subcontractor meets all of the following conditions:
  - 1. Contractors/Subcontractors are not exempt based on 41 CFR 60-1,5.
  - 2. Has 50 or more employees.
  - 3. Is a prime contractor or first tier subcontractor.
  - 4. There is a contract, subcontract, or purchase order amounting to \$50,000 or more
- k. The undersigned acknowledges receipt of the following addenda:

Addendum Number ___ dated _____	Received _____
Addendum Number ___ dated _____	Received _____
Addendum Number ___ dated _____	Received _____

### REPRESENTATIONS BY BIDDER

By submittal of a proposal (bid), the BIDDER represents the following:

- a. The BIDDER has read and thoroughly examined the bid documents including all authorized addenda.
- b. The BIDDER has a complete understanding of the terms and conditions required for the satisfactory performance of project work.
- c. The BIDDER has fully informed themselves of the project site, the project site conditions and the surrounding area.
- d. The BIDDER has familiarized themselves of the requirements of working on an operating airport and understands the conditions that may in any manner affect cost, progress or performance of the work
- e. The BIDDER has correlated their observations with that of the project documents.
- f. The BIDDER has found no errors, conflicts, ambiguities or omissions in the project documents, except as previously submitted in writing to the owner that would affect cost, progress or performance of the work.
- g. The BIDDER is familiar with all applicable Federal, State and local laws, rules and regulations pertaining to execution of the contract and the project work.
- h. The BIDDER has complied with all requirements of these instructions and the associated project documents.

**ATTACHMENTS TO THIS BID**

The following documents are attached to and made a part of this Bid:

1. Certifications:
  - a. Certification of Non-Segregated Facilities
  - b. Debarment & Suspension Certification
  - c. Lobbying and Influencing Federal Employees
  - d. Certification of Offerer/Bidder Regarding Tax Delinquency and Felony Convictions
  - e. Trade Restriction
2. Non-collusion Affidavit
3. Affidavit of Contractor or Supplier of Non-Delinquency Personal Property Taxes

**SIGNATURE OF BIDDER**

**IF AN INDIVIDUAL:**

Name: \_\_\_\_\_

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

*(Signature of Individual)*

Doing Business as: \_\_\_\_\_

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

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

**IF A PARTNERSHIP:**

Partnership Name: \_\_\_\_\_

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

*(Authorized Signature)*

*(Attach Evidence of Authority to sign as a Partnership)*

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

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

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

**IF A CORPORATION:**

Corporation Name: \_\_\_\_\_

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

*(Authorized Signature)*

*(Attach Evidence of Authority to sign)*

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

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

(CORPORATE SEAL)

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

**ATTEST:**

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

*(Authorized Signature)*

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

**IF A JOINT VENTURE:** *(Attach copy of Joint Venture Agreement)*

Joint Venture Name: \_\_\_\_\_

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

*(Authorized Signature)*  
*(Attach Evidence of Authority to sign)*

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

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

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

Joint Venture Name: \_\_\_\_\_

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

*(Authorized Signature)*  
*(Attach Evidence of Authority to sign)*

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

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

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

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**SCHEDULE OF PRICES**

Item No.	Spec.	Item Description	Unit	Quantity	UNIT VALUE	EXTENDED VALUE
<b>Base Bid:</b>						
1	C-102	INSTALL AND REMOVE SILT FENCE	LF	580		
2	C-105	MOBILIZATION	LS	1		
3	203	EMBANKMENT	CY	2,300		
4	304	8" AGGREGATE BASE	SY	560		
5	304	8" AGGREGATE ACCESS ROAD	SY	500		
6	407	TACK COAT	GAL	30		
7	408	PRIME COAT	GAL	90		
8	409	SAWING AND SEALING ASPHALT CONCRETE PAVEMENT JOINTS	LF	170		
9	441	ASPHALT CONCRETE SURFACE COURSE, TYPE 1, (448), PG 64-22	TON	70		
10	441	ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE 1, (448), PG 64-22	TON	70		
11	511	CONCRETE PAD	SY	20		
12	641	PAVEMENT MARKING	SF	240		
13	659	SEEDING AND MULCHING	AC	0.5		
14	SP-1.1	MODIFIED 4-UNIT HANGAR	LS	1		
15	SP-1.2	ELECTRICAL SERVICE, FORCE ACCOUNT	LS	1	\$20,000	\$20,000

**BASE BID VALUE (in numbers):** \$ \_\_\_\_\_

**BASE BID VALUE (in words):** \_\_\_\_\_

**BIDDER NAME:** \_\_\_\_\_

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**STATEMENT OF QUALIFICATIONS**  
**(Bidders May Be Pre-Qualified with the Ohio Department of Transportation)**

SIMILAR PROJECTS COMPLETED

DATE \_\_\_\_\_ VALUE \_\_\_\_\_

Name of Project, Location, Type of Improvement.

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SIMILAR PROJECTS UNDER CONTRACT

DATE \_\_\_\_\_ VALUE \_\_\_\_\_

Name of Project, Location, Type of Improvement.

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PROPOSED EQUIPMENT TO BE USED ON PROJECT

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FINANCIAL STATEMENT: Attached is a copy of my latest financial statement listing assets and liabilities. In lieu of the financial statement, a bidder may submit evidence that he is pre-qualified with the Ohio Department of Transportation and is on the "Current Bidders List" for projects of this size and nature.

Bidder: \_\_\_\_\_

By \_\_\_\_\_

Address \_\_\_\_\_

## CERTIFICATIONS

**BIDDER'S NAME:** \_\_\_\_\_

**ADDRESS:** \_\_\_\_\_

**TELEPHONE NO.:** \_\_\_\_\_ **FAX NO.** \_\_\_\_\_

**IRS EMPLOYER IDENTIFICATION NUMBER:** \_\_\_\_\_

### NOTICE OF NONSEGREGATED FACILITIES REQUIREMENT

#### Notice to Prospective Federally Assisted Construction Contractors

1. A Certification of Non-segregated Facilities shall be submitted prior to the award of a federally- assisted construction contract exceeding \$10,000 which is not exempt from the provisions of the Equal Opportunity Clause.
2. Contractors receiving federally-assisted construction contract awards exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity Clause will be required to provide for the forwarding of the following notice to prospective subcontractors for supplies and construction contracts where the subcontracts exceed \$10,000 and are not exempt from the provisions of the Equal Opportunity Clause.
3. The penalty for making false statements in offers is prescribed in 18 U.S.C. § 1001.

#### Notice to Prospective Subcontractors of Requirements for Certification of Non-Segregated Facilities

1. A Certification of Non-segregated Facilities shall be submitted prior to the award of a subcontract exceeding \$10,000, which is not exempt from the provisions of the Equal Opportunity Clause.
2. Contractors receiving subcontract awards exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity Clause will be required to provide for the forwarding of this notice to prospective subcontractors for supplies and construction contracts where the subcontracts exceed \$10,000 and are not exempt from the provisions of the Equal Opportunity Clause.
3. The penalty for making false statements in offers is prescribed in 18 U.S.C. § 1001.

\* \* \* \* \*

### CERTIFICATION OF NON-SEGREGATED FACILITIES

The federally-assisted construction contractor certifies that she or he does not maintain or provide, for his employees, any segregated facilities at any of his establishments and that she or he does not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. The federally-assisted construction contractor certifies that she or he will not maintain or provide, for his employees, segregated facilities at any of his establishments and that she or he will not permit his employees to perform their services at any location under his control where segregated facilities are maintained. The federally-assisted construction contractor agrees that a breach of this

certification is a violation of the Equal Opportunity Clause in this contract.

As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms, and washrooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directives or are, in fact, segregated on the basis of race, color, religion, or national origin because of habit, local custom, or any other reason. The federally-assisted construction contractor agrees that (except where she or he has obtained identical certifications from proposed subcontractors for specific time periods) she or he will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity Clause and that she or he will retain such certifications in his files.

\* \* \* \* \*

### **CERTIFICATION OF OFFEROR/BIDDER REGARDING DEBARMENT**

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

### **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.

\* \* \* \* \*

### **CERTIFICATION REGARDING LOBBYING**

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

- (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.

\* \* \* \* \*

#### **CERTIFICATION OF OFFERER/BIDDER REGARDING TAX DELINQUENCY AND FELONY CONVICTIONS**

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

Certifications:

- 1) The Contractor represents that it is (\_\_\_) is not (\_\_\_) a corporation that has any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability.
- 2) The Contractor represents that it is (\_\_\_) is not (\_\_\_) a corporation that was convicted of a criminal violation under any Federal law within the preceding 24 months.

Note:

If a Contractor responds in the affirmative to either of the above representations, the Contractor 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 Contractor 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.

\* \* \* \* \*

#### TRADE RESTRICTION CERTIFICATION

By submission of an offer, the Offeror certifies that with respect to this solicitation and any resultant contract, the Offeror -

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

**Printed Name & Title:** \_\_\_\_\_

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

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

**NON-COLLUSION AFFIDAVIT**

**(submit with bid)**

(This Affidavit must be executed)

STATE OF \_\_\_\_\_ )  
 ) SS  
COUNTY OF \_\_\_\_\_ )

\_\_\_\_\_ being first duly sworn, deposes and says that he is \_\_\_\_\_

(Sole Owner, a Partner, President, Secretary, etc.) of \_\_\_\_\_

\_\_\_\_\_ the party making the foregoing proposal or bid; that such bid is genuine and not collusive or sham; that said Bidder has not colluded, conspired, connived, or agreed, directly or indirectly with any Bidder or person, to put in a sham bid, or that such other person shall refrain from bidding, and has not in any manner, directly or indirectly sought by agreement or collusion or communication or conference, with any person, to fix the bid price of affiant or any other Bidder, or to fix any overhead, profit, or cost element of said Bid price, or of that of any other Bidder, or to secure any advantage against the Owner, or any person interested in the proposed Contract; and that all statements contained in said proposal or bid are true; and further, that such Bidder has not, directly or indirectly submitted this Bid, or the contents thereof, or divulged information or data relative thereto to any association or to any member or agent thereof.

\_\_\_\_\_  
Affiant

Subscribed and sworn to before me this \_\_\_\_\_ day of \_\_\_\_\_, 20 \_\_\_\_.

\_\_\_\_\_  
Notary Public

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

END OF DOCUMENT

**AFFIDAVIT OF CONTRACTOR OR SUPPLIER OF NON-DELINQUENCY  
PERSONAL PROPERTY TAX O.R.C. SECTION 5719.042**

State of Ohio            )  
                                  ) SS:  
Harrison                 )

To: MORROW COUNTY AIRPORT

The undersigned, being first duly sworn, having been awarded a contract for the \_\_\_\_\_ hereby states that we were not charged at the time the bid was submitted with any delinquent personal property taxes on the general tax list of personal property of any county in which you as a taxing district have territory and that we were not charged with delinquent personal property taxes on any such tax list.

In consideration of the award of the above contract, the above statement is incorporated in said contract as a covenant of the undersigned.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Company Name

Sworn to before me and subscribed in my presence this \_\_\_\_\_ day of \_\_\_\_\_, 20 \_\_\_\_.

\_\_\_\_\_  
Notary Public  
(Seal) My commission expires \_\_\_\_\_

Ohio Revised Code Section 5719.042 provides as follows:

After the award by a taxing district of any contract let by competitive bid and prior to the time the contract is entered into, the person making a bid shall submit to the district's fiscal officer a statement affirmed under oath that the person with whom the contract is to be made was not charged at the time the bid was submitted with any delinquent personal property taxes on the general tax list of personal property of any county in which the taxing district has territory or that such person was charged with delinquent personal property taxes on any such tax list, in which case the statement shall also set forth the amount of such due and unpaid delinquent taxes and any due and unpaid penalties and interest thereon. If the statement indicates that the taxpayer was charged with any such taxes, a copy of the statement shall be transmitted by the fiscal officer to the county treasurer within thirty days of the date it is submitted.

A copy of the statement shall also be incorporated into the contract, and no payment shall be made with respect to any contract to which this section applies unless such statement has been so incorporated as a part thereof.

**Form of**  
**CONTRACT AGREEMENT**  
MORROW COUNTY AIRPORT

THIS AGREEMENT, made as of {Insert Effective Date Of Agreement} is

BY AND BETWEEN

the OWNER: MORROW COUNTY BOARD OF COMMISSIONERS  
4679 Township Road 126  
Cardington, Ohio 43315

and the CONTRACTOR: {Insert Contractor's Name, Address, City/State/Zip Code}

**WITNESSETH:**

WHEREAS it is the intent of the Owner to make improvements at MORROW COUNTY AIRPORT, Cardington, Ohio, generally described as follows;

HANGAR DEVELOPMENT 2026

hereinafter referred to as the Project.

NOW THEREFORE in consideration of the mutual covenants hereinafter set forth, OWNER and CONTRACTOR agree as follows:

**Article 1 – Work**

It is hereby mutually agreed that for and in consideration of the payments as provided for herein to the CONTRACTOR by the OWNER, CONTRACTOR shall faithfully furnish all necessary labor, equipment, and material and shall fully perform all necessary work to complete the Project in strict accordance with this Contract Agreement and the Contract Documents.

**Article 2 – Contract Documents**

CONTRACTOR agrees that the Contract Documents consist of the following: this Agreement, General Provisions, Supplementary Provisions, Specifications, Drawings, all issued addenda, Notice to Bidders, Instructions to Bidders, Proposal and associated attachments, Performance Bond, Payment Bond, Wage Rate Determination, Insurance certificates, documents incorporated by reference, documents incorporated by attachment, and all OWNER authorized change orders issued subsequent to the date of this agreement. All documents comprising the Contract Documents are complementary to one another and together establish the complete terms, conditions and obligations of the CONTRACTOR. All said Contract Documents are incorporated by reference into the Contract Agreement as if fully rewritten herein or attached thereto.

**Article 3 – Contract Price**

In consideration of the faithful performance and completion of the Work by the CONTRACTOR in accordance with the Contract Documents, OWNER shall pay the CONTRACTOR an amount equal to:

\$ \_\_\_\_\_

*(Amount in Numerals)*

\_\_\_\_\_  
*(Amount in Written Words)*

subject to the following;

- a. Said amount is based on the schedule of prices and estimated quantities stated in CONTRACTOR'S Bid Proposal, which is attached to and made a part of this Agreement;
- b. Said amount is the aggregate sum of the result of the CONTRACTOR'S stated unit prices multiplied by the associated estimated quantities;
- c. CONTRACTOR and OWNER agree that said estimated quantities are not guaranteed and that the determination of actual quantities is to be made by the OWNER'S ENGINEER;
- d. Said amount is subject to modification for additions and deductions as provided for within the Contract General Provisions.

**Article 4 – Payment**

Upon the completion of the work and its acceptance by the OWNER, all sums due the CONTRACTOR by reason of faithful performance of the work, taking into consideration additions to or deductions from the Contract price by reason of alterations or modifications of the original Contract or by reason of "Extra Work" authorized under this Contract, will be paid to the CONTRACTOR by the OWNER after said completion and acceptance.

The acceptance of 90% Review payment by the CONTRACTOR shall be considered as a release in full of all claims against the OWNER, arising out of, or by reason of, the work completed and materials furnished under this Contract.

OWNER shall make progress payments to the CONTRACTOR in accordance with the terms set forth in the General Provisions. Progress payments shall be based on estimates prepared by the ENGINEER for the value of work performed and materials completed in place in accordance with the Contract Drawings and Specifications.

Progress payments are subject to retainage requirements as set forth in the General Provisions.

**Article 5 – Contract Time**

The CONTRACTOR agrees to commence work within ten (10) calendar days of the date specified in the OWNER'S Notice to Proceed. CONTRACTOR further agrees to complete said work within **300 Calendar Days** of the commencement date stated within the Notice to Proceed with phasing as detailed in the Plan Sheets.

It is expressly understood and agreed that the stated Contract Time is reasonable for the completion of the Work, taking all factors into consideration. Furthermore, extensions of the Contract Time may only be permitted by execution of a formal modification to this Contract Agreement in accordance with the General Provisions and as approved by the OWNER.

#### **Article 6 – Liquidated Damages**

The CONTRACTOR and OWNER understand and agree that time is of essence for completion of the Work and that the OWNER will suffer additional expense and financial loss if said Work is not completed within the authorized Contract Time. Furthermore, the CONTRACTOR and OWNER recognize and understand the difficulty, delay, and expense in establishing the exact amount of actual financial loss and additional expense. Accordingly, in place of requiring such proof, the CONTRACTOR expressly agrees to pay the OWNER as liquidated damages the non-penal sum of \$200.00 per day for each calendar day required in excess of the authorized Contract Time.

Furthermore, the CONTRACTOR understands and agrees that;

- a. the OWNER has the right to deduct from any moneys due the CONTRACTOR, the amount of said liquidated damages;
- b. the OWNER has the right to recover the amount of said liquidated damages from the CONTRACTOR, SURETY or both.

#### **Article 7 – CONTRACTOR’S Representations**

The CONTRACTOR understands and agrees that all representations made by the CONTRACTOR within the Proposal shall apply under this Agreement as if fully rewritten herein.

#### **Article 8 – CONTRACTOR’S Certifications**

The CONTRACTOR understands and agrees that all certifications made by the CONTRACTOR within the Proposal shall apply under this Agreement as if fully rewritten herein.

#### **Article 9 – Miscellaneous**

- a. CONTRACTOR understands that it shall be solely responsible for the means, methods, techniques, sequences and procedures of construction in connection with completion of the Work;
- b. CONTRACTOR understands and agrees that it shall not accomplish any work or furnish any materials that are not covered or authorized by the Contract Documents unless authorized in writing by the OWNER or ENGINEER;
- c. The rights of each party under this Agreement shall not be assigned or transferred to any other person, entity, firm or corporation without prior written consent of both parties;
- d. OWNER and CONTRACTOR each bind itself, their partners, successors, assigns and legal representatives to the other party in respect to all covenants, agreements, and obligations contained in the Contract Documents.

#### **Article 10 – OWNER’S Representative**

The OWNER’S Representative, herein referred to as ENGINEER, is defined as follows:

*Crawford, Murphy & Tilly, Inc.*  
*8101 N High Street, Suite 150*  
*Columbus, Ohio 43235*

Said ENGINEER will act as the OWNER’S representative and shall assume all rights and authority assigned to the ENGINEER as stated within the Contract Documents in connection with the completion of the Project Work.

IN WITNESS WHEREOF, OWNER and CONTRACTOR have executed three (3) copies of this Agreement on the day and year first noted herein.

**OWNER**

**CONTRACTOR**

Name: \_\_\_\_\_

Name: \_\_\_\_\_

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

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

\_\_\_\_\_

\_\_\_\_\_

By: \_\_\_\_\_  
*Signature*

By: \_\_\_\_\_  
*Signature*

\_\_\_\_\_  
*Title of Representative*

\_\_\_\_\_  
*Title of Representative*

**ATTEST**

**ATTEST**

By: \_\_\_\_\_  
*Signature*

By: \_\_\_\_\_  
*Signature*

\_\_\_\_\_  
*Title*

\_\_\_\_\_  
*Title*

## **SELECTION CRITERIA FOR AWARDING PRIME CONTRACTS TO BIDDERS**

Prime Contracts shall be awarded to the bidder offering the lowest and most reasonable price, conditioned upon satisfying the requirements established by the Sponsor to evaluate the efforts of the bidder to meet the DBE contract goal.

To determine the reasonableness of a bidder's offer, the Sponsor shall use the same criteria it would use if the bidder has made the only offer to perform the contract. In addition to price, the following criteria shall be used to determine the lowest and best bidder:

1. The ability, capacity, and skill of the bidder to perform the contract.
2. Whether the bidder can perform the contract within the time specified, without delay or interference.
3. The character, integrity, reputation, judgment, experience, and efficiency of the bidder.
4. The quality of performance of previous contracts.
5. Previous and existing compliance by the bidder with laws and ordinances relating to the contract.
6. The sufficiency of the financial resources and ability of the bidder to perform the contract or provide the service.
7. The quality, availability, and adaptability of the supplies or contractual services to the particular use required.
8. The ability of the bidder to provide maintenance and service for the use of the subject of the contract.
9. Compliance with the requirements of the bid proposal.

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## **DIVISION 3**

### **SUPPLEMENTARY PROVISIONS**

These Supplementary Conditions amend and/or supplement the General Provisions of the Contract and other provisions of the Contract Documents as indicated herein. All contract provisions that are not so amended or supplemented remain in full force and effect.

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**PART A - FEDERAL PROVISIONS**

*AC 150/5370-2G*



U.S. Department  
of Transportation  
**Federal Aviation  
Administration**

# Advisory Circular

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**Subject:** Operational Safety on  
Airports During Construction

**Date:** 12/13/2017  
**Initiated By:** AAS-100

**AC No:** 150/5370-2G  
**Change:**

---

1 **Purpose.**

This AC sets forth guidelines for operational safety on airports during construction.

2 **Cancellation.**

This AC cancels AC 150/5370-2F, *Operational Safety on Airports during Construction*, dated September 29, 2011.

3 **Application.**

This AC assists airport operators in complying with Title 14 Code of Federal Regulations (CFR) Part 139, *Certification of Airports*. For those certificated airports, this AC provides one way, but not the only way, of meeting those requirements. The use of this AC is mandatory for those airport construction projects receiving funds under the Airport Improvement Program (AIP). See Grant Assurance No. 34, *Policies, Standards, and Specifications*. While we do not require non-certificated airports without grant agreements or airports using Passenger Facility Charge (PFC) Program funds for construction projects to adhere to these guidelines, we recommend that they do so to help these airports maintain operational safety during construction.

4 **Related Documents.**

ACs and Orders referenced in the text of this AC do not include a revision letter, as they refer to the latest version. [Appendix A](#) contains a list of reading material on airport construction, design, and potential safety hazards during construction, as well as instructions for obtaining these documents.

5 **Principal Changes.**

The AC incorporates the following principal changes:

1. Notification about impacts to both airport owned and FAA-owned NAVAIDs was added. See paragraph [2.13.5.3](#), NAVAIDs.

2. Guidance for the use of orange construction signs was added. See paragraph 2.18.4.2, Temporary Signs.
3. Open trenches or excavations may be permitted in the taxiway safety area while the taxiway is open to aircraft operations, subject to restrictions. See paragraph 2.22.3.4, Excavations.
4. Guidance for temporary shortened runways and displaced thresholds has been enhanced. See Figure 2-1 and Figure 2-2.
5. Figures have been improved and a new Appendix F on the placement of orange construction signs has been added.

Hyperlinks (allowing the reader to access documents located on the internet and to maneuver within this document) are provided throughout this document and are identified with underlined text. When navigating within this document, return to the previously viewed page by pressing the “ALT” and “ ← ” keys simultaneously.

Figures in this document are schematic representations and are not to scale.

6 **Use of Metrics.**

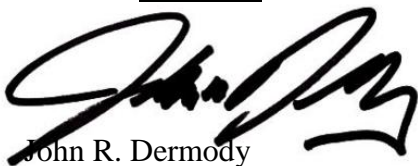
Throughout this AC, U.S. customary units are used followed with “soft” (rounded) conversion to metric units. The U.S. customary units govern.

7 **Where to Find this AC.**

You can view a list of all ACs at [http://www.faa.gov/regulations\\_policies/advisory\\_circulars/](http://www.faa.gov/regulations_policies/advisory_circulars/). You can view the Federal Aviation Regulations at [http://www.faa.gov/regulations\\_policies/faa\\_regulations/](http://www.faa.gov/regulations_policies/faa_regulations/).

8 **Feedback on this AC.**

If you have suggestions for improving this AC, you may use the Advisory Circular Feedback form at the end of this AC.



John R. Dermody  
Director of Airport Safety and Standards

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## CHAPTER 1. PLANNING AN AIRFIELD CONSTRUCTION PROJECT

### 1.1 Overview.

Airports are complex environments, and procedures and conditions associated with construction activities often affect aircraft operations and can jeopardize operational safety. Safety considerations are paramount and may make operational impacts unavoidable. However, careful planning, scheduling, and coordination of construction activities can minimize disruption of normal aircraft operations and avoid situations that compromise the airport's operational safety. The airport operator must understand how construction activities and aircraft operations affect one another to be able to develop an effective plan to complete the project. While the guidance in this AC is primarily used for construction operations, the concepts, methods and procedures described may also enhance the day-to-day airport maintenance operations, such as lighting maintenance and snow removal operations.

### 1.2 Plan for Safety.

Safety, maintaining aircraft operations, and construction costs are all interrelated. Since safety must not be compromised, the airport operator must strike a balance between maintaining aircraft operations and construction costs. This balance will vary widely depending on the operational needs and resources of the airport and will require early coordination with airport users and the FAA. As the project design progresses, the necessary construction locations, activities, and associated costs will be identified and their impact to airport operations must be assessed. Adjustments are made to the proposed construction activities, often by phasing the project, and/or to airport operations to maintain operational safety. This planning effort will ultimately result in a project Construction Safety and Phasing Plan (CSPP). The development of the CSPP takes place through the following five steps:

#### 1.2.1 Identify Affected Areas.

The airport operator must determine the geographic areas on the airport affected by the construction project. Some, such as a runway extension, will be defined by the project. Others may be variable, such as the location of haul routes and material stockpiles.

#### 1.2.2 Describe Current Operations.

Identify the normal airport operations in each affected area for each phase of the project. This becomes the baseline from which the impact on operations by construction activities can be measured. This should include a narrative of the typical users and aircraft operating within the affected areas. It should also include information related to airport operations: the Aircraft Approach Category (AAC) and Airplane Design Group (ADG) of the airplanes that operate on each runway; the ADG and Taxiway Design Group (TDG)<sup>1</sup> for each affected taxiway; designated approach visibility minimums;

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<sup>1</sup> Find Taxiway Design Group information in [AC 150/5300-13, Airport Design](#).

available approach and departure procedures; most demanding aircraft; declared distances; available air traffic control services; airport Surface Movement Guidance and Control System (SMGCS) plan; and others. The applicable seasons, days and times for certain operations should also be identified as applicable.

### 1.2.3 Allow for Temporary Changes to Operations.

To the extent practical, current airport operations should be maintained during the construction. In consultation with airport users, Aircraft Rescue and Fire Fighting (ARFF) personnel, and FAA Air Traffic Organization (ATO) personnel, the airport operator should identify and prioritize the airport's most important operations. The construction activities should be planned, through project phasing if necessary, to safely accommodate these operations. When the construction activities cannot be adjusted to safely maintain current operations, regardless of their importance, then the operations must be revised accordingly. Allowable changes include temporary revisions to approach procedures, restricting certain aircraft to specific runways and taxiways, suspension of certain operations, decreased weights for some aircraft due to shortened runways, and other changes. An example of a table showing temporary operations versus current operations is shown in Appendix E.

### 1.2.4 Take Required Measures to Revise Operations.

Once the level and type of aircraft operations to be maintained are identified, the airport operator must determine the measures required to safely conduct the planned operations during the construction. These measures will result in associated costs, which can be broadly interpreted to include not only direct construction costs, but also loss of revenue from impacted operations. Analysis of costs may indicate a need to reevaluate allowable changes to operations. As aircraft operations and allowable changes will vary widely among airports, this AC presents general guidance on those subjects.

### 1.2.5 Manage Safety Risk.

The FAA is committed to incorporating proactive safety risk management (SRM) tools into its decision-making processes. FAA Order 5200.11, *FAA Airports (ARP) Safety Management System (SMS)*, requires the FAA to conduct a Safety Assessment for certain triggering actions. Certain airport projects may require the airport operator to provide a Project Proposal Summary to help the FAA determine whether a Safety Assessment is required prior to FAA approval of the CSPP. The airport operator must coordinate with the appropriate FAA Airports Regional or District Office early in the development of the CSPP to determine the need for a Safety Risk Assessment. If the FAA requires an assessment, the airport operator must at a minimum:

1. Notify the appropriate FAA Airports Regional or District Office during the project "scope development" phase of any project requiring a CSPP.
2. Provide documents identified by the FAA as necessary to conduct SRM.
3. Participate in the SRM process for airport projects.
4. Provide a representative to participate on the SRM panel.

5. Ensure that all applicable SRM identified risks elements are recorded and mitigated within the CSPP.

### 1.3 **Develop a Construction Safety and Phasing Plan (CSPP).**

Development of an effective CSPP will require familiarity with many other documents referenced throughout this AC. See Appendix A for a list of related reading material.

#### 1.3.1 List Requirements.

A CSPP must be developed for each on-airfield construction project funded by the Airport Improvement Program (AIP) or located on an airport certificated under Part 139. For on-airfield construction projects at Part 139 airports funded without AIP funds, the preparation of a CSPP represents an acceptable method the certificate holder may use to meet Part 139 requirements during airfield construction activity. As per FAA Order 5200.11, projects that require Safety Assessments do not include construction, rehabilitation, or change of any facility that is entirely outside the air operations area, does not involve any expansion of the facility envelope and does not involve construction equipment, haul routes or placement of material in locations that require access to the air operations area, increase the facility envelope, or impact line-of-sight. Such facilities may include passenger terminals and parking or other structures. However, extraordinary circumstances may trigger the need for a Safety Assessment and a CSPP. The CSPP is subject to subsequent review and approval under the FAA's Safety Risk Management procedures (see paragraph 1.2.5).

#### 1.3.2 Prepare a Safety Plan Compliance Document (SPCD).

The Safety Plan Compliance Document (SPCD) details how the contractor will comply with the CSPP. Also, it will not be possible to determine all safety plan details (for example specific hazard equipment and lighting, contractor's points of contact, construction equipment heights) during the development of the CSPP. The successful contractor must define such details by preparing an SPCD that the airport operator reviews for approval prior to issuance of a notice-to-proceed. The SPCD is a subset of the CSPP, similar to how a shop drawing review is a subset to the technical specifications.

#### 1.3.3 Assume Responsibility for the CSPP.

The airport operator is responsible for establishing and enforcing the CSPP. The airport operator may use the services of an engineering consultant to help develop the CSPP. However, writing the CSPP cannot be delegated to the construction contractor. Only those details the airport operator determines cannot be addressed before contract award are developed by the contractor and submitted for approval as the SPCD. The SPCD does not restate nor propose differences to provisions already addressed in the CSPP.

## 1.4 **Who Is Responsible for Safety During Construction?**

### 1.4.1 Establish a Safety Culture.

Everyone has a role in operational safety on airports during construction: the airport operator, the airport's consultants, the construction contractor and subcontractors, airport users, airport tenants, ARFF personnel, Air Traffic personnel, including Technical Operations personnel, FAA Airports Division personnel, and others, such as military personnel at any airport supporting military operations (e.g. national guard or a joint use facility). Close communication and coordination between all affected parties is the key to maintaining safe operations. Such communication and coordination should start at the project scoping meeting and continue through the completion of the project. The airport operator and contractor should conduct onsite safety inspections throughout the project and immediately remedy any deficiencies, whether caused by negligence, oversight, or project scope change.

### 1.4.2 Assess Airport Operator's Responsibilities.

An airport operator has overall responsibility for all activities on an airport, including construction. This includes the predesign, design, preconstruction, construction, and inspection phases. Additional information on the responsibilities listed below can be found throughout this AC. The airport operator must:

- 1.4.2.1 Develop a CSPP that complies with the safety guidelines of Chapter 2, Construction Safety and Phasing Plans, and Chapter 3, Guidelines for Writing a CSPP. The airport operator may develop the CSPP internally or have a consultant develop the CSPP for approval by the airport operator. For tenant sponsored projects, approve a CSPP developed by the tenant or its consultant.
- 1.4.2.2 Require, review and approve the SPCD by the contractor that indicates how it will comply with the CSPP and provides details that cannot be determined before contract award.
- 1.4.2.3 Convene a preconstruction meeting with the construction contractor, consultant, airport employees and, if appropriate, tenant sponsor and other tenants to review and discuss project safety before beginning construction activity. The appropriate FAA representatives should be invited to attend the meeting. See AC 150/5370-12, Quality Management for Federally Funded Airport Construction Projects. (Note “FAA” refers to the Airports Regional or District Office, the Air Traffic Organization, Flight Standards Service, and other offices that support airport operations, flight regulations, and construction/environmental policies.)
- 1.4.2.4 Ensure contact information is accurate for each representative/point of contact identified in the CSPP and SPCD.
- 1.4.2.5 Hold weekly or, if necessary, daily safety meetings with all affected parties to coordinate activities.
- 1.4.2.6 Notify users, ARFF personnel, and FAA ATO personnel of construction and conditions that may adversely affect the operational safety of the airport via Notices to Airmen (NOTAM) and other methods, as appropriate. Convene a meeting for review and discussion if necessary.
- 1.4.2.7 Ensure construction personnel know applicable airport procedures and changes to those procedures that may affect their work.
- 1.4.2.8 Ensure that all temporary construction signs are located per the scheduled list for each phase of the project.
- 1.4.2.9 Ensure construction contractors and subcontractors undergo training required by the CSPP and SPCD.
- 1.4.2.10 Ensure vehicle and pedestrian operations addressed in the CSPP and SPCD are coordinated with airport tenants, the airport traffic control tower (ATCT), and construction contractors.
- 1.4.2.11 At certificated airports, ensure each CSPP and SPCD is consistent with Part 139.

- 1.4.2.12 Conduct inspections sufficiently frequently to ensure construction contractors and tenants comply with the CSPP and SPCD and that there are no altered construction activities that could create potential safety hazards.
  - 1.4.2.13 Take immediate action to resolve safety deficiencies.
  - 1.4.2.14 At airports subject to 49 CFR Part 1542, *Airport Security*, ensure construction access complies with the security requirements of that regulation.
  - 1.4.2.15 Notify appropriate parties when conditions exist that invoke provisions of the CSPP and SPCD (for example, implementation of low-visibility operations).
  - 1.4.2.16 Ensure prompt submittal of a Notice of Proposed Construction or Alteration (Form 7460-1) for conducting an aeronautical study of potential obstructions such as tall equipment (cranes, concrete pumps, other), stock piles, and haul routes. A separate form may be filed for each potential obstruction, or one form may be filed describing the entire construction area and maximum equipment height. In the latter case, a separate form must be filed for any object beyond or higher than the originally evaluated area/height. The FAA encourages online submittal of forms for expediency at <https://oeaaa.faa.gov/oeaaa/external/portal.jsp>. The appropriate FAA Airports Regional or District Office can provide assistance in determining which objects require an aeronautical study.
  - 1.4.2.17 Ensure prompt transmission of the Airport Sponsor Strategic Event Submission, FAA Form 6000-26, located at [https://oeaaa.faa.gov/oeaaa/external/content/AIRPORT\\_SPONSOR\\_STRATEGIC\\_EVENT\\_SUBMISSION\\_FORM.pdf](https://oeaaa.faa.gov/oeaaa/external/content/AIRPORT_SPONSOR_STRATEGIC_EVENT_SUBMISSION_FORM.pdf), to assure proper coordination for NAS Strategic Interruption per Service Level Agreement with ATO.
  - 1.4.2.18 Promptly notify the FAA Airports Regional or District Office of any proposed changes to the CSPP prior to implementation of the change. Changes to the CSPP require review and approval by the airport operator and the FAA. The FAA Airports Regional or District office will determine if further coordination within the FAA is needed. Coordinate with appropriate local and other federal government agencies, such as Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA), Transportation Security Administration (TSA), and the state environmental agency.
- 1.4.3 Define Construction Contractor's Responsibilities.  
The contractor is responsible for complying with the CSPP and SPCD. The contractor must:

- 1.4.3.1 Submit a Safety Plan Compliance Document (SPCD) to the airport operator describing how it will comply with the requirements of the CSPP and supply any details that could not be determined before contract award. The SPCD must include a certification statement by the contractor, indicating an understanding of the operational safety requirements of the CSPP and the assertion of compliance with the approved CSPP and SPCD unless written approval is granted by the airport operator. Any construction practice proposed by the contractor that does not conform to the CSPP and SPCD may impact the airport's operational safety and will require a revision to the CSPP and SPCD and re-coordination with the airport operator and the FAA in advance.
- 1.4.3.2 Have available at all times copies of the CSPP and SPCD for reference by the airport operator and its representatives, and by subcontractors and contractor employees.
- 1.4.3.3 Ensure that construction personnel are familiar with safety procedures and regulations on the airport. Provide a point of contact who will coordinate an immediate response to correct any construction-related activity that may adversely affect the operational safety of the airport. Many projects will require 24-hour coverage.
- 1.4.3.4 Identify in the SPCD the contractor's on-site employees responsible for monitoring compliance with the CSPP and SPCD during construction. At least one of these employees must be on-site when active construction is taking place.
- 1.4.3.5 Conduct sufficient inspections to ensure construction personnel comply with the CSPP and SPCD and that there are no altered construction activities that could create potential safety hazards.
- 1.4.3.6 Restrict movement of construction vehicles and personnel to permitted construction areas by flagging, barricading, erecting temporary fencing, or providing escorts, as appropriate, and as specified in the CSPP and SPCD.
- 1.4.3.7 Ensure that no contractor employees, employees of subcontractors or suppliers, or other persons enter any part of the air operations area (AOA) from the construction site unless authorized.
- 1.4.3.8 Ensure prompt submittal through the airport operator of Form 7460-1 for the purpose of conducting an aeronautical study of contractor equipment such as tall equipment (cranes, concrete pumps, and other equipment), stock piles, and haul routes when different from cases previously filed by the airport operator. The FAA encourages online submittal of forms for expediency at <https://oeaaa.faa.gov/oeaaa/external/portal.jsp>.

- 1.4.3.9 Ensure that all necessary safety mitigations are understood by all parties involved, and any special requirements of each construction phase will be fulfilled per the approved timeframe.
- 1.4.3.10 Participate in pre-construction meetings to review construction limits, safety mitigations, NOTAMs, and understand all special airport operational needs during each phase of the project.

#### 1.4.4 Define Tenant's Responsibilities.

If planning construction activities on leased property, Airport tenants, such as airline operators, fixed base operators, and FAA ATO/Technical Operations sponsoring construction are strongly encouraged to:

1. Develop, or have a consultant develop, a project specific CSPP and submit it to the airport operator. The airport operator may forgo a complete CSPP submittal and instead incorporate appropriate operational safety principles and measures addressed in the advisory circular within their tenant lease agreements.
2. In coordination with its contractor, develop an SPCD and submit it to the airport operator for approval issued prior to issuance of a Notice to Proceed.
3. Ensure that construction personnel are familiar with safety procedures and regulations on the airport during all phases of the construction.
4. Provide a point of contact of who will coordinate an immediate response to correct any construction-related activity that may adversely affect the operational safety of the airport.
5. Identify in the SPCD the contractor's on-site employees responsible for monitoring compliance with the CSPP and SPCD during construction. At least one of these employees must be on-site when active construction is taking place.
6. Ensure that no tenant or contractor employees, employees of subcontractors or suppliers, or any other persons enter any part of the AOA from the construction site unless authorized.
7. Restrict movement of construction vehicles to construction areas by flagging and barricading, erecting temporary fencing, or providing escorts, as appropriate, as specified in the CSPP and SPCD.
8. Ensure prompt submittal through the airport operator of Form 7460-1 for conducting an aeronautical study of contractor equipment such as tall equipment (cranes, concrete pumps, other), stock piles, and haul routes. The FAA encourages online submittal of forms for expediency at <https://oeaaa.faa.gov/oeaaa/external/portal.jsp>.
9. Participate in pre-construction meetings to review construction limits, safety mitigations, NOTAMs, and understand all special airport operational needs during each phase of the project.

## CHAPTER 2. CONSTRUCTION SAFETY AND PHASING PLANS

### 2.1 **Overview.**

Aviation safety is the primary consideration at airports, especially during construction. The airport operator's CSPP and the contractor's Safety Plan Compliance Document (SPCD) are the primary tools to ensure safety compliance when coordinating construction activities with airport operations. These documents identify all aspects of the construction project that pose a potential safety hazard to airport operations and outline respective mitigation procedures for each hazard. They must provide information necessary for the Airport Operations department to conduct airfield inspections and expeditiously identify and correct unsafe conditions during construction. All aviation safety provisions included within the project drawings, contract specifications, and other related documents must also be reflected in the CSPP and SPCD.

### 2.2 **Assume Responsibility.**

Operational safety on the airport remains the airport operator's responsibility at all times. The airport operator must develop, certify, and submit for FAA approval each CSPP. It is the airport operator's responsibility to apply the requirements of the FAA approved CSPP. The airport operator must revise the CSPP when conditions warrant changes and must submit the revised CSPP to the FAA for approval. The airport operator must also require and approve a SPCD from the project contractor.

### 2.3 **Submit the CSPP.**

Construction Safety and Phasing Plans should be developed concurrently with the project design. Milestone versions of the CSPP should be submitted for review and approval as follows. While these milestones are not mandatory, early submission will help to avoid delays. Submittals are preferred in 8.5 × 11 inch or 11 × 17 inch format for compatibility with the FAA's Obstruction Evaluation / Airport Airspace Analysis (OE / AAA) process.

#### 2.3.1 Submit an Outline/Draft.

By the time approximately 25% to 30% of the project design is completed, the principal elements of the CSPP should be established. Airport operators are encouraged to submit an outline or draft, detailing all CSPP provisions developed to date, to the FAA for review at this stage of the project design.

#### 2.3.2 Submit a CSPP.

The CSPP should be formally submitted for FAA approval when the project design is 80 percent to 90 percent complete. Since provisions in the CSPP will influence contract costs, it is important to obtain FAA approval in time to include all such provisions in the procurement contract.

### 2.3.3 Submit an SPCD.

The contractor should submit the SPCD to the airport operator for approval to be issued prior to the Notice to Proceed.

### 2.3.4 Submit CSPP Revisions.

All revisions to a previously approved CSPP must be re-submitted to the FAA for review and approval/disapproval action.

## 2.4 **Meet CSPP Requirements.**

2.4.1 To the extent possible, the CSPP should address the following as outlined in Chapter 3, Guidelines for Writing a CSPP. Details that cannot be determined at this stage are to be included in the SPCD.

1. Coordination.
  - a. Contractor progress meetings.
  - b. Scope or schedule changes.
  - c. FAA ATO coordination.
2. Phasing.
  - a. Phase elements.
  - b. Construction safety drawings.
3. Areas and operations affected by the construction activity.
  - a. Identification of affected areas.
  - b. Mitigation of effects.
4. Protection of navigation aids (NAVAIDs).
5. Contractor access.
  - a. Location of stockpiled construction materials.
  - b. Vehicle and pedestrian operations.
6. Wildlife management.
  - a. Trash.
  - b. Standing water.
  - c. Tall grass and seeds.
  - d. Poorly maintained fencing and gates.
  - e. Disruption of existing wildlife habitat.
7. Foreign Object Debris (FOD) management.
8. Hazardous materials (HAZMAT) management.
9. Notification of construction activities.

- a. Maintenance of a list of responsible representatives/ points of contact.
  - b. NOTAM.
  - c. Emergency notification procedures.
  - d. Coordination with ARFF Personnel.
  - e. Notification to the FAA.
10. Inspection requirements.
- a. Daily (or more frequent) inspections.
  - b. Final inspections.
11. Underground utilities.
12. Penalties.
13. Special conditions.
14. Runway and taxiway visual aids. Marking, lighting, signs, and visual NAVAIDs.
- a. General.
  - b. Markings.
  - c. Lighting and visual NAVAIDs.
  - d. Signs, temporary, including orange construction signs, and permanent signs.
15. Marking and signs for access routes.
16. Hazard marking and lighting.
- a. Purpose.
  - b. Equipment.
17. Work zone lighting for nighttime construction (if applicable).
18. Protection of runway and taxiway safety areas, object free areas, obstacle free zones, and approach/departure surfaces.
- a. Runway Safety Area (RSA).
  - b. Runway Object Free Area (ROFA).
  - c. Taxiway Safety Area (TSA). Provide details for any adjustments to Taxiway Safety Area width to allow continued operation of smaller aircraft. See paragraph 2.22.3.
  - d. Taxiway Object Free Area (TOFA). Provide details for any continued aircraft operations while construction occurs within the TOFA. See paragraph 2.22.4.
  - e. Obstacle Free Zone (OFZ).
  - f. Runway approach/departure surfaces.
19. Other limitations on construction.
- a. Prohibitions.

b. Restrictions.

2.4.2 The Safety Plan Compliance Document (SPCD) should include a general statement by the construction contractor that he/she has read and will abide by the CSPP. In addition, the SPCD must include all supplemental information that could not be included in the CSPP prior to the contract award. The contractor statement should include the name of the contractor, the title of the project CSPP, the approval date of the CSPP, and a reference to any supplemental information (that is, “I, (Name of Contractor), have read the (Title of Project) CSPP, approved on (Date), and will abide by it as written and with the following additions as noted:”). The supplemental information in the SPCD should be written to match the format of the CSPP indicating each subject by corresponding CSPP subject number and title. If no supplemental information is necessary for any specific subject, the statement, “No supplemental information,” should be written after the corresponding subject title. The SPCD should not duplicate information in the CSPP:

1. Coordination. Discuss details of proposed safety meetings with the airport operator and with contractor employees and subcontractors.
2. Phasing. Discuss proposed construction schedule elements, including:
  - a. Duration of each phase.
  - b. Daily start and finish of construction, including “night only” construction.
  - c. Duration of construction activities during:
    - i. Normal runway operations.
    - ii. Closed runway operations.
    - iii. Modified runway “Aircraft Reference Code” usage.
3. Areas and operations affected by the construction activity. These areas and operations should be identified in the CSPP and should not require an entry in the SPCD.
4. Protection of NAVAIDs. Discuss specific methods proposed to protect operating NAVAIDs.
5. Contractor access. Provide the following:
  - a. Details on how the contractor will maintain the integrity of the airport security fence (gate guards, daily log of construction personnel, and other).
  - b. Listing of individuals requiring driver training (for certificated airports and as requested).
  - c. Radio communications.
    - i. Types of radios and backup capabilities.
    - ii. Who will be monitoring radios.
    - iii. Who to contact if the ATCT cannot reach the contractor’s designated person by radio.

- d. Details on how the contractor will escort material delivery vehicles.
6. Wildlife management. Discuss the following:
  - a. Methods and procedures to prevent wildlife attraction.
  - b. Wildlife reporting procedures.
7. Foreign Object Debris (FOD) management. Discuss equipment and methods for control of FOD, including construction debris and dust.
8. Hazardous Materials (HAZMAT) management. Discuss equipment and methods for responding to hazardous spills.
9. Notification of construction activities. Provide the following:
  - a. Contractor points of contact.
  - b. Contractor emergency contact.
  - c. Listing of tall or other requested equipment proposed for use on the airport and the timeframe for submitting 7460-1 forms not previously submitted by the airport operator.
  - d. Batch plant details, including 7460-1 submittal.
10. Inspection requirements. Discuss daily (or more frequent) inspections and special inspection procedures.
11. Underground utilities. Discuss proposed methods of identifying and protecting underground utilities.
12. Penalties. Penalties should be identified in the CSPP and should not require an entry in the SPCD.
13. Special conditions. Discuss proposed actions for each special condition identified in the CSPP.
14. Runway and taxiway visual aids. Including marking, lighting, signs, and visual NAVAIDs. Discuss proposed visual aids including the following:
  - a. Equipment and methods for covering signage and airfield lights.
  - b. Equipment and methods for temporary closure markings (paint, fabric, other).
  - c. Temporary orange construction signs.
  - d. Types of temporary Visual Guidance Slope Indicators (VGSI).
15. Marking and signs for access routes. Discuss proposed methods of demarcating access routes for vehicle drivers.
16. Hazard marking and lighting. Discuss proposed equipment and methods for identifying excavation areas.
17. Work zone lighting for nighttime construction (if applicable). Discuss proposed equipment, locations, aiming, and shielding to prevent interference with air traffic control and aircraft operations.

18. Protection of runway and taxiway safety areas, object free areas, obstacle free zones, and approach/departure surfaces. Discuss proposed methods of identifying, demarcating, and protecting airport surfaces including:
  - a. Equipment and methods for maintaining Taxiway Safety Area standards.
  - b. Equipment and methods to ensure the safe passage of aircraft where Taxiway Safety Area or Taxiway Object Free Area standards cannot be maintained.
  - c. Equipment and methods for separation of construction operations from aircraft operations, including details of barricades.
19. Other limitations on construction should be identified in the CSPP and should not require an entry in the SPCD.

## 2.5 **Coordination.**

Airport operators, or tenants responsible for design, bidding and conducting construction on their leased properties, should ensure at all project developmental stages, such as predesign, prebid, and preconstruction conferences, they capture the subject of airport operational safety during construction (see [AC 150/5370-12, \*Quality Management for Federally Funded Airport Construction Projects\*](#)). In addition, the following should be coordinated as required:

### 2.5.1 Progress Meetings.

Operational safety should be a standing agenda item for discussion during progress meetings throughout the project developmental stages.

### 2.5.2 Scope or Schedule Changes.

Changes in the scope or duration at any of the project stages may require revisions to the CSPP and review and approval by the airport operator and the FAA (see paragraph [1.4.2.17](#)).

### 2.5.3 FAA ATO Coordination.

Early coordination with FAA ATO is highly recommended during the design phase and is required for scheduling Technical Operations shutdowns prior to construction. Coordination is critical to restarts of NAVAID services and to the establishment of any special procedures for the movement of aircraft. Formal agreements between the airport operator and appropriate FAA offices are recommended. All relocation or adjustments to NAVAIDs, or changes to final grades in critical areas, should be coordinated with FAA ATO and may require an FAA flight inspection prior to restarting the facility. Flight inspections must be coordinated and scheduled well in advance of the intended facility restart. Flight inspections may require a reimbursable agreement between the airport operator and FAA ATO. Reimbursable agreements should be coordinated a minimum of 12 months prior to the start of construction. (See paragraph [2.13.5.3.2](#) for required FAA notification regarding FAA-owned NAVAIDs.)

## 2.6 **Phasing.**

Once it has been determined what types and levels of airport operations will be maintained, the most efficient sequence of construction may not be feasible. In this case, the sequence of construction may be phased to gain maximum efficiency while allowing for the required operations. The development of the resulting construction phases should be coordinated with local Air Traffic personnel and airport users. The sequenced construction phases established in the CSPP must be incorporated into the project design and must be reflected in the contract drawings and specifications.

### 2.6.1 Phase Elements.

For each phase the CSPP should detail:

- Areas closed to aircraft operations.
- Duration of closures.
- Taxi routes and/or areas of reduced TSA and TOFA to reflect reduced ADG use.
- ARFF access routes.
- Construction staging, disposal, and cleanout areas.
- Construction access and haul routes.
- Impacts to NAVAIDs.
- Lighting, marking, and signing changes.
- Available runway length and/or reduced RSA and ROFA to reflect reduced ADG use.
- Declared distances (if applicable).
- Required hazard marking, lighting, and signing.
- Work zone lighting for nighttime construction (if applicable).
- Lead times for required notifications.

### 2.6.2 Construction Safety Drawings.

Drawings specifically indicating operational safety procedures and methods in affected areas (i.e., construction safety drawings) should be developed for each construction phase. Such drawings should be included in the CSPP as referenced attachments and should also be included in the contract drawing package.

## 2.7 **Areas and Operations Affected by Construction Activity.**

Runways and taxiways should remain in use by aircraft to the maximum extent possible without compromising safety. Pre-meetings with the FAA ATO will support operational simulations. See Appendix E for an example of a table showing temporary operations versus current operations. The tables in Appendix E can be useful for coordination among all interested parties, including FAA Lines of Business.

## 2.7.1 Identification of Affected Areas.

Identifying areas and operations affected by the construction helps to determine possible safety problems. The affected areas should be identified in the construction safety drawings for each construction phase. (See paragraph 2.6.2.) Of particular concern are:

### 2.7.1.1 **Closing, or Partial Closing, of Runways, Taxiways and Aprons, and Displaced Thresholds.**

When a runway is partially closed, a portion of the pavement is unavailable for any aircraft operation, meaning taxiing, landing, or takeoff in either direction on that pavement is prohibited. A displaced threshold, by contrast, is established to ensure obstacle clearance and adequate safety area for landing aircraft. The pavement prior to the displaced threshold is normally available for take-off in the direction of the displacement and for landing and takeoff in the opposite direction. Misunderstanding this difference, may result in issuance of an inaccurate NOTAM, and can lead to a hazardous condition.

#### 2.7.1.1.1 Partially Closed Runways.

The temporarily closed portion of a partially closed runway will generally extend from the threshold to a taxiway that may be used for entering and exiting the runway. If the closed portion extends to a point between taxiways, pilots will have to back-taxi on the runway, which is an undesirable operation. See Figure 2-1 for a desirable configuration.

#### 2.7.1.1.2 Displaced Thresholds.

Since the portion of the runway pavement between the permanent threshold and a standard displaced threshold is available for takeoff and for landing in the opposite direction, the temporary displaced threshold need not be located at an entrance/exit taxiway. See Figure 2-2.

2.7.1.2 Closing of aircraft rescue and fire fighting access routes.

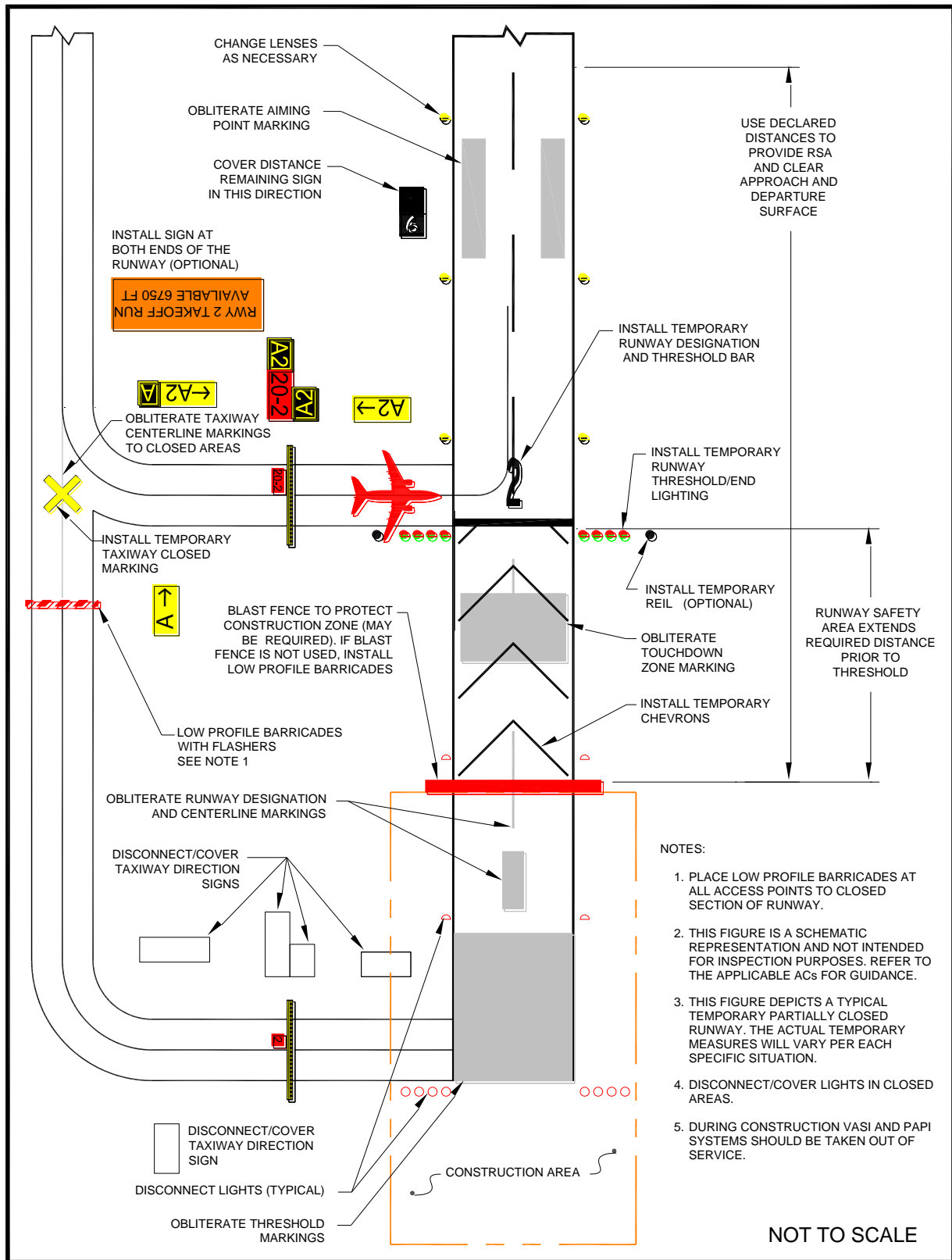
2.7.1.3 Closing of access routes used by airport and airline support vehicles.

2.7.1.4 Interruption of utilities, including water supplies for fire fighting.

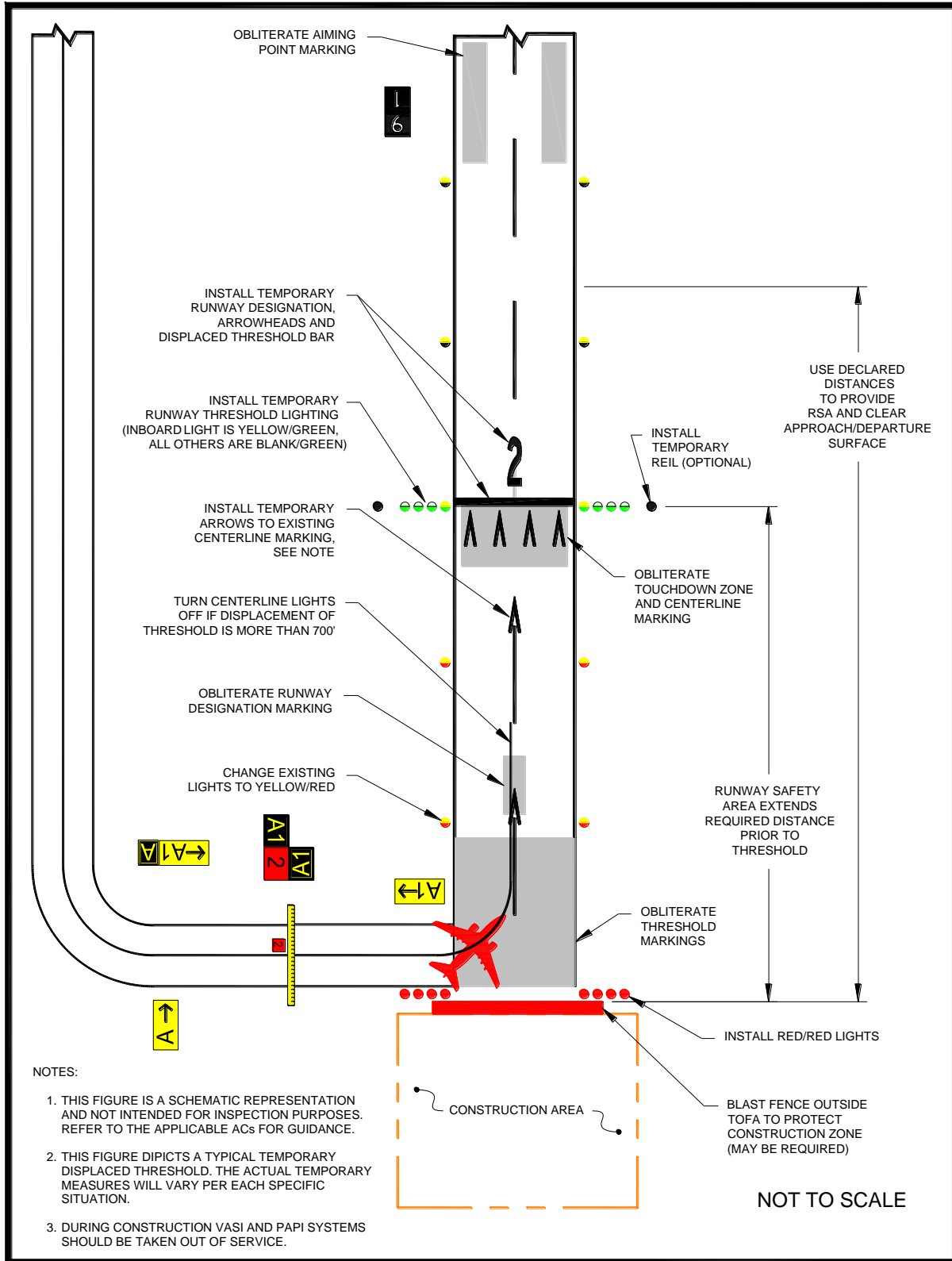
2.7.1.5 Approach/departure surfaces affected by heights of objects.

2.7.1.6 Construction areas, storage areas, and access routes near runways, taxiways, aprons, or helipads.

**Figure 2-1. Temporary Partially Closed Runway**



**Figure 2-2. Temporary Displaced Threshold**



**Note:** See paragraph 2.18.2.5.

### 2.7.2 Mitigation of Effects.

Establishment of specific procedures is necessary to maintain the safety and efficiency of airport operations. The CSPP must address:

- 2.7.2.1 Temporary changes to runway and/or taxi operations.
- 2.7.2.2 Detours for ARFF and other airport vehicles.
- 2.7.2.3 Maintenance of essential utilities.
- 2.7.2.4 Temporary changes to air traffic control procedures. Such changes must be coordinated with the ATO.

### 2.8 **Navigation Aid (NAVAID) Protection.**

Before commencing construction activity, parking vehicles, or storing construction equipment and materials near a NAVAID, coordinate with the appropriate FAA ATO/Technical Operations office to evaluate the effect of construction activity and the required distance and direction from the NAVAID. (See paragraph 2.13.5.3.) Construction activities, materials/equipment storage, and vehicle parking near electronic NAVAIDs require special consideration since they may interfere with signals essential to air navigation. If any NAVAID may be affected, the CSPP and SPCD must show an understanding of the “critical area” associated with each NAVAID and describe how it will be protected. Where applicable, the operational critical areas of NAVAIDs should be graphically delineated on the project drawings. Pay particular attention to stockpiling material, as well as to movement and parking of equipment that may interfere with line of sight from the ATCT or with electronic emissions. Interference from construction equipment and activities may require NAVAID shutdown or adjustment of instrument approach minimums for low visibility operations. This condition requires that a NOTAM be filed (see paragraph 2.13.2.) Construction activities and materials/equipment storage near a NAVAID must not obstruct access to the equipment and instruments for maintenance. Submittal of a 7460-1 form is required for construction vehicles operating near FAA NAVAIDs. (See paragraph 2.13.5.3.)

### 2.9 **Contractor Access.**

The CSPP must detail the areas to which the contractor must have access, and explain how contractor personnel will access those areas. Specifically address:

#### 2.9.1 Location of Stockpiled Construction Materials.

Stockpiled materials and equipment storage are not permitted within the RSA and OFZ, and if possible should not be permitted within the Object Free Area (OFA) of an operational runway. Stockpiling material in the OFA requires submittal of a 7460-1 form and justification provided to the appropriate FAA Airports Regional or District Office for approval. The airport operator must ensure that stockpiled materials and equipment adjacent to these areas are prominently marked and lighted during hours of restricted visibility or darkness. (See paragraph 2.18.2.) This includes determining and

verifying that materials are stabilized and stored at an approved location so as not to be a hazard to aircraft operations and to prevent attraction of wildlife and foreign object damage from blowing or tracked material. See paragraphs [2.10](#) and [2.11](#).

## 2.9.2 Vehicle and Pedestrian Operations.

The CSPP should include specific vehicle and pedestrian requirements. Vehicle and pedestrian access routes for airport construction projects must be controlled to prevent inadvertent or unauthorized entry of persons, vehicles, or animals onto the AOA. The airport operator should coordinate requirements for vehicle operations with airport tenants, contractors, and the FAA air traffic manager. In regard to vehicle and pedestrian operations, the CSPP should include the following, with associated training requirements:

### 2.9.2.1 **Construction Site Parking.**

Designate in advance vehicle parking areas for contractor employees to prevent any unauthorized entry of persons or vehicles onto the AOA. These areas should provide reasonable contractor employee access to the job site.

### 2.9.2.2 **Construction Equipment Parking.**

Contractor employees must park and service all construction vehicles in an area designated by the airport operator outside the OFZ and never in the safety area of an active runway or taxiway. Unless a complex setup procedure makes movement of specialized equipment infeasible, inactive equipment must not be parked on a closed taxiway or runway. If it is necessary to leave specialized equipment on a closed taxiway or runway at night, the equipment must be well lighted. Employees should also park construction vehicles outside the OFA when not in use by construction personnel (for example, overnight, on weekends, or during other periods when construction is not active). Parking areas must not obstruct the clear line of sight by the ATCT to any taxiways or runways under air traffic control nor obstruct any runway visual aids, signs, or navigation aids. The FAA must also study those areas to determine effects on airport design criteria, surfaces established by 14 CFR Part 77, Safe, Efficient Use, and Preservation of the Navigable Airspace (Part 77), and on NAVAIDs and Instrument Approach Procedures (IAP). See paragraph [2.13.1](#) for further information.

### 2.9.2.3 **Access and Haul Roads.**

Determine the construction contractor's access to the construction sites and haul roads. Do not permit the construction contractor to use any access or haul roads other than those approved. Access routes used by contractor vehicles must be clearly marked to prevent inadvertent entry to areas open to airport operations. Pay special attention to ensure that if construction traffic is to share or cross any ARFF routes that ARFF right of way is not impeded at any time, and that construction traffic on haul

roads does not interfere with NAVAIDs or approach surfaces of operational runways. Address whether access gates will be blocked or inoperative or if a rally point will be blocked or inaccessible.

- 2.9.2.4 Marking and lighting of vehicles in accordance with AC 150/5210-5, *Painting, Marking, and Lighting of Vehicles Used on an Airport*.
- 2.9.2.5 Description of proper vehicle operations on various areas under normal, lost communications, and emergency conditions.
- 2.9.2.6 Required escorts.
- 2.9.2.7 **Training Requirements for Vehicle Drivers to Ensure Compliance with the Airport Operator's Vehicle Rules and Regulations.**  
Specific training should be provided to vehicle operators, including those providing escorts. See AC 150/5210-20, *Ground Vehicle Operations on Airports*, for information on training and records maintenance requirements.
- 2.9.2.8 **Situational Awareness.**  
Vehicle drivers must confirm by personal observation that no aircraft is approaching their position (either in the air or on the ground) when given clearance to cross a runway, taxiway, or any other area open to airport operations. In addition, it is the responsibility of the escort vehicle driver to verify the movement/position of all escorted vehicles at any given time. At non-towered airports, all aircraft movements and flight operations rely on aircraft operators to self-report their positions and intentions. However, there is no requirement for an aircraft to have radio communications. Because aircraft do not always broadcast their positions or intentions, visual checking, radio monitoring, and situational awareness of the surroundings is critical to safety.
- 2.9.2.9 **Two-Way Radio Communication Procedures.**
- 2.9.2.9.1 General.  
The airport operator must ensure that tenant and construction contractor personnel engaged in activities involving unescorted operation on aircraft movement areas observe the proper procedures for communications, including using appropriate radio frequencies at airports with and without ATCT. When operating vehicles on or near open runways or taxiways, construction personnel must understand the critical importance of maintaining radio contact, as directed by the airport operator, with:
1. Airport operations
  2. ATCT

3. Common Traffic Advisory Frequency (CTAF), which may include UNICOM, MULTICOM.
4. Automatic Terminal Information Service (ATIS). This frequency is useful for monitoring conditions on the airport. Local air traffic will broadcast information regarding construction related runway closures and “shortened” runways on the ATIS frequency.

2.9.2.9.2 Areas Requiring Two-Way Radio Communication with the ATCT.

Vehicular traffic crossing active movement areas must be controlled either by two-way radio with the ATCT, escort, flagman, signal light, or other means appropriate for the particular airport.

2.9.2.9.3 Frequencies to be Used.

The airport operator will specify the frequencies to be used by the contractor, which may include the CTAF for monitoring of aircraft operations. Frequencies may also be assigned by the airport operator for other communications, including any radio frequency in compliance with Federal Communications Commission requirements. At airports with an ATCT, the airport operator will specify the frequency assigned by the ATCT to be used between contractor vehicles and the ATCT.

2.9.2.9.4 Proper radio usage, including read back requirements.

2.9.2.9.5 Proper phraseology, including the International Phonetic Alphabet.

2.9.2.9.6 Light Gun Signals.

Even though radio communication is maintained, escort vehicle drivers must also familiarize themselves with ATCT light gun signals in the event of radio failure. See the FAA safety placard “Ground Vehicle Guide to Airport Signs and Markings.” This safety placard may be downloaded through the Runway Safety Program Web site at [http://www.faa.gov/airports/runway\\_safety/publications/](http://www.faa.gov/airports/runway_safety/publications/) (see “Signs & Markings Vehicle Dashboard Sticker”) or obtained from the FAA Airports Regional Office.

2.9.2.10 **Maintenance of the secured area of the airport, including:**

2.9.2.10.1 Fencing and Gates.

Airport operators and contractors must take care to maintain security during construction when access points are created in the security fencing to permit the passage of construction vehicles or personnel. Temporary gates should be equipped so they can be securely closed and locked to prevent access by animals and unauthorized people. Procedures should be in place to ensure that only authorized persons and vehicles have access to the AOA and to prohibit “piggybacking” behind another person or vehicle. The Department of Transportation (DOT) document DOT/FAA/AR-

00/52, *Recommended Security Guidelines for Airport Planning and Construction*, provides more specific information on fencing. A copy of this document can be obtained from the Airport Consultants Council, Airports Council International, or American Association of Airport Executives.

2.9.2.10.2 Badging Requirements.

Airports subject to 49 CFR Part 1542, *Airport Security*, must meet standards for access control, movement of ground vehicles, and identification of construction contractor and tenant personnel.

2.10 **Wildlife Management.**

The CSPP and SPCD must be in accordance with the airport operator's wildlife hazard management plan, if applicable. See AC 150/5200-33, *Hazardous Wildlife Attractants On or Near Airports*, and CertAlert 98-05, *Grasses Attractive to Hazardous Wildlife*. Construction contractors must carefully control and continuously remove waste or loose materials that might attract wildlife. Contractor personnel must be aware of and avoid construction activities that can create wildlife hazards on airports, such as:

2.10.1 Trash.

Food scraps must be collected from construction personnel activity.

2.10.2 Standing Water.

2.10.3 Tall Grass and Seeds.

Requirements for turf establishment can be at odds with requirements for wildlife control. Grass seed is attractive to birds. Lower quality seed mixtures can contain seeds of plants (such as clover) that attract larger wildlife. Seeding should comply with the guidance in AC 150/5370-10, *Standards for Specifying Construction of Airports*, Item T-901, Seeding. Contact the local office of the United States Department of Agriculture Soil Conservation Service or the State University Agricultural Extension Service (County Agent or equivalent) for assistance and recommendations. These agencies can also provide liming and fertilizer recommendations.

2.10.4 Poorly Maintained Fencing and Gates.

See paragraph 2.9.2.10.1.

2.10.5 Disruption of Existing Wildlife Habitat.

While this will frequently be unavoidable due to the nature of the project, the CSPP should specify under what circumstances (location, wildlife type) contractor personnel should immediately notify the airport operator of wildlife sightings.

**2.11 Foreign Object Debris (FOD) Management.**

Waste and loose materials, commonly referred to as FOD, are capable of causing damage to aircraft landing gears, propellers, and jet engines. Construction contractors must not leave or place FOD on or near active aircraft movement areas. Materials capable of creating FOD must be continuously removed during the construction project. Fencing (other than security fencing) or covers may be necessary to contain material that can be carried by wind into areas where aircraft operate. See AC 150/5210-24, *Foreign Object Debris (FOD) Management*.

**2.12 Hazardous Materials (HAZMAT) Management.**

Contractors operating construction vehicles and equipment on the airport must be prepared to expeditiously contain and clean-up spills resulting from fuel or hydraulic fluid leaks. Transport and handling of other hazardous materials on an airport also requires special procedures. See AC 150/5320-15, *Management of Airport Industrial Waste*.

**2.13 Notification of Construction Activities.**

The CSPP and SPCD must detail procedures for the immediate notification of airport users and the FAA of any conditions adversely affecting the operational safety of the airport. It must address the notification actions described below, as applicable.

2.13.1 List of Responsible Representatives/points of contact for all involved parties, and procedures for contacting each of them, including after hours.

**2.13.2 NOTAMs.**

Only the airport operator may initiate or cancel NOTAMs on airport conditions, and is the only entity that can close or open a runway. The airport operator must coordinate the issuance, maintenance, and cancellation of NOTAMs about airport conditions resulting from construction activities with tenants and the local air traffic facility (control tower, approach control, or air traffic control center), and must either enter the NOTAM into NOTAM Manager, or provide information on closed or hazardous conditions on airport movement areas to the FAA Flight Service Station (FSS) so it can issue a NOTAM. The airport operator must file and maintain a list of authorized representatives with the FSS. Refer to AC 150/5200-28, *Notices to Airmen (NOTAMs) for Airport Operators*, for a sample NOTAM form. Only the FAA may issue or cancel NOTAMs on shutdown or irregular operation of FAA owned facilities. Any person having reason to believe that a NOTAM is missing, incomplete, or inaccurate must notify the airport operator. See paragraph 2.7.1.1 about issuing NOTAMs for partially closed runways versus runways with displaced thresholds.

2.13.3 Emergency notification procedures for medical, fire fighting, and police response.

2.13.4 Coordination with ARFF.

The CSPP must detail procedures for coordinating through the airport sponsor with ARFF personnel, mutual aid providers, and other emergency services if construction requires:

1. The deactivation and subsequent reactivation of water lines or fire hydrants, or
2. The rerouting, blocking and restoration of emergency access routes, or
3. The use of hazardous materials on the airfield.

2.13.5 Notification to the FAA.

2.13.5.1 **Part 77.**

Any person proposing construction or alteration of objects that affect navigable airspace, as defined in Part 77, must notify the FAA. This includes construction equipment and proposed parking areas for this equipment (i.e., cranes, graders, other equipment) on airports. FAA Form 7460-1, *Notice of Proposed Construction or Alteration*, can be used for this purpose and submitted to the appropriate FAA Airports Regional or District Office. See Appendix A to download the form. Further guidance is available on the FAA web site at [oeaaa.faa.gov](http://oeaaa.faa.gov).

2.13.5.2 **Part 157.**

With some exceptions, Title 14 CFR Part 157, *Notice of Construction, Alteration, Activation, and Deactivation of Airports*, requires that the airport operator notify the FAA in writing whenever a non-Federally funded project involves the construction of a new airport; the construction, realigning, altering, activating, or abandoning of a runway, landing strip, or associated taxiway; or the deactivation or abandoning of an entire airport. Notification involves submitting FAA Form 7480-1, *Notice of Landing Area Proposal*, to the nearest FAA Airports Regional or District Office. See Appendix A to download the form.

2.13.5.3 **NAVAIDs.**

For emergency (short-notice) notification about impacts to both airport owned and FAA owned NAVAIDs, contact: 866-432-2622.

2.13.5.3.1 Airport Owned/FAA Maintained.

If construction operations require a shutdown of 24 hours or greater in duration, or more than 4 hours daily on consecutive days, of a NAVAID owned by the airport but maintained by the FAA, provide a 45-day minimum notice to FAA ATO/Technical Operations prior to facility shutdown, using Strategic Event Coordination (SEC) Form 6000.26 contained within FAA Order 6000.15, *General Maintenance Handbook for National Airspace System (NAS) Facilities*.

#### 2.13.5.3.2 FAA Owned.

1. The airport operator must notify the appropriate FAA ATO Service Area Planning and Requirements (P&R) Group a minimum of 45 days prior to implementing an event that causes impacts to NAVAIDs, using SEC Form 6000.26.
2. Coordinate work for an FAA owned NAVAID shutdown with the local FAA ATO/Technical Operations office, including any necessary reimbursable agreements and flight checks. Detail procedures that address unanticipated utility outages and cable cuts that could impact FAA NAVAIDs. Refer to active Service Level Agreement with ATO for specifics.

### 2.14 **Inspection Requirements.**

#### 2.14.1 Daily Inspections.

Inspections should be conducted at least daily, but more frequently if necessary to ensure conformance with the CSPP. A sample checklist is provided in Appendix D, Construction Project Daily Safety Inspection Checklist. See also AC 150/5200-18, Airport Safety Self-Inspection. Airport operators holding a Part 139 certificate are required to conduct self-inspections during unusual conditions, such as construction activities, that may affect safe air carrier operations.

#### 2.14.2 Interim Inspections.

Inspections should be conducted of all areas to be (re)opened to aircraft traffic to ensure the proper operation of lights and signs, for correct markings, and absence of FOD. The contractor should conduct an inspection of the work area with airport operations personnel. The contractor should ensure that all construction materials have been secured, all pavement surfaces have been swept clean, all transition ramps have been properly constructed, and that surfaces have been appropriately marked for aircraft to operate safely. Only if all items on the list meet with the airport operator's approval should the air traffic control tower be notified to open the area to aircraft operations. The contractor should be required to retain a suitable workforce and the necessary equipment at the work area for any last minute cleanup that may be requested by the airport operator prior to opening the area.

#### 2.14.3 Final Inspections.

New runways and extended runway closures may require safety inspections at certificated airports prior to allowing air carrier service. Coordinate with the FAA Airport Certification Safety Inspector (ACSI) to determine if a final inspection will be necessary.

**2.15 Underground Utilities.**

The CSPP and/or SPCD must include procedures for locating and protecting existing underground utilities, cables, wires, pipelines, and other underground facilities in excavation areas. This may involve coordinating with public utilities and FAA ATO/Technical Operations. Note that “One Call” or “Miss Utility” services do not include FAA ATO/Technical Operations.

**2.16 Penalties.**

The CSPP should detail penalty provisions for noncompliance with airport rules and regulations and the safety plans (for example, if a vehicle is involved in a runway incursion). Such penalties typically include rescission of driving privileges or access to the AOA.

**2.17 Special Conditions.**

The CSPP must detail any special conditions that affect the operation of the airport and will require the activation of any special procedures (for example, low-visibility operations, snow removal, aircraft in distress, aircraft accident, security breach, Vehicle / Pedestrian Deviation (VPD) and other activities requiring construction suspension/resumption).

**2.18 Runway and Taxiway Visual Aids.**

This includes marking, lighting, signs, and visual NAVAIDs. The CSPP must ensure that areas where aircraft will be operating are clearly and visibly separated from construction areas, including closed runways. Throughout the duration of the construction project, verify that these areas remain clearly marked and visible at all times and that marking, lighting, signs, and visual NAVAIDs that are to continue to perform their functions during construction remain in place and operational. Visual NAVAIDs that are not serving their intended function during construction must be temporarily disabled, covered, or modified as necessary. The CSPP must address the following, as appropriate:

**2.18.1 General.**

Airport markings, lighting, signs, and visual NAVAIDs must be clearly visible to pilots, not misleading, confusing, or deceptive. All must be secured in place to prevent movement by prop wash, jet blast, wing vortices, and other wind currents and constructed of materials that will minimize damage to an aircraft in the event of inadvertent contact. Items used to secure such markings must be of a color similar to the marking.

**2.18.2 Markings.**

During the course of construction projects, temporary pavement markings are often required to allow for aircraft operations during or between work periods. During the design phase of the project, the designer should coordinate with the project manager,

airport operations, airport users, the FAA Airports project manager, and Airport Certification Safety Inspector for Part 139 airports to determine minimum temporary markings. The FAA Airports project manager will, wherever a runway is closed, coordinate with the appropriate FAA Flight Standards Office and disseminate findings to all parties. Where possible, the temporary markings on finish grade pavements should be placed to mirror the dimensions of the final markings. Markings must be in compliance with the standards of AC 150/5340-1, *Standards for Airport Markings*, except as noted herein. Runways and runway exit taxiways closed to aircraft operations are marked with a yellow X. The preferred visual aid to depict temporary runway closure is the lighted X signal placed on or near the runway designation numbers. (See paragraph 2.18.2.1.2.)

#### 2.18.2.1 **Closed Runways and Taxiways.**

##### 2.18.2.1.1 Permanently Closed Runways.

For runways, obliterate the threshold marking, runway designation marking, and touchdown zone markings, and place an X at each end and at 1,000-foot (300 m) intervals. For a multiple runway environment, if the lighted X on a designated number will be located in the RSA of an adjacent active runway, locate the lighted X farther down the closed runway to clear the RSA of the active runway. In addition, the closed runway numbers located in the RSA of an active runway must be marked with a flat yellow X.

##### 2.18.2.1.2 Temporarily Closed Runways.

For runways that have been temporarily closed, place an X at each end of the runway directly on or as near as practicable to the runway designation numbers. For a multiple runway environment, if the lighted X on a designated number will be located in the RSA of an adjacent active runway, locate the lighted X farther down the closed runway to clear the RSA of the active runway. In addition, the closed runway numbers located in the RSA of an active runway must be marked with a flat yellow X. See Figure 2-3. See also paragraph 2.18.3.3.

##### 2.18.2.1.3 Partially Closed Runways and Displaced Thresholds.

When threshold markings are needed to identify the temporary beginning of the runway that is available for landing, the markings must comply with AC 150/5340-1. An X is not used on a partially closed runway or a runway with a displaced threshold. See paragraph 2.7.1.1 for the difference between partially closed runways and runways with displaced thresholds. Because of the temporary nature of threshold displacement due to construction, it is not necessary to re-adjust the existing runway centerline markings to meet standard spacing for a runway with a visual approach. Some of the requirements below may be waived in the cases of low-activity airports and/or short duration changes that are measured in days rather than weeks. Consider whether the presence of an airport traffic

control tower allows for the development of special procedures. Contact the appropriate FAA Airports Regional or District Office for assistance.

**Figure 2-3. Markings for a Temporarily Closed Runway**

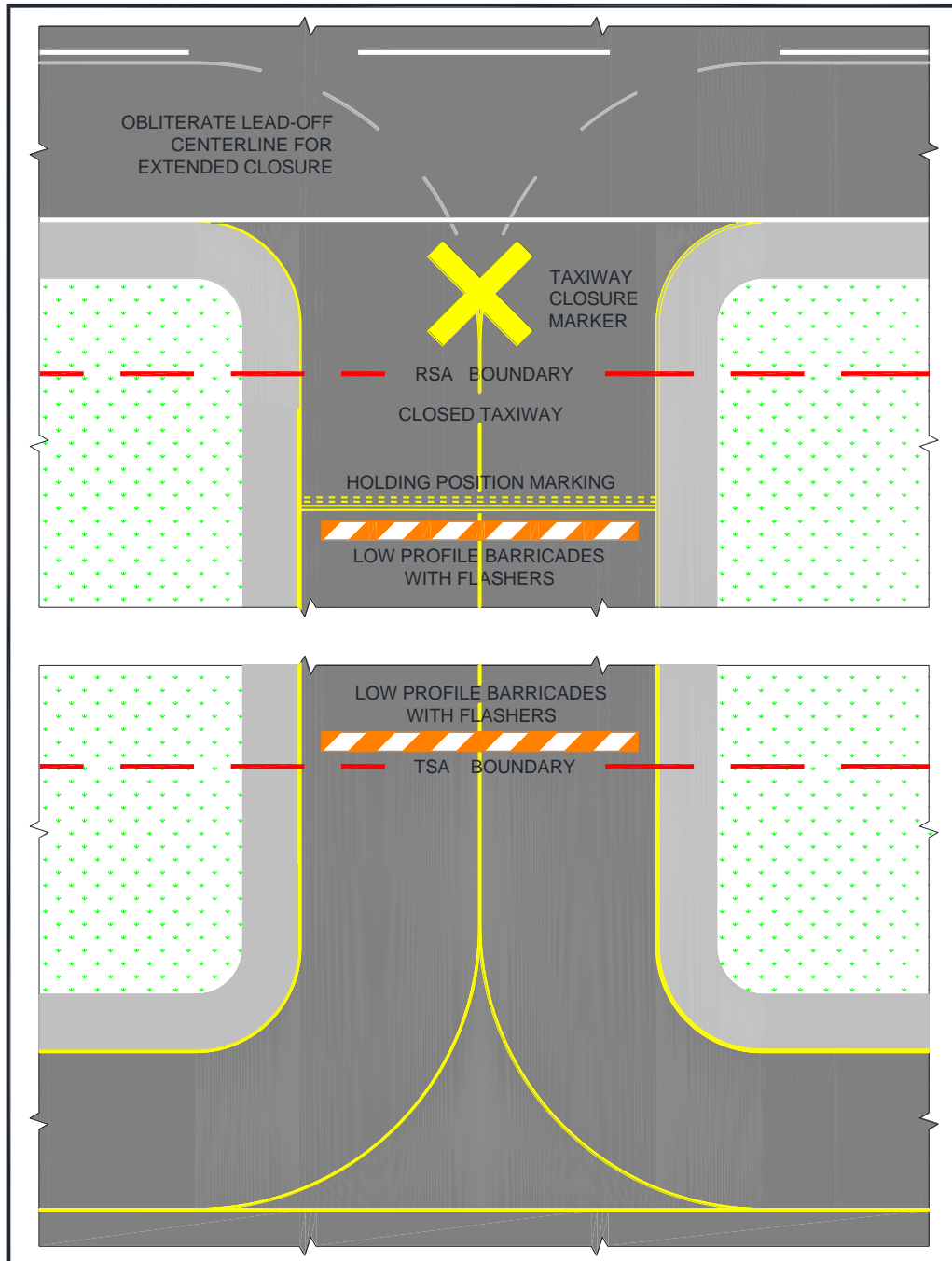


1. **Partially Closed Runways.** Pavement markings for temporary closed portions of the runway consist of a runway threshold bar, runway designation, and yellow chevrons to identify pavement areas that are unsuitable for takeoff or landing (see [AC 150/5340-1](#)). Obliterate or cover markings prior to the moved threshold. Existing touchdown zone markings beyond the moved threshold may remain in place. Obliterate aiming point markings. Issue appropriate NOTAMs regarding any nonstandard markings. See [Figure 2-4](#).
2. **Displaced Thresholds.** Pavement markings for a displaced threshold consist of a runway threshold bar, runway designation, and white arrowheads with and without arrow shafts. These markings are required to identify the portion of the runway before the displaced threshold to provide centerline guidance for pilots during approaches, takeoffs, and landing rollouts from the opposite direction. See [AC 150/5340-1](#). Obliterate markings prior to the displaced threshold. Existing touchdown zone markings beyond the displaced threshold may remain in place. Obliterate aiming point markings. Issue appropriate NOTAMs regarding any nonstandard markings. See [Figure 2-2](#).

2.18.2.1.4 Taxiways.

1. **Permanently Closed Taxiways.** *AC 150/5300-13 Airport Design*, notes that it is preferable to remove the pavement, but for pavement that is to remain, place an X at the entrance to both ends of the closed section. Obliterate taxiway centerline markings, including runway leadoff lines, leading to the closed taxiway. See [Figure 2-4](#).

**Figure 2-4. Temporary Taxiway Closure**



2. **Temporarily Closed Taxiways.** Place barricades outside the safety area of intersecting taxiways. For runway/taxiway intersections, place an X at the entrance to the closed taxiway from the runway. If the taxiway will be closed for an extended period, obliterate taxiway centerline markings, including runway leadoff lines and taxiway to taxiway turns, leading to the closed section. Always obliterate runway lead-off lines for high speed exits, regardless of the duration of the closure. If the centerline markings will be reused upon reopening the taxiway, it is preferable to paint over the marking. This will result in less damage to the pavement when the upper layer of paint is ultimately removed. See Figure 2-4.

2.18.2.1.5 Temporarily Closed Airport.

When the airport is closed temporarily, mark all the runways as closed.

- 2.18.2.2 If unable to paint temporary markings on the pavement, construct them from any of the following materials: fabric, colored plastic, painted sheets of plywood, or similar materials. They must be properly configured and appropriately secured to prevent movement by prop wash, jet blast, or other wind currents. Items used to secure such markings must be of a color similar to the marking.

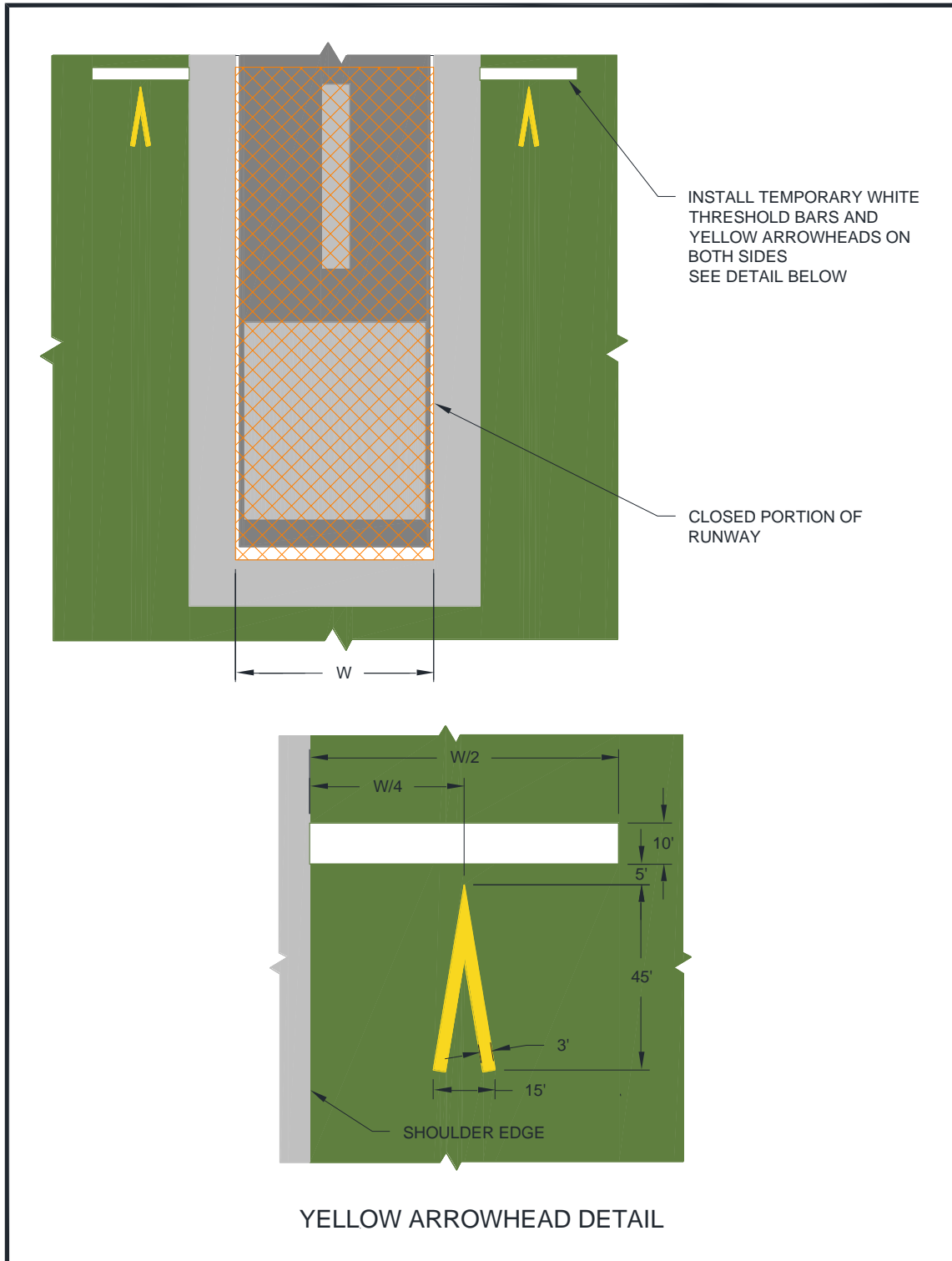
- 2.18.2.3 It may be necessary to remove or cover runway markings, including but not limited to, runway designation markings, threshold markings, centerline markings, edge stripes, touchdown zone markings and aiming point markings, depending on the length of construction and type of activity at the airport. When removing runway markings, apply the same treatment to areas between stripes or numbers, as the cleaned area will appear to pilots as a marking in the shape of the treated area.

- 2.18.2.4 If it is not possible to install threshold bars, chevrons, and arrows on the pavement, “temporary outboard white threshold bars and yellow arrowheads”, see Figure 2-5, may be used. Locate them outside of the runway pavement surface on both sides of the runway. The dimensions must be as shown in Figure 2-5. If the markings are not discernible on grass or snow, apply a black background with appropriate material over the ground to ensure they are clearly visible.

- 2.18.2.5 The application rate of paint to mark a short-term temporary runway and taxiway markings may deviate from the standard (see Item P-620, “Runway and Taxiway Painting,” in AC 150/5370-10), but the dimensions must meet the existing standards. When applying temporary markings at night, it is recommended that the fast curing, Type II paint be used to help offset the higher humidity and cooler temperatures often experienced at night. Diluting the paint will substantially increase cure time and is not recommended. Glass beads are not recommended for temporary markings. Striated markings may also be used for certain temporary markings. AC

150/5340-1, *Standards for Airport Markings*, has additional guidance on temporary markings.

**Figure 2-5. Temporary Outboard White Threshold Bars and Yellow Arrowheads**



### 2.18.3 Lighting and Visual NAVAIDs.

This paragraph refers to standard runway and taxiway lighting systems. See below for hazard lighting. Lighting installation must be in conformance with AC 150/5340-30, *Design and Installation Details for Airport Visual Aids*, and fixture design in conformance with AC 150/5345-50, *Specification for Portable Runway and Taxiway Lights*. When disconnecting runway and taxiway lighting fixtures, disconnect the associated isolation transformers. See AC 150/5340-26, *Maintenance of Airport Visual Aid Facilities*, for disconnect procedures and safety precautions. Alternately, cover the light fixture in such a way as to prevent light leakage. Avoid removing the lamp from energized fixtures because an excessive number of isolation transformers with open secondaries may damage the regulators and/or increase the current above its normal value. Secure, identify, and place any above ground temporary wiring in conduit to prevent electrocution and fire ignition sources. Maintain mandatory hold signs to operate normally in any situation where pilots or vehicle drivers could mistakenly be in that location. At towered airports certificated under Part 139, holding position signs are required to be illuminated on open taxiways crossing to closed or inactive runways. If the holding position sign is installed on the runway circuit for the closed runway, install a jumper to the taxiway circuit to provide power to the holding position sign for nighttime operations. Where it is not possible to maintain power to signs that would normally be operational, install barricades to exclude aircraft. Figure 2-1, Figure 2-2, Figure 2-3, and Figure 2-4 illustrate temporary changes to lighting and visual NAVAIDs.

#### 2.18.3.1 **Permanently Closed Runways and Taxiways.**

For runways and taxiways that have been permanently closed, disconnect the lighting circuits.

#### 2.18.3.2 **Temporarily Closed Runways and New Runways Not Yet Open to Air Traffic.**

If available, use a lighted X, both at night and during the day, placed at each end of the runway on or near the runway designation numbers facing the approach. (Note that the lighted X must be illuminated at all times that it is on a runway.) The use of a lighted X is required if night work requires runway lighting to be on. See AC 150/5345-55, *Specification for L-893, Lighted Visual Aid to Indicate Temporary Runway Closure*. For runways that have been temporarily closed, but for an extended period, and for those with pilot controlled lighting, disconnect the lighting circuits or secure switches to prevent inadvertent activation. For runways that will be opened periodically, coordinate procedures with the FAA air traffic manager or, at airports without an ATCT, the airport operator. Activate stop bars if available. Figure 2-6 shows a lighted X by day. Figure 2-7 shows a lighted X at night.

**Figure 2-6. Lighted X in Daytime****Figure 2-7. Lighted X at Night**

### 2.18.3.3 **Partially Closed Runways and Displaced Thresholds.**

When a runway is partially closed, a portion of the pavement is unavailable for any aircraft operation, meaning taxiing and landing or taking off in either direction. A displaced threshold, by contrast, is put in place to ensure obstacle clearance by landing aircraft. The pavement prior to the displaced threshold is available for takeoff in the direction of the displacement, and for landing and takeoff in the opposite direction. Misunderstanding this difference and issuance of a subsequently inaccurate NOTAM can result in a hazardous situation. For both partially

closed runways and displaced thresholds, approach lighting systems at the affected end must be placed out of service.

2.18.3.3.1 Partially Closed Runways.

Disconnect edge and threshold lights on that part of the runway at and behind the threshold (that is, the portion of the runway that is closed). Alternately, cover the light fixtures in such a way as to prevent light leakage. See Figure 2-1.

2.18.3.3.2 Temporary Displaced Thresholds.

Edge lighting in the area of the displacement emits red light in the direction of approach and yellow light (white for visual runways) in the opposite direction. If the displacement is 700 feet or less, blank out centerline lights in the direction of approach or place the centerline lights out of service. If the displacement is over 700 feet, place the centerline lights out of service. See AC 150/5340-30 for details on lighting displaced thresholds. See Figure 2-2.

2.18.3.3.3 Temporary runway thresholds and runway ends must be lighted if the runway is lighted and it is the intended threshold for night landings or instrument meteorological conditions.

2.18.3.3.4 A temporary threshold on an unlighted runway may be marked by retroreflective, elevated markers in addition to markings noted in paragraph 2.18.2.1.3. Markers seen by aircraft on approach are green. Markers at the rollout end of the runway are red. At certificated airports, temporary elevated threshold markers must be mounted with a frangible fitting (see 14 CFR Part 139.309). At non-certificated airports, the temporary elevated threshold markings may either be mounted with a frangible fitting or be flexible. See AC 150/5345-39, *Specification for L-853, Runway and Taxiway Retroreflective Markers*.

2.18.3.3.5 Temporary threshold lights and runway end lights and related visual NAVAIDs are installed outboard of the edges of the full-strength pavement only when they cannot be installed on the pavement. They are installed with bases at grade level or as low as possible, but not more than 3 inch (7.6 cm) above ground. (The standard above ground height for airport lighting fixtures is 14 inches (35 cm)). When any portion of a base is above grade, place properly compacted fill around the base to minimize the rate of gradient change so aircraft can, in an emergency, cross at normal landing or takeoff speeds without incurring significant damage. See AC 150/5370-10.

2.18.3.3.6 Maintain threshold and edge lighting color and spacing standards as described in AC 150/5340-30. Battery powered, solar, or portable lights that meet the criteria in AC 150/5345-50 may be used. These systems are intended primarily for visual flight rules (VFR) aircraft operations but may

be used for instrument flight rules (IFR) aircraft operations, upon individual approval from the Flight Standards Division of the applicable FAA Regional Office.

- 2.18.3.3.7 When runway thresholds are temporarily displaced, reconfigure yellow lenses (caution zone), as necessary, and place the centerline lights out of service.
- 2.18.3.3.8 Relocate the Visual Glide Slope Indicator (VGSI), such as Visual Approach Slope Indicator (VASI) and Precision Approach Path Indicator (PAPI); other airport lights, such as Runway End Identifier Lights (REIL); and approach lights to identify the temporary threshold. Another option is to disable the VGSI or any equipment that would give misleading indications to pilots as to the new threshold location. Installation of temporary visual aids may be necessary to provide adequate guidance to pilots on approach to the affected runway. If the FAA owns and operates the VGSI, coordinate its installation or disabling with the local ATO/Technical Operations Office. Relocation of such visual aids will depend on the duration of the project and the benefits gained from the relocation, as this can result in great expense. See FAA JO 6850.2, *Visual Guidance Lighting Systems*, for installation criteria for FAA owned and operated NAVAIDs.
- 2.18.3.3.9 Issue a NOTAM to inform pilots of temporary lighting conditions.

2.18.3.4 **Temporarily Closed Taxiways.**

If possible, deactivate the taxiway lighting circuits. When deactivation is not possible (for example other taxiways on the same circuit are to remain open), cover the light fixture in a way as to prevent light leakage.

2.18.4 Signs.

To the extent possible, signs must be in conformance with AC 150/5345-44, *Specification for Runway and Taxiway Signs*, and AC 150/5340-18, *Standard for Airport Sign Systems*.

2.18.4.1 **Existing Signs.**

Runway exit signs are to be covered for closed runway exits. Outbound destination signs are to be covered for closed runways. Any time a sign does not serve its normal function or would provide conflicting information, it must be covered or removed to prevent misdirecting pilots. Note that information signs identifying a crossing taxiway continue to perform their normal function even if the crossing taxiway is closed. For long term construction projects, consider relocating signs, especially runway distance remaining signs.

#### 2.18.4.2 **Temporary Signs.**

Orange construction signs comprise a message in black on an orange background. Orange construction signs may help pilots be aware of changed conditions. The airport operator may choose to introduce these signs as part of a movement area construction project to increase situational awareness when needed. Locate signs outside the taxiway safety limits and ahead of construction areas so pilots can take timely action. Use temporary signs judiciously, striking a balance between the need for information and the increase in pilot workload. When there is a concern of pilot “information overload,” the applicability of mandatory hold signs must take precedence over orange construction signs recommended during construction. Temporary signs must meet the standards for such signs in Engineering Brief 93, *Guidance for the Assembly and Installation of Temporary Orange Construction Signs*. Many criteria in AC 150/5345-44, *Specification for Runway and Taxiway Signs*, are referenced in the Engineering Brief. Permissible sign legends are:

1. CONSTRUCTION AHEAD,
2. CONSTRUCTION ON RAMP, and
3. RWY XX TAKEOFF RUN AVAILABLE XXX FT.

Phasing, supported by drawings and sign schedule, for the installation of orange construction signs must be included in the CSPP or SPCD.

##### 2.18.4.2.1 Takeoff Run Available (TORA) signs.

**Recommended:** Where a runway has been shortened for takeoff, install orange TORA signs well before the hold lines, such as on a parallel taxiway prior to a turn to a runway hold position. See EB 93 for sign size and location.

##### 2.18.4.2.2 Sign legends are shown in Figure F-1.

**Note:** See Figure E-1, Figure E-2, Figure E-3, Figure F-2, and Figure F-3 for examples of orange construction sign locations.

#### 2.19 **Marking and Signs for Access Routes.**

The CSPP should indicate that pavement markings and signs for construction personnel will conform to AC 150/5340-18 and, to the extent practicable, with the Federal Highway Administration Manual on Uniform Traffic Control Devices (MUTCD) and/or State highway specifications. Signs adjacent to areas used by aircraft must comply with the frangibility requirements of AC 150/5220-23, *Frangible Connections*, which may require modification to size and height guidance in the MUTCD.

## 2.20 **Hazard Marking, Lighting and Signing.**

2.20.1 Hazard marking, lighting, and signing prevent pilots from entering areas closed to aircraft, and prevent construction personnel from entering areas open to aircraft. The CSPP must specify prominent, comprehensible warning indicators for any area affected by construction that is normally accessible to aircraft, personnel, or vehicles. Hazard marking and lighting must also be specified to identify open manholes, small areas under repair, stockpiled material, waste areas, and areas subject to jet blast. Also consider less obvious construction-related hazards and include markings to identify FAA, airport, and National Weather Service facilities cables and power lines; instrument landing system (ILS) critical areas; airport surfaces, such as RSA, OFA, and OFZ; and other sensitive areas to make it easier for contractor personnel to avoid these areas.

### 2.20.2 Equipment.

#### 2.20.2.1 **Barricades.**

Low profile barricades, including traffic cones, (weighted or sturdily attached to the surface) are acceptable methods used to identify and define the limits of construction and hazardous areas on airports. Careful consideration must be given to selecting equipment that poses the least danger to aircraft but is sturdy enough to remain in place when subjected to typical winds, prop wash and jet blast. The spacing of barricades must be such that a breach is physically prevented barring a deliberate act. For example, if barricades are intended to exclude aircraft, gaps between barricades must be smaller than the wingspan of the smallest aircraft to be excluded; if barricades are intended to exclude vehicles, gaps between barricades must be smaller than the width of the excluded vehicles, generally 4 feet (1.2 meters). Provision must be made for ARFF access if necessary. If barricades are intended to exclude pedestrians, they must be continuously linked. Continuous linking may be accomplished through the use of ropes, securely attached to prevent FOD.

#### 2.20.2.2 **Lights.**

Lights must be red, either steady burning or flashing, and must meet the luminance requirements of the State Highway Department. Batteries powering lights will last longer if lights flash. Lights must be mounted on barricades and spaced at no more than 10 feet (3 meters). Lights must be operated between sunset and sunrise and during periods of low visibility whenever the airport is open for operations. They may be operated by photocell, but this may require that the contractor turn them on manually during periods of low visibility during daytime hours.

#### 2.20.2.3 **Supplement Barricades with Signs (for example) As Necessary.**

Examples are “No Entry” and “No Vehicles.” Be aware of the increased effects of wind and jet blast on barricades with attached signs.

#### 2.20.2.4 **Air Operations Area – General.**

Barricades are not permitted in any active safety area or on the runway side of a runway hold line. Within a runway or taxiway object free area, and on aprons, use orange traffic cones, flashing or steady burning red lights as noted above, highly reflective collapsible barricades marked with diagonal, alternating orange and white stripes; and/or signs to separate all construction/maintenance areas from the movement area. Barricades may be supplemented with alternating orange and white flags at least 20 by 20 inch (50 by 50 cm) square and securely fastened to eliminate FOD. All barricades adjacent to any open runway or taxiway / taxilane safety area, or apron must be as low as possible to the ground, and no more than 18 inches high, exclusive of supplementary lights and flags. Barricades must be of low mass; easily collapsible upon contact with an aircraft or any of its components; and weighted or sturdily attached to the surface to prevent displacement from prop wash, jet blast, wing vortex, and other surface wind currents. If affixed to the surface, they must be frangible at grade level or as low as possible, but not to exceed 3 inch (7.6 cm) above the ground. [Figure 2-8](#) and [Figure 2-9](#) show sample barricades with proper coloring and flags.

**Figure 2-8. Interlocking Barricades**



**Figure 2-9. Low Profile Barricades****2.20.2.5 Air Operations Area – Runway/Taxiway Intersections.**

Use highly reflective barricades with lights to close taxiways leading to closed runways. Evaluate all operating factors when determining how to mark temporary closures that can last from 10 to 15 minutes to a much longer period of time. However, even for closures of relatively short duration, close all taxiway/runway intersections with barricades. The use of traffic cones is appropriate for short duration closures.

**2.20.2.6 Air Operations Area – Other.**

Beyond runway and taxiway object free areas and aprons, barricades intended for construction vehicles and personnel may be many different shapes and made from various materials, including railroad ties, sawhorses, jersey barriers, or barrels.

**2.20.2.7 Maintenance.**

The construction specifications must include a provision requiring the contractor to have a person on call 24 hours a day for emergency maintenance of airport hazard lighting and barricades. The contractor must file the contact person's information with the airport operator. Lighting should be checked for proper operation at least once per day, preferably at dusk.

**2.21 Work Zone Lighting for Nighttime Construction.**

Lighting equipment must adequately illuminate the work area if the construction is to be performed during nighttime hours. Refer to [AC 150/5370-10](#) for minimum illumination levels for nighttime paving projects. Additionally, it is recommended that all support equipment, except haul trucks, be equipped with artificial illumination to safely

illuminate the area immediately surrounding their work areas. The lights should be positioned to provide the most natural color illumination and contrast with a minimum of shadows. The spacing must be determined by trial. Light towers should be positioned and adjusted to aim away from ATCT cabs and active runways to prevent blinding effects. Shielding may be necessary. Light towers should be removed from the construction site when the area is reopened to aircraft operations. Construction lighting units should be identified and generally located on the construction phasing plans in relationship to the ATCT and active runways and taxiways.

## 2.22 **Protection of Runway and Taxiway Safety Areas.**

Runway and taxiway safety areas, OFZs, OFAs, and approach surfaces are described in [AC 150/5300-13](#). Protection of these areas includes limitations on the location and height of equipment and stockpiled material. An FAA airspace study may be required. Coordinate with the appropriate FAA Airports Regional or District Office if there is any doubt as to requirements or dimensions (see paragraph [2.13.5](#)) as soon as the location and height of materials or equipment are known. The CSPP should include drawings showing all safety areas, object free areas, obstacle free zones and approach departure surfaces affected by construction.

### 2.22.1 Runway Safety Area (RSA).

A runway safety area is the defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway (see [AC 150/5300-13](#)). Construction activities within the existing RSA are subject to the following conditions:

- 2.22.1.1 No construction may occur within the existing RSA while the runway is open for aircraft operations. The RSA dimensions may be temporarily adjusted if the runway is restricted to aircraft operations requiring an RSA that is equal to the RSA width and length beyond the runway ends available during construction. (See [AC 150/5300-13](#)). The temporary use of declared distances and/or partial runway closures may provide the necessary RSA under certain circumstances. Coordinate with the appropriate FAA Airports Regional or District Office to have declared distances information published, and appropriate NOTAMs issued. See [AC 150/5300-13](#) for guidance on the use of declared distances.
- 2.22.1.2 The airport operator must coordinate the adjustment of RSA dimensions as permitted above with the appropriate FAA Airports Regional or District Office and the local FAA air traffic manager and issue a NOTAM.
- 2.22.1.3 The CSPP and SPCD must provide procedures for ensuring adequate distance for protection from blasting operations, if required by operational considerations.

#### 2.22.1.4 **Excavations.**

2.22.1.4.1 Open trenches or excavations are not permitted within the RSA while the runway is open. Backfill trenches before the runway is opened. If backfilling excavations before the runway must be opened is impracticable, cover the excavations appropriately. Covering for open trenches must be designed to allow the safe operation of the heaviest aircraft operating on the runway across the trench without damage to the aircraft.

2.22.1.4.2 Construction contractors must prominently mark open trenches and excavations at the construction site with red or orange flags, as approved by the airport operator, and light them with red lights during hours of restricted visibility or darkness.

#### 2.22.1.5 **Erosion Control.**

Soil erosion must be controlled to maintain RSA standards, that is, the RSA must be cleared and graded and have no potentially hazardous ruts, humps, depressions, or other surface variations, and capable, under dry conditions, of supporting snow removal equipment, aircraft rescue and fire fighting equipment, and the occasional passage of aircraft without causing structural damage to the aircraft.

#### 2.22.2 Runway Object Free Area (ROFA).

Construction, including excavations, may be permitted in the ROFA. However, equipment must be removed from the ROFA when not in use, and material should not be stockpiled in the ROFA if not necessary. Stockpiling material in the OFA requires submittal of a 7460-1 form and justification provided to the appropriate FAA Airports Regional or District Office for approval.

#### 2.22.3 Taxiway Safety Area (TSA).

2.22.3.1 A taxiway safety area is a defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an airplane unintentionally departing the taxiway. (See AC 150/5300-13.) Since the width of the TSA is equal to the wingspan of the design aircraft, no construction may occur within the TSA while the taxiway is open for aircraft operations. The TSA dimensions may be temporarily adjusted if the taxiway is restricted to aircraft operations requiring a TSA that is equal to the TSA width available during construction. Give special consideration to TSA dimensions at taxiway turns and intersections. (see AC 150/5300-13).

2.22.3.2 The airport operator must coordinate the adjustment of the TSA width as permitted above with the appropriate FAA Airports Regional or District Office and the FAA air traffic manager and issue a NOTAM.

2.22.3.3 The CSPP and SPCD must provide procedures for ensuring adequate distance for protection from blasting operations.

2.22.3.4 **Excavations.**

1. Curves. Open trenches or excavations are not permitted within the TSA while the taxiway is open. Trenches should be backfilled before the taxiway is opened. If backfilling excavations before the taxiway must be opened is impracticable, cover the excavations appropriately. Covering for open trenches must be designed to allow the safe operation of the heaviest aircraft operating on the taxiway across the trench without damage to the aircraft.
2. Straight Sections. Open trenches or excavations are not permitted within the TSA while the taxiway is open for unrestricted aircraft operations. Trenches should be backfilled before the taxiway is opened. If backfilling excavations before the taxiway must be opened is impracticable, cover the excavations to allow the safe passage of ARFF equipment and of the heaviest aircraft operating on the taxiway across the trench without causing damage to the equipment or aircraft. In rare circumstances where the section of taxiway is indispensable for aircraft movement, open trenches or excavations may be permitted in the TSA while the taxiway is open to aircraft operations, subject to the following restrictions:
  - a. Taxiing speed is limited to 10 mph.
  - b. Appropriate NOTAMs are issued.
  - c. Marking and lighting meeting the provisions of paragraphs 2.18 and 2.20 are implemented.
  - d. Low mass, low-profile lighted barricades are installed.
  - e. Appropriate temporary orange construction signs are installed.
3. Construction contractors must prominently mark open trenches and excavations at the construction site with red or orange flags, as approved by the airport operator, and light them with red lights during hours of restricted visibility or darkness.

2.22.3.5 **Erosion control.**

Soil erosion must be controlled to maintain TSA standards, that is, the TSA must be cleared and graded and have no potentially hazardous ruts, humps, depressions, or other surface variations, and capable, under dry conditions, of supporting snow removal equipment, aircraft rescue and firefighting equipment, and the occasional passage of aircraft without causing structural damage to the aircraft.

#### 2.22.4 Taxiway Object Free Area (TOFA).

Unlike the Runway Object Free Area, aircraft wings regularly penetrate the taxiway object free area during normal operations. Thus, the restrictions are more stringent. Except as provided below, no construction may occur within the taxiway object free area while the taxiway is open for aircraft operations.

- 2.22.4.1 The taxiway object free area dimensions may be temporarily adjusted if the taxiway is restricted to aircraft operations requiring a taxiway object free area that is equal to the taxiway object free area width available. Give special consideration to TOFA dimensions at taxiway turns and intersections.
- 2.22.4.2 Offset taxiway centerline and edge pavement markings (do not use glass beads) may be used as a temporary measure to provide the required taxiway object free area. Where offset taxiway pavement markings are provided, centerline lighting, centerline reflectors, or taxiway edge reflectors are required. Existing lighting that does not coincide with the temporary markings must be taken out of service.
- 2.22.4.3 Construction activity, including open excavations, may be accomplished without adjusting the width of the taxiway object free area, subject to the following restrictions:
  - 2.22.4.3.1 Taxiing speed is limited to 10 mph.
  - 2.22.4.3.2 NOTAMs issued advising taxiing pilots of hazard and recommending reduced taxiing speeds on the taxiway.
  - 2.22.4.3.3 Marking and lighting meeting the provisions of paragraphs 2.18 and 2.20 are implemented.
  - 2.22.4.3.4 If desired, appropriate orange construction signs are installed. See paragraph 2.18.4.2 and Appendix F.
  - 2.22.4.3.5 Five-foot clearance is maintained between equipment and materials and any part of an aircraft (includes wingtip overhang). If such clearance can only be maintained if an aircraft does not have full use of the entire taxiway width (with its main landing gear at the edge of the usable pavement), then it will be necessary to move personnel and equipment for the passage of that aircraft.
  - 2.22.4.3.6 Flaggers furnished by the contractor must be used to direct and control construction equipment and personnel to a pre-established setback distance for safe passage of aircraft, and airline and/or airport personnel. Flaggers must also be used to direct taxiing aircraft. Due to liability issues, the airport operator should require airlines to provide flaggers for directing taxiing aircraft.

### 2.22.5 Obstacle Free Zone (OFZ).

In general, personnel, material, and/or equipment may not penetrate the OFZ while the runway is open for aircraft operations. If a penetration to the OFZ is necessary, it may be possible to continue aircraft operations through operational restrictions. Coordinate with the FAA through the appropriate FAA Airports Regional or District Office.

### 2.22.6 Runway Approach/Departure Areas and Clearways.

All personnel, materials, and/or equipment must remain clear of the applicable threshold siting surfaces, as defined in AC 150/5300-13. Objects that do not penetrate these surfaces may still be obstructions to air navigation and may affect standard instrument approach procedures. Coordinate with the FAA through the appropriate FAA Airports Regional or District Office.

2.22.6.1 Construction activity in a runway approach/departure area may result in the need to partially close a runway or displace the existing runway threshold. Partial runway closure, displacement of the runway threshold, as well as closure of the complete runway and other portions of the movement area also require coordination through the airport operator with the appropriate FAA air traffic manager (FSS if non-towered) and ATO/Technical Operations (for affected NAVAIDS) and airport users.

#### 2.22.6.2 **Caution About Partial Runway Closures.**

When filing a NOTAM for a partial runway closure, clearly state that the portion of pavement located prior to the threshold is not available for landing and departing traffic. In this case, the threshold has been moved for both landing and takeoff purposes (this is different than a displaced threshold). There may be situations where the portion of closed runway is available for taxiing only. If so, the NOTAM must reflect this condition).

#### 2.22.6.3 **Caution About Displaced Thresholds.**

Implementation of a displaced threshold affects runway length available for aircraft landing over the displacement. Depending on the reason for the displacement (to provide obstruction clearance or RSA), such a displacement may also require an adjustment in the landing distance available and accelerate-stop distance available in the opposite direction. If project scope includes personnel, equipment, excavation, or other work within the existing RSA of any usable runway end, do not implement a displaced threshold unless arrivals and departures toward the construction activity are prohibited. Instead, implement a partial closure.

### 2.23 **Other Limitations on Construction.**

The CSPP must specify any other limitations on construction, including but not limited to:

### 2.23.1 Prohibitions.

- 2.23.1.1 No use of tall equipment (cranes, concrete pumps, and so on) unless a 7460-1 determination letter is issued for such equipment.
- 2.23.1.2 No use of open flame welding or torches unless fire safety precautions are provided and the airport operator has approved their use.
- 2.23.1.3 No use of electrical blasting caps on or within 1,000 feet (300 meters) of the airport property. See AC 150/5370-10.

### 2.23.2 Restrictions.

- 2.23.2.1 Construction suspension required during specific airport operations.
- 2.23.2.2 Areas that cannot be worked on simultaneously.
- 2.23.2.3 Day or night construction restrictions.
- 2.23.2.4 Seasonal construction restrictions.
- 2.23.2.5 Temporary signs not approved by the airport operator.
- 2.23.2.6 Grades changes that could result in unplanned effects on NAVAIDs.

## CHAPTER 3. GUIDELINES FOR WRITING A CSPP

### 3.1 **General Requirements.**

The CSPP is a standalone document written to correspond with the subjects outlined in paragraph 2.4. The CSPP is organized by numbered sections corresponding to each subject listed in paragraph 2.4, and described in detail in paragraphs 2.5 - 2.23. Each section number and title in the CSPP matches the corresponding subject outlined in paragraph 2.4 (for example, 1. Coordination, 2. Phasing, 3. Areas and Operations Affected by the Construction Activity, and so on). With the exception of the project scope of work outlined in Section 2. Phasing, only subjects specific to operational safety during construction should be addressed.

### 3.2 **Applicability of Subjects.**

Each section should, to the extent practical, focus on the specific subject. Where an overlapping requirement spans several sections, the requirement should be explained in detail in the most applicable section. A reference to that section should be included in all other sections where the requirement may apply. For example, the requirement to protect existing underground FAA ILS cables during trenching operations could be considered FAA ATO coordination (Coordination, paragraph 2.5.3), an area and operation affected by the construction activity (Areas and Operations Affected by the Construction Activity, paragraph 2.7.1.4), a protection of a NAVAID (Protection of Navigational Aids (NAVAIDs), paragraph 2.8), or a notification to the FAA of construction activities (Notification of Construction Activities, paragraph 2.13.5.3.2). However, it is more specifically an underground utility requirement (Underground Utilities, paragraph 2.15). The procedure for protecting underground ILS cables during trenching operations should therefore be described in 2.4.2.11: “The contractor must coordinate with the local FAA System Support Center (SSC) to mark existing ILS cable routes along Runway 17-35. The ILS cables will be located by hand digging whenever the trenching operation moves within 10 feet of the cable markings.” All other applicable sections should include a reference to 2.4.2.11: “ILS cables shall be identified and protected as described in 2.4.2.11” or “See 2.4.2.11 for ILS cable identification and protection requirements.” Thus, the CSPP should be considered as a whole, with no need to duplicate responses to related issues.

### 3.3 **Graphical Representations.**

Construction safety drawings should be included in the CSPP as attachments. When other graphical representations will aid in supporting written statements, the drawings, diagrams, and/or photographs should also be attached to the CSPP. References should be made in the CSPP to each graphical attachment and may be made in multiple sections.

### 3.4 **Reference Documents.**

The CSPP must not incorporate a document by reference unless reproduction of the material in that document is prohibited. In that case, either copies of or a source for the referenced document must be provided to the contractor. Where this AC recommends references (e.g. as in paragraph 3.9) the intent is to include a reference to the corresponding section in the CSPP, not to this Advisory Circular.

### 3.5 **Restrictions.**

The CSPP should not be considered as a project design review document. The CSPP should also avoid mention of permanent (“as-built”) features such as pavements, markings, signs, and lighting, except when such features are intended to aid in maintaining operational safety during the construction.

### 3.6 **Coordination.**

Include in this section a detailed description of conferences and meetings to be held both before and during the project. Include appropriate information from AC 150/5370-12. Discuss coordination procedures and schedules for each required FAA ATO Technical Operations shutdown and restart and all required flight inspections.

### 3.7 **Phasing.**

Include in this section a detailed scope of work description for the project as a whole and each phase of work covered by the CSPP. This includes all locations and durations of the work proposed. Attach drawings to graphically support the written scope of work. Detail in this section the sequenced phases of the proposed construction. Include a reference to paragraph 3.8, as appropriate.

### 3.8 **Areas and Operations Affected by Construction.**

Focus in this section on identifying the areas and operations affected by the construction. Describe corresponding mitigation that is not covered in detail elsewhere in the CSPP. Include references to paragraphs below as appropriate. Attach drawings as necessary to graphically describe affected areas and mechanisms proposed. See Appendix F for sample operational effects tables and figures.

### 3.9 **NAVAID Protection.**

List in this section all NAVAID facilities that will be affected by the construction. Identify NAVAID facilities that will be placed out of service at any time prior to or during construction activities. Identify individuals responsible for coordinating each shutdown and when each facility will be out of service. Include a reference to paragraph 3.6 for FAA ATO NAVAID shutdown, restart, and flight inspection coordination. Outline in detail procedures to protect each NAVAID facility remaining in service from interference by construction activities. Include a reference to paragraph 3.14 for the

issuance of NOTAMs as required. Include a reference to paragraph 3.16 for the protection of underground cables and piping serving NAVAIDs. If temporary visual aids are proposed to replace or supplement existing facilities, include a reference to paragraph 3.19. Attach drawings to graphically indicate the affected NAVAIDs and the corresponding critical areas.

### 3.10 **Contractor Access.**

This will necessarily be the most extensive section of the CSPP. Provide sufficient detail so that a contractor not experienced in working on airports will understand the unique restrictions such work will require. Due to this extent, it should be broken down into subsections as described below:

#### 3.10.1 Location of Stockpiled Construction Materials.

Describe in this section specific locations for stockpiling material. Note any height restrictions on stockpiles. Include a reference to paragraph 3.21 for hazard marking and lighting devices used to identify stockpiles. Include a reference to paragraph 3.11 for provisions to prevent stockpile material from becoming wildlife attractants. Include a reference to paragraph 3.12 for provisions to prevent stockpile material from becoming FOD. Attach drawings to graphically indicate the stockpile locations.

#### 3.10.2 Vehicle and Pedestrian Operations.

While there are many items to be addressed in this major subsection of the CSPP, all are concerned with one main issue: keeping people and vehicles from areas of the airport where they don't belong. This includes preventing unauthorized entry to the AOA and preventing the improper movement of pedestrians or vehicles on the airport. In this section, focus on mechanisms to prevent construction vehicles and workers traveling to and from the worksite from unauthorized entry into movement areas. Specify locations of parking for both employee vehicles and construction equipment, and routes for access and haul roads. In most cases, this will best be accomplished by attaching a drawing. Quote from AC 150/5210-5 specific requirements for contractor vehicles rather than referring to the AC as a whole, and include special requirements for identifying HAZMAT vehicles. Quote from, rather than incorporate by reference, AC 150/5210-20 as appropriate to address the airport's rules for ground vehicle operations, including its training program. Discuss the airport's recordkeeping system listing authorized vehicle operators.

#### 3.10.3 Two-Way Radio Communications.

Include a special section to identify all individuals who are required to maintain communications with Air Traffic (AT) at airports with active towers, or monitor CTAF at airports without or with closed ATCT. Include training requirements for all individuals required to communicate with AT. Individuals required to monitor AT frequencies should also be identified. If construction employees are also required to communicate by radio with Airport Operations, this procedure should be described in detail. Usage of vehicle mounted radios and/or portable radios should be addressed. Communication procedures for the event of disabled radio communication (that is, light

signals, telephone numbers, others) must be included. All radio frequencies should be identified (Tower, Ground Control, CTAF, UNICOM, ATIS, and so on).

#### 3.10.4 Airport Security.

Address security as it applies to vehicle and pedestrian operations. Discuss TSA requirements, security badging requirements, perimeter fence integrity, gate security, and other needs. Attach drawings to graphically indicate secured and/or Security Identification Display Areas (SIDA), perimeter fencing, and available access points.

#### 3.11 **Wildlife Management.**

Discuss in this section wildlife management procedures. Describe the maintenance of existing wildlife mitigation devices, such as perimeter fences, and procedures to limit wildlife attractants. Include procedures to notify Airport Operations of wildlife encounters. Include a reference to paragraph 3.10 for security (wildlife) fence integrity maintenance as required.

#### 3.12 **FOD Management.**

In this section, discuss methods to control and monitor FOD: worksite housekeeping, ground vehicle tire inspections, runway sweeps, and so on. Include a reference to paragraph 3.15 for inspection requirements as required.

#### 3.13 **HAZMAT Management.**

Describe in this section HAZMAT management procedures: fuel deliveries, spill recovery procedures, Safety Data Sheet (SDS), Material Safety Data Sheet (MSDS) or Product Safety Data Sheet (PSDS) availability, and other considerations. Any specific airport HAZMAT restrictions should also be identified. Include a reference to paragraph 3.10 for HAZMAT vehicle identification requirements. Quote from, rather than incorporate by reference, AC 150/5320-15.

#### 3.14 **Notification of Construction Activities.**

List in this section the names and telephone numbers of points of contact for all parties affected by the construction project. We recommend a single list that includes all telephone numbers required under this section. Include emergency notification procedures for all representatives of all parties potentially impacted by the construction. Identify individual representatives – and at least one alternate – for each party. List both on-duty and off-duty contact information for each individual, including individuals responsible for emergency maintenance of airport construction hazard lighting and barricades. Describe procedures to coordinate immediate response to events that might adversely affect the operational safety of the airport (such as interrupted NAVAID service). Explain requirements for and the procedures for the issuance of Notices to Airmen (NOTAMs), notification to FAA required by 14 CFR Part 77 and Part 157 and in the event of affected NAVAIDs. For NOTAMs, identify an individual, and at least one alternate, responsible for issuing and cancelling each specific type of Notice to

Airmen (NOTAM) required. Detail notification methods for police, fire fighting, and medical emergencies. This may include 911, but should also include direct phone numbers of local police departments and nearby hospitals. Identify the E911 address of the airport and the emergency access route via haul roads to the construction site. Require the contractor to have this information available to all workers. The local Poison Control number should be listed. Procedures regarding notification of Airport Operations and/or the ARFF Department of such emergencies should be identified, as applicable. If airport radio communications are identified as a means of emergency notification, include a reference to paragraph 3.10. Differentiate between emergency and nonemergency notification of ARFF personnel, the latter including activities that affect ARFF water supplies and access roads. Identify the primary ARFF contact person and at least one alternate. If notification is to be made through Airport Operations, then detail this procedure. Include a method of confirmation from the ARFF department.

**3.15 Inspection Requirements.**

Describe in this section inspection requirements to ensure airfield safety compliance. Include a requirement for routine inspections by the resident engineer (RE) or other airport operator's representative and the construction contractors. If the engineering consultants and/or contractors have a Safety Officer who will conduct such inspections, identify this individual. Describe procedures for special inspections, such as those required to reopen areas for aircraft operations. Part 139 requires daily airfield inspections at certificated airports, but these may need to be more frequent when construction is in progress. Discuss the role of such inspections on areas under construction. Include a requirement to immediately remedy any deficiencies, whether caused by negligence, oversight, or project scope change.

**3.16 Underground Utilities.**

Explain how existing underground utilities will be located and protected. Identify each utility owner and include contact information for each company/agency in the master list. Address emergency response procedures for damaged or disrupted utilities. Include a reference to paragraph 3.14 for notification of utility owners of accidental utility disruption as required.

**3.17 Penalties.**

Describe in this section specific penalties imposed for noncompliance with airport rules and regulations, including the CSPP: SIDA violations, VPD, and others.

**3.18 Special Conditions.**

Identify any special conditions that may trigger specific safety mitigation actions outlined in this CSPP: low visibility operations, snow removal, aircraft in distress, aircraft accident, security breach, VPD, and other activities requiring construction suspension/resumption. Include a reference to paragraph 3.10 for compliance with airport safety and security measures and for radio communications as required. Include

a reference to paragraph 3.14 for emergency notification of all involved parties, including police/security, ARFF, and medical services.

**3.19 Runway and Taxiway Visual Aids.**

Include marking, lighting, signs, and visual NAVAIDS. Detail temporary runway and taxiway marking, lighting, signs, and visual NAVAIDS required for the construction. Discuss existing marking, lighting, signs, and visual NAVAIDS that are temporarily, altered, obliterated, or shut down. Consider non-federal facilities and address requirements for reimbursable agreements necessary for alteration of FAA facilities and for necessary flight checks. Identify temporary TORA signs or runway distance remaining signs if appropriate. Identify required temporary visual NAVAIDS such as REIL or PAPI. Quote from, rather than incorporate by reference, AC 150/5340-1, Standards for Airport Markings; AC 150/5340-18, Standards for Airport Sign Systems; and AC 150/5340-30, as required. Attach drawings to graphically indicate proposed marking, lighting, signs, and visual NAVAIDS.

**3.20 Marking and Signs for Access Routes.**

Detail plans for marking and signs for vehicle access routes. To the extent possible, signs should be in conformance with the Federal Highway Administration MUTCD and/or State highway specifications, not hand lettered. Detail any modifications to the guidance in the MUTCD necessary to meet frangibility/height requirements.

**3.21 Hazard Marking and Lighting.**

Specify all marking and lighting equipment, including when and where each type of device is to be used. Specify maximum gaps between barricades and the maximum spacing of hazard lighting. Identify one individual and at least one alternate responsible for maintenance of hazard marking and lighting equipment in the master telephone list. Include a reference to paragraph 3.14. Attach drawings to graphically indicate the placement of hazard marking and lighting equipment.

**3.22 Work Zone Lighting for Nighttime Construction.**

If work is to be conducted at night, specify all lighting equipment, including when and where each type of device is to be used. Indicate the direction lights are to be aimed and any directions that aiming of lights is prohibited. Specify any shielding necessary in instances where aiming is not sufficient to prevent interference with air traffic control and aircraft operations. Attach drawings to graphically indicate the placement and aiming of lighting equipment. Where the plan only indicates directions that aiming of lights is prohibited, the placement and positioning of portable lights must be proposed by the Contractor and approved by the airport operator's representative each time lights are relocated or repositioned.

**3.23 Protection of Runway and Taxiway Safety Areas.**

This section should focus exclusively on procedures for protecting all safety areas, including those altered by the construction: methods of demarcation, limit of access, movement within safety areas, stockpiling and trenching restrictions, and so on. Reference AC 150/5300-13, as required. Include a reference to paragraph 3.10 for procedures regarding vehicle and personnel movement within safety areas. Include a reference to paragraph 3.10 for material stockpile restrictions as required. Detail requirements for trenching, excavations, and backfill. Include a reference to paragraph 3.21 for hazard marking and lighting devices used to identify open excavations as required. If runway and taxiway closures are proposed to protect safety areas, or if temporary displaced thresholds and/or revised declared distances are used to provide the required Runway Safety Area, include a reference to paragraphs 3.14 and 3.19. Detail procedures for protecting the runway OFZ, runway OFA, taxiway OFA and runway approach surfaces including those altered by the construction: methods of demarcation, limit of cranes, storage of equipment, and so on. Quote from, rather than incorporate by reference, AC 150/5300-13, as required. Include a reference to paragraph 3.24 for height (i.e., crane) restrictions as required. One way to address the height of equipment that will move during the project is to establish a three-dimensional “box” within which equipment will be confined that can be studied as a single object. Attach drawings to graphically indicate the safety area, OFZ, and OFA boundaries.

**3.24 Other Limitations on Construction.**

This section should describe what limitations must be applied to each area of work and when each limitation will be applied: limitations due to airport operations, height (i.e., crane) restrictions, areas which cannot be worked at simultaneously, day/night work restrictions, winter construction, and other limitations. Include a reference to paragraph 3.7 for project phasing requirements based on construction limitations as required.

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**APPENDIX A. RELATED READING MATERIAL**

Obtain the latest version of the following free publications from the FAA on its Web site at <http://www.faa.gov/airports/>.

**Table A-1. FAA Publications**

<b>Number</b>	<b>Title and Description</b>
<u>AC 150/5200-28</u>	<i>Notices to Airmen (NOTAMs) for Airport Operators</i> Guidance for using the NOTAM System in airport reporting.
<u>AC 150/5200-30</u>	<i>Airport Field Condition Assessments and Winter Operations Safety</i> Guidance for airport owners/operators on the development of an acceptable airport snow and ice control program and on appropriate field condition reporting procedures.
<u>AC 150/5200-33</u>	<i>Hazardous Wildlife Attractants On or Near Airports</i> Guidance on locating certain land uses that might attract hazardous wildlife to public-use airports.
<u>AC 150/5210-5</u>	<i>Painting, Marking, and Lighting of Vehicles Used on an Airport</i> Guidance, specifications, and standards for painting, marking, and lighting vehicles operating in the airport air operations areas.
<u>AC 150/5210-20</u>	<i>Ground Vehicle Operations to include Taxiing or Towing an Aircraft on Airports</i> Guidance to airport operators on developing ground vehicle operation training programs.
<u>AC 150/5300-13</u>	<i>Airport Design</i> FAA standards and recommendations for airport design. Establishes approach visibility minimums as an airport design parameter, and contains the Object Free area and the obstacle free-zone criteria.
<u>AC 150/5210-24</u>	<i>Airport Foreign Object Debris (FOD) Management</i> Guidance for developing and managing an airport foreign object debris (FOD) program

Number	Title and Description
<u>AC 150/5320-15</u>	<p><i>Management of Airport Industrial Waste</i></p> <p>Basic information on the characteristics, management, and regulations of industrial wastes generated at airports. Guidance for developing a Storm Water Pollution Prevention Plan (SWPPP) that applies best management practices to eliminate, prevent, or reduce pollutants in storm water runoff with particular airport industrial activities.</p>
<u>AC 150/5340-1</u>	<p><i>Standards for Airport Markings</i></p> <p>FAA standards for the siting and installation of signs on airport runways and taxiways.</p>
<u>AC 150/5340-18</u>	<p><i>Standards for Airport Sign Systems</i></p> <p>FAA standards for the siting and installation of signs on airport runways and taxiways.</p>
<u>AC 150/5345-28</u>	<p><i>Precision Approach Path Indicator (PAPI) Systems</i></p> <p>FAA standards for PAPI systems, which provide pilots with visual glide slope guidance during approach for landing.</p>
<u>AC 150/5340-30</u>	<p><i>Design and Installation Details for Airport Visual Aids</i></p> <p>Guidance and recommendations on the installation of airport visual aids.</p>
<u>AC 150/5345-39</u>	<p><i>Specification for L-853, Runway and Taxiway Retroreflective Markers</i></p>
<u>AC 150/5345-44</u>	<p><i>Specification for Runway and Taxiway Signs</i></p> <p>FAA specifications for unlighted and lighted signs for taxiways and runways.</p>
<u>AC 150/5345-53</u>	<p><i>Airport Lighting Equipment Certification Program</i></p> <p>Details on the Airport Lighting Equipment Certification Program (ALECP).</p>
<u>AC 150/5345-50</u>	<p><i>Specification for Portable Runway and Taxiway Lights</i></p> <p>FAA standards for portable runway and taxiway lights and runway end identifier lights for temporary use to permit continued aircraft operations while all or part of a runway lighting system is inoperative.</p>
<u>AC 150/5345-55</u>	<p><i>Specification for L-893, Lighted Visual Aid to Indicate Temporary Runway Closure</i></p>

<b>Number</b>	<b>Title and Description</b>
<u>AC 150/5370-10</u>	<i>Standards for Specifying Construction of Airports</i> Standards for construction of airports, including earthwork, drainage, paving, turfing, lighting, and incidental construction.
<u>AC 150/5370-12</u>	<i>Quality Management for Federally Funded Airport Construction Projects</i>
EB 93	<i>Guidance for the Assembly and Installation of Temporary Orange Construction Signs</i>
FAA Order 5200.11	<u>FAA Airports (ARP) Safety Management System (SMS)</u> Basics for implementing SMS within ARP. Includes roles and responsibilities of ARP management and staff as well as other FAA lines of business that contribute to the ARP SMS.
FAA Certalert 98-05	<i>Grasses Attractive to Hazardous Wildlife</i> Guidance on grass management and seed selection.
FAA Form 7460-1	<u>Notice of Proposed Construction or Alteration</u>
FAA Form 7480-1	<u>Notice of Landing Area Proposal</u>
FAA Form 6000.26	National NAS Strategic Interruption Service Level Agreement, Strategic Events Coordination, Airport Sponsor Form

Obtain the latest version of the following free publications from the Electronic Code of Federal Regulations at <http://www.ecfr.gov/>.

**Table A-2. Code of Federal Regulation**

<b>Number</b>	<b>Title</b>
Title 14 CFR Part 77	Safe, Efficient Use and Preservation of the Navigable Airspace
Title 14 CFR Part 139	Certification of Airports
Title 49 CFR Part 1542	Airport Security

Obtain the latest version of the Manual on Uniform Traffic Control Devices from the Federal Highway Administration at <http://mutcd.fhwa.dot.gov/>.

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**APPENDIX B. TERMS AND ACRONYMS****Table B-1. Terms and Acronyms**

<b>Term</b>	<b>Definition</b>
Form 7460-1	Notice of Proposed Construction or Alteration. For on-airport projects, the form submitted to the FAA regional or airports division office as formal written notification of any kind of construction or alteration of objects that affect navigable airspace, as defined in 14 CFR Part 77, <i>Safe, Efficient Use, and Preservation of the Navigable Airspace</i> . (See guidance available on the FAA web site at <a href="https://oeaaa.faa.gov">https://oeaaa.faa.gov</a> .) The form may be downloaded at <a href="http://www.faa.gov/airports/resources/forms/">http://www.faa.gov/airports/resources/forms/</a> , or filed electronically at: <a href="https://oeaaa.faa.gov">https://oeaaa.faa.gov</a> .
Form 7480-1	Notice of Landing Area Proposal. Form submitted to the FAA Airports Regional Division Office or Airports District Office as formal written notification whenever a project without an airport layout plan on file with the FAA involves the construction of a new airport; the construction, realigning, altering, activating, or abandoning of a runway, landing strip, or associated taxiway; or the deactivation or abandoning of an entire airport The form may be downloaded at <a href="http://www.faa.gov/airports/resources/forms/">http://www.faa.gov/airports/resources/forms/</a> .
Form 6000-26	Airport Sponsor Strategic Event Submission Form
AC	Advisory Circular
ACSI	Airport Certification Safety Inspector
ADG	Airplane Design Group
AIP	Airport Improvement Program
ALECP	Airport Lighting Equipment Certification Program
ANG	Air National Guard
AOA	Air Operations Area, as defined in 14 CFR Part 107. Means a portion of an airport, specified in the airport security program, in which security measures are carried out. This area includes aircraft movement areas, aircraft parking areas, loading ramps, and safety areas, and any adjacent areas (such as general aviation areas) that are not separated by adequate security systems, measures, or procedures. This area does not include the secured area of the airport terminal building.
ARFF	Aircraft Rescue and Fire Fighting
ARP	FAA Office of Airports
ASDA	Accelerate-Stop Distance Available
AT	Air Traffic
ATCT	Airport Traffic Control Tower
ATIS	Automatic Terminal Information Service
ATO	Air Traffic Organization
Certificated Airport	An airport that has been issued an Airport Operating Certificate by the FAA under

<b>Term</b>	<b>Definition</b>
	the authority of 14 CFR Part 139, <i>Certification of Airports</i> .
CFR	Code of Federal Regulations
Construction	The presence of construction-related personnel, equipment, and materials in any location that could infringe upon the movement of aircraft.
CSPP	Construction Safety and Phasing Plan. The overall plan for safety and phasing of a construction project developed by the airport operator, or developed by the airport operator's consultant and approved by the airport operator. It is included in the invitation for bids and becomes part of the project specifications.
CTAF	Common Traffic Advisory Frequency
Displaced Threshold	A threshold that is located at a point on the runway other than the designated beginning of the runway. The portion of pavement behind a displaced threshold is available for takeoffs in either direction or landing from the opposite direction.
DOT	Department of Transportation
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FOD	Foreign Object Debris/Damage
FSS	Flight Service Station
GA	General Aviation
HAZMAT	Hazardous Materials
HMA	Hot Mix Asphalt
IAP	Instrument Approach Procedures
IFR	Instrument Flight Rules
ILS	Instrument Landing System
LDA	Landing Distance Available
LOC	Localizer antenna array
Movement Area	The runways, taxiways, and other areas of an airport that are used for taxiing or hover taxiing, air taxiing, takeoff, and landing of aircraft, exclusive of loading aprons and aircraft parking areas (reference 14 CFR Part 139).
MSDS	Material Safety Data Sheet
MUTCD	Manual on Uniform Traffic Control Devices
NAVAID	Navigation Aid
NAVAID Critical Area	An area of defined shape and size associated with a NAVAID that must remain clear and graded to avoid interference with the electronic signal.
Non-Movement Area	The area inside the airport security fence exclusive of the Movement Area. It is important to note that the non-movement area includes pavement traversed by aircraft.

Term	Definition
NOTAM	Notices to Airmen
Obstruction	Any object/obstacle exceeding the obstruction standards specified by 14 CFR Part 77, subpart C.
OCC	Operations Control Center
OE / AAA	Obstruction Evaluation / Airport Airspace Analysis
OFA	Object Free Area. An area on the ground centered on the runway, taxiway, or taxi lane centerline provided to enhance safety of aircraft operations by having the area free of objects except for those objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes. (See <a href="#">AC 150/5300-13</a> for additional guidance on OFA standards and wingtip clearance criteria.)
OFZ	Obstacle Free Zone. The airspace below 150 ft (45 m) above the established airport elevation and along the runway and extended runway centerline that is required to be clear of all objects, except for frangible visual NAVAIDs that need to be located in the OFZ because of their function, in order to provide clearance protection for aircraft landing or taking off from the runway and for missed approaches. The OFZ is subdivided as follows: Runway OFZ, Inner Approach OFZ, Inner Transitional OFZ, and Precision OFZ. Refer to <a href="#">AC 150/5300-13</a> for guidance on OFZ.
OSHA	Occupational Safety and Health Administration
OTS	Out of Service
P&R	Planning and Requirements Group
NPI	NAS Planning & Integration
PAPI	Precision Approach Path Indicator
PFC	Passenger Facility Charge
PLASI	Pulse Light Approach Slope Indicator
Project Proposal Summary	A clear and concise description of the proposed project or change that is the object of Safety Risk Management.
RA	Reimbursable Agreement
RE	Resident Engineer
REIL	Runway End Identifier Lights
RNAV	Area Navigation
ROFA	Runway Object Free Area
RSA	Runway Safety Area. A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway, in accordance with <a href="#">AC 150/5300-13</a> .
SDS	Safety Data Sheet
SIDA	Security Identification Display Area
SMS	Safety Management System

<b>Term</b>	<b>Definition</b>
SPCD	Safety Plan Compliance Document. Details developed and submitted by a contractor to the airport operator for approval providing details on how the performance of a construction project will comply with the CSPP.
SRM	Safety Risk Management
SSC	System Support Center
Taxiway Safety Area	A defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an airplane unintentionally departing the taxiway, in accordance with <a href="#">AC 150/5300-13</a> .
TDG	Taxiway Design Group
Temporary	Any condition that is not intended to be permanent.
Temporary Runway End	The beginning of that portion of the runway available for landing and taking off in one direction, and for landing in the other direction. Note the difference from a displaced threshold.
Threshold	The beginning of that portion of the runway available for landing. In some instances, the landing threshold may be displaced.
TODA	Takeoff Distance Available
TOFA	Taxiway Object Free Area
TORA	Takeoff Run Available. The length of the runway less any length of runway unavailable and/or unsuitable for takeoff run computations. See <a href="#">AC 150/5300-13</a> for guidance on declared distances.
TSA	Taxiway Safety Area, or Transportation Security Administration
UNICOM	A radio communications system of a type used at small airports.
VASI	Visual Approach Slope Indicator
VGSI	Visual Glide Slope Indicator. A device that provides a visual glide slope indicator to landing pilots. These systems include precision approach path indicator (PAPI), visual approach slope indicator (VASI), and pulse light approach slope indicator (PLASI).
VFR	Visual Flight Rules
VOR	Very High Frequency Omnidirectional Radio Range
VPD	Vehicle / Pedestrian Deviation

**APPENDIX C. SAFETY AND PHASING PLAN CHECKLIST**

This appendix is keyed to Chapter 2. In the electronic version of this AC, clicking on the paragraph designation in the Reference column will access the applicable paragraph. There may be instances where the CSPP requires provisions that are not covered by the list in this appendix.

This checklist is intended as an aid, not a required submittal.

**Table C-1. CSPP Checklist**

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
<b>General Considerations</b>					
Requirements for predesign, prebid, and preconstruction conferences to introduce the subject of airport operational safety during construction are specified.	<u>2.5</u>				
Operational safety is a standing agenda item for construction progress meetings.	<u>2.5</u>				
Scheduling of the construction phases is properly addressed.	<u>2.6</u>				
Any formal agreements are established.	<u>2.5.3</u>				
<b>Areas and Operations Affected by Construction Activity</b>					
Drawings showing affected areas are included.	<u>2.7.1</u>				
Closed or partially closed runways, taxiways, and aprons are depicted on drawings.	<u>2.7.1.1</u>				
Access routes used by ARFF vehicles affected by the project are addressed.	<u>2.7.1.2</u>				
Access routes used by airport and airline support vehicles affected by the project are addressed.	<u>2.7.1.3</u>				
Underground utilities, including water supplies for firefighting and drainage.	<u>2.7.1.4</u>				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
Approach/departure surfaces affected by heights of temporary objects are addressed.	<u>2.7.1.5</u>				
Construction areas, storage areas, and access routes near runways, taxiways, aprons, or helipads are properly depicted on drawings.	<u>2.7.1</u>				
Temporary changes to taxi operations are addressed.	<u>2.7.2.1</u>				
Detours for ARFF and other airport vehicles are identified.	<u>2.7.2.2</u>				
Maintenance of essential utilities and underground infrastructure is addressed.	<u>2.7.2.3</u>				
Temporary changes to air traffic control procedures are addressed.	<u>2.7.2.4</u>				
<b>NAVAIDs</b>					
Critical areas for NAVAIDs are depicted on drawings.	<u>2.8</u>				
Effects of construction activity on the performance of NAVAIDs, including unanticipated power outages, are addressed.	<u>2.8</u>				
Protection of NAVAID facilities is addressed.	<u>2.8</u>				
The required distance and direction from each NAVAID to any construction activity is depicted on drawings.	<u>2.8</u>				
Procedures for coordination with FAA ATO/Technical Operations, including identification of points of contact, are included.	<u>2.8, 2.13.1, 2.13.5.3.1, 2.18.1</u>				
<b>Contractor Access</b>					
The CSPP addresses areas to which contractor will have access and how	<u>2.9</u>				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
the areas will be accessed.					
The application of 49 CFR Part 1542 Airport Security, where appropriate, is addressed.	<u>2.9</u>				
The location of stockpiled construction materials is depicted on drawings.	<u>2.9.1</u>				
The requirement for stockpiles in the ROFA to be approved by FAA is included.	<u>2.9.1</u>				
Requirements for proper stockpiling of materials are included.	<u>2.9.1</u>				
Construction site parking is addressed.	<u>2.9.2.1</u>				
Construction equipment parking is addressed.	<u>2.9.2.2</u>				
Access and haul roads are addressed.	<u>2.9.2.3</u>				
A requirement for marking and lighting of vehicles to comply with <i>AC 150/5210-5, Painting, Marking and Lighting of Vehicles Used on an Airport</i> , is included.	<u>2.9.2.4</u>				
Proper vehicle operations, including requirements for escorts, are described.	<u>2.9.2.5, 2.9.2.6</u>				
Training requirements for vehicle drivers are addressed.	<u>2.9.2.7</u>				
Two-way radio communications procedures are described.	<u>2.9.2.9</u>				
Maintenance of the secured area of the airport is addressed.	<u>2.9.2.10</u>				
<b>Wildlife Management</b>					
The airport operator's wildlife management procedures are addressed.	<u>2.10</u>				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
<b>Foreign Object Debris Management</b>					
The airport operator's FOD management procedures are addressed.	<u>2.11</u>				
<b>Hazardous Materials Management</b>					
The airport operator's hazardous materials management procedures are addressed.	<u>2.12</u>				
<b>Notification of Construction Activities</b>					
Procedures for the immediate notification of airport user and local FAA of any conditions adversely affecting the operational safety of the airport are detailed.	<u>2.13</u>				
Maintenance of a list by the airport operator of the responsible representatives/points of contact for all involved parties and procedures for contacting them 24 hours a day, seven days a week is specified.	<u>2.13.1</u>				
A list of local ATO/Technical Operations personnel is included.	<u>2.13.1</u>				
A list of ATCT managers on duty is included.	<u>2.13.1</u>				
A list of authorized representatives to the OCC is included.	<u>2.13.2</u>				
Procedures for coordinating, issuing, maintaining and cancelling by the airport operator of NOTAMS about airport conditions resulting from construction are included.	<u>2.8, 2.13.2, 2.18.3.3.9</u>				
Provision of information on closed or hazardous conditions on airport movement areas by the airport operator to the OCC is specified.	<u>2.13.2</u>				
Emergency notification procedures for medical, fire fighting, and police	<u>2.13.3</u>				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
response are addressed.					
Coordination with ARFF personnel for non-emergency issues is addressed.	<u>2.13.4</u>				
Notification to the FAA under 14 CFR parts 77 and 157 is addressed.	<u>2.13.5</u>				
Reimbursable agreements for flight checks and/or design and construction for FAA owned NAVAIDs are addressed.	<u>2.13.5.3.2</u>				
<b>Inspection Requirements</b>					
Daily and interim inspections by both the airport operator and contractor are specified.	<u>2.14.1, 2.14.2</u>				
Final inspections at certificated airports are specified when required.	<u>2.14.3</u>				
<b>Underground Utilities</b>					
Procedures for protecting existing underground facilities in excavation areas are described.	<u>2.15</u>				
<b>Penalties</b>					
Penalty provisions for noncompliance with airport rules and regulations and the safety plans are detailed.	<u>2.16</u>				
<b>Special Conditions</b>					
Any special conditions that affect the operation of the airport or require the activation of any special procedures are addressed.	<u>2.17</u>				
<b>Runway and Taxiway Visual Aids - Marking, Lighting, Signs, and Visual NAVAIDs</b>					
The proper securing of temporary airport markings, lighting, signs, and visual NAVAIDs is addressed.	<u>2.18.1</u>				
Frangibility of airport markings, lighting, signs, and visual NAVAIDs is specified.	<u>2.18.1, 2.18.3, 2.18.4.2, 2.20.2.4</u>				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
The requirement for markings to be in compliance with <u>AC 150/5340-1</u> , <i>Standards for Airport Markings</i> , is specified.	<u>2.18.2</u>				
Detailed specifications for materials and methods for temporary markings are provided.	<u>2.18.2</u>				
The requirement for lighting to conform to <u>AC 150/5340-30</u> , <i>Design and Installation Details for Airport Visual Aids</i> ; <u>AC 150/5345-50</u> , <i>Specification for Portable Runway and Taxiway Lights</i> ; and <u>AC 150/5345-53</u> , <i>Airport Lighting Certification Program</i> , is specified.	<u>2.18.3</u>				
The use of a lighted X is specified where appropriate.	<u>2.18.2.1.2</u> , <u>2.18.3.2</u>				
The requirement for signs to conform to <u>AC 150/5345-44</u> , <i>Specification for Runway and Taxiway Signs</i> ; <u>AC 150/5340-18</u> , <i>Standards for Airport Sign Systems</i> ; and <u>AC 150/5345-53</u> , <i>Airport Lighting Certification Program</i> , is specified.	<u>2.18.4</u>				
<b>Marking and Signs For Access Routes</b>					
The CSPP specifies that pavement markings and signs intended for construction personnel should conform to <u>AC 150/5340-18</u> and, to the extent practicable, with the MUTCD and/or State highway specifications.	<u>2.18.4.2</u>				
<b>Hazard Marking and Lighting</b>					
Prominent, comprehensible warning indicators for any area affected by construction that is normally accessible to aircraft, personnel, or vehicles are specified.	<u>2.20.1</u>				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
Hazard marking and lighting are specified to identify open manholes, small areas under repair, stockpiled material, and waste areas.	<u>2.20.1</u>				
The CSPP considers less obvious construction-related hazards.	<u>2.20.1</u>				
Equipment that poses the least danger to aircraft but is sturdy enough to remain in place when subjected to typical winds, prop wash and jet blast is specified.	<u>2.20.2.1</u>				
The spacing of barricades is specified such that a breach is physically prevented barring a deliberate act.	<u>2.20.2.1</u>				
Red lights meeting the luminance requirements of the State Highway Department are specified.	<u>2.20.2.2</u>				
Barricades, temporary markers, and other objects placed and left in areas adjacent to any open runway, taxiway, taxi lane, or apron are specified to be as low as possible to the ground, and no more than 18 inch high.	<u>2.20.2.3</u>				
Barricades are specified to indicate construction locations in which no part of an aircraft may enter.	<u>2.20.2.3</u>				
Highly reflective barriers with lights are specified to barricade taxiways leading to closed runways.	<u>2.20.2.5</u>				
Markings for temporary closures are specified.	<u>2.20.2.5</u>				
The provision of a contractor's representative on call 24 hours a day for emergency maintenance of airport hazard lighting and barricades is specified.	<u>2.20.2.7</u>				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
<b>Work Zone Lighting for Nighttime Construction</b>					
If work is to be conducted at night, the CSPP identifies construction lighting units and their general locations and aiming in relationship to the ATCT and active runways and taxiways.	<u>2.21</u>				
<b>Protection of Runway and Taxiway Safety Areas</b>					
The CSPP clearly states that no construction may occur within a safety area while the associated runway or taxiway is open for aircraft operations.	<u>2.22.1.1,</u> <u>2.22.3.1</u>				
The CSPP specifies that the airport operator coordinates the adjustment of RSA or TSA dimensions with the ATCT and the appropriate FAA Airports Regional or District Office and issues a local NOTAM.	<u>2.22.1.2,</u> <u>2.22.3.2</u>				
Procedures for ensuring adequate distance for protection from blasting operations, if required by operational considerations, are detailed.	<u>2.22.3.3</u>				
The CSPP specifies that open trenches or excavations are not permitted within a safety area while the associated runway or taxiway is open, subject to approved exceptions.	<u>2.22.1.4</u>				
Appropriate covering of excavations in the RSA or TSA that cannot be backfilled before the associated runway or taxiway is open is detailed.	<u>2.22.1.4</u>				
The CSPP includes provisions for prominent marking of open trenches and excavations at the construction site.	<u>2.22.1.4</u>				
Grading and soil erosion control to maintain RSA/TSA standards are	<u>2.22.3.5</u>				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
addressed.					
The CSPP specifies that equipment is to be removed from the ROFA when not in use.	<u>2.22.2</u>				
The CSPP clearly states that no construction may occur within a taxiway safety area while the taxiway is open for aircraft operations.	<u>2.22.3</u>				
Appropriate details are specified for any construction work to be accomplished in a taxiway object free area.	<u>2.22.4</u>				
Measures to ensure that personnel, material, and/or equipment do not penetrate the OFZ or threshold siting surfaces while the runway is open for aircraft operations are included.	<u>2.22.4.3.6</u>				
Provisions for protection of runway approach/departure areas and clearways are included.	<u>2.22.6</u>				
<b>Other Limitations on Construction</b>					
The CSPP prohibits the use of open flame welding or torches unless adequate fire safety precautions are provided and the airport operator has approved their use.	<u>2.23.1.2</u>				
The CSPP prohibits the use of electrical blasting caps on or within 1,000 ft (300 m) of the airport property.	<u>2.23.1.3</u>				

**APPENDIX D. CONSTRUCTION PROJECT DAILY SAFETY INSPECTION CHECKLIST**

The situations identified below are potentially hazardous conditions that may occur during airport construction projects. Safety area encroachments, unauthorized and improper ground vehicle operations, and unmarked or uncovered holes and trenches near aircraft operating surfaces pose the most prevalent threats to airport operational safety during airport construction projects. The list below is one tool that the airport operator or contractor may use to aid in identifying and correcting potentially hazardous conditions. It should be customized as appropriate for each project including information such as the date, time and name of the person conducting the inspection.

**Table D-1. Potentially Hazardous Conditions**

<b>Item</b>	<b>Action Required (Describe)</b>	<b>No Action Required (Check)</b>
Excavation adjacent to runways, taxiways, and aprons improperly backfilled.		
Mounds of earth, construction materials, temporary structures, and other obstacles near any open runway, taxiway, or taxi lane; in the related Object Free area and aircraft approach or departure areas/zones; or obstructing any sign or marking.		
Runway resurfacing projects resulting in lips exceeding 3 inch (7.6 cm) from pavement edges and ends.		
Heavy equipment (stationary or mobile) operating or idle near AOA, in runway approaches and departures areas, or in OFZ.		
Equipment or material near NAVAIDs that may degrade or impair radiated signals and/or the monitoring of navigation and visual aids. Unauthorized or improper vehicle operations in localizer or glide slope critical areas, resulting in electronic interference and/or facility shutdown.		
Tall and especially relatively low visibility units (that is, equipment with slim profiles) — cranes, drills, and similar objects — located in critical areas, such as OFZ and		

<b>Item</b>	<b>Action Required (Describe)</b>	<b>No Action Required (Check)</b>
approach zones.		
Improperly positioned or malfunctioning lights or unlighted airport hazards, such as holes or excavations, on any apron, open taxiway, or open taxi lane or in a related safety, approach, or departure area.		
Obstacles, loose pavement, trash, and other debris on or near AOA. Construction debris (gravel, sand, mud, paving materials) on airport pavements may result in aircraft propeller, turbine engine, or tire damage. Also, loose materials may blow about, potentially causing personal injury or equipment damage.		
Inappropriate or poorly maintained fencing during construction intended to deter human and animal intrusions into the AOA. Fencing and other markings that are inadequate to separate construction areas from open AOA create aviation hazards.		
Improper or inadequate marking or lighting of runways (especially thresholds that have been displaced or runways that have been closed) and taxiways that could cause pilot confusion and provide a potential for a runway incursion. Inadequate or improper methods of marking, barricading, and lighting of temporarily closed portions of AOA create aviation hazards.		
Wildlife attractants — such as trash (food scraps not collected from construction personnel activity), grass seeds, tall grass, or standing water — on or near airports.		
Obliterated or faded temporary markings on active operational areas.		
Misleading or malfunctioning obstruction lights. Unlighted or unmarked obstructions in the approach to any open runway pose aviation hazards.		

<b>Item</b>	<b>Action Required (Describe)</b>	<b>No Action Required (Check)</b>
Failure to issue, update, or cancel NOTAMs about airport or runway closures or other construction related airport conditions.		
Failure to mark and identify utilities or power cables. Damage to utilities and power cables during construction activity can result in the loss of runway / taxiway lighting; loss of navigation, visual, or approach aids; disruption of weather reporting services; and/or loss of communications.		
Restrictions on ARFF access from fire stations to the runway / taxiway system or airport buildings.		
Lack of radio communications with construction vehicles in airport movement areas.		
Objects, regardless of whether they are marked or flagged, or activities anywhere on or near an airport that could be distracting, confusing, or alarming to pilots during aircraft operations.		
Water, snow, dirt, debris, or other contaminants that temporarily obscure or derogate the visibility of runway/taxiway marking, lighting, and pavement edges. Any condition or factor that obscures or diminishes the visibility of areas under construction.		
Spillage from vehicles (gasoline, diesel fuel, oil) on active pavement areas, such as runways, taxiways, aprons, and airport roadways.		
Failure to maintain drainage system integrity during construction (for example, no temporary drainage provided when working on a drainage system).		

<b>Item</b>	<b>Action Required (Describe)</b>	<b>No Action Required (Check)</b>
Failure to provide for proper electrical lockout and tagging procedures. At larger airports with multiple maintenance shifts/workers, construction contractors should make provisions for coordinating work on circuits.		
Failure to control dust. Consider limiting the amount of area from which the contractor is allowed to strip turf.		
Exposed wiring that creates an electrocution or fire ignition hazard. Identify and secure wiring, and place it in conduit or bury it.		
Site burning, which can cause possible obscuration.		
Construction work taking place outside of designated work areas and out of phase.		

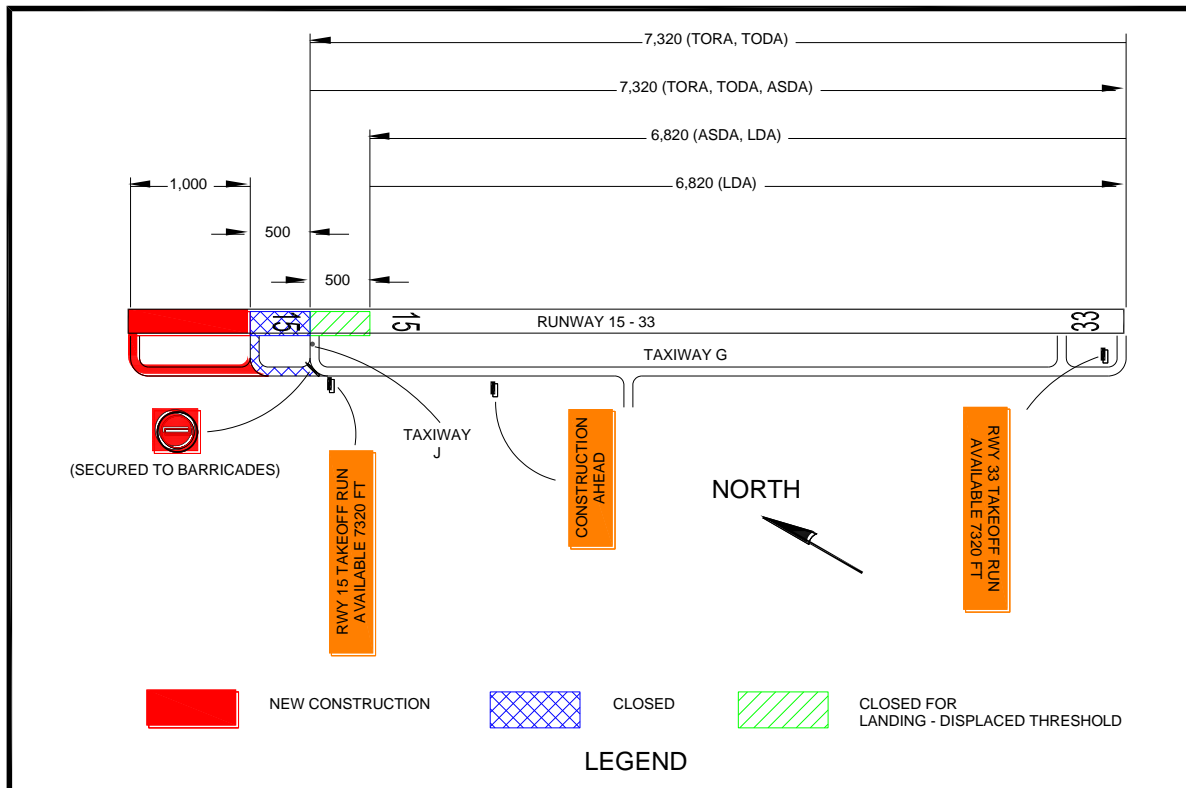
**APPENDIX E. SAMPLE OPERATIONAL EFFECTS TABLE**

**E.1 Project Description.**

Runway 15-33 is currently 7820 feet long, with a 500 foot stopway on the north end. This project will remove the stopway and extend the runway 1000 feet to the north and 500 feet to the south. Finally, the existing portion of the runway will be repaved. The runway 33 glide slope will be relocated. The new runway 33 localizer has already been installed by FAA Technical Operations and only needs to be switched on. Runway 15 is currently served only by a localizer, which will remain in operation as it will be beyond the future RSA. Appropriate NOTAMS will be issued throughout the project.

E.1.1 During Phase I, the runway 15 threshold will be displaced 1000 feet to keep construction equipment below the approach surface. The start of runway 15 takeoff and the departure end of runway 33 will also be moved 500 feet to protect workers from jet blast. Declared distances for runway 33 will be adjusted to provide the required RSA and applicable departure surface. Excavation near Taxiway G will require its ADG to be reduced from IV to III. See Figure E-1.

**Figure E-1. Phase I Example**

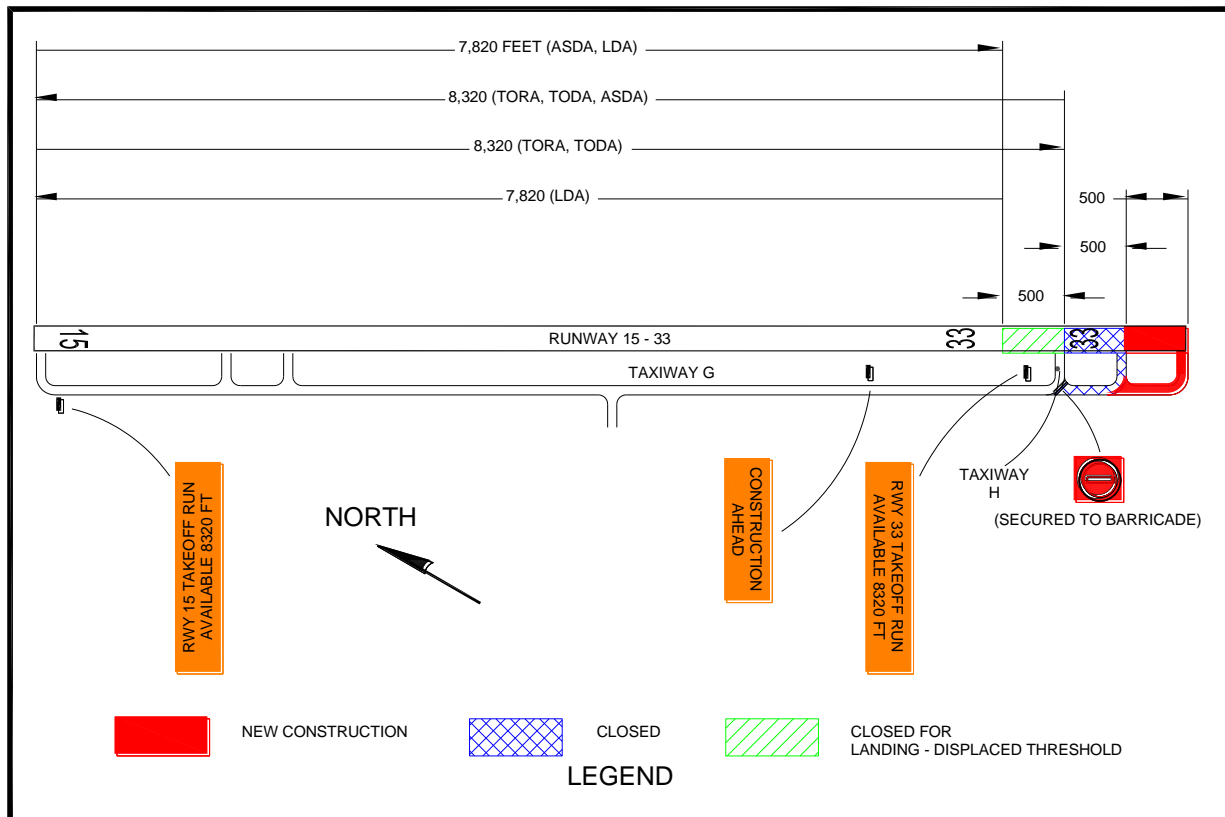


**Note 1:** Where hold signs are installed on both sides of a taxiway, install the TORA sign on the left side of the taxiway before the final turn to the runway intersection.

**Note 2:** Based on the declared distances for Runway 33 departures, the maximum equipment height in the construction area is 12.5 feet ( $500/40 = 12.5$ ).

E.2 During Phase II, the runway 33 threshold will be displaced 1000 feet to keep construction equipment below the approach surface. The start of runway 33 takeoff and the departure end of runway 15 will also be moved 500 feet to protect workers from jet blast. Declared distances for runway 15 will be adjusted to provide the required RSA and applicable departure surface. See Figure E-2.

**Figure E-2. Phase II Example**

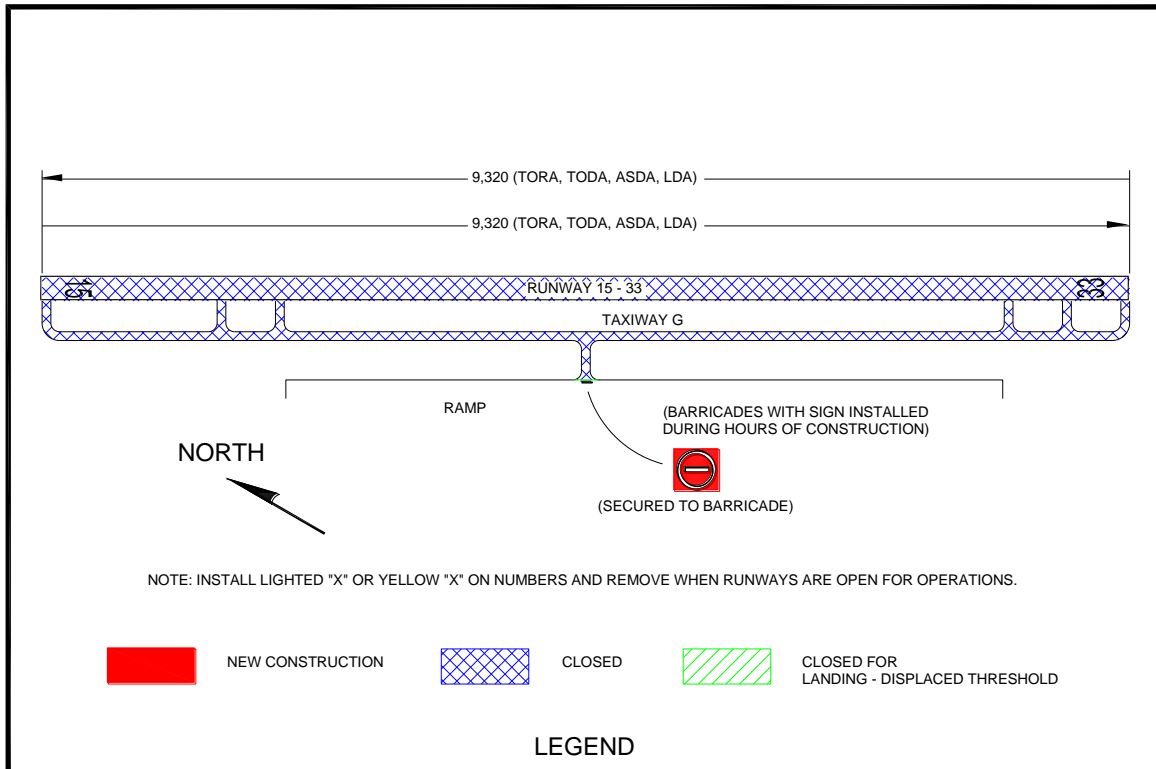


**Note 1:** Where hold signs are installed on both sides of a taxiway, install the TORA sign on the left side of the taxiway before the final turn to the runway intersection.

**Note 2:** Based on the declared distances for Runway 15 departures, the maximum equipment height in the construction area is 12.5 feet ( $500/40 = 12.5$ ).

- E.3 During Phase III, the existing portion of the runway will be repaved with Hot Mix Asphalt (HMA) and the runway 33 glide slope will be relocated. Construction will be accomplished between the hours of 8:00 pm and 5:00 am, during which the runway will be closed to operations.

**Figure E-3. Phase III Example**



**Table E-1. Operational Effects Table**

<b>Project</b>	<b>Runway 15-33 Extension and Repaving</b>			
<b>Phase</b>	<b>Normal (Existing)</b>	<b>Phase I: Extend Runway 15 End</b>	<b>Phase II: Extend Runway 33 End</b>	<b>Phase III: Repave Runway</b>
<b>Scope of Work</b>	N/A	Extend Runway 15-33 1,000 ft on north end with Hot Mix Asphaltic Concrete (HMA).	Extend Runway 15-33 500 ft on south end with Hot Mix Asphaltic Concrete (HMA).	Repave existing runway with HMA Relocate Runway 33 Glide Slope
<b>Effects of Construction Operations</b>	N/A	Existing North 500 ft closed	Existing South 500 ft closed	Runway closed between 8:00 pm and 5:00 am Edge lighting out of service
<b>Construction Phase</b>	N/A	Phase I (Anticipated)	Phase II (Anticipated)	Phase III (Anticipated)
<b>Runway 15 Average Aircraft Operations</b>	Carrier: 52 /day GA: 26 /day Military: 11 /day	Carrier: 40 /day GA: 26 /day Military: 0 /day	Carrier: 45 /day GA: 26 /day Military: 5 /day	Carrier: 45 / day GA: 20 / day Military: 0 /day
<b>Runway 33 Average Aircraft Operations</b>	Carrier: 40 /day GA: 18 /day Military: 10 /day	Carrier: 30 /day GA: 18 /day Military: 0 /day	Carrier: 25 /day GA: 18 /day Military: 5 /day	Carrier: 20 /day GA: 5 /day Military: 0 /day
<b>Runway 15-33 Aircraft Category</b>	C-IV	C-IV	C-IV	C-IV
<b>Runway 15 Approach Visibility Minimums</b>	1 mile	1 mile	1 mile	1 mile
<b>Runway 33 Approach Visibility Minimums</b>	¾ mile	¾ mile	¾ mile	1 mile

**Note:** Proper coordination with Flight Procedures group is necessary to maintain instrument approach procedures during construction.

<b>Project</b>		<b>Runway 15-33 Extension and Repaving</b>			
<b>Phase</b>		<b>Normal (Existing)</b>	<b>Phase I: Extend Runway 15 End</b>	<b>Phase II: Extend Runway 33 End</b>	<b>Phase III: Repave Runway</b>
<b>Runway 15 Declared Distances</b>	<b>TORA</b>	7,820	7,320	8,320	9,320
	<b>TODA</b>	7,820	7,320	8,320	9,320
	<b>ASDA</b>	7,820	7,320	7,820	9,320
	<b>LDA</b>	7,820	6,820	7,820	9,320
<b>Runway 33 Declared Distances</b>	<b>TORA</b>	7,820	7,320	8,320	9,320
	<b>TODA</b>	7,820	7,320	8,320	9,320
	<b>ASDA</b>	8,320	6,820	8,320	9,320
	<b>LDA</b>	7,820	6,820	7,820	9,320
<b>Runway 15 Approach Procedures</b>	LOC only	LOC only	LOC only	LOC only	LOC only
	RNAV	RNAV	RNAV	RNAV	RNAV
	VOR	VOR	VOR	VOR	VOR
<b>Runway 33 Approach Procedures</b>	ILS	ILS	ILS	ILS	LOC only
	RNAV	RNAV	RNAV	RNAV	RNAV
	VOR	VOR	VOR	VOR	VOR
<b>Runway 15 NAVAIDs</b>	LOC	LOC	LOC	LOC	LOC
<b>Runway 33 NAVAIDs</b>	ILS, MALSR	ILS, MALSR	ILS, MALSR	ILS, MALSR	LOC, MALSR
<b>Taxiway G ADG</b>	IV	III	IV	IV	IV
<b>Taxiway G TDG</b>	4	4	4	4	4
<b>ATCT (hours open)</b>	24 hours	24 hours	24 hours	24 hours	0500 - 2000
<b>ARFF Index</b>	D	D	D	D	D

<b>Project</b>	<b>Runway 15-33 Extension and Repaving</b>			
<b>Phase</b>	<b>Normal (Existing)</b>	<b>Phase I: Extend Runway 15 End</b>	<b>Phase II: Extend Runway 33 End</b>	<b>Phase III: Repave Runway</b>
<b>Special Conditions</b>	Air National Guard (ANG) military operations	All military aircraft relocated to alternate ANG Base	Some large military aircraft relocated to alternate ANG Base	All military aircraft relocated to alternate ANG Base
<b>Information for NOTAMs</b>		Refer above for applicable declared distances. Taxiway G limited to 118 ft wingspan	Refer above for applicable declared distances.	Refer above for applicable declared distances. Airport closed 2000 – 0500. Runway 15 glide slope OTS.

**Note:** This table is one example. It may be advantageous to develop a separate table for each project phase and/or to address the operational status of the associated NAVAIDs per construction phase.

Complete the following chart for each phase to determine the area that must be protected along the runway and taxiway edges:

**Table E-2. Runway and Taxiway Edge Protection**

<b>Runway/Taxiway</b>	<b>Aircraft Approach Category* A, B, C, or D</b>	<b>Airplane Design Group* I, II, III, or IV</b>	<b>Safety Area Width in Feet Divided by 2*</b>

\*See AC 150/5300-13 to complete the chart for a specific runway/taxiway.

Complete the following chart for each phase to determine the area that must be protected before the runway threshold:

**Table E-3. Protection Prior to Runway Threshold**

Runway End Number	Airplane Design Group* I, II, III, or IV	Aircraft Approach Category* A, B, C, or D	Minimum Safety Area Prior to the Threshold*	Minimum Distance to Threshold Based on Required Approach Slope*	
				ft	: 1
			ft	ft	: 1
			ft	ft	: 1
			ft	ft	: 1
			ft	ft	: 1

\*See AC 150/5300-13 to complete the chart for a specific runway.

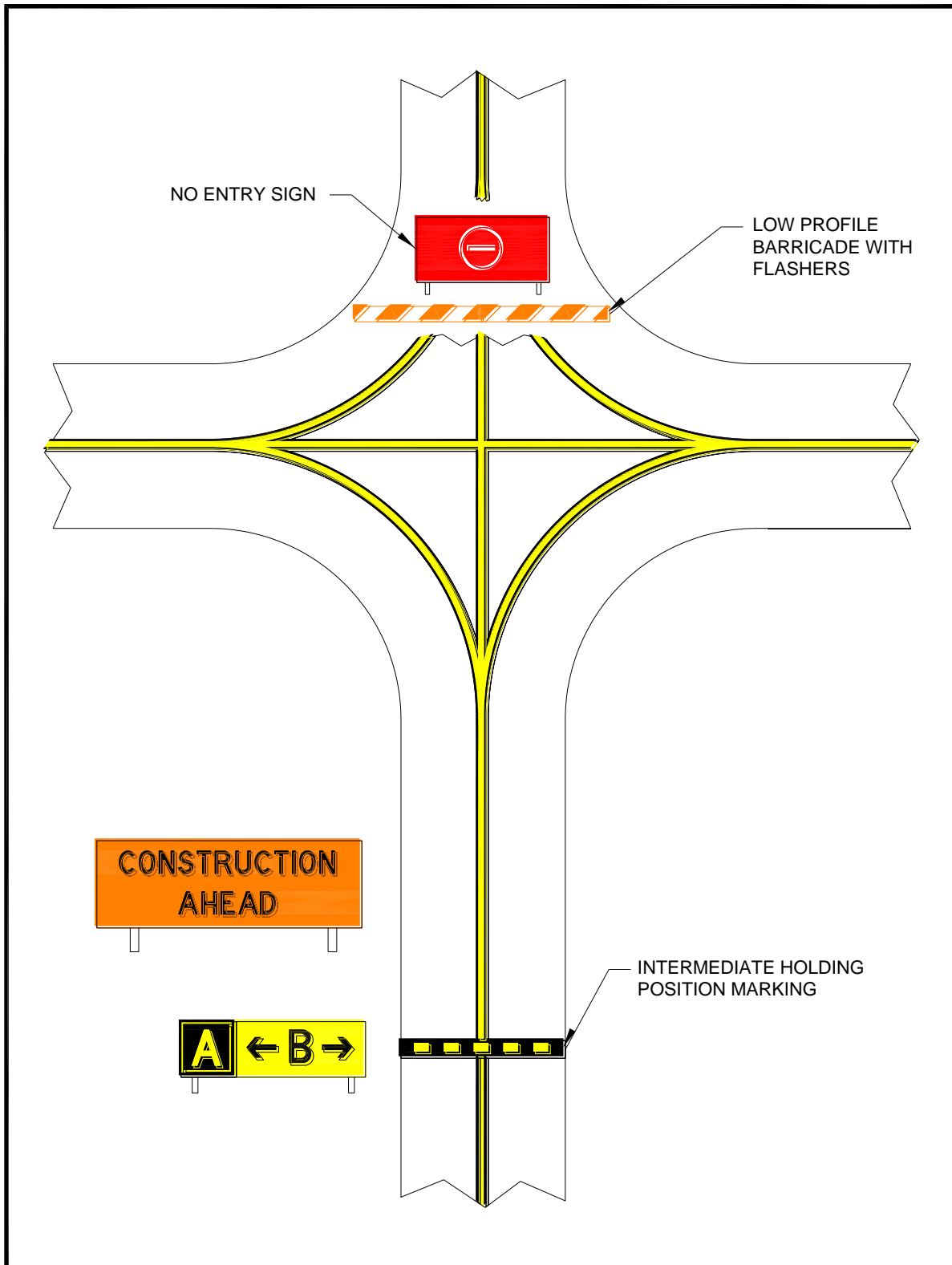
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**APPENDIX F. ORANGE CONSTRUCTION SIGNS**

**Figure F-1. Approved Sign Legends**

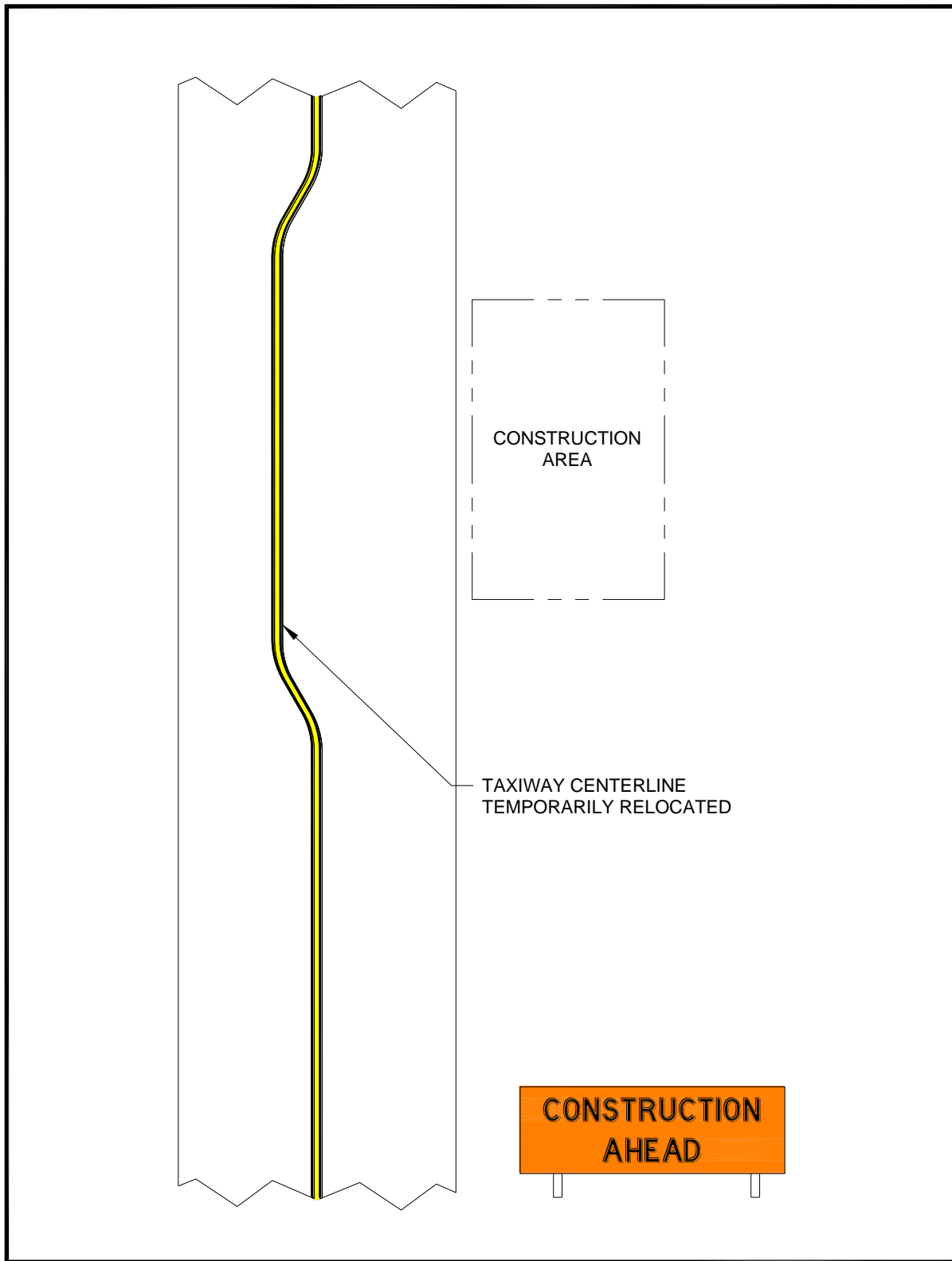


**Figure F-2. Orange Construction Sign Example 1**



**Note:** For proper placement of signs, refer to EB 93.

**Figure F-3. Orange Construction Sign Example 2**



**Note:** For proper placement of signs, refer to EB 93.

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## Advisory Circular Feedback

If you find an error in this AC, have recommendations for improving it, or have suggestions for new items/subjects to be added, you may let us know by (1) mailing this form to Manager, Airport Engineering Division, Federal Aviation Administration ATTN: AAS-100, 800 Independence Avenue SW, Washington DC 20591 or (2) faxing it to the attention of the Office of Airport Safety and Standards at (202) 267-5383.

Subject: AC 150/5370-2G

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

*Please check all appropriate line items:*

An error (procedural or typographical) has been noted in paragraph \_\_\_\_\_ on page \_\_\_\_\_.

Recommend paragraph \_\_\_\_\_ on page \_\_\_\_\_ be changed as follows:

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

In a future change to this AC, please cover the following subject:  
*(Briefly describe what you want added.)*

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

Other comments:

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

I would like to discuss the above. Please contact me at (phone number, email address).

\_\_\_\_\_

Submitted by: \_\_\_\_\_

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

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**PART B - STATE PROVISIONS**

*Ohio Prevailing Wage*

# Prevailing Wage Rate Skilled Crafts

**Name of Union:** Asbestos Local 207

**Type of Rate:** Commercial

**Change #:**  
LCN01-2025ib

**Craft:**  
Asbestos Worker

**Effective Date:**  
8/6/2025

**Effective Date:**  
8/6/2025

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Asbestos Abatement	\$32.50		\$10.95	\$7.25	\$0.75	\$3.75	\$0.00	\$0.05	\$0.00	\$0.00	\$55.25	\$71.50
Apprentice	BHR	Percent										
Trainee	\$22.00	\$67.69	\$10.95	\$1.90	\$0.75	\$1.00	\$0.00	\$0.05	\$0.00	\$0.00	\$36.65	\$47.65

**(\*)Special Calculation Note :**

Other: Drug Testing

**Ratio :**

3 Journeymen to 1 Trainee

**Jurisdiction ( \* denotes special jurisdictional note ) :**

Adams, Ashland, Ashtabula\*, Athens, Auglaize, Brown, Butler\*, Carroll, Champaign, Clark, Clermont, Clinton, Columbiana, Coshocton, Crawford, Cuyahoga, Darke, Delaware, Erie\*, Fairfield, Fayette, Franklin, Geauga, Greene, Guernsey, Hamilton, Hardin, Harrison, Highland, Hocking, Holmes, Huron, Knox, Lake, Licking, Logan, Lorain, Madison, Mahoning, Marion, Medina, Miami, Montgomery, Morgan, Morrow, Muskingum, Noble, Perry, Pickaway, Portage, Preble, Richland, Ross, Shelby, Stark, Summit, Trumbull, Tuscarawas, Union, Vinton, Warren\*, Wayne

**Special Jurisdictional Note :**

Ashtabula County: (post offices & townships of Ashtabula, Austinburg, Geneva, Harperfield, Jefferson, Plymouth & Saybrook) (townships of Andover, Cherry Valley, Colbrook, Canneaut, Denmark, Dorset, East Orwell, Hartsgrove, Kingville, Lenox, Monroe, Morgan, New Lyme, North Kingsville, Orwell, Pierpoint, Richmond Rock Creek, Rome, Sheffield, Trumbull, Wayne, Williamsfield & Windsor)

Butler County: (townships of Fairfield, Hanover, Liberty, Milford, Morgan, Oxford, Ripley, Ross, St. Clair, Union & Wayne) (Lemon & Madison)

Erie County: (post offices & townships of Berlin, Berlin Heights, Birmingham, Florence, Huron, Milan, Shinrock & Vermilion)

Warren County: (townships of: Deerfield, Hamilton, Harlan, Salem, Union & Washington) (Clear Creek, Franklin, Mossie, Turtle Creek & Wayne)

**Details :**

An Abatement Journeyman is anyone who has more than 600 hours in the Asbestos Abatement field.

Asbestos & lead paint abatement including, but not limited to the removal or encapsulation of asbestos & lead paint, all work in conjunction with the preparation of the removal of same & all work in conjunction with the clean up after said removal. The removal of all insulation materials, whether they contain asbestos or not, from mechanical systems (pipes, boilers, ducts, flues, breaching, etc.) is recognized as being the exclusive work of the Asbestos Abatement Workers.

On all mechanical systems (pipes, boilers, ducts, flues, breaching, etc.) that are going to be demolished, the removal of all insulating materials whether they contain asbestos or not shall be the exclusive work of the Laborers.

# Prevailing Wage Rate Skilled Crafts

**Name of Union:** Asbestos Local 50 Heat & Frost Insulators

**Type of Rate:** Commercial

**Change #:**  
LCN02-2025ib

**Craft:**  
Asbestos Worker

**Effective Date:**  
7/30/2025

**Effective Date:**  
7/30/2025

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Asbestos Insulation Mechanic	\$40.56		\$9.55	\$9.60	\$0.55	\$0.00	\$4.75	\$0.00	\$0.00	\$0.00	\$65.01	\$85.29
Firestop Technician	\$40.56		\$9.55	\$9.60	\$0.55	\$0.00	\$4.75	\$0.00	\$0.00	\$0.00	\$65.01	\$85.29
Apprentice	BHR	Percent										
1st year	\$25.81	\$63.63	\$9.55	\$4.52	\$0.50	\$0.00	\$0.50	\$0.00	\$0.00	\$0.00	\$40.88	\$53.78
2nd year	\$30.11	\$74.23	\$9.55	\$4.52	\$0.50	\$0.00	\$0.85	\$0.00	\$0.00	\$0.00	\$45.53	\$60.59
3rd year	\$34.41	\$84.83	\$9.55	\$6.76	\$0.50	\$0.00	\$1.25	\$0.00	\$0.00	\$0.00	\$52.47	\$69.67
4th year	\$36.56	\$90.13	\$9.55	\$6.76	\$0.50	\$0.00	\$1.50	\$0.00	\$0.00	\$0.00	\$54.87	\$73.15

**(\*)Special Calculation Note :**

**Ratio :**

1 Journeymen to 1 Apprentice  
4 Journeymen to 1 Apprentice thereafter

**Jurisdiction ( \* denotes special jurisdictional note ) :**

Athens, Auglaize, Butler\*, Champaign, Clark, Clinton, Crawford, Darke, Delaware, Fairfield, Fayette, Franklin, Greene, Guernsey, Hardin, Hocking, Knox, Licking, Logan, Madison, Marion, Miami, Montgomery, Morgan, Morrow, Muskingum, Noble, Perry, Pickaway, Preble, Ross, Shelby, Union, Vinton, Warren\*

**Special Jurisdictional Note :**

Butler County: Townships of Lemon and Madison.  
Warren County: Township of Clear Creek, Franklin, Massie, Turtle Creek and Wayne

**Details :**

# Prevailing Wage Rate Skilled Crafts

**Name of Union:** Boilermaker Local 85

**Type of Rate:** Commercial

**Change #:**  
LCN01-2012kp

**Craft:**  
Boilermaker

**Effective Date:**  
3/28/2012

**Effective Date:**  
3/28/2012

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Boilermaker	\$31.01		\$6.97	\$10.77	\$0.35	\$0.00	\$3.00	\$2.09	\$0.00	\$0.00	\$54.19	\$69.70
Apprentice	BHR	Percent										
1st 6 months	\$21.71	\$70.00	\$6.97	\$0.25	\$0.35	\$0.00	\$0.25	\$2.09	\$0.00	\$0.00	\$31.62	\$42.47
2nd 6 months	\$22.48	\$72.50	\$6.97	\$0.25	\$0.35	\$0.00	\$0.25	\$2.09	\$0.00	\$0.00	\$32.39	\$43.63
3rd 6 months	\$23.26	\$75.00	\$6.97	\$0.25	\$0.35	\$0.00	\$0.25	\$2.09	\$0.00	\$0.00	\$33.17	\$44.80
4th 6 months	\$24.03	\$77.50	\$6.97	\$10.77	\$0.35	\$0.00	\$3.00	\$2.09	\$0.00	\$0.00	\$47.21	\$59.23
5th 6 months	\$24.81	\$80.00	\$6.97	\$10.77	\$0.35	\$0.00	\$3.00	\$2.09	\$0.00	\$0.00	\$47.99	\$60.39
6th 6 months	\$26.36	\$85.00	\$6.97	\$10.77	\$0.35	\$0.00	\$3.00	\$2.09	\$0.00	\$0.00	\$49.54	\$62.72
7th 6 months	\$27.91	\$90.00	\$6.97	\$10.77	\$0.35	\$0.00	\$3.00	\$2.09	\$0.00	\$0.00	\$51.09	\$65.04
8th 6 months	\$29.46	\$95.00	\$6.97	\$10.77	\$0.35	\$0.00	\$3.00	\$2.09	\$0.00	\$0.00	\$52.64	\$67.37

**(\*)Special Calculation Note :**

No special calculations for this skilled craft wage rate are required at this time.

**Ratio :**

5 Journeymen to 1 Apprentice 10 Journeymen to 2 Apprentice 15 Journeymen to 3 Apprentice Helpers will be referred in the event that apprentices are NOT available.

**Jurisdiction ( \* denotes special jurisdictional note ) :**

Allen, Ashland, Auglaize, Crawford, Darke, Defiance, Delaware, Erie, Fulton, Hancock, Hardin, Henry, Huron, Knox, Logan, Lucas, Marion, Mercer, Morrow, Ottawa, Paulding, Putnam, Richland, Sandusky, Seneca, Shelby, Union, Van Wert, Williams, Wood, Wyandot

**Special Jurisdictional Note :**

**Details :**

# Prevailing Wage Rate Skilled Crafts

**Name of Union:** Bricklayer Local 23 (Mansfield)

**Type of Rate:** Commercial

**Change #:**  
LCN01-2025ib

**Craft:**  
Bricklayer

**Effective Date:**  
6/1/2025

**Effective Date:**  
6/1/2025

Classification	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Bricklayer	\$37.07		\$10.60	\$11.90	\$0.84	\$0.00	\$3.00	\$0.00	\$0.00	\$0.00	\$63.41	\$81.95
Pointer Caulker Cleaner	\$37.07		\$10.60	\$11.90	\$0.84	\$0.00	\$3.00	\$0.00	\$0.00	\$0.00	\$63.41	\$81.95
Tile Setter, Stone, Marble & Cement Masons, Plasterer and Terrazzo & Mosaic Workers	\$37.07		\$10.60	\$11.90	\$0.84	\$0.00	\$3.00	\$0.00	\$0.00	\$0.00	\$63.41	\$81.95
Tile Marble Terrazzo Finishers	\$32.42		\$10.60	\$11.90	\$0.84	\$0.00	\$3.00	\$0.00	\$0.00	\$0.00	\$58.76	\$74.97
Lay Out Man	\$37.07		\$10.60	\$11.90	\$0.84	\$0.00	\$3.00	\$0.00	\$0.00	\$0.00	\$63.41	\$81.95
Saw Man	\$37.07		\$10.60	\$11.90	\$0.84	\$0.00	\$3.00	\$0.00	\$0.00	\$0.00	\$63.41	\$81.95
Stack Worker	\$38.57		\$10.60	\$11.90	\$0.84	\$0.00	\$3.00	\$0.00	\$0.00	\$0.00	\$64.91	\$84.20
Refractory Hot Work	\$39.57		\$10.60	\$11.90	\$0.84	\$0.00	\$3.00	\$0.00	\$0.00	\$0.00	\$65.91	\$85.70
Carbon Masonry and Swing Sand Blasting	\$38.57		\$10.60	\$11.90	\$0.84	\$0.00	\$3.00	\$0.00	\$0.00	\$0.00	\$64.91	\$84.20
Masonry Maintenance Specialist	\$18.54		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$18.54	\$27.81
Apprentice	BHR	Percent										
1st 6 Months	\$22.24	\$60.00	\$10.60	\$11.90	\$0.84	\$0.00	\$3.00	\$0.00	\$0.00	\$0.00	\$48.58	\$59.70
2nd 6 Months	\$24.10	\$65.00	\$10.60	\$11.90	\$0.84	\$0.00	\$3.00	\$0.00	\$0.00	\$0.00	\$50.44	\$62.48
3rd 6 Months	\$25.95	\$70.00	\$10.60	\$11.90	\$0.84	\$0.00	\$3.00	\$0.00	\$0.00	\$0.00	\$52.29	\$65.26
4th 6 Months	\$27.80	\$75.00	\$10.60	\$11.90	\$0.84	\$0.00	\$3.00	\$0.00	\$0.00	\$0.00	\$54.14	\$68.04
5th 6 Months	\$29.66	\$80.00	\$10.60	\$11.90	\$0.84	\$0.00	\$3.00	\$0.00	\$0.00	\$0.00	\$56.00	\$70.82
6th 6 Months	\$31.51	\$85.00	\$10.60	\$11.90	\$0.84	\$0.00	\$3.00	\$0.00	\$0.00	\$0.00	\$57.85	\$73.60

7th 6 Months	\$33.36	\$90.00	\$10.60	\$11.90	\$0.84	\$0.00	\$3.00	\$0.00	\$0.00	\$0.00	\$59.70	\$76.38
8th 6 Months	\$35.22	\$95.00	\$10.60	\$11.90	\$0.84	\$0.00	\$3.00	\$0.00	\$0.00	\$0.00	\$61.56	\$79.16
Mason Trainee 1-90 Days	\$22.24	\$60.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$22.24	\$33.36
91-365 Days	\$22.24	\$60.00	\$10.60	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$32.84	\$43.96
2nd Year	\$25.95	\$70.00	\$10.60	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$36.55	\$49.52

**(\*)Special Calculation Note :**

APPRENTICES BASED ON % OF EACH CLASS ABOVE PLUS FULL FRINGES

**Ratio :**

1-2 Journeymen to 1 Apprentice 3-4 Journeymen to 2 Apprentices 5-6 Journeymen to 2 Apprentices 6-10 Journeymen to 3 Apprentices \*\* Apprentices must be hired prior to hiring Mason Trainees\*\*\* Mason Finisher Ratio 1 Apprentice permits 1 Mason Trainee 2 Apprentice permits 1 Mason Trainee 3 Apprentice permits 2 Mason Trainee 4 Apprentice permits 2 Mason Trainee

**Jurisdiction ( \* denotes special jurisdictional note ) :**

Ashland, Crawford, Hardin, Holmes, Marion, Morrow, Richland, Wayne, Wyandot

**Special Jurisdictional Note :**

**Details :**

All Free Standing Work shall be \$ 1.50 per hour above the Regular rate. Radial brick, common brick, face brick, and acid brick linings, All sandblasting and the leaving of carbon masonry material on all swinging stage and/or scaffolding will be at the rate of \$1.50 per hour above Regular rate. "Hot Work" shall receive \$ 2.50 per hour above Regular Rate. Working on vertical slip forms, jump forms or continuous forming of any kind shall be \$1.50 per hour above Regular rate, for all work from the base up to 5th (50)feet. Above that height they shall be paid at the Regular rate of time and one-half. Topping Materials (emery, iron etc.) will be \$.50 per hour above regular rate. Layout man and Sawman shall receive .25 per hour over the Journeymen Rate.

# Prevailing Wage Rate Skilled Crafts

**Name of Union:** Bricklayer Local 23 Heavy Hwy (A)

**Type of Rate:** Commercial

**Change #:**  
LCN01-2024ib

**Craft:**  
Bricklayer

**Effective Date:**  
6/5/2024

**Effective Date:**  
6/5/2024

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Cement Mason Bricklayer Sewer Water Works A	\$33.39		\$10.00	\$9.53	\$0.53	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$53.45	\$70.15
Apprentice	BHR	Percent										
1st year	\$23.37	\$70.00	\$10.00	\$9.53	\$0.53	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$43.43	\$55.12
2nd year	\$26.71	\$80.00	\$10.00	\$9.53	\$0.53	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$46.77	\$60.13
3rd year	\$30.05	\$90.00	\$10.00	\$9.53	\$0.53	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$50.11	\$65.14

**(\*)Special Calculation Note :**

NOT FOR BUILDING CONSTRUCTION.

**Ratio :**

3 Journeymen to 1 Apprentice 6 Journeymen to 2 Apprentice 9 Journeymen to 3 Apprentice 12 Journeymen to 4 Apprentice 15 Journeymen to 5 Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

Adams, Allen, Ashland, Ashtabula, Athens, Auglaize, Belmont, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Columbiana, Coshocton, Crawford, Cuyahoga, Darke, Defiance, Delaware, Erie, Fairfield, Fayette, Franklin, Fulton, Gallia, Geauga, Greene, Guernsey, Hamilton, Hancock, Hardin, Harrison, Henry, Highland, Hocking, Holmes, Huron, Jackson, Jefferson, Knox, Lake, Lawrence, Licking, Logan, Lorain, Lucas, Madison, Mahoning, Marion, Medina, Meigs, Mercer, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Ottawa, Paulding, Perry, Pickaway, Pike, Portage, Preble, Putnam, Richland, Ross, Sandusky, Scioto, Seneca, Shelby, Stark, Summit, Trumbull, Tuscarawas, Union, Van Wert, Vinton, Warren, Washington, Wayne

**Special Jurisdictional Note :**

**Details :**

(A) Highway Construction, Sewer, Waterworks And Utility Construction, Industrial & Building Site Heavy Construction, Airport Construction Or Railroad Construction Work. (B) Power Plant, Tunnels, Amusement Park, Athletic Stadium Site Work ,Pollution Control,Sewer Plant, Waste Plant, & Water Treatment Facilities, Construction.

# Prevailing Wage Rate Skilled Crafts

**Name of Union:** Bricklayer Local 23 Heavy Hwy (B)

**Type of Rate:** Commercial

**Change #:**  
LCN01-2024ib

**Craft:**  
Bricklayer

**Effective Date:**  
6/5/2024

**Effective Date:**  
6/5/2024

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Cement Mason Bricklayer Power Plants Tunnels Amusement Parks B	\$34.39		\$10.00	\$9.52	\$0.54	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$54.45	\$71.65
Apprentice	BHR	Percent										
1st year	\$24.07	\$70.00	\$10.00	\$9.52	\$0.54	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$44.13	\$56.17
2nd year	\$27.51	\$80.00	\$10.00	\$9.52	\$0.54	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$47.57	\$61.33
3rd year	\$30.95	\$90.00	\$10.00	\$9.52	\$0.54	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$51.01	\$66.49

**(\*)Special Calculation Note :**

NOT FOR BUILDING CONSTRUCTION.

**Ratio :**

3 Journeymen to 1 Apprentice 6 Journeymen to 2 Apprentice 9 Journeymen to 2 Apprentice 12 Journeymen to 4 Apprentice 15 Journeymen to 5 Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

Adams, Allen, Ashland, Ashtabula, Athens, Auglaize, Belmont, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Columbiana, Coshocton, Crawford, Cuyahoga, Darke, Defiance, Delaware, Erie, Fairfield, Fayette, Franklin, Fulton, Gallia, Geauga, Greene, Guernsey, Hamilton, Hancock, Hardin, Harrison, Henry, Highland, Hocking, Holmes, Huron, Jackson, Jefferson, Knox, Lake, Lawrence, Licking, Logan, Lorain, Lucas, Madison, Mahoning, Marion, Medina, Meigs, Mercer, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Ottawa, Paulding, Perry, Pickaway, Pike, Portage, Preble, Putnam, Richland, Ross, Sandusky, Scioto, Seneca, Shelby, Stark, Summit, Trumbull, Tuscarawas, Union, Van Wert, Vinton, Warren, Washington, Wayne

**Special Jurisdictional Note :**

**Details :**

(A) Highway Construction, Sewer, Waterworks And Utility Construction, Industrial & Building Site Heavy Construction, Airport Construction Or Railroad Construction Work. (B) Power Plant, Tunnels, Amusement Park, Athletic Stadium Site Work ,Pollution Control,Sewer Plant, Waste Plant, & Water Treatment Facilities, Construction.

# Prevailing Wage Rate Skilled Crafts

**Name of Union:** Carpenter Commercial Zone NEO 4A

**Type of Rate:** Commercial

**Change #:**  
LCN01-2025ib

**Craft:**  
Carpenter

**Effective Date:**  
6/18/2025

**Effective Date:**  
6/18/2025

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Carpenter	\$32.89		\$8.94	\$10.59	\$0.72	\$0.00	\$4.07	\$0.14	\$0.00	\$0.00	\$57.35	\$73.80
Apprentice	BHR	Percent										
1st 3 Months	\$19.73	\$60.00	\$8.94	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$28.67	\$38.54
2nd 3 Months	\$19.73	\$60.00	\$8.94	\$0.00	\$0.72	\$0.00	\$4.07	\$0.14	\$0.00	\$0.00	\$33.60	\$43.47
2nd 6 Months	\$21.38	\$65.00	\$8.94	\$0.00	\$0.72	\$0.00	\$4.07	\$0.14	\$0.00	\$0.00	\$35.25	\$45.94
3rd 6 Months	\$23.02	\$70.00	\$8.94	\$0.00	\$0.72	\$0.00	\$4.07	\$0.14	\$0.00	\$0.00	\$36.89	\$48.40
4th 6 Months	\$24.67	\$75.00	\$8.94	\$0.00	\$0.72	\$0.00	\$4.07	\$0.14	\$0.00	\$0.00	\$38.54	\$50.87
5th 6 Months	\$26.31	\$80.00	\$8.94	\$8.47	\$0.72	\$0.00	\$4.07	\$0.14	\$0.00	\$0.00	\$48.65	\$61.81
6th 6 Months	\$27.96	\$85.00	\$8.94	\$9.00	\$0.72	\$0.00	\$4.07	\$0.14	\$0.00	\$0.00	\$50.83	\$64.80
7th 6 Months	\$29.60	\$90.00	\$8.94	\$9.53	\$0.72	\$0.00	\$4.07	\$0.14	\$0.00	\$0.00	\$53.00	\$67.80
8th 6 Months	\$31.25	\$95.00	\$8.94	\$10.06	\$0.72	\$0.00	\$4.07	\$0.14	\$0.00	\$0.00	\$55.18	\$70.80

**(\*)Special Calculation Note :**

Other: International training

**Ratio :**

1 Journeymen to 1 Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

Coshocton, Holmes, Knox, Morrow

**Special Jurisdictional Note :**

**Details :**

# Prevailing Wage Rate Skilled Crafts

**Name of Union:** Carpenter Floorlayer Zone NEO 4A

**Type of Rate:** Commercial

**Change #:**  
LCN01-2025ib

**Craft:**  
Carpenter

**Effective Date:**  
6/18/2025

**Effective Date:**  
6/18/2025

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Carpenter Floorlayer	\$32.89		\$8.94	\$10.59	\$0.72	\$0.00	\$4.06	\$0.17	\$0.00	\$0.00	\$57.37	\$73.82
Apprentice	BHR	Percent										
1st 3 Months	\$19.73	\$60.00	\$8.94	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$28.67	\$38.54
2nd 3 Months	\$19.73	\$60.00	\$8.94	\$0.00	\$0.72	\$0.00	\$4.06	\$0.17	\$0.00	\$0.00	\$33.62	\$43.49
2nd 6 Months	\$21.38	\$65.00	\$8.94	\$0.00	\$0.72	\$0.00	\$4.06	\$0.17	\$0.00	\$0.00	\$35.27	\$45.96
3rd 6 Months	\$23.02	\$70.00	\$8.94	\$0.00	\$0.72	\$0.00	\$4.06	\$0.17	\$0.00	\$0.00	\$36.91	\$48.42
4th 6 Months	\$24.67	\$75.00	\$8.94	\$0.00	\$0.72	\$0.00	\$4.06	\$0.17	\$0.00	\$0.00	\$38.56	\$50.89
5th 6 Months	\$26.31	\$80.00	\$8.94	\$8.47	\$0.72	\$0.00	\$4.06	\$0.17	\$0.00	\$0.00	\$48.67	\$61.83
6th 6 Months	\$27.96	\$85.00	\$8.94	\$9.00	\$0.72	\$0.00	\$4.06	\$0.17	\$0.00	\$0.00	\$50.85	\$64.82
7th 6 Months	\$29.60	\$90.00	\$8.94	\$9.53	\$0.72	\$0.00	\$4.06	\$0.17	\$0.00	\$0.00	\$53.02	\$67.82
8th 6 Months	\$31.25	\$95.00	\$8.94	\$10.06	\$0.72	\$0.00	\$4.06	\$0.17	\$0.00	\$0.00	\$55.20	\$70.82

**(\*)Special Calculation Note :**

Other: International Training

**Ratio :**

1 Journeymen to 1 Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

Coshocton, Holmes, Knox, Morrow

**Special Jurisdictional Note :**

**Details :**

# Prevailing Wage Rate Skilled Crafts

**Name of Union:** Carpenter Hev Hwy Zone NHH C2-F

**Type of Rate:** Commercial

**Change #:**  
LCN01-2025ib

**Craft:**  
Carpenter

**Effective Date:**  
6/18/2025

**Effective Date:**  
6/18/2025

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Carpenter	\$33.38		\$8.94	\$10.59	\$0.72	\$0.00	\$4.32	\$0.14	\$0.00	\$0.00	\$58.09	\$74.78
Apprentice	BHR	Percent										
1st 3 Months	\$20.03	\$60.00	\$8.94	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$28.97	\$38.98
2nd 3 Months	\$20.03	\$60.00	\$8.94	\$0.00	\$0.72	\$0.00	\$4.32	\$0.14	\$0.00	\$0.00	\$34.15	\$44.16
2nd 6 Months	\$21.70	\$65.00	\$8.94	\$0.00	\$0.72	\$0.00	\$4.32	\$0.14	\$0.00	\$0.00	\$35.82	\$46.67
3rd 6 Months	\$23.37	\$70.00	\$8.94	\$0.00	\$0.72	\$0.00	\$4.32	\$0.14	\$0.00	\$0.00	\$37.49	\$49.17
4th 6 Months	\$25.04	\$75.00	\$8.94	\$0.00	\$0.72	\$0.00	\$4.32	\$0.14	\$0.00	\$0.00	\$39.16	\$51.67
5th 6 Months	\$26.70	\$80.00	\$8.94	\$8.47	\$0.72	\$0.00	\$4.32	\$0.14	\$0.00	\$0.00	\$49.29	\$62.65
6th 6 Months	\$28.37	\$85.00	\$8.94	\$9.00	\$0.72	\$0.00	\$4.32	\$0.14	\$0.00	\$0.00	\$51.49	\$65.68
7th 6 Months	\$30.04	\$90.00	\$8.94	\$9.53	\$0.72	\$0.00	\$4.32	\$0.14	\$0.00	\$0.00	\$53.69	\$68.71
8th 6 Months	\$31.71	\$95.00	\$8.94	\$10.06	\$0.72	\$0.00	\$4.32	\$0.14	\$0.00	\$0.00	\$55.89	\$71.75

**(\*)Special Calculation Note :**

Other: Training

**Ratio :**

1 Journeymen to 1 Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

Coshocton, Holmes, Knox, Morrow

**Special Jurisdictional Note :**

**Details :**

Any construction work as performed within the definitions listed here below, all of which, taken together are "Heavy-Highway Construction" work: "HIGHWAY CONSTRUCTION" work is defined as work performed to provide a facility to accommodate vehicular or pedestrian traffic and includes, but is not limited to, the construction of all streets, roads, expressways, turnpikes, bridges, drainage structures, grade separations, parking lots, rest areas, alleys, sidewalks, guardrails, fences, and sound barriers, but shall not include construction of buildings. "AIRPORT CONSTRUCTION" work is defined as including site preparation, grading, paving, drainage, fences, sidewalks, driveways, parking areas and similar work incidental to the construction of airfields but shall not include the construction of buildings. "HEAVY CONSTRUCTION" work is defined as including, but not limited to grade separations, foundations (does not include building foundations), abutments, retaining walls, shafts, tunnels, subways, elevators, drainage projects, flood control projects, reclamation projects, reservoirs, water supply projects, water development projects, hydro-electric development, utility transmission lines, including right-of-way clearing, locks, dams, dikes, levees, revetments, channels, channel cutoffs, intakes, dredging projects, jetties, breakwater, docks, harbors; and all municipal and utility construction except construction classified as building construction. "RAILROAD CONSTRUCTION" work is defined as including, grading, drainage, placing of rails, crossties, ballast and the construction of bridges, and other incidentals for railroads, street railways construction projects and rapid transit system projects, but shall not include the construction of buildings. "SEWER WATERWORKS AND UTILITY CONSTRUCTION" work is defined as including construction of all storm sewers, sanitary sewers, supplying and distributing waterlines, gas lines, telephone and television conduit, underground electrical lines, and similar utility construction. Main waterline and trunk sewers connecting water works and/or sewage disposal plants are included within this definition. "SUPPORTIVE EXCAVATION AND DEEP FOUNDATIONS" work is all driven and drilled foundations within the building site. "POWER PLANT SITE" work is defined as all work which is inside the property line, but outside the actual building construction. Such work shall include, but is not limited to, the grading and installation of sewer lines, drainage lines, gas lines, telephone and television conduit, underground electrical lines and similar utility construction, parking lots, bridges, roads, streets, sidewalks, reservoirs, ash pits, storage tanks, ramps and other such construction work performed on the work site, but shall not include the actual excavation for the buildings, foundations or footers or construction of the buildings. "POLLUTION CONTROL, SEWAGE PLANT, WASTE PLANT AND WATER TREATMENT FACILITIES CONSTRUCTION" WORK shall be all work in construction of pumping stations, waste and sewage disposal plants, incinerator plants, water treatment plants, filtration plants, solid waste disposal and similar pollution control facilities. "SOLAR & WIND FARM" WORK is considered "HEAVY CONSTRUCTION" and includes all work in the construction of solar fields/farms and wind fields/farms (not installations on buildings).

# Prevailing Wage Rate Skilled Crafts

**Name of Union:** Carpenter Insulation Zone NEO 4A

**Type of Rate:** Commercial

**Change #:**  
LCN01-2025ib

**Craft:**  
Carpenter

**Effective Date:**  
6/18/2025

**Effective Date:**  
6/18/2025

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Carpenter Insulation	\$26.31		\$8.94	\$10.59	\$0.72	\$0.00	\$4.07	\$0.14	\$0.00	\$0.00	\$50.77	\$63.93
Apprentice	BHR	Percent										
1st 3 months	\$15.79	\$60.00	\$8.94	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$24.73	\$32.62
2nd 3 months	\$15.79	\$60.00	\$8.94	\$0.00	\$0.72	\$0.00	\$4.07	\$0.14	\$0.00	\$0.00	\$29.66	\$37.55
2nd 6 months	\$17.10	\$65.00	\$8.94	\$0.00	\$0.72	\$0.00	\$4.07	\$0.14	\$0.00	\$0.00	\$30.97	\$39.52
3rd 6 months	\$18.42	\$70.00	\$8.94	\$0.00	\$0.72	\$0.00	\$4.07	\$0.14	\$0.00	\$0.00	\$32.29	\$41.50
4th 6 months	\$19.74	\$75.02	\$8.94	\$0.00	\$0.72	\$0.00	\$4.07	\$0.14	\$0.00	\$0.00	\$33.61	\$43.48
5th 6 months	\$21.05	\$80.00	\$8.94	\$8.47	\$0.72	\$0.00	\$4.07	\$0.14	\$0.00	\$0.00	\$43.39	\$53.91
6th 6 months	\$22.36	\$85.00	\$8.94	\$9.00	\$0.72	\$0.00	\$4.07	\$0.14	\$0.00	\$0.00	\$45.23	\$56.42
7th 6 months	\$23.68	\$90.00	\$8.94	\$9.53	\$0.72	\$0.00	\$4.07	\$0.14	\$0.00	\$0.00	\$47.08	\$58.92
8th 6 months	\$24.99	\$95.00	\$8.94	\$10.06	\$0.72	\$0.00	\$4.07	\$0.14	\$0.00	\$0.00	\$48.92	\$61.42

**(\*)Special Calculation Note :**

\*Other is Training

**Ratio :**

1 Journeymen to 1 Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

Coshocton, Holmes, Knox, Morrow

**Special Jurisdictional Note :**

**Details :**

# Prevailing Wage Rate Skilled Crafts

**Name of Union:** Carpenter Millwright NE Zone M1-B

**Type of Rate:** Commercial

**Change #:**  
LCN01-2025ib

**Craft:**  
Carpenter

**Effective Date:**  
6/18/2025

**Effective Date:**  
6/18/2025

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Carpenter Millwright	\$41.11		\$8.85	\$10.98	\$0.72	\$0.00	\$1.97	\$0.19	\$0.00	\$0.00	\$63.82	\$84.38
Certified Welder	\$42.11		\$8.85	\$10.98	\$0.72	\$0.00	\$1.97	\$0.19	\$0.00	\$0.00	\$64.82	\$85.88
Lay-Out Man Monorail	\$44.19		\$8.85	\$10.98	\$0.72	\$0.00	\$1.97	\$0.19	\$0.00	\$0.00	\$66.90	\$89.00
Apprentice	BHR	Percent										
1st 6 months	\$24.67	\$60.00	\$8.85	\$10.98	\$0.72	\$0.00	\$1.97	\$0.19	\$0.00	\$0.00	\$47.38	\$59.71
2nd 6 months	\$26.72	\$65.00	\$8.85	\$10.98	\$0.72	\$0.00	\$1.97	\$0.19	\$0.00	\$0.00	\$49.43	\$62.79
3rd 6 months	\$28.78	\$70.00	\$8.85	\$10.98	\$0.72	\$0.00	\$1.97	\$0.19	\$0.00	\$0.00	\$51.49	\$65.88
4th 6 months	\$30.83	\$75.00	\$8.85	\$10.98	\$0.72	\$0.00	\$1.97	\$0.19	\$0.00	\$0.00	\$53.54	\$68.96
5th 6 months	\$32.89	\$80.00	\$8.85	\$10.98	\$0.72	\$0.00	\$1.97	\$0.19	\$0.00	\$0.00	\$55.60	\$72.04
6th 6 months	\$34.94	\$85.00	\$8.85	\$10.98	\$0.72	\$0.00	\$1.97	\$0.19	\$0.00	\$0.00	\$57.65	\$75.13
7th 6 months	\$37.00	\$90.00	\$8.85	\$10.98	\$0.72	\$0.00	\$1.97	\$0.19	\$0.00	\$0.00	\$59.71	\$78.21
8th 6 months	\$39.05	\$95.00	\$8.85	\$10.98	\$0.72	\$0.00	\$1.97	\$0.19	\$0.00	\$0.00	\$61.76	\$81.29

**(\*)Special Calculation Note :**

Other is Training

**Ratio :**

1 Journeymen to 1 Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

Coshocton, Holmes, Knox, Morrow

**Special Jurisdictional Note :**

**Details :**

The term "Millwright and Machine Erectors" jurisdiction shall mean the unloading, hoisting, rigging, skidding, moving, dismantling, aligning, erecting, assembling, repairing, maintenance and adjusting of all structures, processing areas either under cover, under ground or elsewhere, required to process material, handle, manufacture or service, be it powered or receiving power manually, by steam, gas, electricity, gasoline, diesel, nuclear, solar, water, air or chemically, and in industries such as and including, which are identified for the purpose of description, but not limited to, the following: woodworking plants; canning industries; steel mills; coffee roasting plants; paper and pulp; cellophane; stone crushing; gravel and sand washing and handling; refineries; grain storage and handling; asphalt plants; sewage disposal; water plants; laundries; bakeries; mixing plants; can, bottle and bag packing plants; textile mills; paint mills; breweries; milk processing plants; power plants; aluminum processing or manufacturing plants; and amusement and entertainment fields. The installation of mechanical equipment in atomic energy plants; installation of reactors in power plants; installation of control rods and equipment in reactors; and installation of mechanical equipment in rocket missile bases, launchers, launching gantry, floating bases, hydraulic escape doors and any and all component parts thereto, either assembled, semi-assembled or disassembled. The installation of, but not limited to, the following: setting-up of all engines, motors, generators, air compressors, fans, pumps, scales, hoppers, conveyors of all types, sizes and their supports; escalators; man lifts; moving sidewalks; hoists; dumb waiters; all types of feeding machinery; amusement devices; mechanical pin setters and spotters in bowling alleys; refrigeration equipment; and the installation of all types of equipment necessary and required to process material either in the manufacturing or servicing. The handling and installation of pulleys, gears, sheaves, fly wheels, air and vacuum drives, worm drives and gear drives directly or indirectly coupled to motors, belts, chains, screws, legs, boots, guards, booth tanks, all bin valves, turn heads and indicators, shafting, bearings, cable sprockets, cutting all key seats in new and old work, troughs, chippers, filters, calendars, rolls, winders, rewinders, slitters, cutters, wrapping machines, blowers, forging machines, rams, hydraulic or otherwise, planing, extruder, ball, dust collectors, equipment in meat packing plants, splicing of ropes and cables. The laying-out, fabrication and installation of protection equipment including machinery guards, making and setting of templates for machinery, fabrication of bolts, nuts, pans, drilling of holes for any equipment which the Millwrights install regardless of materials; all welding and burning regardless of type, fabrication of all lines, hose or tubing used in lubricating machinery installed by Millwrights; grinding, cleaning, servicing and any machine work necessary for any part of any equipment installed by the Millwrights; and the break-in and trial run of any equipment or machinery installed by the Millwrights. It is agreed the Millwrights shall use the layout tools and optic equipment necessary to perform their work.

# Prevailing Wage Rate Skilled Crafts

**Name of Union:** Carpenter Pile Driver Hev Hwy Zone NHH P3-A

**Type of Rate:** Commercial

**Change #:**  
LCN01-2025ib

**Craft:**  
Carpenter

**Effective Date:**  
6/18/2025

**Effective Date:**  
6/18/2025

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Carpenter Pile Driver	\$36.24		\$8.88	\$10.98	\$0.72	\$0.00	\$1.84	\$0.19	\$0.00	\$0.00	\$58.85	\$76.97
Diver	\$54.36		\$8.88	\$10.98	\$0.72	\$0.00	\$1.84	\$0.19	\$0.00	\$0.00	\$76.97	\$104.15
Certified Welder	\$37.29		\$8.88	\$10.98	\$0.72	\$0.00	\$1.84	\$0.19	\$0.00	\$0.00	\$59.90	\$78.55
Apprentice	BHR	Percent										
1st 6 months	\$21.74	\$60.00	\$8.88	\$10.98	\$0.72	\$0.00	\$1.84	\$0.19	\$0.00	\$0.00	\$44.35	\$55.23
2nd 6 months	\$23.56	\$65.00	\$8.88	\$10.98	\$0.72	\$0.00	\$1.84	\$0.19	\$0.00	\$0.00	\$46.17	\$57.94
3rd 6 months	\$25.37	\$70.00	\$8.88	\$10.98	\$0.72	\$0.00	\$1.84	\$0.19	\$0.00	\$0.00	\$47.98	\$60.66
4th 6 months	\$27.18	\$75.00	\$8.88	\$10.98	\$0.72	\$0.00	\$1.84	\$0.19	\$0.00	\$0.00	\$49.79	\$63.38
5th 6 months	\$28.99	\$80.00	\$8.88	\$10.98	\$0.72	\$0.00	\$1.84	\$0.19	\$0.00	\$0.00	\$51.60	\$66.10
6th 6 months	\$30.80	\$85.00	\$8.88	\$10.98	\$0.72	\$0.00	\$1.84	\$0.19	\$0.00	\$0.00	\$53.41	\$68.82
7th 6 months	\$32.62	\$90.00	\$8.88	\$10.98	\$0.72	\$0.00	\$1.84	\$0.19	\$0.00	\$0.00	\$55.23	\$71.53
8th 6 months	\$34.43	\$95.00	\$8.88	\$10.98	\$0.72	\$0.00	\$1.84	\$0.19	\$0.00	\$0.00	\$57.04	\$74.25

**(\*)Special Calculation Note :**

\*Other is Training

**Ratio :**

1 Journeymen to 1 Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

Coshocton, Holmes, Knox, Morrow

**Special Jurisdictional Note :**

**Details :**

Pile Drivers duties shall include but not limited to: Pile driving, milling, fashioning, joining assembling, erecting, fastening, or dismantling of all material of wood, plastic, metal, fiber, cork and composition and all other substitute materials: pile driving, cutting, fitting and placing of lagging, and the handling, cleaning, erecting, installing and dismantling of machinery, equipment and erecting pre-engineered metal buildings. Pile Drivers work but not limited to: unloading, assembling, erection, repairs, operation, signaling, dismantling and reloading all equipment that is used for pile driving including pile butts is defined as sheeting or scrap piling. Underwater work that may be required in connection with the installation of piling. The driver and his tender work as a team and shall arrive at their own financial arrangements with the contractor. Any configuration of wood, steel, concrete or composite that is jetted, driven or vibrated onto the ground by conventional pile driving equipment for the purpose of supporting a future load that may be permanent or temporary. The construction of all wharves and docks, including the fabrication and installation of floating docks. Driving bracing, plumbing, cutting off and capping of all piling whether wood, metal, pipe piling or composite, loading, unloading, erecting, framing, dismantling, moving and handling of pile driving equipment piling used in the construction and repair of all wharves, docks, piers, trestles, caissons, cofferdams and erection of all sea walls and breakwaters. All underwater and marine work on bulkheads, wharves, docks, shipyards, caissons, piers, bridges, pipeline, work, viaducts, marine cable and trestles, as well as salvage and reclamation work where divers are employed. Rate shall include carpenters, acoustic and ceiling installers, drywall installers, pile drivers and floorlayers.

# Prevailing Wage Rate Skilled Crafts

**Name of Union:** Cement Mason Local 132 (Columbus)

**Type of Rate:** Commercial

**Change #:**  
LCN01-2025ib

**Craft:**  
Cement Mason

**Effective Date:**  
6/4/2025

**Effective Date:**  
6/4/2025

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Cement Mason	\$35.12		\$8.90	\$4.65	\$0.75	\$0.00	\$3.10	\$0.06	\$0.00	\$0.00	\$52.58	\$70.14
Apprentice	BHR	Percent										
1st Year	\$24.58	\$70.00	\$8.90	\$4.65	\$0.75	\$0.00	\$3.10	\$0.06	\$0.00	\$0.00	\$42.04	\$54.34
2nd Year	\$28.10	\$80.00	\$8.90	\$4.65	\$0.75	\$0.00	\$3.10	\$0.06	\$0.00	\$0.00	\$45.56	\$59.60
3rd Year	\$31.61	\$90.00	\$8.90	\$4.65	\$0.75	\$0.00	\$3.10	\$0.06	\$0.00	\$0.00	\$49.07	\$64.87

**(\*)Special Calculation Note :**

Other: International Training Fund

**Ratio :**

3 Journeymen to 1 Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

Ashland, Coshocton, Crawford, Delaware, Fairfield, Fayette, Franklin, Guernsey, Hocking, Knox, Licking, Madison, Marion, Morrow, Muskingum, Perry, Pickaway, Richland, Ross, Union, Vinton, Wyandot

**Special Jurisdictional Note :**

**Details :**

Working on swing stage, slip scaffold, window jack scaffold, scissor lifts, and aerial lifts shall receive the following rates: \$.50 above the regular rate for heights up to fifty (50) feet above grade level \$1.00 above the regular rate for heights over fifty (50) feet above grade level

# Prevailing Wage Rate Skilled Crafts

**Name of Union:** Cement Mason Local 132 Hev Hwy (Columbus)

**Type of Rate:** Commercial

**Change #:**  
LCN01-2025ib

**Craft:**  
Cement Mason

**Effective Date:**  
5/1/2025

**Effective Date:**  
5/1/2025

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Cement Mason	\$37.29		\$9.00	\$7.65	\$0.75	\$0.00	\$2.40	\$0.07	\$0.00	\$0.00	\$57.16	\$75.81
Apprentice	BHR	Percent										
1st Year	\$26.10	\$70.00	\$9.00	\$7.65	\$0.75	\$0.00	\$2.40	\$0.07	\$0.00	\$0.00	\$45.97	\$59.02
2nd Year	\$29.83	\$80.00	\$9.00	\$7.65	\$0.75	\$0.00	\$2.40	\$0.07	\$0.00	\$0.00	\$49.70	\$64.62
3rd Year	\$33.56	\$90.00	\$9.00	\$7.65	\$0.75	\$0.00	\$2.40	\$0.07	\$0.00	\$0.00	\$53.43	\$70.21

**(\*)Special Calculation Note :**

Other: International Training Fund

**Ratio :**

1 Journeyman to 1 Apprentice 2 Journeymen to 1 Apprentice thereafter

**Jurisdiction ( \* denotes special jurisdictional note ) :**

Ashland, Athens, Coshocton, Crawford, Delaware, Fairfield, Fayette, Franklin, Guernsey, Hocking, Knox, Licking, Madison, Marion, Meigs, Monroe, Morgan, Morrow, Muskingum, Noble, Perry, Pickaway, Richland, Ross, Union, Vinton, Washington, Wyandot

**Special Jurisdictional Note :**

**Details :**

Highway Construction, Sewer, Waterworks And Utility Construction, Industrial & Building Site, Heavy Construction, Airport Construction Or Railroad Construction Work, Power Plant, Tunnels, Amusement Park, Athletic Stadium Site Work, Pollution Control, Sewer Plant, Waste & Water Plant, Water Treatment Facilities Construction.

# Prevailing Wage Rate Skilled Crafts

**Name of Union:** Electrical Local 688 Inside

**Type of Rate:** Commercial

**Change #:**  
LCN02-2025ib

**Craft:**  
Electrical

**Effective Date:**  
9/10/2025

**Effective Date:**  
9/10/2025

Classification	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Electrician	\$38.00		\$10.10	\$7.75	\$0.60	\$0.00	\$3.26	\$1.14	\$0.00	\$0.00	\$60.85	\$79.85
Over 50 feet	\$76.00		\$10.10	\$7.75	\$0.60	\$0.00	\$3.26	\$2.28	\$0.00	\$0.00	\$99.99	\$137.99
1st Level Constructi on Wireman 0-2000 hours	\$15.29		\$6.83	\$0.46	\$0.92	\$0.00	\$0.46	\$0.00	\$0.00	\$0.00	\$23.96	\$31.61
2nd Level CW 2001-4000 hours	\$16.25		\$6.83	\$0.49	\$0.92	\$0.00	\$0.49	\$0.00	\$0.00	\$0.00	\$24.98	\$33.11
3rd Level CW 4001-6000 hours	\$17.20		\$6.83	\$0.52	\$0.92	\$0.00	\$0.52	\$0.00	\$0.00	\$0.00	\$25.99	\$34.59
4th Level CW 6001-8000 hours	\$19.12		\$6.83	\$0.57	\$0.92	\$0.00	\$0.57	\$0.00	\$0.00	\$0.00	\$28.01	\$37.57
1st Level Constructi on Electrician 8001-10000 hours	\$21.03		\$6.83	\$0.63	\$0.92	\$0.00	\$0.63	\$0.00	\$0.00	\$0.00	\$30.04	\$40.56
2nd Level CE 10001-12000 hours	\$22.94		\$6.83	\$0.69	\$0.92	\$0.00	\$0.69	\$0.00	\$0.00	\$0.00	\$32.07	\$43.54
3rd Level CE 12001-14000 hours	\$28.67		\$6.83	\$0.86	\$0.92	\$0.00	\$0.86	\$0.00	\$0.00	\$0.00	\$38.14	\$52.48
Apprentice	BHR	Percent										
1st Period	\$19.00	\$50.00	\$10.10	\$0.00	\$0.60	\$0.00	\$0.00	\$0.57	\$0.00	\$0.00	\$30.27	\$39.77
2nd Period	\$20.90	\$55.00	\$10.10	\$0.00	\$0.60	\$0.00	\$0.00	\$0.63	\$0.00	\$0.00	\$32.23	\$42.68
3rd Period	\$22.80	\$60.00	\$10.10	\$7.75	\$0.60	\$0.00	\$3.26	\$0.68	\$0.00	\$0.00	\$45.19	\$56.59
4th Period	\$24.70	\$65.00	\$10.10	\$7.75	\$0.60	\$0.00	\$3.26	\$0.74	\$0.00	\$0.00	\$47.15	\$59.50
5th Period	\$28.50	\$75.00	\$10.10	\$7.75	\$0.60	\$0.00	\$3.26	\$0.86	\$0.00	\$0.00	\$51.07	\$65.32
6th Perod	\$32.30	\$85.00	\$10.10	\$7.75	\$0.60	\$0.00	\$3.26	\$0.93	\$0.00	\$0.00	\$54.94	\$71.09

**(\*)Special Calculation Note :**

Other: NEBF (National Electrical Benefit Fund).

**Ratio :**

1-3 Journeymen to 2 Apprentices  
4-6 Journeymen to 4 Apprentices  
7-9 Journeymen to 6 Apprentices Etc.

**Jurisdiction ( \* denotes special jurisdictional note ) :**

Ashland, Crawford, Huron\*, Knox\*, Marion, Morrow, Richland, Wyandot\*

**Special Jurisdictional Note :**

In Huron County the following townships: Richmond, New Haven, Ripley, and Greenwich  
In Knox County the following townships: Liberty, Clinton, Union, Howard, Monroe, Middleberry, Morris, Wayne, Berlin, Pike, Brown, Jefferson  
In Wyandot County the following townships: Sycamore, Crane, Eden, Pitt, Antrim and Tymochee

**Details :**

Scope of work for CW/CEs will be limited only by what the employer deems appropriate and within the individual's qualifications to properly perform safely and in a workmanlike manner. Projects where CW/CEs could be utilized are office buildings, shopping centers, gas stations, auto sales agencies and garages, educational facilities, food service centers, restaurants, entertainment facilities, funeral homes, hospitals, clinics, motels, retail and wholesale facilities not to exceed 200,000 square feet and small manufacturing facilities not to exceed 50,000 square feet.

# Prevailing Wage Rate Skilled Crafts

**Name of Union:** Electrical Local 688 Inside Lt Commercial South West

**Type of Rate:** Commercial

**Change #:**  
LCN02-2025ib

**Craft:**  
Electrical

**Effective Date:**  
9/10/2025

**Effective Date:**  
9/10/2025

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Electrician	\$38.00		\$10.10	\$7.75	\$0.60	\$0.00	\$3.26	\$1.14	\$0.00	\$0.00	\$60.85	\$79.85
Over 50 feet	\$76.00		\$10.10	\$7.75	\$0.60	\$0.00	\$3.26	\$2.28	\$0.00	\$0.00	\$99.99	\$137.99
CE-3 12,001-14,000 Hrs	\$28.67		\$6.83	\$0.86	\$0.92	\$0.00	\$0.86	\$0.00	\$0.00	\$0.00	\$38.14	\$52.48
CE-2 10,001-12,000 Hrs	\$22.94		\$6.83	\$0.69	\$0.92	\$0.00	\$0.69	\$0.00	\$0.00	\$0.00	\$32.07	\$43.54
CE-1 8,001-10,000 Hrs	\$21.03		\$6.83	\$0.63	\$0.92	\$0.00	\$0.63	\$0.00	\$0.00	\$0.00	\$30.04	\$40.56
CW-4 6,001-8,000 Hrs	\$19.12		\$6.83	\$0.57	\$0.92	\$0.00	\$0.57	\$0.00	\$0.00	\$0.00	\$28.01	\$37.57
CW-3 4,001-6,000 Hrs	\$17.20		\$6.83	\$0.52	\$0.92	\$0.00	\$0.52	\$0.00	\$0.00	\$0.00	\$25.99	\$34.59
CW-2 2,001-4,000 Hrs	\$16.25		\$6.83	\$0.49	\$0.92	\$0.00	\$0.49	\$0.00	\$0.00	\$0.00	\$24.98	\$33.11
CW-1 0-2,000 Hrs	\$15.29		\$6.83	\$0.46	\$0.92	\$0.00	\$0.46	\$0.00	\$0.00	\$0.00	\$23.96	\$31.61
Apprentice	BHR	Percent										
1st Period	\$19.00	\$50.00	\$10.10	\$0.00	\$0.60	\$0.00	\$0.00	\$0.57	\$0.00	\$0.00	\$30.27	\$39.77
2nd Period	\$20.90	\$55.00	\$10.10	\$0.00	\$0.60	\$0.00	\$0.00	\$0.63	\$0.00	\$0.00	\$32.23	\$42.68
3rd Period	\$22.80	\$60.00	\$10.10	\$7.75	\$0.60	\$0.00	\$3.26	\$0.68	\$0.00	\$0.00	\$45.19	\$56.59
4th Period	\$24.70	\$65.00	\$10.10	\$7.75	\$0.60	\$0.00	\$3.26	\$0.74	\$0.00	\$0.00	\$47.15	\$59.50
5th Period	\$28.50	\$75.00	\$10.10	\$7.75	\$0.60	\$0.00	\$3.26	\$0.86	\$0.00	\$0.00	\$51.07	\$65.32
6th Period	\$32.30	\$85.00	\$10.10	\$7.75	\$0.60	\$0.00	\$3.26	\$0.93	\$0.00	\$0.00	\$54.94	\$71.09
	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$

**(\*)Special Calculation Note :**

Other: NEBF (National Electrical Benefit Fund) and Administration Fund

**Ratio :**

Journeyman 1-3 to 2 Apprentices  
Journeyman 4-6 to 4 Apprentices  
Journeyman 7-9 to 6 Apprentices Etc.

Construction Electrician and Construction Wireman Ratio There shall be a minimum ratio of one inside Journeyman to every (4) employees of different classification per jobsite. An inside Journeyman Wireman is required on the project as the fifth (5th) worker or when apprentices are used.

**Jurisdiction ( \* denotes special jurisdictional note ) :**

Ashland, Crawford, Huron\*, Knox\*, Marion, Morrow, Richland, Wyandot\*

**Special Jurisdictional Note :**

In Huron County the following townships: Richland, New Haven, Ripley, and Greenwich  
In Knox County the following townships: Liberty, Clinton, Union, Howard, Monroe, Middleberry, Morris, Wayne, Berlin, Pike, Brown, Jefferson  
In Wyandot County the following townships: Sycamore, Crane, Eden, Pitt, Antrim and Tymochee

**Details :**

The scope of work for the light commercial agreement shall apply to the following facilities not to exceed 200,000 square feet; office buildings, shopping centers, auto sales agencies and garages, churches, funeral homes, nursing homes, hotels, retail and wholesale facilities, small stand-alone manufacturing facilities when free standing and not part of a larger facility (not to exceed 50,000 square fee), solar projects (500 panels or less) unless otherwise covered under the agreement, lighting retrofits (when not associated with remodels involving branch re-circuiting) lighting retrofits shall be defined as the changing of lamps and ballasts in existing light fixtures and shall also include the one for one replacement of existing fixtures, warehouses, gas stations, food service centers, restaurants, entertainment facilities, hospitals, clinics, motels, residential buildings.

# Prevailing Wage Rate Skilled Crafts

**Name of Union:** Electrical Local 688 Voice Data Video

**Type of Rate:** Commercial

**Change #:**  
LCN01-2022sks

**Craft:**  
Electrical

**Effective Date:**  
6/29/2022

**Effective Date:**  
6/29/2022

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Electrical Installer Technician B	\$29.50		\$9.65	\$2.14	\$0.70	\$0.00	\$1.21	\$0.68	\$0.00	\$0.00	\$43.88	\$58.63
Installer Technician A	\$30.75		\$9.65	\$2.18	\$0.70	\$0.00	\$1.21	\$0.71	\$0.00	\$0.00	\$45.20	\$60.58
Cable Puller	\$14.75		\$9.65	\$1.70	\$0.70	\$0.00	\$1.21	\$0.34	\$0.00	\$0.00	\$28.35	\$35.73
Apprentice	BHR	Percent										
1st Period 0-1000hrs	\$16.23	\$55.00	\$9.65	\$1.74	\$0.70	\$0.00	\$1.21	\$0.38	\$0.00	\$0.00	\$29.91	\$38.02
2nd 1001-2000 hours	\$17.70	\$60.00	\$9.65	\$1.79	\$0.70	\$0.00	\$1.21	\$0.41	\$0.00	\$0.00	\$31.46	\$40.31
3rd 2001-3000 hours	\$19.18	\$65.00	\$9.65	\$1.83	\$0.70	\$0.00	\$1.21	\$0.45	\$0.00	\$0.00	\$33.02	\$42.60
4th 3001-4000 hours	\$20.65	\$70.00	\$9.65	\$1.87	\$0.70	\$0.00	\$1.21	\$0.48	\$0.00	\$0.00	\$34.56	\$44.89
5th 4001-5000 hours	\$22.13	\$75.00	\$9.65	\$1.92	\$0.70	\$0.00	\$1.21	\$0.51	\$0.00	\$0.00	\$36.12	\$47.18
6th 5001-6000 hours	\$23.60	\$80.00	\$9.65	\$1.96	\$0.70	\$0.00	\$1.21	\$0.55	\$0.00	\$0.00	\$37.67	\$49.47

**(\*)Special Calculation Note :**

Other is for Holiday Pay. Vacation: Only applies to employees with one (1) continuous year of service with a firm.

**Ratio :**

1 Journeyman Installer to 1 Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

Ashland, Crawford, Huron\*, Knox\*, Marion, Morrow, Richland, Wyandot\*

**Special Jurisdictional Note :**

In Knox County the following townships: Liberty, Clinton, Union, Howard, Monroe, Middleberry, Morris, Wayne, Berlin, Pike, Brown, Jefferson. In Wyandot County: Sycamore, Crane, Eden, Pitt, Antrim & Tymochee. In Huron County: Richmond, New Haven, Ripley, & Greenwich.

**Details :**

An employee who is required to wear an electronic device after hours will receive an additional 1.00 per hour for all hours worked. HOLIDAYS: Memorial Day, 4th of July, Labor Day, Thanksgiving Day, Christmas Day, New Years Day. The following work is EXCLUDED from the Teledata Technician work scope: - Installation of computer systems in industrial applications such as assembly lines, robotics, computer controller manufacturing systems. - Installation of conduit &/or raceways shall be installed by Inside Wireman . On sites where there is no Inside Wireman employed, the Teledata Technician may install raceway, or conduit not greater than 10 foot. - Fire Alarm work is excluded on all new construction sites or wherever the fire alarm system is installed in conduit - All HVAC control work. TECHNICIAN (A) is a Technician B who holds a current Technician Certification from BICSI (Building Industry Consulting Service International, Inc.) CABLE PULLERS are for the installation of cable from one termination point to another.

# Prevailing Wage Rate Skilled Crafts

**Name of Union:** Electrical Local 71 High Tension Pipe Type Cable

**Type of Rate:** Commercial

**Change #:**  
LCN01-2026ib

**Craft:**  
Electrical

**Effective Date:**  
1/7/2026

**Effective Date:**  
1/7/2026

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Electrical Lineman	\$54.94		\$7.50	\$1.65	\$0.55	\$0.00	\$13.19	\$1.00	\$0.00	\$0.00	\$78.83	\$106.30
Certified Lineman Welder	\$54.94		\$7.50	\$1.65	\$0.55	\$0.00	\$13.19	\$1.00	\$0.00	\$0.00	\$78.83	\$106.30
Certified Cable Splicer	\$54.94		\$7.50	\$1.65	\$0.55	\$0.00	\$13.19	\$1.00	\$0.00	\$0.00	\$78.83	\$106.30
Operator A	\$49.20		\$7.50	\$1.48	\$0.49	\$0.00	\$11.81	\$1.00	\$0.00	\$0.00	\$71.48	\$96.08
Operator B	\$43.52		\$7.50	\$1.31	\$0.44	\$0.00	\$10.44	\$1.00	\$0.00	\$0.00	\$64.21	\$85.97
Operator C	\$34.93		\$7.50	\$1.05	\$0.35	\$0.00	\$8.38	\$1.00	\$0.00	\$0.00	\$53.21	\$70.67
Groundman 0-12 months Exp	\$27.47		\$7.50	\$0.82	\$0.27	\$0.00	\$6.59	\$1.00	\$0.00	\$0.00	\$43.65	\$57.38
Groundman 0-12 months Exp w/CDL	\$30.22		\$7.50	\$0.91	\$0.30	\$0.00	\$7.25	\$1.00	\$0.00	\$0.00	\$47.18	\$62.29
Groundman 1 yr or more	\$30.22		\$7.50	\$0.91	\$0.30	\$0.00	\$7.25	\$1.00	\$0.00	\$0.00	\$47.18	\$62.29
Groundman 1 yr or more w/CDL	\$35.71		\$7.50	\$1.07	\$0.36	\$0.00	\$8.57	\$1.00	\$0.00	\$0.00	\$54.21	\$72.06
Equipment Mechanic A	\$43.52		\$7.50	\$1.31	\$0.44	\$0.00	\$10.44	\$1.00	\$0.00	\$0.00	\$64.21	\$85.97
Equipment Mechanic B	\$39.22		\$7.50	\$1.18	\$0.39	\$0.00	\$9.41	\$1.00	\$0.00	\$0.00	\$58.70	\$78.31
Equipment Mechanic C	\$34.92		\$7.50	\$1.05	\$0.35	\$0.00	\$8.38	\$1.00	\$0.00	\$0.00	\$53.20	\$70.66
X-Ray Technician	\$54.94		\$7.50	\$1.65	\$0.55	\$0.00	\$13.19	\$1.00	\$0.00	\$0.00	\$78.83	\$106.30
Apprentice	BHR	Percent										
1st 1000 hrs	\$32.96	\$60.00	\$7.50	\$0.99	\$0.33	\$0.00	\$7.91	\$1.00	\$0.00	\$0.00	\$50.69	\$67.17
2nd 1000 hrs	\$35.71	\$65.00	\$7.50	\$1.07	\$0.36	\$0.00	\$8.57	\$1.00	\$0.00	\$0.00	\$54.21	\$72.06
3rd 1000 hrs	\$38.46	\$70.00	\$7.50	\$1.15	\$0.38	\$0.00	\$9.23	\$1.00	\$0.00	\$0.00	\$57.72	\$76.95

4th 1000 hrs	\$41.20	\$75.00	\$7.50	\$1.24	\$0.41	\$0.00	\$9.89	\$1.00	\$0.00	\$0.00	\$61.24	\$81.84
5th 1000 hrs	\$43.95	\$80.00	\$7.50	\$1.32	\$0.44	\$0.00	\$10.55	\$1.00	\$0.00	\$0.00	\$64.76	\$86.74
6th 1000 hrs	\$46.70	\$85.00	\$7.50	\$1.39	\$0.47	\$0.00	\$11.21	\$1.00	\$0.00	\$0.00	\$68.27	\$91.62
7th 1000 hrs	\$49.45	\$90.00	\$7.50	\$1.48	\$0.49	\$0.00	\$11.87	\$1.00	\$0.00	\$0.00	\$71.79	\$96.52

**(\*)Special Calculation Note :**

Other is Health Reimbursement Account

**Ratio :**

1 Journeyman to 1 Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

Adams, Ashland, Ashtabula, Athens, Auglaize, Belmont, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Columbiana, Coshocton, Crawford, Cuyahoga, Darke, Delaware, Fairfield, Fayette, Franklin, Gallia, Geauga, Greene, Guernsey, Hamilton, Harrison, Highland, Hocking, Holmes, Jackson, Jefferson, Knox, Lake, Lawrence, Licking, Logan, Lorain, Madison, Mahoning, Marion, Medina, Meigs, Mercer, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Perry, Pickaway, Pike, Portage, Preble, Richland, Ross, Scioto, Shelby, Stark, Summit, Trumbull, Tuscarawas, Union, Vinton, Warren, Washington, Wayne

**Special Jurisdictional Note :**

**Details :**

Operator "A": John Henry Rock Drill, D-6 (or equivalent) and above, Trackhoe Digger, (320 Track excavator), Cranes (greater than 25 tons and less than 45 tons).  
 Operator "B": Cranes (greater than 6 tons and up to 25 tons), Backhoes, Road Tractor, Dozer up to D-5, Pressure Digger- wheeled or tracked, all Tension wire Stringing equipment.  
 Operator "C": Trench, Backhoe, Riding type vibratory Compactor, Ground Rod Driver, Boom Truck (6 ton & below), Skid Steer Loaders, Material Handler.

**Special Notes:**

When Cable Splicer helpers are used, they must be a Journeyman Lineman.

Pipe installation, holiday testing, welding, cable splicing operation of vacuum pumps and cable pulling equipment and all work requiring the use of hand tools shall be done by Journeymen and Apprentices. Pipe coating, manhole preparations and conditioning, nitrogen connections and flowmeter installation shall be done by or under the direct supervision of a Journeyman.

At least two (2) Journeyman Linemen in addition to certified lineman welders shall be employed to install high voltage pipe.

When pulling cable, at least six (6) of the workmen shall be no less than Journeyman classifications. When pumping oil, only Journeyman Lineman or equipment operators shall be permitted to operate degasifying and oil pumping equipment

# Prevailing Wage Rate Skilled Crafts

**Name of Union:** Electrical Local 71 Outside (Central OH Chapter)

**Type of Rate:** Commercial

**Change #:**  
LCN01-2025ib

**Craft:**  
Electrical

**Effective Date:**  
6/4/2025

**Effective Date:**  
6/4/2025

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Electrical Lineman	\$46.03		\$7.50	\$1.38	\$0.46	\$0.00	\$9.20	\$0.50	\$0.00	\$0.00	\$65.07	\$88.09
Traffic Signal & Lighting Journeyman	\$44.43		\$7.50	\$1.33	\$0.44	\$0.00	\$8.89	\$0.50	\$0.00	\$0.00	\$63.09	\$85.31
Equipment Operator	\$40.44		\$7.50	\$1.21	\$0.40	\$0.00	\$8.09	\$0.50	\$0.00	\$0.00	\$58.14	\$78.36
Groundman 0-12 months (W/O CDL)	\$24.52		\$7.50	\$0.74	\$0.25	\$0.00	\$4.90	\$0.50	\$0.00	\$0.00	\$38.41	\$50.67
Groundman 0-12 Months W/CDL	\$26.78		\$7.50	\$0.80	\$0.27	\$0.00	\$5.36	\$0.50	\$0.00	\$0.00	\$41.21	\$54.60
Groundman greater than 1 Year W/CDL	\$29.07		\$7.50	\$0.87	\$0.29	\$0.00	\$5.81	\$0.50	\$0.00	\$0.00	\$44.04	\$58.58
Traffic Signal Apprentices	\$		\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
1st 1,000 hours	\$26.66		\$7.50	\$0.80	\$0.27	\$0.00	\$5.33	\$0.50	\$0.00	\$0.00	\$41.06	\$54.39
2nd 1,000 hours	\$28.88		\$7.50	\$0.87	\$0.29	\$0.00	\$5.78	\$0.50	\$0.00	\$0.00	\$43.82	\$58.26
3rd 1,000 hours	\$31.10		\$7.50	\$0.93	\$0.31	\$0.00	\$6.22	\$0.50	\$0.00	\$0.00	\$46.56	\$62.11
4th 1,000 hours	\$33.32		\$7.50	\$1.00	\$0.33	\$0.00	\$6.66	\$0.50	\$0.00	\$0.00	\$49.31	\$65.97
5th 1,000 hours	\$35.54		\$7.50	\$1.07	\$0.36	\$0.00	\$7.11	\$0.50	\$0.00	\$0.00	\$52.08	\$69.85
6th 1,000 hours	\$39.99		\$7.50	\$1.20	\$0.40	\$0.00	\$8.00	\$0.50	\$0.00	\$0.00	\$57.59	\$77.59
Apprentice	BHR	Percent										
1st 1,000 Hours	\$27.62	\$60.00	\$7.50	\$0.83	\$0.28	\$0.00	\$5.52	\$0.50	\$0.00	\$0.00	\$42.25	\$56.06
2nd 1,000 Hours	\$29.92	\$65.00	\$7.50	\$0.90	\$0.30	\$0.00	\$5.98	\$0.50	\$0.00	\$0.00	\$45.10	\$60.06
3rd 1,000 Hours	\$32.22	\$70.00	\$7.50	\$0.97	\$0.32	\$0.00	\$6.44	\$0.50	\$0.00	\$0.00	\$47.95	\$64.06
4th 1,000 Hours	\$34.52	\$75.00	\$7.50	\$1.04	\$0.35	\$0.00	\$6.90	\$0.50	\$0.00	\$0.00	\$50.81	\$68.07

5th 1,000 Hours	\$36.82	\$80.00	\$7.50	\$1.10	\$0.37	\$0.00	\$7.36	\$0.50	\$0.00	\$0.00	\$53.65	\$72.07
6th 1,000 Hours	\$39.13	\$85.00	\$7.50	\$1.17	\$0.39	\$0.00	\$7.82	\$0.50	\$0.00	\$0.00	\$56.51	\$76.07
7th 1,000 Hours	\$41.43	\$90.00	\$7.50	\$1.24	\$0.41	\$0.00	\$8.28	\$0.50	\$0.00	\$0.00	\$59.36	\$80.07

**(\*)Special Calculation Note :**

Other is Health Reimbursement Account

**Ratio :**

1 Journeymen to 1 Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

Adams, Ashland, Athens, Coshocton, Crawford, Delaware, Fairfield, Fayette, Franklin, Gallia, Guernsey, Highland, Hocking, Jackson, Knox, Lawrence, Licking, Madison, Marion, Meigs, Monroe, Morgan, Morrow, Muskingum, Noble, Perry, Pickaway, Pike, Richland, Ross, Scioto, Tuscarawas, Union, Vinton, Washington

**Special Jurisdictional Note :**

**Details :**

A groundman when directed shall assist a Journeyman Lineman, Traffic Signal and Lighting Journeyman or Equipment Operator in the performance of his/her work on the ground, including the use of hand tools. Under no circumstances shall this classification climb poles, towers, or work from an elevated platform or bucket truck. This classification shall not perform work normally assigned to an Apprentice. No more than three (3) Groundmen shall work alone. Jobs with more than three Groundmen shall be supervised by a Groundcrew Foreman, Journeyman Lineman, Journeyman Traffic Signal Technician or an Equipment Operator. Scope of Work: installation and maintenance of highway and street lighting, highway and street sign lighting, electronic message boards and traffic control systems, camera systems, traffic signal work, substation and line construction including overhead and underground projects for private and industrial work as in accordance with the IBEW Constitution. This Agreement includes the operation of all tools and equipment necessary for the installation of the above projects.

# Prevailing Wage Rate Skilled Crafts

**Name of Union:** Electrical Local 71 Outside Utility Power

**Type of Rate:** Commercial

**Change #:**  
LCN01-2026ib

**Craft:**  
Electrical

**Effective Date:**  
1/7/2026

**Effective Date:**  
1/7/2026

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Electrical Lineman	\$52.03		\$7.50	\$1.56	\$0.52	\$0.00	\$12.49	\$1.00	\$0.00	\$0.00	\$75.10	\$101.12
Substation Technician	\$52.03		\$7.50	\$1.56	\$0.50	\$0.00	\$12.49	\$1.00	\$0.00	\$0.00	\$75.08	\$101.09
Cable Splicer	\$54.50		\$7.50	\$1.64	\$0.55	\$0.00	\$13.08	\$1.00	\$0.00	\$0.00	\$78.27	\$105.52
Operator A	\$46.61		\$7.50	\$1.40	\$0.47	\$0.00	\$11.19	\$1.00	\$0.00	\$0.00	\$68.17	\$91.47
Operator B	\$41.17		\$7.50	\$1.23	\$0.41	\$0.00	\$9.87	\$1.00	\$0.00	\$0.00	\$61.18	\$81.77
Operator C	\$33.00		\$7.50	\$0.99	\$0.33	\$0.00	\$7.92	\$1.00	\$0.00	\$0.00	\$50.74	\$67.24
Groundman 0-12 months Exp	\$26.02		\$7.50	\$0.78	\$0.26	\$0.00	\$6.24	\$1.00	\$0.00	\$0.00	\$41.80	\$54.81
Groundman 0-12 months Exp w/CDL	\$28.62		\$7.50	\$0.86	\$0.29	\$0.00	\$6.87	\$1.00	\$0.00	\$0.00	\$45.14	\$59.45
Groundman 1 yr or more	\$28.62		\$7.50	\$0.86	\$0.29	\$0.00	\$6.87	\$1.00	\$0.00	\$0.00	\$45.14	\$59.45
Groundman 1 yr or more w/CDL	\$33.82		\$7.50	\$1.01	\$0.34	\$0.00	\$8.12	\$1.00	\$0.00	\$0.00	\$51.79	\$68.70
Equipment Mechanic A	\$41.17		\$7.50	\$1.23	\$0.41	\$0.00	\$9.87	\$1.00	\$0.00	\$0.00	\$61.18	\$81.77
Equipment Mechanic B	\$37.09		\$7.50	\$1.11	\$0.37	\$0.00	\$8.90	\$1.00	\$0.00	\$0.00	\$55.97	\$74.52
Equipment Mechanic C	\$33.00		\$7.50	\$0.99	\$0.33	\$0.00	\$7.92	\$1.00	\$0.00	\$0.00	\$50.74	\$67.24
Line Truck w/auger	\$36.40		\$7.50	\$1.09	\$0.36	\$0.00	\$8.71	\$1.00	\$0.00	\$0.00	\$55.06	\$73.26
Apprentice	BHR	Percent										
1st 1000 hrs	\$31.22	\$60.00	\$7.50	\$0.94	\$0.31	\$0.00	\$7.49	\$1.00	\$0.00	\$0.00	\$48.46	\$64.07
2nd 1000 hrs	\$33.82	\$65.00	\$7.50	\$1.01	\$0.34	\$0.00	\$8.12	\$1.00	\$0.00	\$0.00	\$51.79	\$68.70
3rd 1000 hrs	\$36.42	\$70.00	\$7.50	\$1.09	\$0.36	\$0.00	\$8.74	\$1.00	\$0.00	\$0.00	\$55.11	\$73.32

4th 1000 hrs	\$39.02	\$75.00	\$7.50	\$1.17	\$0.39	\$0.00	\$9.37	\$1.00	\$0.00	\$0.00	\$58.45	\$77.96
5th 1000 hrs	\$41.62	\$80.00	\$7.50	\$1.25	\$0.44	\$0.00	\$9.99	\$1.00	\$0.00	\$0.00	\$61.80	\$82.61
6th 1000 hrs	\$44.23	\$85.00	\$7.50	\$1.33	\$0.44	\$0.00	\$10.61	\$1.00	\$0.00	\$0.00	\$65.11	\$87.22
7th 1000 hrs	\$46.83	\$90.00	\$7.50	\$1.40	\$0.47	\$0.00	\$11.24	\$1.00	\$0.00	\$0.00	\$68.44	\$91.86

**(\*)Special Calculation Note :**

Other: Health Reimbursement Account

**Ratio :**

(1) Journeyman Lineman to (1) Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

Adams, Ashland, Ashtabula, Athens, Auglaize, Belmont, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Columbiana, Coshocton, Crawford, Cuyahoga, Darke, Delaware, Fairfield, Fayette, Franklin, Gallia, Geauga, Greene, Guernsey, Hamilton, Harrison, Highland, Hocking, Holmes, Jackson, Jefferson, Knox, Lake, Lawrence, Licking, Logan, Lorain, Madison, Mahoning, Marion, Medina, Meigs, Mercer, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Perry, Pickaway, Pike, Portage, Preble, Richland, Ross, Scioto, Shelby, Stark, Summit, Trumbull, Tuscarawas, Union, Vinton, Warren, Washington, Wayne

**Special Jurisdictional Note :**

**Details :**

Operator "A": John Henry Rock Drill, D-6 (or equivalent) and above, Trackhoe Digger, (320 Track excavator), Cranes (greater than 25 tons and less than 45 tons).  
 Operator "B": Cranes (greater than 6 tons and up to 25 tons), Backhoes, Road Tractor, Dozer up to D-5, Pressure Digger- wheeled or tracked, all Tension wire Stringing equipment.  
 Operator "C": Trench, Backhoe, Riding type vibratory Compactor, Ground Rod Driver, Boom Truck (6 ton & below), Skid Steer Loaders, Material Handler.

# Prevailing Wage Rate Skilled Crafts

**Name of Union:** Electrical Local 71 Underground Residential Distribution

**Type of Rate:** Commercial

**Change #:**  
LCN01-2026ib

**Craft:**  
Electrical

**Effective Date:**  
1/7/2026

**Effective Date:**  
1/7/2026

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
URD Electrician	\$39.42		\$7.50	\$1.18	\$0.39	\$0.00	\$9.43	\$1.00	\$0.00	\$0.00	\$58.92	\$78.63
Equipment Operator A	\$35.24		\$7.50	\$1.06	\$0.35	\$0.00	\$8.46	\$1.00	\$0.00	\$0.00	\$53.61	\$71.23
Equipment Operator B	\$32.34		\$7.50	\$0.97	\$0.32	\$0.00	\$7.76	\$1.00	\$0.00	\$0.00	\$49.89	\$66.06
Directional Drill Locator	\$35.24		\$7.50	\$1.06	\$0.35	\$0.00	\$8.46	\$1.00	\$0.00	\$0.00	\$53.61	\$71.23
Directional Drill Operator	\$32.34		\$7.50	\$0.97	\$0.32	\$0.00	\$7.76	\$1.00	\$0.00	\$0.00	\$49.89	\$66.06
Groundman 0-12 months Exp	\$25.50		\$7.50	\$0.77	\$0.26	\$0.00	\$6.12	\$1.00	\$0.00	\$0.00	\$41.15	\$53.90
Groundman 0-12 months Exp w/CDL	\$28.15		\$7.50	\$0.84	\$0.28	\$0.00	\$6.76	\$1.00	\$0.00	\$0.00	\$44.53	\$58.60
Groundman 1 yr or more	\$28.15		\$7.50	\$0.84	\$0.28	\$0.00	\$6.76	\$1.00	\$0.00	\$0.00	\$44.53	\$58.60
Groundman 1 yr or more w/CDL	\$33.47		\$7.50	\$1.00	\$0.33	\$0.00	\$8.03	\$1.00	\$0.00	\$0.00	\$51.33	\$68.06
Apprentice	BHR	Percent										
1st 1000 hrs	\$31.54	\$80.00	\$7.50	\$0.95	\$0.32	\$0.00	\$7.57	\$1.00	\$0.00	\$0.00	\$48.88	\$64.65
2nd 1000 hrs	\$33.51	\$85.00	\$7.50	\$1.01	\$0.34	\$0.00	\$8.04	\$1.00	\$0.00	\$0.00	\$51.40	\$68.16
3rd 1000 hrs	\$35.48	\$90.00	\$7.50	\$1.06	\$0.35	\$0.00	\$8.51	\$1.00	\$0.00	\$0.00	\$53.90	\$71.64
4th 1000 hrs	\$37.45	\$95.00	\$7.50	\$1.12	\$0.37	\$0.00	\$8.99	\$1.00	\$0.00	\$0.00	\$56.43	\$75.16

**(\*)Special Calculation Note :**

Other: Health Reimbursement Account

**Ratio :**

(1) Journeyman Lineman to (1) Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

Adams, Ashland, Ashtabula, Athens, Auglaize, Belmont, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Columbiana, Coshocton, Crawford, Cuyahoga, Darke, Delaware, Fairfield, Fayette, Franklin, Gallia, Geauga, Greene, Guernsey, Hamilton, Harrison, Highland, Hocking, Holmes, Jackson, Jefferson, Knox, Lake, Lawrence, Licking, Logan, Lorain, Madison, Mahoning, Marion, Medina, Meigs, Mercer, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Perry, Pickaway, Pike, Portage, Preble, Richland, Ross, Scioto, Shelby, Stark, Summit, Trumbull, Tuscarawas, Union, Vinton, Warren, Washington, Wayne

**Special Jurisdictional Note :**

**Details :**

This work applies to projects designated for any outside Underground Residential Distribution construction work for electrical utilities, municipalities and rural electrification projects.

# Prevailing Wage Rate Skilled Crafts

**Name of Union:** Electrical Local 71 Voice Data Video Outside

**Type of Rate:** Commercial

**Change #:**  
LCN02-2024ib

**Craft:**  
Electrical

**Effective Date:**  
3/6/2024

**Effective Date:**  
3/6/2024

Classification	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)		
Electrical Installer Technician I	\$35.39		\$7.25	\$1.06	\$0.00	\$0.00	\$1.77	\$0.00	\$0.00	\$45.47	\$63.17
Installer Technician II	\$33.37		\$7.25	\$1.00	\$0.00	\$0.00	\$1.67	\$0.00	\$0.00	\$43.29	\$59.98
Installer Repairman	\$33.37		\$7.25	\$1.00	\$0.00	\$0.00	\$1.67	\$0.00	\$0.00	\$43.29	\$59.98
Equipment Operator II	\$24.98		\$7.25	\$0.75	\$0.00	\$0.00	\$1.25	\$0.00	\$0.00	\$34.23	\$46.72
Cable Splicer	\$35.39		\$7.25	\$1.06	\$0.00	\$0.00	\$1.77	\$0.00	\$0.00	\$45.47	\$63.17
Ground Driver W/CDL	\$16.69		\$7.25	\$0.50	\$0.00	\$0.00	\$0.83	\$0.00	\$0.00	\$25.27	\$33.62
Groundman	\$14.57		\$7.25	\$0.44	\$0.00	\$0.00	\$0.73	\$0.00	\$0.00	\$22.99	\$30.28
Apprentice	BHR	Percent									
Trainee F	\$17.70	\$50.01	\$7.25	\$0.53	\$0.00	\$0.89	\$0.00	\$0.00	\$0.00	\$26.37	\$35.22
Trainee E	\$20.53	\$58.00	\$7.25	\$0.62	\$0.00	\$1.03	\$0.00	\$0.00	\$0.00	\$29.43	\$39.69
Trainee D	\$23.36	\$66.00	\$7.25	\$0.70	\$0.00	\$1.17	\$0.00	\$0.00	\$0.00	\$32.48	\$44.16
Trainee C	\$26.19	\$74.00	\$7.25	\$0.79	\$0.00	\$1.31	\$0.00	\$0.00	\$0.00	\$35.54	\$48.63
Trainee B	\$29.02	\$82.00	\$7.25	\$0.87	\$0.00	\$1.45	\$0.00	\$0.00	\$0.00	\$38.59	\$53.10
Trainee A	\$31.85	\$90.00	\$7.25	\$0.96	\$0.00	\$1.59	\$0.00	\$0.00	\$0.00	\$41.65	\$57.58

**(\*)Special Calculation Note :**

**Ratio :**

1 Trainee to 1 Journeyman

**Jurisdiction ( \* denotes special jurisdictional note ) :**

Adams, Ashland, Ashtabula, Athens, Auglaize, Belmont, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Columbiana, Coshocton, Crawford, Cuyahoga, Darke, Delaware, Fairfield, Fayette, Franklin, Gallia, Geauga, Greene, Guernsey, Hamilton, Harrison, Highland, Hocking, Holmes, Jackson, Jefferson, Knox, Lake, Lawrence, Licking, Logan, Lorain, Madison, Mahoning, Marion, Medina, Meigs, Mercer, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Perry, Pickaway, Pike, Portage, Preble, Richland, Ross, Scioto, Shelby, Stark, Summit, Trumbull, Tuscarawas, Union, Vinton, Warren, Washington, Wayne

**Special Jurisdictional Note :**

**Details :**

Cable Splicer: Inspect and test lines or cables, analyze results, and evaluate transmission characteristics. Cover conductors with insulation or seal splices with moisture-proof covering. Install, splice, test, and repair cables using tools or mechanical equipment. This will include the splicing of fiber. Installer Technician I: Must know all aspects of telephone and cable work. This is to include aerial, underground, and manhole work. Must know how to climb and run bucket. Must have all the tools required to perform these tasks. Must be able to be responsible for the safety of the crew at all times. Must also have CDL license and have at least 5 years experience. Installer Repairman: Perform tasks of repairing, installing, and testing phone and CATV services. Installer Technician II: Have at least three years of telephone and CATV experience. Must have the knowledge of underground, aerial, and manhole work. Must be able to climb and operate bucket. Must have CDL. Must have all tools needed to perform these tasks. Equipment Operator II: Able to operate a digger derrick or bucket truck. Have at least 3 years of experience and must have a valid CDL license. Groundman W/CDL: Must have a valid CDL license and be able to perform tasks such as: climbing poles, pulling down guys, making up material, and getting appropriate tools for the job. Must have at least 5 year's experience. Groundman: Perform tasks such as: climbing poles, pulling down guys, making up material, and getting appropriate tools for the job. Experience 0-5 years.

# Prevailing Wage Rate Skilled Crafts

**Name of Union:** Elevator Local 37

**Type of Rate:** Commercial

**Change #:**  
LCN01-2025ib

**Craft:**  
Elevator

**Effective Date:**  
1/1/2026

**Effective Date:**  
1/1/2026

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Elevator Mechanic	\$59.84		\$16.37	\$11.06	\$0.85	\$4.79	\$10.70	\$0.00	\$0.00	\$0.00	\$103.61	\$133.53
Helper	\$41.89		\$16.37	\$11.06	\$0.85	\$3.35	\$10.70	\$0.00	\$0.00	\$0.00	\$84.22	\$105.16
Apprentice	BHR	Percent										
Probationary Apprentice	\$29.92	\$50.00	\$0.00	\$0.00	\$0.00	\$1.80	\$0.00	\$0.00	\$0.00	\$0.00	\$31.72	\$46.68
1st Year	\$32.91	\$55.00	\$16.37	\$11.06	\$0.85	\$1.97	\$10.70	\$0.00	\$0.00	\$0.00	\$73.86	\$90.31
2nd Year	\$38.90	\$65.00	\$16.37	\$11.06	\$0.85	\$2.33	\$10.70	\$0.00	\$0.00	\$0.00	\$80.21	\$99.66
3rd Year	\$41.89	\$70.00	\$16.37	\$11.06	\$0.85	\$2.51	\$10.70	\$0.00	\$0.00	\$0.00	\$83.38	\$104.32
4th Year	\$47.87	\$80.00	\$16.37	\$11.06	\$0.85	\$2.87	\$10.70	\$0.00	\$0.00	\$0.00	\$89.72	\$113.66
Assistant Mechanic	\$47.87	\$80.00	\$16.37	\$11.06	\$0.85	\$3.83	\$10.70	\$0.00	\$0.00	\$0.00	\$90.68	\$114.61

**(\*)Special Calculation Note :**

**Ratio :**

- 1 Journeyman to 1 Apprentice\*\*
- 1 Journeyman to 1 Helper\*\*
- 1 Journeyman to 1 Assistant Mechanic\*\*

**Jurisdiction ( \* denotes special jurisdictional note ) :**

Athens, Champaign, Clark, Delaware, Fairfield, Fayette, Franklin, Gallia, Guernsey, Hocking, Jackson, Knox, Lawrence, Licking, Logan, Madison, Marion, Meigs, Monroe\*, Morgan, Morrow, Muskingum, Noble, Perry, Pickaway, Pike, Ross, Union, Vinton

**Special Jurisdictional Note :**

Monroe County is shared by both Local 37 and Local 6.

**Details :**

**\*\*Art. 10 Par. 2 Apprentice Work Qualifications: Par 2-** The total number of Helpers and Apprentices employed shall not exceed the number of Mechanics on any one job, except on jobs where two teams or more are working, one extra Helper or Apprentice may be employed for the first two teams and an extra Helper or Apprentice for each additional three teams. Further, the Company may use as many Helpers and Apprentices as best suits his convenience under the direction of a Mechanic in wrecking old plants and in handling and hoisting material, and on foundation work. When removing old and installing new cable on existing elevator installations, the Company may use two Helpers or Apprentices to one Mechanic.

# Prevailing Wage Rate Skilled Crafts

**Name of Union:** Glazier Local 372

**Type of Rate:** Commercial

**Change #:**  
LCN01-2025ib

**Craft:**  
Glazier

**Effective Date:**  
11/12/2025

**Effective Date:**  
11/12/2025

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Glazier	\$36.72		\$6.80	\$10.14	\$0.45	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$54.11	\$72.47
Apprentice	BHR	Percent										
1st Year	\$25.70	\$70.00	\$6.80	\$2.84	\$0.45	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$35.79	\$48.64
2nd Year	\$27.54	\$75.00	\$6.80	\$2.84	\$0.45	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$37.63	\$51.40
3rd Year	\$31.21	\$85.00	\$6.80	\$6.55	\$0.45	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$45.01	\$60.61
4th Year	\$34.88	\$95.00	\$6.80	\$6.55	\$0.45	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$48.68	\$66.12

**(\*)Special Calculation Note :**

A premium of one dollar (\$1.00) per hour above regular hourly rate of pay shall be paid for each hour worked by every employee from any mechanical lift or scaffold, either suspended or supported including the Hex type scaffolding.

**Ratio :**

1 Journeyman to 1 Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

Delaware, Fairfield, Fayette\*, Franklin, Hocking, Jackson, Knox, Licking, Madison, Marion, Morrow, Muskingum, Perry, Pickaway, Pike, Ross, Union, Vinton

**Special Jurisdictional Note :**

Fayette County - locations west of State Route 62 ONLY.

**Details :**

# Prevailing Wage Rate Skilled Crafts

Name of Union: Ironworker Local 172

Type of Rate: Commercial

**Change #:**  
OCR01-2025ib

**Craft:**  
Ironworker

**Effective Date:**  
11/5/2025

**Effective Date:**  
11/5/2025

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Ironworker	\$40.87		\$9.50	\$9.50	\$0.71	\$0.00	\$3.50	\$0.00	\$0.00	\$0.00	\$64.08	\$84.52
Rigger Welder Reinforcing Sheeter Fence Erector Machinery Mover	\$40.87		\$9.50	\$9.50	\$0.71	\$0.00	\$3.50	\$0.00	\$0.00	\$0.00	\$64.08	\$84.52
Apprentice	BHR	Percent										
1st Year 0-1500 Hours	\$28.61	\$70.00	\$9.50	\$9.50	\$0.71	\$0.00	\$3.50	\$0.00	\$0.00	\$0.00	\$51.82	\$66.12
2nd Year 1501-3000 Hours	\$32.70	\$80.00	\$9.50	\$9.50	\$0.71	\$0.00	\$3.50	\$0.00	\$0.00	\$0.00	\$55.91	\$72.25
3rd Year 3001-4500 Hours	\$36.79	\$90.02	\$9.50	\$9.50	\$0.71	\$0.00	\$3.50	\$0.00	\$0.00	\$0.00	\$60.00	\$78.40

**(\*)Special Calculation Note :**

**Ratio :**

1 Journeyman to 1 Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

Champaign\*, Clark\*, Crawford\*, Delaware, Fairfield, Fayette\*, Franklin, Hardin\*, Highland\*, Hocking, Jackson\*, Knox, Licking, Logan\*, Madison\*, Marion, Morrow, Perry, Pickaway, Pike, Ross, Union, Vinton, Wyandot\*, Muskingum\*

**Special Jurisdictional Note :**

Champaign County Twps included: Wayne, Rush, Goshen  
Clark County Twps included: Vienna, Catawba and portions of Harmony and Pleasant  
Crawford County Twps included: Bucyrus, Dallas, Jefferson, Jackson, Whetstone, Polk, Sandusky  
Fayette County Twps included: Paint, Marion, Perry, Madison, Wayne, Union  
Hardin County Twps included: McDonald, Taylorcreek, Hale, Dudley, Pleasant, Goshen, Blanchard, Lynn, Jackson, Buck, Cessna, Marion, Washington  
Highland County Twps included: Madison. Jackson County Twps included: Liberty, Washington, Milton, Jackson, Coal, Wilkesville  
Logan County Twps included: Monroe, Zane, Jefferson, Perry, Rush Creek, Bokes Creek  
Madison County Twps included: Range, Paint, Fairfield, Sommerford, Jefferson, Pike, Canaan, Pleasant, Oak Run, Union, Deer Creek, Monroe, Darby  
Muskingum County Twps include: Jackson, Licking, Hope Well, Newton, Clay, Cass, Muskingum falls, Springfield, Madison, Washington, Wayne, Brush Creek  
Pike County Twps included: Perry, Benton, Mifflin, Sunfish, Newton, Prebble, Pee Pee, Seal, Beaver, Jackson  
Wyandot County Twps included: Jackson, Marseilles, Mifflin, Pitt, Antrim

**Details :**

# Prevailing Wage Rate Skilled Crafts

**Name of Union:** Labor HevHwy 3

**Type of Rate:** Commercial

**Change #:**  
LCN02-2025ib

**Craft:**  
Laborer

**Effective Date:**  
6/11/2025

**Effective Date:**  
6/11/2025

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Laborer Group 1	\$37.27		\$8.60	\$4.45	\$0.45	\$0.00	\$2.50	\$0.00	\$0.10	\$0.00	\$53.37	\$72.01
Group 2	\$37.44		\$8.60	\$4.45	\$0.45	\$0.00	\$2.50	\$0.00	\$0.10	\$0.00	\$53.54	\$72.26
Group 3	\$37.77		\$8.60	\$4.45	\$0.45	\$0.00	\$2.50	\$0.00	\$0.10	\$0.00	\$53.87	\$72.76
Group 4	\$38.22		\$8.60	\$4.45	\$0.45	\$0.00	\$2.50	\$0.00	\$0.10	\$0.00	\$54.32	\$73.43
Watch Person	\$32.00		\$8.60	\$4.45	\$0.45	\$0.00	\$2.50	\$0.00	\$0.10	\$0.00	\$48.10	\$64.10
Apprentice	BHR	Percent										
0-1000 hrs	\$29.82	\$80.00	\$8.60	\$4.45	\$0.45	\$0.00	\$2.50	\$0.00	\$0.10	\$0.00	\$45.92	\$60.82
1001-2000 hrs	\$31.68	\$85.00	\$8.60	\$4.45	\$0.45	\$0.00	\$2.50	\$0.00	\$0.10	\$0.00	\$47.78	\$63.62
2001-3000 hrs	\$33.54	\$90.00	\$8.60	\$4.45	\$0.45	\$0.00	\$2.50	\$0.00	\$0.10	\$0.00	\$49.64	\$66.41
3001-4000 hrs	\$35.41	\$95.00	\$8.60	\$4.45	\$0.45	\$0.00	\$2.50	\$0.00	\$0.10	\$0.00	\$51.51	\$69.21
More than 4000 hrs	\$37.27	\$100.00	\$8.60	\$4.45	\$0.45	\$0.00	\$2.50	\$0.00	\$0.10	\$0.00	\$53.37	\$72.01

**(\*)Special Calculation Note :**

Watchmen have no Apprentices. Tunnel Laborer rate with air-pressurized add \$1.00 to the above wage rate. Commercial Driver's License – Any Laborer required to utilize a valid Commercial Driver's License (CDL), are in compliance with necessary FMCSA regulations and approved by the Contractor to operate a Commercial Motor Vehicle (CMV), shall be paid one dollar (\$1.00) per hour above the base rate for the entirety of their working shift.

**Ratio :**

1 Journeymen to 1 Apprentice 3 Journeymen to 1 Apprentice thereafter

**Jurisdiction ( \* denotes special jurisdictional note ) :**

Adams, Allen, Ashland, Athens, Auglaize, Belmont, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Columbiana, Coshocton, Crawford, Darke, Defiance, Delaware, Fairfield, Fayette, Franklin, Fulton, Gallia, Greene, Guernsey, Hamilton, Hancock, Hardin, Harrison, Henry, Highland, Hocking, Holmes, Jackson, Jefferson, Knox, Lawrence, Licking, Logan, Madison, Marion, Meigs, Mercer, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Paulding, Perry, Pickaway, Pike, Preble, Putnam, Richland, Ross, Scioto, Seneca, Shelby, Tuscarawas, Union, Van Wert, Vinton, Warren, Washington, Wayne, Williams, Wyandot

**Special Jurisdictional Note :**

Hod Carriers and Common Laborers - Heavy, Highway, Sewer, Waterworks, Utility, Airport, Railroad, Industrial and Building Site, Sewer Plant, Waste Water Treatment Facilities Construction

## Details :

Group 1 Laborer (Construction); Plant Laborer or Yardman, Right-of-way Laborer, Landscape Laborer, Highway Lighting Worker, Signalization Worker, (Swimming) Pool Construction Laborer, Utility Man, \*Bridge Man, Handyman, Joint Setter, Flagperson, Carpenter Helper, Waterproofing Laborer, Slurry Seal, Seal Coating, Surface Treatment or Road Mix Laborer, Riprap Laborer & Grouter, Asphalt Laborer, Dump Man (batch trucks), Guardrail & Fence Installer, Mesh Handler & Placer, Concrete Curing Applicator, Scaffold Erector, Sign Installer, Hazardous Waste (level D), Diver Helper, Zone Person and Traffic Control. \*Bridge Man will perform work as per the October 31, 1949, memorandum on concrete forms, by and between the United Brotherhood of Carpenters and Joiners of America and the Laborers' International Union of North America, which states in; "the moving, cleaning, oiling and carrying to the next point of erection, and the stripping of forms which are not to be re-used, and forms on all flat arch work shall be done by members of the Laborers' International Union of North America." Group 2 Asphalt Raker, Screwman or Paver, Concrete Puddler, Kettle Man (pipeline), All Machine-Driven Tools (Gas, Electric, Air), Mason Tender, Brick Paver, Mortar Mixer, Skid Steer, Sheeting & Shoring Person, Surface Grinder Person, Screedperson, Water Blast, Hand Held Wand, Power Buggy or Power Wheelbarrow, Paint Striper, Plastic fusing Machine Operator, Rodding Machine Operator, Pug Mill Operator, Operator of All Vacuum Devices Wet or Dry, Handling of all Pumps 4 inches and under (gas, air or electric), Diver, Form Setter, Bottom Person, Welder Helper (pipeline), Concrete Saw Person, Cutting with Burning Torch, Pipe Layer, Hand Spiker (railroad), Underground Person (working in sewer and waterline, cleaning, repairing and reconditioning). Tunnel Laborer (without air), Caisson, Cofferdam (below 25 feet deep), Air Track and Wagon Drill, Sandblaster Nozzle Person, Hazardous Waste (level B), \*\*\*Lead Abatement, Hazardous Waste (level C) \*\*\*Includes the erecting of structures for the removal, including the encapsulation and containment of Lead abatement process. Group 3 Blast and Powder Person, Muckers will be defined as shovel men working directly with the miners, Wrencher (mechanical joints & utility pipeline), Yarnier, Top Lander, Hazardous Waste (level A), Concrete Specialist, Curb Setter and Cutter, Grade Checker, Concrete Crew in Tunnels. Utility pipeline Tappers, Waterline, Caulker, Signal Person will receive the rate equal to the rate paid the Laborer classification for which the Laborer is signaling. Group 4 Miner, Welder, Gunite Nozzle Person A.) The Watchperson shall be responsible to patrol and maintain a safe traffic zone including but not limited to barrels, cones, signs, arrow boards, message boards etc. The responsibility of a watchperson is to see that the equipment, job and office trailer etc. are secure.

# Prevailing Wage Rate Skilled Crafts

**Name of Union:** Labor Local 1216 Building

**Type of Rate:** Commercial

**Change #:**  
LCN01-2025ib

**Craft:**  
Laborer

**Effective Date:**  
5/1/2025

**Effective Date:**  
5/1/2025

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Laborer Group 1	\$34.12		\$8.60	\$4.45	\$0.40	\$0.00	\$1.00	\$0.00	\$0.10	\$0.00	\$48.67	\$65.73
Group 2	\$34.32		\$8.60	\$4.45	\$0.40	\$0.00	\$1.00	\$0.00	\$0.10	\$0.00	\$48.87	\$66.03
Group 3	\$34.62		\$8.60	\$4.45	\$0.40	\$0.00	\$1.00	\$0.00	\$0.10	\$0.00	\$49.17	\$66.48
Group 4	\$31.45		\$8.60	\$4.45	\$0.40	\$0.00	\$1.00	\$0.00	\$0.10	\$0.00	\$46.00	\$61.73
Apprentice	BHR	Percent										
0-1000 hrs	\$27.29	\$79.98	\$8.60	\$4.45	\$0.40	\$0.00	\$1.00	\$0.00	\$0.10	\$0.00	\$41.84	\$55.48
1001-2000 hrs	\$29.00	\$85.00	\$8.60	\$4.45	\$0.40	\$0.00	\$1.00	\$0.00	\$0.10	\$0.00	\$43.55	\$58.05
2001-3000 hrs	\$30.70	\$89.98	\$8.60	\$4.45	\$0.40	\$0.00	\$1.00	\$0.00	\$0.10	\$0.00	\$45.25	\$60.60
3001-4000 hrs	\$32.41	\$95.00	\$8.60	\$4.45	\$0.40	\$0.00	\$1.00	\$0.00	\$0.10	\$0.00	\$46.96	\$63.17
4001+ hrs	\$34.12	\$100.00	\$8.60	\$4.45	\$0.40	\$0.00	\$1.00	\$0.00	\$0.10	\$0.00	\$48.67	\$65.73

**(\*)Special Calculation Note :**

No special calculations for this skilled craft wage rate are required at this time.

**Ratio :**

1 Journeyman to 1 Apprentice 4 Journeymen to 1 Apprentice thereafter per project

**Jurisdiction ( \* denotes special jurisdictional note ) :**

Ashland, Crawford, Knox, Morrow, Richland

**Special Jurisdictional Note :**

**Details :**

Group 1 Concrete Handler, Finisher tender, Building and Construction Laborer, Signalman, Flagman, Tool Cribman, Carpenter Tender, Utility Construction Laborer, Guardrail Erector, and Hazardous Waste (Level C,D) Group 2 Guniting Operator, Bottom Men, Tunnel Laborer, Pipe Layer, Air and Power Driven Tools, Burner on Demolition work, Swinging Scaffold, Mucker, Caisson Worker, Cofferdam Worker, Powder Man and Dynamite Blaster, Creosote Worker, Form Setter, Plasterer Tender, Hod Carrier, Laser Beam Set-up Man, and Hazardous Waste (Level A, B) Group 3 Fork Lift, Scaffold Builders, Mortar Mixer, Mason Tender, Stone Mason Tender Group 4 Watchman Hazardous Waste Removal and Lead Abatement For laborers working in an exclusive or "hot" area with toxic or hazardous materials, one of the following personal protective equipment ensembles will be required for necessary protection against toxic contaminants. Level A Protective equipment is required when the area has been determined to contain extremely toxic contaminants of contaminants unknown but may be expected to be extremely toxic and/or immediately Dangerous to life and health (IDLH). This ensemble includes a full encapsulated chemical suit (moon suit), Self-Contained Breathing Apparatus (SUBA), or Airline Fed Respirator, and various types and numbers of boots and gloves; cool vests and voice-activated radios are optional equipment sometimes worn. This level places the greatest physical and mental stress on the worker. Level B Protective equipment includes a chemically resistant splash suit and SCBA or airline Respirator. This ensemble is required when the situation is very hazardous, such as oxygen deficient atmospheres, IDLH atmospheres, or confined space entries, but the risk of skin exposure is not as great as in Level D situations Level C Protective equipment includes a protective suit and an Air Purifying Respirator (APR) with the appropriate filter canisters. The ensemble is used when the contaminants are reliably known not to be hazardous to the skin and not IDLH (immediately Dangerous to Life or Health) and correct filter protection is available. This ensemble offers adequate protection for many jobs. Level D Normal work clothes to normal skin protection such as gloves, face shields, goggles, coveralls and occasionally respiratory protection.

# Prevailing Wage Rate Skilled Crafts

**Name of Union:** Operating Engineers - Building Local 18 - Zone III

**Type of Rate:** Commercial

**Change #:**  
LCN01-2025ib

**Craft:**  
Operating Engineer

**Effective Date:**  
5/1/2025

**Effective Date:**  
5/1/2025

Classification	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Operator Group A	\$45.84		\$9.51	\$6.25	\$0.95	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$62.74	\$85.66
Operator Group B	\$45.72		\$9.51	\$6.25	\$0.95	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$62.62	\$85.48
Operator Group C	\$44.68		\$9.51	\$6.25	\$0.95	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$61.58	\$83.92
Operator Group D	\$43.50		\$9.51	\$6.25	\$0.95	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$60.40	\$82.15
Operator Group E	\$38.04		\$9.51	\$6.25	\$0.95	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$54.94	\$73.96
Master Mechanic	\$46.84		\$9.51	\$6.25	\$0.95	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$63.74	\$87.16
Lift Director	\$46.84		\$9.51	\$6.25	\$0.95	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$63.74	\$87.16
Cranes & Mobile Concrete Pumps 150'-180'	\$46.34		\$9.51	\$6.25	\$0.95	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$63.24	\$86.41
Cranes & Mobile Concrete Pumps 180'-249'	\$46.84		\$9.51	\$6.25	\$0.95	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$63.74	\$87.16
Cranes & Mobile Concrete Pumps 249' and over	\$47.09		\$9.51	\$6.25	\$0.95	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$63.99	\$87.54
Apprentice	BHR	Percent										
1st Year	\$22.92	\$50.00	\$9.51	\$6.25	\$0.95	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$39.82	\$51.28
2nd Year	\$27.50	\$60.00	\$9.51	\$6.25	\$0.95	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$44.40	\$58.16
3rd Year	\$32.09	\$70.00	\$9.51	\$6.25	\$0.95	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$48.99	\$65.03
4th Year	\$36.67	\$80.00	\$9.51	\$6.25	\$0.95	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$53.57	\$71.91
Field Mechanic Trainee	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
1st Year	\$27.50	\$60.00	\$9.51	\$6.25	\$0.95	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$44.40	\$58.16
2nd Year	\$32.09	\$70.00	\$9.51	\$6.25	\$0.95	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$48.99	\$65.03
3rd Year	\$36.67	\$80.00	\$9.51	\$6.25	\$0.95	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$53.57	\$71.91
4th Year	\$41.26	\$90.00	\$9.51	\$6.25	\$0.95	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$58.16	\$78.78

**(\*)Special Calculation Note :**

Other: Education & Safety Misc: National Training

**Ratio :**

For every (3) Operating Engineer Journeymen employed by the company there may be employed (1) Registered Apprentice or trainee Engineer through the referral when they are available. An apprentice, while employed as part of a crew per Article VIII, paragraph 77, will not be subject to the apprenticeship ratios in this collective bargaining agreement

**Jurisdiction ( \* denotes special jurisdictional note ) :**

Adams, Allen, Ashland, Athens, Auglaize, Belmont, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Coshocton, Crawford, Darke, Defiance, Delaware, Fairfield, Fayette, Franklin, Fulton, Gallia, Greene, Guernsey, Hamilton, Hancock, Hardin, Harrison, Henry, Highland, Hocking, Holmes, Jackson, Jefferson, Knox, Lawrence, Licking, Logan, Madison, Marion, Meigs, Mercer, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Ottawa, Paulding, Perry, Pickaway, Pike, Preble, Putnam, Richland, Ross, Sandusky, Scioto, Seneca, Shelby, Stark, Tuscarawas, Union, Van Wert, Vinton, Warren, Washington, Wayne, Williams, Wyandot

**Special Jurisdictional Note :**

**Details :**

Note: There will be a 10% increase for the apprentices on top of the percentages listed above provided they are operating mobile equipment. Group A- Barrier Moving Machines; Boiler Operators or Compressor Operators, when compressor or boiler is mounted on crane (Piggyback Operation); Boom Trucks (all types); Cableways Cherry Pickers; Combination - Concrete Mixers & Towers; All Concrete Pumps with Booms; Cranes (all types); Compact Cranes, track or rubber over 4,000 pounds capacity; Cranes self-erecting, stationary, track or truck (all configurations); Derricks (all types); Draglines; Dredges (dipper, clam or suction) 3-man crew; Elevating Graders or Euclid Loaders; Floating Equipment; Forklift (rough terrain with winch/hoist); Gradalls; Helicopter Operators, hoisting building materials; Helicopter Winch Operators, Hoisting building materials; Hoes (All types); Hoists (with two or more drums in use); Horizontal Directional Drill; Hydraulic Gantry (lift system); Laser Finishing Machines; Laser Screed and like equipment; Lift Slab or Panel Jack Operators; Locomotives (all types); Maintenance Operator/Technician(Mechanic Operator/Technician and/or Welder); Mixers, paving (multiple drum); Mobile Concrete Pumps, with booms; Panelboards, (all types on site); Pile Drivers; Power Shovels; Prentice Loader; Rail Tamper (with automatic lifting and aligning device); Rotary Drills (all), used on caissons for foundations and sub-structure; Side Booms; Slip Form Pavers; Straddle Carriers (Building Construction on site); Trench Machines (over 24" wide); Tug Boats. Group B - Articulating/end dumps (minus \$4.00/hour from Group B rate); Asphalt Pavers; Bobcat-type and/or skid steer loader with hoe attachment greater than 7000 lbs.; Bulldozers; CMI type Equipment; Concrete Saw, Vermeer-type; Endloaders; Hydro Milling Machine; Kolman-type Loaders (Dirt Loading); Lead Greasemen; Mucking Machines; Pettibone-Rail Equipment; Power Graders; Power Scoops; Power Scrapers; Push Cats; Rotomills (all), grinders and planers of all types. Group C - A-Frames; Air Compressors, Pressurizing Shafts or Tunnels; All Asphalt Rollers; Bobcat-type and/or Skid Steer Loader with or without attachments; Boilers (15 lbs. pressure and over); All Concrete Pumps (without booms with 5 inch system); Fork Lifts (except masonry); Highway Drills - all types (with integral power); Hoists (with one drum); House Elevators (except those automatic call button controlled), Buck Hoists, Transport Platforms, Construction Elevators; Hydro Vac/Excavator (when a second person is needed, the rate of pay will be "Class E"); Man Lifts; Material hoist/elevators; Mud Jacks; Pressure Grouting; Pump Operators (installing or operating Well Points or other types of Dewatering Systems); Pumps (4 inches and over discharge); Railroad Tie (Inserter/Remover); Rotovator (Lime-Soil Stabilizer); Submersible Pumps (4"and over discharge); Switch & Tie Tampers (without lifting and aligning device); Trench Machines (24" and under); Utility Operators. Group D - Backfillers and Tampers; Ballast Re-locator; Batch Plant Operators; Bar and Joint Installing Machines; Bull Floats; Burlap and Curing Machines; Clefplanes; Compressors, on building construction; Concrete Mixers, more than one bag capacity; Concrete Mixers, one bag capacity (side loaders); All Concrete Pumps (without boom with 4" or smaller system); Concrete Spreader; Conveyors, used for handling building materials; Crushers; Deckhands; Drum Fireman (in asphalt plants); Farm type tractors pulling attachments; Finishing Machines; Form Trenchers; Generators; Guniting Machines; Hydro-seeders; Pavement Breakers (hydraulic or cable); Post Drivers; Post Hole Diggers; Pressure Pumps (over 1/2") discharge); Road Widening Trenchers; Rollers (except asphalt); Self-propelled sub-graders; Shotcrete Machines; Tire Repairmen; Tractors, pulling sheepsfoot post roller or grader; VAC/ALLS; Vibratory Compactors, with integral power; Welders. Group E – Allen Screed Paver (concrete); Boilers (less than 15 lbs. pressure); Cranes-Compact, track or rubber (under 4,000 pounds capacity); Directional Drill "Locator"; Fueling and greasing +\$3.00; Inboard/outboard Motor Boat Launches; Light Plant Operators; Masonry Fork Lifts; Oilers/Helpers; Power Driven Heaters (oil fired); Power Scrubbers; Power Sweepers; Pumps (under 4 inch discharge); Signalperson, Submersible Pumps (under 4" discharge). Master Mechanics - Master Mechanic Cranes 150' – 180' - Boom & Jib 150 - 180 feet Cranes 180' – 249' - Boom & Jib 180 - 249 feet Cranes 250' and over - Boom & Jib 250 feet or over

# Prevailing Wage Rate Skilled Crafts

**Name of Union:** Operating Engineers - HevHwy Zone II

**Type of Rate:** Commercial

**Change #:**  
LCN01-2025ib

**Craft:**  
Operating Engineer

**Effective Date:**  
5/1/2025

**Effective Date:**  
5/1/2025

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Operator Class A	\$45.84		\$9.51	\$6.25	\$0.95	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$62.74	\$85.66
Operator Class B	\$45.72		\$9.51	\$6.25	\$0.95	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$62.62	\$85.48
Operator Class C	\$44.68		\$9.51	\$6.25	\$0.95	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$61.58	\$83.92
Operator Class D	\$43.50		\$9.51	\$6.25	\$0.95	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$60.40	\$82.15
Operator Class E	\$38.04		\$9.51	\$6.25	\$0.95	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$54.94	\$73.96
Master Mechanic	\$46.84		\$9.51	\$6.25	\$0.95	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$63.74	\$87.16
Lift Director	\$46.84		\$9.51	\$6.25	\$0.95	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$63.74	\$87.16
Crane and Mobile Concrete Pump 150' - 179'	\$46.34		\$9.51	\$6.25	\$0.95	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$63.24	\$86.41
Crane and Mobile Concrete Pump 180' - 249'	\$46.84		\$9.51	\$6.25	\$0.95	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$63.74	\$87.16
Crane and Mobile Concrete Pump 250' and Ove	\$47.09		\$9.51	\$6.25	\$0.95	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$63.99	\$87.54
Apprentice	BHR	Percent										
1st Year	\$22.92	\$50.00	\$9.51	\$6.25	\$0.95	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$39.82	\$51.28
2nd Year	\$27.50	\$60.00	\$9.51	\$6.25	\$0.95	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$44.40	\$58.16
3rd Year	\$32.09	\$70.00	\$9.51	\$6.25	\$0.95	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$48.99	\$65.03
4th Year	\$36.67	\$80.00	\$9.51	\$6.25	\$0.95	\$0.00	\$0.00	\$0.09	\$0.00	\$0.10	\$53.57	\$71.91
Field Mech Trainee	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
1st year	\$27.50	\$60.00	\$9.51	\$6.25	\$0.95	\$0.00	\$0.00	\$0.09	\$0.00	\$0.00	\$44.40	\$58.16
2nd year	\$32.09	\$70.00	\$9.51	\$6.25	\$0.95	\$0.00	\$0.00	\$0.09	\$0.00	\$0.00	\$48.99	\$65.03
3rd year	\$36.67	\$80.00	\$9.51	\$6.25	\$0.95	\$0.00	\$0.00	\$0.09	\$0.00	\$0.00	\$53.57	\$71.91
4th year	\$41.26	\$90.00	\$9.51	\$6.25	\$0.95	\$0.00	\$0.00	\$0.09	\$0.00	\$0.00	\$58.16	\$78.78

**(\*)Special Calculation Note :**

Other: Education & Safety Fund Misc: National Training

**Ratio :**

For every (3) Operating Engineer Journeymen employed by the company, there may be employed (1) Registered Apprentice or Trainee Engineer through the referral when they are available. An Apprentice, while employed as part of a crew per Article VIII, paragraph 68 will not be subject to the apprenticeship ratios in this collective bargaining agreement

**Jurisdiction ( \* denotes special jurisdictional note ) :**

Adams, Allen, Ashland, Athens, Auglaize, Belmont, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Coshocton, Crawford, Darke, Defiance, Delaware, Fairfield, Fayette, Franklin, Fulton, Gallia, Greene, Guernsey, Hamilton, Hancock, Hardin, Harrison, Henry, Highland, Hocking, Holmes, Huron, Jackson, Jefferson, Knox, Lawrence, Licking, Logan, Lucas, Madison, Marion, Meigs, Mercer, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Ottawa, Paulding, Perry, Pickaway, Pike, Preble, Putnam, Richland, Ross, Sandusky, Scioto, Seneca, Shelby, Stark, Tuscarawas, Union, Van Wert, Vinton, Warren, Washington, Wayne, Williams, Wood, Wyandot

**Special Jurisdictional Note :**

**Details :**

\*\*Apprentices will receive a 10% increase on top of the percentages listed above provided they are operating mobile equipment.

Class A - Air Compressors on Steel Erection; Asphalt Plant Engineers (Cleveland District Only); Barrier Moving Machine; Boiler Operators, Compressor Operators, or Generators, when mounted on a rig; Boom Trucks (all types); Cableways; Cherry Pickers; Combination- Concrete Mixers & Towers; Concrete Plants (over 4 yd capacity); Concrete Pumps; Cranes (all types); Compact Cranes track or rubber over 4,000 pounds capacity; Cranes self-erecting stationary, track or truck; Derricks (all types); Draglines; Dredges dipper, clam or suction; Elevating Graders or Euclid Loaders; Floating Equipment (all types); Gradalls; Helicopter Crew (Operator- hoist or winch); Hoes (all types); Hoisting Engines; Hoisting Engines, on shaft or tunnel work; Hydraulic Gantry (lifting system); Industrial-type Tractors; Jet Engine Dryer (D8 or D9) diesel Tractors; Locomotives (standard gauge); Maintenance Operators/Technicians (class A); Mixers, paving (single or double drum); Mucking Machines; Multiple Scrapers; Piledriving Machines (all types); Power Shovels, Prentice Loader; Quad 9 (double pusher); Rail Tamper (with automatic lifting and aligning device); Refrigerating Machines (freezer operation); Rotary Drills, on caisson work; Rough Terrain Fork Lift with winch/hoist; Side Booms; Slip Form Pavers; Survey Crew Party Chiefs; Tower Derricks; Tree Shredders; Trench Machines (over 24" wide); Truck Mounted Concrete Pumps; Tug Boats; Tunnel Machines and /or Mining Machines; Wheel Excavators.

Class B - Asphalt Pavers; Automatic Subgrade Machines, self-propelled (CMI-type); Bobcat-type and /or Skid Steer Loader with hoe attachment greater than 7000 lbs.; Boring Machine Operators (more than 48 inches); Bulldozers; Concrete Saws, Vermeer type; Endloaders; Horizontal Directional Drill (50,000 ft. lbs. thrust and over); Hydro Milling Machine; Kolman-type Loaders (production type-dirt); Lead Greasemen; Lighting and Traffic Signal Installation Equipment includes all groups or classifications; Maintenance Operators/Technicians, Class B; Material Transfer Equipment (shuttle buggy) Asphalt; Pettibone-Rail Equipment; Power Graders; Power Scrapers; Push Cats; Rotomills (all), Grinders and Planners of all types, Groovers (excluding walk-behinds); Trench Machines (24 inch wide and under).

Class C - A-Frames; Air Compressors, on tunnel work (low Pressure); Articulating/straight bed end dumps if assigned (minus \$4.00 per hour); Asphalt Plant Engineers (Portage and Summit Counties only); Bobcat-type and/or skid steer loader with or without attachments; Drones; Highway Drills (all types); HydroVac/Excavator (when a second person is needed, the rate of pay will be "Class E"); Locomotives (narrow gauge); Material Hoist/Elevators; Mixers, concrete (more than one bag capacity); Mixers, one bag capacity (side loader); Power Boilers (over 15 lbs. pressure); Pump Operators (installing or operating well Points); Pumps (4 inch and over discharge); Railroad Tie Inserter/Remover; Rollers, Asphalt; Rotovator (lime-soil Stabilizer); Switch & Tie Tampers (without lifting and aligning device); Utilities Operators, (small equipment); Welding Machines and Generators.

Class D – Backfillers and Tampers; Ballast Re-locator; Bar and Joint Installing Machines; Batch Plant Operators; Boring Machine Operators (48 inch or less); Bull Floats; Burlap and Curing Machines; Concrete Plants (capacity 4 yds. and under); Concrete Saws (multiple); Conveyors (highway); Crushers; Deckhands; Farm type tractors, with attachments (highway); Finishing Machines; Firemen, Floating Equipment (all types); Fork Lifts (highway), except masonry; Form Trenchers; Hydro Hammers; Hydro Seeders; Pavement Breakers (hydraulic or cable); Plant Mixers; Post Drivers; Post Hole Diggers; Power Brush Burners; Power Form Handling Equipment; Road Widening Trenchers; Rollers (brick, grade, macadam); Self-Propelled Power Spreaders; Self-Propelled Sub-Graders; Steam Firemen; Survey Instrument men; Tractors, pulling sheepsfoot rollers or graders; Vibratory Compactors, with integral power.

Class E - Compressors (portable, Sewer, Heavy and Highway); Cranes-Compact, track or rubber under 4,000 pound capacity; Drum Firemen (asphalt plant); Fueling and greasing (Primary Operator with Specialized CDL Endorsement Add \$3.00/hr); Generators; Inboard-Outboard Motor Boat Launches; Masonry Fork Lifts; Oil Heaters (asphalt plant); Oilers/Helpers; Power Driven Heaters (oil fired); Power Scrubbers; Power Sweepers; Pumps (under 4 inch discharge); Signalperson; Survey Rodmen or Chairmen; Tire Repairmen; VAC/ALLS.

Master Mechanic - Master Mechanic Cranes and Mobile Concrete Pumps 150' -179' - Boom & Jib 150 - 179 feet  
Cranes and Mobile Concrete Pumps 180' - 249' - Boom & Jib 180 - 249 feet  
Cranes and Mobile Concrete Pumps 250' and over - Boom & Jib 250 feet or over

# Prevailing Wage Rate Skilled Crafts

**Name of Union:** Painter Local 639 Sign and Display

**Type of Rate:** Commercial

**Change #:**  
LCN01-2025ib

**Craft:**  
Painter

**Effective Date:**  
6/18/2025

**Effective Date:**  
6/18/2025

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Top Mechanic Class A	\$27.53		\$4.50	\$0.00	\$0.00	\$0.00	\$0.00	\$1.45	\$0.00	\$0.00	\$33.48	\$47.25
Top Mechanic Class B	\$27.53		\$4.50	\$0.75	\$0.00	\$0.53	\$0.00	\$1.45	\$0.00	\$0.00	\$34.76	\$48.53
Top Helper Class A	\$22.33		\$4.50	\$0.00	\$0.00	\$0.00	\$0.00	\$1.20	\$0.00	\$0.00	\$28.03	\$39.20
Top Helper Class B	\$22.33		\$4.50	\$0.75	\$0.00	\$0.43	\$0.00	\$1.20	\$0.00	\$0.00	\$29.21	\$40.38
Helper Class A	\$17.19		\$4.50	\$0.00	\$0.00	\$0.00	\$0.00	\$0.90	\$0.00	\$0.00	\$22.59	\$31.19
Helper Class B	\$17.19		\$4.50	\$0.75	\$0.00	\$0.30	\$0.00	\$0.90	\$0.00	\$0.00	\$23.64	\$32.24
New Hire (90 Days)	\$15.75		\$4.50	\$0.00	\$0.00	\$0.00	\$0.00	\$0.55	\$0.00	\$0.00	\$20.80	\$28.68
Apprentice	BHR	Percent										

**(\*)Special Calculation Note :**

Other: Sick, Personal & Holiday Pay Swing Stage Rate: Employees shall receive a differential of \$1.50 per hour for all hours worked on scaffolds four sections or higher, including any boom lifts and swing stage scaffolds. In addition, the rigging and derigging of hanging/suspended swing stage systems and rappelling/bolson chair work of a single employee will qualify for \$1.50 differential, will be paid to a single lead Top Mechanic or single lead Top Helper on any given swing stage job, even when it includes multiple running rigs on a single jobsite.

**Ratio :**

**Jurisdiction ( \* denotes special jurisdictional note ) :**

Adams, Allen, Ashland, Ashtabula, Athens, Auglaize, Belmont, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Columbiana, Coshocton, Crawford, Cuyahoga, Darke, Defiance, Delaware, Erie, Fairfield, Fayette, Franklin, Fulton, Gallia, Geauga, Greene, Guernsey, Hamilton, Hancock, Hardin, Harrison, Henry, Highland, Hocking, Holmes, Huron, Jackson, Jefferson, Knox, Lake, Lawrence, Licking, Logan, Lorain, Lucas, Madison, Mahoning, Marion, Medina, Meigs, Mercer, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Ottawa, Paulding, Perry, Pickaway, Pike, Portage, Preble, Putnam, Richland, Ross, Sandusky, Scioto, Seneca, Shelby, Stark, Summit, Trumbull, Tuscarawas, Union, Van Wert, Vinton, Warren, Washington, Wayne, Williams, Wood, Wyandot

**Special Jurisdictional Note :**

**Details :**

The work performed by employees covered by this rate shall include cleaning and refinishing of architectural metals using chemicals, solvents, coatings and hand-applied lacquer thinner, removing scratches from mirror finished metals, burnishing of bronze, statuary finishes on exterior and interior surfaces during the course of the restoration and maintenance of architectural metals, and other specialty metal finishing work, and the use of all tools required to perform such work, including but not limited to polishes, spray equipment and scaffolding. Class A: Less Than 1 Year of Service Class B: More Than 1 Year of Service Top Mechanic: Top Mechanic shall be responsible for ensuring the highest quality of workmanship by Helpers, and be highly competent and knowledgeable in the following areas: coatings, both solvent and waterborne, spraying ability, stainless steel, aluminum and bronze finishing, scaffolding and swing stage work. The Top Mechanic shall also be responsible for providing necessary training of employees in lower classifications and for directing all employees in his/her crew to perform their responsibilities in a productive and efficient manner. Top Helper: For existing Top Helpers at the time of this Agreement shall, in addition to performing the responsibilities of a Helper, be responsible and accountable for the setup, breakdown, safety and quality of the Company's product. Helper: A Helper shall be responsible for performing tasks in refinishing, compliance with safety procedures, setting up and breaking down job sites, setting up and breaking down scaffolding and swing stages, preparing surfaces for refinishing, including but not limited to masking and stripping, cleaning, oxidizing, polishing and scratch removal on various finishes.

# Prevailing Wage Rate Skilled Crafts

**Name of Union:** Painter Local 639 Zone 2 Sign

**Type of Rate:** Commercial

**Change #:**  
LCN01-2025ib

**Craft:**  
Painter

**Effective Date:**  
5/28/2025

**Effective Date:**  
5/28/2025

	BHR	Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
		H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification											
Painter Sign Journeyman Tech/Team Leader Class A	\$26.56	\$3.36	\$0.21	\$0.00	\$0.00	\$0.00	\$0.72	\$0.00	\$0.00	\$30.85	\$44.13
Painter Sign Journeyman Tech/Team Leader Class B	\$26.56	\$3.36	\$0.21	\$0.00	\$0.51	\$0.00	\$0.72	\$0.00	\$0.00	\$31.36	\$44.64
Painter Sign Journeyman Tech/Team Leader Class C	\$26.56	\$3.36	\$0.21	\$0.00	\$1.02	\$0.00	\$0.72	\$0.00	\$0.00	\$31.87	\$45.15
Painter Sign Journeyman Tech/Team Leader Class D	\$26.56	\$3.36	\$0.21	\$0.00	\$1.53	\$0.00	\$0.72	\$0.00	\$0.00	\$32.38	\$45.66
Sign Journeyman Class A	\$26.27	\$3.36	\$0.21	\$0.00	\$0.00	\$0.00	\$0.71	\$0.00	\$0.00	\$30.55	\$43.69
Sign Journeyman Class B	\$26.27	\$3.36	\$0.21	\$0.00	\$0.51	\$0.00	\$0.71	\$0.00	\$0.00	\$31.06	\$44.20
Sign Journeyman Class C	\$26.27	\$3.36	\$0.21	\$0.00	\$1.01	\$0.00	\$0.71	\$0.00	\$0.00	\$31.56	\$44.70
Sign Journeyman Class D	\$26.27	\$3.36	\$0.21	\$0.00	\$1.52	\$0.00	\$0.71	\$0.00	\$0.00	\$32.07	\$45.21
Tech Sign Fabricator/ Erector Class A	\$20.67	\$3.36	\$0.21	\$0.00	\$0.00	\$0.00	\$0.56	\$0.00	\$0.00	\$24.80	\$35.14
Tech Sign Fabricator/ Erector Class B	\$20.67	\$3.36	\$0.21	\$0.00	\$0.40	\$0.00	\$0.56	\$0.00	\$0.00	\$25.20	\$35.54

Tech Sign Fabrication/ Erector Class C	\$20.67	\$3.36	\$0.21	\$0.00	\$0.80	\$0.00	\$0.56	\$0.00	\$0.00	\$25.60	\$35.94
Tech Sign Fabrication/ Erector Class D	\$20.67	\$3.36	\$0.21	\$0.00	\$1.19	\$0.00	\$0.56	\$0.00	\$0.00	\$25.99	\$36.33
Apprentice	BHR	Percent									

**(\*)Special Calculation Note :**

Other is for paid holidays.

**Ratio :**

**Jurisdiction ( \* denotes special jurisdictional note ) :**

Adams, Allen, Auglaize, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Columbiana, Coshocton, Crawford, Darke, Defiance, Delaware, Erie, Fairfield, Fayette, Franklin, Fulton, Greene, Hamilton, Hancock, Hardin, Henry, Highland, Holmes, Huron, Jackson, Knox, Licking, Logan, Lorain, Lucas, Madison, Mahoning, Marion, Mercer, Miami, Montgomery, Morrow, Muskingum, Ottawa, Paulding, Perry, Pickaway, Pike, Preble, Putnam, Ross, Sandusky, Scioto, Seneca, Shelby, Stark, Trumbull, Tuscarawas, Union, Van Wert, Warren, Wayne, Williams, Wood, Wyandot

**Special Jurisdictional Note :**

**Details :**

Class A: less that 1 year. Class B: 1-3 years. Class C; 3-10 years. Class D: More than 10 years.

# Prevailing Wage Rate Skilled Crafts

**Name of Union:** Painter Local 788

**Type of Rate:** Commercial

**Change #:**  
LCN01-2025ib

**Craft:**  
Painter

**Effective Date:**  
7/23/2025

**Effective Date:**  
7/23/2025

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)		
Classification											
Painter Brush Roll	\$30.23		\$9.52	\$8.55	\$0.45	\$0.00	\$0.00	\$0.00	\$0.00	\$48.75	\$63.86
REFINERY RATE	\$		\$	\$	\$	\$	\$	\$	\$	\$	\$
Painter Brush Roll	\$32.02		\$9.52	\$8.55	\$0.45	\$0.00	\$0.00	\$0.00	\$0.00	\$50.54	\$66.55
POWERHOUSE RATE	\$		\$	\$	\$	\$	\$	\$	\$	\$	\$
Painter Brush Roll	\$34.90		\$9.52	\$8.55	\$0.45	\$0.00	\$0.00	\$0.00	\$0.00	\$53.42	\$70.87
Apprentice	BHR	Percent									
1st Year	\$19.65	\$65.00	\$9.52	\$8.55	\$0.45	\$0.00	\$0.00	\$0.00	\$0.00	\$38.17	\$47.99
2nd Year	\$22.67	\$75.00	\$9.52	\$8.55	\$0.45	\$0.00	\$0.00	\$0.00	\$0.00	\$41.19	\$52.53
3rd Year	\$25.70	\$85.00	\$9.52	\$8.55	\$0.45	\$0.00	\$0.00	\$0.00	\$0.00	\$44.22	\$57.07
4th Year	\$28.72	\$95.00	\$9.52	\$8.55	\$0.45	\$0.00	\$0.00	\$0.00	\$0.00	\$47.24	\$61.60

**(\*)Special Calculation Note :**

Apprentice rate based upon % of each classification.

- A. \$0.50 per hour shall be added to the rate of pay for the classification of work, while working: Swing stage, Boatswain Chair, Needle Beam & Horizontal Cable.
- B. \$1.00 per hour shall be added to the rate of pay for the classification of work, while operating: Any spray equipment, Sandblasting, Cob blasting, High Pressure Water blasting (4000 PSI), and for Automatic Taping & Finishing Tools for Drywall.
- C. \$0.50 per hour shall be added to the rate of pay for the classification of work, for tending: three (3) or more sprayers.
- D. \$1.00 per hour shall be added to the rate of pay for the classification of work, for the application of: Catalyzed Epoxy, including latex Epoxy that is deemed hazardous, Lead Abatement, or for work or material, where special precautions beyond normal work duties must be taken. Questionable work or material shall be approved by the Business Representative and/or Joint Trade Board.
- E. \$1.00 per hour shall be added to the rate of pay for the classification of work, for working on: Stacks, Tanks, and Towers over forty (40) feet in height.
- F. \$0.40 per hour shall be added to the rate of pay for the classification of work, for Paperhanging.
- G. \$1.00 per hour shall be added to the rate of pay for the classification of work, for Spray Painting.
- H. \$1.50 per hour shall be added to the rate of pay for the classification of work, for Drywall Finishing.

**Ratio :**

1 Journeymen to 1 Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

Ashland, Crawford, Erie, Hancock, Huron, Marion, Morrow, Ottawa, Richland, Sandusky, Seneca, Wyandot

**Special Jurisdictional Note :**

**Details :**

# Prevailing Wage Rate Skilled Crafts

**Name of Union:** Painter Local 788 Drywall

**Type of Rate:** Commercial

**Change #:**  
LCN01-2025ib

**Craft:**  
Painter

**Effective Date:**  
7/23/2025

**Effective Date:**  
7/23/2025

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Painter Drywall Finisher	\$31.73		\$9.52	\$8.55	\$0.45	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$50.25	\$66.11
REFINERY RATE	\$		\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
Painter Drywall Finisher	\$33.52		\$9.52	\$8.55	\$0.45	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$52.04	\$68.80
POWERHOUSE RATE	\$		\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
Painter Drywall Finisher	\$36.40		\$9.52	\$8.55	\$0.45	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$54.92	\$73.12
Apprentice	BHR	Percent										
1st Year	\$20.62	\$65.00	\$9.52	\$8.55	\$0.45	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$39.14	\$49.45
2nd Year	\$23.80	\$75.00	\$9.52	\$8.55	\$0.45	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$42.32	\$54.22
3rd Year	\$28.56	\$90.00	\$9.52	\$8.55	\$0.45	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$47.08	\$61.36

**(\*)Special Calculation Note :**

Apprentice rate based upon % of each classification.

- A. \$0.50 per hour shall be added to the rate of pay for the classification of work, while working: Swing stage, Boatswain Chair, Needle Beam & Horizontal Cable.
- B. \$1.00 per hour shall be added to the rate of pay for the classification of work, while operating: Any spray equipment, Sandblasting, Cob blasting, High Pressure Water blasting (4000 PSI), and for Automatic Taping & Finishing Tools for Drywall.
- C. \$0.50 per hour shall be added to the rate of pay for the classification of work, for tending: three (3) or more sprayers.
- D. \$1.00 per hour shall be added to the rate of pay for the classification of work, for the application of: Catalyzed Epoxy, including latex Epoxy that is deemed hazardous, Lead Abatement, or for work or material, where special precautions beyond normal work duties must be taken. Questionable work or material shall be approved by the Business Representative and/or Joint Trade Board.
- E. \$1.00 per hour shall be added to the rate of pay for the classification of work, for working on: Stacks, Tanks, and Towers over forty (40) feet in height.
- F. \$0.40 per hour shall be added to the rate of pay for the classification of work, for Paperhanging.
- G. \$1.00 per hour shall be added to the rate of pay for the classification of work, for Spray Painting.

**Ratio :**

1 Journeymen to 1 Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

Ashland, Crawford, Erie, Hancock, Huron, Marion, Morrow, Ottawa, Richland, Sandusky, Seneca, Wyandot

**Special Jurisdictional Note :**

**Details :**

# Prevailing Wage Rate Skilled Crafts

**Name of Union:** Painter Local 788 Hvy Hwy

**Type of Rate:** Commercial

**Change #:**  
LCN01-2025ib

**Craft:**  
Painter

**Effective Date:**  
7/30/2025

**Effective Date:**  
7/30/2025

	BHR	Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
		H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification											
Class 1: Bridge Blaster	\$41.71	\$9.52	\$8.55	\$0.45	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$60.23	\$81.08
Class 2: Bridge Painter, Rigger, Containment Builder, Spot Blaster	\$38.71	\$9.52	\$8.55	\$0.45	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.23	\$76.58
Class 3: Equipment Operator/ Field Mechanic, Grit Reclamation, Paint Mixer, Traffic Control Boat Person, Driver (0-5 Years Exp.)	\$31.71	\$9.52	\$8.55	\$0.45	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$50.23	\$66.08
Class 3: Equipment Operator/ Field Mechanic, Grit Reclamation, Paint Mixer, Traffic Control Boat Person, Driver (5 Plus Years Exp.)	\$34.71	\$9.52	\$8.55	\$0.45	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$53.23	\$70.58
Class 4: Concrete Sealing, Concrete Blasting/P ower Washing/ Etc.	\$34.71	\$9.52	\$8.55	\$0.45	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$53.23	\$70.58

Class 5: Quality Control/Q uality Assurance , Traffic Safety, Competen t Person	\$34.71		\$9.52	\$8.55	\$0.45	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$53.23	\$70.58
Apprentice	BHR	Percent										
1st Year	\$29.20	\$70.00	\$9.52	\$8.55	\$0.45	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$47.72	\$62.32
2nd Year	\$33.37	\$80.00	\$9.52	\$8.55	\$0.45	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$51.89	\$68.57
3rd Year	\$37.54	\$90.00	\$9.52	\$8.55	\$0.45	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$56.06	\$74.83

**(\*)Special Calculation Note :**

Apprentice pay based upon percentage of each classification.

**Ratio :**

1 Apprentice to 1 Journeyman

**Jurisdiction ( \* denotes special jurisdictional note ) :**

Ashland, Crawford, Erie, Hancock, Huron, Marion, Morrow, Ottawa, Richland, Sandusky, Seneca, Wyandot

**Special Jurisdictional Note :**

**Details :**

# Prevailing Wage Rate Skilled Crafts

**Name of Union:** Plasterer Local 132 (Columbus)

**Type of Rate:** Commercial

**Change #:**  
LCN01-2025ib

**Craft:**  
Plasterer

**Effective Date:**  
6/1/2025

**Effective Date:**  
6/1/2025

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Plasterer	\$31.68		\$8.20	\$4.70	\$0.50	\$0.00	\$2.00	\$0.06	\$0.00	\$0.00	\$47.14	\$62.98
Fireproofing Gunner	\$32.68		\$8.20	\$4.70	\$0.50	\$0.00	\$2.00	\$0.06	\$0.00	\$0.00	\$48.14	\$64.48
Apprentice	BHR	Percent										
1st 800 hrs	\$22.18	\$70.00	\$8.20	\$4.70	\$0.50	\$0.00	\$2.00	\$0.06	\$0.00	\$0.00	\$37.64	\$48.72
2nd 800 hrs	\$23.44	\$74.00	\$8.20	\$4.70	\$0.50	\$0.00	\$2.00	\$0.06	\$0.00	\$0.00	\$38.90	\$50.62
3rd 800 hrs	\$24.71	\$78.00	\$8.20	\$4.70	\$0.50	\$0.00	\$2.00	\$0.06	\$0.00	\$0.00	\$40.17	\$52.53
4th 800 hrs	\$25.98	\$82.00	\$8.20	\$4.70	\$0.50	\$0.00	\$2.00	\$0.06	\$0.00	\$0.00	\$41.44	\$54.43
5th 800 hrs	\$27.24	\$86.00	\$8.20	\$4.70	\$0.50	\$0.00	\$2.00	\$0.06	\$0.00	\$0.00	\$42.70	\$56.33
6th 800 hrs	\$28.51	\$90.00	\$8.20	\$4.70	\$0.50	\$0.00	\$2.00	\$0.06	\$0.00	\$0.00	\$43.97	\$58.23
7th 800 hrs	\$29.78	\$94.00	\$8.20	\$4.70	\$0.50	\$0.00	\$2.00	\$0.06	\$0.00	\$0.00	\$45.24	\$60.13
8th 800 hrs	\$31.05	\$98.00	\$8.20	\$4.70	\$0.50	\$0.00	\$2.00	\$0.06	\$0.00	\$0.00	\$46.51	\$62.03

**(\*)Special Calculation Note :**

\*Other is International Training Fund

**Ratio :**

3 Journeymen to 1 Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

Ashland, Coshocton, Crawford, Delaware, Fairfield, Fayette, Franklin, Guernsey, Hocking, Knox, Licking, Madison, Marion, Morrow, Muskingum, Perry, Pickaway, Richland, Ross, Union, Vinton, Wyandot

**Special Jurisdictional Note :**

**Details :**

Fireproofing Gunner: If any mechanical means is used in the gauging of lime for any finish coat, the mixing shall be gauged by a member of the crew who is to apply the respective gauging. This clause applies on jobs where cementitious and fibrous type fireproofing is the material being applied. There shall be an equal number of plasterers to nozzles used. Working on swing stage, slip scaffold or window jack scaffold shall receive the following rates: \$0 above the regular rate for heights up to forty-nine (49) feet above grade level \$0.75 above the regular rate for heights over fifty (50) feet above grade level

# Prevailing Wage Rate Skilled Crafts

**Name of Union:** Plumber Pipefitter Local 42

**Type of Rate:** Commercial

**Change #:**  
LCN01-2025ib

**Craft:**  
Plumber Pipefitter

**Effective Date:**  
7/1/2025

**Effective Date:**  
7/1/2025

Classification	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)		
Plumber Pipefitter	\$42.02		\$12.62	\$12.63	\$1.23	\$0.00	\$0.00	\$0.00	\$0.00	\$68.50	\$89.51
Plumber Pipefitter Heavy Industrial	\$43.02		\$12.62	\$12.63	\$1.23	\$0.00	\$0.00	\$0.00	\$0.00	\$69.50	\$91.01
Apprentice Heavy Industrial	\$		\$	\$	\$	\$	\$	\$	\$	\$	\$
1st Year	\$22.49		\$8.92	\$0.00	\$1.23	\$0.00	\$0.00	\$0.00	\$0.00	\$32.64	\$43.89
2nd Year	\$26.81		\$12.62	\$8.41	\$1.23	\$0.00	\$0.00	\$0.00	\$0.00	\$49.07	\$62.48
3rd Year	\$31.11		\$12.62	\$8.41	\$1.23	\$0.00	\$0.00	\$0.00	\$0.00	\$53.37	\$68.93
4th Year	\$34.41		\$12.62	\$9.41	\$1.23	\$0.00	\$0.00	\$0.00	\$0.00	\$57.67	\$74.88
5th Year	\$37.71		\$12.62	\$10.41	\$1.23	\$0.00	\$0.00	\$0.00	\$0.00	\$61.97	\$80.83
Apprentice	BHR	Percent									
1st Year	\$22.07	\$52.52	\$8.92	\$0.00	\$1.23	\$0.00	\$0.00	\$0.00	\$0.00	\$32.22	\$43.25
2nd Year	\$26.28	\$62.54	\$12.62	\$8.41	\$1.23	\$0.00	\$0.00	\$0.00	\$0.00	\$48.54	\$61.68
3rd Year	\$30.48	\$72.54	\$12.62	\$8.41	\$1.23	\$0.00	\$0.00	\$0.00	\$0.00	\$52.74	\$67.98
4th Year	\$33.68	\$80.15	\$12.62	\$9.41	\$1.23	\$0.00	\$0.00	\$0.00	\$0.00	\$56.94	\$73.78
5th Year	\$36.89	\$87.79	\$12.62	\$10.41	\$1.23	\$0.00	\$0.00	\$0.00	\$0.00	\$61.15	\$79.59

**(\*)Special Calculation Note :**

**Ratio :**

1 Journeyman to 1 Apprentice 2 Journeymen to 2 Apprentices 3 Journeymen to 3 Apprentices 4-6 Journeymen to 4 Apprentices 7-10 Journeymen to 5 Apprentices 11-13 Journeymen to 6 Apprentices 14-15 Journeymen to 7 Apprentices 16-18 Journeymen to 8 Apprentices 19-20 Journeymen to 9 Apprentices 21-23 Journeymen to 10 Apprentices 24-26 Journeymen to 11 Apprentices 27-30 Journeymen to 12 Apprentices 31-34 Journeymen to 13 Apprentices 35-38 Journeymen to 14 Apprentices 39-40 Journeymen to 15 Apprentices Then 1 Journeyman to 5 Apprentices thereafter Water Treatment Work described below is a ratio of: 1 Journeyman to 1 Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

Ashland, Crawford, Erie, Huron, Knox, Lorain, Morrow, Richland, Wyandot

**Special Jurisdictional Note :**

**Details :**

Includes but not limited to : all water services from main to building including water meters and water meter foundations, all lawn sprinkler work including piping, fittings, and lawn sprinkler heads, all power plant piping of every description. All fire extinguishing systems and piping whether by water, steam, gas, or chemical, fire alarm piping and control tubing. On Water Treatment Plants, waste water treatment plants, prefabricated water treatment plants, lift stations, elevated water tanks, meter vaults, underground work on site at treatment, water mains and fire protection external mains, all construction work on public utilities obtained by employer other than plumbing and heating. On all construction projects wherein the work involves sanitary sewers, storm sewers and water lines (site work) performed outside the structure of the building.

# Prevailing Wage Rate Skilled Crafts

**Name of Union:** Roofer Local 86

**Type of Rate:** Commercial

**Change #:**  
LCN01-2025ib

**Craft:**  
Roofer

**Effective Date:**  
9/3/2025

**Effective Date:**  
9/3/2025

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Roofer	\$38.33		\$8.20	\$7.40	\$0.88	\$0.00	\$0.30	\$0.09	\$0.00	\$0.00	\$55.20	\$74.36
Apprentice	BHR	Percent										
1st Year	\$24.91	\$65.00	\$0.00	\$0.00	\$0.88	\$0.00	\$0.25	\$0.09	\$0.00	\$0.00	\$26.13	\$38.59
2nd Year	\$27.60	\$72.00	\$8.20	\$1.85	\$0.88	\$0.00	\$0.25	\$0.09	\$0.00	\$0.00	\$38.87	\$52.67
3rd Year	\$30.66	\$80.00	\$8.20	\$3.33	\$0.88	\$0.00	\$0.25	\$0.09	\$0.00	\$0.00	\$43.41	\$58.74
4th Year	\$33.73	\$88.00	\$8.20	\$4.81	\$0.88	\$0.00	\$0.25	\$0.09	\$0.00	\$0.00	\$47.96	\$64.83

**(\*)Special Calculation Note :**

Other: Education & Research Fund

**Ratio :**

1 Journeyman to 1 Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

Champaign, Delaware, Fairfield, Fayette, Franklin, Hardin, Hocking, Knox, Licking, Logan, Madison, Marion, Morrow, Perry, Pickaway, Pike, Ross, Union, Wyandot

**Special Jurisdictional Note :**

**Details :**

# Prevailing Wage Rate Skilled Crafts

**Name of Union:** Sheet Metal Local 24 (Columbus)

**Type of Rate:** Commercial

**Change #:**  
LCN01-2025ib

**Craft:**  
Sheet Metal Worker

**Effective Date:**  
6/11/2025

**Effective Date:**  
6/11/2025

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Sheet Metal Worker	\$41.10		\$10.23	\$12.56	\$1.26	\$0.00	\$4.12	\$0.00	\$0.00	\$0.00	\$69.27	\$89.82
Apprentice	BHR	Percent										
1st Year	\$23.43	\$57.00	\$8.42	\$2.19	\$1.05	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$35.09	\$46.80
2nd Year	\$26.72	\$65.00	\$9.61	\$8.17	\$1.05	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$45.55	\$58.90
3rd Year	\$30.83	\$75.00	\$9.84	\$9.42	\$1.26	\$0.00	\$3.09	\$0.00	\$0.00	\$0.00	\$54.44	\$69.85
4th Year	\$34.94	\$85.00	\$9.99	\$10.67	\$1.26	\$0.00	\$3.50	\$0.00	\$0.00	\$0.00	\$60.36	\$77.82

**(\*)Special Calculation Note :**

**Ratio :**

1 Journeyman to 1 Apprentice 2 Journeymen to 2 Apprentices 3 Journeymen to 3 Apprentices 4 Journeymen to 4 Apprentices 5-7 Journeymen to 5 Apprentices 8-10 Journeymen to 6 Apprentices 11-13 Journeyman to 7 Apprentices 14-16 Journeyman to 8 Apprentices 17-19 Journeymen to 9 Apprentices 20-22 Journeymen to 10 Apprentices 23-25 Journeymen to 11 Apprentices 26-28 Journeymen to 12 Apprentices 29-31 Journeymen to 13 Apprentices 32-34 Journeymen to 14 Apprentices 35-37 Journeymen to 15 Apprentices 38-40 Journeymen to 16 Apprentices and so on

**Jurisdiction ( \* denotes special jurisdictional note ) :**

Adams, Athens, Delaware, Fairfield, Fayette, Franklin, Gallia, Guernsey, Hocking, Jackson, Knox, Lawrence, Licking, Madison, Marion, Meigs, Morgan, Morrow, Muskingum, Noble, Perry, Pickaway, Pike, Ross, Scioto, Union, Vinton

**Special Jurisdictional Note :**

**Details :**

# Prevailing Wage Rate Skilled Crafts

**Name of Union:** Sprinkler Fitter Local 669

**Type of Rate:** Commercial

**Change #:**  
LCR01-2025ib

**Craft:**  
Sprinkler Fitter

**Effective Date:**  
8/6/2025

**Effective Date:**  
8/6/2025

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Sprinkler Fitter	\$48.28		\$12.40	\$7.40	\$0.54	\$0.00	\$7.74	\$0.00	\$0.00	\$0.00	\$76.36	\$100.50
Apprentice	BHR	Percent										
CLASS 1	\$24.14	\$50.00	\$9.03	\$0.00	\$0.54	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$33.71	\$45.78
CLASS 2	\$27.04	\$56.00	\$9.03	\$0.00	\$0.54	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$36.61	\$50.13
CLASS 3	\$29.45	\$61.00	\$12.40	\$7.40	\$0.54	\$0.00	\$1.15	\$0.00	\$0.00	\$0.00	\$50.94	\$65.66
CLASS 4	\$31.38	\$65.00	\$12.40	\$7.40	\$0.54	\$0.00	\$1.15	\$0.00	\$0.00	\$0.00	\$52.87	\$68.56
CLASS 5	\$33.31	\$69.00	\$12.40	\$7.40	\$0.54	\$0.00	\$1.40	\$0.00	\$0.00	\$0.00	\$55.05	\$71.70
CLASS 6	\$36.21	\$75.00	\$12.40	\$7.40	\$0.54	\$0.00	\$1.40	\$0.00	\$0.00	\$0.00	\$57.95	\$76.05
CLASS 7	\$38.14	\$79.00	\$12.40	\$7.40	\$0.54	\$0.00	\$1.40	\$0.00	\$0.00	\$0.00	\$59.88	\$78.95
CLASS 8	\$40.56	\$84.00	\$12.40	\$7.40	\$0.54	\$0.00	\$1.40	\$0.00	\$0.00	\$0.00	\$62.30	\$82.58
CLASS 9	\$42.97	\$89.00	\$12.40	\$7.40	\$0.54	\$0.00	\$1.40	\$0.00	\$0.00	\$0.00	\$64.71	\$86.19
CLASS 10	\$44.90	\$93.00	\$12.40	\$7.40	\$0.54	\$0.00	\$1.40	\$0.00	\$0.00	\$0.00	\$66.64	\$89.09

**(\*)Special Calculation Note :**

**Ratio :**

1 Journeyman to 1 Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

Adams, Allen, Ashland, Ashtabula, Athens, Auglaize, Belmont, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Columbiana, Coshocton, Crawford, Darke, Defiance, Delaware, Erie, Fairfield, Fayette, Franklin, Fulton, Gallia, Greene, Guernsey, Hamilton, Hancock, Hardin, Harrison, Henry, Highland, Hocking, Holmes, Huron, Jackson, Jefferson, Knox, Lawrence, Licking, Logan, Lucas, Madison, Mahoning, Marion, Medina, Meigs, Mercer, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Ottawa, Paulding, Perry, Pickaway, Pike, Portage, Preble, Putnam, Richland, Ross, Sandusky, Scioto, Seneca, Shelby, Stark, Summit, Trumbull, Tuscarawas, Union, Van Wert, Vinton, Warren, Washington, Wayne, Williams, Wood, Wyandot

**Special Jurisdictional Note :**

**Details :**

Sprinkler Fitter work shall consist of the installation, dismantling, maintenance, repairs, adjustments, and corrections of all fire protection and fire control systems including the unloading, handling by hand, power equipment and installation of all piping or tubing, appurtenances and equipment pertaining thereto, including both overhead and underground water mains, fire hydrants and hydrant mains, standpipes and hose connections to sprinkler systems used in connection with sprinkler and alarm systems. Also all tanks and pumps connected thereto, also included shall be CO-2 and Cardox Systems, Dry Chemical Systems, Foam Systems and all other fire protection systems.

# Prevailing Wage Rate Skilled Crafts

**Name of Union:** Truck Driver Locals 20,40,92,100,175,284,348,377,637,697,908,957 - Bldg & HevHwy Class 1

**Type of Rate:** Commercial

**Change #:**  
LCN01-2025ib

**Craft:**  
Truck Driver

**Effective Date:**  
5/28/2025

**Effective Date:**  
5/28/2025

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Truck Driver CLASS 1	\$34.26		\$9.25	\$9.60	\$0.40	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$53.51	\$70.64
Apprentice	BHR	Percent										
First 6 months	\$27.41	\$80.00	\$9.25	\$9.60	\$0.40	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$46.66	\$60.36
7-12 months	\$29.12	\$85.00	\$9.25	\$9.60	\$0.40	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$48.37	\$62.93
13-18 months	\$30.83	\$90.00	\$9.25	\$9.60	\$0.40	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$50.08	\$65.50
19-24 months	\$32.55	\$95.00	\$9.25	\$9.60	\$0.40	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$51.80	\$68.07
25-30 months	\$34.26	\$100.00	\$9.25	\$9.60	\$0.40	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$53.51	\$70.64

**(\*)Special Calculation Note :**

**Ratio :**

3 Journeymen to 1 Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

Adams, Allen, Ashland, Ashtabula, Athens, Auglaize, Belmont, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Columbiana, Coshocton, Crawford, Darke, Defiance, Delaware, Erie, Fairfield, Fayette, Franklin, Fulton, Gallia, Greene, Guernsey, Hamilton, Hancock, Hardin, Harrison, Henry, Highland, Hocking, Holmes, Huron, Jackson, Jefferson, Knox, Lawrence, Licking, Logan, Lorain, Lucas, Madison, Mahoning, Marion, Medina, Meigs, Mercer, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Ottawa, Paulding, Perry, Pickaway, Pike, Portage, Preble, Putnam, Richland, Ross, Sandusky, Scioto, Seneca, Shelby, Stark, Summit, Trumbull, Tuscarawas, Union, Van Wert, Vinton, Warren, Washington, Wayne, Williams, Wood, Wyandot

**Special Jurisdictional Note :**

**Details :**

CLASS 1: Drivers on trucks, including but not limited to: 4-wheel service trucks; 4-wheel dump trucks; batch trucks; drivers on tandems; truck sweepers (not to include power sweepers and scrubbers) Drivers on tractor – trailer combinations including but not limited to the following: Semi-tractor trucks; pole trailers; ready-mix trucks; fuel trucks; all trucks five (5) axle and over; drivers on belly dumps; truck mechanics (when needed).

# Prevailing Wage Rate Skilled Crafts

**Name of Union:** Truck Driver Locals 20,40,92,100,175,284,348,377,637,697,908,957 - Bldg & HevHwy Class 2

**Type of Rate:** Commercial

**Change #:**  
LCN01-2025ib

**Craft:**  
Truck Driver

**Effective Date:**  
5/28/2025

**Effective Date:**  
5/28/2025

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Truck Driver CLASS 2	\$35.26		\$9.25	\$9.60	\$0.40	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$54.51	\$72.14
Apprentice	BHR	Percent										
First 6 months	\$28.21	\$80.00	\$9.25	\$9.60	\$0.40	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$47.46	\$61.56
7-12 months	\$29.97	\$85.00	\$9.25	\$9.60	\$0.40	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$49.22	\$64.21
13-18 months	\$31.73	\$90.00	\$9.25	\$9.60	\$0.40	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$50.98	\$66.85
19-24 months	\$33.50	\$95.00	\$9.25	\$9.60	\$0.40	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$52.75	\$69.50
25-30 months	\$35.26	\$100.00	\$9.25	\$9.60	\$0.40	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$54.51	\$72.14

**(\*)Special Calculation Note :**

**Ratio :**

3 Journeymen to 1 Apprentice

**Jurisdiction ( \* denotes special jurisdictional note ) :**

Adams, Allen, Ashland, Ashtabula, Athens, Auglaize, Belmont, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Columbiana, Coshocton, Crawford, Darke, Defiance, Delaware, Erie, Fairfield, Fayette, Franklin, Fulton, Gallia, Greene, Guernsey, Hamilton, Hancock, Hardin, Harrison, Henry, Highland, Hocking, Holmes, Huron, Jackson, Jefferson, Knox, Lawrence, Licking, Logan, Lorain, Lucas, Madison, Mahoning, Marion, Medina, Meigs, Mercer, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Ottawa, Paulding, Perry, Pickaway, Pike, Portage, Preble, Putnam, Richland, Ross, Sandusky, Scioto, Seneca, Shelby, Stark, Summit, Trumbull, Tuscarawas, Union, Van Wert, Vinton, Warren, Washington, Wayne, Williams, Wood, Wyandot

**Special Jurisdictional Note :**

**Details :**

CLASS 2: Drivers on articulated dump trucks; rigid-frame rock trucks; distributor trucks; low boys/drag driver on the construction site only and heavy duty equipment (irrespective of load carried) when used exclusively for transportation on the construction site only.

**PART C - LOCAL PROVISIONS**

*None Applicable*

**PART D - ATTACHMENTS TO SUPPLEMENTARY PROVISIONS**

- A. Standard Insurance, Indemnification and Venue Provisions for Airport Construction Contracts.

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**ATTACHMENT A**  
**STANDARD INSURANCE, INDEMNIFICATION AND VENUE PROVISIONS FOR**  
**AIRPORT CONSTRUCTION CONTRACTS**

Without limiting any of the other obligations or liabilities of the Contractor, the Contractor shall secure and maintain at its own cost and expense, throughout the duration of this Contract and until the Work is completed and accepted by the Owner, insurance of such types and in such amounts as may be necessary to protect it and the interests of the Owner against all hazards or risks of loss as hereunder specified or which may arise out of the performance of the Contract Documents. The form and limits of such insurance, together with the underwriter thereof in each case, are subject to approval by the Owner. Regardless of such approval, it shall be the responsibility of the Contractor to maintain adequate insurance coverage at all times during the term of the Contract. Failure of the Contractor to maintain coverage shall not relieve it of any contractual responsibility or obligation or liability under the Contract Documents.

The certificates of insurance, including evidence of the required endorsements hereunder or the policies, shall be filed with the Owner within Twenty (20) days after the date of the receipt of Notice of the Award of the Contract to the Contractor and prior to the start of the work. All insurance policies shall provide thirty (30) days written notice to be given by the insurance company in question prior to modification or cancellation or non-renewal of such insurance. Such notices shall be mailed, certified mail, return receipt requested, to:

Morrow County Board of Commissioners  
4679 Township Road 126  
Cardington, OH 43315

The minimum coverages for the insurance referred to herein shall be in accordance with the requirements established below:

- (A) Workmen's Compensation - Statutory Unlimited  
Employer's Liability - (\$1,000,000)
- (B) Commercial General Liability Insurance, Including Premises Operations, Products and Completed Operations, Contractual Liability, Broad Form Property Damage, Independent Contractors, Explosion Collapse and Underground Property Damage; Such Coverage shall Apply to Bodily Injury and Property Damage with a Combined Single Limit of \$5,000,000 naming the Owner as an additional insured. Policy will include the per project aggregate endorsement.
- (C) Comprehensive Automobile Liability Insurance covering all vehicles, owned, hired, or non-owned licensed or not licensed used in the operation and work hereunder shall not be less than \$1,000,000 combined single limit.
- (D) Fire and Extended Coverage "All Risk" Property Insurance (Installation Floater) - Full Replacement Value

Contractor shall require any and all subcontractors with whom it enters into a contract to perform Work on this Project, to protect, through insurance, against applicable hazards or risks and shall, upon request of the Sponsor, provide evidence of such insurance.

Unless otherwise specifically indicated in the contract documents, no deductible will be permitted with respect to any of the above-described policies.

INDEMNIFICATION

- A. The Contractor agrees to indemnify, defend and hold harmless the MORROW COUNTY AIRPORT, the MORROW COUNTY BOARD OF COMMISSIONERS; Morrow County, Ohio; Crawford, Murphy & Tilly, Inc., agents, servants and employees from claims and damages to property which may arise out of or during operations under this contract whether such operations be by the Contractor or by any subcontractor or anyone directly or indirectly employed by the Contractor or Subcontractor.
- B. In any and all claims against the Owner, or any of its agents or employees, by any employee of the Contractor, any subcontractor or anyone directly or indirectly employed by any of them, or anyone for whose actions any of them may be liable, the indemnification obligation shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or any subcontractor under Workmen's Compensation acts, disability benefit act or other employee benefit acts.
- C. The obligation of the Contractor under this paragraph shall not extend to the liability of the engineer, his agents or employees arising out of the preparation or approval of maps, drawings, opinions, reports, surveys, change orders, designs or specifications.

VENUE

This agreement has been made in and shall for the purpose of interpretation be deemed to be an Ohio contract. Should any part of this Agreement be adjudicated, venue shall be proper only in the District Court State of Ohio and County of Morrow, Ohio.

**DIVISION 4**

**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:

<b>Paragraph Number</b>	<b>Term</b>	<b>Definition</b>
<b>10-01</b>	<b>AASHTO</b>	The American Association of State Highway and Transportation Officials.
<b>10-02</b>	<b>Access Road</b>	The right-of-way, the roadway and all improvements constructed thereon connecting the airport to a public roadway.
<b>10-03</b>	<b>Advertisement</b>	A public announcement, as required by local law, inviting bids for work to be performed and materials to be furnished.
<b>10-04</b>	<b>Airport</b>	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.
<b>10-05</b>	<b>Airport Improvement Program (AIP)</b>	A grant-in-aid program, administered by the Federal Aviation Administration (FAA).
<b>10-06</b>	<b>Air Operations Area (AOA)</b>	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.
<b>10-07</b>	<b>Apron</b>	Area where aircraft are parked, unloaded or loaded, fueled and/or serviced.

<b>Paragraph Number</b>	<b>Term</b>	<b>Definition</b>
<b>10-08</b>	<b>ASTM International (ASTM)</b>	Formerly known as the American Society for Testing and Materials (ASTM).
<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>	A written agreement between the Owner and the Contractor that establishes the obligations of the parties including but not limited to performance of work, furnishing of labor, equipment and materials and the basis of payment.  The awarded contract includes but may not be limited to: Advertisement, Contract form, Proposal, Performance bond, payment bond, General provisions, certifications and representations, Technical Specifications, Plans, Supplemental Provisions, standards incorporated by reference and issued addenda.
<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>Paragraph Number</b>	<b>Term</b>	<b>Definition</b>
<b>10-18</b>	<b>Contract Time</b>	The number of calendar days or working days, stated in the proposal, allowed for completion of the contract, including authorized time extensions. If a calendar date of completion is stated in the proposal, in lieu of a number of 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.

Paragraph Number	Term	Definition
10-27	<b>Extra Work</b>	An item of work not provided for in the awarded contract as previously modified by change order or supplemental agreement, but which is found by the Owner's Engineer or Resident Project Representative (RPR) to be necessary to complete the work within the intended scope of the contract as previously modified.
10-28	<b>FAA</b>	The Federal Aviation Administration. When used to designate a person, FAA shall mean the Administrator or their duly authorized representative.
10-29	<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.
10-30	<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>
10-31	<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>
10-32	<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>Paragraph Number</b>	<b>Term</b>	<b>Definition</b>
<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 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 Morrow County Airport.
10-38	<b>Passenger Facility Charge (PFC)</b>	Per 14 Code of Federal Regulations (CFR) Part 158 and 49 United States Code (USC) § 40117, a PFC is a charge imposed by a public agency on passengers enplaned at a commercial service airport it controls.
<b>10-39</b>	<b>Pavement Structure</b>	The combined surface course, base course(s), and subbase course(s), if any, considered as a single unit.
<b>10-40</b>	<b>Payment bond</b>	The approved form of security furnished by the Contractor and their own surety as a guaranty that the Contractor will pay in full all bills and accounts for materials and labor used in the construction of the work.
<b>10-41</b>	<b>Performance bond</b>	The approved form of security furnished by the Contractor and their own surety as a guaranty that the Contractor will complete the work in accordance with the terms of the contract.
<b>10-42</b>	<b>Plans</b>	The official drawings or exact reproductions which show the location, character, dimensions and details of the airport and the work to be done and which are to be considered as a part of the contract, supplementary to the

<b>Paragraph Number</b>	<b>Term</b>	<b>Definition</b>
		specifications. Plans may also be referred to as 'contract drawings.'
<b>10-43</b>	<b>Project</b>	The agreed scope of work for accomplishing specific airport development with respect to a particular airport.
<b>10-44</b>	<b>Proposal</b>	The written offer of the bidder (when submitted on the approved proposal form) to perform the contemplated work 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)</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>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>	None

**END OF SECTION 10**

## Section 20 Proposal Requirements and Conditions

**20-01 Advertisement (Notice to Bidders).** Refer to the 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*.

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

A prebid conference is required on this project to discuss as a minimum, the following items: material requirements; submittals; Quality Control/Quality Assurance requirements; the construction safety and phasing plan including airport access and staging areas; and unique airfield paving construction requirements. See Notice to Bidders for details.

**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.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

## Section 30 Award and Execution of Contract

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

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

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

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

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

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

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

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

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

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

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

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

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

**END OF SECTION 30**

## 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

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## 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.** None

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

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

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

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

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

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

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

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

Copies of survey notes will be provided to the RPR for each area of construction and for each placement of material as specified to allow the RPR to make periodic checks for conformance with plan grades, alignments and grade tolerances required by the applicable material specifications. Surveys will be provided to the RPR prior to commencing work items that cover or disturb the survey staking. Survey(s) and notes shall be provided in the following format(s): AutoCAD 2018, 2022, or 2024 and PDF format.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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## Section 60 Control of Materials

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

In order to expedite the inspection and testing of materials, the Contractor shall furnish documentation to the 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.** An Engineer/RPR field office is not required.

**60-06 Storage of materials.** Materials shall be stored to assure the preservation of their quality and fitness for the work. Stored materials, even though approved before storage, may again be inspected prior to their use in the work. Stored materials shall be located to facilitate their prompt inspection. The Contractor shall coordinate the storage of all materials with the 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



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## 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: N/A

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 sheet(s) 3 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.

**70-16 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 Certificate of Insurance section of bidding documents.

## 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 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 10 days of the NTP date. The Contractor shall notify the RPR at least 24 hours in advance of the time contract operations begins. The Contractor shall not commence any actual operations prior to the date on which the notice to proceed is issued by the Owner.

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

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

At the time of final payment, the contract time shall be increased in the same proportion as the cost of the actually completed quantities bears to the cost of the originally estimated quantities in the proposal. Such increase in the contract time shall not consider either cost of work or the extension of contract time that has been covered by a change order or supplemental agreement. Charges against the contract time will cease as of the date of final acceptance.

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

Schedule	Liquidated Damages Cost	Allowed Construction Time
Total	\$200/day	120 days*

The maximum construction time allowed for Schedules total project will be the sum of the time allowed for individual schedules but not more than 120 days. Permitting the Contractor to continue and finish the work or any part of it after the time fixed for its completion, or after the date to which the time for completion may have been extended, will in no way operate as a 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>	Scales must be tested for accuracy and serviced before use. Scales for weighing materials which are required to be proportioned or measured and paid for by weight shall be furnished, erected, and maintained by the Contractor, or be certified permanently installed commercial scales. Platform scales shall be installed and maintained with the platform level and rigid bulkheads at each end.  Scales shall be accurate within 0.5% of the correct weight throughout the range of use. The Contractor shall have the scales checked under the observation of the RPR before beginning work and at such other times as requested. The intervals shall be uniform in spacing throughout the graduated or marked length of the beam or dial and shall not exceed 0.1% of the nominal rated capacity of the

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. From the total of the amount determined to be payable on a partial payment, 10% percent of such total amount will be deducted and retained by the Owner for protection of the Owner's interests. Unless otherwise instructed by the Owner, the amount retained by the Owner will be in effect until the final payment is made except as follows:

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

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

b. The Contractor is required to pay all subcontractors for satisfactory performance of their contracts no later than 30 days after the Contractor has received a partial payment. Contractor must provide the Owner evidence of prompt and full payment

of retainage held by the prime Contractor to the subcontractor within 30 days after the subcontractor's work is satisfactorily completed. A subcontractor's work is satisfactorily completed when all the tasks called for in the subcontract have been accomplished and documented as required by the Owner. When the Owner has made an incremental acceptance of a portion of a prime contract, the work of a subcontractor covered by that acceptance is deemed to be satisfactorily completed.

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

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

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

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

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

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

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

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

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

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

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

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

No partial payment will be made for stored or stockpiled living or perishable plant materials.

The Contractor shall bear all costs associated with the partial payment of stored or stockpiled materials in accordance with the provisions of this paragraph.

**90-08 Payment of withheld funds.** At the Contractor's option, if an Owner withholds retainage in accordance with the methods described in paragraph 90-06 *Partial Payments*, the Contractor may request that the Owner deposit the retainage into an escrow account. The Owner's deposit of retainage into an escrow account is subject to the following conditions:

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

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

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

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

**90-09 Acceptance and final payment.** When the contract work has been accepted in accordance with the requirements of Section 50, paragraph 50-15, *Final Acceptance*, the RPR will prepare the final estimate of the items of work actually performed. The Contractor shall approve the RPR's final estimate or advise the RPR of the Contractor's objections to the final estimate which are based on disputes in measurements or computations of the final quantities to be paid under the contract as amended by change order or supplemental agreement. The Contractor and the RPR shall resolve all disputes (if any) in the measurement and computation of final quantities to be paid within 30 calendar days of the Contractor's receipt of the RPR's final estimate. If, after such 30-day period, a dispute still exists, the Contractor may approve the RPR's estimate under protest of the quantities in dispute, and such disputed quantities shall be considered by the Owner as a claim in accordance with Section 50, paragraph 50-16, *Claims for Adjustment and Disputes*.

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

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

**90-10 Construction warranty.**

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

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

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

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

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

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

g. With respect to all warranties, express or implied, from subcontractors, manufacturers, or suppliers for work performed and materials furnished under this contract, the Contractor shall: (1) Obtain all warranties that would be given in normal commercial practice; (2) Require all warranties to be executed, in writing, for the benefit of the Owner, as directed by the Owner, and (3) Enforce all warranties for the benefit of the Owner.

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

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

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

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

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

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

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

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

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

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

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

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

k. Security for Construction Warranty.

l. Equipment commissioning documentation submitted, if required.

**END OF SECTION 90**

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## Part 2 – General Construction Items

### Item C-102 Temporary Air and Water Pollution, Soil Erosion, and Siltation Control

#### DESCRIPTION

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

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

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

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

#### MATERIALS

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

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

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

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

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

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

## CONSTRUCTION REQUIREMENTS

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

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

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

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

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

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

The RPR may increase or decrease the area of erodible earth material that can be exposed at any time based on an analysis of project conditions.

The erosion control features installed by the Contractor shall be maintained by the Contractor during the construction period.

Provide temporary structures whenever construction equipment must cross watercourses at frequent intervals. Pollutants such as fuels, lubricants, bitumen, raw sewage, wash water from concrete mixing operations, and other harmful materials shall not be discharged into any waterways, impoundments or into natural or manmade channels.

**102-3.4 Installation, maintenance and removal of silt fence.** Silt fences shall extend a minimum of 16 inches (41 cm) and a maximum of 34 inches (86 cm) above the ground surface. Posts shall be set no more

than 10 feet (3 m) on center. Filter fabric shall be cut from a continuous roll to the length required minimizing joints where possible. When joints are necessary, the fabric shall be spliced at a support post with a minimum 12-inch (300-mm) overlap and securely sealed. A trench shall be excavated approximately 4 inches (100 mm) deep by 4 inches (100 mm) wide on the upslope side of the silt fence. The trench shall be backfilled and the soil compacted over the silt fence fabric. The Contractor shall remove and dispose of silt that accumulates during construction and prior to establishment of permanent erosion control. The fence shall be maintained in good working condition until permanent erosion control is established. Silt fence shall be removed upon approval of the RPR.

### METHOD OF MEASUREMENT

**102-4.1** Temporary erosion and pollution control work required will be performed as scheduled or directed by the RPR. Completed and accepted work will be measured as follows:

a. Installation and removal of silt fence will be measured by the linear foot

b. Installation and removal of inlet protection will be measured per each installed, maintained and removed, as directed by the RPR.

**102-4.2** Control work performed for protection of construction areas outside the construction limits, such as borrow and waste areas, haul roads, equipment and material storage sites, and temporary plant sites, will not be measured and paid for directly but shall be considered as a subsidiary obligation of the Contractor.

### BASIS OF PAYMENT

**102-5.1** Accepted quantities of temporary water pollution, soil erosion, and siltation control work ordered by the RPR and measured as provided in paragraph 102-4.1 will be paid for under:

Item C-102-5.1a            Installation and removal of silt fence per linear feet (meter)

Item C-102-5.1b            Install and remove inlet protection – 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 RPR will be paid for in accordance with Section 90, paragraph 90-05 *Payment for Extra Work*.

### REFERENCES

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

Advisory Circulars (AC)

AC 150/5200-33            *Hazardous Wildlife Attractants on or Near Airports*

AC 150/5370-2            *Operational Safety on Airports During Construction*

ASTM International (ASTM)

ASTM D6461            *Standard Specification for Silt Fence Materials*

United States Department of Agriculture (USDA)

FAA/USDA Wildlife Hazard Management at Airports, A Manual for Airport Personnel

**END OF ITEM C-102**

## **Item C-105 Mobilization**

**105-1 Description.** This item of work shall consist of, but is not limited to, work and operations necessary for the movement of personnel, equipment, material and supplies to and from the project site for work on the project except as provided in the contract as separate pay items.

**105-2 Mobilization limit.** Mobilization shall be limited to 10 percent of the total project cost.

**105-3 Posted notices.** Prior to commencement of construction activities, the Contractor must post the following documents in a prominent and accessible place where they may be easily viewed by all employees of the prime Contractor and by all employees of subcontractors engaged by the prime Contractor: Equal Employment Opportunity (EEO) Poster “Equal Employment Opportunity is the Law” in accordance with the Office of Federal Contract Compliance Programs Executive Order 11246, as amended. These notices must remain posted until final acceptance of the work by the Owner.

**105-4 Engineer/RPR field office.** An Engineer/RPR field office is not required.

### **METHOD OF MEASUREMENT**

**105-5 Basis of measurement and payment.** Based upon the contract lump sum price for “Mobilization” partial payments will be allowed as follows:

- a. With first pay request, 25%.
- b. When 25% or more of the original contract is earned, an additional 25%.
- c. When 50% or more of the original contract is earned, an additional 40%.
- d. After Final Inspection, Staging area clean-up and delivery of all Project Closeout materials as required by Section 90, paragraph 90-11, *Contractor Final Project Documentation*, the final 10%.

### **BASIS OF PAYMENT**

**105-6 Payment will be made under:**

Item C-105 Mobilization – per lump sum

### **REFERENCES**

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

Office of Federal Contract Compliance Programs (OFCCP)

Executive Order 11246, as amended

EEOC-P/E-1 – Equal Employment Opportunity is the Law Poster

United States Department of Labor, Wage and Hour Division (WHD)  
WH 1321 – Employee Rights under the Davis-Bacon Act Poster

**END OF ITEM C-105**

## ITEM 203 ROADWAY EXCAVATION AND EMBANKMENT

**203.01 Description.** This work consists of preparing areas upon which embankments are to be placed; excavating for roadways and channels, including the removal of all material encountered not being removed under another item; constructing embankments with the excavated material and material from other approved sources as necessary to complete the planned embankments; furnishing and incorporating all water required for compacting embankment; disposing of unsuitable and surplus material and finishing shoulders, slopes, and ditches.

All excavation is considered unclassified excavation. If the excavation contains regulated materials such as garbage, solid waste, and hazardous waste or material, the Contract Documents will detail the removal for these items.

Use removed or excavated materials in the Work when the material conforms to the specifications; if not, then recycle or dispose of the material according to [105.16](#) and [105.17](#).

### **203.02 Material Definitions.**

**A. Asphalt Concrete.** Reclaimed asphalt pavement (RAP) that is blended to meet the requirements in [703.16](#).

**C. Borrow.** Material obtained from approved sources, located outside the construction limits that is required for the construction of the embankment. When borrow is specified or used, use suitable materials that conform to [203.02.R](#).

**D. Compaction Testing.** The Department will perform the compaction testing of embankment and subgrade according to Supplement [1015](#).

**E. Embankment.** A structure consisting of suitable materials conforming to [203.02.R](#) and constructed in lifts to a predetermined elevation and cross section.

**F. Excavation.** The excavation and disposal of all materials required by the Contract Documents.

**G. Maximum Dry Density.** The maximum dry density is determined according to [AASHTO T 99](#), [AASHTO T 272](#), or Supplement [1015](#). The Department will use this maximum dry density for compaction acceptance.

**H. Natural Granular Materials.** Natural granular materials include broken or crushed rock, gravel, sand, durable siltstone, and durable sandstone that can be placed in an 8-inch loose lift.

**I. Natural Soil.** All natural earth materials, organic or inorganic, resulting from natural processes such as weathering, decay, and chemical action.

**J. Optimum Moisture Content.** The water content at which the maximum dry density is produced in an embankment material. The optimum moisture content is determined according to [AASHTO T 99](#), [AASHTO T 272](#), or Supplement [1015](#).

**K. Petroleum Contaminated Soil (PCS).** Petroleum contaminated soil (PCS) that is regulated under [OAC-1301: 7-9-16](#).

**L. Random Material.** Mixtures of suitable materials that can be placed in 8-inch (200 mm) loose lifts.

**M. Recycled Portland Cement Concrete.** Recycled Portland cement concrete (RPCC) that is blended to meet the requirements in [703.16](#).

**N. Recycled Materials.** Fly ash, bottom ash, foundry sand, recycled glass, tire shreds, or other materials or manufacturing byproducts not specifically named as suitable materials in [203.02.R](#).

**O. Rock.** Sandstone, siltstone, limestone, dolomite, glacial boulders, brick, and RPCC too large to be placed in an 8-inch loose lift.

**P. Shale.** A fine-grained sedimentary rock formed from the lithification of clay, silt, or mud. Shale has a laminated structure, which splits easily (is fissile). For the purpose of this specification, mudstone and claystone are also considered to be shale. Shale is classified as durable or nondurable according to [703.16.D](#).

**Q. Slag Materials.** Slag materials include air cooled blast furnace slag (ACBFS), granulated slag (GS), open hearth (OH) slag, basic oxygen furnace (BOF) slag, and electric arc furnace (EAF) slag meeting the requirements in [703.16](#).

**R. Suitable Materials.** All suitable materials are restricted in [203.03](#). Furnish soil or embankment material conforming to [703.16](#), when [Item 203](#) Embankment is specified. Furnish material that conforms to [703.16.B](#) or [703.16.C](#) when [Item 203](#) Granular Embankment is specified. Furnish material that conforms to [703.16.C](#) when [Item 203](#) Granular Material Types A, B, C, D, E or F are specified. Do not use recycled materials unless specifically allowed by the Supplemental Specifications.

**203.03 Restrictions on the Use of Embankment Materials.** Suitable materials are further restricted as follows:

**A.** Use silt identified as ODOT Group Classification A-4b and RAP only if placed at least 3 feet below the surface of the subgrade.

**B.** Do not place RPCC and RAP in any location where it would inhibit the growth of vegetation.

**C.** Do not use any suitable material that cannot be incorporated in an 8-inch lift in the top 2 feet of the embankment.

**D.** Do not use nondurable shale in the top 2 feet of the embankment that is not completely compacted and pulverized into a soil with 100 percent of the material passing the No. 4 sieve.

**E.** If using RPCC, OH slag, EAF slag, BOF slags, or blends of these materials, place these materials at least 1 foot below the flow line of the underdrains.

**F.** Do not use RPCC, OH slag, EAF slag, BOF slags, granulated slag, or blends of these materials for underwater applications.

**G.** Do not use materials that cannot be satisfactorily placed and compacted to a stable and durable condition.

**H.** Material excavated in the work that contains excessive moisture is unsuitable for embankment construction unless dried. Dry or aerate such material before incorporating in the work. The Contractor may elect to waste this material, instead of drying it.

**I.** If Granular Material Type E in [703.16.C](#) is allowed or specified, use a geotextile fabric conforming to [712.09](#), Type D on the top, bottom, and around the Type E material to prevent piping of the material into the Type E material.

**J.** If electing to use PCS, submit the information stated below in a suitable format at least 10 workdays before the intended usage.

1. Have an ODOT prequalified consultant, in environmental site assessment and remediation, review the proposed usage. The consultant shall randomly monitor the construction to ensure that the environmental requirements are carried out on the project. The consultant shall report any discrepancies to the Department and the Contractor. The consultant shall certify the report or reports to the Department.

2. Use PCS that conforms to all current environmental policies, rules, and regulations under [OAC-1301: 7-9-16](#). Perform sampling and testing on every 100 tons of PCS used.

**203.04 General.** Perform the required clearing and grubbing before starting the excavation, grading, and embankment operations.

Coordinate the clearing and grubbing with the installation of sediment and erosion controls.

Remove all existing pavement before the embankment construction.

Temporarily discontinue operations when the excavating operations encounter remains of prehistoric archaeological sites, historical archaeological sites, or human remains. The Engineer will contact the Department's Office of Environmental Services to determine the disposition thereof. Preserve the artifacts or other archeological items or human remains until a determination as to what the disposition and/or removal of such items is made by the Office of Environmental Services. Such excavation is considered Extra Work.

If the Contractor encounters any abnormal material such as, but not limited to, drums, tanks, or stained earth or any unusual odors during construction operations, the Contractor shall temporarily discontinue the work in this area, leave equipment in place, cordon off the area, and notify the Engineer. The area is considered to contain hazardous waste or material and must be handled according to Department procedures and appropriate environmental agency regulatory requirements. Upon notification by the Engineer to resume work, the Contractor may file for an extension of time according to [108.06](#).

**A. Drainage and Maintenance of the Work.** Maintain a well-drained embankment and excavation operation. If trenching for narrow widening and in other areas of the embankment construction, construct ditches of an adequate depth and at frequent intervals across the berm or embankment to maintain drainage. Deepen side ditches when necessary to ensure thorough embankment or subgrade drainage.

Construct the embankment with sufficient cross-slope to drain in case of rain.

If precipitation saturates the embankment construction, stay off the embankment construction until the embankment dries or stabilizes. Expedite the construction by removing the saturated embankment or dry the embankment by scarifying, plowing, disking, and recompacting the embankment.

Throughout the embankment construction operation and at the end of each day's operation, shape to drain, compact, and recompact the work area to a uniform cross section. Eliminate all ruts and low spots that could hold water.

If using embankment construction or cut areas to haul on, continuously move the hauling equipment around on the area to take advantage of the compactive effort. Continually re-grade and compact the haul roads and maintain the construction according to [105.13](#) and [105.14](#).

Plug and cover the upstream ends of all pipe lines encountered during earthwork operations.

**B. Rock or Shale Blasting Operations.** Conform to [Item 208](#) when blasting.

**C. Slides and Breakages.** Remove all slides and breakages beyond the limits of the planned finished work when caused by improper excavation methods.

**D. Shoulders, Slopes, and Ditches.** When specified, place the topsoil in areas to be seeded or sodded according to [Item 659](#). Build shoulders to the lines shown on the plans and to the tolerances specified in [203.08](#). Reshape shoulders, slopes, and ditches that have been damaged by erosion during construction.

Keep new and existing pavement, and the paved area of the berm clear of earth stockpiles or other berm materials.

**F. Borrow.** Unless otherwise designated in the Contract, make arrangements for obtaining borrow and pay all costs involved. If borrow is specified, use all suitable excavated material in the work prior to using the borrow material.

Place borrow used as embankment according to all the requirements for constructing embankment.

Blade and leave all borrow areas in such shape as to allow accurate measurements after the excavation has been completed.

Notify the Engineer sufficiently in advance of opening any borrow areas so that cross section elevations and measurements of the ground surface after stripping may be taken.

Construct borrow areas that conform to [105.16](#); clean up the borrow areas according to [104.04](#).

**G. Staged Construction and Waiting Periods.** If specified in the Contract Documents, control the rate of fill accordingly. Adhere to the rate of fill and to the waiting periods during the work.

**203.05 Embankment Construction Methods.** Embankment construction includes preparing areas upon which embankments are to be placed; placing and compacting approved material within roadway areas where unsuitable material has been removed; and placing and compacting approved material in holes, pits, and other depressions within the roadway.

If scalping is required, scarify, plow, disk, and compact the existing embankment foundation. Compact the top 8 inches of the foundation to 95 percent of the maximum dry density or to a maximum test section dry density according to Supplement [1015](#). If the foundation cannot be compacted, the Department will design replacement material or the Engineer may increase the lift thickness of the next layer of embankment.

The Engineer may increase the lift thickness of the next embankment layer to bridge the soft or wet foundation areas that will not support the weight of the trucks or hauling equipment. Dump successive loads of rock, durable shale, or granular material in a uniform lift. Do not exceed the thickness required to support the equipment placing the material. Manipulate, blade, distribute, level, and doze the material in place until the area is stabilized and material is above the normal water elevation. Once the bridging has been accomplished, construct the remaining lifts according to [203.06](#).

If the existing slope is steeper than 8:1, bench into the existing slope as follows:

- A. Scalp the existing slope according to [Item 201](#).
- B. Cut horizontal benches in the existing slope to a sufficient width to blend the new embankment with the existing embankment and to accommodate the placement, and compaction operations and equipment.
- C. Bench the slope as the embankment is placed, and compact into layers.
- D. Begin each bench at the intersection of the existing slope and the vertical cut of the previous bench. Recompact the cut materials along with the new embankment.

If constructing embankment on only one side of abutments, wing walls, piers, or culvert headwalls, construct the embankment so that the area immediately adjacent to the structure is not compacted in a manner that causes overturning of or excessive pressure against the structure. If constructing embankment on both sides of a concrete wall, pipe, or box type structure, construct the embankment so that the elevation on both sides of the structure is always approximately the same.

**203.06 Spreading and Compacting.** Do not construct frozen embankment material or place embankment material on frozen ground.

Spread all embankment material, except for rock in [203.06.C](#). and RPCC in [203.06.D](#), in successive horizontal loose lifts, not to exceed 8 inches in thickness. Compact all embankment material lifts, except for Type D granular material, Type E granular material, rock and durable shale, to the specified density and moisture controls in [203.07](#).

When a minimum effective weight requirement is specified in [203.06](#) or [203.07](#), the Contractor may use a vibratory roller which meets the requirement using a combination of weight and equivalent centrifugal force from vibration. In all cases, submit documentation from the manufacturer that shows the roller meets the minimum effective weight requirements.

The Engineer may reduce the minimum number of passes if additional passes are detrimental to compaction or stability.

**A. Soil and Granular Embankment.** Use a footed drum roller having a minimum effective weight of 10 tons to compact cohesive soil, except that the Contractor may use a smooth drum vibratory roller if the quantity of embankment is 75 cubic yards or less and the roller is operating on a slope no steeper than 4:1.

For soil or granular material, when a test section is used, use a minimum compactive effort of eight passes with a steel drum roller having a minimum effective weight of 10 tons.

Compact Type D and Type E granular material using at least ten passes of a smooth drum vibratory roller having a minimum effective weight of 10 tons. Add water to Type D granular material as needed or directed by the Engineer.

**B. Shale.** The Engineer will test shale for durability according to [703.16.D](#), to determine if compaction testing is required. For nondurable shale, when a test section is used, use a minimum compactive effort of ten passes with a footed drum roller having a minimum effective weight of 15 tons or with rollers meeting the requirements of [703.16.D](#).

Use water to aid in breaking down large particles and to bring the shale to at least 2 percent above optimum moisture content.

Compact durable shale, as defined in [703.16.D](#), with a minimum compactive effort of ten passes of a footed drum roller having a minimum effective weight of 15 tons or with rollers meeting the requirements of [703.16.D](#). When durable shale is mixed with fine material, use fine material that is at least 2 percent above optimum moisture content. No density testing will be required. If shale mixtures contain large particles of shale, break down the particles during placement until the voids are filled.

Place and compact shale and rock mixtures using the same procedure as for shale. Reduce rock size in a shale-rock mixture to less than or equal to 8 inches, or separate rock greater than 8 inches from the mixture and use as rock fill. Use the construction methods for rock when the shale-rock mixture contains less than 15 percent shale.

**C. Rock.** Reduce the rock until it is small enough to be incorporated into the following horizontal lift thickness: Place rock in a maximum loose lift thickness 6 inches larger than the largest diameter of the rock pieces or 3 feet, whichever results in the smaller lift thickness. When placing rock fill within a length of six times the height of the fill at an abutment, place rock fill in loose lifts not to exceed 18 inches. [For example, if the fill height is 20 feet, then the rock fill within 120 feet of the abutment is placed in less than 18-inch loose lifts.]

Do not dump the rock, but distribute and place the full width of the lift by blading or dozing to ensure proper placement. Evenly distribute the larger rocks, and reduce the voids, pockets, and bridging

to ensure minimum deformation. Incorporate smaller rock pieces in the upper portions of each rock lift to fill the voids during this manipulation.

When placing embankment material other than rock on top of the rock lift, level and smooth the rock surface using suitable leveling equipment and evenly distribute the smaller rock, rock spalls, or finer rock fragments.

Roll all rock lift surfaces with eight passes of a vibratory footed drum roller having a minimum effective weight of 10 tons.

When constructing rock and other embankment materials at approximately the same time, perform the following:

1. Use the rock at the base of the embankment.
2. Use rock in the outer portions of the embankment.
3. Use the larger rocks on the outside side slopes.
4. Use the other embankment material in the inner portion of the fill.
5. Keep the top of the other embankment materials higher than the rock.
6. Construct the other embankment materials to a sufficient width to allow the specified compaction.
7. When rock is placed on top of other embankment material, construct the other embankment material at a center-to-side slope grade of approximately 4 percent.

**D. Random Materials.** Reduce the random material until it is small enough to incorporate into an 8-inch lift, except for RPCC in [203.06.D.1](#) through [203.06.D.4](#).

When using a uniformly graded mixture, use material with a moisture content less than 2 percent below optimum to obtain compaction. When large pieces are incorporated in the lifts, use fine material with a moisture content less than 2 percent below optimum to obtain compaction.

Compact natural soil and natural granular material blends with RAP or RPCC to the same requirements as a granular embankment in [203.06](#).

When using RPCC slabs or large RPCC pieces in the embankment construction, conform to the following:

1. Use natural soil or natural granular material that is less than 2 percent below optimum moisture content in the blend. Reduce the slabs or pieces to less than 3 × 3 feet in size and place the blend in a maximum loose lift thickness of 12 inches.
2. Manipulate, level, and distribute the mixture by blading or dozing to fill the voids and pockets, and reduce bridging.
3. Compact the natural soil or natural granular embankment to the compaction and moisture requirements in [203.07](#).
4. When the RPCC slabs or large RPCC pieces consists of more than 50 percent of the embankment lift, place the blended material in maximum loose lifts of 18 inches. Do not place one slab directly on the other. Compact, manipulate, level, and distribute as stated in [203.06.D.1](#) through [203.06.D.3](#).

**E. Areas Inaccessible to Rollers.** For areas inaccessible to rollers, such as adjacent to culverts, retaining walls, or other structures, construct the embankment in 6-inch horizontal loose lifts.

**203.07 Compaction and Moisture Requirements.** Construct all embankments, except rock and durable shale, using moisture and density controls. Unless otherwise specified in the Contract Documents, the Engineer will perform all compaction tests according to Supplement 1015.

**A. Moisture Controls.** Sprinkle enough water on embankment material that contains too little moisture to wet it to a moisture content needed to meet the density requirements. Apply the water using tank trucks equipped with suitable sprinkling devices. Thoroughly incorporate the water into the material by using discs, plows, or other approved equipment. Continue to water and to manipulate until the required moisture is uniformly distributed throughout the lift.

Before or during compaction, allow the embankment material that contains excess moisture to dry to a moisture content needed to meet the density requirements. Continue drying until the required moisture is uniform throughout the lift. However, for material that displays pronounced elasticity or deformation under the action of loaded rubber tire construction equipment or other equipment, reduce the moisture content to secure stability. Expedite and manipulate the embankment material by drying the wet embankment material by using plows or discs; by adding dry material, lime, lime kiln dust, or cement; or by other methods.

Do not mix shale in the lifts to reduce the moisture content of the embankment material.

**B. Compaction Requirements.** Compact all embankment materials, except for rock and durable shale, in horizontal lifts to a dry density greater than the percentage of maximum dry density in Table 203.07-1, or to 98 percent of the maximum dry density determined by the test section methods specified in Supplement 1015.

**TABLE 203.07-1 EMBANKMENT COMPACTION REQUIREMENTS**

<b>Maximum Dry Density [lb/ft<sup>3</sup>]</b>	<b>Minimum Compaction Requirements in Percent of Maximum Dry Density</b>
90 to 104.9	102
105 to 119.9	100
120 and more	98

If needed for compaction acceptance, construct a test section using the following:

1. Use at least the same number of passes and compactive effort used to construct the test section to construct the production embankment areas.
2. Construct a new test section when the material, supporting foundation, or embankment changes.
3. Reduce the moisture content if the material becomes unstable.

**203.08 Earthwork Construction Tolerances.** Finish the completed excavation and embankment to the cross sections shown on the plans. Check the excavation and embankment work with templates, slope boards, electronic methods, or other methods specified in Item 623. The Engineer will allow occasional deviations in the work within the following tolerances:

- A.** When topsoil is specified, use the following:
1. In fill areas, construct the embankment to the bottom of the topsoil depth.
  2. In cut areas, excavate additional depth to allow for the topsoil.

3. For cuts or fills, the cross sections show the finished grade, which is the top of the topsoil.

**B.** For the backslopes (cut slopes), from the back of the ditch to the existing ground, and for the foreslopes (fill slopes), from the edge of the graded shoulder to the bottom of the ditch, do not allow deviations greater than 1 foot as measured in the horizontal plane.

**C.** Do not construct shoulders and ditches less than the horizontal measurement from the centerline or to a higher elevation than shown on the plans. However, the cross section may vary below the plan grades by less than 1/2 inch at the pavement edge and by less than 2 inches elsewhere.

**D.** Construct or fine grade the subgrade to within 1/2 inch of the plan elevation at any location. Construct or fine grade the subgrade to within 1/2 inch of the plan grade as measured with a 10-foot straightedge applied to the surface parallel to the centerline of the pavement.

**E.** For all rock or shale cut slopes that do not require control blasting techniques, rake excavate, hoe ram, or mechanically shape these slopes to obtain a neat and smooth appearance.

**203.09 Method of Measurement.** The Department will measure Excavation by the number of cubic yards of material in the original position, acceptably excavated, using the average end area method.

The Department will measure Embankment; Rock; Granular Embankment; and Granular Material, Type \_\_\_ by the number of cubic yards of material in the final position, acceptably placed, using the average end area method.

Measurement will include overbreakage or slides not attributable to carelessness of the Contractor, embankment settlement caused by soft embankment foundation, unsuitable materials excavated and removed to obtain proper stability in cut sections and in foundation areas for fill sections.

The Department may use three-dimensional measurements where it is impractical to measure material by the cross section method due to the erratic location of isolated deposits.

The Department will not measure excavation or embankment outside plan limits.

The Department will measure Borrow by the cubic yard or ton as specified in the Contract Documents.

The Contract Documents will specify borrow only when the measurement of the material in its final location by volume is impractical. For example, this would apply when the borrow material is to be placed in locations that are under water or in locations with extremely soft foundations. In addition, the Department may specify borrow when additional material is needed and when [Item 209](#) is specified. In this case, the Department will pay for borrow under [209 Borrow](#).

The Department will measure the volume of borrow material in a natural formation either by the average end area method or by weight.

Where measurement is by the average end area, the Department will take cross sections after the surface has been cleared and scalped and again after the borrow area excavation has been completed. The cross sections determine the volume for payment.

Where the total weight is measured and converted to volume, the Department will determine material density in pounds per cubic yard in its original position by a series of representative field measurements made after clearing and scalping have been performed, and as the excavation exposes the borrow material. Weigh the acceptable material, minus excess moisture, excavated from the borrow area for incorporation into the embankment, and furnish the Department with load slips. The Department will determine the cubic yards for payment by dividing the total weight of the borrow material by the average weight per cubic yard of the undisturbed material. If the moistures of the in-place borrow site

density test material is not within 2 percent of the accepted delivered material, the Department will calculate volume based on the dry densities and weights.

The Department will calculate the volume of borrow from sources other than natural in-place formations, such as processed slag, sand, stone or gravel, and quarry material as follows: Determine the material in-place compacted density in pounds per cubic yard. The volume paid will be the total weight of the material furnished, minus excess moisture, divided by 95 percent of the average embankment density. If the moisture content of the accepted in-place density test material is not within 2 percent of the delivered material, the Department will calculate volume based on the dry densities and weights. Where measurements show that completed embankment exists outside the plan cross sections or outside the allowable tolerances, the Department will multiply the quantity outside plan lines by a shrinkage factor to determine the quantity deducted from the measured borrow quantity. The shrinkage factor is determined by dividing the volume or weight of the material excavated or used as borrow by the volume or weight of the material compacted in place.

When the measurement is by weight, the Department will accept the material based on the freight bills and weight and volume evidence according to [109](#).

**203.10 Basis of Payment.** If the Contract does not include [201](#) Clearing and Grubbing or an estimated quantity for [201](#) Tree Removed or [201](#) Stump Removed, or an estimated quantity for the pay items under [Item 202](#), the Department will not pay for this work directly but will considered it incidental to pay items under [Item 203](#).

The Department will not pay for additional wasting cost of material excavated in the work that was wasted instead of being dried as detailed in [203.03.H](#).

If the Contractor elects to use PCS, the Department will not pay for additional work necessary to comply with the requirements specified in [203.03.J](#).

If during excavation the Contractor encounters remains of prehistoric archaeological sites, historical archaeological sites, or human remains, the Department will pay for such excavation according to [109.05](#).

If during excavation the Contractor encounters hazardous material or waste, the Department will pay according to [109.05](#).

If necessary during the construction in [203.03.H](#), [203.04.A](#), or [203.07.A](#), the Department will not pay for removing the saturated embankment or drying the embankment.

If caused by improper excavation methods, the Department will not pay for removing slides and breakages beyond the limits of the planned finished work. The Department will pay for the removal of slides and breakages beyond the limits of the planned finished work according to [109.05](#), when there is no Contractor fault or neglect.

If caused by the lack of implementing erosion controls, the Department will not pay for reshaping shoulders, slopes, and ditches damaged by erosion during construction.

If caused by the Contractor's equipment or methods, the Department will not pay for repairing or restoring damaged areas designated for salvage.

When topsoil is specified, the Department will not make deductions or additions from the earthwork quantities for the topsoil.

The Department will not adjust earthwork quantities when the volume between two consecutive cross-sections differs by less than 5 percent from the plan quantity, unless the difference between the actual quantity and plan quantity is greater than 1000 cubic yards for all pay items measured by the

cubic yard under [Item 203](#), combined. For quantity differences greater than 5 percent or greater than 1000 cubic yards, submit supporting documentation to the Engineer. However, the Department will adjust earthwork quantities for changes less than 5 percent or 1000 cubic yards when the change results from the following: undercutting, foundation settlement, changes to grades or slopes, and removing slides. For quantities measured for payment, the Department will use the plan cross sections, corrected for errors, as the original field cross sections. Additional cross sections may be interpolated from the plans at points necessary to more accurately determine quantities.

The Department will pay according to [109.05](#) for changes or extra work that increases the haul distance more than 1/2 mile to the work detailed in the Contract Documents. The Department will pay for additional quantities that increase the haul distance 1/2 mile or less at the unit bid price.

When specified, the payment for borrow includes all work to complete the embankment construction to the cross sections shown on the plans. The Department will not make additional payment for the embankment construction of the borrow material. When borrow is not specified, all work is included in the excavation or embankment pay items.

The Department will pay for accepted quantities at the contract prices as follows:

<b>Item</b>	<b>Unit</b>	<b>Description</b>
203	Cubic Yard	Excavation
203	Cubic Yard	Embankment

## ITEM 304 AGGREGATE BASE

**304.01 Description.** This work consists of furnishing, placing, and compacting one or more courses of aggregate on a prepared surface, including furnishing and incorporating all water required for compaction.

**304.02 Materials.** Furnish materials conforming to [703.17](#).

**304.03 Before Spreading.** Sample the material stockpile, according to [ASTM D75](#), to determine the initial moisture content to be used for compaction. Create the moisture-density curve according to [AASHTO T 99](#), Method C or Method D, to determine the optimum moisture content. For projects when the total volume of material is less than 1000 cubic yards, the optimum moisture content may be obtained from a moisture-density curve that was performed on the material within 1 year prior to the date of placement. Submit moisture-density test results to the Engineer.

Use material that has reasonably uniform moisture content. Ensure the moisture content is not less than 2 percent below the optimum moisture content before spreading. Add water to the stockpile if necessary to meet this moisture requirement.

Handle the material in a manner to minimize segregation. If segregation occurs, thoroughly mix or regrade the stockpile.

**304.04 Spreading.** Spread the material on the prepared surface. Do not use frozen material and do not spread on frozen surfaces.

Do not exceed a compacted lift thickness of 8 inches when using vibratory rollers with effective weights greater than 12 tons. Do not exceed a compacted lift thickness of 6 inches when using vibratory rollers with effective weights from 10 to 12 tons. Do not exceed a maximum compacted lift thickness of 4 inches when these vibratory rollers are not used. The effective weight of a vibratory roller is the weight plus the centrifugal force from vibration. Submit documentation from the manufacturer that shows the vibratory roller meets the minimum effective weight requirements.

Place the material in two or more approximately equal lifts when the specified compacted thickness exceeds the maximum allowed.

Place the material with self-propelled spreading machines capable of placing the material true to line and grade. Spreading machines such as spreader boxes or pavers are allowed. Do not use graders or dozers without spreader boxes to spread the material except for areas described in the next paragraph. Spread the material such that it minimizes segregation and requires minimal blading or manipulation. The Department may perform in-place gradation testing in areas that are visually segregated according to Supplement [1090](#).

The Contractor may use hand-placing methods, dozers or graders when the total area of the material is 2000 square yards or less or in small areas where self-propelled spreading machines are impractical. Small areas include lane widths less than 12 feet or lengths less than 1000 feet. The Department will not take in-place gradation tests in these small areas.

The Department may test for in-place gradation after spreading but before compaction testing according to Supplement [1090](#).

**304.05 Compaction.** Add water or dry the material to bring it to within 2 percent of the optimum moisture content before compacting. Maintain the moisture content within this range during all compaction operations. The Engineer will determine the percentage of moisture to apply or to be dried from the material. Uniformly apply the water or dry the material throughout the lift and in a manner that does not soften or disturb the lower courses. Reduce the moisture content if the material becomes unstable during the compaction operation.

Compact each lift of material immediately after spreading. Use rollers that correspond with the lift thickness as described in 304.04. The Contractor may use lighter rollers or vibratory equipment in small areas as specified in 304.04 or when heavier rollers are not practical. Approved compaction equipment may consist of vibratory rollers, static rollers, or vibratory equipment.

At the beginning of the compaction operation, construct a test section according to Supplement 1015. Use a minimum compactive effort of eight passes to construct the test section. Use and adjust the vibration on the vibratory rollers to maximize the density and stability. Construct a new test section when the material changes or when the supporting materials change appreciably.

Unless otherwise specified in the Contract Documents, the Engineer will perform all compaction tests according to Supplement 1015.

The Engineer will use 98 percent of the test section maximum dry density for acceptance of the production material. Use at least the same number of passes and compactive effort used to obtain the test section maximum dry density for the production material. At a minimum, use eight passes in the production area. The Engineer may reduce the minimum passes if the passes are detrimental to compaction.

The Engineer may check the production material density before or after the finishing operations.

Maintain the surface of each lift during the compaction operations in such a manner that the surface texture is reasonably uniform and the material is firmly keyed.

Cover the aggregate base with the next layer of pavement before the end of the construction season. If the aggregate base is not covered up, then assume all liability for contamination of, damage to and instability of the base, subgrade and underdrains.

Provide drainage and maintain the material according to 203.04.A.

**304.06 Finished Surface.** Ensure that the finished surface does not vary more than 3/8 inch from a 10-foot straightedge parallel to the centerline or more than 1/2 inch from a template conforming to the required cross-section. Furnish straightedges, templates, or other devices satisfactory to the Engineer, and check the surface for conformance with these requirements.

Do not construct the aggregate base at a consistent depth below the required minimum compacted depth thickness. When the depth is found to be less than the required depth, provide the Engineer with a written corrective action plan for approval.

**304.07 Method of Measurement.** The Department will measure Aggregate Base by the number of cubic yards computed from the profile grade and typical sections, compacted in place.

Where variable depth is specified, the Department will measure the number of cubic yards of aggregate base by converting from weight using the following conversion factors:

**TABLE 304.07-1**

<b>Material</b>	<b>Conversion Factor</b>
Crushed stone	4000 lb/yd <sup>3</sup>
Crushed gravel	4000 lb/yd <sup>3</sup>
Crushed slag <sup>[1]</sup>	
less than 90 lb/ft <sup>3</sup>	3600 lb/yd <sup>3</sup>
90 to 100 lb/ft <sup>3</sup>	4000 lb/yd <sup>3</sup>
more than 100 lb/ft <sup>3</sup>	4500 lb/yd <sup>3</sup>
Granulated slag	2800 lb/yd <sup>3</sup>

[1]Based on average dry rodded weight of standard size of slag aggregates on record at the Laboratory. The conversion factors listed are the long gradation weights. These numbers are based on the dry rodded weights of No. 67, 57, or 8 gradation. The Department will determine slag weights based on weights obtained from the original source.

The Department will verify that the moisture content of the delivered material is less than 2 percent above saturated surface dry (SSD). If the moisture content is greater than 2 percent above SSD, then the Department will calculate the number of cubic yards based on the dry density and dry weight.

The Department will determine the pounds per cubic yard for aggregate mixtures by using 100 percent of the test section maximum dry density obtained in [304.05](#).

**304.08 Basis of Payment.** The Department will pay for accepted quantities at the contract price as follows:

<b>Item</b>	<b>Unit</b>	<b>Description</b>
304	Cubic Yard	Aggregate Base

## ITEM 403 ASPHALT CONCRETE QUALITY ASSURANCE

**403.01 Description.** This specification outlines the asphalt concrete quality assurance program including the contractor requirements for controlling asphalt concrete mixtures during production and construction through Contractor provided quality control (QC) testing and the Department Verification Acceptance (VA) program.

**403.02 General.** The Contractor is responsible for all aspects of process control and QC needed to ensure quality of the specified material, including but not limited to sampling, testing, inspecting, assessing, and corrective action to ensure the quality of the final product.

The Department is responsible for all aspects of quality assurance (QA) and independent assurance (IA) to ensure and verify the quality and acceptability of the final product. Independent (non-split) random samples are required for Contractor QC when those results are used in the acceptance decision, and for Department VA.

The Department will verify Contractor QC results by QC monitoring reviews and by Department VA sampling and testing. If the Contractor results cannot be verified, Department results will be used for acceptance and payment. If the Contractor fails to operate according to their Department-accepted Quality Control Program (QCP), the Department will accept asphalt mixtures by Restricted Acceptance.

Restoration of Contractor QC sampling and testing used for acceptance will be by the Department's Quality Control Review Group (QC Review Group) based on District recommendation and review of the Contractor problems, resolutions, and QCP. The QC Review Group consists of the Asphalt Materials Engineer, Office of Materials Management (OMM); the Administrator, OMM; and the Pavement Engineer, Office of Construction Administration.

Acceptance does not relieve the Contractor of responsibility for supplying and installing a finished product conforming to all requirements of the Contract.

Supplement 1041 outlines the responsibilities and requirements for Contractor and Consultant employees engaged in all aspects of asphalt concrete production at any level, including, but not limited to, management, supervision, quality control (QC), plant operations, materials management, paving operations, and hauling truck drivers.

**403.03 Quality Control Program (QCP).** For each paving season create and execute a QCP. In the QCP cover processes conducted to provide an asphalt mixture at the paving site that is uniform in composition, conforms to the specification requirements and that when placed is free of any defect (ex. segregation, lack of mixture and texture uniformity, raveling, rutting, holes, debris etc.) within the Contractor's control at project completion. The intention of the QCP is not to copy and paste or paraphrase what is already in the specifications. It is expected that contractors that only place asphalt mix (i.e., paving contractors) also submit a QCP. A minimum of four weeks before mix production and placement, but no later than second Friday in January, submit a hard copy of the proposed QCP to OMM for review and acceptance.

Provide digital copies in a searchable formatted PDF, such as Optical Character Recognition. Convert files from Microsoft Office documents (printed or saved as a PDF) and other computer programs (e.g., plant control systems), including all appendices, as a single document with page numbering. Documents that are unable to be converted digitally without printing can be scanned into a PDF, however, the results must be digitally readable. Save digital files with the date of revision in the file name. Keep a copy of the Department's acceptance letter and the QCP in both the Contractor plant laboratory and the plant operation control room. A digital copy of the QCP and acceptance letter may be kept in each location provided that the QCP file icon is labelled with a descriptive file name

that includes the revision date and is on the computer's desktop in each area. Remove out-of-date QCPs from the computer desktop. Updates to the QCP will require the entire QCP to be submitted with the updates and a summary of the changes. Send a hard copy and a digital copy of the acceptance letter and QCP to OMM and District Testing in every District in which work is performed.

Execute and comply with the Department accepted QCP. Failure to comply with the accepted QCP may result in removal of personnel in accordance with Supplement 1041, removal from VA, and adversely affect the Contractor's Prequalification rating.

For Contractors who produce and place material, include all sections in the order below and include the bold titles. For Contractors who only produce mix include sections A through M, S, and T. For Contractors who only place mix include sections A through C and M through T. As a minimum, include in the following in the QCP:

Make the first page of the QCP a front cover with the Company name(s) and logo, the construction year, a statement that this is their Quality Control Plan, and the revision date. Start the second page with the Table of Contents listing all the required sections below in the same order with page numbers and including Appendices. Name Appendices with letter and title of each section and include after the revision sheet.

**A. Quality Control Personnel:** Provide the Contractor's full name including main address, mailing address if different, phone number(s), email(s), and other information as deemed fit. Provide a table of organization (can be a hierarchy list) including company president, vice president, superintendents, Quality Control, Plant, and Paving Managers including area managers, and supervisors and note their designated responsibilities to meet QCP requirements. Include office and cell phone numbers, emails, office location if different than the main office, and Department approvals (e.g. Asphalt Level 2 or 3 and FQCS). Provide the name of the Quality Control Manager holding a Supplement 1041 Level 3 approval for production and the names of FQCS for placement and who are company employees. Provide lists of approved Asphalt Level 2 and 3 technicians and FQCS technicians in Appendix A that includes expirations and a date showing when the lists were put together. Note any technicians that are consultants and the company that employs them.

**B. Training:** Document means for annual training including in ethical conduct according to company expectations of all company employees and consultants who are responsible for the mix design, production, testing, and placement of asphalt mix and their supervisors. Document how and when training is given, what the expectations are, how expectations are communicated and list the personnel classifications being trained. Describe the QC Manager's and supervisor's responsibilities and methods to ensure personnel are trained and ethical conduct is maintained throughout the year.

**C. Review of QCP:** Procedure for ensuring that every Contractor employee involved in the testing of asphalt mix, operation of the asphalt plant facility, and placement has read the QCP and has on site access to all applicable Department specifications, supplements, proposals, policies, and the current approved JMF.

**D. Level 2 Lab Calibration:** Procedures for equipment calibration and documentation for Level 2 lab equipment including calibration record storage. Ensure calibration intervals meet or exceed the Department requirements (Supplements, AASHTO, ASTM standards, and AASHTO R 18). Provide documentation that all Level 2 lab equipment has been calibrated at the time of the Level 2 lab approval inspection.

**E. Asphalt Mixture Quality Control Sampling and Testing:**

**E1. QC Technicians:** Assign Level 2 technicians for all Level 2 QC testing duties. Provide a list designating Level 2 technician responsibilities and expected actions. A list of technician names is not

required in the QCP but shall be included in AWP. Ensure only approved personnel handle and test samples at all times. If Level 2 consultant technicians are used, include a document in the QCP listing designated responsibilities and expected actions (if different from employee expectations). Provide a copy of the document to the Level 2 consultant technician.

**E2. Random Numbers:** Provide and follow the procedure for determining random numbers for asphalt mix QC sampling and testing including additional sampling and full testing at the start of production. Track random numbers used. Include how random numbers are tracked and the frequency that they will be monitored and that processes are being done correctly (that they have an approximately equal distribution of results across the entire Lot or Sublot). Document how any misuse of the random number procedure is corrected and ensure future compliance.

**E3. Labeling:** Document and follow the procedure for labeling QC, calibrations, sublots, and split samples and testing done on the TE-199, TE-448, and TE-125. Include procedures for saving samples, including duration, and how samples will be destroyed and removed from the lab that are not required by specification (e.g., heat up pills in oven and bust open).

**E4. Extra Testing:** Provide and follow procedures, frequencies, and expectations (e.g., how will the extra testing help with ensuring the mixture conforms to the specification requirements) for extra testing (e.g., responses to poor test results or field mix problems, aggregate stock testing, reclaimed asphalt concrete pavement checks, additional moisture checks) and any other testing necessary to control materials not already defined in these Specifications. Include how these will be labeled on the Quality Control Report. If extra testing procedures do not follow Department procedures, provide step-by-step instructions for each test in Appendix E4. Note: District Testing may observe, review, and approve or disapprove the procedures at any time according to 403.06.E.

**E5. Warning Band & Control Charts:** Provide and use warning bands for all tests and give specific instruction how the warning bands and control charts will be used for tests in concert with 403.06.E, 403.06.F, Table 403.06.G-1 specification requirements. Include an example control chart according to 403.06.E in Appendix E5.

**E6. QC Test Result Issues:** Provide and follow step-by-step procedure of how QC technicians will handle mix that is in the warning band, out of specification including when multiple failures happen, and how these issues will be resolved (e.g., when air voids are out what adjustment(s) will be made, etc.). Flow charts may be used and provided.

**E7. Recording:** Provide how results will be accurately and correctly recorded and reported and who will be responsible for sending daily results to District Testing. If the role for sending daily results to District Testing is the QC technician, indicate QC technician (a specific name is not required). Provide copies of all test reports and forms used in the quality control process including any forms that would be used for handwritten data in Appendix E7.

**F. Record Retention:** Provide and follow methods to maintain all worksheets, including all handwritten records, and other test and sample records from all plant(s) and, or project(s) for a minimum of eight years. Define the test record retention process. Define company records retention requirements.

**G. Asphalt Binder QC:** Provide and follow procedures for handling and testing of the mix plant asphalt binder QC samples and subsequent corrective action of binder test failures of any sample (QC or Department). Include how samples will be labeled and stored. Failure to perform QC of asphalt binder samples is at the Contractor's risk. Any Department binder sample failures will result in penalties according to Supplement 1102. These include remove and replace, pay deductions, or other

penalties for the asphalt mix represented by the Department's sample. The Department may take as few as one sample representing the entire course being placed according to C&MS 700.00.

**H. Mix Plant Info:** List of each mix plant name, mix plant number, AWP Facility ID, plant operator(s), phone number(s), email address(es) (if applicable), county the plant is located, physical address, mailing address (if different), and if plant is portable. For each mix plant also include the mix plant type including drum type (e.g., counter-flow, parallel flow, double barrel, mini drum, uni-counterflow), if applicable, plant operating system, the high and low operating tons per hour, number and size of storage silos, number and size of liquid asphalt binder silos or tankers, RAP processing method used, if the plant has the capabilities to in-line blend chemical additives (e.g. chemical WMA and liquid antistrips), if plant has WMA water injection system, RAP bin sizes and number of bins, and if RAS will be used. Provide copies of 5-minute printouts with labels showing the minimum criteria required according to Supplement 1101 with each computerized system used in Appendix H.

**I. Quick Calibrations:**

Provide expectations on when quick calibrations will be performed according to Supplement 1101 outside of the minimum frequency (e.g., mix production issues). Provide example quick calibration documentation forms in Appendix I.

**J. RAP/RAS Processing:** Provide and follow procedures to meet the processing, testing and documentation requirements for RAP and RAS in 402.04 including test forms, record keeping, technician responsibilities, and the following.

**J1. RAP Processing:** Include in the QCP methods of validating RAP properties when using concurrent project RAP. Include additional methods and procedures to dictate how the processing of RAP by means of fractionation or by additional in line processing will be accomplished for mix plants using Method 2. Specify documentation method for RAP pile measurements. Include any additional information about RAP or RAS processing and pile maintenance (e.g., if RAP piles are moved to other or shared between plants).

**J2. RAS Processing:** If RAS is used, include RAS usage methods before using RAS and include what Contractor requirements apply to the RAS processor. Include the Contractor's blending equipment type and operation and uniformity testing requirements for preblended RAP and RAS or RAS and virgin aggregate. If methods are different based on the mix plant, specify what plants follow what methods. Other methods must be approved by OMM prior to use on a project.

**K. Material Verification & Handling:** Provide and follow procedure and frequency for ensuring aggregates, RAP, and RAS piles, and asphalt binder source and PG grade (bill of lading and BOL load number) are reviewed against the running JMFs and record of review listing the above information be kept in the plant lab for the duration of the project. Means to meet the handling and storage requirements of 402.06 and asphalt binder suppliers for all asphalt binders.

**L. In-Line Blending of Additives:** Provide and follow processes outside of Supplement 1053 for in-line blending for chemical WMA additives and liquid antistrip additives (e.g., storing and handling additive during cold weather). Include procedure(s) to calibrate in-line additive pumps. Include a description of what chemical WMA additives and antistrip additives will be used at each facility (may be included in 403.03.H). Include example weight tickets with chemical WMA used according to 402.05.B and forms for dosing rate verification in Appendix L.

**L1. 401.05 Cold Temp Production:** Provide and follow procedure and processes for producing mix with chemical WMA for cold temperature paving according to 401.05 including how it will be communicated with District Testing when it will be used, how the target dosage will be determined,

and corrective actions when mix issues occur (e.g., chunking or low density in the field). Address communication efforts and checks with paving company.

**L2. Dosage Verification:** Provide and follow procedures to ensure proper dosing rates are within tolerance according to Supplement 1053 and a corrective action plan when rates do not meet requirements.

**M. Haul Vehicles & Mix Quality:** Define who is responsible at each mix plant and at the paving site to meet delivered mixture uniformity/coating. Provide and follow specific methods for ensuring all haul vehicles meet all Department requirements including procedures for ensuring haul vehicles not meeting requirements are not used, that proper bed release products are used and checks to ensure non-approved release agents or products (i.e., diesel) are avoided, and that tarps completely cover all loads. Include immediate notification to the Department of non-compliance. Detail procedures of loading mixture to minimize thermal and material segregation.

**N. Field Quality Control Supervisor (FQCS):** Provide a Supplement 1041 approved FQCS who is a company employee that is routinely and usually at the paving site during placement of any permanent asphalt concrete pavement. Define the roles and responsibilities of the FQCS including how the FQCS will be determined when more than one person on the paving crew is a FQCS and what position on the crew (e.g., paving foreman) would likely be the FQCS.

**O. Misc. Equipment for Paving:** Provide and follow details on calibration and verification of asphalt distributors, tar kettles, and other equipment used for applying emulsions and hot applied materials (e.g., tack coats, longitudinal joint adhesive, VRAM).

**P. 401.05 Cold Temp Paving:** Describe and follow the extra steps (e.g., additional rollers, extra monitoring of density) planned for cold temperature paving, including any communication.

**Q. Mix Paving Issues:** Provide and follow a detailed description of how the FQCS will handle and correct all paving issues including segregation, tenderness, mat tears, debris, holes, low density, bleeding/flushing, not straight joints, poor tack coat, longitudinal joint sealant, VRAM application, and milling/planing irregularities like scabbing, etc. Include that the FQCS is to immediately communicate all issues to the Department.

**R. Field Sampling & Coring:** Provide and follow procedures for sampling, tracking, handling and documentation method for all sampling and testing at the project paving site including taking of all cores used for density determination or density gauge correlation. Describe the process for Supplement 1055 cores including who will run the cores for the Contractor and how the results will be reported back to the Supplement 1055 gauge operator. Ensure personnel obtaining and handling cores at the project site are approved Asphalt Level 2 technicians, FQCS or personnel approved by OMM or Office of Construction Administration.

**S. Signatures:** Provide the signature of the Quality Assurance Manager for both production and placement and, if different, the person in authority to enforce all operations covered by the QCP as outlined in this subsection.

**T. Revision Sheet:** Provide a revision sheet with the last 8 years of records. In the revision sheet include three columns: the first column being the date of the revision (matching with the revision sheet date); the second column is to list the section and page number being updated; and the third column is to provide a short description of what was revised, added, or removed. Highlight all revisions from the previous version to make clear to the Department what was revised or added.

**Stone-Matrix Asphalt (SMA) Mixes:** For 443 mixes, develop and follow a separate project specific QCP with the following additional information beyond the above sections in a single QCP and

submit to OMM, District Testing, and the Engineer at least 3 weeks before the start of production for acceptance. Include production and placement activities for the SMA. If separate companies produce and place the mix, collaborate to develop a single project specific QCP. Also, submit the already accepted QCP outlined above along with the project specific QCP. Provide a front cover for the project specific QCP that clearly indicates its use for SMA; the construction project number; the Company names(s) and logo(s); and the revision date. Provide a Table of Contents as the second page including page numbers and sections in the order below.

#### **U. Quality Control:**

**U1. Manager and Technicians:** List the QC Manager that will oversee production and their experience with SMA. Provide a list of approved Asphalt Level 2 and 3 technicians that will be present during production of the SMA and their experience with SMA sampling and testing.

**U2. Testing Equipment:** Provide additional equipment and calibrations to test SMA.

**U3. Additional Testing for SMA:** Describe what additional testing will take place. Include special testing worksheets to calculate the additional tests required for SMA in Appendix U3.

**U4. Troubleshooting Production of SMA:** Provide step-by-step details on what adjustments will be made if mix issues happen (e.g., segregation, draindown, fiber stabilizer clumps in mix, etc.)

**V. Production:** Provide the plant(s) that will produce the SMA and the experience the plant operator(s) has with SMA production. Include additional calibration procedures for the fiber stabilizer and verifying rates.

#### **W. Placement of SMA:**

**W1. FQCS:** Provide the FQCS that will oversee the placement of the SMA and their experience with placing SMA.

**W2. Hauling:** Provide any additional steps on hauling of the asphalt mix including special considerations related to haul distance, air temperature, etc.

**W3. Project Specific Paving:** Provide any additional steps that are specific to paving SMA for this project that will need special considerations (e.g., gore areas, hand work, pavement geometry, etc.).

**W4. Test Strip:** Provide details on placement of the test strip including any changes needed compared to non-443 mix placement.

**W5. Troubleshooting:** Provide step-by-step details on what adjustments will be made if mix issues happen (e.g., segregation, fat spots, bleeding/flushing, etc.)

**X. Signatures:** Provide signatures and dates of the QC Manager, Asphalt Level 3, Plant Operator, and FQCS so that they understand the SMA specification, their duties, and have read this project specific QCP and company QCP.

**403.04 Testing Facilities.** Provide testing facilities at the plant site conforming to Supplement 1041. Provide testing facilities and sufficient testing equipment and qualified staff that can handle the production at the plant, including multiple projects being produced during the same production day.

**403.05 Asphalt Mixture Sampling.** Sample and provide enough material to perform all required and requested testing by the Department. Follow sampling requirements as outlined below.

The District may require sampling and testing from the roadway according to AASHTO R 97, Subsection 5.9 (*Sampling from Roadway before Compaction*).

Report all sampling and testing on the Quality Control Report, as applicable (TE-125 for 301, 302, and 424 Type A or TE 199 for all other mixes) and when applicable the 448 and 449 Sublot Report (TE-448).

**A. Quality Control (QC) Sampling & Testing.** For QC sampling and testing, the Contractor's technician will randomly select the truck in which to take a sample by using a Department provided random number generator. For 448 and 449 sublots, the Department will provide the random number immediately prior to each sublot. The Contractor's technician will give no indication to anyone other than the Department of the time that the sample is to be taken. Include the random number, sample tonnage location, and time of sampling on the daily Quality Control Report with each test. with each test.

Random independent (not split) sampling and testing is required by Federal regulation. A single pattern of non-randomness will be a minor event as indicated in Supplement 1041 and a continued pattern of non-randomness will trigger a major event and Restricted Acceptance according to 403.11.

For QC 446, 447, and non-449 sublot samples, sample and test a minimum of one time for each 750 tons (680 metric tons) of asphalt concrete produced, or for any portion of 750 tons, for every production day.

For 448 and 449 sublot sampling and testing, the sublot sample will be the QC sample as described below. For low production days where a sublot sample is not generated, sample and test one random QC sample.

A production day includes the period of time from when mix production begins to the time the last load of asphalt leaves the asphalt plant, either from the mix drum or from any storage silo. Any planned break in plant production to accommodate a new work shift triggers a new production day.

Perform random additional sampling and full testing beyond the minimum specified for QC during the first three days of production. These samples will be called 'Additional Tests' and are required. All tests are required to be reported on the Quality Control Report.

Extra sampling and testing are at the Contractor's discretion according to their QCP and are considered process control. All tests are required to be reported on the Quality Control Report. Contractor process control sampling and testing do not need to be random and cannot be used for acceptance.

If samples are split, test all samples taken. Split samples are for process control or troubling shooting differences in Department and Contractor results and cannot be used for acceptance. When split samples are requested, provide a clean area of sufficient size and a hard surface to perform sample splitting at the testing facility. Split samples by quartering and recombining only as described in AASHTO R 76, Method B for hard surfaces for the Department and Contractor's sample. Alternately, use a mechanical splitter according to AASHTO R 47, Type A, followed by the quartering method. The split sample size required is generally 22 to 27 pounds (10,000 to 12,000 g). A mechanical quartering device approved by OMM may be used in lieu of the above but only split according to the procedure outlined in the Contractor QCP. Wrap and label split samples as process control, the Lot Sublot, time, location (tonnage), and accompanying Contractor test identification. The Monitoring Team will pick up all Department samples within four work days. Sample mishandling (careless identification, changing sample size, consistency, or pre-testing) will result in a change to Restricted Acceptance.

**B. Sublot Sampling and Testing.** For 448 and 449 acceptance mixes not including 301, 302, and 424 Type A mixes, conform to the procedures of Supplements 1035, 1038, 1039, and 1043. Use 3000 tons (3000 metric tons) Lots and 750 tons (750 metric tons) Sublots. However, when production is

limited to less than 3000 tons (3000 metric tons), the quantity produced will be considered a partial Lot, unless otherwise approved by District Testing or OMM. For partial Lots of 1500 tons (1500 metric tons) or less sample and test at least two subplot samples regardless of the tons produced. The Department will provide the random number for the subplot immediately prior to each subplot sample. It is the responsibility of the QC technician to ensure they have the subplot sample and immediately notify the Monitoring Team if they do not have one.

Sublot samples will be considered QC samples and will have full testing performed as outlined in 403.06. The test results will apply for both QC and subplot requirements.

Test all subplot samples from locations selected by the Monitoring Team or Engineer. A change in the location of the Sublot sample must be approved by the Monitoring Team and be reasonably close to the original location. This location allowance does not apply to any other samples including Department VA sample locations selected by the Monitor.

Record all subplot test data on form TE-448 in addition to the Quality Control Report.

**C. Small Quantity.** Small Quantity (SMQ) sampling and testing will be allowed for Contractors with an accepted QCP according to 403.03 and for facilities not on Restricted Acceptance. SMQ is only allowed for JMF's that have been properly offset according to Supplement 1043, show documented acceptable comparison testing according to 403.06 and 403.10, and do not represent a 448/449 subplot sample location. Notify District Testing a minimum of 24-hours prior to testing of any SMQ material unless otherwise authorized by District Testing. The total production per project for each mix type is not to exceed 750 tons or 20 percent of the mix type bid quantity tonnage, whichever is less.

District Testing can sample, test and reject any material received under this procedure. Material may be rejected by visual inspection by the Department or rejected through Department verification testing. Poor plant or mix control, poor mix performance, poor mix quality, failure to submit the required forms as required, or ongoing District sample failures can result in disallowing further use of this procedure on the project and future projects. This procedure may be disallowed by the Department for any Contractor's facility when documented premature SMQ mix failure in any application has occurred on the Contractor's previous project(s).

When material is being produced under this procedure and has a quantity of less than 150 tons per production day for each mix type, no QC sampling or testing is required, and the acceptance is by Contractor certification as outlined below. A Department Level 2 or 3 technician must be present to verify the mix in the haul trucks is acceptable, not visually segregated, well coated, and is within an acceptable mix temperature. Any mixture sent to the paving site greater than 150 tons that does not have adequate QC testing will be considered non-specification material and subject to removal.

A quick check plant calibration must have been performed in accordance with the Contractor's QCP as outlined in 402.03. Computerized plant operation tickets, a copy of the dated and signed quick check calibration(s), and a TE 199 SMQ form must be submitted.

The required SMQ information must be submitted by the Contractor to District Testing by the end of each production day unless otherwise authorized by District Testing. The TE-199 SMQ form will be signed by an employee of the Contractor having authority to represent the Contractor as outlined in the Contractor's QCP. The TE-199 SMQ form will be sent to the Project Engineer and District Testing.

Failure to follow the procedures outlined above may result in the removal of SMQ use for the mix plant facility. Ongoing issues occurring company-wide may result in the removal of SMQ acceptance for the company.

**403.06 Quality Control Tests.** Prior to each production day, determine the moisture content of each aggregate, RAP, and RAS stockpile to be used in the JMF according to AASHTO T 255 and ensure the moisture contents are entered into the mix plant controls. Retest stockpiles after weather event prior to resuming production day and as outlined in the Contractor's QCP.

Perform process and QC tests on all samples to control the asphalt concrete mix within the specifications and report each test result according to Table 403.08-1. As a minimum and as required by mix type, ensure that these QC tests measure the asphalt binder content, gradation, air voids, Maximum Specific Gravity (MSG), and any additional testing according to the Contractor's accepted QCP. Perform only asphalt binder content and gradation testing for 301, 302, and 424 Type A. Ensure QC tests for asphalt binder content and air voids are not consistently on the low side or high side of JMF and adjust the mix within the tolerances allowed by the specification.

Perform additional process testing, QC sampling and testing, or both, over the minimum required, during production when the QC tests show the asphalt concrete being produced is outside the warning bands in the Contractor's QCP. Immediately resolve problems indicated by any test result exceeding the warning bands and immediately retest a sufficient number of samples to validate corrections have returned the materials to within the warning band limits. The Contractor may determine the method of testing the asphalt concrete beyond the minimum specified contractually according to the details and the methods technicians will follow in the Contractor's accepted QCP.

Should additional testing as required above not be performed, District Testing, after consultation with OMM, will require the testing frequency to be increased for the remainder of the project. If this occurs, District Testing will request an opinion from the QC Review Group for action(s) against the technician, Contractor, or both including but not limited to warning, removal, or a change of the facility to Restricted Acceptance.

Record the results of every test performed, including failed tests.

Perform the required QC tests, control charts, and test requirements as follows:

**A. Asphalt Binder Content.** Determine the asphalt binder content of a sample of asphalt concrete by performing an Asphalt Content (AC) Gauge test according to Supplement 1043. Make all printouts available for review by the Monitoring Team at any time. Offset the AC Gauge for each JMF on each project at the start of the project. Perform the offset using the solvent extraction method for every QC sample according to Supplement 1038 and the AC Gauge Verification and Offset Record until the offset is established. Use solvent extraction according to Supplement 1038 when an AC Gauge problem exists and for testing cooled samples that cannot adequately be tested in an AC Gauge test.

Total, for each day's production, the flow meter printouts for SBR polymer added at the asphalt concrete mixing plant. Calculate the percent of polymer versus neat asphalt binder in the mix each day and record values on the Quality Control Report. Provide calculation worksheets and printouts in the plant laboratory for review by the Monitoring Team. A +/- 0.2 percent tolerance from the target amount of SBR polymer will be used as a guide for an acceptable amount of SBR polymer, but consistently low values will not be acceptable. Only take SBR PG-Modified Binder samples using a five-gallon (19 L) bucket. Take 1 gallon (4 L) of binder to clean the valve port and discard it. Take 2 gallons (7.5 L) of binder, stir its contents and transfer it to the required sample containers.

Determine the moisture content of the asphalt concrete for each AC Gauge test according to Supplement 1043. Maintain the moisture content at 0.80 percent or less.

**B. Gradation.** Perform the gradation test on aggregate remaining after removing the asphalt binder with a solvent from an asphalt concrete sample used in an AC Gauge test (solvent sample) or on aggregate remaining after removing the asphalt binder with a preapproved asphalt ignition oven

according to Supplement 1054 and from an asphalt concrete sample used in an AC Gauge test (ignition oven sample). For asphalt concrete samples with polymer modified PG Binder use only an asphalt ignition oven to obtain aggregate gradation results. District Testing may make an exception to this for SBS polymer if no issues arise. Correct each solvent sample for ash. Perform all other gradations on solvent samples, ignition oven samples, or on samples obtained according to the Contractor's accepted QCP.

The gradation results of all the sieves must be representative of the JMF. If the Contractor fails to control the entire gradation, the Department may require a redesign according to 440.

When the F-T value is specified for a mix, calculate it for each gradation analysis. Maintain the F-T value at +4 percentage points or less for these mixes during production.

Calculate the F/A ratio for every solvent sample or ignition oven sample analysis. Maintain the F/A ratio so no F/A ratio is greater than 1.2 for all mixes. Use the effective asphalt binder content determined by the AC Gauge for calculating the F/A ratio. For 302 mixes, use total asphalt content determined by the AC Gauge. Calculate the effective asphalt binder content according to the Department's Asphalt Level 2 procedures. Use MSG from the production mix test. Use the combined Gsb value based on bin percentages during the time the sample was taken. Calculate the effective asphalt binder content on the calculation sheet using the asphalt binder content determined by the AC Gauge and attach it to the Quality Control Report. If the F/A ratio is greater than 1.0 for ignition oven samples, calculate the F/A ratio using the percent passing the No. 200 (75  $\mu$ m) sieve from a washed gradation of the ignition oven sample according to AASHTO T 30.

**C. Air Voids and MSG.** Determine the air voids of the asphalt concrete by analyzing a set of compacted specimens and a corresponding MSG determination according to Supplement 1036. Use a Marshall or gyratory compactor meeting the requirements of Supplement 1041 to compact specimens. If the compactor was moved to the plant before production, calibrate it and present the results to District Testing for acceptance. Ensure that the cure temperature and specimen compaction temperature are the same. Use a 1-hour cure for all mix samples used in air voids analysis. The Contractor may use a 2-hour cure time if voids are consistently near the low air void warning band. When a 2-hour cure is used, notify District Testing and OMM and use the 2-hour cure for all air voids testing through the remainder of the project, and record the cure time and temperature on the Quality Control Report. Use the approved JMF lab compaction temperature. Do not reduce lab compaction temperature for warm mix asphalt. Use a compaction temperature tolerance of +/- 5.0 °F (3.0 °C). Compact specimens to design blows or Ndes. Record on the Quality Control Report if the mixture produced was run at the asphalt plant as a hot mix asphalt (HMA) or as a warm mix asphalt (WMA) produced according to 402.05 or another approved method.

Calculate the Voids in Mineral Aggregate (VMA) value for every set of compacted specimens according to Supplement 1037.

Calculate the average of all the MSG determinations performed each production day and report this average on the Quality Control Report. When the range of three consecutive daily average MSG determinations is equal to or less than 0.020, average these three average MSG determinations to determine the Maximum Theoretical Density (MTD). Exclude the MSG in the daily average MSG if the sample did not meet the requirements in Table 403.06.G-1. After the MTD is established, compare all individual MSG determinations to the MTD.

**D. Other Requirements.** Perform an APA test once each day for the first 3 days according to Supplement 1057 if the produced mixture requires an APA test. Compact the sample the same day the

sample was taken, cure it overnight, and test it the following day. Give the test result and sample density to District Testing the day of the APA test. Report the APA data on the Quality Control Report.

Retain all QC samples for each AC Gauge test and MSG test and all compacted specimens for review by the Department for at least two days for AC Gauge tests and at least seven days for MSG and compacted specimen samples unless directed otherwise. Maintain MSG samples in the state described in AASHTO T 209, Section 7.3 and keep sample at room temperature.

Measure the temperature of the mixture and record the value. Validate the results on the load tickets at least once during each hour of production.

The Contractor may conduct extra process control testing of any type. Record all extra testing along with all other quality control records and have these records readily available for the Monitoring Team's review. District Testing may observe, review, and approve or disapprove the procedures at any time.

**E. Control Charts.** Maintain up to date control charts showing each individual test result and the moving accumulative range as follows for all mixes:

1. Plot tests showing the percent passing for: 1/2 inch (12.5 mm), No. 4 (4.75 mm), No. 8 (2.36 mm), and No. 200 (75  $\mu$ m) sieves, the percent asphalt binder content, the MSG, percent air voids, the VMA, the Gmb, the produced mixture Gsb, the effective specific gravity of combined aggregate blend (Gse), and aggregate bin percentages, including baghouse fines.

2. Show the out of specification limits specified in 403.06.F and Table 403.06.G-1 and QCP Warning Band Limits on the control charts. Additionally, for MSG show the established MTD range limits.

3. Label each control chart to identify the project, mix type and producer.

4. Record the moving accumulative range for three tests under each test point on the chart for air voids, MSG, and asphalt binder content. Accumulative range is defined as the positive total of the individual ranges of two consecutive tests in three consecutive tests regardless of the up or down direction tests take. If more than the minimum required testing (i.e. 750 tons per sample per production day, 403.05.A) is performed do not include the result in accumulative range calculations.

Regularly calculating and tracking Percent-Within-Limits (PWL) is suggested to assist in determining process control and QC effectiveness and for identifying potential areas that need additional attention (e.g., low PWL values for any material characteristic). For PWL calculations reference AASHTO R 9 or the Federal Highway Administration's Standard Specifications for the Construction of Roads and Bridges on Federal Highway Projects ("FP-24"), Section 106.05, and use the material characteristic specification limit(s) for upper limits, lower limits, or both.

Make all charts available for review by the Department.

**F. Test Requirements for 301, 302, and 424 Type A.** Control mixes as follows:

1. If a single asphalt binder content is more than  $\pm 0.50$  percent beyond the JMF, immediately take and test an additional sample.

2. If the Range difference in any three consecutive asphalt binder content tests is greater than 0.70 percent for 302 mixes or 0.60 percent for 301 and 424 Type A mixes immediately notify the Monitoring Team. Range is defined as the difference between the largest and the smallest test result.

3. If the Range difference in any three consecutive gradation tests for the No. 4 (4.75 mm) sieve is greater than 10.0 percent, immediately notify the Monitoring Team.

4. Maintain gradations within design limits of mix type.

5. Maintain a minimum of 7 percent retained on the 1 inch (25.0 mm), ¾ inch (19.0 mm), ½ inch (12.5 mm), and 3/8 inch (9.5 mm) for 302 mix.

**Stop production and immediately notify the Monitoring Team when either 6 or 7 occurs:**

6. If two consecutive asphalt binder content tests are more than ± 0.50 percent beyond the JMF, notify the Monitoring Team and cease production until the problem is corrected.

7. If Range deviations as specified in 2 or 3 continue, cease production.

Any mixture sent to the paving site without stopping production and notifying the Monitoring Team, when required by this specification, will be considered non-specification material.

**G. Test Requirements for all other mixes.** Control all other mixes of Table 403.06.G-1 and as follows:

**TABLE 403.06.G-1**

Mix Characteristic	Out of Specification Limits <sup>[5]</sup>
Asphalt Binder Content <sup>[1]</sup>	-0.30% to 0.30%
1/2 inch (12.5 mm) sieve <sup>[1]</sup>	-6.0% to 6.0%
No. 4 (4.75 mm) sieve <sup>[1][8]</sup>	-5.0% to 5.0%
No. 8 (2.36 mm) sieve <sup>[1]</sup>	-4.0% to 4.0%
No. 200 (75 µm) sieve <sup>[1]</sup>	-2.0% to 2.0%
Air Voids <sup>[2]</sup>	2.5% to 4.5%
Air Voids <sup>[3]</sup>	3.0% to 5.0%
MSG <sup>[4]</sup>	-0.012 to 0.012
F/A	1.2 max
F-T	+4 max <sup>[6]</sup>
VMA	Design – 0.5% <sup>[7]</sup>

[1] Deviation from the JMF

[2] For Design Air Voids of 3.5%

[3] For Design Air Voids of 4.0%

[4] Deviation from the MTD

[5] Unless otherwise restricted by mix type specification

[6] When specified for mix type

[7] Reduce VMA production minimum 0.5% from minimum design VMA (e.g., minimum design VMA for a 442 19.0 mm is 13.0 and the minimum during production will be 12.5%).

[8] For 442 12.5 mm mixes do not exceed 63% max during production

**Stop production and immediately notify the Monitoring Team when either 1, 2, or 3 occurs:**

1. Any two tests in a row or any two tests in two days are outside of the specification limits of Table 403.06.G-1. Do not shut down during the first three days of production for VMA unless two VMA tests in a row are outside specification limits.

2. Any two tests in a row or any two tests in two days (QC and 448 and 449 subplot) exceeding 63 percent passing the No. 4 sieve for 442 12.5 mm mixes.

3. Any four consecutive moving accumulative ranges greater than specification limits of 2.50 percent for air voids or 0.60 percent for asphalt binder content occur.

Any mixture sent to the paving site without stopping production and notifying the Monitoring Team, when required by this specification, will be considered non-specification material.

**H. Load-and-Hold Testing and Restart of Production.** Perform a load-and-hold procedure by producing the mix and performing full testing if production is stopped due to a plant shutdown from failing test results. Demonstrate to the Department that the plant can produce the JMF conforming to the appropriate mix specifications. Provide notification of the date and time of the scheduled load and hold testing that is mutually agreed upon by the Contractor and the Department. Provide full test results to the Department including any plant or mix changes to correct all deficiencies. The Department will review the results to determine if production may continue. Do not restart production until an adequate correction to remedy problems is in place and the Monitoring Team is satisfied. Determine root-cause(s) for problem(s) and take immediate action to resolve when there is a lack of Department satisfaction with mix quality or control. When production problems cannot be solved within one day after a plant shut down a contractor's representative holding Level 3 Asphalt Department approval is required to be at the asphalt plant until a full production day is achieved with results satisfactory to the Monitoring Team. If deficiencies cannot be corrected, the Department may opt to rescind the JMF according to 403.09.

Multiple load-and-holds at a mix plant facility may result in the Department requiring the Contractor to prove that the mix can be produced and meet specifications on non-Department and non-LPA projects at the cost to the Contractor before being permitted to proceed producing for the Department or LPA projects.

**403.07 JMF Field Adjustments.** During the first three days of production the Contractor may adjust the JMF gradation within the below limits without a redesign of the mixture. For projects with less than 3 days of production, give District Testing written notice of any JMF gradation adjustments within 1 workday following the last day of production. Limit adjustments of the JMF to conform to actual production, without a redesign of the mixture, to  $\pm 3$  percent passing each of the 1/2 inch (12.5 mm), No. 4 (4.75 mm), and No. 8 (2.36 mm) sieves and  $\pm 1$  percent passing the No. 200 (75 $\mu$ m) sieve. Do not exceed the limits in Table 424.02-1, Table 441.02-1, Table 442.02-2, and Table 443.03-1 in the adjusted JMF. Do not exceed five percent adjustment for each individual aggregate. RAP may be reduced up to five percent (virgin AC would go up to meet total AC) and maintain the original JMF virgin PG grade (e.g., going from 30 percent to 25 percent would still require a PG 58-28). Determine the need for any JMF gradation adjustments in the time specified. Should no adjustments be made, the Department will base acceptance on conformance to the original JMF. After the time period specified, the Department will allow no further adjustment of the JMF.

Should a redesign of the mixture become necessary, submit a new JMF according to the requirements for the initial JMF. A new acceptance lot will begin when a new JMF established by a redesign of the mixture becomes effective. Make any adjustment of this new JMF as provided for the original JMF. Record both the design JMF and the adjusted JMF in effect during production of an acceptance lot on the Quality Control Report for that lot. In the event that a new JMF is proposed and approved, also make a notation on the ticket for the first load produced under the new JMF.

**403.08 Quality Control Reports.** Record all test results and sample identification on the Quality Control Report including the random number, sample tonnage location, and time of sampling with each test. Record on the Quality Control Report if the mixture produced was ran at the asphalt plant as a hot mix asphalt (HMA) or as a warm mix asphalt (WMA) produced according to 402.05 or another approved method. Also record if antistripping additives were used, dosage rate, the daily quantity used, and copies of the yield checks according to Supplement 1053. After startup adjustments, report any plant operation changes on the Quality Control Report. Ensure that these documents contain technician

comments as to production quality, input materials received and condition, and include any other process or QC activities as specified in the QCP. Document all decisions regarding responses to test results on the Quality Control Report. (referring to the particular test), including reasons why a particular problem may exist, what action was taken to correct the problem (plant operation or testing), and what communication with Department personnel took place. Attach computerized plant printouts representing samples tested to that day's report, if desired by the Monitoring Team, or otherwise keep them with the quality control records. Ensure that the technician records the test results for the AC content and percent passing the No. 4 (4.75 mm) sieve on the plant printout from the tonnage the quality control sample was taken. Keep remaining printouts and a copy of all QC reports in the plant laboratory for the duration of the project after which they may be transferred to an office location for records retention. and a copy of all QC reports in the plant laboratory for the duration of the project after which they may be transferred to an office location for records retention.

Deliver (fax, e-mail, hand) completed Quality Control Reports to District Testing by the end of each day in which testing is conducted. If desired by District Testing and always for unsigned E-mail versions, mail the originals. Ongoing problems with submitting reports on time may also result in the plant not being able to produce until the report is submitted with adequate time for review by District Testing. Ongoing problems with inadequate, incomplete, or illegible reporting will result in a change to Restricted Acceptance. The Contractor's technician must sign each Quality Control Report. Retain copies of all records documenting the quality control inspections and tests as outlined in the Contractor's QCP according to 403.03.F and furnish them to District Testing on request.

Provide delivery tickets of liquid or hydrated lime antistripping additive, if used, to District Testing at the end of the project and at the end of each construction year on a multiple year project. Provide the following information for each shipment: Letter of certification, Production date, Shipment date, Shipment destination, Batch or lot number and Net weight. The District Testing will verify the weight (in pounds) of antistripping additive used is within 10 percent of the calculated amount of antistripping additive required for the total weight of asphalt binder, based on the produced JMF. The Department may obtain samples of the hydrated lime at any time to verify quality. If the quality of the hydrated lime is in question, the Department may require independent laboratory testing.

Report test results to the accuracy of the following decimal places. When the figures to be dropped in rounding off are exactly one-half of unity in the decimal place to be retained, round the value up to the nearest number in the decimal place to be retained.

**TABLE 403.08-1 REPORTING ACCURACY**

	<b>Single Test</b>	<b>Average</b>
Asphalt Binder Content Effective Binder Content (PBE)	0.01	0.01
No. 200 (75 µm) sieve	0.1	0.1
Other sieves	Whole number	0.1
BSG, MSG, MTD, GSB, GSE	0.001	0.001
Air Voids	0.1	0.1
VMA	0.1	0.1
F/A	0.1	0.1
F-T	Whole number	Whole number
Mix Moisture Percent	0.01	0.01
APA, inch (mm)	0.0004 (0.01)	0.004 (0.1)

Additionally for 448 and 449 acceptance mixes (excluding 301, 302, and 424 Type A), track the Sublot and Lot tonnages through the project and identify on the Quality Control Report each random Sublot test as to Lot number and Sublot tonnage location. In addition to the Quality Control Report, submit form TE-448 with lot identification and actual sieve weights for each Sublot sample from the technician's gradation worksheets.

**403.09 Mixture and Placement Deficiencies.** The Contractor is responsible for controlling all production processes to assure the Engineer that the mixture delivered to the paving site is uniform in composition, within the specification requirements and limits, conforms to the JMF, and that the placed mixture is free of any defect (ex. segregation, tenderness, lack of mixture and/or texture uniformity, raveling, flushing, rutting, holes, debris etc.). Correct pavement problems according to 401.08. If the Department has any suspicion that other mixture composition or pavement problems exist, the Monitoring Team will conduct an initial investigation through review of data, sampling of the asphalt pavement, or both. Should a Department investigation determine that the Contractor's QCP is not controlling the mixture in a manner to achieve mixture quality as described above, the Contractor's QC test results, and corresponding pavement quality may be rejected. In that case the Department will conduct a thorough investigation by testing samples from the roadway and use those test results in determining disposition of the non-specification material.

A mixture is not uniform in composition if multiple non-specification individual tests or any four consecutive non-specification moving accumulative ranges exist. The mixture can be rejected, production can be stopped or a redesign can be required by the Department. OMM will not approve any redesign it determines is unsatisfactory to provide acceptable mix performance. Submit this new design for approval according to 440 and at no additional cost to the Department.

When any Contractor QC tests are out of specification and not within the limits of 403.06.F and Table 403.06.G-1, material that is sent to the paving site, the Engineer in conjunction with District Testing or OMM will determine disposition of the material according to Supplement 1102.

**403.10 Verification Acceptance (VA).** The Code of Federal Regulation 23 CFR 637, requires independent random sampling and testing for acceptance through verification sampling and testing; and requires evaluation with an independent assurance (IA) program.

District Testing will perform VA by testing independent random samples. If the independent random Department VA sampling and testing verifies the accompanying Contractor tests, the individual and average of the Contractor's quality control tests will be used to determine acceptance as follows:

- For 449 acceptance mixes (301, 302, and 424 Type A) according to 449.04.A - Each production day;
- For 448 and 449 acceptance mixes - Average of the Contractor's tests for each Lot according to 448.04 and 449.04 B, respectively;
- For 446, 447, 448, or 449 acceptance mixes - Daily average MSG (other than 301, 302, and 424 Type A).

**A. Monitoring.** The Department will establish District Monitoring Teams for the purpose of verifying all Contractor mixture production processes. Verification will be accomplished by obtaining independent random samples from the plant or roadway. Split samples may be used to help isolate differences in test results resulting from a technician performing the test or equipment but cannot be used for verification of Contractor QC results or acceptance.

**B. Sampling.** The Department will perform VA by sampling and testing independent samples a minimum of one in every four production days to verify Contractor sampling, testing, and mix control.

The Department will determine where the sample is taken. One day may be added to the above Department sample testing frequency for each production day that is less than 500 tons (450 metric tons). In addition to the above, for 446 and 447 acceptances, the Department may take a daily sample for asphalt content and the sample may also be utilized for gradation and MSG. The Department can require samples from the plant or project site (hopper, plate or truck).

The Department may take additional samples including split samples, to determine plant operation and equipment, and personnel process control functionality, effectiveness, proficiency, and isolating variability and for additional verification of Contractor QC or as desired. Other properties can be tested by the District as desired.

The Department will sample or require the Contractor to sample with the Monitor witnessing sufficient material to perform all the tests. If the Contractor desires, enough material will be taken or provided to obtain three split samples: one is the Contractor split for information purposes only; one is the Department split for verification acceptance; and one is the referee split for dispute resolution. If requested, provide the Monitor access to split the sample at the plant facility. If the Contractor takes the sample for the Monitor, the Monitor or Department must witness the entire sampling process and must take immediate possession of the Department's verification and referee samples. The Department will take immediate possession of the Department and referee splits and deliver them to District Testing.

District Testing or OMM will also perform independent assurance (IA) monitoring and testing of QC technicians and for projects from independent assurance samples (IAS) or split samples.

The Contractor's portion of the Department's VA split sample or IAS results are for informational purposes only and cannot be used for quality determination, verification, acceptance, or payment (Federal regulation 23 CFR 637).

**C. Department Verification Testing and Monitoring.** All Department VA or IAS samples will be prepared by the Monitor (e.g., material for nuclear gauge pans or MSG) and tested at District Testing or OMM using Department equipment.

All VA samples will be tested for asphalt content and gradation. The Department will also perform MSG testing on VA samples on all mixes other than 301, 302, and 424 Type A.

Record the results, date tested, and technician performing the testing, and include in District Testing project record.

The Contractor may test the split of the VA sample with the Monitor witnessing

The Department will use its VA test results and the Contractor's production day QC individual and average test results or subplot tests in the comparison for the Department VA testing.

The Department can use QC split samples to investigate contractor data but they cannot be used as VA samples. The results will be compared to the Contractor split using tolerances in Table 403.10-1.

**TABLE 403.10-1 DEPARTMENT VERIFICATION ACCEPTANCE**

<b>Percent Asphalt Binder<sup>[1] [2]</sup></b>	<b>Percent Passing No. 4 (4.75mm) <sup>[1] [2]</sup></b>	<b>MSG Comparison <sup>[3]</sup></b>
<b>± 0.30</b>	<b>± 4</b>	<b>0.010</b>

[1] District VA mix test deviation from the approved JMF.

[2] District VA mix test deviation from that production day QC test result and/or individual and average lot testing results.

[3] Deviation of District MSG VA compared to QC MSG daily average for all asphalt pavement mixture types except 301, 302, and 424 Type A. mixtures.

If the Department VA tests confirm Contractor testing is within the verification tolerances, but a pattern of high or low results exist that suggests mix control is not at the approved design JMF, then investigate with the Monitoring Team to correct the problem to the Monitoring Team's satisfaction. Direct any questions regarding interpretation of circumstances to OMM in writing. .

If the Monitor witnesses the Contractor's portion of the Department's VA split sample being tested, the results may also be utilized as an IAS sample.

**D. Contractor QC Tests are Acceptable are Verified.** Production is acceptable if:

1. The Monitoring Team verifies the Contractor's QCP is being fully followed; and
2. The Department VA tests are within the limits specified in 403.10.C; and
3. For 301, 302, and 424 Type A mixes, the remaining sieves do not exceed the limits of the applicable specification.

Failure on the Contractor's part to respond and resolve Monitoring Team concerns may result in a change to Restricted Acceptance.

Acceptance is per 446, 447, 448, or 449.

**E. Contractor QC Tests Not Acceptable or Verified.** If the Department VA test is not within specification, tolerance limits, or does not verify the accompanying Contractor QC tests within the verification tolerances of Table 403.10-1, immediately cease production until resolved. Investigate to the Department's satisfaction.

The Monitoring Team, District Testing, or OMM may choose to participate in determining the cause of non-verification or out of specification results. Until fully resolved, the Department results will be utilized for acceptance.

The Contractor may dispute the results within seven calendar days with written notification to the Department as to why the Contractor believes the Department's VA results may be erroneous with supporting documentation and testing (which could include historical test data). If Contractor documentation and testing adequately supports their tested results as determined by OMM, the referee sample will be sent to OMM. for dispute resolution. The Department will deliver the referee sample to OMM. The results closest to the referee sample results will be used in acceptance.

If the Contractor's written request for referee testing is accepted The Department may allow District Testing to investigate a non-comparison or out-of-specification material issue by testing the Department's VA sample at the Contractor's mix plant lab to determine if the non-comparison is from Contractor testing (technician or equipment). If this material is found to verify the original Department's VA results, the referee sample will be sent to OMM for dispute resolution. If this

material does not compare with the Department’s VA results, then the Department’s initial results will be utilized for acceptance.

If a Contractor’s MSG test result is not verified by Department MSG VA testing according to the tolerance in Table 403.10-1, the Department’s corresponding MSG for that production day and every day back to when the Contractor’s MSG was verified by the Department’s MSG VA will be used for each 446, 447, 448, or 449 acceptance mixes (other than 301, 302, and 424 Type A Day/Lot density and QC air void determination). If an independent VA plant sample is not available, the Department may test MSG from a random independent field sample or road cut sample for Department VA testing.

The Contractor may occasionally request a review with the Department for the purpose of determining the cause of a verification comparison problem. Department decisions upon review are final. If a Contractor is requesting a review of every occurrence of lack of comparison and the Department test is predominantly found correct, the Department may deny that Contractor further reviews until the Contractor has determined the root-cause of the problem and made corrections to prevent it from recurring.

**TABLE 403.10-2 DEVIATION LIMITS**

Property	Mix	Limits
Asphalt Binder Content	All	±0.5 %
No. 4 (4.75 mm) sieve	All, except 302	±6.0%
	302	±7.0%

Additionally, stop production and perform additional tests to aid in problem solving if ongoing Department VA tests do not verify. . Document the resolution and root cause. If needed, contact OMM for assistance in resolving problems.

**F. Contractor Department VA Removal and Restoration.** For 446 and 447 MSG, for a given Contractor facility, if in a series of eight or more Contractor/ Department MSG comparison tests (VA, Monitoring tests) the Contractor MSG is lower than the Department MSG by more than 0.002 or low MSG comparisons that occur more than 65 percent of the time, the facility will be removed from Department MSG Verification Acceptance and operate under 403.11.

The District will request an opinion from the QC Review Group before notifying the Contractor of removal from Department VA if repeated problems occur with: poor comparison of tests originating from Contractor sampling or testing (not the District); poor comparison of Contractor tests to the JMF; plant operation; source materials; or any of the other requirements of Department specifications regardless of whether they occur in a single project or successive projects. The District will immediately notify the Contractor of the removal with a follow up letter from District Testing. Once notified, acceptance of asphalt mixtures is by Restricted Acceptance. Restoration of the VA procedures may occur on a future project with a District recommendation to the QC Review Group based on consistent improved plant operation and mix control, a review of the Contractor problems and resolutions, and a review of the QCP by the QC Review Group.

**G. Dispute Resolution for 446 and 447 cores.** The Contractor may dispute the results of District Testing core results within seven calendar days with written notification to the Department as to why the Contractor believes the Department’s results may be erroneous with supporting documentation and testing (which could include historical test data). If Contractor documentation and testing adequately supports their information as determined by OMM, the Department’s core(s) will be delivered to OMM by District Testing. Do not cut more cores unless the Department feels the cores were damaged prior to the original District Testing core results. If OMM BSG core test results differ by more than 0.010

from District Testing results, OMM results will be used in the calculation of the pay factor. If not, then the original District Testing core results will be used.

The Contractor may occasionally request a review of District Testing results. However, if a Contractor frequently requests a review of District Testing core results and the District Testing results are predominantly found correct, the Department may deny that Contractor further reviews. Department decisions upon review are final.

**403.11 Restricted Acceptance.** If the Contractor is removed from Department VA, the following will occur.

The Contractor must bring its QCP and operation to a level acceptable to the District, OMM, and QC Review Group before production continues. District Testing will ensure that the project C-95 (Contractor's Prequalification Rating survey) reflects the change to Restricted Acceptance in all of the appropriate C-95 categories. The Department will accept all material for Department projects from the facility under Restricted Acceptance. SMQ acceptance while the facility is under Restricted Acceptance will not be permitted.

Quality control testing requirements specified in 403.06 are modified as follows:

**A.** Sampling and testing once every 90 minutes during the production day using a random number to determine the time to sample for each JMF produced. Ensure the sample is within five minutes of the random time. If no trucks are being loaded, sample the next truck to be loaded. Do not discuss sampling times with anyone other than the Department.

This requirement does not apply to 446 and 447 MSG Restricted Acceptance according to 403.10.F.

If the sampling and testing exceeds the capacity of the testing facility according to 403.04, immediately notify the Engineer and District Testing, then stop production until the testing facility can handle the capacity. The Department may limit the number of JMF's being produced at a mix plant facility if more than one is being produced and sampling and testing becomes an issue while on Restricted Acceptance.

**B.** For 301, 302, and 424 Type A mixes, if the variation from the JMF for one test is  $\pm 8$  percent passing the No. 4 (4.75 mm) sieve or  $\pm 0.3$  percent asphalt binder content, investigate and correct the problem, then resample and test. Maintain the moving average of three tests within  $\pm 4$  percent passing the No. 4 (4.75 mm) sieve and  $\pm 0.2$  percent asphalt binder content. In addition to the Quality Control Report, maintain control charts according to 403.06.E for asphalt binder content and the No. 4 (4.75 mm) sieve. If the Range difference in any three consecutive tests is greater than 0.6 percent for asphalt binder content or 10.0 percent passing the No. 4 (4.75 mm) sieve, notify the Monitoring Team. If Range deviations as specified continue, cease production.

For 446 and 447 MSG, the Department will test a single daily MSG for each corresponding 446 and 447 Day/Lot density determination from the facility. The facility can be returned to Department MSG VA when the 65 percent criteria (see 403.10.F) are not exceeded in a series of 30 comparison tests.

**C.** Report each day's testing on a Quality Control Report, according to 403.08. Report all testing performed by the Contractor's technician on the Quality Control Report. After startup adjustments, report any plant operation changes on the Quality Control Report. Ensure that each Quality Control Report contains technician comments as to production quality, input materials received and condition, and includes any other quality control activities required in the QCP. The Contractor's technician must sign each Quality Control Report. Attach each day's computerized plant printouts to that day's report. The technician must note on the accompanying printout from which tonnage the quality control sample

was taken with accompanying test results for asphalt binder content and percent passing the No. 4 (4.75 mm) sieve. Keep a copy of all Quality Control Reports for a project in the Contractor's plant laboratory.

The District will monitor according to 403.10, except notification for ceasing production does not have to be in writing. Additional samples may be obtained for Department testing at any time.

For 301, 302, and 424 Type A mixes, if the average of the Lot or partial Lot acceptance tests for any sieve other than the No. 4 (4.75 mm) sieve exceeds the specification limits, the pay factor is determined as follows:

**TABLE 403.11-1 301, 302, 424 TYPE A PAY FACTORS**

Number of Tests	1	2	3	4
Pay Factor	0.98	0.97	0.96	0.95

For 448 and 449 Sublot acceptance mixes, the Department will perform acceptance sampling and testing according to 403.05, 448.04, and 449.04 except the Lot size will be 5000 tons (5000 metric tons) with 1250 ton (1250 metric tons) Sublots. Sublots and acceptance samples may be taken from the roadway or plant at the Districts discretion. Department testing under Restricted Acceptance will receive a lower testing priority than other VA projects.

## ITEM 407 TACK COAT

**407.01 Description.** This work consists of preparing and treating a paved surface with asphalt material, and cover aggregate if required.

**407.02 Materials.** Conform to the applicable requirements of 702 for the asphalt material and use one of the following types: 702.04 RS-1, SS-1, SS-1h, CRS-1, CSS-1, or CSS-1h; 702.12 Non-Tracking Asphalt Emulsion or 702.13 SBR Asphalt Emulsion.

Supply 702.12 Non-Tracking Asphalt Emulsion any time Item 407 Non-Tracking Tack Coat is specified.

Conform to 703.06 for cover aggregate.

**407.03 Equipment.** Provide adequate cleaning equipment, spreader boxes, and distributors.

Use distributors designed, equipped, maintained, and operated to apply asphalt material at the specified rate per square yard (square meter) with uniform pressure over the required width of application. Ensure that the distributor includes a tachometer, pressure gauges, and an accurate volume measuring device or a calibrated tank. Mount an accurate thermometer with a range covering the specified application temperature for asphalt material at approximately center height of the tank with the stem extending into the asphalt material. Ensure that the distributor has a full-circulating system with a spray bar that is adjustable laterally and vertically. Ensure that the spray bar will maintain a constant height above the pavement under variable load conditions. Supply each distributor with suitable charts showing truck and pump speeds and other pertinent application data necessary to obtain the required results.

Do not use equipment that cannot obtain the correct tack application.

**407.04 Weather Limitations.** Do not apply the asphalt material if the surface temperature is below the minimum placement temperature for the pavement course to be placed, as specified in 401.05.

**407.05 Preparation of Surface.** Ensure that the surface is thoroughly clean and dry when the asphalt material is applied. Remove material cleaned from the surface and dispose of it as the Engineer directs.

**407.06 Application of Asphalt Material.** Uniformly apply the asphalt material with a distributor having clean nozzles functioning properly.

For irregular areas such as driveways and intersections, apply the asphalt material using a method the Engineer approves.

If paving asphalt concrete directly onto Portland cement concrete or brick pavement, tack the pavement with SBR asphalt emulsion conforming to 702.13.

Apply the asphalt material in a manner that offers the least inconvenience to traffic. Only apply the asphalt material to areas that will be covered by a pavement course during the same day. Ensure the tack breaks before releasing to construction traffic unless the paver is equipped with a spray bar system to apply tack just prior to mat placement.

Apply asphalt material to obtain uniform coverage within the range specified in Table 407.06-1, as directed by the Engineer. Obtain the Engineer's approval for the quantity, rate of application, temperature, and areas to be treated before application of the asphalt material. The Engineer will determine the actual application in gallons per square yard (liters per square meter) by a check on the project.

**TABLE 407.06-1, TYPICAL TACK COAT APPLICATION RATES**

<b>Existing Pavement</b>	<b>Application Rate gal/yd<sup>2</sup> (L/m<sup>2</sup>)</b>
New Asphalt	0.05 to 0.06 (0.23 to 0.27)
Oxidized Asphalt	0.08 to 0.09 (0.36 to 0.41)
Milled Asphalt Surface	0.08 to 0.09 (0.36 to 0.41)
Milled PCC Surface	0.06 to 0.08 (0.27 to 0.36)
PCC Surface	0.06 to 0.08 (0.27 to 0.36)

The application is considered satisfactory when the actual rate is within  $\pm 10$  percent of the required rate and the material is applied uniformly with no visible evidence of streaking, ridging or pickup by construction traffic. The Engineer will require proper correction when ridging, streaking, pickup or other non-uniform coverage is observed. Correct non-uniform tack only in areas of non-uniform coverage. Do not reapply tack in areas where the tack meets uniformity and application requirements.

If the coverage is not uniform and not corrected the total square yardage of non-uniform application will be considered non-specification material. The Engineer will determine the number of gallons (liters) for non-payment by using the approved rate of application times the total square yards (square meters) of non-uniform application.

**407.07 Method of Measurement.** The Department will measure Tack Coat and Non-Tracking Tack Coat by the number of gallons (liters) of undiluted asphalt material applied for each according to Item 109.

Provide weight tickets (including weigh back tickets) for every load, or partial load used, according to Supplement 1060 based on weight tickets from an Ohio Permitted Device according to provisions of [Ohio Revised Code Section 1327](#), and [Ohio Administrative Code Chapter 901:6](#).

**407.08 Basis of Payment.** The cost of cover aggregate is incidental to Tack Coat.

The Department will not pay for non-uniformly applied materials as defined in [407.06](#).

The Department will pay for accepted quantities at the contract prices as follows:

<b>Item</b>	<b>Unit</b>	<b>Description</b>
407	Gallon (Liter)	Tack Coat

## ITEM 408 PRIME COAT

**408.01 Description.** This work consists of preparing and treating an existing surface with asphalt material, and cover aggregate if required.

**408.02 Asphalt Material.** Conform to the applicable requirements of [702](#) for asphalt material and use one of the following types: [702.02](#) MC-30, MC-70, or MC-250; or [702.03](#) Primer 20.

**408.03 Cover Aggregate.** Use cover aggregate conforming to No. 9 size or gradation requirements of [703.05](#) or [703.06](#).

**408.04 Weather Limitations.** Do not apply asphalt material on a wet surface. Do not apply prime coats for asphalt concrete or surface treatment work when the atmospheric temperature is below 50 °F (10 °C) or when the air temperature within the preceding 24 hours has been 40 °F (5 °C) or lower. Do not apply prime coats on stabilized or granular base courses when the atmospheric temperature is below 40 °F (5 °C).

**408.05 Equipment.** Use equipment conforming to [407.03](#).

**408.06 Preparation of Surface.** Shape the surface to be primed to the required grade and section. Ensure the surface is free from all ruts, corrugations, segregated material or other irregularities and is smooth and uniformly compacted at the time of application of the asphalt material. Clean the surface in a manner that will thoroughly remove all mud, earth, and other foreign material. Take care to clean the edges of road to be primed to ensure uniform application of the asphalt material directly onto the existing base or pavement surface. Remove material cleaned from the surface and dispose of it as the Engineer directs.

**408.07 Application of Asphalt Material.** Apply asphalt material in a uniform manner spread to the width of the section to be primed by means of a distributor conforming to [407.03](#). Take care that the application of asphalt material at the junction of spreads is not in excess of the specified amount. Squeegee excess asphalt material from the surface. Correct skipped areas or deficiencies.

Do not allow traffic on the prime coat until the asphalt material has been absorbed by the surface and will not be picked up. Obtain the Engineer's approval for the quantity, rate of application, temperatures and areas to be treated before application of the prime coat.

**408.08 Application of Cover Aggregate.** If, after applying the prime coat, the asphalt material fails to penetrate and traffic must use the roadway, spread cover aggregate in the amount required to absorb any excess asphalt material.

**408.09 Method of Measurement.** The Department will measure Prime Coat by the number of gallons (liters) according to [109](#).

Provide weight tickets (including weigh back tickets) for every load, or partial load used, according to Supplement [1060](#) based on weight tickets from an Ohio Permitted Device according to provisions of [Ohio Revised Code Section 1327](#), and [Ohio Administrative Code Chapter 901:6](#).

**408.10 Basis of Payment.** The cost of cover aggregate is incidental to Prime Coat.

The Department will pay for accepted quantities, complete in place, at the contract price as follows:

Item	Unit	Description
408	Gallon (Liter)	Prime Coat

## ITEM 409 SAWING AND SEALING ASPHALT CONCRETE PAVEMENT JOINTS

**409.01 Description.** This work consists of saw cutting and sealing the finished surface of the asphalt concrete pavement and shoulders directly over and in line with transverse joints in the underlying Portland cement concrete pavement.

**409.02 Materials.** Use joint sealant conforming to 705.04 and approved by OMM before shipment to the project. Use a 1/2 inch (13 mm) diameter closed cell foam backer rod that will form and maintain a reservoir of sealant as specified in 409.03.

**409.03 Construction Details.** Saw cut, clean, and seal transverse joints as a continuous operation. If the surface course is not placed within 5 days after the intermediate course is placed, make a 1/8-inch (3 mm) wide saw cut that is one-fourth the depth of the intermediate course over contraction joints and a 1/2-inch (13 mm) wide cut that is one-fourth the depth of the intermediate course over expansion joints.

Saw joints in the surface course as soon as the saw can be operated without damaging the asphalt concrete, but no later than 48 hours after the asphalt concrete is placed.

Locate the sawed joints directly over each transverse pavement joint in the concrete pavement, including joints at full-depth pavement repairs. Accurately locate joints with pins or stakes before paving. Pre-mark the saw cut on the new asphalt with a chalk line or other acceptable method. Obtain the Engineer's approval of the method for locating and accurately marking the proposed saw cuts before starting any resurfacing operations.

Saw all transverse joints and create a joint sealant reservoir according to Table 409.03-1. Use either dry or wet cutting. Make one or two passes to create the saw cut and joint sealant reservoir.

**TABLE 409.03-1**

Measurement	Inch (mm)
Saw cut depth	2 (50)
Backer rod diameter	1/2 (13)
Joint sealant reservoir	
Width	3/8 (10)
Depth	3/4 (19)
Recess below surface course	1/8 (3)

Clean dry sawed joints with compressed air to remove dirt, dust, or deleterious matter. Use an air compressor with a minimum rated capacity of 100 pounds per square inch (689 kPa) and sufficient hose for continuous cleaning operations.

Clean wet sawed joints with a water blast to remove sawing slurry, dirt, or deleterious matter. Dry wet sawed joints with a propane torch or lance unit capable of producing a blast of hot air at 2000 °F (1093 °C) and with a gas velocity of 2000 feet per second (610 m/s).

Extend the transverse saw cut joints the full width of the asphalt over the concrete pavement and paved shoulders.

Do not allow traffic to knead together or damage the sawed joints before sealing.

Heat joint sealant material in a kettle or melter constructed as a double boiler, with the space between the inner and outer shells filled with oil or other heat transfer medium. Provide positive temperature control and mechanical agitation.

Heat the material according to the manufacturer’s recommendation. Consider the first gallon (4 L) of material that flows out of the applicator wand at the start of the day spoil, and discard it into a container so designated.

After cleaning, place the backer rod in the sawed joints, then immediately seal the joints with sealant applied through a nozzle projected into the sawed joint, filling from the bottom up. Ensure that the sealant completely fills the joint such that after cooling, the level of the sealant is below the surface by less than 1/8 inch (3 mm). Fill any depression in the seal greater than 3/16 inch (5 mm) to the specified limit by adding additional sealant. Do not overfill the joints. Take care in the sealing of the joints so that the final appearance will present a neat line.

**409.04 Method of Measurement.** The Department will measure Sawing and Sealing Asphalt Concrete Pavement Joints by the number of feet (meters) of joints sawed and sealed.

**409.05 Basis of Payment.** The Department will not pay for saw cuts in the intermediate course.

The Department will pay for accepted quantities at the contract price as follows:

<b>Item</b>	<b>Unit</b>	<b>Description</b>
409	Foot (Meter)	Sawing and Sealing Asphalt Concrete Pavement Joints

## ITEM 441 MARSHALL ASPHALT CONCRETE

**441.01 Description.** This work consists of design, production, placement, compaction and testing of one or more courses of Marshall asphalt concrete, on a prepared foundation. The Marshall asphalt concrete consists of a mixture of graded aggregate and specified type and grade of asphalt binder that is designed using Marshall mix design procedures and a Marshall hammer. The aggregate and asphalt binder are mixed in a central plant then spread and compacted on the prepared surface. The requirements of Items [401](#), [402](#), [403](#), and [440](#) apply with the additional requirements of this specification.

**441.02 Composition.** Use a PG 64-22 asphalt binder for a Type 1 Intermediate course unless RAP, RAS, or both used according to [440.03](#) require a virgin binder grade change. Use a PG 64-22 asphalt binder for a Type 2 intermediate course unless RAP and/or RAS used according to [440.03](#) require a virgin binder grade change. Use a PG 64-22 asphalt binder and Type 1 surface gradation for asphalt concrete for driveways and under guardrails.

**TABLE 441.02-1**

<b>Asphalt Mixture Composition</b>			
<b>Property</b>	<b>Type 1 Surface</b>	<b>Type 1 Intermediate</b>	<b>Type 2 Intermediate</b>
1 1/2 inch (37.5 mm) <sup>[1]</sup>			100
1 inch (25.0 mm) <sup>[1]</sup>			95 to 100
3/4 inch (19.0 mm) <sup>[1]</sup>			85 to 100
1/2 inch (12.5 mm) <sup>[1]</sup>	100	100	65 to 85
3/8 inch (9.5 mm) <sup>[1]</sup>	90 to 100	90 to 100	
No. 4 (4.75 mm) <sup>[1]</sup>	45 to 57	50 to 72	35 to 60
No. 8 (2.36 mm) <sup>[1]</sup>	30 to 45	30 to 55	25 to 48
No. 16 (1.18 mm) <sup>[1]</sup>	17 to 35	17 to 40	16 to 36
No. 30 (600 μm) <sup>[1]</sup>	12 to 25	12 to 30	12 to 30
No. 50 (300 μm) <sup>[1]</sup>	5 to 18	5 to 20	5 to 18
No. 100 (150 μm) <sup>[1]</sup>	2 to 10	2 to 12	2 to 10
No. 200 (75 μm) <sup>[1]</sup>			
Asphalt Binder <sup>[2]</sup>	5.8 to 10.0	5.8 to 10.0	4.6 to 9.0
F/A Ratio, max. <sup>[3]</sup>	1.2	1.2	1.2
F-T Value <sup>[4]</sup>	+2	+2	
Blows <sup>[5]</sup>	50	50	50
Stability, min., pounds <sup>[5]</sup> (N)	1200 (5338)	1200 (5338)	1200 (5338)
Flow, 0.25 mm <sup>[5]</sup>	8 - 16	8 - 16	8 - 16
Design Air Voids <sup>[6]</sup>	3.5	3.5	4.0
VMA, min. <sup>[7]</sup>	15.5	15.5	12.5
CTIndex, min. <sup>[8]</sup>	Report	Report	Report

[1] Sieve, percent passing

[2] Percent of total mix

[3] Using effective asphalt binder content

[4] Percentage points maximum

[5] [AASHTO T 245](#)

[6] Percent, Supplement [1036](#)

[7] Percent, Supplement [1037](#)

[8] Perform the IDEAL-CT and report results according to Supplement [1033](#)

**441.03 Acceptance.** The Department will base acceptance of the asphalt concrete mix on the item specified in the Contract item description. (i.e., [446](#), [447](#), [448](#), [449](#)).

**441.04 Basis of Payment.** Include the cost of asphalt material to coat vertical faces and seal joints and gutters in the contract unit price for Item [441](#). The Department will pay for accepted quantities at the contract prices as follows.

<b>Item</b>	<b>Unit</b>	<b>Description</b>
441	Cubic Yard (Cubic Meter)	Asphalt Concrete Surface Course, Type 1, (448), PG64-22

## ITEM 448 ASPHALT CONCRETE GAUGE DENSITY ACCEPTANCE

**448.01 Description.** This specification describes the acceptance criteria for asphalt concrete surface and intermediate courses using density gauge and laboratory testing. The Department will determine acceptance of the mixture by Lot, based on the field density and mix composition of random samples taken and tested by the Contractor and verified by the Department.

**448.02 Density.** Conduct density gauge quality control testing on the asphalt mat according to Supplement 1055. Do NOT enter a density gauge offset of any kind into the gauge. If an offset is already in the gauge remove it. Verify to the Engineer daily that no offset is present in the gauge. All values used in controlling mat density according to Supplement 1055 will be as calculated and written on forms supplied in Supplement 1055.

**448.03 Reports.** Report density gauge QC testing results according to Supplement 1055.

**448.04 Acceptance.** Acceptance is by Lot as defined in 403. A Lot is considered acceptable for gradation and asphalt binder content if the deviation of the average from the JMF and the Range is no more than the tolerances shown in Table 448.04-1.

**TABLE 448.04-1 DEVIATION FROM THE JMF AND RANGE TOLERANCES [1]**

<b>Mix Property</b>	<b>Deviation from JMF (Percent)</b>	<b>Range (Percent)</b>
Asphalt Binder Content	0.30	1.00
1/2 inch (12.5 mm) sieve	6	15
No. 4 (4.75 mm) sieve	5	15
No. 8 (2.36 mm) sieve	4	15

[1] Based on average of four Lot Acceptance tests.

If the average of the Lot acceptance tests for a particular sieve or sieves, or for asphalt binder content deviates from the JMF by more than the tolerances shown in Table 448.04-1 but falls within the tolerances shown in Table 448.04-2, then the Lot is considered reasonably acceptable and may remain in place with payment at a reduced pay factor as show in Table 448.04-2.

If the Range of the Lot acceptance tests for asphalt binder content or for any particular sieve, or sieves, exceeds the tolerance shown in Table 448.04-1, the Department will apply a pay factor of 0.95.

**TABLE 448.04-2 448 ACCEPTANCE SCHEDULE [1]**

<b>Mix Property</b>	<b>Pay Factor</b>	<b>2 Tests</b>	<b>3 Tests</b>	<b>4 Tests</b>
<b>Asphalt Binder Content</b>	1.00	0 to 0.47	0 to 0.36	0 to 0.30
	0.98	0.48 to 0.54	0.37 to 0.42	0.31 to 0.35
	0.90	0.55 to 0.61	0.43 to 0.48	0.36 to 0.40
	0.80	0.62 to 0.68	0.49 to 0.54	0.41 to 0.45
	0.60	0.69 to 0.75	0.55 to 0.59	0.46 to 0.50
	[2]	> 0.75	> 0.59	> 0.50
<b>1/2 inch (12.5 mm) sieve</b>	1.00	0 to 8.5	0 to 6.9	0 to 6.0
	0.99	8.6 to 9.9	7.0 to 8.1	6.1 to 7.0
	0.97	10.0 to 11.3	8.2 to 9.2	7.1 to 8.0
	0.94	11.4 to 12.7	9.3 to 10.4	8.1 to 9.0
	0.90	12.8 to 14.1	10.5 to 11.5	9.1 to 10.0
	[3]	> 14.1	> 11.5	> 10.0
<b>No. 4 (4.75 mm) sieve</b>	1.00	0 to 7.1	0 to 5.8	0 to 5.0
	0.99	7.2 to 8.5	5.9 to 6.9	5.1 to 6.0
	0.97	8.6 to 9.9	7.0 to 8.1	6.1 to 7.0
	0.94	10.0 to 11.3	8.2 to 9.2	7.1 to 8.0
	0.90	11.4 to 12.7	9.3 to 10.4	8.1 to 9.0
	[3]	> 12.7	> 10.4	> 9.0
<b>No. 8 (2.36 mm) sieve</b>	1.00	0 to 5.7	0 to 4.6	0 to 4.0
	0.99	5.8 to 7.1	4.7 to 5.8	4.1 to 5.0
	0.97	7.2 to 8.5	5.9 to 6.9	5.1 to 6.0
	0.94	8.6 to 9.9	7.0 to 8.1	6.1 to 7.0
	0.90	10.0 to 11.3	8.2 to 9.2	7.1 to 8.0
	[3]	> 11.3	> 9.2	> 8.0

[1]Based on average of Lot Acceptance tests from the JMF.

[2]Remove and replace material

[3]Engineer will determine if the material may remain in place. Pay factor for material allowed to remain in place is 0.70.

The Department will determine payment for the Lot by multiplying the contract unit price by the pay factor. When any pay factors for a specific Lot are less than 1.00, use the lowest pay factor to calculate the payment.

The Department will base acceptance of partial Lots on the average and the Range of the results of tests on the number of samples obtained

Payment for compaction of the completed pavement is based on quality assurance (QA) testing according to Supplement 1055. Each QA density test represents one half (1/2) day's production. The Department will use Table 448.04-3 to determine the percent deduction pay adjustment due to density for each one half (1/2) day's production represented by the QA test.

**TABLE 448.04-3 DENSITY PAY DEDUCTIONS**

<b>Density (%)</b>	<b>Payment Deduction</b>	
	<b>One Test Below 91.0%</b>	<b>Both Tests Below 92.0%</b>
<b>91.0 to 91.9</b>	n/a	5%
<b>90.0 to 90.9</b>	5%	10%
<b>89.0 to 89.9</b>	15%	15%
<b>88.0 to 88.9</b>	30%	30%
<b>Less than 88.0</b>	Remove and replace	

## ITEM 499 CONCRETE—GENERAL

**499.01 Description.** This specification consists of proportioning requirements for portland cement concrete mix designs, mixing, adjustments and controls, and batch plant requirements for portland cement concrete.

**499.02 Materials.** Furnish materials conforming to:

Portland cement .....	701.01, 701.02, 701.04 701.05, 701.09, 701.15 or blended cement <sup>[1]</sup>
Micro-silica .....	701.10
Slag cement .....	701.11
Fly ash or natural pozzolan .....	701.13
Fine aggregate <sup>[2][3]</sup> .....	703.02
Coarse aggregate <sup>[3]</sup> .....	703.02, 703.13 <sup>[4]</sup>
Recycled Concrete Aggregate (RCA) Supplement	1117
Air-entraining admixture .....	705.10
Chemical admixture for concrete <sup>[5]</sup> ..	705.12
Carbonate micro-fines .....	705.27
Macro-fibers <sup>[6]</sup> .....	705.29

[1] If blended cement is used, provide mill certification of all the cement and pozzolanic components and final product for approval by the [Office of Materials Management](#)

[2] [703.02](#) natural sand or sand manufactured from stone as specified in Item [703.02.A.3](#) is required in [255](#), [256](#), [451](#), [452](#), [526](#), and [511](#) deck slabs.

[3] Aggregates may be standard gradation sizes from [703.02](#) and Table [703.01-1](#) or they may be a modified gradation defined with the mix design submittal and certified by the [Office of Materials Management](#) under Supplement [1069](#).

[4] Applies only to [305](#), [451](#) and [452](#) concrete.

[5] Admixtures shall contain no more than 50 parts per million chloride ions by weight of cement except for Type C accelerating admixtures or calcium chloride for QC-FS only.

[6] Applies only to Class QC RS.

Use water for concrete mixing free from sewage, oil, acid, strong alkalis, vegetable matter, clay, and loam. Potable water is satisfactory for use in concrete. Non-potable water will meet the requirements of [ASTM C1602](#). Water from a reclaiming system will contain no more than 0.06% chlorides. Test the non-potable water monthly and maintain data verifying that the water meets the requirements. Provide the data at the Engineer's request.

**499.03 Concrete Mix Designs.** Develop concrete mix designs with 1-inch maximum nominal size coarse aggregate according to [ACI 301](#), Section 4 meeting the requirements of Table [499.03-1](#). Limit the pozzolan and carbonate micro-fines content of any mix design according to Table [499.03-2](#) and Table [499.03-3](#). The design air for concrete with 1-inch nominal maximum size aggregate is 7%. Develop concrete mix designs per this specification and Supplement [1126](#).

Only use mix designs accepted by the Department and issued a JMF number.

**TABLE 499.03-1 CONCRETE MIX DESIGN REQUIREMENTS**

Quantities per Cubic Yard (Cubic Meter) Provide Concrete with 7±2% Air Content				
Class	Design Strength psi (MPa)	Permeability [1] Maximum (Coulombs)	Cementitious Content [2] Minimum. lbs (kg)	Aggregate Requirements
QC 1	4,000 (28.0) at 28 days	2,000	520 (236)	Well-Graded
QC 1P <sup>[9]</sup>	4,000 (28.0) at 28 days	2,000	520 (236)	Well-Graded
QC 2	4,500 (31.0) at 28 days	1,500	520 (236)	Well-Graded
QC 3 Special	As per plan	1,500 or as per plan	520 (236) or as per plan	Well-Graded or as per plan
QC 4 Mass Concrete	4,000 (28.0) or as per plan <sup>[3]</sup>	2,000 or as per plan	470 (213) <sup>[4] [5]</sup> or as per plan	Well-Graded or as per plan
QC 5 <sup>[8]</sup>	4500 (31.0) at 28 days	N/A	520 (236)	1 inch or 3/8-inch nominal maximum size
QC SCC <sup>[8]</sup>	4500 (31.0) at 28 days	1,500 or as per plan	520 (236)	Well-Graded, 1 inch or 3/8- inch nominal size or as per plan
QC MS	See Supplement <a href="#">1126</a>	N/A	800 (363)	1-inch nominal maximum size
<b>QC FS</b> <b>QC RS</b> <sup>[10]</sup>	See Supplement <a href="#">1126</a>	<b>N/A</b> <b>2,000</b>	<b>900 (408)</b> <b>520 (236)</b>	<b>1-inch nominal maximum size</b> <b>Well Graded</b>
QC Misc. <sup>[6]</sup>	4,000 (28.0) at 28 days	N/A	550 <sup>[7]</sup> (249)	1-inch nominal maximum size

[1] [AASHTO T277](#) Modified.  
 [2] Cementitious Content includes cement and pozzolan denoted as Cm.  
 [3] Strength for Mass Concrete (QC 4) may be tested at either 28 or 56 days.  
 [4] Do not use Type III cement or accelerating admixtures in mass concrete.  
 [5] The maximum fly ash, natural pozzolan, or slag cement content may be increased up to 50%.  
 [6] For QC Misc. mixes only –Water/Cementitious ratio limited to 0.50 maximum.  
 [7] Cement or a combination of cement and up to 15% fly ash or natural pozzolan; or up to 30% slag cement.  
 [8] For QC 5 and QC SCC mixes with 3/8-inch nominal size, provide an air content of 8±2%.  
 [9] Portland cement concrete pavement mix design.  
**[10] Provide QC RS with 6±2% air content**

Determine the permeability by testing according to [AASHTO T277](#) except moist cure the permeability samples for 7 days at 73 °F (23 °C) followed by 21 days of moist curing at 100 °F (38 °C). Perform permeability testing at 28 days.

Limit pozzolan materials as a percent of total cementitious content according to Table 499.03-2:

**TABLE 499.03-2 POZZOLAN MATERIALS**

Materials	Maximum Content (%)
Fly Ash	25
Natural pozzolan	25
Slag Cement	30
Micro-Silica	10
When using multiple pozzolan materials, do not exceed the individual maximum contents above for each material. A combination of pozzolan materials may not exceed 50% of the total cementitious content by weight.	

Limit carbonate micro-fines as a percent of total cementitious content according to Table 499.03-3:

**TABLE 499.03-3 CARBONATE MICRO-FINES MATERIALS**

Material	Maximum Content (%)
Carbonate Micro-Fines	20
Do not use carbonate micro-fines in Class QC 2 or QC 3 concrete.	

**A. Slump and SCC Slump Flow.** Maintain slump within the nominal slump range in Table 499.03-4. If below the maximum water-cementitious ratio of the Job Mix Formula (JMF), adjust the quantity of water to meet slump requirements. Water-reducing admixtures conforming to the requirements of 705.12 may also be used or adjusted to meet slump requirements. Do not use concrete with a slump greater than the maximum shown in Table 499.03-4. Conduct tests on the plastic concrete for pavement at the point of placement or at an Engineer-designated location.

**TABLE 499.03-4 CONCRETE SLUMP**

Type of Work	Nominal Slump inch (mm) <sup>[1]</sup>	Maximum Slump inch (mm) <sup>[2]</sup>
Concrete pavement (305, 451, 452, 615)	1 to 3 (25 to 75)	4 (100)
Structural Concrete (511, 622)	1 to 4 (25 to 100)	5 (125)
Superstructure concrete (511, 526)	2 to 4 (50 to 100)	4 (100)
Non-reinforced concrete (601, 602, 611, 608, 609, 622)	1 to 4 (25 to 100)	5 (125)
[1] This nominal slump may be increased to 6 inches (150 mm), provided the increase in slump is achieved by adding a chemical admixture conforming to the requirements of 705.12, Type F or G.		
[2] This maximum slump may be increased to 7 inches (180 mm), provided the increase in slump is achieved by adding a chemical admixture conforming to the requirements of 705.12, Type F or G.		

Maintain slump flow within the nominal slump flow range in Table 499.03-5. Do not use concrete with a slump flow greater than the specified maximum for the SCC Class shown in Table 499.03-5.

Test for slump flow and Visual Stability Index (VSI) according to [ASTM C1611](#). Provide a VSI of zero (0) or one (1) according to the Appendix in [ASTM C1611](#).

**TABLE 499.03-5 CONCRETE SLUMP FLOW**

SCC Class	Minimum Slump Flow inch (mm)	Nominal Slump Flow inch (mm)	Maximum Slump Flow inch (mm)
Class I	18 (460)	20 (508)	22 (560)
Class II	22 (560)	24 (600)	26 (660)
Class III	26 (660)	28 (710)	30 (760)

**B. Air Content.** Ensure that the air content in all concrete at the point of placement is within the percentage range specified in Table [499.03-1](#).

**499.04 Adjustments and Controls.** Provide the following adjustments and controls during batching and placement of the concrete:

**A.** Batch the concrete to the proportions of the accepted JMF. Provide a workable and finishable mix. Adjustments to the JMF’s aggregate proportions up to 100 lbs (44 kg) for workability may be made. Adjustments greater than 100 lbs (44 kg) may be made if approved by the Engineer. Maintain an absolute volume of 27.0 cubic feet/cubic yard for the adjusted concrete mix. For Well Graded JMF adjustments, maintain the combined aggregate gradation within the optimal zone II requirements **and the Tarantula Curve limits** for well-graded mixes as defined in Supplement [1126](#). If outside the optimal zone II of the Coarseness Factor Chart **or the Tarantula Curve limits of the Tarantula Curve** adjust the JMF’s proportions to maintain the combined gradation within Zone II **and the Tarantula Curve limits** and report the JMF changes to the Engineer.

**B.** Handle, haul and store aggregates to minimize segregation, avoid contamination, and assure a uniform grading within the specified gradation. Do not combine aggregates from different sources or of different gradings in the same stockpile. Do not use segregated or contaminated aggregates. Keep aggregate stockpiles at or above SSD condition prior to batching.

**C.** Remove all wash water by reversing each truck drum at the plant immediately prior to reloading.

**D.** Adjust the SSD aggregate design weights in the JMF to compensate for the moisture contained in the aggregates. Perform moisture burn offs on all aggregates prior to concrete production. For bridge deck concrete, perform a moisture burn off 2 hours prior to the start of concrete placement.

Provide moisture burn off calculations showing the free moisture of each aggregate prior to batching concrete.

**E.** Use only compatible admixtures in the concrete. Dispense all admixtures according to the manufacturer’s recommendations. Furnish a volumetric dispenser for the Type F or G admixture or ensure that there is a gage on each truck-mounted Type F or G admixture dispensing tank. If any admixture is added at the job site, mix the load for a minimum of 5 minutes.

**F.** Do not exceed the maximum water/cementitious ratio or maximum water/powder ratio of the accepted JMF. Use a water-reducing admixture conforming to [705.12](#); proportionately increase the cementitious content; or develop and submit for acceptance a new JMF. Adjust the absolute volume of the aggregates if the cementitious content is increased.

**G.** If during placement of concrete, cement or micro-silica balling is observed, take corrective action with further mixing. If after corrective action, balling continues, reject the load. Revise the mixing process and/or loading sequence to prevent further balling.

**H.** If slump loss occurs before or during placement of the concrete, the concrete slump may be field adjusted to restore plasticity with a Type F or G chemical admixture conforming to [705.12](#), additional water, or both, only if the maximum water-cementitious ratio of the accepted JMF is not exceeded. Mix for a minimum of 30 revolutions at mixing speed after addition of admixture, water, or both. Inform the Inspector, record all adjustments, and confirm compliance with [499.03.A](#). The Engineer will recheck the slump and air content to ensure conformance to the specification. If after any adjustment the components of the load are segregated, the Department will reject the load.

**I.** Completely discharge the concrete from each delivery truck within the time requirements of [499.08](#).

**J.** Provide sufficient quality control at the plant to assure conformance with this specification and project requirements.

**K.** Use an approved set-retarding admixture conforming to [705.12](#), Type B or D when the concrete temperature exceeds a nominal temperature of 75 °F (24 °C).

**499.05 Equipment.** Use a Department approved batch plant and trucks. Provide batching and mixing equipment meeting the following requirements:

**A. Batching Plants.** Operate each plant so that aggregate materials are not segregated and there is no intermingling of the materials before batching. Use weighing mechanisms that allow a visible means of checking weights and produce a printed record. Use dispensing mechanisms for water and admixtures that allow a visible means of checking quantities and produce a printed record.

Use cement and aggregate weighing mechanisms that are accurate to within  $\pm 0.5$  percent of the correct weight. Ensure that devices for weighing or metering water are accurate to  $\pm 1.0$  percent throughout the range used.

Maintain a certification from a Sealer of Weights and Measures or a scale servicing company attesting to the accuracy of the weighing and metering devices. A Certificate of Performance issued by the National Ready Mixed Concrete Association may be used instead of the Sealer of Weights and Measures or a scale servicing company. Do not use plants with a certification or certificate older than 12 months

Maintain the services of a scale servicing company or ten standard test weights to reach a capacity of 500 pounds (227 kg) for testing the weighing devices at the batch plant. Ensure all device-testing weights are sealed by the Ohio Department of Agriculture every 3 years.

The Engineer may test weighing and dispensing devices as often as necessary to ensure continued accuracy.

**B. Mixers.** Provide mixers and agitators conforming to [AASHTO M 157](#), Sections 10, 11.2, 11.5, and 11.6, except that the Department will allow mechanical counters.

For bodies of non-agitating concrete hauling equipment, provide smooth, mortar-tight, metal containers capable of discharging the concrete at a satisfactory controlled rate without segregation. Provide covers when required by the Engineer. The Engineer will allow trucks having dump bodies with rounded corners and no internal ribs or projections for non-agitating hauling.

**C. Concrete Pumping and Conveying Equipment.** Provide concrete pumping and conveying equipment in accordance with [ACI 304.2R](#) and [ACI 304.4R](#). Conduct a pre-placement meeting to

discuss concrete pumping and conveying procedures to maintain air content within specified limits per Table 499.03-1.

**D. Volumetric Truck Mixers.** Volumetric Truck Mixers. Provide mixers conforming to ASTM C685, Sections 7, 8, 9, 10, 11, 13, and 14. Mixers must have rating plates indicating that the performance of the mixer is in accordance with the Volumetric Mixer Manufacturer Bureau or equivalent. Mix concrete in accordance with the manufacturer's recommended procedures. The volumetric mixer must be capable of carrying sufficient unmixed dry bulk cement, supplementary cementitious materials, coarse and fine aggregate, admixtures and water, in separate compartments and accurately proportion the approved JMF. Each volumetric mixer shall be equipped with an onboard ticketing system that will electronically produce a record of all material used and their respective weights and the total volume of concrete placed. Place no more than 30 cubic yards (23 m<sup>3</sup>) per unit per day. Limit the use of volumetric truck mixers to QC Misc., QC MS, QC **FS RS**, and Item 613.

Provide a process control plan, product quality control plan, and manufacturer's recommended procedures to the OMM Cement and Concrete Engineer. Calibrate the proportioning devices before the start of a project and at intervals recommended by the manufacturer. Perform calibrations in the presence of the Engineer. Calibrate the cement and aggregate proportioning devices by weighing (determining the mass of) each component. Calibrate the admixture and water proportioning device(s) by weight (mass) or volume. Batch each material to ensure weights are within the tolerances listed in Table 499.06-2, based on the amount specified in the accepted JMF. Furnish batch tickets in accordance with Item 499.07. Verify yield daily based on the cement meter count (number of revolutions per 94 pounds (42.5 kg) of cement), for each volumetric truck mixer.

**499.06 Handling, Measuring, and Batching Materials.** Do not stockpile aggregates from different sources or different gradations together. Do not use aggregates that have become segregated or mixed with foreign material. The Engineer may direct reworking or cleaning, or may reject aggregates that have become segregated or mixed with earth or foreign material.

Prior to and during batching, maintain all coarse and fine aggregates at a uniform moisture content, at or above, an SSD condition.

For all slag aggregates or other aggregates with a reported absorption above 3.0 percent, maintain the moisture contents at or above the ODOT-reported SSD for that aggregate as follows:

**A.** Use appropriate stockpile watering systems capable of raising and maintaining aggregate moisture at or above SSD. Test the moisture content of the watered aggregate stockpiles at least five (5) locations to assure the stockpile is at or above SSD.

**B.** Have processes to maintain the aggregate stockpile at SSD until stockpile draining for SSD consistency has begun. Twenty-four (24) hours before batching concrete with the aggregate, shut down the stockpile watering process to allow drainage and to establish a uniform moisture content.

**C.** Test aggregate moisture content at least once per half day, but not less than twice per day, during concrete production. If the moisture content varies between tests by more than 1 percent increase the moisture testing frequency to assure correct batching information.

**D.** Provide the moisture content test results as part of all quality control plant ticket information.

Separately weigh the amounts of fine aggregate and coarse aggregate. Use a separate weighing device for cementitious materials.

Batch each material to ensure weights are within the tolerance specified in Table 499.06-1, based on the amount specified in the approved JMF including any proportion adjustments according to Item 499.04.

**TABLE 499.06-1 CONCRETE BATCHING TOLERANCES**

<b>Material</b>	<b>Batching Tolerance (%)</b>
Cement	±1.0
Pozzolan <sup>[1]</sup>	±1.0
Carbonate Micro-fines <sup>[2]</sup>	±2.0
Aggregates <sup>[2]</sup>	±2.0
Water <sup>[3][4]</sup>	±1.0
Chemical Admixtures	±3.0
<b>Macro-fibers</b>	<b>±3.0</b>

[1] Tolerance is on cumulative target weight when weighing together with cement  
 [2] Tolerance is on cumulative target weight when weighing together with more than one aggregate  
 [3] Measured by weight or volume  
 [4] Tolerance based on target water quantity, not water quantity allowed at maximum water-cementitious ratio

**TABLE 499.06-2 VOLUMETRIC TRUCK BATCHING TOLERANCES**

<b>Material</b>	<b>Batching Tolerance (%)</b>
Cement	0.0 to +4.0
Pozzolan	0.0 to +4.0
Carbonate Micro-fines	0.0 to +4.0
Aggregates	±2.0
Water	±1.0
Chemical Admixtures	±3.0
<b>Macro-fibers</b>	<b>±3.0</b>

**499.07 Batch Plant Tickets.** Furnish a concrete batch plant ticket to the Engineer for each load of concrete incorporated into the project. Provide computer generated batch tickets. At a minimum, include the information listed in Table 499.07-1 on each ticket:

**TABLE 499.07-1 EVERY BATCH TICKET**

Name of ready-mix batch plant	
Batch plant No.	
Batch plant location	
Producer/Supplier Code	
Serial number of ticket	
Date	
Truck number	
Class of concrete	
JMF Number	
Batch time	
Batch size	yd <sup>3</sup> (m <sup>3</sup> )
Actual weights and batch tolerance of cementitious material:	
Cement	lb (kg)
Fly ash	lb (kg)
Natural pozzolan	lb (kg)
Slag cement	lb (kg)
Micro-silica	lb (kg)
Other	lb (kg)
Actual weights and batch tolerance of aggregates:	
Coarse	lb (kg)
Intermediate	lb (kg)
Fine	lb (kg)
Carbonate Micro-Fines	lb (kg)
Other	lb (kg)
Actual weight of water and batch tolerance	lb (kg)
Actual volume of admixtures:	
Air-entrainer	fl oz (mL)
Superplasticizer	fl oz (mL)
Water-reducer	fl oz (mL)
Retarder	fl oz (mL)
Macro-fibers	lb (kg)
Other	fl oz (mL)
Aggregate moisture contents:	
Coarse aggregate	%
Intermediate aggregate	%
Fine aggregate	%
Water-cementitious ratio, leaving the plant	
Allowable additional water	gallons

Provide the information in Table 499.07-2 with batch tickets for each day’s first load of concrete and for each JMF. Include Table 499.07-2 information on the batch ticket or furnish the information on a separate computer-generated or handwritten form attached to the batch ticket. Provide moisture adjustment calculations for all coarse and fine aggregate according to 499.06.C.

If during the concrete manufacturing process any of the information listed in Table 499.07-2 changes, resubmit Table 499.07-2 information with the first batch ticket supplied with the changed concrete.

**TABLE 499.07-2 FIRST TICKET EACH DAY, EACH JMF**

<b>Cementitious Materials:</b>	<b>Source:</b>	<b>Grade or Type:</b>
Cement		
Fly ash		
Natural pozzolan		
Slag cement		
Micro-silica		
Other		
Admixtures	Brand:	Type:
Air-entrainer		
Retarder		
Superplasticizer		
Water-reducer		
Macro-fibers		
Other		

The provided concrete batch ticket information is according to [ASTM C94/C 94M](#), Section 14.

Provide a copy of the moisture burn off calculation sheet with the first ticket of the day, or when there is an updated moisture burn off performed.

**499.08 Mixing Concrete.** Use a central mix plant or in truck mixers to mix the concrete.

When using a central mix plant, mix the concrete not less than 60 seconds Begin the mixing time when all materials are in the drum and end the mixing time when discharge begins. Include transfer time in multiple drum mixers in the mixing time. Remove the contents of an individual mixer drum before a succeeding batch is emptied into the drum.

When concrete is mixed using a truck mixer for complete mixing, mix each batch of concrete at the rotation rate designated on the mixer as mixing speed for not less than 70 revolutions of the drum. Transport mixed concrete from the central mixers in truck mixers, truck agitators, or trucks having non-agitating bodies. Within 90 minutes after cement and water are combined, deliver and completely discharge concrete.

Use admixtures containing no more than 50 parts per million chloride by weight of cement only when specified in the Contract Documents, the accepted JMF, or with the Engineer’s written permission.

Ensure that the temperature of all concrete does not exceed 95 °F (35 °C) until incorporated into the work. For bridge deck concrete, ensure the temperature of the concrete does not exceed 85 °F (30 °C).

## ITEM 511 CONCRETE FOR STRUCTURES

**511.01 Description.** This work consists of providing falsework and forming, furnishing, placing, consolidating, finishing, and curing portland cement concrete. This work also includes diamond saw cutting longitudinal grooves into the surface of superstructure concrete. Construct falsework and forms as required in Item 508.

**511.02 Materials.** Furnish materials conforming to 499.02, except as modified below.

Use the same kind and color of aggregate for all concrete above the ground line in a given substructure unit and for all concrete in a given superstructure.

Use high molecular weight methacrylate resin sealer conforming to 705.15.

Use curing materials conforming to 705.05; 705.06 (white opaque); or 705.07; Type 1 or 1D.

Use 1/4-inch (6 mm) gray sponge joint filler conforming to 711.28, or use preformed filler conforming to 705.03.

Use preformed elastomeric compression joint seals conforming to 705.11.

**511.03 Concrete.** Provide concrete for structures according to 499.03, using Class QC 1, QC 2, QC 3, or QC 4 or QC 5 as specified in the Contract. Mix concrete according to 499.08.

At least 10 days before placing concrete, submit, in writing, the Department accepted Job Mix Formula (JMF) to the Engineer. The Engineer will review the mix design for conformance to contract requirements; otherwise the mix design is for the Engineer's information.

**511.04 Quality Control Requirements.** When the concrete bid item requires QC/QA, develop and submit a Quality Control plan (QCP) for the work and perform quality control testing of the concrete conforming to Item 455.

When the concrete bid item requires QC/QA, The Engineer will perform Quality Assurance conforming to Item 455.

When the concrete bid item does not require QC/QA, the Engineer will make at least one set of acceptance test cylinders for each 50 cubic yards of concrete.

With any 511 concrete bid item provide and maintain a Concrete Cylinder Curing Box (CCCB) capable of holding at least twelve 4 × 8 inch cylinders at a temperature of 60 to 80 °F degrees no matter what the ambient temperature. Provide a max-min thermometer with each CCCB to ensure these temperature requirements are met. The box will have a sealed lid. If the project has numerous 511 concrete bid items, one CCCB may be used for multiple items of work. Locate the CCCB at a site that is convenient to the concrete work and will eliminate handling damage to both the Contractor QC or QA cylinders and the Department Cylinders. Move the CCCB as needed during the project when the distance from the concrete work increases the possibility of cylinder handling damage.

**511.05 Mass Concrete Requirements.** For concrete components with a minimum dimension of 5-ft or greater, develop a concrete mix design QC-4 for mass concrete according to 499.03. Develop a Thermal Control Plan (TCP) to control placement of the mass concrete so that the highest maximum internal temperature of the placed concrete is not greater than 160 °F and the maximum differential concrete temperature does not exceed 36 °F over 28 days from time of placement.

For drilled shafts with a dimension of 7-ft diameter or greater, develop a concrete mix design QC-4 for mass concrete, QC 4 according to 499.03. Develop a TCP to control placement of the mass concrete so that the highest maximum internal temperature of the placed concrete is not greater than 160 °F.

Submit the TCP to the Engineer for acceptance at least 10 calendar days prior to placement along with the approved JMF (s).

As a minimum, the TCP shall include the following information:

- A. Duration and method of curing.
- B. Procedures to control concrete temperature at the time of placement. The mix shall contain no frozen pieces of ice after blending and mixing components.
- C. Methods and equipment used for controlling temperature differentials.
- D. Temperature sensor types, locations and installation details. As a minimum, concrete temperatures shall be monitored at the calculated hottest location, on at least 2 outer faces, 2 corners, and top surfaces.
- E. Temperature monitoring and recording system; operation plan; recording and reporting plan with example output; and a remedial action plan.
- F. Criteria for form removal to control the maximum temperature differential.

As an alternative to the maximum differential concrete temperature specified above, the Contractor may propose maximum differential temperature limits based on strength gain with time. The TCP for the alternative proposal shall include the methods used to determine the temperature and supporting data and design to support the accuracy of the method chosen. Provide complete calculations and basis for increasing the maximum differential temperature specification. The TCP for the alternative proposal shall also provide the Engineer with tables that define ambient temperatures for acceptable concrete placement, the required temperature of the concrete for the ambient air temperature, the maximum predicted concrete temperature, the maximum predicted differential temperature, the time for removal of forms, the allowable air temperature for form removal, and the predicted maximum and differential temperature from placement to age of 28 days. The Department will consider all cracking of a mass concrete placement where the differential temperature exceeded 36 °F the responsibility of the Contractor.

Upon the Engineer's acceptance of the TCP, continuously monitor all temperature sensors over the required age of the concrete. If the maximum limit or differential temperature limits are exceeded at any time, immediately take action to retard and reduce the out-of-specification temperatures. If a mass concrete placement temperature exceeds the specification limits of the currently accepted TCP, re-engineer, revise and resubmit the TCP. Do not place additional mass concrete until the revised TCP is accepted.

The Department will consider in-place mass concrete that exceeds the temperature limits or that cracked, as defective and resulting delays as non-excusable. Determine the extent and effect of the damage and submit a proposed repair plan to the Engineer to return the concrete to acceptable quality. The Department will determine if the proposed repair methods are acceptable or if removal is required.

**511.06 Slump.** Within the slump ranges specified in [499.03](#), provide a slump that produces concrete that is workable in the required position, flows around reinforcing steel, and coats individual particles of coarse aggregate with mortar containing the proportionate amount of sand.

**511.07 Placing Concrete.** Submit to the Engineer a description of proposed placing procedures and notify the Engineer at least 24 hours in advance of placing concrete. If the concrete bid item requires QC/QA, include the submittal as part of the QCP.

Place and finish concrete to the lines and grades shown in the plans.

Provide coverage over or around reinforcing steel as described in [509.04](#).

Conform to the following tolerances from plan dimensions:

**TABLE 511.07-1 - PLACEMENT TOLERANCES**

Deviation from plumb for exposed surfaces	± ¾ inch (19 mm)
Vertical alignment (Deviation from a line parallel to the grade line)	± ½ inch in 20 feet (13 mm in 6 m) Max. ±1 inch (25 mm)
Longitudinal alignment (Deviation from a line parallel to the centerline or baseline)	±½ inch in 20 feet (13 mm in 6 m) Max. ±1 inch (25 mm)
Width dimensions of walls for exposed surfaces	±½ inch (13 mm)
Bridge Slab thickness	±¼ inch (6 mm)
Elevations of beam seats	±1/8 inch (3 mm)
Slope, Vertical Deviation from Plane	±0.2%
Slope, Horizontal Deviation from Plane	±0.4%

Until discharged in the work, ensure the temperature of bridge deck concrete does not exceed 85 °F (30 °C) and ensure that the temperature of all other concrete does not exceed 95 °F (35 °C).

When placing superstructure and approach slab concrete assure the ambient air temperature is 85 °F (30 °C) or less and not predicted to go above 85 °F (30 °C) during the concrete placement; and evaporation rates, determined according to Figure 1 in [ACI 308-81](#), do not exceed 0.1 lbs/ft<sup>2</sup>/hour (0.5 kg/m<sup>2</sup>/hour).

Determine and document the ambient air temperature, concrete temperature, deck surface temperature, relative humidity, and wind velocity, subject to verification by the Engineer. Measure data required in Figure 1 from within 10 feet (3 m) of the area where the superstructure concrete is placed.

Figure 1 does not apply to substructure items and formed parapets. Figure 1 applies to slip-formed parapets and approach slabs.

To meet favorable atmospheric conditions, ODOT may require the Contractor to place concrete at night. At least 24 hours before placing concrete at night, submit a lighting plan for the work area to the Engineer. Obtain the Engineer’s approval of the lighting plan before placing the concrete. Direct lights so that approaching traffic is not affected or distracted.

Before placing a concrete deck on continuous steel beams or girders, complete all of the main beam or girder splices at least two piers beyond the pier or piers supporting the concrete.

Before placing concrete for backwalls above the approach slab seat with steel expansion joints, backfill the abutments to within 2-feet (0.6 m) of the bridge seat elevation, erect structural steel or prestressed concrete beams and place superstructure concrete in the adjacent span. Use the steel expansion joint as a template for the top of the backwall. If temporary bolts are used to support the backwall portion of an expansion device during the placing of the backwall concrete, remove the bolts after the concrete has taken its initial set and before a change in temperature causes superstructure movement sufficient to damage the backwall.

Before placing concrete, assure the Engineer of an adequate and uniform source of supply of concrete to allow proper placing and finishing, and of the availability of coverings to protect the concrete from rain.

Do not add or apply water to the concrete after it has left the truck and before applying curing materials according to [511.13](#).

Before placing concrete, thoroughly clean all forms and structural steel that contact the concrete and ensure that the space to be occupied by the concrete is free of laitance, silt, dirt, shavings, sawdust, loose and built-up rust, and other debris.

Deposit concrete using methods that ensure reinforcing steel is completely enveloped in concrete mortar and that allow inspection of concrete enveloping the reinforcing steel. Use a method or device to convey the concrete from the mixer to the work that prevents coarse aggregate separating from the mortar. If depositing concrete in shallow members, such as slabs, place it with as short a vertical drop as possible. Place the concrete over a section to maintain a practically horizontal surface. If using a chute, slope the chute to allow concrete to flow without segregation. Place concrete as near as possible to its final position.

Drop concrete into the forms with a free-fall distance of 5 feet (1.5 m) or less. As necessary, use drop chutes to limit the free fall to 5 feet (1.5 m) and to ensure the delivery ends as vertical as possible.

For concrete delivered to the point of placement by means of pumping equipment, ensure the air content at the point of placement is within the specified parameters of Table 499.03-1. Adjust the pumping pressure, boom angles and use pumping aids to lower the friction in the piping to meet the specified parameters. Provide a hose at the end of the line that is at least 0.5 inch (12 mm) smaller in diameter than the line on the boom to minimize free-fall and maintain a continuous flow of concrete in the pipe lines and boom during discharge.

Deliver and distribute the concrete at a uniform and adequate rate no more than 10 feet (3 m) directly in front of the finishing machine by suitable mechanical equipment. For structures with a skew angle greater than fifteen (15) degrees, Orient the finishing machine according to 511.16. For structures with a skew angle greater than fifteen (15) degrees and up to fifty (50) degrees, load the concrete at the skew angle. For structures with a skew angle greater than fifty (50) degrees, load the concrete as close to the skew angle of the structure as possible, but do not allow the leading edge of the concrete placement to exceed twenty (20) feet (6.1 m) ahead of the finishing machine.

Place concrete in structures using vibration. Furnish and use sufficient vibration equipment of the type and size approved by the Engineer to properly compact the concrete immediately after it is placed in the forms. The vibrators shall generally be of a type that is applied directly to the concrete and have a frequency of at least 4500 impulses per minute. If the concrete is inaccessible for this method of vibration, apply the vibrators to the outside of the forms.

Do not move concrete using a vibrator. Vibrate freshly deposited concrete at the point deposited. Slowly insert and withdraw the vibrators vertically into the concrete until the concrete is thoroughly compacted but not segregated. During vibration, do not disturb partially hardened concrete.

As necessary, spade along form surfaces, in corners, and in locations impossible to reach with vibrators to ensure smooth surfaces and dense concrete. Closely observe the results obtained on the first concrete placed, and, if necessary, modify the mix according to this specification to secure the best results.

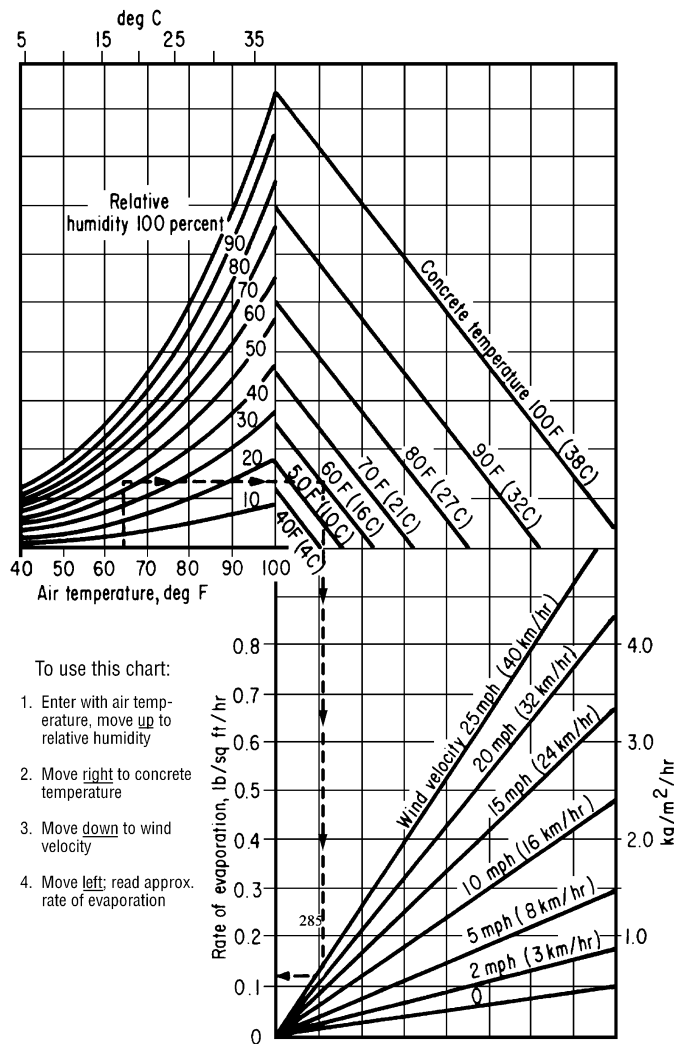


FIGURE 1 ACI 308-81

**511.08 Slipform Construction of Bridge Railing.** If slipforming, provide finished concrete conforming to the following tolerances from plan dimensions:

**TABLE 511.08-1  
SLIPFORMED BRIDGE RAILING TOLERANCES**

Reinforcing steel cover	-1/2 inch, +1/2 inch (-13 mm, +13 mm)
Top width dimension	-0, +1/4 inch (+6 mm)
Bottom width dimension	-0, +1/2 inch (+13 mm)
Surface flatness	1/4 inch in 10 feet (6 mm in 3 m)
Vertical alignment (Deviation from a line parallel to the grade line)	1/2 inch in 20 feet (13 mm in 6 m) Max. ±1 inch (25 mm)

Tie all joints and splices in bridge railing reinforcing steel. Before placing concrete, perform a slipforming dry run to verify reinforcing clearance and rigidity of the reinforcing cages. Adjust and stabilize the cage as necessary to establish the required clearances and to ensure the cage will not move

during slipforming. The Contractor may add any additional diagonal reinforcing steel between the front and rear vertical reinforcing faces to establish the required rigidity.

Repair or patch honeycombing, cracking, tearing, and other defects immediately after concrete exits the slipform equipment. Completely fill defects with concrete without using water to smooth or close the surface. If the slipforming exhibits more than infrequent defects, stop work and make adjustments to produce a slipformed surface that does not require repairs. Do not broom finish the surface of the bridge railings.

After the concrete initially sets, but before any shrinkage cracks develop, saw control joints 1 1/4 inches (32 mm) deep into the perimeter of the parapet. Generally, initial set is within 6 hours of batching of the concrete. Ensure that all control joints are sawed within 24 hours of placement. Saw control joints using an edge guide, fence, or jig to ensure that the joint is straight, true, and aligned on all faces of the parapet. The joint width shall be the width of the saw blade, a nominal 1/4 inch (6 mm). After the concrete curing period specified in Item 511.13 has been reached, before applying construction loads on the deck (excluding personnel, hand operated equipment and manually powered vehicles) and before allowing vehicle traffic in the lane immediately adjacent to median bridge railing saw cut each control joint at least 4 inches (100 mm) deep around the perimeter of the front face, top and back face of the top portion of parapet, no lower than 12 and 1/2 inches (313 mm) above the top of the concrete deck slab. Caulk the control joints with a polyurethane or polymeric material conforming to ASTM C920, Type S.

Slip formed concrete requires different slumps than those listed in Item 499 or other plan specified concrete. Provide a slump such that the concrete exiting the slipform does not pull but is stiff enough to prevent waviness and sags in the finished surfaces. Cure slipform concrete according 511.13, Method A. Because slipformed concrete has a low water-cement ratio, timely application of the water cure is critical in helping control shrinkage cracks.

Furnish platforms as necessary to protect traffic passing under the bridge from falling debris during the slipforming operation, to allow access for completing the finishing operation, and to allow the Engineer access to the outside of the parapet.

The Engineer will inspect the slipformed surface for horizontal cracking no earlier than 21 days after completion of the slipforming operation. Repair all horizontal cracks by epoxy injection. If a concrete sealer was applied, repair damage to the sealer after completing the epoxy injection.

**511.09 Construction Joints.** A construction joint is a plane separating concrete placements that reach initial set at different times. Place construction joints in the locations shown in the plans. Construction joints shall have a non-finished surface, a formed finish surface or a roughened finish surface. Provide a non-finished surface on horizontal joints and a formed finished on vertical joints unless otherwise specified. A non-finished surface shall have uniformly exposed aggregate, no loose aggregate and all laitance removed. When placing concrete against an existing surface, placed in a previous project, the Department will consider the construction joint created to be a formed finish surface unless otherwise specified in the plans. All construction joint form work and bulkheads shall be in accordance with Item 508. Do not use an edger on construction joint edges. Cure the construction joints according to 511.13.

A roughened construction joint surface, when specified in the plans, shall be as follows:

A. For bonding surfaces that can be finished, finish the surface by producing grooves at right angles and penetrating the finished surface approximately  $1/4 \pm 1/8$  inch ( $6 \pm 3$  mm) at a maximum spacing of  $1 - 1/4 \pm 1/4$  inch ( $32 \pm 6$  mm). Grooves shall terminate approximately 1 1/2-inches from the edge of

finishing surface. If the first strike-off does not produce the required roughness, repeat the process before the concrete reaches initial set.

**B.** For bonding surfaces that cannot be finished according to Part A, use mechanical scarifying equipment to thoroughly roughen the existing surface to a uniformly distributed  $1/4 \pm 1/8$  inch ( $6 \pm 3$  mm) at a spacing of  $1 - 1/4 \pm 1/4$  inch ( $32 \pm 6$  mm). Do not use chipping hammers heavier than the nominal 15 lb (7 kg) class and operate at an angle of less than 45 degrees with respect to the surface. Remove concrete in a manner that prevents cutting, elongating or damaging reinforcing steel.

Before placing fresh concrete against any hardened concrete surface, thoroughly clean and saturate the existing surface. Remove all loose particles, dust, dirt, laitance, oil, curing compound, concrete lip or edging, and any film of any sort. Flush construction joint surfaces with water and allow the surfaces to dry to a surface-dry condition immediately before placing concrete.

Requests to add, delete or relocate construction joints shall be in accordance with the ODOT [Bridge Design Manual](#) and shall be in writing, accompanied by revised plan sheets signed, sealed, and dated by an Ohio Registered Professional Engineer. Obtain the Engineer's acceptance prior to placing a construction joint not shown on the plans. The Department will not pay for added costs that result from such changes.

**511.10 Work Stoppage.** If the work is unexpectedly interrupted by breakdowns, storms, delays or other causes which will result in an initial set of the placed concrete, rearrange the freshly deposited concrete to provide a straight and non-wavy construction joint per [511.09](#). If the Engineer determines that this construction joint adversely affects the structure capacity, the Engineer will require a corrective action plan per [501.05.C](#).

**511.11 Depositing Concrete Under Water.** Except for cofferdam seals and drilled shafts, do not place concrete under water.

**511.12 Depositing and Curing Concrete During Cold Weather.** If placing concrete when the atmospheric temperature is  $32\text{ }^{\circ}\text{F}$  ( $0\text{ }^{\circ}\text{C}$ ) or less, or if weather forecasts predict these temperatures during the curing period, follow the procedures of this subsection.

Heat the water or aggregate, or both, as necessary to produce concrete with a temperature when placed of at least  $50\text{ }^{\circ}\text{F}$  ( $10\text{ }^{\circ}\text{C}$ ) but not greater than  $70\text{ }^{\circ}\text{F}$  ( $21\text{ }^{\circ}\text{C}$ ).

Place concrete against materials with a temperature of greater than  $32\text{ }^{\circ}\text{F}$  ( $0\text{ }^{\circ}\text{C}$ ). If necessary, heat the forms, reinforcing steel, and foundation materials before placing the concrete.

Maintain the concrete surface temperature between  $50$  and  $100\text{ }^{\circ}\text{F}$  ( $10$  and  $38\text{ }^{\circ}\text{C}$ ) for a period of not less than 5 days, except as modified in [511.12.C](#). After the minimum cure period of 5 days, reduce the concrete surface temperature at a rate not to exceed  $20\text{ }^{\circ}\text{F}$  ( $11\text{ }^{\circ}\text{C}$ ) in 24 hours until the concrete surface temperature is within  $20\text{ }^{\circ}\text{F}$  ( $11\text{ }^{\circ}\text{C}$ ) of atmospheric temperature.

Install sufficient high-low thermometers to readily determine the concrete surface temperature. For deck slabs, install high-low thermometers to measure deck bottom surfaces, deck fascia surfaces, and deck top surfaces.

Maintain the concrete curing temperature using a heated enclosure, insulated forms, or by flooding, except cure deck slabs less than 10 inches (250 mm) thick using more than just insulated forms.

Remove falsework and open cold weather concrete to traffic according to [511.14](#).

**A. Heated Enclosure.** Construct the heated enclosure to surround the top, sides, and bottom of the concrete. Construct strong and wind proof enclosures that contain adequate space to allow free circulation of air around the forms and concrete.

Before placing concrete, construct the enclosure and heating devices to the extent allowed by the concrete operation. As the concreting operation progresses and as soon as possible after placing concrete, complete construction of the enclosures and apply heat. Supply heat by a method that continuously maintains a reasonably uniform temperature throughout the enclosures and does not discolor the concrete.

Vent combustion-type heating devices outside the enclosure.

If dry heat, other than free steam, maintains the enclosure temperature, immediately cover exposed concrete with two thicknesses of burlap. Continuously wet the burlap and, except for required rubbing of the concrete, do not remove the burlap during the heating period.

If wood forms without liners are left in place more than 2 days after the placing of concrete, thoroughly wet the forms at least once each day for the remainder of the heating period. If forms are removed during the heating period, thoroughly drench the concrete with water and, for the remainder of the heating period, cover and wet the concrete with burlap as specified above.

**B. Insulation.** Install sufficient thermometers to readily determine the concrete surface temperature. If the surface temperature approaches 100 °F (38 °C), loosen or otherwise vent the forms or insulation to keep the surface temperature within the limits specified above. If insulation does not maintain the minimum required temperature, promptly enclose the concrete as specified in 511.12.A or flood the concrete as specified in 511.12.C.

Use a wind and water resistant insulating material. Ensure edges, corners, and other points of extreme exposure are adequately insulated. Place a tarpaulin or other Engineer approved waterproof cover over the insulation to protect the concrete top surface.

**C. Flooding with Water.** The Contractor may flood the concrete with water provided flooding does not damage the concrete. Heat the water to a temperature from 50 to 100 °F (10 to 38 °C). The Contractor may stop using heated water after 48 hours if the concrete remains flooded to a depth of 1 foot (0.3 m) above its highest elevation for at least the next 120 hours.

**511.13 Curing.** Cure concrete as follows:

**TABLE 511.13-1, CURING REQUIREMENTS**

Location	Curing Method <sup>[1]</sup>
Superstructure concrete	Method A
Concrete to which sealer is applied	Method A
Construction joints	Method A
Top surface of concrete deck superstructure concrete	Method A followed by Method B
Concrete with waterproofing	Method A or Method B
All other concrete	Method A or Method B
[1] Method A is water curing. Method B is membrane curing. If using Method B on areas to be waterproofed, remove the curing membrane.	

Concrete curing methods are as follows:

**A. Method A, Water Curing.** With the exception of the top surface of deck superstructure concrete, protect surfaces not covered by forms immediately after final finishing with two thicknesses of wet burlap. Keep burlap wet for at least 7 days by the continuous application of water. If forms are

removed before 7 days, immediately drench the exposed concrete with water and cover it with burlap. Continuously apply water to the burlap for the remainder of the curing period.

Instead of continuous application of water, with the exception of the top surface of deck superstructure concrete, the Contractor may cover the wet burlap with white polyethylene sheeting or plastic coated burlap blankets conforming to 705.06. Place plastic coated burlap blankets wet and with the burlap side against the previous layer of wet burlap. Sufficiently lap and secure adjoining plastic coated blankets or polyethylene sheets at the laps and edges to form a seal that maintains the concrete wet at laps and edges. Cover white polyethylene sheeting or plastic coated blankets containing holes or tears with an additional covering of plastic sheeting or blankets as directed by the Engineer.

Cover the top surface of deck superstructure concrete with a single layer of clean wet burlap after it is bull floated if necessary and finished. Keep the burlap wet by a continuous flow of water through soaker hoses and cover the hoses with a 4 mils white opaque polyethylene film for 7 days. After 7 days, allow the surface of the deck to dry.

After curing the top surface of the deck superstructure concrete for 7 days, remove the burlap and standing water. Within 12 hours after removing the burlap, apply a curing membrane and cure the concrete according to Method B.

**B. Method B, Membrane Curing.** Immediately after the free water has disappeared on surfaces not protected by forms, apply curing material conforming to 705.07, Type 1 or 1D. If forms are removed before the end of the 7-day curing period, apply curing material on the concrete exposed by removing the forms.

Thoroughly mix curing material immediately before use. Apply the membrane curing material at the rate of at least 1 gallon per 200 square feet of surface and in a fine mist to provide a continuous, uniform, and water impermeable film without marring the concrete surface. The surface of the 705.07, Type 1D material shall have the appearance of a white sheet of typing paper.

Do not allow workers, materials, and equipment on the concrete during the curing period, unless adequately protecting the membrane curing material from damage.

If the film is broken or damaged during the specified curing period, reapply curing material as specified above to the damaged or affected areas.

#### **511.14 Application of External Loads to New Concrete, Removal of Forms, Removal of Falsework and Opening to Traffic.**

##### **A. Applications of External Loads to New Concrete**

Do not apply external loads to or perform work on new concrete until workers and construction materials will not damage the concrete or interfere with its curing.

- 1) Prior to 36 hours after placement, Worker foot traffic is allowed on the concrete as long as they do not make any impressions or damage the concrete.
- 2) After 36 hours after placement and prior to reaching 85%  $f'c$  (\*) apply only minor loads including tying reinforcement in place, setting bearings or forms being placed for future work. No stockpiling of reinforcement, forms or other materials or using machinery on the concrete.
- 3) After 36 hours and after the field cured compressive strength cylinders or maturity results reach 85%  $f'c$  (\*) apply any additional external loads or superimposed concrete placement.

\* Test 2 field cured cylinders per 511.04 with the average compressive strength required to be greater than or equal to 85%  $f'c$  or test 2 flexural strength beams with an average strength greater than or equal to 650 psi. The maturity curve method may be used for determining the strength according to supplement 1098 in lieu of field cured samples.

**B. Removal of Formwork.**

Forms may be removed as soon as the concrete has hardened sufficiently. Damage to concrete form removal prior to field cured compressive strength cylinders or test 2 flexural strength beams with an average strength greater than or equal to 650 psi maturity results reach 85% f'c (\*) will be the responsibility of the contractor.

\* Test 2 field cured cylinders per 511.04 with the average compressive strength required to be greater than or equal to 85% f'c or test 2 flexural strength beams with an average strength greater than or equal to 650 psi. The maturity curve method may be used for determining the strength according to supplement 1098 in lieu of field cured samples.

**C. Removal of Falsework and Opening to Traffic.**

Remove falsework and open structures to traffic only after the concrete has reached the strength specified by Table 511.14-1A for concrete bid items requiring QC/QA. Use Table 511.14.1B for concrete items not requiring QC/QA. Do not shorten the minimum required Method A curing time regardless of strength test results.

**TABLE 511.14-1A**

**LOADING REQUIREMENTS FOR CONCRETE REQUIRING QC/QA**

	Span <sup>[1]</sup>	Required Strength <sup>[2]</sup>
Removing Falsework	Any Span	Compressive Strength $\geq 85\% f'c$ or Flexural Strength (Center point)
	All pier caps	
Traffic	Any	$\geq 650$ psi
[1] Span is defined as the horizontal distance between faces of the supporting elements when measured parallel to the primary reinforcement.		
[2] Field cured samples. Applicable only when the average modulus of rupture for two flexural strength (Center Point) tests is $\geq 650$ psi or two compressive strength cylinders is $\geq 85\% f'c$ . The maturity curve method may be used for determining the strength according to Supplement 1098 in lieu of field curing samples.		

**TABLE 511.14-1B**  
**LOADING REQUIREMENTS FOR CONCRETE**  
**NOT REQUIRING QC/QA**

	Span <sup>[1]</sup>	Age of Concrete in Days	
		No Test	Test <sup>[2]</sup>
Removing Falsework	Over 10 feet (3 m)	14	5
	10 feet (3 m) or less and all pier caps	7	3
Traffic	Any	14	7
[1] Span is defined as the horizontal distance between faces of the supporting elements when measured parallel to the primary reinforcement.			
[2] Field cured samples. Applicable only when the average modulus of rupture for two flexural strength (Center Point) tests is $\geq 650$ psi or two compressive strength cylinders is $\geq 85\%f'_c$ . The maturity curve method may be used for determining the strength according to Supplement 1098 in lieu of field curing samples.			

Take enough specimens to verify compliance with the strength requirements of Table 511.14-1A. Obtain samples from the first and last sublots of continuously placed concrete for quantities of 500 yd<sup>3</sup> or less, and one extra set of specimens for each additional 500 yd<sup>3</sup> or fraction thereof. Obtain samples in equally spaced increments throughout the placement as directed by the Engineer. Delays in placements of more than 4 hours are not considered continuously placed and are to be treated as separate placements.

If the air temperature surrounding the concrete is maintained between 32 and 50 °F, and if the provisions of 511.12 do not apply, maintain the concrete above 32 °F for 7 days or until a successful strength test conforming to Table 511.14-1A, except this time shall not be less than 5 days.

**511.15 Surface Finish.** For concrete that is to be sealed with Epoxy-Urethane according to 512.03, perform surface profiling and surface finish according to 512.03.F.

For all others, finish the concrete surface as detailed below:

**A. Standard Finish.** On all surfaces, remove fins and irregular projections with a stone or power grinder, taking care to avoid contrasting surface textures. Repair all cavities produced by form ties and, on visible surfaces, repair all defects using a mortar consisting of one part of hydraulic cement conforming to Item 499 and 1-1/2 parts sand conforming to 703.03, by volume and water conforming to 499.02 with a maximum water/cementitious ratio of 0.4. A defect is an imperfection in the concrete measuring at least 3/4" (19mm) in diameter or at least 1/2" (13 mm) deep but not exceeding a total volume of 1 cubic inch (16.387 mL). Finish all repaired surfaces on the structure in a similar manner and to the extent required to produce a uniform appearance.

**B. Rubbed Finish.** If a rubbed finish is shown on the plans, if possible, remove forms within 2 days after placing concrete. Finish the surface as specified above to correct defects. After the mortar used for finishing is thoroughly set, and for a minimum of 2 hours before starting the rubbed finish, thoroughly saturate the concrete with water.

Rub surfaces to be finished with a medium coarse silicon carbide stone until all form marks, projections, and irregularities are removed, all voids are filled, and a uniform surface is obtained. Leave the paste produced by rubbing in place. Other than water, do not apply additional material to the surface. After placing concrete above the finishing area, obtain the final finish by rubbing the concrete with a fine silicon carbide stone and water until the entire surface is of a smooth texture and uniform in color. Protect surfaces with a rubbed finish from damage caused by subsequent construction operations. If damaged, clean and refinish the surface as specified above.

**511.16 Roadway Finish.** Finish and test concrete deck slabs according to [451.13](#). Do not groove or broom finish a strip of surface 9 to 12 inches (220 to 300 mm) wide adjacent to curbs and barriers. Provide a broom drag finish on concrete deck slabs in the longitudinal or transverse direction.

The Engineer will approve the finishing machine. Provide a self-propelled machine with forward and reverse drive mechanisms that enable precise control of machine velocity in both directions. The machine shall have two rotating rollers, leveling augers, and either a vibrating pan or vibrating rollers. Field verify that the vibrating frequency of the pans or rollers are from 1500 to 5000 pulses per minute. Do not use vibrating rollers that have fins protruding more than 1/4 inch (6 mm) from the roller. Use a finishing machine capable of finishing transversely while traveling in both directions across the deck. Provide screeds capable of rising above the concrete surface. Provide a finishing machine capable of finishing the full width of the decks between curbs or parapet walls. The wheels of the finishing machine shall run on temporary riding rails adequately supported on the structural steel or falsework of the deck. Make the rail and rail supports of steel and arrange the rail and rail supports so that the weight of the finishing machine and the operator cause zero vertical deflection while traveling across the deck. Ensure the rail is straight, with no sections exceeding a tolerance of 1/8 inch in 10 feet (3 mm in 3 m) in any direction. Elevate support rails a sufficient distance above the slab to allow the simultaneous hand finishing of areas not machine finished. Fabricate and install rail supports to allow removal to at least 2 inches (50 mm) below the top of the slab. Fill holes formed by the removal of rail supports during the final finishing of the slab.

For structures with a skew angle greater than fifteen (15) degrees and up to fifty (50) degrees, place the finishing machine within 5° of the skew angle of the structure. For structures with a skew angle greater than fifty (50) degrees, place the finishing machine at fifty (50) degrees.

**511.17 Bridge Deck Grooving.** After water curing the concrete and either before applying curing compound or some period after applying curing compound and before opening the bridge to traffic, saw longitudinal grooves into the deck, unless specified otherwise in the plans. If sawing grooves after applying the curing compound and the concrete deck is less than 30 days old, reapply the curing compound after removing standing water, within 12 hours after sawing grooves in the deck.

Use diamond blades mounted on a multi-blade arbor on self-propelled machines that were built for grooving of concrete surfaces. The groove machines shall have depth control devices that detect variations in the pavement surface and adjust the cutting head height to maintain the specified depth of the groove. The grooving machines shall have devices to control alignment. Do not use flailing or impact type grooving equipment. More than one size grooving machine may be required in order to saw the grooves as specified. Maintain a minimum of 3/4 inch (19 mm) to a maximum of 2 1/4 inches (56 mm) transverse distance between adjacent passes of the grooving machine head.

Provide an experienced technician to supervise the location, alignment, layout, dimension, and grooving of the surface.

Saw grooves parallel to the bridge centerline in a continuous pattern across the surface. Begin and end sawing 9 to 12 inches (220 to 300 mm) from any device in place in a bridge deck, such as scuppers

or expansion joints. Stop sawing a minimum of 2 inches (50 mm) to a maximum of 24 inches (600 mm) from skewed expansion joints. Maintain a clearance of a minimum of 2 inches (50 mm) and a maximum of 4 inches (100 mm) from the grooves to longitudinal joints in the deck. Maintain a minimum clearance of 9 inches (220 mm) to a maximum of 30 inches (750 mm) clearance between the grooves and the curb or parapet toe. However, at no point shall un-grooved portions of deck extend beyond edge line and into the temporary or permanent travelled lanes. Saw grooves in a uniform pattern spaced at 3/4 inch minus 1/4 inch or plus 0 (19 mm minus 6 mm or plus 0). Saw grooves approximately 0.15 inches (4 mm) deep and 0.10 inches (3 mm) wide.

For staged, or phase bridge deck work, saw the grooves parallel to the final, permanent bridge centerline. If the different stages or phases of the bridge deck work occur within one construction season, any stage opened to traffic shall receive an interim coarse broom finish during placement, then saw the longitudinal grooves after the final stage. The interim broom finish will not be allowed as a surface texture when opened to traffic over a winter season. Saw longitudinal grooves in the deck prior to opening to traffic for a winter season.

For bridge decks that widen from one end to the other, saw the longitudinal grooves parallel to the centerline of the roadway. On the side of the bridge that widens, saw the longitudinal grooves to follow the edge line. Saw longitudinal grooves in the gore areas, avoiding the overlapping of grooves.

At the beginning of each work shift, furnish a full complement of grooving blades with each saw that are capable of cutting grooves of the specified width, depth, and spacing.

If during the work, a single grooving blade on a machine becomes incapable of cutting a groove, continue work for the remainder of the work shift. The Contractor is not required to cut the groove omitted because of the failed blade. Should two or more grooving blades on a machine become incapable of cutting grooves, cease operating the machine until it is repaired.

Continuously remove all slurry and remaining residue from the grooving operation and leave the deck surface in a clean condition. Prevent residue from grooving operations from flowing across shoulders or across lanes occupied by public traffic or from flowing into gutters or other drainage facilities. Remove solid residue before the residue is blown by passing traffic or by wind.

Provide water as necessary to saw grooves according to this subsection.

**511.18 Sidewalk Finish.** After placing, strike off the concrete with a template and finish the concrete with a float to produce a sandy texture.

#### **511.19 Joints, Cracks, Scaling and Spalls.**

##### **A. Joints prior to opening to traffic**

After completing all curing operations and allowing the deck to thoroughly dry, seal the following areas with a high molecular weight methacrylate (HMWM) sealer. Flood the areas and squeegee off the excess material as specified in Item 512 before opening the deck to traffic:

1. Transverse joints in the deck.
2. Joints between the concrete deck and steel end dams.
3. Longitudinal joints in the deck.
4. Longitudinal joints between the deck and safety curb, barriers, and parapets, etc.
5. Repaired portable barrier anchor locations.

##### **B. Cracks prior to opening to traffic.**

Evaluate the top and bottom of the deck for cracks, within 7 days of opening the deck to traffic in the presence of the Engineer. Provide the Engineer with a summary of the inspection including top surface crack locations, bottom surface crack locations, size of cracks on the top surface greater than 20 mils (0.020 inches) and the percentage of top and bottom cracked area itemized separately. The

Department will define the top surface as all exposed deck surface area for a phase width not covered by parapets or sidewalks multiplied by the bridge limits. The Department will define the bottom surface of the same phase as all exposed deck surface area not covered by flanges or encased in diaphragms.

The Department will define all cracked area per phase as follows:

1. For cracks spaced greater than 12”, the cracked area will include 6” on each side of crack for full length of the crack.

2. For cracks spaced 12” or less, the cracked area will include the area between the cracks and 6” outside the limits of the crack clusters.

For deck cracking that is 20% or less than the top or bottom deck areas per phase and less than 20 mils in width, seal top surface cracks with HMWM sealer. All costs with sealing the cracking are incidental to the appropriate concrete item.

For deck cracking exceeding 20% of the top or bottom deck area per phase or if a crack exceeds 20 mils, an investigation will be performed by the Engineer and OMM to determine the treatment of the cracks and evaluate the project for violations that would contribute to the cracking. Provide documentation requested by the Engineer for review. If the OMM investigation finds no violations of the specification that would cause the deck cracking, the Department will pay the cost of the additional corrective work on a negotiated price per 109.05.B. If the investigation shows the contractor had violations of the specification that would contribute to deck cracking, the cost of the corrective work will be the responsibility of the contractor.

### **C. Cracking investigation prior to Final Inspection**

Evaluate the top and bottom of the deck for cracks, within 30 days of final inspection per 109.12.A in the presence of the Engineer. An earlier date may be approved by the Engineer. Provide the Engineer with a summary of the inspection including top surface crack locations, bottom surface crack locations, size of cracks on the top surface greater than 20 mils and the percentage of top and bottom cracked area itemized separately. If the Engineer deems it necessary to set up traffic control for the final inspection, the Department will pay for additional work on a negotiated price per 109.05.B. The Department will define the cracked area per 511.19.B.

For deck cracking that is 20% or less than the top or bottom deck areas per phase and less than 20 mils in width, seal top surface cracks as directed by the Engineer with HMWM sealer on a negotiated price per 109.05.B.

For deck cracking exceeding 20% of the top or bottom deck area per phase or if a crack exceeds 20 mils (0.020 in) width, an investigation will be performed by the Engineer and OMM to determine the treatment of the cracks and evaluate the project for violations that would contribute to the cracking. Provide documentation requested by the Engineer for review. If the OMM investigation finds no violations of the specification that would cause the deck cracking, the Department will pay the cost of the additional corrective work on a negotiated price per 109.05.B. If the investigation shows the contractor had violations of the specification that would contribute to deck cracking, the cost of the corrective work will be the responsibility of the contractor.

### **D. Scaling and spalls**

For deck scaling that is greater than 0.250 inches deep, or on more than 20% of the deck surface area, or deck spalling on more than one area, or an area greater than 32 square yards, the Engineer will investigate the project with OMM to determine the treatment and proceed according to 108.02 to resolve.

**511.20 Compressive Strength.** Sample and test concrete strength according to 511.04.

A. Concrete Requiring QC/QA. When the bid item requires QC/QA, the Engineer will evaluate the QC compressive test subplot results according to Supplement 1127 and as follows:

If a single reported compressive strength test result for a subplot of concrete is less than 88%  $f'c$  reevaluate the in place concrete as follows.

The Engineer will determine the location for evaluating the strength of the subplot represented by the low compressive strength concrete. Evaluate using either nondestructive testing or cores. The Engineer will accept the concrete if the reported nondestructive test results are greater than the specified  $f'c$ . The Department will use the original cylinder results for calculating the compressive strength pay factor (PFc) if non destructive testing is used. If cores are tested the core results will be used in place of the original cylinder results for pay factor determination.

If the nondestructive test results are less than the specified  $f'c$ , the Department will require the concrete to be cored. The Engineer will determine the locations for the required concrete cores. Provide all concrete cores to the Engineer for testing by the Department. Patch core holes with approved patching material. If the core results are above 88%  $f'c$ , the Department will use the core strength results for calculating the compressive strength pay factor (PFc).

If the core results indicate that the compressive strength of the concrete is below 88%  $f'c$ , submit a plan for corrective action to the Engineer for approval. If the corrective plan is not approved, the Engineer will require the Contractor to:

1. Remove and replace the unacceptable subplot and retest the new subplot at no cost to the Department or
2. Leave the unacceptable material in place and pay for the subplot with a pay factor of 0.75.

If three or more subplot compressive strength acceptance test results are less than  $f'c$  but greater than 88%  $f'c$  the Engineer will require an investigation of the reasons for the consistent low strengths. Until the investigation is completed to the satisfaction of the Engineer no additional placements of the concrete JMF will be made. Investigations should include all facets of the concrete operation including batching, mixing, delivery, clean up, sampling, testing, quality control plan, etc. If the Engineer is unsatisfied with the results of the investigation, the JMF and the quality control plan will become not approved. Develop and submit a new JMF and quality control plan conforming to the requirements of 499.03 and 511.04. Pay factors under 511.22 for these low strength sublots will be based on the original reported cylinder strengths.

**B. Concrete Not Requiring QC/QA.** When the bid item does not require QC/QA, the Engineer will evaluate the strength results following the requirements of Table 511.22-2 and as follows:

If a single compressive strength test result is less than  $f'c$  the material will be considered unacceptable material and the Department will determine acceptance according to Item 106.07.

If three or more compressive strength test results are less than  $f'c$  the Engineer will require an investigation of the reasons for the consistent low strengths. Until the investigation is completed to the satisfaction of the Engineer no additional placements of the concrete JMF will be made. Investigations should include all facets of the concrete operation including batching, mixing, delivery, clean up, sampling, testing, etc. If the Engineer is unsatisfied with the results of the investigation, the JMF will become not approved. Develop and submit a new JMF conforming to the requirements of 499.03.

**511.21 Air Content.** For concrete that requires QC/QA, test the air content of the concrete according to Item 455. When QC/QA concrete is not required, the Department will test the air content as directed by the Engineer.

**A. Concrete Requiring QC/QA.** Any concrete with air results outside the requirements of Table 499.03-1 that is placed into the structure is unacceptable material according to item 106.07. The amount

of unacceptable material will be the amount represented by the test result. Reevaluate the unacceptable material at no cost to the Department as follows:

1. Core the location containing the unacceptable concrete. Patch the core hole with approved material.

a. For concrete with high air content, test a core for compressive strength. Concrete with a minimum strength of  $f'c$  may be left in place.

b. For concrete with low air content, test the core to determine the in-place hardened air content, specific surface and spacing factor according to [ASTM C457](#). Remove and replace unacceptable materials with specific surface results less than  $600 \text{ in}^{-1}$  ( $25 \text{ mm}^{-1}$ ) or spacing factor results are more than 0.008 in (0.20 mm).

Hire an independent laboratory acceptable to the Department to perform the testing.

**B. Concrete Not Requiring QC/QA.** Any concrete with air results outside the requirements of [Table 499.03-1](#) that is placed into the structure is unacceptable material, according to item [106.07](#). The amount of unacceptable material will be the amount represented by the test result. Reevaluate the unacceptable material at no cost to the Department as follows:

1. The Department will core the location containing the unacceptable concrete. Patch the core hole with approved materials.

a. For concrete with high air content, the Department will test a core for compressive strength. Concrete with a strength of  $f'c$  may be left in place.

b. For concrete with low air content the Department will determine the in-place hardened air content, specific surface and spacing factor according to [ASTM C457](#). Remove and replace unacceptable materials with specific surface results less than  $600 \text{ in}^{-1}$  ( $25 \text{ mm}^{-1}$ ) or spacing factor results of more than 0.008 in (0.20 mm).

**511.22 Pay Factors.** Apply pay factors as follows:

**A. Concrete Requiring QC/QA**

The Department will use pay factors based on the percent within limits (PWL) to establish a final adjusted price. The PWL will be established per lot(s) accepted in the QCP for each bid item quantity of concrete. The Department will calculate a PWL according to [Supplement 1127](#) using either the Contractor's verified QC compressive test results or core results when the QC could not be verified. The compressive strength pay factor ( $PF_C$ ) from [Table 511.22-1](#) for the lot will be applied to each bid item represented in the lot. The Department will combine approach slab and deck concrete test results in the same lot to determine final pay factors.

**TABLE 511.22-1, PAY FACTORS FOR CONCRETE REQUIRING QC/QA**

<b>PWL</b>	<b>PFC</b>
85 % – 100 %	1.00
84%	0.995
83%	0.990
82%	0.985
81%	0.980
80%	0.975
79%	0.970
78%	0.965
77%	0.960
76%	0.955
75%	0.950
< 75%	See below

If the PWL value determined for the lot of concrete is below 75%, submit a plan for corrective action to the Engineer for approval. If the corrective plan is not approved, the Engineer will require the Contractor to:

1. Remove and replace the lot of unacceptable material at no cost to the Department, or
2. Leave the unacceptable material in place and pay for the lot of with a pay factor of 0.75.

#### **B. Concrete Not Requiring QC/QA**

For concrete items that the Department performs compression testing, the Department will use pay factors based on the individual compressive strength results for the quantity represented by the test results to establish an adjusted price to the items. The pay factors from Table 511.22-2 will be applied to items represented by the tests.

**TABLE 511.22-2, PAY FACTORS FOR CONCRETE NOT REQUIRING QC/QA**

<b>Individual Test Results</b>	<b>Pay Factor (PFC)</b>
$\geq f'c$	1.00
$< f'c$	Follow <a href="#">106.07</a>

**511.23 Method of Measurement.** The Department will measure the appropriate concrete item by the number of cubic yards (cubic meters) determined by calculations from plan dimensions, in place, completed and accepted.

The Department will make deductions for portions of primary structural members embedded in concrete. The Department will not make deductions for the volume of reinforcing steel, conduits or embedded piles.

Superstructure concrete includes the concrete in deflective parapets not having a metallic railing.

The Department may measure deck concrete by either volume or area using plan dimensions.

The Department will calculate separate quantities of concrete due to unacceptable compressive strength, [511.21](#) and air content, [511.22](#).

**511.24 Basis of Payment.** The Department will pay for accepted quantities of concrete as follows.

Work necessary to adjust seat elevations and deck haunches for prestressed beam members is incidental to the affected structural concrete items. The Department will pay for final quantities as measured and field verified.

The Department will not pay for additional reinforcing steel required to adequately stabilize the cages.

The Department will not pay for repairs to horizontal cracks by epoxy injection or, if a concrete sealer was applied, for repairs to the sealer after the completing the epoxy injection.

The Department will not pay extra for any type of surface finish specified in [511.15](#), the cost being considered as included in the price bid for concrete.

If the Contractor elects to saw the deck after applying the curing compound, the Department will not pay to reapply the curing compound.

All costs for sealing as specified in 511.19.A are incidental to the appropriate concrete item. The Department will not pay separately for the concrete cylinder curing box (CCCB).

The Department will not pay for the re-evaluation of low strength test results, [511.20.A](#).

The Department will initially pay the full bid price to the Contractor upon completing the work. The Department will calculate the final adjusted payment for each item as follows:

PF1 - The final adjusted pay per cubic yard (cubic meter) or square yard (square meter), for accepted quantities of concrete:

$$PF1 = (\text{Contract Bid Price}) \times PFC$$

PF2 - The final adjusted pay per cubic yard (cubic meter) or square yard (square meter) for unacceptable quantities of concrete due to compressive strength or low air content and allowed to stay in place, according to [511.20](#) or [511.21](#).

$$PF2 = (\text{Contract Bid Price}) \times 0.75$$

Calculate the adjusted price per bid item by multiplying PF1 or PF2 by the appropriate quantities of concrete, then sum the values. Subtract the full bid price paid to the Contractor from the adjusted price to determine the difference. The Department will execute final adjustments by change order upon receipt of all test data.

The Department will pay for accepted quantities at the contract prices as follows:

<b>Item</b>	<b>Unit</b>	<b>Description</b>
511	Cubic Yard (Cubic Meter)	Class ___ Concrete, _____
511	Cubic Yard (Cubic Meter)	Class ___ Concrete, _____ with QC/QA
511	Cubic Yard (Cubic Meter)	Class QC 1 Concrete, Substructure
511	Cubic Yard (Cubic Meter)	Class QC 1 Concrete, Substructure with QC/QA
511	Cubic Yard (Cubic Meter)	Class QC 2 Concrete, Bridge Deck
	Square Yard (Square Meter)	
511	Cubic Yard (Cubic Meter)	Class QC 2 Concrete, Bridge Deck with QC/QA

	Square Yard (Square Meter)	
511	Cubic Yard (Cubic Meter)	Class QC 2 Concrete, Bridge Deck (Parapet)
511	Cubic Yard (Cubic Meter)	Class QC 2 Concrete, Bridge Deck (Parapet) with QC/QA
511	Cubic Yard (Cubic Meter)	Class QC 3 Concrete, _____ with QC/QA
511	Cubic Yard (Cubic Meter)	Class QC 4 Mass Concrete, Substructure with QC/QA

## 640 PAVEMENT MARKING

### ITEM 641 PAVEMENT MARKING — GENERAL

**641.01 Description.** This specification gives general requirements for various kinds of retroreflective pavement markings. Deviations from these general requirements are covered in the specific requirements for each marking type.

Place all pavement markings according to the [OMUTCD](#).

**641.02 Materials.** Use marking materials that are a formulation, identified by a manufacturer's code number, prequalified by the Laboratory and that have the same composition as the prequalified marking material.

Any materials delivered without a [DSR](#) when applicable and applied without Laboratory preapproval shall be removed. Laboratory tested materials not meeting specifications shall be removed from the project site.

Furnish a safety data sheet (SDS) for each material, including resin, catalyst, primer, adhesive, activator, glass beads, and cleaning solvent, to be used on the project to the Engineer before material delivery. Inform workers of the location of all SDS and allow workers an opportunity to review them.

Furnish the Engineer, prior to application, the paint manufacturer's printed application equipment requirements and application instructions.

**641.03 General.** Apply lines as solid, broken, or dotted lines, either singly or in combination, as shown on the plans. Apply broken lines in a 40 foot (12.0 m) cycle consisting of a 10 foot (3.0 m) dash and a 30 foot (9.0 m) gap between broken lines, unless otherwise shown on the plans. Use an accurate striping mechanism that is capable of being easily adjusted to retrace existing broken markings or to apply new materials at the correct spacing. Begin broken lines that are to be applied over plainly visible existing broken lines within 6 inches (150 mm) of the beginning of the existing broken line, unless otherwise directed by the Engineer. Apply dotted lines in an 8 foot (2.4 m) cycle consisting of a 2 foot (0.6 m) dot and a 6 foot (1.8 m) gap between dots for line extensions and in a 12 foot (3.6 m) cycle consisting of a 3 foot (0.9 m) line segment and a 9 foot (2.7 m) gap for lane drop/add markings.

Fill gaps that were not marked as a result of template use for spray-applied auxiliary markings with marking material after the template is removed. If applying extruded thermoplastic, the Contractor may leave small gaps in arrows or letters resulting from template use unfilled.

Ensure that pavement markings are free of uneven edges, overspray, or other readily visible defects that detract from the appearance or function of the pavement markings.

Ensure that lines are sharp, well defined, and uniformly retroreflective. Apply the lines to the width specified  $\pm 1/4$  inch (6 mm). Fuzzy lines, excessive overspray, or non-uniform application are unacceptable. The Engineer will inspect lines at night to verify proper retroreflectivity. Correct pavement markings that are improperly applied, located, or reflectorized. Reapply lines applied with insufficient material quantities according to [641.11](#), [644.04](#) or [648.05](#). Remove improperly located lines according to [641.10](#), and apply new lines in the correct locations.

Reapply any lines applied with non-specification materials.

Disperse remaining loose glass beads or wet reflective optics from the non-marked roadway surface in areas where the glass beads or wet reflective optics are applied by hand, are loaded into the striping apparatus, or are applied along the radii of intersections

Obtain the Engineer’s approval for methods and equipment used for pavement preparation, marking, and marking removal. Keep glass beads dry during storage and before use.

Furnish to the Engineer at least 3 days in advance of installation current copies of the manufacturer’s instructions and recommendations for application of any marking material, including primer, activator, catalyst, and adhesive, shown on the plans. Schedule and perform other construction work, such as shoulder paving, seeding, and mulching in a manner to avoid damage to applied pavement markings.

Do not apply pavement marking materials to the reflector of a plowable raised pavement marker. Interrupt the application of the pavement marking line at each raised pavement marker where marking material would otherwise be applied to the marker’s prismatic reflector. Provide a maximum gap in the marked line of 18 inches (0.5 m) at each marker. Remove pavement marking material applied to a prismatic reflector surface, or replace the reflector that same workday. If material must be removed from the reflector, restore the reflector’s brightness to its prior condition.

**641.04 Equipment.** Equip long line pavement marking equipment with a computerized Data Logging System (DLS), including a cab mounted display. For center line, lane line, and edge line markings, when the length of marking exceeds 0.5 mile (0.8 km) of continuous line equivalent, provide the Table 641.04-1 DLS capabilities.

**TABLE 641.04-1**

Provide the highway number with the county and beginning and ending county log points rounded to the nearest thousandths of a mile, the beginning and ending coordinates determined by a Global Positioning System receiver with at least 16 foot accuracy, and the direction of travel in terms of increasing or decreasing county log points. The Department will provide mapping information downloadable through Transportation Information Mapping System (TIMS) online LRS layer at <a href="https://gis.dot.state.oh.us/tims">https://gis.dot.state.oh.us/tims</a>
Provides cellular capabilities for field data transport to website.
Provide GPS mapping system that is capable of real time (within 20 minute) tracking of the Department cloud DLS report format, Table 641.04-2 requirements, and color coded alarms for a 20 percent deficiency in film thickness, bead rate, and wet reflective optic rate.
Send report to the Engineer or their designated representative by email at 7:00 AM the day after the work is completed.
Transfer raw data collected by the DLS directly to a secure server.
Provide flagging of data entered manually.
Ensure the DLS manufacturer provides a Department login with direct access to stored data summary on a secure password protected website.

Record as a separate DLS report line entry the Table 641.04-2 information for each route section marked, when the length of center line, lane line and edge line marking exceeds 0.5 mile (0.8 km) of continuous line equivalent. A route section is defined as one direction of a contiguous section of highway (without breaks) with the same route number designation. Continuous line equivalent is defined as 0.5 mile (0.8 km) of edge line, 0.25 mile (0.4 km) of double yellow center line, or 2 mile (3.2 km) of lane line. DLS documentation is not required for center line, lane line, and edge line

markings of 0.5 mile (0.8 km) continuous line equivalent or less, and for channelizing lines of any length.

If the DLS equipment fails, finish that day's work only and resume when the DLS equipment is working. Provide documentation of the corrective work that was required to make the DLS and ancillary equipment operational. Repair the DLS before resuming work. Document the application and material usage quantities from the time of the DLS failure and make calculations to determine the gallons or pounds of binder per mile and pounds of beads, wet reflective optics, or both per mile.

The Department will provide a standard DLS long report form ([CA-T-9](#), [CA-T-10](#), [CA-T-11](#), or [CA-T-12](#)), that prescribes the correct DLS report format and required content prior to beginning of work. Ensure the DLS records start time once the project or report line is started and the first gun is on. In addition to the Department DLS report format required content, document in accordance with the DLS at least the Table [641.04-2](#) requirements.

**TABLE 641.04-2 ADDITIONAL DLS REPORT REQUIREMENTS.**

Measure and record application vehicle speed to nearest 0.1 MPH (0.16 km/h),
Measure and record weight or volume of material used by color,
Measure and record weight or volume of material used by line type,
Measure and record weight or volume of material used by line width.

. The DLS must store data and export to a secure server on a daily basis. Ensure the data is in Microsoft Excel format, or a comma or spaces delimited text file adequate for insertion into a computerized spreadsheet. Ensure the DLS manufacturer provides the Engineer a direct access login to the data being exported to the secure server. Provide data in the Department cloud DLS report format. Ensure the data is available to the Engineer within 24 hours of the pavement marking work and may be retrieved by the Engineer or designated field personnel for inclusion with documentation reporting. Ensure the electronic records are completed in their final form prior to the records being removed from the pavement marking equipment.

Ensure each DLS has at least an annual calibration of all mechanical and electrical components and its software function and output confirmed by the DLS manufacturer or their designated representative. Ensure evidence of the annual calibration is carried by a signed and dated stamp or seal affixed to the inside of the driver's door of each striper.

**A. Traffic Paint, Polyester, Epoxy.** Ensure the cab mounted display shows the actual material application rate and film thickness.

**B. Thermoplastic, Spray Thermoplastic.** Ensure the cab mounted display shows the actual bead application rate.

Use application equipment that includes a kettle for melting the thermoplastic material and maintaining it at the proper temperature. Equip the kettle with a thermostat to control the temperature of the melted thermoplastic material and to prevent overheating. Use equipment that continuously mixes and agitates the molten thermoplastic material. Ensure that the parts of the equipment that convey the thermoplastic material from the kettle to the application point maintains it at the required temperature.

Attach an automatic dispenser for glass beads, wet reflective optics, or both to the equipment so that the beads, optics, or both are immediately and uniformly dispensed over the marking surface. Equip the dispenser with an automatic cut-off control synchronized with the cut-off of the thermoplastic material.

**641.05 Pavement Preparation.** Clean all visible loose or foreign material from the surface to be marked. Equip the pavement marking equipment with an air jet to remove all debris from the pavement in advance of the applicator gun. Operate the air jet when marking material is being applied, and synchronize it with marking material application. Power-broom clean all surfaces where gore markings or edge lines are to be applied. If required by the Engineer, also power-broom clean other surfaces. Do not apply marking to portland cement concrete until the concrete in the areas to be marked is clean of membrane curing material and is dry.

Before applying marking material, the pavement surfaces must be completely dry. In the presence of the Engineer, test for moisture using the following test procedure, when rainfall has occurred within 24 hours prior to the start of the pavement marking operations or as directed by the Engineer.

#### MOISTURE TEST

Tape a 12 inch (300 mm) square sheet of thin plastic to the road surface, sealing all edges.
After 15 minutes examine the side of the sheet facing the road surface.
If more than a sparse amount of moisture is present, do not apply marking material.

**641.06 Layout and Premarking.** Lay out the locations of all lines, words, and other symbols to ensure their proper placement. Do not start marking operations until the Engineer or the Engineer's representative has approved the layout and premarking lines. If applying longitudinal or transverse lines, use existing lines, construction joints, or premarking to guide this marking equipment.

On projects where resurfacing or other operations will result in obliteration of the existing pavement markings, establish reference points to ensure proper placement of restored markings. If existing markings are to be retraced, verify any adjustment in the location with the Engineer.

Establish "T" marking of no-passing zones according to the plans or a no-passing zone log provided by the Engineer.

Locate premarking from survey data or reference points, and offset it so as to parallel the theoretical edge of the marking lines at a maximum distance of 1 inch (25 mm). Use templates for the layout of arrows, words, and other symbols. Place premarking for longitudinal lines at 40 foot (12 m) intervals, and do not exceed 2 inches (50 mm) in width or 12 inches (300 mm) in length. Locate premarking for auxiliary markings from the plans or schematic forms provided by the Engineer.

**641.07 Line Placement Tolerance.** Ensure that pavement marking lines are straight or smoothly curved, true to the alignment of the pavement, and do not deviate laterally from the proper location at a rate of more than 2 inches in 100 feet (50 mm in 30 m). The Engineer will not allow any deviation greater than 3 inches (75 mm). Remove improperly located lines according to [641.10](#) and apply new lines in the correct locations.

**641.08 Marking Types.** Apply marking materials at the rate or thickness specified in [642.04](#), [643.04](#), [644.04](#), [645.03](#), [646.05](#), [647.04](#), or [648.05](#) and, except for parking lot stall markings, ensure that they are uniformly retroreflective. Ensure that portions of parking stalls that are adjacent to street traffic are retroreflective. Pavement markings consist of the following types:

**A. Edge Lines.** Place edge lines as continuous stripes using the width specified. Locate the center of the stripe 6 inches (150 mm) from the edge of pavement. Ensure that the right edge line is applied to the left of the right edge of pavement. Ensure that the left edge line is applied to the right of the left edge of pavement.

**B. Lane Lines.** Place lane lines using the width specified, as white stripes between contiguous lanes of pavement carrying traffic in the same direction. Place them as broken lines unless specified solid.

Offset lane lines to the left of the longitudinal joint, if present, or the theoretical line lying between contiguous lanes, if a joint is not present. Ensure that the nearer edge of the stripe is 2 inches (50 mm) to the left of the joint or line. Do not place lane lines through intersections.

**C. Center Lines.** Place center lines as single or double yellow stripes between contiguous lanes of pavement carrying traffic in opposite directions. Center line marking includes two-way left-turn lane striping and the outline of left-turn islands. Make each stripe 4 inches (100 mm) wide, solid or broken as specified.

**D. Channelizing Lines.** Place channelizing lines as continuous white stripes, using the width specified.

**E. Stop and Crosswalk Lines.** Place stop lines as solid 24-inch (600 mm) wide white stripes. Place transverse crosswalk lines as solid 12-inch (300 mm) wide white stripes. Place longitudinal bar crosswalk lines as solid 24-inch (600 mm) wide white stripes.

**F. Transverse/Diagonal Lines.** Place transverse/diagonal lines as solid 24-inch (600 mm) wide stripes, of the color specified, and at an angle to the direction of travel.

**G. Curb and Island Marking.** Prepare exposed surfaces and curbs and paved islands according to 641.05. In addition, remove and dispose of all visible loose or foreign material, including vegetation, on and immediately contiguous to surfaces to be marked.

**H. Symbol Markings.** Place all railroad, school, bicycle and handicap symbol markings using white markings. A railroad marking includes the 16 inch (400 mm) crossbuck, two 72 inch (1.8 m) “R”s, two 24 inch (600 mm) transverse lines, and a stop line. A school marking includes the word “SCHOOL” and two 16 inch (400 mm) transverse lines. A shared lane marking includes the bicycle symbol and two sharrows. A bicycle crossing symbol includes the bicycle symbol and the word “XING”.

**I. Parking Lot Stall Marking.** Place parking lot stall marking lines as continuous 4-inch (100 mm) wide white stripes.

**J. Lane Arrows.** Place lane arrows using white markings.

**K. Words on Pavement.** Place words on pavement using white markings.

**L. Dotted Lines.** Place dotted lines using the width and color specified.

**M. Yield Lines.** Place yield lines as solid white 24-inch (600 mm) isosceles triangles pointing toward approaching traffic.

The term long lines, when used in sections 642 through 648 includes edge lines, lane lines, center lines, and channelizing lines over 200 feet (60 m) long. The term auxiliary markings, when used in Items 642 through 648 includes channelizing lines 200 feet (60 m) or shorter, stop lines, yield lines, crosswalk lines, transverse lines, diagonal lines, curb markings, island markings, symbol markings, parking lot stall markings, lane arrows, and dotted lines.

**641.09 Two-Way Radio Communications.** If two-way radio equipment is required, furnish and maintain radio equipment necessary for the voice communication between the striping and the inspector’s vehicle at all times during the pavement marking operation. Use equipment capable of transmitting and receiving normal voice communications to at least 4 miles (6 km).

**641.10 Removal of Pavement Markings.** If specified as a pay item, remove pavement markings as described in 614.11.G. Take care during marking removal not to scar, discolor, or otherwise damage the pavement surface. Do not overpaint or use other methods of covering markings instead of removal.

**641.11 Unsatisfactory Materials and Deduction for Deficiency.** For traffic paint, polyester and epoxy, the Engineer will compute each day the amount of marking material (including all components)

and glass beads applied for each route section on the DLS report for determining unsatisfactory sections. The Department will reduce the contract price for each route section in direct proportion to the percent of deficiency of marking material or glass beads as specified in 642.04, 643.04 and 646.05, up to 20 percent for each material deficiency. The Department will only use the greater deficiency of marking material or glass beads to compute the deduction.

The Department will consider materials unsatisfactory if at least one of the following conditions is met:

- A. Deficiency of marking material or glass beads is 20 percent or more.
- B. Materials applied outside the temperature or application requirements in Items 642, 643, and 646 without written approval of the Engineer.
- C. Markings not meeting the performance parameters contained in Supplement 1047, Appendices C, D, E, G, or a combination of the Appendices.
  - 1. Numerical rating of 8 or lower for Daytime Color (Appendix C)
  - 2. Composite rating of 8 or lower for Night Visibility (Appendix D)
  - 3. Numerical rating of 9 or lower for Durability (Appendix E)
  - 4. Less than the initial measurement for Retroreflectivity (Appendix G)

Replace pavement markings and glass beads in all sections determined to be unsatisfactory by retracing over the unsatisfactory markings at the full thickness specified in Items 642, 643 and 646.

**641.12 Method of Measurement.** The Department will measure pavement markings complete in place in the units designated. The Department will measure line quantities as the length of completed marking, including the gaps, intersections, and other sections of pavement not normally marked. The Department will measure Crosswalk Line as the total length of all individual transverse or longitudinal crosswalk lines. The Department will measure Two Way Left Turn Arrow as one pair of two opposing left turn arrows. The Department will measure Speed Measurement Marking as a 24-inch-wide by 4 feet long marking including the surveying work. The Department will measure the removal of pavement markings using the same method of measurement as completed markings in the units designated.

**641.13 Basis of Payment.** The Department will pay for accepted quantities of work performed under Items 642, 643, 644, 645, 646, 647 and 648.

The Department will not pay for costs associated with correcting improperly located lines, replacing reflectors coated with pavement marking material, or replacing unsatisfactory pavement markings.

The Department will not pay for lines placed using non-specification materials.

The Department will not pay for non-specification lines determined through field measurement.

The Department will pay for Two-Way Radio Equipment at the lump sum bid price.

## ITEM 659 SEEDING AND MULCHING

**659.01 Description.** This work consists of placing topsoil, preparing the seed bed, and placing and incorporating seed, agricultural lime, commercial fertilizer, and placing mulching material used to achieve [NPDES](#) final stabilization.

Perform this work in areas shown on the plans for seeding and mulching.

Perform seeding and mulching after completing all work in the area and within 7 days of obtaining final grade. If it is anticipated that future work may disturb an area, place temporary [NPDES](#) compliant Best Management Practices as needed until final stabilization measures under this item can be installed. If the Contractor disturbs a final area, then the Contractor shall restore this area. With the Engineer's approval, the Contractor may apply permanent seed between October 30 and March 1 on projects started and completed within the same calendar year.

Use all excavation material in the work. Alternatively legally use, recycle, or dispose of all excavated materials according to [105.16](#) and [105.17](#).

**659.02 Testing of Soil or Topsoil.** When a Soil Analysis Test of the soil or topsoil is required in the plans, use the following sampling frequency to determine the lime required:

**A.** When an area is near final grade, perform Standard Soil Analysis Test to measure the soil acidity or alkalinity (pH) if no topsoil is to be placed. This testing will determine the soil requirements for lime. If the soil requirements are different than the standard lime mixture ratio application rates then the standard application rate shall be adjusted up or down such that the soil requirements are met. If liquid lime is used then use the following application table to achieve a pH of 6.5 or greater. Calculate the difference between the soil pH and 6.5 pH.

pH Difference	0.25	0.50	0.75	1.0
Application rate in gals/ac (L/ha)	2.5 (4)	5 (8)	10 (15)	20 (30)

Example: Soil Analysis Test pH=5.75 required pH=6.5 difference= 0.75 required application rate is 10 gals/ac (15L/ha)

Only use liquid lime on the [QPL](#) list. Provide the Engineer with the Liquid Lime manufacturers written application rate. The Engineer will only accept printed application rates.

There will be no change in the mixture ratio. The sampling frequency is one sample every 10 acres (4.0 ha) per project side or one sample per project side whichever is greater. A sample consist of 15 soil cores in a random pattern spaced at a minimum of 500 feet (153 m) apart. Sample any change in soil. Soil changes can be seen as color and/or texture changes.

**B.** If placing topsoil, perform the Standard Soil Analysis Test from topsoil stockpiles to measure the topsoil acidity or alkalinity (pH). This testing will determine the soil requirements for lime. If the topsoil requirements are different than the standard lime mixture ratio application rates then the standard application rate shall be adjusted up or down such that the topsoil requirements are met.

If liquid lime is used then use the following application table to achieve a pH of 6.5 or greater. Calculate the difference between the soil pH and 6.5 pH.

pH Difference	0.25	0.50	0.75	1.0
Application rate in gals/ac (L/ha)	2.5 (4)	5 (8)	10 (15)	20 (30)

Example: Soil Analysis Test pH=5.75 required pH=6.5 difference= 0.75 required application rate is 10 gals/ac (15L/ha)

Only use liquid lime on the [QPL](#) list. Provide the Engineer with the Liquid Lime manufacturers written application rate. The Engineer will only accept printed application rates.

There will be no change in the mixture ratio. The sampling frequency is one sample every 10,000 cubic yards (7600 m<sup>3</sup>) of a topsoil stockpile, or at least two samples per stock pile whichever is greater. Test each stockpile. A sample consisting of 15 soil cores in a random pattern spaced evenly throughout the stockpile.

Mix the 15 cores from each sample and then remove 1 pint (0.5 L) for testing.

The Ohio County Extension offices can provide the Contractor with a soil sample kit and testing laboratory locations.

The Department will review the sample test results and approve application rates for the standard mixture ratios provided by the Contractor.

If a Soil Analysis Test of the soil is not required by the plans, use the standard application rates for lime and commercial fertilizer.

**659.03 Lime.** Obtain granular or liquid lime from a agricultural lime dealer or manufacturer whose brands are grades registered or licensed by the State of Ohio, Department of Agriculture. The granular or liquid lime standard grade is Ag-ground 90+. Ag-ground 90+ is defined as agricultural ground limestone, having a total neutralizing power (TNP) of 90 percent or more, at least 40 percent passing a No. 100 (150 µm) sieve and 95 percent passing a No. 8 (2.36 mm) sieve. Test granular or liquid lime according to Supplement [1007](#). Apply the granular or liquid lime standard grade Ag-ground 90+ at the standard application rate of 92 pounds per 1000 square feet (2 tons per acre) [0.45 kg/m<sup>2</sup> (9 metric tons/ha)].

The Contractor may provide other lime grade materials. The lime grade materials provided will meet Table 3-5 “Total Neutralizing Power, Fineness, Moisture, and Effective Neutralizing Power of Various Liming Materials That Can be Found in Ohio” found in [Bulletin 472](#), *Ohio Agronomy Guide*, published by the Cooperative Extension Service, The Ohio State University. Based on the type of lime grade material provided, determine the increase or decrease in the standard application rate from Table 3-6 according to the “Adjustments for the Type of Liming Material” section.

If using liquid lime apply liquid lime at a rate of 5 gals/acre (8 L/ha) unless otherwise required per the soil or topsoil Soil Analysis Test. Provide the Engineer with the Liquid Lime manufacturers written application rate. The Engineer will only accept printed application rates. Only use Liquid lime on the [QPL](#) list.

If testing of the soil or topsoil was performed, the lime required will be such that a growing environment of slightly acidic (pH 6.5) can be reached. The application rate of the standard grade lime Ag-ground 90+ will be adjusted up or down to achieve this condition and reported to the Department for approval. No lime is required for the soil or topsoil if the test shows a slightly acidic condition.

**659.04 Commercial Fertilizer.** Obtain commercial fertilizer from a dealer or manufacturer whose brands are grades registered or licensed by the State of Ohio, Department of Agriculture.

Commercial fertilizer may be dry or liquid. Apply standard commercial fertilizer 10-20-10 evenly over the surface at a standard dry application rate of 20 pounds per 1000 square feet (0.1 kg/m<sup>2</sup>). Furnish liquid application rates for approval by the Department.

The Contractor may provide other commercial fertilizer mixture ratios, however, ensure that the ratio meets or exceeds the standard commercial fertilizer ratio of 10-20-10 by providing an application rate specific for that ratio. The Department will approve this application rate that is specific to that ratio provided by the Contractor.

For areas of inter-seeding apply commercial fertilizer 12-12-12 over the affected area at the above rate.

For commercial fertilizer second application the method, mixture, and rate is broadcast 12-12-12 evenly over the surface without incorporation into the soil at a rate of 10 pounds per 1000 square feet (0.05 kg/m<sup>2</sup>).

**659.05 Topsoil.** If placing topsoil as specified in the plan, then stockpile off project site topsoil for testing and/or stockpile stripped topsoil from the project for testing. Perform the Soil Analysis Test from these stockpiles to determine the percent of organic matter present. The topsoil shall contain between 4 percent and 20 percent organic matter as determined by loss on ignition of samples oven dried to constant weight at 212 °F (100 °C) and consist of fertile, loose, friable, and loamy material that contains humus material. For topsoil to be considered loamy, ensure that the fraction passing the No. 10 (200) sieve does not contain more than 40 percent clay. Test topsoil according to [AASHTO T 267](#).

The Department will review the sample test results and approve the stockpiles for use. Stockpiles outside the above limits will not be used.

Stripped topsoil from the R/W limits will be from the upper most layers of the excavation areas. Remove all heavy grass, weeds, and other vegetation before stripping topsoil from the excavation areas.

A mixture of 1 part compost and 2 parts topsoil will be treated as topsoil.

**659.06 Compost.** Acceptable compost shall include [Ohio EPA](#) rated Class IV compost, EQS biosolids compost, or a Department approved equal. Furnish compost with a nitrogen content of 1.4 percent or above. Obtain compost from an [Ohio EPA](#) approved facility. Before delivering compost, provide the Engineer with the facility name and location.

**659.07 Seeds.** Furnish grass seed from a grass seed dealer or grower whose brands are grades registered or licensed by the State of Ohio, Department of Agriculture or from the [Approved List](#) of grass seed dealers or growers on file with Department. Furnish the kind and type of grass seed required that meets current specifications on file with the Department as to percentage purity, percentage weed seed, and percentage germination.

Turf grass germination rates specifications are shown below in Table [659.07-1](#) to provide an understanding of the specifications on file with the Department along with information to understand what is required.

**TABLE 659.07-1 GERMINATION RATES**

<b>Species</b>	<b>Minimum Percent</b>	<b>High Quality Percent</b>
Kentucky Bluegrass	80	85
Fine Fescue	85	90
Perennial Ryegrass	85	90
Annual Ryegrass	85	90
Tall Fescue	85	90
Creeping Red Fescue	85	90

If high quality is not shown on the plans, then the minimum germination rate is required.

Mark the test date on seed bags. Furnish seeds as separate species and cultivars, packaged together or bagged separately, and labeled, tagged, or marked according to [ORC 907.03](#). Sow seeds within 15 months of the testing date. The Department reserves the right to test, reject, or approve all seed after delivery.

**659.08 Legumes.** Inoculate or treat all leguminous seeds (crown vetch) with the proper amount of pure nitrogen-fixing bacteria and mix with sufficient water to thoroughly wet the seed. The bacteria selected will be for maximum vitality and shall not be more than one-year old. All culture records will be provided with the leguminous seeds.

If sown hydraulically, use 4 times the inoculant rate specified by the inoculant manufacturer. If pre-inoculated seed is used then use 3 times the inoculant rate specified by the inoculant manufacturer. Immediately before seeding, add inoculant and sticking agent directly into the slurry, and thoroughly mix the slurry. Sow seed as soon as possible after inoculation. If left standing for more than 24 hours, reinoculate seed before sowing. Mix all seed on the project. Sixty days before seeding, provide a written description for the Class 3C mixture showing the percentage by weight (mass) of each kind of seed for the Engineer's approval.

Include the following with the description:

- A. Name and location of the seed supplier.
- B. Origin and date of harvest of each kind of seed.
- C. A statement of the purity and germination of each seed.
- D. Testing date for each seed.
- E. How and when seeds were mixed.

**659.09 Native Grasses and Wildflowers.** Table [659.09-1](#) lists the seed quantities by weight per area. Use Classes 4, 5, and 6 in the amounts of pure live seed (PLS) for each species listed. If seed tests show that the seed has an actual pure live seed (PLS) yield less than the intended yield, adjust the specified quantity to provide the intended PLS yields.

For Class 4, 5, and 6 mixtures, provide seed specifically grown for the Ohio climate.

Use cool season turf Classes 1, 2, 3A, and 3B as listed in Table [659.09-1](#) composed of no less than two and no more than four cultivars of the same species. Sixty days before seeding, provide a written description for the Class 1, 2, and 3A mixtures showing the percentage by weight (mass) of each kind of seed for the Engineer's approval. Mix all seed on the project. Sixty days before seeding, provide a written description for the Classes 1, 2, 3A, 3B, 4, 5, and 6 mixtures showing the percentage by weight (mass) of each kind of seed for the Engineer's approval.

Include the following with the description:

- A. Name and location of the seed supplier.
- B. Origin and date of harvest of each kind of seed.
- C. A statement of the purity and germination of each seed.
- D. Testing date for each seed.
- E. How and when seeds were mixed.

**TABLE 659.09-1 GRASS AND WILDFLOWER SEED MIXES**

Class	Mix Type Seeds	Weight per Area	
		lb	kg
		1000 ft <sup>2</sup>	1000 m <sup>2</sup>
1	Lawn Mixture Use for areas in front of residences, commercial properties, etc. between curb and sidewalk with slopes 3:1 or flatter.		
	Kentucky Bluegrass ( <i>Poa pratensis</i> )	3	14.64
	Creeping Red Fescue ( <i>Festuca rubra</i> )	3	14.64
	Annual Ryegrass ( <i>Lolium multiflorum</i> )	2	9.76
	Perennial Ryegrass, turf type ( <i>Lolium perenne</i> )	2	9.76
2	Roadside Mixture		
	Kentucky Bluegrass ( <i>Poa pratensis</i> )	1.5	7.32
	Kentucky 31 Fescue ( <i>Festuca arundinacea</i> var. KY 31 or Fawn Tall Fescue)	2	9.76
	Perennial Ryegrass ( <i>Lolium perenne</i> )	1.5	7.32
3A	Slope Mixtures Use for slopes flatter than or equal to 3:1.		
	Use Class 2, 3B, 3C, or 4B mixtures		
3B	Low Growing Slope Mixture Use for slopes steeper than 3:1 when low growing species are required		
	Hard Fescue ( <i>Festuca longifolia</i> )	1.3	6.35
	Creeping Red Fescue ( <i>Festuca rubra</i> )	0.8	3.9
	Annual Ryegrass ( <i>Lolium multiflorum</i> )	0.23	1.12
3C	Crown Vetch Mixture Use for slopes steeper than 3:1 and shale or rock slopes.		
	Crown Vetch ( <i>Coronilla varia</i> )	0.9	4.39
	Perennial Ryegrass ( <i>Lolium perenne</i> )	1.8	8.79
	Annual Ryegrass ( <i>Lolium multiflorum</i> )	0.3	1.46
4A	Native Grass Mixture Use for slopes flatter than 2:1 and seeding for wildlife habitat mitigation.		
	Big Bluestem ( <i>Andropogon gerardii</i> )	0.07	0.34
	Indiangrass ( <i>Sorghastrum nutans</i> )	0.09	0.44
	Switchgrass ( <i>Panicum virgatum</i> )	0.02	0.09
	Annual Ryegrass ( <i>Lolium multiflorum</i> )	spring fall	0.11 0.34



Class	Mix Type Seeds	Weight per Area	
		lb	kg
		1000 ft <sup>2</sup>	1000 m <sup>2</sup>
	Big Bluestem ( <i>Andropogon gerardii</i> )	0.046	0.22
	Little Bluestem ( <i>Schizachyrium scoparium</i> )	0.069	0.34
	Indiangrass ( <i>Sorghastrum nutans</i> )	0.023	0.11
	Annual Ryegrass ( <i>Lolium multiflorum</i> )	0.92	4.49
6	Wildlife Mixture Use for slopes flatter than 2:1 and seeding for wildlife habitat mitigation.		
	Big Bluestem ( <i>Andropogon gerardii</i> )	0.13	0.63
	Little Bluestem ( <i>Schizachyrium scoparium</i> )	0.18	0.88
	Indiangrass ( <i>Sorghastrum nutans</i> )	0.13	0.63
	Ox-eye Sunflower ( <i>Heliopsis helianthoides</i> )	0.18	0.88
	Prairie Dock ( <i>Silphium terebinthinaceum</i> )	0.18	0.88
	Purple Coneflower ( <i>Echinacea purpurea</i> )	0.18	0.88
	Whorled Rosinweed ( <i>Silphium trifoliatum</i> )	0.11	0.54
	Downy Sunflower ( <i>Helianthus mollis</i> )	0.07	0.34
	New England Aster ( <i>Aster novae-angliae</i> )	0.07	0.34
	Annual Ryegrass ( <i>Lolium multiflorum</i> ) spring	0.11	0.54
fall	0.34	1.66	
7	Temporary Erosion Control Mixture		
	Annual Ryegrass ( <i>Lolium multiflorum</i> )	2.02	9.86

**659.10 Site Preparation.** Before placing topsoil or seed remove rock or other foreign material of 3 inches (75 mm) or greater in any dimension, from all areas except as listed below.

**A.** Remove stones 1-inch (25 mm) or greater in any dimension from all seed areas from in front of residences, commercial properties, etc.; between curb and sidewalks; or as shown on the plans.

**B.** Remove nothing in shale cuts, but allow the shale to deteriorate to a soil type surface before seeding or placing topsoil.

Finish the area in such a manner that seeding, place sod, planting, or, placing topsoil can proceed without additional soil preparation.

Apply commercial fertilizer, lime, or other soil amendments including compost to the soil or topsoil surface in separate operations. Incorporate the commercial fertilizer, granular lime, or other soil amendments, including compost either separately or together, into the soil or topsoil to a depth of 2 to 4 inches (50 to 100 mm). Do not mix Liquid lime into the soil or topsoil. Only apply liquid lime to the top of the soil or topsoil. Furnish a smooth surface for the seed or topsoil by tracking with a dozer or by other methods. If the site is inaccessible to a dozer and other methods do not provide results equivalent to hand raking, hand rake these areas. Ensure that the surface is uniform, free of gullies, rivulets, crusting, and caking. Finely grade the surface for seed or topsoil for slopes 4:1 or flatter, and grade all other slopes. Rake or open the surface with a dozer cleats or otherwise loosen the surface of these areas to a depth of 1 inch (25 mm) immediately before covering with topsoil. Remove raked up material from the area.

**659.11 Placing Topsoil.** If shown on the plans, place topsoil in loose lifts that construct a 4-inch (100 mm) compacted depth. The surface of the topsoil shall be such that the final grade as shown on the cross-sections is met. Use the following methods or combination of any of the methods to produce the required space to place the topsoil.

**A.** The 203 Items can be cut or placed to the final grade, which will match the plan quantities for Items 203, and then remove a 4-inch (100 mm) thickness for the topsoil.

**B.** The 203 Items can be cut or placed to a 4-inch (100 mm) height below the final grade. There will be no change from the plan quantities in the 203 Items for this method.

Track the area with a dozer to compact and provide good contact between the topsoil and the surface.

The Contractor may place topsoil by using pneumatic, or hydraulic methods. If using pneumatic or hydraulic methods to place the topsoil, the Contractor may place the top 1-inch (25 mm) with a mix of seed, commercial fertilizer, lime, and other soils amendments. This mixture will be 1 part compost and 2 parts topsoil. Do not apply mulch to this surface. The compost is the mulch.

**659.12 Seeding Methods.** Apply seed to prepared areas. If the prepared areas to be seeded become compacted before seeding, loosen the surface using disks, rakes, or other methods.

Thoroughly mix all seed, and evenly sow the seed over the prepared areas at the required rates. Do not sow seed during high winds. For slopes subject to windy conditions, seed using hydraulic methods only. Operate equipment in a manner to ensure complete coverage of the entire area to be seeded.

If broadcast seeding, seed Classes 1, 2, 3A, and 3B between August 15 to October 30. If necessary to seed Classes 1, 2, 3A, or 3B before August 15, but after March 1 increase the seeding rates by 5 percent.

Between March 1 and October 30, the Contractor may use hydro seeding, which applies the mulch, seed, water, and commercial fertilizer in the same operation, for Classes 1, 2, 3A, 3B, 3C, and 7.

Between October 30 and March 1, apply temporary seed according to Item SS832. With the Engineer's approval, the Contractor may apply permanent seed between October 30 and March 1 on projects started and completed within the same calendar year.

Seed before or concurrently with all required erosion control items.

Do not apply crown vetch seed from September 1 to October 31.

Wildflower Classes 5 and 6 seed from September 1 to October 30, unless the Engineer allows seeding from March 1 to May 31.

Seed Class 4 wildflowers from March 1 to May 31.

Seed native grasses and wildflowers in Classes 4, 5, and 6 with a rangeland type, slit seeder or native seed grass drill. Seed native grasses with no less than two passes in different directions and by equally splitting the seed application rate to each pass. Use broadcast seeding, along with cultipacking or rolling, only with the Engineer's approval.

If broadcast seeding, perform the following, immediately after sowing, to provide good seed-soil contact:

**A.** For flat surfaces, lightly rake the area then roll.

**B.** For slopes, track the area with a dozer.

**659.13 Mulching Operation.** Mulch materials consist of straw, compost, or wood fiber for 3:1 or flatter slopes. The Contractor may specify which mulch to use, if it is not shown on the plans. Use mulch that is reasonably free of weed seed, foreign materials, or other materials that would prohibit

seed germination. Do not mulch during high winds. For slopes subject to windy conditions mulch using hydraulic methods only. Within 24 hours after seeding an area, evenly place mulch. Immediately replace mulch that becomes displaced.

**659.14 Straw Mulch.** Straw mulch consists of straw. Evenly place straw mulch over all seeded areas at the following rates:

Seeding Period	Rate
From March 15 to October 30	2 tons per acre (0.5 metric ton/1000 m <sup>2</sup> )
From October 31 to March 14	3 tons per acre (0.7 metric ton/1000 m <sup>2</sup> )

Keep straw mulching materials in place by applying an asphalt emulsion at a minimum rate of 60 gallons per ton (250 L/metric ton) of straw mulch or by applying tackifiers according to the manufacturer's recommendations. Apply an additional application at a rate of 30 gallons per ton (125 L/metric ton) of straw mulch to shoulder areas, starting at the berm edge and extending out for a distance of 10 feet (3 m). Use an emulsion that is nontoxic to plants and prepared in a manner that will not change during transportation or storage.

**659.15 Wood Fiber Mulch.** Wood fiber mulch consists of pure wood fibers manufactured expressly from clean wood chips. Ensure that the chips do not contain lead paint, varnish, printing ink, and petroleum based compounds. Do not use wood fiber mulch manufactured from recycled materials of unknown origin such as sawdust, paper, cardboard, or residue from chlorine-bleached pulp and paper mills.

Ensure that the wood fiber mulch maintains uniform suspension in water under agitation and blends with grass seed, commercial fertilizer, and other additives to form a homogeneous slurry. Use manufacturer-approved tackifiers.

Using standard hydraulic mulching equipment, evenly apply the slurry over the soil surface in a one-step operation. Apply slurry from March 1 to October 30 at the following rates:

Surface	Rate
Slopes 3:1 or flatter	46 pounds per 1000 square feet (225 kg/1000 m <sup>2</sup> )

**659.16 Compost Mulch.** The Contractor may provide compost applied to a minimum depth of 1/4-inch (6 mm) over the prepared seed areas. The Contractor may also mix the grass seed with the compost and using pneumatic equipment, place this mixture to a minimum depth of 1/4-inch (6 mm) over the prepared seed areas. If using compost no tackifiers or asphalt emulsion are required.

**659.17 Watering.** Thoroughly water all permanent seeded areas (Classes 1 to 6) after the seed has germinated. Apply a total rate of 300 gallons per 1000 square feet (12.2 m<sup>3</sup>/1000 m<sup>2</sup>) in at least 2 applications spread over 7 days. Apply the water using a hydro-seeder or a water tank under pressure with a nozzle that produces a spray that will not dislodge the mulch material.

Perform a secondary water application between 7 and 10 days after the primary applications. If 1/2-inch (13 mm) or greater of rainfall has occurred within the first 7-day period, the Contractor may delay or omit the secondary application, depending on weather conditions.

**659.18 Maintenance.** Maintain all seeded and mulched areas until final inspection. Repair damaged areas to the original condition and grade.

**659.19 Mowing.** The Engineer may require mowing before permanent seeding and during the growing season following permanent seeding. The Engineer will notify the Contractor of when to begin each mowing. Use suitable mowing equipment of the rotary, flail, disk, or sickle type. Use handheld

equipment where inaccessible by larger equipment. Do not bunch or windrow mowed vegetation. Mow to a final cutting height of no less than 6 inches (150 mm). If necessary to achieve the cutting height, make more than one pass with the mower.

**659.20 Repair Seeding and Mulching.** Repair all damage or erosion of the seeded and mulched areas before the completion of the project.

Rework or reshape slopes, and bring in additional material, as necessary, using whatever equipment is necessary to restore slopes to grade. Seed and mulch repaired areas according to this specification. As an alternative, the Contractor may apply compost to repair areas as specified in [Item 659](#).

**659.21 Inter-Seeding.** Inter-seeding is seeding existing thin and spotty growing turf using a slit or drill type seeder. Perform inter-seeding only from March 15 to May 15 and from September 1 to October 15. If necessary to achieve good seed-soil contact, mow before seeding according to [Item 659](#).

For seeding steep slopes or inaccessible areas, the Contractor may use broadcast or hydraulic seeding methods. Broadcast commercial fertilizer over affected areas as specified in [Item 659](#). Water affected areas at the rate specified in [659](#) to aid in seed-soil contact.

**659.22 Fertilization: 2nd Application.** Once all repair seeding and mulching, and inter-seeding is complete and no earlier than 3 months after seeding, perform a Soil Analysis Test if shown on the plans to determine the need for a second application of commercial fertilizer. Do not apply the second application of commercial fertilizer unless the grass has germinated. Broadcast commercial fertilizer of 12-12-12 evenly over the surface without incorporation at a rate of 10 pounds per 1000 square feet (0.05 kg/m<sup>2</sup>).

**659.23 Performance.** The Department will inspect all seeded areas no earlier than 6 months and no later than 12 months after final seeding. For any area identified without a uniform density of at least 70 percent grass cover, repair seeding and mulching as specified in [659](#) or perform inter-seeding as specified in [659](#), and fertilize as specified in this subsection.

Also repair seeding and mulching or perform inter-seeding, and fertilize seeded areas damaged by traffic or erosion, due to no fault or negligence of the Contractor.

**659.24 Method of Measurement.** The Department will measure Soil Analysis Test by the number of tests submitted to the Engineer.

The Department will measure the compacted topsoil by the number of cubic yards (cubic meters).

The Department will measure Commercial Fertilizer by the number of tons (kilograms) of each quantity of furnished, spread, and incorporated into the soil or topsoil. This measure will be converted to the standard application rate for the standard mixture ratio.

The Department will measure lime or liquid lime by the number of acres (ha) furnished, spread, and incorporated into the soil or topsoil. The measure will be converted to the standard application rate for the standard mixture ratio.

The Department will measure Seeding and Mulching by the number of square yards (square meters).

The Department will measure Repair Seeding and Mulching by the number of square yards (square meters) of damaged or eroded areas reshaped, seeded, and mulched. If compost is substituted for mulch to repair areas, the Department will include such work under Repair Seeding and Mulching.

The Department will measure Water by the number of M gallons or 1000 gallon units (cubic meters) applied. The Department will measure water in tanks, tank wagons, or trucks of predetermined capacity, or by means of meters of a type satisfactory to the Engineer and furnished and installed by the Contractor at expense to the Department, or determined by weight conversion.

The Department will measure Inter-Seeding by the number of square yards (square meters) of the seeded area.

The Department will measure mowing by the number of M square feet (square meters) satisfactorily mowed.

If seeded areas are damaged by traffic or erosion, due to no fault or negligence of the Contractor, the Department will measure for such work and mobilization by Supplemental Agreement.

The Department will not measure for repairs to seeding and mulching if damage or erosion of the areas occurs as a result of fault or negligence of the Contractor.

**659.25 Basis of Payment.**

The Department will pay the plan quantity for compacted topsoil. The Department will not adjust topsoil quantities when the volume between two consecutive cross-sections differs by less than 5 percent from the plan quantity, unless the difference between the actual quantity and plan quantity is greater than 1000 cubic yards (1000 m<sup>3</sup>). For quantity differences greater than 5 percent or greater than 1000 cubic yards (1000 m<sup>3</sup>), submit supporting documentation to the Engineer.

The Department will pay the plan quantity for Seeding and Mulching. The Department will not adjust Seeding and Mulching quantities when the area between two consecutive cross-sections differs by less than 5 percent from the plan quantity, unless the difference between the actual quantity and plan quantity is greater than 20,000 square yards (20,000 m<sup>2</sup>) for all Seeding and Mulching pay items, combined. For quantity differences greater than 5 percent or greater than 20,000 square yards (20,000 m<sup>2</sup>), submit supporting documentation to the Engineer.

The Department will pay for accepted quantities at the contract prices as follows (M=1000):

<b>Item</b>	<b>Unit</b>	<b>Description</b>
659	Square Yard (Square Meter)	Seeding and Mulching

## 701 CEMENTITIOUS MATERIALS

**701.00 Acceptance.** Provide cements meeting 701.01, 701.02, 701.04, 701.05, 701.07, 701.09 and 701.15 and certified according to Supplement 1028 ; fly ash or natural pozzolan meeting 701.13 and certified according to Supplement 1026; slag cement meeting 701.11 and certified according to Supplement 1034; and micro silica meeting 701.10 and certified according to Supplement 1045, without prior sampling, testing and approval by the Department. Lists for certified cement, fly ash, natural pozzolan, slag cement and micro silica sources are maintained by the Laboratory.

**701.01 Air-Entraining Portland Cement.** Provide air-entraining portland cement according to ASTM C150, Type IA. The Gillmore time of set and the air permeability (fineness) tests will govern.

**701.02 Portland Cement.** Provide portland cement according to ASTM C150, Type II. The Gillmore time of set and the air permeability (fineness) tests will govern.

**701.04 Portland Cement.** Provide portland cement according to ASTM C150, Type I. The Gillmore time of set and the air permeability (fineness) tests will govern.

**701.05 High Early Strength Portland Cement.** Provide high early strength portland cement according to ASTM C150, Type III. The Gillmore time of set test shall govern.

**701.07 Masonry Cement.** Provide masonry cement according to ASTM C91.

**701.09 Slag Modified Portland Cement.** Provide slag modified portland cement according to ASTM C595, Type IS (< 25).

**701.10 Micro-Silica.** Provide micro-silica according to ASTM C1240. Do not use micro-silica admixtures in dissolvable bags.

**701.11 Slag Cement.** Provide slag cement according to ASTM C989, meeting the Grade 100 minimum.

**701.13 Fly Ash or Natural Pozzolan for Use in Portland Cement Concrete.** Provide fly ash or natural pozzolan according to ASTM C618, Class C, F, or N, except ensure a maximum loss on ignition (LOI) of 5.0 percent for fly ash and 5 percent for natural pozzolan.

**701.15 Portland-limestone Cement, Type IL.** Provide portland-limestone cement according to ASTM C595, Type IL. The maximum allowable limestone content is fifteen percent by mass.

**701.16 Portland-limestone Cement, Type IL HE.** Provide portland-limestone cement according to ASTM C 595, Type 1L HE. The maximum allowable limestone content is fifteen percent by mass.

**701.17 Portland-limestone Cement, Type 1T.** Provide Portland-limestone cement according to ASTM C 595, Type 1T(S<25). Ternary blended cements containing pozzolans will not be allowed.

## 702 ASPHALT MATERIAL

**Acceptance.** Asphalt binders [702.01](#) and liquid asphalts [702.02](#), [702.03](#), [702.04](#), [702.07](#), [702.12](#), [702.13](#), and [702.16](#) may be acceptable for shipment to and immediate use in construction projects. Acceptance is according to Supplement [1032](#) . Material will meet specification requirements and no tolerances are given for material falling out of specification requirements. The remaining materials may be acceptable for shipment to and immediately used in construction projects based on meeting the requirements of Department [DSR](#), [QPL](#) and certified test data based on what each material requires.

**702.00 Application Temperatures.** Apply asphalt materials, according to the temperature ranges specified in Table [702.00-1](#).

**TABLE 702.00-1**

Type and Grade of Material	Application Temperature Range °F (°C)	
	Spray	Mix
MC-30	50 to 120 (10 to 49)	---
MC-70	75 to 150 (24 to 66)	---
MC-250	100 to 225 (38 to 107)	100 to 225 (38 to 107)
MC-800	150 to 250 (66 to 121)	150 to 225 (66 to 107)
MC-3000	225 to 275 (107 to 135)	200 to 250 (93 to 121)
All Emulsions	50 to 160 (10 to 71)	50 to 140 (10 to 60)
Asphalt Primer for Waterproofing	50 to 80 (10 to 27)	---
Asphalt for Waterproofing	300 to 350 (149 to 177)	---
CBAE 350, CBAE 350 SP	100 to 150 (38 to 66)	100 to 150 (38 to 66)
CBAE 800, CBAE 800 SP	125 to 175 (52 to 79)	125 to 175 (52 to 79)
Primer 20	60 to 120 (16 to 49)	---
Primer 100	75 to 125 (24 to 52)	---
Asphalt Binders	350 (177) Max.	325 (163) Max.
Asphalt Binders Polymer modified with SB, SBR, SBS, or Elvaloy	375 (190) Max	350 (177) Max.

### 702.01 Asphalt Binders.

General. According to [AASHTO M 320-17](#) Table 1 and Supplement [1105](#) except as follows.

Ensure PG 70-22M, PG 76-22M, PG 88-22M, and PG 64-28 meet the requirements of Table [702.01-1](#).

An independent laboratory will not be owned or operated, in whole or part, by the binder supplier, Contractor, or affiliates of either.

Materials and Manufacture. Replace the requirements of [AASHTO M 320-17](#) Table 1 Section 5 “Materials and Manufacture” Section with the following:

5.1 Supply PG Binder from the refining of crude petroleum, or combination of asphalt binders from the refining of crude petroleum, or asphalt binders and suitable liquid from the refining of crude petroleum, and possible organic modifiers for performance enhancement. Material from the crude refining stream is considered neat. Liquid from crude refining may be used for adjustments, but do not use liquid from crude refining for the purpose of substitution of crude refined asphalt binder in a PG Binder. In the event of a failure investigation where asphalt binders exhibit unusual properties a

supplier may be requested by **OMM** to supply information about the makeup of a PG Binder. Failure to cooperate will mean removal from Supplement 1032 certification.

5.2 A modifier may be any approved material of suitable manufacture that is proven compatible with asphalt binder (does not separate appreciably in routine storage), and that is dissolved or reacted in asphalt binder to improve its performance. Do not use paraffin wax, organic wax, or like materials. Performance enhancement is defined as a decrease in the temperature susceptibility of the asphalt binder while maintaining or improving desirable properties in a neat asphalt binder such as coat ability, adhesiveness and cohesiveness. Unless otherwise noted limit modifiers to no more than 6.0 percent by PG Binder weight.

5.3 The use of previously used materials in a PG Binder must be approved by **OMM**. Since no standard test procedures exist for reprocessed materials (and original tests were not developed with the use of such materials in mind), appropriate test methods may be chosen by **OMM** for review. **OMM** approval does not relieve the binder supplier from full responsibility for content and use of any previously used material in a PG Binder nor guarantee suitable performance enhancement as defined above. The detected presence in a PG Binder sample of any unapproved previously used material will mean immediate removal from Supplement 1032 certification. Do not use recycled engine oil bottoms (REOB), vacuum tower asphalt extender (VTAE), or like materials as modifiers. Limit approved previously used materials to 5.0 percent by PG Binder weight maximum and provide a written certification to **OMM** stating the exact percent used, the source, and any brand or trade names. Approved previously used materials are only allowed to be used to produce PG 58-28 and PG 64-28 and suppliers must get recertified per Supplement 1032 for these PG grades.

5.4 Ensure the PG Binder is homogeneous, free from water and deleterious materials, and does not foam when heated to 350 °F (175 °C). Prove the asphalt binder (before modification or after modification if liquid modifier used) is fully compatible with a negative result by means of the Spot Test per AASHTO T 102 using standard naphtha solvent. If standard naphtha shows a positive result, a retest using reagent grade 35 percent Xylene/ 65 percent Heptane (volume) may be used.

5.5 Ensure the PG Binder is at least 99.0 percent soluble as determined by AASHTO T44 or ASTM D7553. Ensure any insoluble component is free of fibers or discrete particles more than 75 µm.

5.6 Ensure flash point is 500 °F (260 °C) minimum. Ensure mass change on RTFO of the final PG Binder grade is 0.75 percent maximum.

5.7 PAV aged all PG grades at 212 °F (100 °C).

5.8 Direct Tension testing is not required, unless otherwise required in this specification.

Requirements for PG Modified Binder. Furnish PG Modified Binder according to the requirements of Table 702.01-1 by modifying a non-oxidized, non-air blown, neat asphalt binder by using a styrene butadiene latex rubber compound (SBR polymer), a styrene butadiene styrene polymer block copolymer (SB, SBS polymer), an ethylene/ nbutyl acrylate/ glycidyl methacrylate copolymer (Elvaloy) as specified or Ground Tire Rubber (GTR) according to Supplemental Specification 887. For SB, SBS products the polymer supplier will certify to the refiner and Contractor that the polymer used meets a minimum 68 percent by weight butadiene content. Perform SB, SBS, Elvaloy or GTR modification prior to shipment to the asphalt concrete mixing plant (pre-blend). Perform SBR modification at the asphalt concrete mixing plant (post-blend) or prior to shipment to the asphalt concrete mixing plant (pre-blend) where allowed by specification.

Polyphosphoric acid (PPA) is allowed in PG binders as follows. PPA is a polymer of orthophosphoric acid. When using PPA ensure all the applicable requirements of the required PG binder in Table 702.01-1 are met. Ensure PPA does not contain water. To retain Supplement 1032 certification, suppliers of PPA modified asphalt will provide a written certification to **OMM** that the amount of PPA used is less than 1.0% by weight of neat binder. Suppliers of PPA can have their Supplement 1032 certification removed for not following the above PPA requirements.

For each project, the PG Modified Binder supplier will give the Contractor a handling guide specifying temperature, circulation, shelf life, and other requirements for assuring the PG Modified Binder will perform as desired. Give this handling guide to the Monitoring Team and place a copy in the plant control room and plant laboratory.

If PG Modified Binder is retained at the asphalt concrete mixing plant for more than two weeks before use or beyond the supplier recommended shelf life, whichever is less, a top and bottom sample test (material property difference between samples taken from the top and bottom of the storage tank) will be performed by OMM on samples retrieved by the Contractor at the Laboratory's direction. Do not use material on hand until approved.

**TABLE 702.01-1, MATERIAL REQUIREMENTS FOR PG MODIFIED BINDER**

Test / Requirement	SBR Polymer		Pre Blended Binder				Note
	70-22M (a, b)	64-28 (b)	64-28 (a)	70-22M (a,k)	76-22M (a,k)	88-22M (a,l,m)	
Final PG Binder Grade							c
Actual Pass Temperatures	Report						i
RTFO Mass Change, percent max	0.75						d
Phase Angle, max	78		78	74			d
Elastic Recovery, min			65	75	90		e, d
Toughness, in. lb	125	105					f, d
Tenacity, in lb.	70	80					f, d
Elongation, in. min	20	20					f, d
Ductility, in. min	28	28					j, d
Separation, F max	10						g, d
Homogeneity	None Visible						h, d

a. Pre-blended Binder. Use a base neat asphalt binder that is a -22 grade for 70-22M and 76-22M. Use a base neat asphalt binder that is a -28 grade for 64-28. 64-28 can be neat, PPA modified or modified

- with SB, SBS or Elvaloy. 64-28 PPA only modified does not have to meet the phase angle or elastic recovery requirements. Ensure SB, SBS or Elvaloy modified 64-28 meets all requirements listed.
- b. Post-blended Binder made from neat Supplement [1032](#) certified or preapproved standard PG Binder grade and SBR solids amount equal to or above 3.5 percent by weight of total binder to achieve the PG Binder grade. Ensure all listed properties are met.
  - c. Without Direct Tension, graded with actual pass temperatures
  - d. PG Modified Binder
  - e. [AASHTO T301](#), 10cm @ 77 °F (25 °C), hold 5 min. before cutting, on RTFO material for SB, SBS, and Elvaloy. Note elongation after one hour to the nearest 0.01 cm and report elastic recovery to nearest 0.1%.
  - f. [ASTM D5801](#), 50cm/min @ 77 °F (25 °C)
  - g. Condition samples according to [ASTM D7173](#). Conduct softening point difference of top and bottom of tube per [AASHTO T53](#). Compatibility of polymer and neat binder is sole responsibility of supplier. Formulate PG Modified Binder to retain dispersion for 3 days minimum.
  - h. Heat a minimum 400 gram sample at 350 °F (177 °C) for 2.5-3 hours. Pour entire sample over a hot No. 50 (300 µm) sieve at 340 °F (171 °C). Look for retained polymer lumps.
  - i. Actual high and low temperature achieved by PG Modified Binder beyond required grade, but will not grade out to the next standard PG Binder grade for low temperature.
  - j. [AASHTO T51](#), @ 39 °F (4 °C), 1 cm/min
  - k. SB, SBS, Elvaloy or Supplemental Specification [887](#) GTR
  - l. SB, SBS, Elvaloy
  - m. The requirements of 3.0 Pa\*s maximum for the rotational viscosity for 88-22M may be waived at the discretion of the Department if the supplier warrants that the asphalt binder can be adequately pumped, mixed, and compacted at or below the temperature requirements in Table [702.00-1](#). Do not exceed 10.0 Pa\*s rotational viscosity using the #27 spindle at time of shipment.

**702.02 Cut-Back Asphalt.** Provide medium curing cut-back asphalt according to [AASHTO M 82](#). Instead of viscosity on the residue, the penetration in note 2 ([AASHTO M 82](#)) will govern.

**702.03 Cut-Back Asphalt Emulsions.** Prepare emulsions by compounding a suitable volatile solvent and water with [702.01](#) asphalt to produce emulsions according to Table 702.03-1.

**TABLE 702.03-1**

	<b>CBAE-350</b>	<b>CBAE-350 Special</b>	<b>CBAE-800</b>	<b>CBAE-800 Special</b>	<b>Primer 20</b>	<b>Primer 100</b>
Kinematic Viscosity at 60 °C, Centistokes	350-700	350-700	800-1600	800-1600	20-40	100-200
Water Content <sup>[1]</sup> , %	4-12	4-12	4-12	4-12	3-8	3-8
Volatile Solvent <sup>[1]</sup> , %	12-25	12-25	10-20	10-20		
Asphalt Content <sup>[1]</sup> , %	67+	67+	72+	72-	45+	60-
Adhesion Test <sup>[1]</sup>	[2]	[2]	[2]	[2]		
Wet Stone Coating Test <sup>[1]</sup>		[2]		[2]	[2]	[2]
Stripping Test <sup>[1]</sup>		[2]		[2]		
	<b>Tests on Residue From Distillation</b>					
Penetration at 25 °C	80-150	80-150	80-150	80-150	100-200	100-200
Ductility at 25 °C, in. cm	100+	100+	100+	100+	100+	100+
Total Binder (Sol. in CSx), %	99+	99+	99+	99+	99+	99+
[1] Perform tests according to Supplement 1014.						
[2] Meets						

**702.04 Emulsified Asphalts.** Provide emulsified asphalts according to AASHTO M 140 or AASHTO M 208 except specification limits will be producible for at least 30 days from sample date. Use Saybolt Furol for viscosity.

**702.05 Asphalt Primer for Waterproofing.** Provide asphalt primer for waterproofing according to ASTM D41 Type 2.

Furnish materials according to the Department's [QPL](#).

**702.06 Asphalt for Waterproofing.** Provide asphalt for waterproofing according to ASTM D312, Type III.

Furnish materials according to the Department's [QPL](#).

**702.07 Asphalt Emulsion MWS.** Prepare asphalt emulsion MWS from a base material according to [702.01](#), except vary the penetration to meet the float test and penetration specified below. Ensure that the emulsion coats the aggregate readily, thoroughly, and uniformly. Ensure that the specified characteristics do not change during transportation, normal storage and that the emulsion is according to the following when tested according to AASHTO T 59 within 30 days after sample date:

Saybolt furol viscosity at 77 °F (25 °C), seconds	50+ <sup>[1]</sup>
Asphalt residue, percent	68+
Settlement, 7 days, percent	5-
Sieve test	0.1-
Coating test	<sup>[2]</sup>
Oil distillate, percent	7-
Withstand freezing to	-10 °F (-23 °C) <sup>[3]</sup>
Particle charge	Negative
Penetration, 77 °F (25 °C) <sup>[6]</sup>	<sup>[4]</sup>
Float test at 140 °F (60 °C), seconds <sup>[6]</sup>	1200+ <sup>[5]</sup>
% Solubilty <sup>[6]</sup>	97.5+
Ash content, percent <sup>[6]</sup>	2.0-
[1] Pumpable.	
[2] Use aggregates to test the emulsion that are from sources standardized by <b>OMM</b> . Use aggregates consisting of 100 percent passing a 3/8 inch (9.5 mm) sieve and 0 percent passing a 1/4 inch (6.3 mm) sieve. Wash the standard reference aggregates with distilled water until free of dust, and dry them. Weigh 3.280 ounces (93 grams) of the dry graded reference aggregate into a suitable container. Weigh 0.247 ounces (7 grams) of the emulsion onto the aggregate in the container, and vigorously mix the contents for 5 minutes. After mixing, thoroughly coat the stone. Completely immerse the mixture in tap water, and immediately pour off the tap water. Ensure that the aggregate surface area is at least 90 percent coated.	
[3] When shipped after October 1 and before April 15, except if the emulsion is stored and mixed at temperatures of emulsion, aggregate, and atmosphere above 40 °F (5 °C).	
[4] Select the penetration within the following ranges of the designation specified:	
[5] AASHTO T 50, except immediately pour residue from distillation into the float collar at 500 °F (260 °C); or if the residue has been allowed to cool, heat it again to 500 °F (260 °C) and pour it into the float collar.	
[6] Test on residue from distillation per AASHTO T44 or ASTM D7553	

Designation	Penetration at 77 °F (25 °C)
MWS 300	300+
MWS 150	150 to 300
MWS 90	90 to 150
MWS 60	60 to 90

**702.08 Cold Liquid-Applied Elastomeric Waterproofing Membrane.** Provide Cold Liquid-Applied Elastomeric Waterproofing Membrane as follows:

Hardness Type 00, min.	50	ASTM D-2240 as modified in Section 6.5 of ASTM C-836
Low temperature crack bridging	no cracking	ASTM C-1305 as modified in Section 6.7 of ASTM C-836
Adhesion-in-peel after water immersion	1[4.4]	ASTM C-794 as modified in Section 6.9 of ASTM C-836 min. Lbf [N] (no optional test allowed)
Extensibility after heat aging, min. in [mm]	¼ [6.4]	ASTM C-1522
Hydrostatic Resistance min. psi	25[0.16]	ASTM C-1306

Provide Certified Test Data to the Engineer for each shipment of material .

**702.09 Hot Applied Asphaltic Joint Adhesive.** Provide hot applied asphaltic joint adhesive meeting the following requirements:

**TABLE 702.09-1**

Test	Description	Requirement
ASTM D3236	Brookfield Viscosity @ 400°F (205°C)	4,000 - 10,000 CP
ASTM D5329	Cone Penetration @ 77°F (25°C)	60-100 dmm
ASTM D5329	Flow @ 140°F (60°C)	5 mm Max.
ASTM D5329	Resilience @ 77°F (25°C)	30 % Min.
ASTM D113	Ductility @ 77°F (25°C)	30 cm Min.
ASTM D113	Ductility @ 39.2°F (4°C)	30 cm Min.
ASTM D5329	Tensile Adhesion @ 77°F (25°C)	500 % Min.
AASHTO T 53	Softening Point	170°F Min.
ASTM D5329	Asphalt Compatibility	Pass

Furnish materials according to the Department's QPL. Provide Certified Test Data to the Engineer for each shipment of material corresponding to the batch of material being used..

**702.12 Non-Tracking Asphalt Emulsion.** Provide certified non-tracking asphalt emulsion material meeting Table 702.12-1 and Supplement 1128 and Supplement 1032. Emulsion will comply with all specification requirements for at least 30 days after sample date.

**TABLE 702.12-1**

Tests on emulsion, AASHTO T 59, unless otherwise designated:	
Viscosity, Saybolt Furol at 77 °F (25 °C) (SFS)	20 to 100
Storage Stability Tests, 24-hr (% difference), max.	1.0
Settlement tests, 5-day (% difference), max.	5.0
Sieve Tests (%) (Distilled Water), max.	0.30
Distillation, Residue % solids, min. [1]	50
Oil distillate, %, max.	3

[1] Products may use residual by evaporation to perform residual and may use the material to perform residual tests but must be submitted during approval process in S-1128. Will be required to perform residual by distillation to obtain oil distillate %.

**702.13 SBR Asphalt Emulsion.** Provide material consisting of asphalt emulsion SS-1, SS-1h, CSS-1 or CSS-1h per 702.04 and Supplement 1032, blended with SBR emulsion per 702.14, to produce a residual mixture of asphalt binder and SBR solids having a composition of  $97.0 \pm 0.3$  percent asphalt binder and  $3.0 \pm 0.3$  percent SBR solids by weight.

Furnish a certification to the Engineer and signed by the contractor containing the following:

- A. The weight of SBR emulsion blended with the asphalt emulsion.
- B. The weight of asphalt emulsion blended with the SBR emulsion.
- C. The SBR emulsion manufacturer certification per 702.14.
- D. The percent of asphalt binder in the asphalt emulsion (residue by distillation).
- E. The percent of SBR solids in the SBR emulsion.
- F. The percent of SBR solids in the mixture of asphalt binder residue and SBR solids.
- G. Name of Certified asphalt emulsion producer and asphalt emulsion.

Determine the weight of the SBR emulsion to be added to a designated weight of asphalt emulsion to provide the percent of SBR solids in the mixture of asphalt residue and SBR solids using the following formula:

$$X = \frac{0.0309(B)(W)}{(A)}$$

where:

- $X$  = pounds (kilograms) of SBR emulsion
- $A$  = percent SBR solids in the SBR emulsion
- $B$  = percent of asphalt residue of the asphalt emulsion
- $W$  = pounds (kilograms) of the asphalt emulsion

For field blending, ensure the asphalt emulsion and SBR emulsion are thoroughly mixed as follows before application: Add to the distributor the asphalt emulsion and the required amount of the SBR emulsion of the appropriate SBR emulsion type (i.e. cationic or anionic). Heat and circulate the distributor contents for at least 30 minutes to ensure complete blending. Re-circulate the distributor contents for 10 minutes just prior to application. If the distributor has set for 12 hours without circulation, repeat the heating and circulating of the distributor contents for 30 minutes prior to application.

Draw samples of the mixed SBR and asphalt emulsion after mixing the materials as indicated above. Emulsion will comply with all specification requirements for at least 30 days after sample date.

**702.14 SBR Emulsion.** Ensure the SBR emulsion is a cold polymerized Styrene Butadiene synthetic rubber (SBR) in latex form specifically compounded for use in asphalt binders and asphalt emulsions. Ensure the manufacturer of the SBR emulsion furnishes a written certification of the total SBR solids content of the SBR emulsion and actual test results showing compliance with both of the following requirements:

**A. SBR emulsion:**

<b>Type of SBR Emulsion:</b>	<b>Anionic</b>	<b>Cationic</b>
SBR solids Styrene Butadiene Ratio	27 ±5 : 73 ±5	27 ±5 : 73 ±5
Total SBR solids, % by weight	60-72	60-72
SBR solids Residual Styrene, % by weight	0.1 max	3.5 0.1 max
Ash, % of total SBR solids by weight	3.5 max	3.5 max
pH	9-11	4-6
Viscosity, Brookfield Units, Model RVF, spindle No 2 @20 RPM@ 77° F (25 °C)	2000 max	2000 max

**B. Combination of 3.0 – 4.0 % SBR solids with 96.0 – 97.0 % PG 64-22 meeting 702.01 by weight:**

Toughness inch-pounds (N×m), Minimum 133 (15)

Tenacity, inch-pounds (N×m), Minimum 80 (9)

**702.16 Polymer Emulsified Binder.** Material will meet specification requirements of the table below.

**TABLE 702.16 POLYMER EMULSIFIED BINDER**

<b>Tests on Emulsion (AASHTO T 59):</b>	<b>Type A <sup>(b)</sup></b>	<b>Type B <sup>(c,g)</sup></b>	<b>Type C <sup>(h)</sup></b>
Saybolt Furol Viscosity <sup>(g)</sup>	120-550 (50 °C)	20-100 (25 °C)	20-100 (25 °C)
Storage stability, 24 hrs., % difference, max <sup>(a)</sup>	1	1	1
Demulsibility, 35 ml of 0.8% Dioctyl Sodium Sulf., min	50	60	
Demulsibility, 35 ml of 0.02N, CaCl <sub>2</sub> , %, min		60	
Particle Charge Test	Positive		Positive
Sieve test, (distilled water), %, max	0.1	0.05	0.10
Distillation to 177 °C, residue % solids <sup>(d)</sup>	66	63	62
Oil distillate, %, max	2	2	
Tests on Distillation Residue:			
Penetration, 100g, 5 sec @ 77 °F (25°C) AASHTO T 49	70-125	90-150	40-90
Softening point, ° C, min AASHTO T 53	57		60
Solubility, %, min AASHTO T44 or ASTM D7553 <sup>(i)</sup>	97.5	97.5	97.5
Elastic Recovery, 50 °F (10° C), %, min AASHTO T 301, <sup>(e),(f)</sup>	60	58	50
Ductility, 25 °C, 5 cm/min, (cm), min. AASHTO T 51			40

- (a) After standing undisturbed for 24 hours, the surface will show no white, milky colored substance, but will be a smooth homogeneous color throughout.
- (b) CRS-2P, test within 20 days of project sampling. Limits for both certified source and project samples.
- (c) CRS-1P and HFRS-1P, test within 20 days of project sampling. Limits for both certified source and project samples.
- (d) See Supplement 1013. For Type C if natural latex is used, use the Oven Evaporation method in AASHTO T 59 in place of distillation and use this residue for further testing.
- (e) Straight molds. Hold at test temperature for 90 minutes. Place in ductilometer and elongate 20 cm at 5 cm/min. Hold for 5 minutes and cut. After 1 hour retract the broken ends to touch and note elongation in cm (X) to the nearest 0.01cm. Percent Recovery = ((20-X)/20) x 100. Report elastic recovery to nearest 0.1%.
- (f) SBR, SBS, & SB
- (g) Minimum of 70 SFS for project acceptance
- (h) CSS-1hM, test within 30 days of sampling. Limits for both certified source and project samples. Do not use port addition of the polymer to the emulsified asphalt. Include the percent residue on the Bill of Lading.
- (i) On base asphalt only

**702.17 Crack Sealant**

**A. Type I Crack Sealant.** Conform to [705.04](#)

**B. Type II Crack Sealant.** Provide a mixture of PG 64-22 certified binder (Supplement [1032](#)) and polyester fibers (recycled fibers not permitted) according to the following requirements:

- Denier; ASTM D1577\* ..... 3.0 to 6.0
- Length ... 0.25 ± 0.02 inch (6.35 ± 0.51mm)
- Crimps; ASTM D3937 ..... None
- Tensile str, min. ASTM D2256\* .....  
..... 70,000 psi (483 Mpa)

Specific gravity ..... 1.32 to 1.40  
Minimum melting temperature .....  
..... 475 °F (256 °C)  
Ignition temperature.....  
..... 1000 °F (538 °C) min.

\*This data must be obtained prior to cutting the fibers.

The fiber and fiber manufacturer must be on the Department's [QPL](#).

Combine materials so the fibers are a minimum of 5.0 percent by total weight of the asphalt binder. Ensure combined materials are according to the following properties:

Strength (at break)  
at 72 °F (22 °C) .. 350 psi (2.4 MPa) min.  
at 0 °F (-18 °C) ... 500 psi (3.5 MPa) min.  
Elongation (at break)  
at 72 °F (22 °C) ..... 50 percent min.  
at 0 °F (-18 °C) ..... 20 percent min.

The option for using premixed and prepackaged Type II crack sealant is permitted provided (1) the fibers and the fiber binder are according to the requirements as shown and, (2) the fiber binder is according to the manufacturer's specifications, and (3) must be on Department's [QPL](#). Furnish certified test data from the fiber binder manufacturer annually to [OMM](#), and when requested by [OMM](#). Furnish a letter of certification with each shipment stating that the material complies with specification requirements.

**C. Type III Crack Sealant.** Provide a mixture of PG 64-22 certified binder (Supplement [1032](#)) and polypropylene fibers (recycled fibers not permitted) according to the following requirements:

Denier; ASTM D1577\* ..... 15 ±3  
Length, ... 0.39 ± 0.08 inch (9.91 ± 2.0 mm)  
Crimps; ASTM D3937 ..... None  
Tensile strength, min, ASTM D2256\*  
..... 40,000 psi (276 MPa)  
Specific gravity ..... 0.91 ± 0.04  
Minimum melting point ..... 320 °F (160 °C)

\* This data must be obtained prior to cutting the fibers.

The fiber and fiber manufacturer must be on the Department's [QPL](#).

Combine materials so the fibers are a minimum of 7.0 percent by total weight of the asphalt binder. Ensure combined materials are according to the following properties:

Strength (at break)  
at 72 °F (22 °C) .. 350 psi (2.4 MPa) min.  
at 0 °F (-18 °C).... 500 psi (3.5 MPa) min.  
Elongation (at break)  
at 72 °F (22 °C) ..... 50 percent min.  
at 0 °F (-18 °C) ..... 20 percent min.

**D. Type IV Crack Sealant.** Provide a prepackaged, preapproved mixture of modified binder according to the following properties and minimum 2.0 percent polyester fibers (recycled fibers not permitted) according to the following properties.

Modified binder:

- Cone penetration, 77 °F (25 °C) .....50-90
- Flow, 140 °F (60 °C) ..... 1.0 cm max
- Resilience, 77 °F (25 °C)..... 25-60 percent
- Ductility, 77 °F (25 °C) ..... 40 cm min
- Bond, 0 °F (-18 °C), 100 percent ext.
  - Pass ..... 5 cycles
- Impact, 0 °F (-18 °C) ..... Pass
- Compression recovery .....0.40 min
- Recommended pour temperature .....
  - ..... 380 °F (193 °C)
- Safe heating temperature.... 410 °F (210 °C)

Fiber must meet requirements for Type II polyester fiber. Fiber and fiber manufacturer must be on the Department's [QPL](#).

- Safe heating temperature.... 400 °F (204 °C)
- Softening point..... 190 °F (88 °C)
- Viscosity, 400 °F (225 °C) ..... 3000 cp min
- Cone penetration, 77 °F (25 °C) .....25-45
- Workability - Capable of being melted and applied through a pressure feed, indirect heated and agitated melter
- Flexibility\* ..... Pass

\* 1 inch (25mm) sample at -20 °F (-30 °C), 90 degree bend, 10 sec

Crack sealant and crack sealant manufacturer must be on the Department's [QPL](#).

**E. Type V Crack Sealant.** Provide a prepackaged, preapproved hot-applied asphalt mastic sealant meeting ASTM D8260-20, Type 2. Provide certified test data to the Engineer

Furnish materials according to the Department's [QPL](#).

## 703 AGGREGATE

### 703.01 General.

The following abbreviations apply:

CCS	Crushed Carbonate Stone.
ACBFS	Air Cooled Blast Furnace Slag
GS	Granulated Slag
RAP	Reclaimed Asphalt Pavement
RPCC	Recycled Portland Cement Concrete
OH	Open Hearth Slag
EAF	Electric Arc Furnace Slag
BOF	Basic Oxygen Furnace Slag
PCS	Petroleum Contaminated Soil

Prequalified Aggregate Supplier Program (Supplement 1069). Provide aggregate materials to the Ohio Department of Transportation from prequalified suppliers.

**A. Soundness.** When the major portion of the unsound material in a coarse aggregate acquires a mud-like condition when tested for soundness, ensure that the maximum loss for all uses is 5 percent.

**B. Stockpiles.** Use stockpiling and loading methods that permit ready identification of the aggregates and to minimize segregation. Clean the sites for stockpiles before storing materials. Do not remove aggregates from stockpiles within 1 foot (0.3 m) of the ground until final cleanup of the work. Do not use material that has become mixed with foreign matter, wood or other size or grades of aggregates.

Handle aggregates in such a manner that the moisture content is reasonably uniform for each day's run.

**C. Size.** Provide aggregate according to the size specified in the material specification, the construction item, or as shown in AASHTO M 43.

**D. Method of Test.** Provide aggregate tested by the following methods:

Amount finer than No. 200 (75 µm) sieve..	.....S1004
Clay lumps .....	S1017
Coal and lignite .....	AASHTO T 113
Crushed pieces .....	ASTM D5821
Deleterious materials .....	S1029
Effect of organic impurities on strength of mortar.....	AASHTO T 71
Liquid limit .....	AASHTO T 89
Percent of wear, Los Angeles abrasion test.....	..... AASHTO T 96 or ASTM C535
Plasticity index.....	AASHTO T 90
Sieve analysis.....	S1004, S1005
Sieve analysis of mineral filler .....	..... AASHTO T 37
Sodium sulfate soundness test, 5 cycle .....	AASHTO T 104

Specific Gravity and percent absorption for fine and coarse aggregate .....	S1031
Unit weight.....	AASHTO T 19
Lightweight chert in aggregates.....	
.....	AASHTO T 113
Sand equivalent.....	AASHTO T 176
Uncompacted void content .....	AASHTO T 304
Flat and elongated.....	ASTM D4791
Rapid freezing and thawing .....	
.....	ASTM C666, Procedure B
Insoluble residue of carbonate aggregates .....	ASTM D3042
Compaction testing of Unbound Materials . .....	S1015
In place gradation sampling .....	S1090
Sulfur leachate test.....	S1027
Soundness of aggregate by freezing and thawing .....	AASHTO T 103
Micro-Deval.....	AASHTO T 327
Silicon Dioxide .....	
.....	ASTM C146, ASTM C114
Sodium sulfate soundness test, Rock slabs .....	ASTM D5240

**E. Steel Slag Aggregate.** Provide open-hearth (OH), basic oxygen furnace (BOF), and electric arc furnace (EAF) steel slag aggregate (known as steel slag) according to the following requirements when 703.04 aggregate for asphalt concrete base or 703.05 aggregate for asphalt intermediate course is specified. Do not use OH, BOF, or EAF slag as the fine or coarse aggregate (virgin or recycled) for asphalt surface courses.

Supply all steel slag from sources according to Supplement 1071. Furnish steel slag to a size meeting the specified grading requirements. Provide steel slag aggregate meeting the specified coarse or fine aggregate quality requirements. Ensure that measurements of soft pieces include soft lime, lime oxide, or magnesia agglomerations or any foreign materials prone to rapid disintegration under construction processing and weathering conditions. Ensure that additional testing beyond those listed are performed or required any time poor quality steel slag is suspected due to visual inspection, testing, or field performance problems.

Provide a letter of certification to the Engineer from the steel slag processor for every shipment of steel slag to the Contractor. In addition the steel slag processor must provide the Engineer with the following:

Quality control records (created in accordance with Supplement 1071).

Documentation of the steel slag production, processing, and stockpile retrieval

Failure to follow the processor QC plan or continued problems with performance recognized by the Laboratory attributable to steel slag is cause for limiting steel slag use from that processor.

**F. Restrictions.** When an aggregate source is specially designated with a “SR or SRH” according to *Guidelines for Maintaining Adequate Pavement Friction in Surface Pavements*, the aggregate source

will be restricted for use in surface pavement according to the methods in the guidelines. The document, *Guidelines for Maintaining Adequate Pavement Friction in Surface Pavements*, is available on the [OMM](#) website under “Material Information by Category, Aggregate”, or the Office of Pavement Engineering’s website.

## 703.02 Aggregate for Portland Cement Concrete.

### A. Fine Aggregate.

1. Provide fine aggregate consisting of natural sand or sand manufactured from stone.
2. Sieve analysis.

Sieve Size	Total Percent Passing
3/8 inch (9.5 mm)	100
No. 4 (4.75 mm)	95 to 100
No. 8 (2.36 mm)	70 to 100
No. 16 (1.18 mm)	38 to 80
No. 30 (600 μm)	18 to 60
No. 50 (300 μm)	5 to 30
No. 100 (150 μm)	0 to 10
No. 200 (75 μm)	0 to 5

Should the fineness modulus of a job control sample of sand from any source vary by more than 0.20 percent from that of the representative sample from that source, the sand may be rejected.

3. Physical properties.

	Maximum
Loss, sodium sulfate soundness test	10%
Aggregations of soil, silt, etc. by weight	0.5 %

When tested for the effect of organic impurities on strength of mortar, ensure that the compressive strength at 3 and 7 days of mortar made with untreated sand is not less than 95 percent of the compressive strength of mortar made with treated sand.

Provide fine aggregate for Items [255](#), [256](#), [451](#), [452](#), [526](#), and [511](#) deck slabs with at least 25 percent siliceous particles as determined by the acid insoluble residue test [ASTM D3042]. Ensure material has been tested and results are on file at the Laboratory. For sources not tested and on file at the laboratory, submit certified test data from an AMRL accredited independent laboratory verifying the minimum 25 percent.

### B. Coarse Aggregate.

1. Provide coarse aggregate consisting of washed gravel, CCS, or crushed ACBFS.
2. Physical properties.

Percent of wear, Los Angeles test, maximum (CCS or washed gravel)	40 %
Unit weight, compacted, minimum (slag)	70 lb/ft <sup>3</sup> (1120 kg/m <sup>3</sup> )
Loss, sodium sulfate soundness test, maximum:	12%

Deleterious substances shall not exceed the following:

Material Type	Percent by Weight	
	Super-Structure	All Other Concrete
Soft pieces	2.0	3.0
Coal and lignite	0.25	1.0
Clay lumps	0.25	0.25
Pieces having a length greater than 5 times the average thickness	15	15
Shale and shaly material	0.5	1.0
Limonitic concretions	0.5	1.0
Alkali	0.5	1.0
Metallic particles	0.5	1.0
Chert, that disintegrates in 5 cycles of the soundness test	0.5	1.0

Additional requirement for ACBFS aggregate:

Total Sulfur as S, maximum (ASTM C114)	2.0%
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3. Amount passing the No. 200 (75  $\mu\text{m}$ ) sieve. Ensure that the percent by weight of material passing the No. 200 (75  $\mu\text{m}$ ) sieve in the aggregate portion of the concrete mix does not exceed the following:

Material Type	Percent by Weight	
	Super-Structure	All Other Concrete
CCS and crushed ACBFS	3.4	3.8
Washed gravel	2.0	2.2

### 703.03 Fine Aggregate for Mortar or Grout.

- A. Provide fine aggregate consisting of natural sand or sand manufactured from stone or ACBFS.
- B. Sieve Analysis.

Sieve Size	Natural Sand	Manufactured Sand
	Total Percent Passing	
No. 4 (4.75 mm)	100	100
No. 8 (2.36 mm)	95 to 100	95 to 100
No. 50 (300 $\mu\text{m}$ )	10 to 40	20 to 40
No. 100 (150 $\mu\text{m}$ )	0 to 15	10 to 25
No. 200 (75 $\mu\text{m}$ )	0 to 5	0 to 10

- C. Physical properties.

	Maximum
Loss, sodium sulfate soundness test	10 %
Aggregations of soil, silt, etc. by weight	0.5 %

When tested for the effect of organic impurities on strength of mortar, ensure that the compressive strength of mortar made with untreated sand is not less than 95 percent of the compressive strength of mortar made with treated sand.

**703.04 Aggregate for Asphalt Concrete Base (301 and 302).**

A. Provide coarse aggregate for asphalt concrete base used in combination with rigid pavement consisting of CCS, gravel, or crushed ACBFS.

Provide coarse aggregate for asphalt concrete base used in flexible pavements consisting of CCS, gravel (see note [1] in table below), or crushed ACBFS. Provide fine aggregate for asphalt concrete base consisting of natural sand or sand manufactured from stone, gravel, or ACBFS. Crushed Steel Slag (OH, EAF or BOF) conforming to 703.01.E and 440.02 may be used for coarse and fine aggregate in asphalt concrete base used in flexible pavements.

B. Physical properties.

Percent of wear, Los Angeles test, maximum (CCS or washed gravel)	50 %
Unit weight, compacted, minimum (slag)	65 lb/ft <sup>3</sup> (1040 kg/m <sup>3</sup> )
Loss, sodium sulfate soundness test, maximum	15 %
Percent by weight of fractured pieces (one or more faces), minimum	40 %
Micro-Deval Abrasion Loss test, maximum (for coarse aggregate gravel only)	22 % [1]
[1]If the MD value is greater than the specification limit conform to Supplement 1010.	

Deleterious substances shall not exceed the following:

Material Type	Percent by Weight
Soft pieces	3.0
Coal and lignite	1.0
Clay lumps	0.25
Pieces having a length greater than 5 times the average thickness	15
Shale and shaly material	2.5
Chert that disintegrates in 5 cycles of the soundness test	2.5

**703.05 Aggregate for Asphalt Concrete (Intermediate and Surface Courses), Prime Coat (408), Chip Seal (422), and Microsurfacing (421).**

**A. Fine Aggregate.**

1. Provide fine aggregate consisting of natural sand or sand manufactured from stone, gravel, ACBFS or, for intermediate courses only, steel slag (OH, EAF or BOF) conforming to 703.01.E and 440.02.

2. Sieve analysis.

Standard 703.05 Gradation

Sieve Size	Total Percent Passing
3/8 inch (9.5 mm)	100
No. 4 (4.75 mm)	90 to 100
No. 8 (2.36 mm)	65 to 100
No. 16 (1.18 mm)	40 to 85
No. 30 (600 μm)	20 to 60
No. 50 (300 μm)	7 to 40
No. 100 (150 μm)	0 to 20
No. 200 (75 μm)	0 to 10

#### Screenings

Sieve Size	Total Percent Passing
3/8 inch (9.5 mm)	100
No. 4 (4.75 mm)	85 to 100
No. 100 (150 μm)	10 to 30

#### 3. Physical properties.

	Maximum
Loss, sodium sulfate soundness test	15 %
Aggregations of soil, silt, etc., by weight	0.5 %

### B. Coarse Aggregate.

1. Provide coarse aggregate consisting of CCS, crushed ACBFS, washed gravel, or for intermediate courses only, steel slag (OH, EAF or BOF) conforming to 703.01.E and 440.02.

#### 2. Physical properties.

Percent of wear, Los Angeles test, maximum (CCS or washed gravel)	40 %
Unit weight, compacted, minimum (slag):	
Asphalt Concrete, 408 and 422	70 lb/ft <sup>3</sup> (1120 kg/m <sup>3</sup> )
Loss, sodium sulfate soundness test, maximum:	
Asphalt Concrete and 422	12 %
421	15 %
Percent by weight of fractured pieces (one or more faces), minimum	40 %
Micro-Deval Abrasion Loss test, maximum (for gravel only)	20 % <sup>[1]</sup>
[1]If the MD value is greater than the specification limit conform to Supplement 1010.	

Deleterious substances shall not exceed the following:

Material Type	Percent by Weight
Soft pieces	3.0
Coal and lignite	1.0
Clay lumps	0.25
Amount finer than No. 200 (75 µm) sieve	3.0
Pieces having a length greater than 5 times the average thickness	15
Shale and shaly material	2.5
Limonitic concretions	2.5
Alkali	2.5
Chert that disintegrates in 5 cycles of the soundness test	2.5

**C. General Requirements for Fine Aggregate.** For fine aggregate calculate each individual sieve fraction soundness loss and ensure that the fractional size does not exceed 13.0 percent for all surface courses, intermediate courses, and any asphalt concrete course directly below an open graded friction course. Should the sample contain less than 10 percent of any of the sizes specified in AASHTO T104 Section 5.1, that individual size shall not be held to the above maximum loss requirement.

**D. Silicon Dioxide Requirements for Natural Sands for Item 424.** Provide natural sands for Item 424 with at least 50 percent silicon dioxide by weight. Test for silicon dioxide content according to ASTM C146 or ASTM C114. Natural sands will be approved on the following basis:

Percent by Weight, SiO <sub>2</sub>	Status of Source Approval
> 55 %	Valid for two years from date approved <sup>[1]</sup>
50 – 55 %	Valid for one year from date approved <sup>[1]</sup>
< 50 %	Not approved <sup>[2]</sup>

[1] If a notable change in the properties of the aggregate originating from the affected source is determined from quality assurance testing, then a retest may be performed prior to the original expiration date. The Laboratory will make the determination to retest.

[2] Retests may be requested for materials falling below the 50% threshold; however, all requests must be supported by current test data from an AASHTO or CCRL accredited laboratory.

The Laboratory will maintain a list of approved sources.

**703.06 Sand Cover (407 and 408).**

A. Furnish sand cover consisting of natural sand or sand manufactured from stone or ACBFS.

B. Sieve analysis.

Sieve Size	Total Percent Passing
No. 4 (4.75 mm)	90 to 100
No. 50 (300 µm)	7 to 40
No. 200 (75 µm)	0 to 10

**703.07 Mineral Filler.**

- A. Furnish mineral filler consisting of limestone dust, portland cement, or other inert mineral matter. Ensure the mineral filler is thoroughly dry and free from lumps.
- B. Sieve analysis.

Sieve Size	Total Percent Passing
No. 30 (600 μm)	100
No. 50 (300 μm)	95 to 100
No. 200 (75 μm)	65 to 100

**703.08 Granulated Slag.**

- A. Furnish Granulated Slag (GS) consisting of glassy, granular materials formed when molten blast furnace slag or electric-furnace slag is rapidly chilled, as by immersion in water. The Department may reject material containing mill waste, cinders, large pieces of ungranulated slag, or other matter foreign to the production of slag in the normal operation of the blast furnace or electric furnace.

Furnish material of such nature that it will compact to the satisfaction of the Engineer.

- B. Sieve analysis.

Sieve Size	Total Percent Passing
2 inch (50 mm)	100
1 inch (25 mm)	85 to 100
No. 100 (150 μm)	0 to 15

**703.10 Screenings.**

- A. Furnish screenings for No. 10 size gravel, stone, or ACBFS. Where crushed material is specified, ensure that it is crushed from material larger than the 1/2-inch (12.5 mm) sieve.
- B. Physical properties.

	Maximum
Loss, sodium sulfate soundness test	15 %

- 703.11 Structural Backfill for 611 Bedding and Backfill.** Furnish structural backfill for 611 bedding and backfill consisting of CCS, gravel, natural sand, sand manufactured from stone, foundry sand, ACBFS, or RPCC.

Furnish ACBF Slag according to Supplement [1027](#).

The use of RPCC is permitted without wear testing or sodium soundness testing requirements if the Contractor provides information proving the material met this specification at the time of its original incorporation. The use of RPCC is not permitted in conjunction with aluminum pipe or aluminum coated steel pipe. Ensure that the RPCC use does not contain more than two percent steel.

Reclaimed asphalt concrete is not allowed for any bedding or backfill materials.

Use foundry sand if the material meets these requirements and meets the requirements of the [Ohio EPA](#), Division of Surface Water, Policy 400.007 “Beneficial use of Non-Toxic Bottom Ash, Fly Ash and Spent Foundry Sand and Other Exempt Waste,” and all other regulations. Ten days before using

foundry sand on the project, submit written permission from the [Ohio EPA](#) to the Engineer. Instead of written permission from the [Ohio EPA](#), the Contractor may elect to have an independent consultant prequalified by ODOT in remedial design environmental site assessment review the proposed usage. The consultant will provide all documentation utilized to ensure that the proposed usage is according to all [Ohio EPA](#) regulations. Ensure that the consultant coordinates all EPA required meetings, documentation, and testing requirements. Ensure that the consultant certifies this to the Department.

**A. Structural Backfill Type 1 and 3.**

1. Furnish Type 1 structural backfill that meets the gradations of Items 304, 411, or 617, except 0 to 20 percent may pass the No. 200 sieve. Furnish Type 3 structural backfill that meets the gradations of Size No. 57 or 67 from Table [703.01-1](#).

2. Physical properties.

Percent of wear, Los Angeles test, maximum (CCS or washed gravel)	50 %
Loss, sodium, sulfate soundness test, maximum	15 %
Percent by weight of fractured pieces (one or more faces), minimum (Type 3 only)	90 %

Deleterious substances shall not exceed the following:

<b>Material Type</b>	<b>Percent by weight</b>
Shale and shaly material	5.0
Chert, that disintegrates in 5 cycles of the soundness test	5.0

Ensure that the portion of the material passing through the No. 40 (425 µm) sieve has a maximum liquid limit of 25 and a maximum plasticity index of 6.

Crush gravel for Type 3 from material retained on the 1/2 inch (12.5 mm) sieve.

**B. Structural Backfill Type 2.**

1. Furnish Type 2 structural backfill that meets the gradations of [703.05.A](#). Standard Gradation, [703.02.A](#), or one of the well graded gradations below:

Sieve Size	Type A	Type B
	Total Percent Passing	
2 1/2 inch (63 mm)	–	100
1 inch (25.0 mm)	–	70 to 100
3/4 inch (19.0 mm)	100	–
3/8 inch (9.5 mm)	80 to 100	–
No. 4 (4.75 mm)	60 to 100	25 to 100
No. 8 (2.36 mm)	45 to 95	–
No. 40 (425 µm)	–	10 to 50
No. 50 (300 µm)	7 to 55	–
No. 200 (75 µm)	0 to 15	0 to 15

2. Physical properties:

Percent of wear, Los Angeles test, maximum (CCS or gravel)	50 %
Loss, sodium sulfate soundness test, maximum	15 %

Ensure that the portion of the material passing through the No. 40 (425 mm) sieve has a maximum liquid limit of 25 and a maximum plastic index of 6.

**703.13 Coarse Aggregate for Items 305, 451 and 452.** In addition to the requirements of [703.02](#), the following aggregate requirements apply.

When the total combined quantity of the listed items is greater than 10,000 square yards (8000 m<sup>2</sup>), provide size No. 57 or 67 from Table [703.01-1](#). If the total combined quantity of the listed items is less than 10,000 square yards (8000 m<sup>2</sup>), then provide one of the following sizes from Table [703.01-1](#): No. 7, 78, 8, 57, or 67.

If gravel or limestone No. 57 or 67 size is selected in either of the above cases, then ensure that the coarse aggregate incorporated into the concrete is tested according to ODOT Supplement 1024.

Ensure that the validity of results of freeze thaw-resistance testing is as outlined below:

Average Total Percent Expansion <sup>[1]</sup>	Status of Source Approval
0.000 to 0.010	Valid for four years from date approved <sup>[2]</sup>
0.011 to 0.020	Valid for two years from date approved <sup>[2]</sup>
0.021 to 0.030 <sup>[4]</sup>	Not Approved, one retest allowed <sup>[3]</sup>
> 0.030 <sup>[4]</sup>	Not Approved, no retesting allowed <sup>[3]</sup>
[1] As measured at 350 cycles.	
[2] If a notable change in the properties of the aggregate originating from the affected source is determined from quality control testing, a retest of freeze-thaw resistance may be requested before the original expiration date. The Laboratory will make the determination to retest.	
[3] Except as noted, the Department will not retest the material unless the producer of the material sends a written request to the Department with substantiation that significant changes in operation have been made (e.g., new processing equipment, material from a new ledge, etc.).	
[4] If the average total percent expansion is greater than 0.020, but the durability is greater than or equal to 100, the department may accept the source for two years.	

The Laboratory will maintain a list of approved sources.

**703.14 Non Pavement Open-Hearth, Electric Arc Furnace, and Basic Oxygen Furnace Steel Slag Aggregate Use.** Provide steel slag according to the following requirements.

1. Non-confined Applications. When using OH, EAF, and BOF slag in applications where the steel slag will not be confined, ensure that the slag meets the requirements in 703.14.A (deleterious substances and crushing), and in 703.14.B (aging and stockpiling requirements). Recycled steel slag from Department or non-Department projects may be used in applications where the recycled steel slag will not be confined.

2. Confined Applications. When using OH, EAF, and BOF slag in applications where the steel slag will be confined, ensure the steel slag meets all requirements of 703.14. The use of recycled steel slag from Department or non-Department projects is not allowed in confined applications.

**A. Deleterious Substances (soft pieces).** Deleterious substances include soft lime, lime oxide, or magnesia agglomerations or any foreign materials prone to rapid disintegration under construction processing and weathering conditions.

Furnish steel slag with less than 3 percent deleterious substances (soft pieces) by weight. The Department will use Supplement 1029 (hand crushing of soft pieces) to determine the soft pieces.

Crushing of steel slag is not allowed.

**B. Aging and Stockpiling Requirements.** Stockpile and age all steel slag as follows:

1. Grade and stockpile the material into maximum size piles of 25,000 ton (23,000 metric tons). Before and during the stockpiling operation, add water to these materials to provide a uniform moisture content not less than their absorbed moisture. Ensure that the stockpile is maintained in a moist condition during the required stockpiling period.

2. Ensure that the producer mixes the stockpile when the outside surface of the pile has crusted over. The Department will inspect the stockpile every 2 months to ensure no crusting occurs. Do not mix frozen stockpile material. Suspend the aging period when the stockpile is frozen for more than one month.

3. Ensure that this aging period is at least 6 months in duration and starts over if any new material is added to the pile during the aging period.

**C. Identification of Steel Slag.** Clear, definitive, and undisputable identification of the proposed material being steel slag is required.

The producer will show the Department evidence that the material supplied is steel slag. This information will consist of, but is not limited to, the following:

1. Steel producer.
2. Production dates.
3. Production rates.
4. Stockpiling dates.
5. Type of steel furnace(s).
6. All known Department and non-Department projects where the material was previously used.

This identification of steel slag and the source may be supplemented by other information approved by the Department or by using 10 years of good performance data. Ensure that the producer submits to the Department projects where the steel slag has been used without expansion or tufa problems. The Department will review the above projects as part of the identification approval process.

**D. Tufa Performance Verification of Steel Slag.** Tufa is a precipitate form of calcium carbonate that can clog up the underdrain systems. Some steel slag sources clog up underdrain systems and some do not. Tufa performance verification is based on field performance and Department's inspection of the underdrain systems.

Tufa performance verification is required.

Ensure that the producer submits past projects that are at least 10 years old that used the proposed steel slag source to the Department. The Department may consider projects that are less than 10 years old for tufa performance verification if it can be determined by the Department that the age of the steel slag incorporated in the project was 10 years old or greater. Ensure the producer supplies the Department with construction plans with the underdrains and underdrain outlets marked on the plans, or other suitable method, approved by the Department, showing the underdrain system. Ensure the producer marks the underdrain outlets in the field for inspection. The Department will inspect the underdrain systems for tufa deposits. If tufa deposits are found in the outlets or in the underdrain system, the Department will reject the steel slag source.

**E. Expansion Testing of Steel Slag.** After the aging and stockpiling requirements are met, expansion testing is required for steel slag.

Perform expansion testing according to Pennsylvania Department of Transportation PTM No. 130, the ODOT equivalent to this test or expansion testing acceptable to the Department.

Ensure that the producer hires an independent AASHTO accredited and Department approved laboratory to perform at least half of the expansion testing. At the producer's option, up to half of the required expansion testing may be performed by the producer's laboratory. The Laboratory will observe the expansion testing and approve each independent and producer laboratory.

Perform expansion testing for every 2500 tons (2300 metric tons) or fraction thereof of the material stockpiled in accordance with 703.14.B. For steel slag less than 10 years old, retain a split portion of the expansion sample. Reduce the split sample to 5 lbs (2500 g) and test for total percent MgO by X-Ray florescence and total percent periclase (hard burned MgO) by X-Ray diffraction.

The maximum allowable total expansion for each test is less than 0.50 percent. If any one test fails in the stockpile, the Department will reject the entire stockpile.

When sampling for expansion, ensure that the producer notifies the Department at least 48 hours before the sampling. The Department will verify that the sample came from the correct stockpile and take independent split samples, if required.

Submit the expansion test data and a suitably presented summary of the expansion test data to the Department for approval. Submit X-Ray fluorescence and X-Ray diffraction data to the Department. The Department reserves the right to perform independent testing to verify the laboratory results at any time.

The Department expansion test data takes precedence over the producer or independent laboratory expansion testing results in the event of a conflict. The Department will make the final determination on all conflicting data.

If the material fails the expansion testing, then stockpile the material for a minimum of two additional months from the date of last sampling and retest for expansion. Only materials that pass the expansion test are approved for use.

**703.16 Suitable Materials for Embankment Construction.** Natural soil, natural granular material, granular material types, slag material, brick, shale, rock, random material, RAP, RPCC, or PCS as further defined below are suitable for use in embankment construction. The Engineer will submit samples of soils not identified from the plan subsurface investigation, from borrow sources or materials appearing questionable in the field.

Furnish ACBFS according to Supplement 1027.

Furnish RPCC with the reinforcing steel cut to a maximum length of 1 inch (25 mm) outside the pieces.

Ensure that pieces of RAP do not exceed 4 inches (100 mm) in the largest dimension.

Furnish steel slag according to 703.14.

When using steel slag, RPCC, or RAP, completely blend it with at least 30 percent natural soil or natural granular material.

When using coal, completely blend it with natural soil or natural granular materials. Make at least 90 percent of the blend natural soil or natural granular materials.

**A. Natural Soils.** Furnish natural soils as defined in 203.02.I and classified as Department Group Classifications A-4-a, A-4-b, A-6-a, A-6-b, and A-7-6 as further defined below: Furnish soils with a maximum dry density of at least 90 pounds per cubic foot (1450 kg/m<sup>3</sup>).

Do not use soils having a liquid limit more than 65 or soils identified as Department Group Classifications A-5, or A-7-5 in the work.

**B. Granular Embankment Materials.** Furnish natural granular materials as defined in 203.02.H and classified as Department Group Classifications A-1-a, A-1-b, A-3, A-3-a, A-2-4, A-2-6, or A-2-7.

Do not use granular material classified as A-2-5.

**C. Granular Material Types.** Furnish CCS, gravel, ACBFS, durable sandstone, durable siltstone, GS, or blended natural soil or natural granular materials blended with OH, BOF, EAF, or RPCC as detailed above. Furnish durable sandstone and siltstone with a slake durability index greater than 90 percent according to ASTM D4644.

Except for GS, furnish the following gradations for the granular material types, by weight:

1. Granular Material, Type A. Furnish material having less than 25 percent by weight of the grains or particles passing the No. 200 (75 µm) sieve.

2. Granular Material Type B. For Item 204, furnish the gradation of Items 304, 411, or 617. For Item 203, furnish the gradation of Items 304, 411, or 617 except 0 to 20 percent will be allowed to pass the No. 200 (75 μm) sieve.

3. Granular Material Type C. Furnish well graded material that meets the following gradation:

Sieve Size	Total Percent Passing
3 inch (75 mm)	100
2 inch (50 mm)	70 to 90
1/2 inch (12.5 mm)	30 to 60
No. 200 (75 μm)	0 to 13

4. Granular Material Type D. Furnish the gradation of 100 percent passing the 8 inch (200 mm) sieve, less than 60 percent passing the 3 inch (76 mm) sieve, less than 40 percent passing the 3/4 inch (19 mm) sieve, and 0 to 20 percent passing the No. 200 (75 μm) sieve.

5. Granular Material Type E. Furnish any of the coarse aggregates from No. 1 through 67 inclusive on Table 703.01-1.

6. Granular Material Type F. Furnish material according to the following:

- a. Well graded material.
- b. A gradation with a top size from 8 inches (200 mm) to 3 inches (76 mm) and a bottom size of No. 200 (75 μm) sieve.
- c. An evenly graded material between the top and bottom size.
- d. Compactable, stable, and serves the intended use.

**D. Shale.** Furnish shale as defined in 203.02 and as further defined below. Ensure that the shale is tested for durability to determine whether the shale is durable or nondurable shale. Test the shale according to the following procedure:

1. Obtain a piece of shale that is typical and representative of the rest of the shale. The size of the piece should be about 6 inches (150 mm). If a 6-inch (150 mm) sample is not available, then the shale is nondurable.

2. Place the piece of shale in a bucket of water. Examine the deterioration or slaking of the shale after 48 hours. If the shale has deteriorated, then the shale is nondurable.

3. If the shale has not deteriorated after being in water for 48 hours, then break down the shale over a 3/4 inch (19.0 mm) sieve by hand pressure. If 75 percent or less of the shale is retained on the 3/4 inch (19.0 mm), then the shale is nondurable.

4. If more than 75 percent of the shale is retained on the 3/4 inch (19.0 mm) sieve or, then perform a field test for durability. The field test for durability consists of compacting the shale with six passes of a steel drum roller which has a minimum compaction force of 500 pounds per lineal inch (57 kN/mm) of roller drum width. Provide documentation to the Engineer to verify the roller meets the compaction force requirement.

- a. If more than 40 percent of the shale breaks down, by visual inspection, then the shale is nondurable.
- b. If less than 40 percent of the shale breaks down, by visual inspection, then the shale is durable.

**703.17 Aggregate Materials for 304.** Furnish aggregate that is CCS, crushed gravel, crushed ACBFS, or steel slag.

Furnish steel slag according to 703.14

Furnish ACBFS according to Supplement 1027.

Determine aggregate acceptance before incorporation into the work based on samples taken from stockpiles.

A. Furnish CCS, crushed gravel, crushed ACBFS, and steel slag that meets the following gradation:

Sieve Size	Total Percent Passing
2 inch (50 mm)	100
1 inch (25.0 mm)	70 to 100
3/4 inch (19.0 mm)	50 to 90
No. 4 (4.75 mm)	30 to 60
No. 30 (600 μm)	9 to 33
No. 200 (75 μm)	0 to 15 <sup>[1]</sup>
[1]Furnish steel slag that has 0 to 10 percent passing through the No. 200 (75μm) sieve	

Furnish gravel used under Item 304 that is crushed from material retained on the 1/2 inch (12.5 mm) sieve.

B. Furnish CCS, crushed gravel, ACBFS, and steel slag that meets the physical property requirements:

Percent of wear, Los Angeles test, maximum (CCS or crushed gravel)	50 %
Loss, sodium sulfate soundness test, maximum	15 %
Percent by weight of fractured pieces (one or more faces), minimum	90 % [1]
[1]Does not apply to steel slag	

Ensure deleterious substances in CCS, crushed gravel, and ACBFS do not exceed the following:

Material Type	Percent by weight
Shale and shaly material	5.0
Chert, that disintegrates in 5 cycles of the soundness test	5.0

Ensure that the portion of the material passing through the No. 40 (425 μm) sieve has a maximum liquid limit of 25 and a maximum plasticity index of 6.

**703.18 Materials for Items 410, 411, and 617.** Furnish CCS, gravel, ACBFS, GS, OH slag, BOF slag, EAF slag, RPCC, or RAP for materials.

If RPCC and RAP are used, provide the following information:

1. Specification item that the material was originally constructed under.
2. The applicable material requirements of the original construction item.

If the original construction requirements meet or exceed the requirements of this specification, then the shale, sodium soundness and Los Angeles abrasion test for RAP and RPCC may be waived. The plastic index and clay requirements are not required for RAP. Use RPCC that is free of steel.

Furnish OH, BOF, and EAF slag according to [703.14](#)

Use ACBFS according to Supplement [1027](#).

Furnish GS according to [703.08](#).

**A. Gradations.** Furnish for Items 617, 410, and 411 RAP materials according to the following gradation:

Sieve Size	Total Percent Passing
1 1/2 inch (37.5 mm)	100
3/4 inch (19.0 mm)	80 to 100
3/8 inch (9.5 mm)	60 to 90
No. 4 (4.75 mm)	30 to 90
No. 30 (600 µm)	3 to 20

Except for GS and RAP, use the following gradations for Items 410, 411, and 617.

Furnish materials for Item 410 according to one of the following gradations:

Sieve Size	Type A	Type B	Type C
	Total Percent Passing		
1 1/2 inch (37.5 mm)	100	100	Size No. 4 or 57 from Table <a href="#">703.01-1</a>
1 inch (25.0 mm)	90 to 100	75 to 100	
3/4 inch (19.0 mm)	60 to 100	60 to 100	
3/8 inch (9.5 mm)	40 to 60	35 to 75	
No. 4 (4.75 mm)	15 to 30	30 to 60	

Do not use RAP for Type C material.

Furnish materials for Item 411 according to the following gradation:

Sieve Size	Total Percent Passing
1 1/2 inch (37.5 mm)	100
1 inch (25.0 mm)	75 to 100
3/4 inch (19.0 mm)	60 to 100
3/8 inch (9.5 mm)	35 to 75
No. 4 (4.75 mm)	30 to 60
No. 30 (600 µm)	7 to 30
No. 200 (75 µm)	3 to 15

Furnish materials for [Item 617](#) according to the following gradation:

Sieve Size	Total Percent Passing
1 inch (25.0 mm)	100
3/4 inch (19.0 mm)	60 to 100
3/8 inch (9.5 mm)	35 to 75
No. 4 (4.75 mm)	30 to 60
No. 30 (600 μm)	9 to 33
No. 200 (75 μm)	0 to 15

**B. Physical properties.**

	Item 410	Item 411	Item 617
Percent of wear, Los Angeles test, maximum	50 %	–	–
Loss, sodium sulfate soundness test, maximum	–	15 %	–
Percent by weight of fractured pieces (one or more faces), minimum	–	–	90 %
Gravel used, portion retained on a No. 4 (4.75 mm) sieve (one or more faces) minimum crushed	–	40 %	–
Maximum plasticity index of material passing No. 40 (425 μm) sieve	–	6	–

Deleterious substances shall not exceed the following:

Material Type	Percent by weight		
	Item 410	Item 411	Item 617
Shale and shaly material	–	5 % <sup>[1]</sup>	12 %
Clay	10 %	–	–

[1] Where the major portion of the material in a coarse aggregate, from a source on record at the Laboratory, has shown the characteristics of acquiring a mud-like condition when tested for soundness, test it for soundness and ensure that the maximum loss is 5 percent.

**703.19 Rock and Aggregate Materials for Item 601.**

**A. Crushed Aggregate Slope Protection and Filter Aggregate for Dump Rock Fill.** Furnish crushed gravel, limestone, sandstone, RPCC, ACBFS, OH slag, BOF slag, or EAF slag for crushed aggregate slope protection and filter aggregate for dump rock fill.

Use ACBFS slag according to Supplement 1027.

Use OH, BOF, and EAF slag according to 703.14

Furnish Size No. 1 or 2 from Table 703.01-1, or according to the following gradation for crushed aggregate slope protection:

Sieve Size	Total Percent Passing
4 inch (100 mm)	100
3 1/2 inch (90 mm)	90 to 100
2 1/2 inch (63 mm)	25 to 90
1 1/2 inch (37.5 mm)	0 to 25
3/4 inch (19.0 mm)	0 to 10

For a filter for rock channel protection, use Size No. 3 or 4 from Table 703.01-1.

Physical properties.

Percent of wear, Los Angeles Test, maximum (except for ACBFS)	50 %
Loss, sodium sulfate soundness test, maximum (except for RPCC)	15 %
Percent by weight of fractured pieces minimum (CCS or gravel)	90 %
Loss for RPCC, AASHTO T 103 Soundness of Aggregates by Freezing and Thawing	20 % <sup>[1]</sup>
[1]Use Method C using 25 cycles.	

**B. Dumped Rock Fill and Rock Channel Protection.** Furnish gravel, broken recycled portland cement concrete (RPCC), broken sandstone, broken siltstone, and broken limestone for dumped rock fill and rock channel protection. Furnish sandstone, siltstone, and limestone that is free of laminations, seams, and fractures, or injury due to blasting.

Except for RPCC, test for soundness according to ASTM D5240. Use materials having a maximum 30 percent single slab loss and a maximum 20 percent cumulative loss. Slab heights and lengths will be a minimum of 8 inches. For RPCC, test for soundness according to AASHTO T 103 as stated in 703.18.A.

The Department may waive testing when the stone source has a known durability history.

Do not use thin, slab-like pieces, or any pieces having a dimension larger than 36 inches (1 m). Do not use RPCC with reinforcing steel protruding more than 1 inch (25 mm) beyond the outside surface of the concrete pieces.

Furnish dumped rock fill and rock channel protection materials consisting of the four material types defined below:

1. Type A material has at least 85 percent of the total material by weight larger than an 18-inch (0.5 m) but less than a 30-inch (0.8 m) square opening and at least 50 percent of the total material by weight larger than a 24-inch (0.6 m) square opening. Furnish material smaller than an 18-inch (0.5 m) square opening that consists predominantly of rock spalls and rock fines, and that is free of soil.

2. Type B material has at least 85 percent of the total material by weight larger than a 12-inch (0.3 m) but less than a 24-inch (0.6 m) square opening and at least 50 percent of the total material by weight larger than an 18-inch (0.5 m) square opening. Furnish material smaller than a 12-inch (0.3 m) square opening that consists predominantly of rock spalls and rock fines, and that is free of soil.

3. Type C material has at least 85 percent of the total material by weight larger than a 6-inch (150 mm) but less than an 18-inch (0.5 m) square opening and at least 50 percent of the total material by weight larger than a 12-inch (0.3 m) square opening. Furnish material smaller than a 6-inch (150 mm) square opening that consists predominantly of rock spalls and rock fines, and that is free of soil.

4. Type D material has at least 85 percent of the total material by weight larger than a 3-inch (75 mm) but less than a 12-inch (0.3 m) square opening and at least 50 percent of the total material by weight larger than a 6-inch (150 mm) square opening. Furnish material smaller than a 3-inch (75 mm) square opening that consists predominantly of rock spalls and rock fines, and that is free of soil.

**703.20 Aggregate for Water Quality Structures.**

**A. Fine Aggregate.**

1. Furnish fine aggregate consisting of washed natural sand, washed sand manufactured from stone or gravel, or washed lightweight sand prepared by expanding products such as clay, diatomite, shale, or slate.

2. Sieve analysis.

Sieve Size		Total Percent Passing
3/8 inch	(9.5 mm)	100
No. 4	(4.75 mm)	95 to 100
No. 8	(2.36 mm)	65 to 100
No. 16	(1.18 mm)	40 to 80
No. 30	(600 μm)	20 to 60
No. 50	(300 μm)	5 to 30
No. 100	(150 μm)	0 to 10
No. 200	(75 μm)	0 to 1

**B. Coarse Aggregate.**

1. Furnish coarse aggregate consisting of washed gravel, washed CCS, or washed lightweight aggregate prepared by expanding products such as clay, diatomite, shale, or slate.

2. Gradation. Furnish any of the coarse aggregates from Size No.1 through No.10 inclusive on Table 703.01-1. Ensure that the percent by weight of material passing the No. 200 (75 μm) sieve in the course aggregate does not exceed 1percent.

3. Physical properties.

Percent of wear, Los Angeles test, maximum	40 %
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## 705 CONCRETE INCIDENTALS

**705.01 Glass Fiber Reinforced Polymer (GFRP) Dowel Bars.** Furnish round and straight fiber reinforced polymer (GFRP) dowel bars. Ensure resin used to manufacture the GFRP bars consists of an epoxy vinyl ester resin. Ensure the glass fiber used is ECR glass which meets ASTM D578. Ensure that the minimum glass fiber content is 70 percent by weight. Furnish dowel bars of a type meeting the dimensional requirements of the standard construction drawings. Provide certified test data according to 101.03 with each shipment.

**705.03 Preformed Fillers.** Furnish preformed fillers according to AASHTO M 153 or AASHTO M 213, with the following modification:

5.7 For materials manufactured as described in 4.1.1 and 4.1.2, ensure that the producer certifies to the Engineer that the asphalt content is at least 35 percent by weight of the filler.

Or furnish semi-rigid closed-cell polypropylene foam preformed fillers according to ASTM D8139.

Furnish materials according to the Department's [QPL](#).

**705.04 Hot Applied Joint Sealer,** Furnish hot applied joint sealer conforming to ASTM D6690, Type II Use this material as the primer for Type 3 membrane.

Furnish materials according to the Department's [QPL](#). Provide Certified Test Data to the Engineer for each shipment of material corresponding to the batch of material being used

**705.05 Burlap Cloth.** Furnish burlap cloth according to AASHTO M 182, Class 2.

**705.06 Sheet Materials for Concrete Curing.** Furnish sheet materials conforming to ASTM C171 for moisture loss and reflectance only.

**705.07 Liquid Membrane-Forming Compounds for Curing Concrete.** Furnish liquid membrane-forming compounds conforming to ASTM C309, with the following modification:

5.3 In addition - liquid membrane-forming compounds will have a minimum solids content of 25% .

6.1 Water Retention - Liquid membrane-forming compound, when tested in accordance with 10.1, shall have a water loss of not more than: 0.15 kg/m<sup>2</sup> @ 24 hours and 0.40 kg/m<sup>2</sup> @ 72 hours.

7.1 Reflectance - Type 2 curing compound will have a minimum daylight reflectance of 65%.

10.4 In addition - Mix Type 2 curing compound until uniform in color and consistency, and then pour into a glass graduated cylinder (Kimax 150 ml) to the 150 ml mark. The Type 2 curing compound should have a rate of settling such that its uniformly white portion as visible to the eye is not less than 145 ml at 2 hours and not less than 125 ml at 24 hours after filling the Kimax cylinder . The test should be performed at 73.0 ± 3.5 °F (23 ± 2 °C). During this test the glass cylinder should be stoppered and left undisturbed.

11.1 In addition, Equip the containers for Type 2 white pigmented liquid membrane forming compounds with mechanical agitators. Assign each container in any batch or lot, a number as the container is being filled.

Furnish materials according to the Department's [QPL](#).

**705.10 Air-Entraining Admixtures.** Provide air-entraining admixtures conforming to AASHTO M 154. Conform to Supplement 1001 for approval.

Furnish materials according to the Department's [QPL](#).

**705.11 Preformed Elastomeric Compression Joint Seal for Concrete.**

**A. General.** Provide preformed elastomeric compression joint seal conforming to ASTM D2628, with the following modifications:

- 5.1 Ensure that the size and design is as shown on the plans.
- 7.2 The Engineer will perform inspection at the project site.
- 7.3 If sampled, provide a minimum of 3 feet (1.0 m), with all manufacturers' markings,

12.1 In addition, ensure that markings are every 1 foot (305 mm). Use lubricants recommended by the seal manufacturer to install preformed compression seals.

**B. Qualification.** Obtain Department approval of each design, shape, width, depth, web, and shell thickness before use. Submit drawings of the seals showing all dimensions and dimension tolerances and weight per foot (meter) with the request for approval.

Furnish materials according to the Department's [QPL](#).

**705.12 Chemical Admixture for Concrete.** Provide chemical admixtures conforming to ASTM C494. Ensure that the minimum relative durability factor is 90.

Furnish materials according to the Department's [QPL](#).

**705.13 Neoprene Sheeting.** Provide material conforming to the following:

Test Description	Specification	Requirement
Thickness (inch)	ASTM D751	0.094±0.01
Breaking Strength, Grab (lb)	ASTM D751	700 × 700 (long. × trans.)
Adhesive Strip, 1" wide × 2" long (lb)	ASTM D751	9
Burst Strength (psi)	ASTM D751	1400
Heat Aging, 70 hr., 212 °F, 180° bend without cracking	ASTM D2136	No cracking of coating
Low temperature brittleness, 1 hr., -40 °F, bend around ¼" mandrel	ASTM D2136	No cracking of coating

Furnish material according to the Department's [QPL](#).

**705.15 High Molecular Weight Methacrylate (HMWM) Resin.** Provide low viscosity, non-fuming high molecular weight methacrylate (HMWM) resin conforming to the following:

Viscosity	Less than 25 cps (Brookfield viscometer, Model RVT with UL adaptor or Model LVF, # spindle and UL adaptor C @ 77 °F (25 °C) (ASTM D2849)
Density	Greater than 8.4 lb/gal Ca 77 °F (25 °C) (ASTM D2849)
Flash Point	Greater than 200 °F (93 °C) (PenskyMartens CC) (ASTM D93)
Vapor Pressure	Less than 1.0 mm Hg C @ 77 °F (25 °C) (ASTM D323)
TG (DSC)	Greater than 135 °F (58 °C) (ASTM D3418)
Shelf Life	Must be 1 year minimum at manufacturers recommended environmental considerations
Gel Time	Greater than 40 min, 100 g mass (ASTM D2471) (thin film)
Percent Solids	Greater than 90% by weight
Bond Strength	Greater than 1500 psi (10.5 MPa) (ASTM C882)

Furnish materials according to the Department's [QPL](#).

**705.20 Non Shrink, Non Metallic Materials.** Provide anchoring materials for installing anchor bolts, dowels and similar material in concrete which are non-shrink, 100% solids, two part (resin and hardener), fast setting, and moisture insensitive.

A. Provide certified test data according to 101.03 showing compliance with the following requirements. Include manufacturer's installation and application requirements.

Test Description	Specification	Requirements	Notes
Bond Strength (dry)	ASTM C882 <sup>[2]</sup>	2 day, Min. 1800 psi	Average of three samples <sup>[1]</sup>
Bond Strength after subjected to 300 cycles freeze/thaw testing	Specimens cast according to ASTM C882 should be subjected to ASTM C666 Procedure B prior to testing Bond Strength according to ASTM C882	Min. 1600 psi	Average of three samples <sup>[1]</sup>
Heat Deflection	ASTM D648	7 day, Min. 130 °F	
Linear Coefficient of Shrinkage	ASTM C531	% Max. 0.005	
Pullout Strength Test (dry )	See procedure below	24 hours, Min. Load 22,500 lbs	Average of three cylinders in dry condition
Pullout Strength Test (wet )	See procedure below	24 hours, Min. Load 22,500 lbs	Average of three cylinders in wet condition

[1] A total of six samples will be made under ASTM C882. Three of the specimens cast according to ASTM C882 should be subjected to ASTM C666 Procedure B prior to testing the Bond Strength according to ASTM C882.

- [2] Cure according to each of the Classes specified in the product based on the requirements below:
- if the product specifies Class A, Curing Temperature to be at minimum temperature specified in the product.
  - if the product specifies Class B, Curing Temperature to be at 40°F. **Note: If product is also listed as a Class A and the minimum temperature is >30 °F & < 40 °F, then cure at 50 °F.**
  - if the product specifies Class C, Curing Temperature to be at maximum temperature specified in the product.

**Pullout Strength Test Procedure.** Perform pullout strength tests under dry and wet conditions as follows:

1. Dry Condition (epoxy steel)

Cast three concrete test blocks or cylinders, a minimum of 6 inches (150 mm) in width or diameter by 12 inch (300 mm) in depth. Use concrete with a compressive strength of 4000+/- 500 psi at 28-days. Center a 6 3/4 inch (170 mm) deep hole, drilled the diameter required by the manufacturer's requirements for installing a No. 6 (20M) rebar, in the block or cylinder by drilling or forming. Dry the hole surfaces and clean the holes following manufacturer instructions. Fill the hole with adhesive materials according to manufacturer recommendations. Insert a No. 6 (20M) deformed reinforcing bar 30 inches (760 mm) long, cleaned and degreased, into the hole. Hold and center the bar perpendicular to the concrete surface in the grout-filled hole during the curing period.

2. Wet Condition (epoxy steel)

Cast three concrete test blocks or cylinders, a minimum of 6 inches (150 mm) in width or diameter by 12 inch (300 mm) in depth. Use concrete with a compressive strength of 4000+/- 500 psi at 28-days. Center a 6-3/4 inch (170 mm) deep hole, drilled the diameter required by the manufacturer's requirements for installing a No. 6 (20M) rebar, in the blocks or cylinders by drilling or forming. Wet the hole's surfaces prior to applying the anchoring material by filling the hole with water and letting stand for five minutes. Turn the samples over for two minutes to allow the excess water to drain from the hole, Turn all samples over to the upright positions and immediately fill hole with adhesive materials according to manufacturer recommendations. Insert a No. 6 (20M) deformed reinforcing bar 30 inches (760 mm) long, cleaned and degreased into the hole. Hold and center the bar perpendicular to the concrete surface in the adhesive-filled hole during the curing period.

Cure the specimen at  $77 \pm 5$  °F ( $25 \pm 3$  °C) for 24 hours.

For the pullout strength test, apply an axial load to the bar at a rate of 1/2 inch (13 mm) per minute until the bar pulls out of the specimen, or the concrete block or cylinder cracks or spalls. Record the failure mode and applied load.

B. Epoxy materials will also conform to ASTM C881, Type IV, Grade 3, Class A, B or C.

Supply the anchoring material in non-reactive containers and with their SDS. Label containers with the name of the product, the manufacturer, the shelf life expiration date, the batch number, quantity, and provide application instructions.

Maintain storage areas between 40 and 100 °F (5 and 38 °C).

Only use materials on the Department's [QPL](#).

**705.21 Quick Setting Concrete Mortar.** Provide prepackaged mortar material that requires the addition of water only.

Only use materials meeting the following criteria:

A. Capable of being extended 50 percent by dry mortar weight with aggregate meeting the following requirements:

- (1) Gradation requirements of Table [703.01-1](#) for No. 8, 89, 9, or a combination thereof.
- (2) AASHTO M 43, Maximum Passing No. 200 (75 µm) sieve - Not to exceed 0.2 percent.
- (3) AASHTO T 84 and T 85, Absorption - Not more than 2 percent.
- (4) AASHTO T 104, Soundness Loss - Not more than 2 percent.

a. Ensure that the material meets the following requirements:

Test		Type 1	Type 2
Compressive Strength ASTM C109 <sup>[2]</sup>			
psi (MPa)	@ 1 Hour	100 (0.7)	2000 (14)
	@ 3 Hour	250 (1.7)	---
	@ 24 Hours	2000 (14)	5000 (34)
	@ 7 Days	---	7000 (48)
Compressive Strength ASTM C39 <sup>[1],[2]</sup>			
psi (MPa)	@ 1 Hour	100 (0.7)	(2000) (14)
	@ 3 Hour	150 (1.0)	---
	@ 24 Hours	1000 (10)	3500 (24)
	@ 7 Days	---	6000 (41)
Initial Set Time (min) ASTM C266 <sup>[2]</sup>		5 Minutes	10 Minutes
Bond Strength, ASTM C882 <sup>[1]</sup>			
psi (MPa)	@ 24 Hours	1000 (7)	1000 (7)
	@ 7 Days	1500 (11)	1500 (11)
Flexural Strength ASTM C78 <sup>[1]</sup>			
psi (MPa)	@ 4 Hour	---	200 (1.4)
	@ 3 Day	650 (4.5)	500 (3.4)
Freeze and Thaw ASTM C666 (use either Procedure B or A) <sup>[1]</sup>			
Procedure B (350 Cycles) Durability Factor		80%	80%
Procedure A (300 Cycles) Durability Factor		79%	79%
[1]Extend test specimens 50 percent by dry mortar weight with aggregate.			
[2]Test the mortar as received with the addition of water. Ensure that the amount of water is designated on the packing container by the manufacturer.			

B. Prequalify the material by placing and having the material evaluated conforming to Supplement 1070 for 2 years. At the end of the 2 year rating the material will meet the following criteria:

1. Percentage debonding/delamination  $\leq 5\%$
2. Percentage spalling  $\leq 5\%$
3. Mid panel average crack width  $\leq 1/16$  inch (1.6 mm) and total length of mid panel cracks  $\leq 20$  feet (6.1 m) total length
4. Edge Cracking/debonding average crack width  $\leq 1/16$  inch (1.6 mm) and total length of cracks  $\leq 12$  feet (3.6 m)

Furnish the Laboratory with a certified copy of test results from a recognized laboratory showing compliance with the requirements of this specification for item A. Furnish the laboratory written documentation of the method of surface preparation and any primers, adhesives, or activators used in the field test. Those will become requirements of the material system for subsequent approval or use.

A recognized laboratory is one that is regularly inspected by the Cement and Concrete Reference Laboratory of the National Institute of Standards and Technology.

Provide quick setting concrete mortar packaged in strong moisture resistant paper bags or other suitable containers capable of withstanding shipping, normal handling, and storage without breakage. The package will protect the material from deterioration when stored in a dry condition for a period of 1 year. Each package or container must display information regarding the minimum nominal yield and instructions for mixing. Calculate volumetric yield determinations using the manufacturers' recommended water content.

Furnish materials listed on the Department's [QPL](#).

**705.22 Nonshrink Mortar.** Provide nonshrink mortar conforming to ASTM C1107, with the following modification:

9.1 In addition, ensure that the fluidity of the grout at the maximum water content is at least equal to a flowable mixture as defined in ASTM C827, Section 8.2.2 and that the minimum flow is 125 @ 5 drops of the flow table in 3 seconds.

Furnish materials according to the Department's [Approved List](#).

**705.23 Concrete Sealers**

**A.** Provide an Epoxy-Urethane sealer incorporating a two component cross linked urethane and conforming to the following requirements:

1. Absorption - [ASTM C642](#) (non-air entrained concrete). Proportion and mix concrete according to ASTM C672. Sealed concrete, under total immersion, will not exceed 1.0% after 48 hours or 2.0% after 50 days

2. Scaling Resistance - ASTM C672 A rating of "No scaling" after 100 cycles on the sealed concrete (non-air entrained concrete) as compared to "Severe Scaling" on untreated concrete.

3. NCHRP 244, Series 11 - Cube Test

3.1 Weight gain - not to exceed 25% of untreated cube

3.2 Absorbed chloride - not to exceed 25% of untreated cube

4. NCHRP 244, Series IV - Southern Exposure

4.1 Absorbed chloride - not to exceed 10% of untreated concrete

5. Volatile Organic Compounds (VOC) maximum, OAC 3745-113 Coating Type

Record and report the application rate (square footage/gallon) of sealer during the tests.

Provide test data from an approved independent testing facility. The sealer manufacturer funds the testing costs.

Furnish the test data, a one quart sample, and product literature, including data sheets, label and coating type to the [Office of Materials Management \(OMM\)](#). [OMM](#) will determine material acceptance.

Furnish materials according to the Department's [QPL](#).

**B.** Provide an Non-Epoxy sealer conforming to the following requirements:

1. Absorption - [ASTM C642](#) (non-air entrained concrete). Proportion and mix concrete according to ASTM C672. Sealed concrete, under total immersion, will not exceed 1.0% after 48 hours or 2.0% after 50 days

2. Scaling Resistance - ASTM C672 A rating of “No scaling” after 100 cycles on the sealed concrete (non-air entrained concrete) as compared to “Severe Scaling” on untreated concrete.
3. NCHRP 244, Series 11 - Cube Test
  - 3.1 Weight gain - not to exceed 25% of untreated cube
  - 3.2 Absorbed chloride - not to exceed 25% of untreated cube
4. NCHRP 244, Series IV - Southern Exposure
  - 4.1 Absorbed chloride - not to exceed 10% of untreated concrete
5. Volatile Organic Compounds (VOC) maximum, OAC 3745-113 Coating Type

Record and report the application rate (square footage/gallon) of sealer during the tests.

Provide test data from an approved independent testing facility. The sealer manufacturer funds the testing costs.

Furnish the test data, a one quart sample, and product literature, including data sheets, label and coating type, to the OMM. OMM will determine material acceptance.

Furnish materials according to the Department’s QPL.

**705.24 Soluble Reactive Silicate.** Provide a soluble reactive silicate (SRS) that is a blend of Na/K/FlxSiOx (sodium, potassium, fluoro or other silicate), surfactants, polymers, and stabilizers capable of thoroughly saturating and sealing concrete. The treatment system will meet the following performance requirements:

- A. Scaling Resistance - Treated concrete, abraded by sufficient wire brushing to break any film remaining on the surface after drying, will pass ASTM C672, Scaling Resistance test with a rating of 2 - “Slight to Moderate Scaling” after 50 cycles (non-air entrained concrete) as compared to a rating of 5 - “Severe Scaling” on untreated concrete.
- B. Absorption - The absorption of treated concrete under total immersion will not exceed 1.0 percent after 48 hours or 2.0 percent after 50 days (ASTM C642, non-air entrained concrete). Concrete should be proportioned and mixed in accordance with ASTM C672.
- C. Skid resistance - The skid resistance of treated concrete pavement will not be reduced by more than 10 percent as compared to the same untreated pavement. ASTM E 274 using ASTM E 501 ribbed tire at 40 mph (64 kph), five test average.
- D. AASHTO T 259 as modified. The standard T 259 Resistance of Concrete to Chloride Ion Penetration will; be modified as follows:

In addition to section 3.1, intentionally break the specimens so they have a full depth crack through the middle of the slab.

Install section 3.2 dams around the perimeter of the re-assembled, cracked, concrete specimens. Caulk around the perimeter of the dam to assure that only the crack and the concrete will allow water to pass through or be absorbed. After assembly, measure the crack width at three locations and report the crack width.

Perform the ponding of 3.4 until the 3% solution comes through the specimen’s crack. Record and report the time required for the solution to appear through the specimen’s crack. Remove the solution from the specimens and re-dry according to 3.3 (T 259).

After drying apply the SRS to the specimen’s top surface at the manufacturer’s recommended rate of application. Record and report the rate of application. Air dry the SRS coated dammed sample

specimens for 7 days. After 7 days, re perform the ponding with 3% chloride solution until solution comes through the specimen's crack or 14 days. Record the time the till the ponded solution comes through the crack.

Acceptable SRS materials will have a value of 2 or more when the ponding time before SRS application is divided into the ponding time after SRS application.

Sections 3.5, 3.6, 4.1, 4.2 and 5.1 (of T 259) will not apply.

Have tests performed by an approved independent testing facility acceptable to the Department.

Submit test data and a one quart (one liter) a technical data sheet and the SDS to the **OMM** for approval

Furnish materials according to the Department's **QPL**.

**705.25 Gravity-Fed Resin.** Provide non shrink, non metallic resin conforming to ASTM C881, Type 1, Grade 1, Class B or C and the following:

The maximum viscosity at the lowest allowable temperature will be 250 cps. The manufacturer will provide test data to verify the viscosity at the lowest temperature for the class for which it is to be approved.

A minimum average sand retention of 95.0% for three samples tested according to the Sand Penetration Test Method described below.

Show no signs of cracking, debonding or insufficient curing during the sand penetration test

**A. Sand Penetration Test Method.** This test will be conducted with the following equipment and materials:

1. 4 oz (118 ml) wax coated paper cup. Maximum top diameter 2 5/16" (59 mm); bottom diameter 1 11/16" (43 mm); height 2 3/8" (960 mm).
2. 20 - 30 grade sand (ASTM C778)
3. 1 Pint non-absorbent container
4. 8 oz (240 ml) plastic cup
5. Stirring stick or spatula
6. Scale accurate to 0.1 g
7. Disposable gloves
8. Stop watch
9. Thermometer
10. Paint brush

**B. Perform the test as follows**

1. Assure the material and the room is at 73 °F (23 °C)
2. Determine and record the tare weight of the paper cup (1).
3. Introduce 100.0 grams of 20 - 30 graded sand (2) into the paper cup.
4. Record the weight of the cup and the sand.
5. Consolidate the sand in the cup by lifting the cup approximately ½ " (13 mm) and dropping 25 to 30 times. Then lightly tap the sides of the cup 25 to 30 times with the fingers. The sample may also be placed on a vibrating table for 10 to 15 seconds.

6. Measure enough material into the 8 oz plastic cups (4) to make at least a 200 g sample.
7. Combine the components into the non-absorbent container (3) and mix according to the manufacturer's recommendations using a spatula or stirring stick (5).
8. Pour 40.0g of material over the sand and record the weight of the resin, cup and sand
9. Allow the resin, sand and cup to set undisturbed for 24 hours at 73 °F (23 °C). Re-weigh the resin, cup and sand
10. Remove as much of the paper cup from around the hardened resin and sand matrix as possible. Lightly brush any loose sand from the matrix. Weigh the hardened matrix.
11. Calculate the percent of sand retained, F, as follows:

$$F = [E / (D - A)] \times 100$$

Where,

- A = Tare weight of paper cup (g)
- B = Weight of cup and sand (g)
- C = Weight of fresh mixture of resin, cup and sand (g)
- D = Weight of cured mixture of resin, cup and sand (g)
- E = Weight of resin sand matrix as measured in step 10 (g)

12. Report the average of three specimens mixed separately
13. Also calculate and report the percent loss due to curing G as follows:

$$G = [(D - C) / (C - B)] \times 100$$

14. Examine the sand / resin matrix for signs of insufficient curing and bond, or excessive shrinkage.

**Material Approval.** The manufacturer will provide certified test data verifying compliance with the above requirements; technical data sheet; current SDS for the material; 1 gallon sample; and a letter certifying that the product formulation will not be altered without notification to the Department and OMM.

OMM will determine materials acceptance and include in the Department's QPL.

Furnish materials according to the Department's QPL.

**705.26 Epoxy injection Resin.** Provide epoxy injection resin capable of application, positive adherence and strength development when applied to moist or wet surfaces at temperatures of 33 °F (1 °C) and above.

Use products that contain 100% solids material and no non-reactive diluents, solvents or other fillers. Provide materials that meet the following requirements:

- A.** The injection material will meet the requirements of ASTM C881 Type IV, Grade 1 and Class B or C and have a maximum viscosity of 600 cps at the lowest ambient material and substrate temperature to be used.
- B.** The paste materials will meet the requirements of ASTM C881 Type I, Grade 3 and Class B or C.

**Material Approval.** The manufacturer of the materials is responsible for prequalifying the material and submitting the following to the OMM:

An Independent certified test data indicating that the materials, when mixed according to the manufacturer's recommendations, meet the requirements listed above.
Manufacturer's technical data sheet for the paste and injection materials.
SDS for paste and injection materials.
1 Gallon Sample or 2 kits of the injection materials

Furnish materials according to the Department's QPL.

**705.27 Carbonate Micro-Fines for use in Portland Cement Concrete.** Provide carbonate micro-fines (CMF) according to Supplement 1016 and ASTM C1797, except modify Type C according to the properties shown in Table 705.27-1 below:

**TABLE 705.27-1 CHEMICAL AND PHYSICAL REQUIREMENTS**

<b>Parameter</b>	<b>Type C</b>
MgCO <sub>3</sub> , %	≥43
Sum of CaCO <sub>3</sub> + Mg CO <sub>3</sub> , % by mass	≥ 98
Methylene blue value (mg/g)	≤ 3
<b>Particle size distribution,</b>	<b>minimum % passing</b>
No. 20 (850 μm) sieve	100
No. 50 (300 μm) sieve	80-100
No. 100 (150 μm) sieve	
No. 200 (75 μm) sieve	10-90
No. 325 (45 μm) sieve	5-70

**705.28 Glass Fiber Reinforced Polymer (GFRP) Deformed Bars.** Furnish GFRP reinforcement according to ASTM D7957 except as noted. Furnish deformed bars of a type meeting the dimensional requirements of the standard construction drawings. Furnish certified material according to Supplement 1138.

The Mean Tensile Modulus of Elasticity limit (ASTM D7957 Table 1) shall meet or exceed 8700 ksi (60 GPa).

The Mean Ultimate Tensile Strain limit (ASTM D7957 Table 1) shall meet or exceed 1.4%.

The Tensile Modulus of Elasticity limit (ASTM D7957 Table 2) shall meet or exceed 8700 ksi (60 GPa).

The Ultimate Tensile Strain limit (ASTM D7957 Table 2) shall meet or exceed 1.4%.

The Minimum Guaranteed Ultimate Tensile Force (ASTM D7957 Table 3) shall be as follows:

Bar Designation No	Minimum Guaranteed Ultimate Tensile Force Kip (kN)
2 (M6)	6.1 (27)
3 (M10)	13.2 (59)
4 (M13)	27.6 (123)
5 (M16)	36.6 (163)
6 (M19)	51.9 (231)
7 (M22)	68.5 (305)
8 (M25)	89.9 (400)
9 (M29)	124 (550)
10 (M32)	138 (615)

**705.29 Synthetic Fibers for use in Portland Cement Concrete.** Provide Type III synthetic, non-metallic fibers in accordance with ASTM C1116 and ASTM D7508 with the following exceptions:

Aspect Ratio – Length/Equivalent Diameter,  
 min..... 70 – 100  
 max..... 100

Tensile Breaking Strength, min  
 ..... 70,000 psi (482 MPa)

Modulus of Elasticity, min .....  
 ..... 800,000 psi (5515 MPa)

Length: ..... 1.5 inches (38 mm) to  
 ..... 2.25 inches (57 mm)

Dosage Rate:

Minimum of 4 pounds per cubic yard (2.4 kg/m<sup>3</sup>)

Test the synthetic fibers in accordance with ASTM C1609 and ASTM C1579 utilizing an [AASHTO-accredited laboratory](#) for portland cement concrete materials and in accordance with the following table

**REQUIRED HARDENED FIBER REINFORCED CONCRETE PROPERTIES**

Physical Test	Specification	Requirement
Equivalent Flexural Strength Ratio ( $R_{T,150}^{150}$ )*	ASTM C1609	Minimum of 25%
Crack Reduction Ratio (CRR)	ASTM C1579	Minimum reduction >85%
*Test specimens when the concrete flexural strength at first crack ( $f_1$ ) is a minimum of 600 psi. For 6 inch x 6 inch x 20 inch fiber reinforced beam the maximum required net deflection value of L/150 of the 18 inch span length is 0.12 inch.		

Furnish materials according to the Department's [QPL](#).