

SECTION 00 01 01
PROJECT TITLE PAGE

Project Specifications for: AASF #3 ENTRY CONTROL POINT CONSTRUCTION

Owner:
Armory Commission of Alabama
1720 Congressman WL Dickinson Drive
Montgomery, AL 36109

Architect/Engineer:
Thompson Engineering
2970 Cottage Hill Road Suite 190
Mobile, Alabama 36606

IFB #: AC-22-C-0015-S

Date: June 14, 2022

Set Number _____

Prepared _____

Checked _____

Approved _____

RELEASED FOR CONSTRUCTION

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SECTION 00 01 03 - PROJECT DIRECTORY

(Revised 22 June 2021)

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Identification of project team members and their contact information.

1.02 OWNER:

- A. Name: Armory Commission of Alabama
 - 1. Address: 1720 Cong. W.L. Dickinson Drive
 - 2. City: Montgomery
 - 3. State: AL
 - 4. Zip Code: 36109

1.03 ARCHITECT/ENGINEER OF RECORD:

- A. Architect:
 - 1. Company Name: Thompson Engineering
 - a. Address: 2970 Cottage Hill Road, Suite 190
 - b. City: Mobile
 - c. State: AL
 - d. Zip Code: 36606
 - e. Telephone: 251-661-2443
 - 2. Primary Contact:
 - a. Title: Project Manager
 - b. Name: Matthew Rogers
 - c. Telephone: 251-665-2443
 - d. Email: mrogers@thompsonengineering.com

1.04 CONSULTANTS TO THE ARCHITECT/ENGINEER OF RECORD:

- B. Civil Engineering Consultant:
 - 1. Company Name: Thompson Engineering
 - a. Address: 2970 Cottage Hill Road, Suite 190
 - b. City: Mobile
 - c. State: AL
 - d. Zip Code: 36606
 - e. Telephone: 251-661-2443
- C. Structural Engineering Consultant:
 - 1. Company Name: Thompson Engineering
 - a. Address: 2970 Cottage Hill Road, Suite 190
 - b. City: Mobile
 - c. State: AL
 - d. Zip Code: 36606
 - e. Telephone: 251-661-2443
- D. Mechanical Engineering Consultant - Plumbing & Mechanical:
 - 1. Company Name: N/A
- E. Electrical Engineering Consultant:
 - 1. Company Name: Stewart Engineering
 - a. Address: 40680 State Hwy 59
 - b. City: Bay Minette
 - c. State: AL
 - d. Zip Code: 36507
- F. Architectural Consultant:
 - 1. Company Name: Watermark Design Group
 - a. Address: 2970 Cottage Hill Road, Suite 200
 - b. City: Mobile
 - c. State: AL
 - d. Zip Code: 36606

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 00 01 07 - PROFESSIONAL SEALS

PROFESSIONAL SEALS OF DESIGN PROFESSIONALS:

1.01 THE SPACE ALLOTTED BELOW IS FOR PROFESSIONAL SEALS OF DESIGN PROFESSIONALS RESPONSIBLE FOR PREPARING THE CONSTRUCTION DOCUMENTS.

ARCHITECTURAL



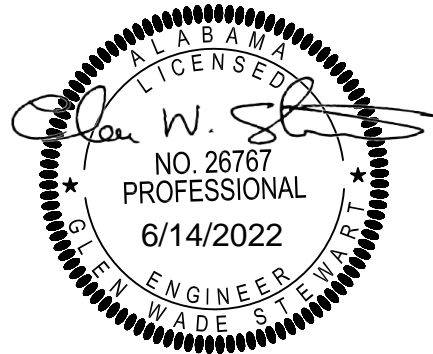
CIVIL



STRUCTURAL



ELECTRICAL



END OF SECTION

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AASF #3 ENTRY CONTROL POINT CONSTRUCTION MOBILE, ALABAMA

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(Revised: 14 June 2022)

PROCUREMENT AND CONTRACTING REQUIREMENTS

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00 01 15 – List of Drawing Sheets
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00 41 00 – Proposal Form (Revised: 14 June 2022)
00 43 00 – Form of Bid Bond
00 43 25 – Substitution Request Form during Bidding (Revised: 14 June 2022)
00 45 19 – Disclosure Statement
00 52 00 – Construction Contract Form
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00 62 76 – Contractor's Periodical Request for Partial Payment
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00 62 78 – Inventory of Stored Materials
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00 65 16 – Affidavit of Payment of Debts & Claims
00 65 17 – Affidavit of Release of Liens
00 65 19 – Consent of Surety Final Payment Form
00 62 20 – Final Completion Form (Revised: 3 August 2021)
00 65 36 – General Contractor's "State of Alabama Roofing Guarantee" (Revised 3 August 2021)
00 72 00 – General Conditions of Contract
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05 12 00 – Structural Steel Framing
05 42 50 – Pre-Engineered Cold-Formed Steel Trusses

Division 06 – Wood, Plastics And Composites

06 16 00 - Sheathing

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07 41 10 – Standing-Seam Metal Roof Panels
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AASF #3 ENTRY CONTROL POINT CONSTRUCTION MOBILE, ALABAMA

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10 75 00 - Flagpoles

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MOBILE, ALABAMA**

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<u>NUMBER</u>	<u>SHEET TITLE</u>
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CIVIL

C101	General Notes And Legend
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C200	Existing Conditions And Demolition Plan
C201	Existing Conditions And Demolition Plan
C300	Site Plan
C301	Site Plan
C500	Grading And Drainage Plan
C501	Grading And Drainage Plan
C700	Traffic And Erosion Control Plan
C701	Traffic And Erosion Control Plan
C702	Traffic And Erosion Control Plan
C800	Miscellaneous Details
C801	Miscellaneous Details
C802	Miscellaneous Details
C803	Miscellaneous Details
C804	Miscellaneous Details

ARCHITECTURAL

AS100	Architectural Site Plan
A100	Entrance Canopy Floor & Roof Plan
A200	Entrance Canopy Exterior Elevations
A300	Entrance Canopy Sections
A500.1	Roof Detail

STRUCTURAL

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S100	Entrance Canopy Plan And Elevation
S101	Entrance Canopy Sections And Details

ELECTRICAL

E100	Electrical Notes and & Legend
E101	Electrical Site Plan
E102	Entrance Canopy Electrical Plan
E200	Operations & Training Electrical Riser & Schedule

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SECTION 00 21 00 - INSTRUCTIONS TO BIDDERS

1. INTENT OF INSTRUCTION:

Instructions to Bidders are included in the Contract Documents to amplify the invitation for Bids, which is abbreviated because of cost and space limitations, and to give other details which interested parties must or should know in order to prepare bids properly.

2. PREQUALIFICATION OF BIDDERS:

Bidders for work costing in excess of \$50,000.00 must be licensed under the terms of existing State laws. In case of a joint venture of two or more contractors, the amount of the bid shall be within the maximum bid limitation as set by the State Licensing Board for General Contractors of the combined limitations of the partners to the joint venture. Before award of any Contract, any Bidder may be required to file under oath with the Commission a complete Confidential Financial Statement, Equipment Questionnaire, and Experience Questionnaire on forms that will be furnished by the Contracting Officer with the request. If the applicant is a corporation organized in a state other than Alabama, it shall furnish a certificate from the Secretary of State showing that it is qualified to transact business in Alabama.

Copies of the Contract Documents may be obtained from the Contracting Officer, as stated in the Invitation For Bids.

3. EXAMINATION OF CONTRACT DOCUMENTS AND OF THE SITE OF THE WORK:

Before submitting a proposal for the work, the bidders shall carefully examine the Contract Documents, visit the site, and satisfy themselves as to the nature and location of the Work, and the general and local conditions, including weather, the general character of the site or building, the character and extent of existing work within or adjacent to the site, and any other work being performed thereon at the time of submission of their bids. They shall obtain full knowledge as to transportation, disposal, handling, and storage of materials, availability of water, electric power, and all other facilities in the area which will have a bearing on the performance of the Work for which they submit their proposals. The submission of a proposal shall be prima facie evidence that the bidder has made such examination and visit and has judged for and satisfied himself as to conditions to be encountered regarding the character, difficulties, quality and quantities of work to be performed and the material and equipment to be furnished, and as to the contract requirements and contingencies involved.

If, in the performance of the Contract, subsurface or latent conditions are found to be materially different from those indicated by the Drawings and Specifications, or unknown conditions of an unusual or impractical nature are disclosed differing materially from conditions usually inherent in work of the character shown and specified, the attention of the Engineer shall be called immediately to such conditions before they are disturbed. Upon such notice, or upon observation of conditions, the Engineer will promptly make such changes in the Drawings and/or Specifications as he finds necessary to conform to the different conditions, and any increase or decrease in the cost of the Work resulting from such changes will be adjusted as provided under CHANGES IN THE WORK or EXTRA WORK as set forth in the GENERAL CONDITIONS.

4. EXPLANATIONS AND INTERPRETATIONS:

Should any bidder observe any ambiguity, discrepancy, omission, or error in the Drawings and Specifications, or in any other Contract Document, or be in doubt as to the intention and meaning thereof, he should at once report such to the Engineer and request clarification, in writing, with a copy of his request to the Contracting Officer. Clarification will be made only by written addenda sent to all prospective bidders. Neither the Engineer, nor the Contracting Officer will be responsible in any manner for verbal answers regarding intent or meaning of the Contract Documents, or for any verbal instructions, by whomsoever made, prior to the award of the Contract.

Should conflict occur in or between Drawings and Specifications, a bidder will be deemed to have estimated on the more expensive way of doing the work involved unless he shall have asked for and

obtained the written decision of the Engineer before submission of his bid as to method, materials, or equipment which will be required.

5. CONTENTS OF PROPOSAL FORMS:

The Contracting Officer as stated in the advertisement, will furnish bidders blank bid forms for the work contemplated, indicating the lump sum bid items, alternate bid items, and unit price bid items.

6. LIQUIDATED DAMAGES:

Time is the essence of the Contract and the bidder's attention is called to that clause of the GENERAL CONDITIONS which requires the deduction of a stipulated time charge equal to six percent interest per annum on the total Contract Price for the work for the entire period that any part of the work remains uncompleted after the time specified in the Contract documents for completion of the work which will be deducted by the Contracting Officer from the final estimate and retained by the Owner out of the moneys otherwise due the Contractor in the final payment, not as a penalty but as liquidated damages sustained by the Owner.

7. PREPARATION OF BID:

The bid must be submitted on the bid form furnished by the Owner or Contracting Officer as stated in the Invitation for Bids.

The bid shall be properly signed by the bidder. If the bidder is an individual, his name and post office address must be shown; if a firm or partnership, the name and post office address of each member of the firm or partnership must be shown; if a corporation, the President, Vice-President, or Secretary shall sign and affix the corporate seal, or if the person signing the bid is an agent, the said agent must attach written authorization from the President, Vice-President or Secretary of the corporation, and the bid must show the name of the corporation, the name of the state under the laws of which the corporation is chartered and the names, titles, and business address of the officers.

8. BID GUARANTY:

No bid submitted will be considered unless accompanied by a certified check or bid bond made payable to the Owner in an amount not less than five percent (5%) of the Contractor's bid, but in no event more than ten thousand dollars (\$10,000.00), as a guaranty that the bidder will enter into a contract with the Owner for the Performance of the work and furnish contract bonds for the work if it be awarded to him.

9. DELIVERY OF BIDS:

Each Bid shall be placed, together with Bid Guaranty, in a sealed envelope on the outside of which is written in large letters "Bid" and so marked as to identify the Work bid on and the name of the Bidder. Bid may be delivered in person, or by mail if ample time is allowed for delivery. When sent by mail, preferable special delivery or registered, the sealed Bid marked as indicated above, shall be enclosed in another envelope for mailing. Bid will be received at the place stated and until the hour of the date set in Invitation for Bids for their opening unless notice is given of postponement. No Bid will be accepted or considered which has not been received prior to the hour of the opening date.

10. WITHDRAWAL OR REVISION OF BIDS:

A Bid may be withdrawn at any time prior to the hour fixed for opening of Bids, provided a request in writing executed by the Bidder or his duly authorized representative is filed with the Contracting Officer prior to that time, in which case such Bid, when received will be returned to the Bidder unopened. Telegrams or written communications to correct Bid will be accepted and the Bid corrected in accordance therewith if received by the Contracting Officer prior to the hour set in the Invitation for Bids. No Bid shall be withdrawn, modified, or corrected after the hour set for opening such Bid.

11. OPENING OF BIDS:

Bids will be opened and read publicly at the time and place indicated in the Invitation for Bids. Bidders or their authorized agents are invited to be present.

12. IRREGULAR BID:

Bids may be rejected if they contain any omissions, alterations of forms, additions not called for, conditional bids, alternate bids unless called for, incomplete bids, erasures, or irregularities of any kind. Bids in which the unit or lump sum prices bid are obviously unbalanced may be rejected.

13. ERRORS IN BID:

In case of error in the extension of prices, the unit price will govern. In case of discrepancy between the prices shown in the figures and in words, the words will govern.

14. DISQUALIFICATION OF BIDDERS:

Any Bidder using the same or different names for submitting more than one Bid upon any unit, portion, part or section of work will be disqualified from further consideration on that part of the Work. Evidence that any bidder is interested, as a principal, in more than one Bid for the Work (for example, bidding in a partnership; as a joint partnership or association and as a Partnership, association, or individual) will cause the rejection of any such Bid. A Bidder may, however, submit a Bid as a principal and as a subcontractor to some other principal, or may submit a Bid as a subcontractor to as many other principals as he desires, and by so doing will not be liable to disqualification.

If there is reason for believing that collusion exists among the bidders any or all Bids may be rejected, and participants in such collusion may not be considered in future Bids for the same work. Bids in which prices are obviously unbalanced or unresponsive to the Invitation for Bids may be rejected.

The right is reserved to reject a Bid from Bidder who has not paid, or satisfactorily settled, all bills due for labor and material on former contracts in force at the time of letting.

15. CONSIDERATION OF BIDS:

After the Bids are opened and read, the Bid prices will be compared and the results of such comparison will be made public. Until the final award of the Contract, however, the Owner reserves the right to reject any all Bids, and to accept or reject any or all items of any bid and to waive technical errors and any informality if, in his judgement, the best interests of the Owner will thereby be promoted.

16. DETERMINATION OF LOW BIDDER:

The low bidder will be determined by the total Bid of all Items on the bid form that are accepted.

17. AWARD OF CONTRACT:

The Contract will be awarded to the lowest responsible bidder complying with all established requirements of the Contract Documents unless the Owner finds that his bid is unreasonable or that it is not in the interest of the Owner to accept it, and subject to the Owner's right to award on the basis of any bid item or any combination of bid items. A bidder to whom award is made will be notified at the earliest possible date.

18. RETURN OF BID GUARANTIES:

All Bid Guaranties, except those of the three lowest bona fide bidders, will be returned immediately after Bids have been checked, tabulated, and the relation of the Bid established. The Bid Guaranty of the three lowest bidders will be returned as soon as the Contract Bonds and the Contract of the successful Bidder have been properly executed and approved. Should no award be made within thirty days, all Bids will be rejected, and all guaranties returned, unless the successful Bidder agrees

in writing to a stipulated extension in time for consideration of his bid, in which case the Owner may, at his discretion, permit the successful Bidder to substitute a satisfactory bidder's bond for the certified check submitted with his Bid as a Bid Guaranty.

19. EXECUTION OF CONTRACT:

The Contract shall be signed by the successful Bidder, in the number of counterparts provided in the Contract Agreement, and returned to the Contracting Officer with satisfactory Contract Bonds.

20. REQUIREMENTS OF CONTRACT BONDS:

In order to insure the faithful performance of each and every condition, stipulation, and requirement of the Contract and to indemnify and save harmless the Owner from any and all damages, either directly or indirectly (arising out of any failure to perform same), the successful Bidder to whom the Contract is awarded shall furnish at his expense and file with the Contracting Officer an acceptable Surety Bond in the amount equal to one hundred (100) per cent of the Contract Price of the Contract as awarded. Said Bond shall be made on the approved Bond form, shall be furnished by a surety company duly authorized and qualified to make such bonds in the State of Alabama, shall be countersigned by an authorized agent resident in the State who is qualified for the execution of such instruments, and shall have attached thereto power of attorney of the signing official. In case of default on the part of the Contractor, all expenses incident to ascertaining and collecting losses suffered by the State under the Bond, the direct costs of administration, architectural, engineering, and legal services, shall lie against the Contract Bond for Performance of the Work.

In addition thereto, the successful Bidder to whom the Contract is awarded shall furnish at his expense and file with the Contracting Officer another Bond with good and sufficient surety payable to the Owner in an amount equal to fifty (50) per cent of the Contract Price, with the obligation that the Contractor shall promptly make payment to all persons furnishing him or them with labor, materials, equipment, or supplies for or in prosecution of the Work provided for in the Contract and for the payment of reasonable attorneys fees incurred by successful claimants or plaintiffs in suits on said Bond.

21. APPROVAL OF CONTRACT:

No Contract is binding upon the Owner until it has been executed by the Contracting Officer and approved by the Chief National Guard Bureau, and/or the State Building Commission as required by Federal and State laws and regulations.

22. FAILURE TO EXECUTE CONTRACT:

Should the successful Bidder or Bidders to whom a Contract is awarded fail to execute a Contract and furnish acceptable Contract Bonds within ten days following the date of Award, the Owner shall retain from the Proposal Guaranty if it be a certified check or recover from the Principal of the Sureties if the guaranty be a bond the difference between the amount of the Contract as awarded and the amount of the proposal of the next lowest bidder. If no other bids are received, the full amount of the Proposal Guaranty shall be so retained or recovered as liquidated damages for such default. Any sums so retained or recovered shall be the property of the Owner. In the event of the death of the low bidder (if an individual and not a partnership or corporation) between the date of the opening of bids and the ten days following the date of award of Contract allowed for furnishing the Contract Bonds, the Owner shall return the Proposal Guaranty intact to the estate of the deceased low bidder.

Failure by the Owner to complete the execution of a Contract and to issue a Notice to Proceed within thirty (30) days after its Presentation by the Contractor shall be just cause, unless both parties agree in writing to a stipulated extension in time for issuance of a Notice to Proceed, for withdrawal of the Contractor's bid and Contract Agreement without forfeiture of a certified check or bond.

SECTION 00 41 00 – PROPOSAL FORM

(Revision Date: 14 June 2022)

IFB # AC-22-C-0015-S

BID OPENING DATE: AUGUST 11, 2022

BIDDER _____

CONTRACTOR'S LICENSE NO. _____

TO: The Armory Commission of Alabama
State Military Property and Disbursing Officer
Headquarters, Alabama National Guard
1720 Cong. W.L. Dickinson Drive
Montgomery, Alabama 36109-0711

PROJECT: AASF# 3 ENTRY CONTROL POINT CONSTRUCTION
MOBILE, AL

In compliance with your Invitation for Bid, the undersigned hereby proposes to furnish the plant, labor, materials, and equipment and perform all work for the above described project in strict accordance with the specifications, drawings, and addenda number _____ for consideration of the following prices (bid prices do NOT include Sales or Use Taxes in accordance with Act 2013-205):

BID

PERFORM ALL WORK IN ACCORDANCE WITH THE DRAWINGS & SPECIFICATIONS FOR:
AASF #3 Entry Control Point Construction, Mobile, Alabama

**BASE BID (Maintenance of existing detention pond,
construction of new entrance driveway,
and construction of new entrance canopy.
See specifications & drawings for details)**

\$ _____

ALTERNATE BID ITEM #1 (Flag Pole)

\$ _____

ACCOUNTING OF SALES TAX

Pursuant to Act 2013-205, section 1(g) the Contractor accounts for sales tax NOT in the bid form as follows:

ESTIMATED SALES TAX AMOUNT

**BASE BID (Maintenance of existing detention pond,
construction of new entrance driveway,
and construction of new entrance canopy.
See specifications & drawings for details)**

\$ _____

ALTERNATE BID ITEM #1 (Flag Pole)

\$ _____

Failure to provide an accounting of sales tax shall render the bid non-responsive. Other than determining responsiveness, sales tax accounting shall not affect the bid pricing nor be considered in the determination of the lowest responsible and responsive bidder

TIME LIMIT: These bids are subject to an acceptance period of thirty (30) days.

A. All amounts and totals given will be subject to verification by the State. In case of variation between unit bid price and total shown by bidder, the unit price will be considered to be his bid. The State reserves the right to award the work on the basis of any bid or any combination of bids and to increase or decrease the quantities of any item listed in this bid at the price quoted for that particular item.

B. Bids shall be for the entire work and shall have each blank space filled in to include the "Estimated Sales Tax Accounting".

C. The quantities of each item of the bid as finally ascertained at the close of the contract will determine the total payment to accrue under the contract.

D. The bidder, upon request of written notice of award of the contract within thirty (30) days after the date of opening of bids, agrees that he will execute the construction contract in accordance with this bid as accepted, and if the consideration of the contract will exceed \$50,000.00 in amount, will furnish to the State a Performance Bond and a Payment Bond on AGO Forms, with good and sufficient surety or sureties as required by the specifications, at the time the contract is executed.

E. It is hereby warranted that in the event award is made to the undersigned, there will be furnished under this contract or used in the performance of the work covered by this contract, only such unmanufactured articles, materials, and supplies as have been mined or produced in the United States, and only such manufactured articles, materials, or supplies mined, produced or manufactured, as the case may be, in the United States, except as indicated in the bid documents..

F. The bidder further agrees that if awarded the contract, he will commence work within ten (10) calendar days after notice to proceed date and that he will fully complete the work ready for use not later than **240 calendar days** after notice to proceed date.

FIRM NAME _____

ADDRESS _____

PHONE _____

FAX _____

EMAIL _____

BY _____

SIGNATURE

PRINTED NAME _____

TITLE _____

STATE OF ALABAMA

CONTRACTOR'S LICENSE NO. _____

NOTES:

All bidders must be licensed under the provisions of Title 34, Chapter 8, Code of Alabama, 1975, as amended.

On projects bid at \$50,000.00 or more, the bidder must include his license number on the bid form in the prescribed place and on the outside of the envelope containing the bid, or otherwise the bid will not be considered.

Bid Prices do not include Sales or Use Taxes but these taxes are identified in the Estimated Sales Tax Amount section of this bid form.

SECTION 00 43 00 - FORM OF BID BOND

BID BOND

A completed/executed Standard Bid Bond form (Building Commission Form, AIA Form, GSA Standard Form, etc.) [A Power of Attorney is **REQUIRED** for all Bid Bonds] or a certified check made payable to the Armory Commission of Alabama in an amount not less than five (5) percent of the Contractor's bid, but in no event more than ten thousand dollars (\$10,000.00), must accompany all bids greater than \$50,000.00.

END OF SECTION

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SECTION 00 43 25 - SUBSTITUTION REQUEST FORM DURING BIDDING

(Revision Date - 14 June 22)

(BIDDERS SHALL USE THIS FORM FOR SUBMITTING SUBSTITUTION REQUESTS DURING BIDDING. OTHER FORMS OF SUBSTITUTION REQUESTS WILL NOT BE CONSIDERED. THIS FORM MUST BE RECEIVED BY ARCHITECT NOT LATER THAN 7 WORKING DAYS PRIOR TO BID OPENING DATE)

Project: AASF #3 Entry Control Point Construction Substitution Request Number: _____

IFB Project No.: IFB #: AC-22-C-0015-S Re: _____

From: _____

Specification Title: _____ Section: _____

Description: _____ Page: _____ Article/Paragraph: _____

Proposed Substitution: _____

Manufacturer: _____ Address: _____ Phone: _____

Trade Name: _____ Model No.: _____

Installer: _____ Address: _____ Phone: _____

History: New Product 1 – 4 years old 5 – 10 years old Exceeds 10 years old

Differences between proposed substitution and specified product: _____

Point by Point comparative data attached – REQUIRED BY ARCHITECT

Reason for not providing specified item: _____

Similar Installation:

Project: _____ Architect: _____

Address: _____ Owner: _____

_____ Date Installed: _____

Proposed substitution affects other parts of Work: ___ No ___ Yes

Explain _____

Savings to Owner for accepting substitution (include rough order of magnitude): \$ _____

Proposed substitution changes Contract Time (include rough order of magnitude): ___ No ___ Yes
[Add] [Deduct] _____ days.

Supporting Data Attached:

Drawings Product Data Samples Tests Reports _____

The Undersigned Certifies:

Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.

Same warranty will be furnished for proposed substitution as for specified product.

Same maintenance service and source of replacement parts, as applicable, is available.

Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.

Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.

Proposed substitution does not affect dimensions and functional clearances.

Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.

Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted By: _____ Signed By: _____

Firm: _____

Address: _____

Telephone: _____ Fax: _____

E-mail: _____ Website: _____

Attachments: _____

END OF SECTION

SECTION 00 45 19 – DISCLOSURE STATEMENT



State of Alabama

Disclosure Statement

(Required by Act 2001-955)

ENTITY COMPLETING FORM

ADDRESS

CITY, STATE, ZIP

TELEPHONE NUMBER

()

STATE AGENCY/DEPARTMENT THAT WILL RECEIVE GOODS, SERVICES, OR IS RESPONSIBLE FOR GRANT AWARD

Armory Commission of Alabama

ADDRESS

1720 Congressman W. L. Dickinson Drive

CITY, STATE, ZIP

Montgomery, AL 36109

TELEPHONE NUMBER

(334) 271-7274

This form is provided with:

☐

Contract

☐

Proposal

☐

Request for Proposal

☐

Invitation to Bid

☐

Grant Proposal

Have you or any of your partners, divisions, or any related business units previously performed work or provided goods to any State Agency/Department in the current or last fiscal year?

☐

Yes

☐

No

If yes, identify below the State Agency/Department that received the goods or services, the type(s) of goods or services previously provided, and the amount received for the provision of such goods or services.

STATE AGENCY/DEPARTMENT

TYPE OF GOODS/SERVICES

AMOUNT RECEIVED

Have you or any of your partners, divisions, or any related business units previously applied and received any grants from any State Agency/Department in the current or last fiscal year?

☐

Yes

☐

No

If yes, identify the State Agency/Department that awarded the grant, the date such grant was awarded, and the amount of the grant.

STATE AGENCY/DEPARTMENT

DATE GRANT AWARDED

AMOUNT OF GRANT

1. List below the name(s) and address(es) of all public officials/public employees with whom you, members of your immediate family, or any of your employees have a family relationship and who may directly personally benefit financially from the proposed transaction. Identify the State Department/Agency for which the public officials/public employees work. (Attach additional sheets if necessary.)

NAME OF PUBLIC OFFICIAL/EMPLOYEE

ADDRESS

STATE DEPARTMENT/AGENCY

OVER

SECTION 00 45 19 – DISCLOSURE STATEMENT

2. List below the name(s) and address(es) of all family members of public officials/public employees with whom you, members of your immediate family, or any of your employees have a family relationship and who may directly personally benefit financially from the proposed transaction. Identify the public officials/public employees and State Department/Agency for which the public officials/public employees work. (Attach additional sheets if necessary.)

NAME OF FAMILY MEMBER	ADDRESS	NAME OF PUBLIC OFFICIAL/ PUBLIC EMPLOYEE	STATE DEPARTMENT/ AGENCY WHERE EMPLOYED
--------------------------	---------	---	--

If you identified individuals in items one and/or two above, describe in detail below the direct financial benefit to be gained by the public officials, public employees, and/or their family members as the result of the contract, proposal, request for proposal, invitation to bid, or grant proposal. (Attach additional sheets if necessary.)

Describe in detail below any indirect financial benefits to be gained by any public official, public employee, and/or family members of the public official or public employee as the result of the contract, proposal, request for proposal, invitation to bid, or grant proposal. (Attach additional sheets if necessary.)

List below the name(s) and address(es) of all paid consultants and/or lobbyists utilized to obtain the contract, proposal, request for proposal, invitation to bid, or grant proposal:

NAME OF PAID CONSULTANT/LOBBYIST	ADDRESS
----------------------------------	---------

By signing below, I certify under oath and penalty of perjury that all statements on or attached to this form are true and correct to the best of my knowledge. I further understand that a civil penalty of ten percent (10%) of the amount of the transaction, not to exceed \$10,000.00, is applied for knowingly providing incorrect or misleading information.

Signature

Date

Notary's Signature

Date

Date Notary Expires

Act 2001-955 requires the disclosure statement to be completed and filed with all proposals, bids, contracts, or grant proposals to the State of Alabama in excess of \$5,000.

CONTRACT NO. AC-16-B-0021-S

00 52 00 - CONSTRUCTION CONTRACT FORM

STATE OF ALABAMA

THE ARMORY COMMISSION OF ALABAMA

CONSTRUCTION CONTRACT

**OWNER: THE ARMORY COMMISSION OF ALABAMA
P.O. BOX 3711
MONTGOMERY, ALABAMA 36109-0711**

**CONTRACTOR: (Contractor's Name)
(Street Address)
(City, State Zip)**

CONTRACT FOR: AASF #3 Entry Control Point Construction

CONSTRUCTION LOCATION: Mobile, Alabama

AMOUNT: (Dollar Amount)

PAYMENT TO BE MADE BY: STATE OF ALABAMA

FEDERAL:

STATE:

00 52 00 - CONSTRUCTION CONTRACT FORM

CONTRACT AGREEMENT FOR CONSTRUCTION

THIS AGREEMENT, entered into this **(day)** day of **(month)** **(year)** by and between The Armory Commission of Alabama (hereinafter called the Owner), and **(Contractor Name)**(hereinafter called the Contractor).

WITNESSETH that the Owner and the Contractor, in consideration of premises of the mutual covenants, considerations, and agreements herein contained, agree as follows:

STATEMENT OF WORK: The Contractor shall furnish all labor and materials and perform all work for **AASF #3 Entry Control Point Construction** in strict and entire conformity with the plans and specifications dated **February 2022** prepared by **Thompson Engineering** and approved by The Armory Commission, including Addenda thereto numbered **(Number)**, all of which are hereby made a part of this agreement as fully and to the same effect as if the same had been set forth at length in the body of this Agreement.

TIME OF COMPLETION: The work shall be commenced on a date to be specified in a written proceed order of the Contracting Officer and shall be completed within **(# of Days)** from and after said date as provided in the Contract documents.

00 52 00 - CONSTRUCTION CONTRACT FORM

COMPENSATION TO BE PAID: The Owner will pay and the Contractor will accept in full consideration for the performance of the Work, subject to additions and deductions (including liquidated damages) as provided in the Contract Documents, the sum of **(Contract Amount)**, being the amount of the Contractor's bid for the aforesaid work, including bid items **(Awarded Items)**. The Contractor and the Owner for themselves, their successors, executors, administrators, and assigns, hereby agree to the full performance of the covenants herein contained.

COMPLIANCE WITH ADDITIONAL STATE REQUIRED CLAUSES: By signing this contract, the Contractor hereby certifies compliance and agreement with the following clauses required by the State of Alabama:

1. In compliance with Act No. 2012-491, the contracting parties affirm, for the duration of the agreement, that they will not violate federal immigration law or knowingly employ, hire for employment, or continue to employ an unauthorized alien within the state of Alabama. Furthermore, a contracting party found to be in violation of this provision shall be deemed in breach of the agreement and shall be responsible for all damages resulting therefrom;
2. In compliance with Act 2016-312, the Contractor hereby certifies that it is not currently engaged in, and will not engage in, the boycott of a person or an entity based in or doing business with a jurisdiction with which this state can enjoy open trade;

00 52 00 - CONSTRUCTION CONTRACT FORM

3. In compliance with the merit system exclusion clause, the Contractor understands and agrees that the Contractor is not to be considered a State of Alabama merit system employee and is not entitled to any benefits of the State Merit System;

4. By entering into this contract, the Contractor is not an agent of the state, its officers, employees, agents or assigns. The Contractor is an independent entity from the State and nothing in this agreement creates an agency relationship between the parties.

IN WITNESS WHEREOF, the Parties hereto and on the day and year first above written have executed this Agreement in Three counterparts, each of which shall without proof or accounting for the other counterparts, be deemed as original thereof.

This Contract was let in accordance with the provisions of Title 39, Code of Alabama 1975 as amended, and applicable sections of Department of Defense Armed Services Procurement Regulation. The terms and commitments of this Contract do not constitute a debt of the State of Alabama in violation of Article 11, Section 213 of the Constitution of Alabama, 1901, as amended by Amendment Number 26.

00 52 00 - CONSTRUCTION CONTRACT FORM

WITNESSES:

CONTRACTING PARTIES:

(Contractor's Name)
Contractor

(Signature)

This contract has been reviewed for legal form and complies with all applicable laws, rules, and regulations of the State of Alabama governing these matters.

JAMES R. HOUTS
Deputy Attorney General

This contract has been reviewed for and is approved as to content.

MARK A. WEEKS
State Property & Disbursing Officer

NOTE: If the Contractor is a corporation, witnesses are not required, but the annexed certificate must be completed. Type or print names under all signatures.

00 52 00 - CONSTRUCTION CONTRACT FORM

ATTEST: The Armory Commission of Alabama

<hr/>	<hr/>
MARK A. WEEKS	SHERYL E. GORDON
Secretary	Major General, ALNG
The Armory Commission	The Adjutant General

ATTEST: APPROVED:

<hr/>	<hr/>
JOHN H. MERRILL	KAY IVEY
Secretary of State of Alabama	Governor, State of Alabama

00 52 00 - CONSTRUCTION CONTRACT FORM

CERTIFICATE

I, _____, certify that I am the _____ of the corporation named as Contractor herein; that xxxxxxxxx., who signed this contract on behalf of the Contractor, was then the xxxxxxxxx of said corporation; that said Contractor was duly signed for and in behalf of said corporation by authority of its governing body, and is within the scope of its corporate powers.

(S E A L)

NOTE: Contractor, if a corporation, should cause the above certificate to be executed under its corporate seal. THE SAME OFFICER SHALL NOT EXECUTE BOTH THE CONTRACT AND THE CERTIFICATE.

NOTE: In the event that the Contractor is not a corporation, the signature page must be witnessed by two individuals and this page may be left blank.

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SECTION 00 61 13 - PERFORMANCE BOND FORM

AGO Form 215 (16 Apr 80) (MOD JUL 87) (See Instructions Attached) (Page 1 of 3)		PERFORMANCE BOND	DATE BOND EXECUTED
PRINCIPAL (Legal name and business address)		TYPE OF ORGANIZATION ("X" Out) <input type="checkbox"/> Individual <input type="checkbox"/> Partnership <input type="checkbox"/> Joint Venture <input type="checkbox"/> Corporation <input type="checkbox"/> State of Incorporation _____	
SURETY(IES) (Name and business address)			
Penal Sum of Bond (Express in words & figures)			
Contract Number		Contract Date	
<p>KNOW ALL MEN BY THESE PRESENTS, That we, the Principal and Surety(ies) hereto, are firmly bound to the Armory Commission of Alabama in the above penal sum for the payment of which we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally: <i>Provided</i>, That, where the Sureties are corporations acting as co-sureties, we, the Sureties, bind ourselves in such sum "jointly and severally" as well as "severally" only for the purpose of allowing a joint action or actions against any or all of us, and for all other purposes each Surety binds itself, jointly and severally with the Principal, for the payment of such sum only as is set forth opposite the name of such Surety, but if no limit of liability is indicated, the limit of liability shall be the full amount of the penal sum.</p> <p>THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Principal entered into the contract identified above:</p> <p>NOW, THEREFORE, if the Principal shall:</p> <p>(a) Perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term of said contract and any extensions thereof that may be granted by the Armory Commission of Alabama through its Contracting Officer, with or without notice to the Surety(ies), and during the life of any guaranty required under the contract, and shall also perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of any and all duly authorized modifications of said contract that may hereafter be made, notice of which modifications to the Surety(ies) being hereby waived; and</p>			

- (b) PROVIDED, further, that upon the failure of the said PRINCIPAL to promptly and efficiently prosecute said Work, in any respect, in accordance with the Contract Documents, the above bound Surety(ies) shall take charge of said work and complete the Contract at his/their own expense, pursuant to its terms, receiving, however, any balance of the funds in the hands of said The Armory Commission of Alabama due under said contract.
- (c) The Invitation for Bids, Instructions to Bidders, Proposal, General and Special Conditions of the Contract, Detailed Specification Requirements, and Drawings, and the Contract Agreement hereinbefore referred to, and the Bond for the Payment of Labor, Materials, Food-stuffs, or Supplies executed under the provision of Chapter 1, Title 39, Alabama Code of 1975, are made a part of this obligation, and this instrument is to be construed in connection therewith.
- (d) If the said contract is subject to the Miller Act, as amended (40 U.S. Code 270a-270e), pay to the U.S. of America the full amount of the taxes imposed by the U.S. Government which are collected, deducted, or withheld from wages paid by the Principal in carrying out the construction contract with respect to which this bond is furnished; then the above obligation shall be void and of no effect.

IN WITNESS WHEREOF, the Principal and Surety(ies) have executed this performance bond and have affixed their seals on the date set forth above.

PRINCIPAL					
Signatures(s)	1.	2.	Corporate Seal		
	(Seal)	(Seal)			
Name(s) & Title(s) (Types)					
CORPORATE SURETY(IES)					
Surety A	Name & Address (Typed)		State of Inc.	Liability Limit	Corporate Seal
	Signature(s)	1.	2.		
	Names(s) & Title(s) (Typed)	1.	2.		
Surety B	Name & Address (Typed)		State of Inc.	Liability Limit	Corporate Seal
	Signature(s)	1.	2.		
	Names(s) & Title(s) (Typed)	1.	2.		

Bond Premium	Rate Per Thousand <hr style="width: 80%; margin: 0 auto;"/>	Total <hr style="width: 80%; margin: 0 auto;"/>
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INSTRUCTIONS

1. This form is authorized for use in connection with contracts for construction work or the furnishing of supplies or services. There shall be no deviation from this form without approval by the Armory Commission of Alabama.
2. The full legal name and business address of the Principal shall be inserted in the space designated "Principal" on the second page of this form. The bond shall be signed by an authorized person. Where such person is signing in a representative capacity (e.g., an attorney-in-fact), but is not a member of the firm, partnership, or joint venture, or an officer of the corporation involved, evidence of his authority must be furnished.
3. Corporations executing the bond as sureties must be licensed to do business in the State of Alabama. Where more than a single corporate surety is involved, their names and addresses (city and state) shall be inserted in the spaces (Surety A, Surety B) headed "CORPORATE SURETY(IES)", and in the space designated "SURETY(IES)" on the front page of this form, only the letter identification of the Sureties shall be inserted. Evidence of authority must be attached.
4. Corporations executing the bond shall affix their corporate seals. Individuals shall execute the bond opposite the word "Seal".
5. The name of each person signing this performance bond should be typed in the space provided.

END OF SECTION

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SECTION 00 61 16 - PAYMENT BOND FORM

AGO Form 214 5 AUG 82 (MOD 29 JUL 87) Page 1 of 2		PAYMENT BOND (See Instructions Attached)	Date bond executed
PRINCIPAL (Legal name and business address)		TYPE OF ORGANIZATION ("X" Out) <input type="checkbox"/> Individual <input type="checkbox"/> Partnership <input type="checkbox"/> Joint Venture <input type="checkbox"/> Corporation State of Incorporation	
SURETY (IES) (Name and Business Address)			
Penal Sum of Bond (Express in words & figures)			
Contract No.:		Contract Date:	
<p>KNOW ALL MEN BY THESE PRESENTS, That we, the Principal and Surety(ies) hereto, are firmly bound to the Armory Commission of Alabama in the above penal sum for the payment of which we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally: <i>Provided</i>, That, where the Sureties are corporations acting as co-sureties, we, the Sureties, bind ourselves in such sum "jointly and severally" as well as "severally" only for the purpose of allowing a joint action or actions against any or all of us, and for all other purposes each Surety binds itself, jointly and severally with the Principal, for the payment of such sum only as is set forth opposite the name of such Surety, but if no limit of liability is indicated, the limit of liability shall be the full amount of the penal sum.</p> <p>THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Principal entered into the contract identified above:</p> <p>NOW, THEREFORE, if the Principal shall promptly make payment to all persons supplying labor, equipment or supplies, and material in the prosecution of the work provided for in said contract and all duly authorized modifications of said contract that may hereafter be made, notice of which modifications to the Surety(ies) being hereby waived, then the above obligation shall be void and of no effect; otherwise to remain and be in full force and effect.</p> <p>PROVIDED, further, in the event that the said Principal, as such Contractor, shall fail to make prompt payment to all persons supplying him or them with labor, materials, feed-stuffs, or supplies for or in the prosecution of the Work provided for in such Contract, the above bound Surety(ies) shall be liable for the payment of reasonable attorney's fees incurred by successful claimants or plaintiffs in suits on said bond as provided in Chapter 1, Title 39, Code of Alabama 1975.</p> <p>PROVIDED, further, that said Principal and Surety hereby agree and bind themselves to the mode of service described in Chapter 1, Title 39, Code of Alabama 1975, and consent that such service shall be the same as personal service on said Principal or Surety.</p>			

(MOD 29 Jul 87)

IN WITNESS WHEREOF, the Principal and Surety(ies) have executed this payment bond and have affixed their seals on the date set forth above.

PRINCIPAL

Signature(s)	1. _____ (Seal)	2. _____ (Seal)	Corporate Seal
Name(s) & Title(s) (Typed)	_____	_____	

CORPORATE SURETY(IES)

Surety A	Name & Address (Typed)	_____	State of Inc.	Liability Limit	Corporate Seal
	Signature(s)	1. _____	2. _____		
	Name(s) & Title(s) (Typed)	1. _____	2. _____		
Surety B	Name & Address (Typed)	_____	State of Inc.	Liability Limit	Corporate Seal
	Signature(s)	1. _____	2. _____		
	Name(s) & Title(s) (Typed)	1. _____	2. _____		

Bond Premium	Rate Per Thousand _____	Total _____
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INSTRUCTIONS

1. This form, for the protection of persons supplying labor and material, shall be used whenever a payment bond is required under the act of Aug 24, 1935, 49 Stat. 793, as amended (40 U.S.C. 270a-270e). There shall be no deviation from this form without approval by the Armory Commission of Alabama.
2. The full legal name and business address of the Principal shall be inserted on the space designated "Principal" on this form. The bond shall be signed by an authorized person. Where such person is signing in a representative capacity (e.g. an attorney-in-fact), but is not a member of the firm, partnership, or joint venture, or an officer of the corporation involved, evidence of his authority must be furnished.
3. Corporations executing the bond as sureties must be licensed to do business in the State of Alabama. Where more than a single corporate surety is involved, their names and addresses (city and state) shall be inserted in the spaces (Surety A, Surety B, etc.) headed "CORPORATE SURETY(IES)", and in the space of the Sureties shall be inserted. Evidence of authority must be attached.
4. Corporations executing the bond shall affix their corporate seals. Individuals shall execute the bond opposite the word "Seal".
5. The name of each person signing this payment bond should be typed in the space provided.

END OF SECTION

CONTRACTORS PERIODICAL REQUEST FOR PARTIAL PAYMENT (Rev 12 MAR 2019)

PROJECT TITLE: _____ LOCATION: _____
 CONTRACT NUMBER: _____ NOTICE TO PROCEED DATE: _____
 OWNER: THE ARMORY COMMISSION OF ALABAMA, P.O. BOX 3711, MONTGOMERY, AL 36109
 CONTRACTOR: _____
 ADDRESS: _____
 FEDERAL IDENTIFICATION NUMBER: _____ INVOICE DATE: _____
 PARTIAL PAYMENT NO. _____ FINAL Pay Req? Yes ___ / No ___ PERIOD COVERED: _____

Item #	Description	Contract Price	Percent Complete	Amount Complete
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TOTAL ORIGINAL CONTRACT		\$0.00		\$0.00
Net Total of ALL Change Orders/Supplements No. _____ to _____				
TOTAL CONTRACT TO DATE		\$0.00		\$0.00

SECTION 00 62 76

Brought Forward			
TOTAL CONTRACT TO DATE	\$	0.00	\$0.00
		% Completed	
Stored Materials: (List)			
Amount of Stored Materials (*)		\$0.00	\$0.00
Total Completed & Stored Materials			\$0.00
Less Retainage (5% up to 50% of Contract Amount)			\$0.00
Total Due			\$0.00
Total Previous Payments			
BALANCE DUE THIS PAYMENT			\$0.00

* As stored materials are incorporated in the finished work, their value shall be deducted from Previous Stored Materials.

I certify that the above account is correct, just and that payment therefore has not yet been received.

Sworn to and subscribed before me this

_____ day of _____	_____ 20_____	CONTRACTOR
(Do NOT Type Above Information - Handwritten Date Info ONLY)		

_____	BY: _____	_____
(Notary Public)		(Signature)
	Printed Name: _____	
My Commission Expires: _____	Title: _____	

VERIFICATIONS AND APPROVALS

Checked by: _____	Date: _____
Architect/Architect's Representative	

Reviewed by: _____	Date: _____
Project Manager	

Approved by: _____	Date: _____
Contracting Officer/Contracting Officer's Representative	

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**THE ARMORY COMMISSION
OF ALABAMA**
P.O. Box 3711
MONTGOMERY, ALABAMA 36109-0711

State Property and Disbursing Office

May 27, 2014

MEMORANDUM FOR ALL Architect-Engineer Firms Preparing Bid Documents for Armory
Commission of Alabama and ALL Project Managers

SUBJECT: Act 2013-205, Certificate of Exemption from Sales and Use Tax for Armory
Commission Contracts

1. Act 2013-205 was signed into law on May 9, 2013, granting the Alabama Department of Revenue (ADOR) the authority to issue certificates of exemption from sales and use taxes for construction projects for certain governmental agencies. Enclosed are a Memo from Alabama Department of Revenue regarding the Sales Tax Exemption guidance and a copy of Act 2013-205.
2. A brief summary of Act 2013-205 as it pertains to Armory Commission Contracts is provided below:
 - a. ADOR shall issue certificates of exemption from sales and use tax to The Armory Commission of Alabama for each tax exempt project. The Armory Commission shall apply for certificates of exemption for each project. The contractor must also apply for certificates of exemption for each project for which they receive a contract.
 - b. Certificates of exemption shall only be issued for contracts entered into (awarded) on or after 1JAN14.
 - c. Certificates shall only be issued to contractors licensed by the State Licensing Board for General Contractors or any subcontractor working under the same contract.
 - d. Items eligible for exemption from sales and use tax are building materials, construction materials and supplies and other tangible personal property that become part of the structure per the written construction contract.
 - e. ADOR will handle the administration of certificates of exemption and the accounting of exempt purchases. ADOR will have the ability to levy fines and may bar the issuance or use of certificates of exemption upon determination of willful misuse by the contractor or a subcontractor.
 - f. The contractor shall account for the tax savings on the bid form by providing the estimated sales taxes for each item in the appropriate area on the bid form.
3. Contractors will NOT include sales taxes in their bids on the bid proposal form. Contractors **MUST** however include the estimated sales taxes for each listed bid item in the area identified on their bid proposal forms. This "accounting" for sales tax on the bid proposal form is required by Act 2013-205, Section 1 (g). Bid proposal forms with base bids and separate alternate bids will follow this procedure. The bid forms shall be modified for each project by the architect or engineer as appropriate to insure that EACH bid item is listed with NO sales taxes and then a separate area identifying the

estimated sales taxes for EACH of these items is identified and listed on the bid proposal form.

4. Failure of the contractor to complete the attachment to the bid proposal form indicating the sales tax as required by Act 2013-205, Section 1 (g) shall render the bid non-responsive.

5. Architects will address these tax reporting requirements in all future pre-bid conferences and will further prepare addenda which will inform all current plan holders of this tax exemption policy for the upcoming bid openings in June 2014.

6. It is the responsibility of the "contractor" to ensure they comply with Act 2013-205.

7. All future projects will include this information in the Instructions to Bidders. Should you have additional questions or need further information, please contact me by email mark.a.weeks3.nfg@mail.mil or phone (334) 271-7275.

Respectfully,

Enclosures

MARK A. WEEKS
Contracting Officer and Secretary,
The Armory Commission of Alabama



JULIE P. MAGEE
Commissioner

State of Alabama Department of Revenue

(www.revenue.alabama.gov)
50 North Ripley Street
Montgomery, Alabama 36132

MICHAEL E. MASON

Assistant Commissioner

JOE W. GARRETT, JR.

Deputy Commissioner

CURTIS E. STEWART

Deputy Commissioner

Alabama Department of Revenue NOTICE

Tax Guidance for Contractors, Subcontractors and Alabama Governmental Entities Regarding Construction-related Contracts

Legislative Act 2013-205 requires the Department of Revenue to issue Form STC-1, *Sales and Use Tax Certificate of Exemption for Government Entity Projects*, to all contractors and subcontractors working on qualifying governmental entity projects once the Form ST: EXC-01 is approved.

Each exempt entity, contractor and subcontractor must make application for qualification of the exemption using Form ST: EXC-01 for each tax-exempt project. The application is available on the department's website at <http://revenue.alabama.gov/salestax/ST-EXC-01.pdf>. Applications should be submitted directly to the Sales and Use Tax Division Central Office, P.O. Box 327710, Montgomery, AL 36132-7710.

The sales and use tax exemption provided for in Act 2013-205 applies to the purchase of building materials, construction materials and supplies, and other tangible personal property that become part of the structure pursuant to a qualifying contract entered into on or after January 1, 2014. Qualifying projects and contracts are those generally entered into with the following governmental entities, unless otherwise noted: the State of Alabama, a county or incorporated municipality of Alabama, an Alabama public school, or an Alabama industrial or economic development board or authority already exempt from sales and use taxes. **Please note that contracts entered into with the federal government and contracts pertaining to highway, road, or bridge construction or repair do not qualify for the exemption provided for in Act 2013-205.** [Reference: Sales and Use Tax Division Administrative Rule 810-6-3-.77 *Exemption for Certain Purchases by Contractors and Subcontractors in Conjunction with Construction Contracts with Certain Governmental Entities.*]

The Alabama Department of Revenue will assign each contractor and sub-contractor a consumers use tax account, if one is currently not in place, at the time the Form STC-1, *Sales and Use Tax Certificate of Exemption for Government Entity Projects*, is issued.

Contractors and sub-contractors for qualifying projects will be required to file monthly consumers use tax returns and report all exempt purchases for ongoing projects, as well as all taxable purchases on one return. These returns are required to be filed through the department's online tax return filing and payment portal, My Alabama Taxes (<https://myalabamataxes.alabama.gov>).

As another option for these types of contracts, as well as with other contracts entered into with other types of exempt entities, the Form ST:PAA1, *Purchasing Agent Appointment*, may be used. However, please be advised that the use of the Form ST:PAA1 option will require the exempt entity to be invoiced directly and pay for directly from their funds any construction and building material and supply purchases.

For additional information concerning this guidance, taxpayers should contact Sales and Use Tax Division representative Thomas Sims at 334-242-1574 or by email at Thomas.Sims@revenue.alabama.gov.

ACT 2013 - 205

1 HB419
2 150466-6
3 By Representative DeMarco
4 RFD: Ways and Means Education
5 First Read: 07-MAR-13



1
2 ENROLLED, An Act,

3 Relating to construction projects of the State of
4 Alabama, counties, municipalities, local boards of education,
5 industrial development boards, and other governmental entities
6 which are exempt from the payment of sales and use taxes on
7 the purchase of building materials and construction materials
8 to be included in construction projects of the governmental
9 entity; to provide for the Department of Revenue to grant
10 certificates of exemption from sales and use taxes to
11 contractors and subcontractors licensed by the State Licensing
12 Board for General Contractors for the purchase of building
13 materials and construction materials to be used in the
14 construction of a building or other project for the
15 governmental entity, with the exception of any highway, road,
16 or bridge project; to provide for accounting for purchases and
17 enforcement for violation of the act; and to authorize the
18 Department of Revenue to adopt rules to implement the act.

19 BE IT ENACTED BY THE LEGISLATURE OF ALABAMA:

20 Section 1. (a) For the purposes of this act, the
21 ~~term "governmental entity" means any governmental entity or a~~
22 ~~political subdivision, department, or agency of a governmental~~
23 ~~entity or a board, commission, or authority of a governmental~~
24 ~~entity which is tax exempt from sales and use taxes by virtue~~
25 ~~of its governmental status, including, but not limited to, all~~

1 ~~of the following: The State of Alabama, a county, a~~
2 ~~municipality, an industrial or economic development board or~~
3 ~~authority, and an educational institution of any of the~~
4 ~~foregoing including a public college or university, a county~~
5 term "governmental entity" means the State of Alabama and its
6 political subdivisions, including a county, a municipality,
7 and an industrial or economic development board or authority.
8 A governmental entity shall also include an educational
9 institution of any of the foregoing Alabama political
10 subdivisions including a public college or university, a
11 county or city board of education, and the State Board of
12 Education.

13 (b) (1) The Department of Revenue shall issue a
14 certificate of exemption to the governmental entity for each
15 tax exempt project.

16 ~~(b)~~ (2) The Department of Revenue shall grant a
17 certificate of exemption from state and local sales and use
18 taxes to any contractor licensed by the State Licensing Board
19 for General Contractors, or any subcontractor working under
20 the same contract, for the purchase of building materials,
21 construction materials and supplies, and other tangible
22 personal property that becomes part of the structure that is
23 the subject of a written contract for the construction of a
24 building or other project, not to include any contract for the
25 construction of any highway, road, or bridge, for and on

1 behalf of a governmental entity which is exempt from the
2 payment of sales and use taxes.

3 (c) The use of a certificate of exemption for the
4 purchase of tangible personal property pursuant to this
5 section shall include only tangible personal property that
6 becomes part of the structure that is the subject of the
7 construction contract. Any contractor or subcontractor
8 purchasing any tangible personal property pursuant to a
9 certificate of exemption shall maintain an accurate cost
10 accounting of the purchase and use of the property in the
11 construction of the project.

12 (d) A contractor who has an exemption from sales and
13 use tax for the purchase of materials to use on a government
14 project shall file, in a manner as prescribed by the
15 department, ~~an annual report~~ reports of all exempt purchases.
16 The ~~annual report~~ reports shall be filed as a prerequisite to
17 renewal of a certificate of exemption.

18 (e) (1) The department may assess any contractor or
19 subcontractor with state and local sales or use taxes on any
20 item purchased with a certificate of exemption not properly
21 accounted for and reported as required.

22 (2) Any contractor or subcontractor who
23 intentionally uses a certificate of exemption in violation of
24 this act shall, in addition to the actual sales or use tax
25 liability due, be subject to a civil penalty levied by the

1 department in the amount of not less than a minimum of two
2 thousand dollars (\$2,000) or two times any state and local
3 sales or use tax due for the property and, based on the
4 contractor's or subcontractor's willful misuse of the
5 certificate of exemption, may be barred from the use of any
6 certificate of exemption on any project for up to two years.

7 (f) The department may adopt rules to implement this
8 act in order to effectuate the purposes of this act and to
9 provide for accurate accounting and enforcement of this act.

10 (g) In bidding the work on a tax exempt project, the
11 bid form shall provide for an accounting for the tax savings.

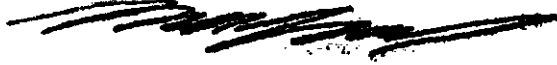
12 (h) The intent of this act is to lower the
13 administrative cost for the governmental entity, contractor,
14 and subcontractor for public works projects. It is not the
15 intent of this act to change the basis for determining
16 professional services from fair market value, which may
17 include sales and use taxes.

18 Section 2. This act shall be operative for contracts
19 entered into ~~October 1, 2013~~ January 1, 2014, or thereafter,
20 and shall not apply to any contract entered into prior to
21 January 1, 2014. In addition, this act shall not apply to any
22 contract change orders or contract extensions, including
23 revised, renegotiated, or altered contracts, when the original
24 contract was entered into prior to January 1, 2014. The


1 Department of Revenue may adopt rules to implement this act
2 after the effective date of this act.

3 Section 3. All laws or parts of laws which conflict
4 with this act are repealed.

5 Section 4. This act shall become effective October
6 1, 2013, following its passage and approval by the Governor,
7 or its otherwise becoming law.



 Speaker of the House of Representatives



 President and Presiding Officer of the Senate

House of Representatives

I hereby certify that the within Act originated in
 and was passed by the House 09-APR-13, as amended.

Jeff Woodard
 Clerk

Senate	_____	_____
	07-MAY-13	Amended and Passed
House	_____	_____
	09-MAY-13	Concurred in Sen- ate Amendment

APPROVED

May 9, 2013

TIME

5 pm



 GOVERNOR

Alabama Secretary Of State

Act Num....: 2013-205
 Bill Num....: H-419

Recv'd 05/10/13 09:48amSLF

HOUSE ACTION

I HEREBY CERTIFY THAT THE
RESOLUTION AS REQUIRED IN
SECTION C OF ACT NO. 81-889
WAS ADOPTED AND IS ATTACHED
TO THE BILL, H.B. 419

YEAS 84 NAYS 6

JEFF WOODARD, Clerk

I HEREBY CERTIFY THAT THE
NOTICE & PROOF IS ATTACHED
TO THE BILL, H.B. _____
AS REQUIRED IN THE GENERAL
ACTS OF ALABAMA, 1975 ACT NO.
919.

JEFF WOODARD, Clerk

CONFERENCE COMMITTEE

House Conferees _____

SENATE ACTION

DATE: 4-11 2013

RD 1 RFD F-1-E

This Bill was referred to the Standing
Committee of the Senate on
F-1-E

and was acted upon by such Committee in
session and is by order of the Committee
returned therefrom with a favorable report
w/amend(s) 1 w/sub 1 by a vote of
years 4 nays 7 abstain 1
this 24 day of April 2013
Patrick Harris, Chairperson

DATE: 4-20 2013

RF Favorable RD 2 CAL

DATE: 5-7 2013

RE-REFERRED 1 RE-COMMITTED 1
Committee _____

I hereby certify that the Resolution as
required in Section C of Act No. 81-889
was adopted and is attached to the Bill,
HB 419

YEAS 21 NAYS 2

PATRICK HARRIS,
Secretary

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00 62 78 INVENTORY OF STORED MATERIALS

INVENTORY OF STORED MATERIALS

Project: _____

For Period Ending _____

Contractor: _____

A	B	C	D	E	F
DESCRIPTION	MATERIALS STORED LAST PERIOD	PURCHASED THIS PERIOD	TOTAL COLUMNS B + C	MATERIALS USED THIS PERIOD	MATERIALS PRESENTLY STORED

To be used as documentation to support value of Stored Materials reported on CONTRACTOR'S PERIODICAL REQUEST FOR PARTIAL PAYMENT.

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00 62 83 CONTRACTOR'S DRAW SCHEDULE

Date Prepared: _____

Project Name: _____

Contract Number: _____

Contractor: _____

Architect/Engineer: _____

This draw schedule is to be updated monthly and the most current version **MUST** be submitted with each Contractor's Periodical Request for Partial Payment.

CURRENT MONTH/YEAR						
PROJECTED DRAW						
ACTUAL DRAW						
TOTAL AMOUNT OF DRAWS	0	0	0	0	0	0
CURRENT MONTH/YEAR						
PROJECTED DRAW						
ACTUAL DRAW						
TOTAL AMOUNT OF DRAWS	0	0	0	0	0	0
CURRENT MONTH/YEAR						
PROJECTED DRAW						
ACTUAL DRAW						
TOTAL AMOUNT OF DRAWS	0	0	0	0	0	0
CURRENT MONTH/YEAR						
PROJECTED DRAW						
ACTUAL DRAW						
TOTAL AMOUNT OF DRAWS	0	0	0	0	0	0

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00 63 56 – WEATHER DELAY DOCUMENTATION FORM
(Revised 3 August 2021)

To:
THOMPSON ENGINEERING
2970 Cottage Hill Rd Suite 190
Mobile, AL 36606
251-666-2443

From:
Contractor Name
Contractor Address
Contractor City, State Zip
Contractor Phone
Contractor Fax

PROJECT: (Name and address)	AASF #3 ENTRY CONTROL POINT CONSTRUCTION Mobile , Alabama	CONTRACT NO.	AC-16-B-0021-S
TO OWNER: (Name and address)	Armory Commission of Alabama 1720 Cong. W. L Dickinson Dr. Montgomery, Alabama 36109	DATE OF ISSUANCE:	

NOTICE OF WEATHER DELAYS:
FOR THE _____ (Month) OF 20 (Year):

This Monthly Notice is to document Weather Delays for the referenced project in order to formally present a Change Order Request for extension of the Contract Time.

The table below defines the monthly anticipated adverse weather for the contract period for exterior work and is based upon National Weather Service Climatological Data for the geographic location for the Project.

MONTHLY ANTICIPATED ADVERSE RAIN (in days) – CALENDAR DAYS

JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

Based on the above data for the geographic location of this Project, the monthly anticipated adverse weather calendar days for _____ (Month) is _____ (days).

From our Daily Project Reports and Recorded Weather Data, it has been determined that the Project experienced ____ days of adverse weather resulting in a partial or complete stoppage of work. The total number of adverse days, of ____ days exceeds the normal adverse weather days at this Project site for this month by ____ days. Therefore we respectfully request that the Contract Time be extended by ____ net days.

TOTAL NET DAYS REQUESTED FOR _____ (Month) OF 20 (Year)

TOTAL NET DAYS REQUESTED FOR PROJECT TO DATE: _____ (Days)

TOTAL NET DAYS APPROVED BY OWNER FOR PROJECT TO DATE: _____ (Days)

NOTE: The purpose of this form is to document Adverse Weather Days during the course of the Project. It does not relieve the Contractor of his responsibility to complete the Project in a timely manner and as scheduled.

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FORM OF ADVERTISEMENT OF COMPLETION

LEGAL NOTICE

In accordance with Chapter 1, Title 39, Code of Alabama, 1975, notice is hereby given that Contractor has completed the Contract for Project Name), Contract #, located at City, State, for the Armory Commission of Alabama, Owner, and have made request for final settlement of said Contract. All persons having any claim for labor, materials or otherwise in connection with this project should immediately notify the Armory Commission of Alabama, P.O. Box 3711, Montgomery, Alabama 36109-0711.

Contractor

Business Address

NOTE: This notice must be run once a week for four successive weeks. Proof of publication is required.

CERTIFICATE OF PUBLICATION

STATE OF ALABAMA

COUNTY OF _____

Before me, _____, a Notary Public, in
and for said County, personally appeared _____,
who duly sworn, deposes and says that he/she is the **PUBLISHER** of the _____
_____, a newspaper published weekly in _____,
_____ County, Alabama, and that the _____

a copy of which is attached hereto, was published in said newspaper for _____ consecutive weeks,
commencing in the issue of _____ (date), and ending in the issue of
_____ (date).

Publisher

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

Notary Public


AIA® Document G706™ – 1994
Contractor's Affidavit of Payment of Debts and Claims**PROJECT:** *(Name and address)*

x

ARCHITECT'S PROJECT NUMBER:

00000-00

OWNER: ☐**ARCHITECT:** ☐**CONTRACTOR:** ☐**SURETY:** ☐**OTHER:** ☐**TO OWNER:** *(Name and address)***CONTRACT FOR:** General Construction**CONTRACT DATED:** January 07, 2005**STATE OF:****COUNTY OF:**

The undersigned hereby certifies that, except as listed below, payment has been made in full and all obligations have otherwise been satisfied for all materials and equipment furnished, for all work, labor, and services performed, and for all known indebtedness and claims against the Contractor for damages arising in any manner in connection with the performance of the Contract referenced above for which the Owner or Owner's property might in any way be held responsible or encumbered.

EXCEPTIONS:**SUPPORTING DOCUMENTS ATTACHED HERETO:**

1. Consent of Surety to Final Payment. Whenever Surety is involved, Consent of Surety is required. AIA Document G707, Consent of Surety, may be used for this purpose

Indicate Attachment ☐ Yes ☒ No**CONTRACTOR:** *(Name and address)***BY:***(Signature of authorized representative)**(Printed name and title)*

The following supporting documents should be attached hereto if required by the Owner:

1. Contractor's Release or Waiver of Liens, conditional upon receipt of final payment.
2. Separate Releases or Waivers of Liens from Subcontractors and material and equipment suppliers, to the extent required by the Owner, accompanied by a list thereof.
3. Contractor's Affidavit of Release of Liens (AIA Document G706A).

Subscribed and sworn to before me on this date:

Notary Public:

My Commission Expires:



AIA® Document G706A™ – 1994

Contractor's Affidavit of Release of Liens

PROJECT: <i>(Name and address)</i>	ARCHITECT'S PROJECT NUMBER:	OWNER: <input type="checkbox"/>
x	00000-00	ARCHITECT: <input type="checkbox"/>
	CONTRACT FOR: General Construction	CONTRACTOR: <input type="checkbox"/>
TO OWNER: <i>(Name and address)</i>	CONTRACT DATED: January 07, 2005	SURETY: <input type="checkbox"/>
		OTHER: <input type="checkbox"/>

STATE OF:
COUNTY OF:

The undersigned hereby certifies that to the best of the undersigned's knowledge, information and belief, except as listed below, the Releases or Waivers of Lien attached hereto include the Contractor, all Subcontractors, all suppliers of materials and equipment, and all performers of Work, labor or services who have or may have liens or encumbrances or the right to assert liens or encumbrances against any property of the Owner arising in any manner out of the performance of the Contract referenced above.

EXCEPTIONS:

SUPPORTING DOCUMENTS ATTACHED HERETO:

1. Contractor's Release or Waiver of Liens, conditional upon receipt of final payment.
2. Separate Releases or Waivers of Liens from Subcontractors and material and equipment suppliers, to the extent required by the Owner, accompanied by a list thereof.

CONTRACTOR: *(Name and address)*

BY:

(Signature of authorized representative)

(Printed name and title)

Subscribed and sworn to before me on this date:

Notary Public:
My Commission Expires:


AIA® Document G707™ – 1994
Consent Of Surety to Final Payment

PROJECT: <i>(Name and address)</i> x	ARCHITECT'S PROJECT NUMBER: 00000-00	OWNER: <input type="checkbox"/>
	CONTRACT FOR: General Construction	ARCHITECT: <input type="checkbox"/>
TO OWNER: <i>(Name and address)</i>	CONTRACT DATED: January 07, 2005	CONTRACTOR: <input type="checkbox"/>
		SURETY: <input type="checkbox"/>
		OTHER: <input type="checkbox"/>

In accordance with the provisions of the Contract between the Owner and the Contractor as indicated above, the
(Insert name and address of Surety)

on bond of
(Insert name and address of Contractor)

, SURETY,

hereby approves of the final payment to the Contractor, and agrees that final payment to the Contractor shall not relieve the
 Surety of any of its obligations to
(Insert name and address of Owner)

, CONTRACTOR,

as set forth in said Surety's bond.

, OWNER,

IN WITNESS WHEREOF, the Surety has hereunto set its hand on this date:
(Insert in writing the month followed by the numeric date and year.)

(Surety)

(Signature of authorized representative)

Attest:
(Seal):

(Printed name and title)

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00 65 20 – CERTIFICATE OF FINAL COMPLETION FORM
(Revised 3 August 2021)

CERTIFICATE OF FINAL COMPLETION

Distribution to:

Thompson Engineering

2970 Cottage Hill Road Suite 190
Mobile, Alabama A/E City, State 36606
251-666-2443

OWNER	<input checked="" type="checkbox"/>
ARCHITECT	<input checked="" type="checkbox"/>
CONTRACTOR	<input checked="" type="checkbox"/>
OTHER	<input checked="" type="checkbox"/>

PROJECT: (Name and address)	AASF #3 ENTRY CONTROL POINT CONSTRUCTION Mobile, Alabama	AC-16-B -0021-S
--------------------------------	--	-----------------

TO OWNER: (Name and address)	Armory Commission of Alabama 1720 Cong. W. L. Dickinson Dr. Montgomery, Alabama 36109	TO CONTRACTOR: (Name and address)	XXXXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXX
---------------------------------	---	--------------------------------------	--

DATE OF ISSUANCE:	DATE	CONTRACT TYPE:	General Construction
		CONTRACT DATE:	MONTH DAY, YEAR

PROJECT OR DESIGNATED PORTION SHALL INCLUDE:
IMPROVEMENTS TO EXISTING ENTRY DRIVE AND NEW ENTRY CANOPY.

The Work performed under this Contract has been reviewed and found, to the Architect's best knowledge, information and belief, to be complete. Final Completion is the stage in the progress of the Work when the Work or designated portion thereof is complete in accordance with the Contract Documents so the Owner can occupy or utilize the Work for its intended use. The Date of Final Completion of the Project designated above is hereby established as the date of execution by the Owner as stated in the General Conditions, which is also the date of commencement of applicable warranties required by the Contract Documents.

The project is hereby certified by the Architect as completed.

Thompson Engineering

Architect:	By: NAME	Date:
------------	----------	-------

Contractor Name

Contractor:	By: NAME (FROM CONTRACT)	Date:
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The Owner accepts the Work as complete and will assume full possession thereof at TIME on DATE.

Armory Commission of Alabama

Owner:	By: AC Representative Name	Date:
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GENERAL CONTRACTOR'S ROOFING GUARANTEE

Contract No. _____

Project Name & Address	Project Owner(s) & Address

General Contractor's Name, Address, & Telephone Number	EFFECTIVE DATES OF GUARANTEE
	Date of Acceptance:
	Date of Expiration:

1. The General Contractor does hereby certify that the roofing work included in this contract was installed in strict accordance with all requirements of the plans and specifications and in accordance with approved roofing manufacturer's recommendations.
2. The General Contractor does hereby guarantee the roofing and associated work including but not limited to all flashing and counter flashing both composition and metal, roof decking and/or sheathing; all materials used as a roof substrate or insulation over which roof is applied; promenade decks or any other work on the surface of the roof; metal work; gravel stops and roof expansion joints to be absolutely watertight and free from all leaks, due to faulty or defective materials and workmanship for a period of five (5) years, starting on the date of Final Acceptance of the project. This guarantee does not include liability for damage to interior contents of building due to roof leaks, nor does it extend to any deficiency which was caused by the failure of work which the General Contractor did not damage or did not accomplish or was not charged to accomplish.
3. Subject to the terms and conditions listed below, the General Contractor also guarantees that during the Guarantee Period he will, at his own cost and expense, make or cause to be made such repairs to, or replacements of said work, in accordance with the roofing manufacturers standards as are necessary to correct faulty and defective work and/or materials which may develop in the work including, but not limited to: blisters, delamination, exposed felts, ridges, wrinkles, splits, warped insulation and/or loose flashings, etc. in a manner pursuant to the total anticipated life of the roofing system and the best standards applicable to the particular roof type in value and in accordance with construction documents as are necessary to maintain said work in satisfactory condition, and further, to respond on or within three (3) calendar days upon notification of leaks or defects by the Owner.

00 65 36 – State of Alabama Roofing Guarantee

- A. Specifically excluded from this Guarantee are damages to the work, other parts of the building and building contents caused by: (1) lightning, windstorm, hailstorm and other unusual phenomena of the elements; and (2) fire. When the work has been damaged by any of the foregoing causes, the Guarantee shall be null and void until such damage has been repaired by the General Contractor, and until the cost and expense thereof has been paid by the Owner or by the responsible party so designated.
- B. During the Guarantee Period, if the Owner allows alteration of the work by anyone other than the General Contractor, including cutting, patching and maintenance in connection with penetrations, and positioning of anything on the roof, this Guarantee shall become null and void upon the date of said alterations. If the Owner engages the General Contractor to perform said alterations, the Guarantee shall not become null and void, unless the General Contractor, prior to proceeding with the said work, shall have notified the Owner in writing, showing reasonable cause for claim that said alterations would likely damage or deteriorate the work, thereby reasonably justifying a termination of this Guarantee.
- C. Future building additions will not void this guarantee, except for that portion of the future addition that might affect the work under this contract at the point of connection of the roof areas, and any damage caused by such addition. If this contract is for roofing of an addition to an existing building, then this guarantee covers the work involved at the point of connection with the existing roof.
- D. During the Guarantee period, if the original use of the roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray cooled surface, flooded basin, or other use of service more severe than originally specified, this Guarantee shall become null and void upon the date of said change.
- E. The Owner shall promptly notify the General Contractor of observed, known or suspected leaks, defects or deterioration, and shall afford reasonable opportunity for the General Contractor to inspect the work, and to examine the evidence of such leaks, defects or deterioration.

IN WITNESS THEREOF, this instrument has been duly executed this _____ day of _____, 20 _____.

General Contractor's Authorized Signature

Typed Name and Title

GENERAL CONDITIONS OF THE CONTRACTCONTENTSParagraph No.

1. Contract Documents
2. Definitions, Intent, Correlation and Streamlining
3. Additional Detail Drawings and Instructions
4. Copies Furnished Contractor
5. Shop Drawings
6. Project and Record Documents
7. Ownership of Drawings
8. Samples
9. Progress Schedule and Charts
10. Materials, Equipment and Employees
11. Equipment and Material Deviation
12. Royalties, Patents and Copyrights
13. Surveys, Permits, Laws and Regulations
14. Protection of Work and Property
15. Climatic Conditions
16. Temporary Utilities
17. Inspection of the Work
18. Superintendence and Supervision
19. Changes in the Work
20. Claims for Extra Cost of Extra Work
21. Deductions for Uncorrected Work
22. Delays, Extension of Time
23. Correction of Work Before Final Payment
24. Correction of Work After Final Payment
25. Owner's Right to Correct Deficiencies
26. Owner's Right to Terminate Contract
27. Contractor's Right to Stop Work or Terminate the Contract
28. Applications for Partial and Final Payments
29. Verification, Certification and Approvals for Payment
30. Payments Withheld
31. Contractor and Subcontractors Insurance
32. Owner's Fire Insurance
33. Fire Insurance, Extended Coverage, Vandalism and Malicious Mischief
34. Contract Bonds
35. Damages
36. Liens
37. Assignment
38. Mutual Responsibility of Contractors
39. Separate Contracts
40. Subcontracts
41. Relations of Contractor and Subcontractors
42. Architect's Status
43. Architect's Decisions
44. Contracting Officer's Decisions
45. Cash Allowances
46. Use of Premises, Sanitary Provisions
47. Cutting and Patching
48. Periodic and Final Cleanup
49. Guarantee of the Work
50. Possession Prior to Completion
51. Liquidated Damages
52. Use of Foreign Materials
53. Withholding of Funds
54. Disputes Concerning Labor Standards
55. Disputes

56. Equal Opportunity
57. Certification of Non-Segregated Facilities
58. Exemptions to Equal Opportunity Clauses
59. Clean Air and Water
60. Clean Air and Water Certification
61. Exemptions to Environmental Protection Clause
62. Affirmative Action for Handicapped Workers
63. Covenant Against Contingent Fees
64. Officials Not to Benefit
65. Convict Labor
66. Nondiscrimination in Employment
67. Gratuities
68. Copeland (Anti-Kickback) Act - Nonrebate of Wages
69. Subcontracts -Termination
70. Audit by Department of Defense
71. Subcontractor Cost or Pricing Data - Price Adjustments
72. Buy American Act
73. Approval
74. Subject to Federal-State Agreement
75. Relationship of the Federal Government
76. Suspension of Work
77. Termination for Convenience of the Owner
78. Use of United States Flag Vessels
79. Debarment and Suspension
80. Nondiscrimination
81. Lobbying
82. Drug-Free Work Place
83. Environmental Standards
84. National Historic Preservation
85. Hatch Act
86. Cargo Preference
87. Relocation and Real Property Acquisition
88. Contract Work Hours and Safety Standards Act
89. Davis-Bacon Act
90. State Addendum

1. CONTRACT DOCUMENTS:

The Contract consists of the following CONTRACT DOCUMENTS, including all additions, deletions, and modifications incorporated therein before the execution of the Contract Agreement:

A. STATUTORY AND PROCEDURAL DOCUMENTS:

- (1) Advertisement for Bids (Invitation for Bids)
- (2) Instructions to Bidders (Information for Bidders)
- (3) Proposal (Bid)
- (4) Proposal Guaranty (Bidder's Bond)
- (5) Contract Agreement
- (6) Contract Bonds (Performance and Payment Bonds)

B. GENERAL CONDITIONS OF THE CONTRACT

C. DETAILED SPECIFICATION REQUIREMENTS

D. DRAWINGS

2. DEFINITIONS, INTENT, CORRELATION, AND STREAMLINING:

A. DEFINITIONS:

Wherever the following abbreviations and terms, or pronouns in place of them, are used in the Contract Documents, the intent and meaning shall be interpreted as follows:

(1) **ARCHITECT:** The architect, architectural firm, association, or corporation employed by the Owner, or, in case of the termination of his employment, his successor designated by the Owner, to furnish the working drawings and specifications in the Contract Documents, to prepare the Contract Documents, prepare details and explanatory drawings, and provide architectural instructions necessary for the execution of the Work, and to check and approve manufacturers' data and shop drawings and when so provided in his contract, to exercise general administration of the Contract under the direction of the Contracting Officer.

(2) **BIDDER:** The person, or persons, firm, partnership, association, corporation, or combination thereof, submitting a Bid for the Work, or any portion thereof, acting directly or through a duly authorized representative.

(3) **COMMISSION:** The Armory Commission of Alabama or any agency that may be designated by the Legislature as its successor.

(4) **CONTRACT AGREEMENT:** The written Contract Agreement executed between the Owner and the successful Bidder, covering the performance of the Work, by which the Contractor is bound to perform the Work and furnish the labor, materials and equipment under the terms of the Contract Documents, and by which the Owner is obligated to compensate him therefor at the mutually established and accepted rate or price, or as hereinafter provided.

(5) **CONTRACT BONDS:** The approved bonds furnished by the Contractor and his Surety to guarantee both completion of the Contract in accordance with the Contract Documents and prompt payment to all persons supplying him or them with labor, materials, supplies, etc.

(6) **CONTRACTOR:** The person or persons, firm, partnership, association or corporation, or combination thereof, that has entered into a Contract with the Owner for any work covered by the Contract Documents, acting directly or through his agents or employees.

(7) **CONTRACTING OFFICER:** The Contracting Officer of the Armory Commission, acting either upon his own initiative or through duly authorized representatives and inspectors, acting severally within the scope of the particular duties entrusted to them or the authority given them.

(8) **MODIFICATIONS OF THE GENERAL CONDITIONS:** Changes or modifications of the parts of the Armory Commission's Contract General Conditions.

(9) NOTICE TO PROCEED: A proceed order issued by the Contracting Officer after final execution of the Contract fixing the time within which the Contractor shall begin the prosecution of the Work.

(10) OWNER: The State of Alabama acting by and through the Armory Commission.

(11) BID: The written offer for the Work contemplated, when prepared and submitted by the Bidder in the required manner on the prescribed Bid Form, properly signed and guaranteed.

(12) SPECIAL CONDITIONS: Additional special or general requirements that are necessary and peculiar to the particular project and which are not included in the parts of the Armory Commission's standard General Conditions.

(13) SPECIFICATIONS: The general term comprising the Statutory and Procedural Documents, General Conditions of the Contract, the Detailed Standard and Project Specification requirements, together with all modifications thereof and all Addenda thereto.

(14) SUBCONTRACTOR: Any properly qualified individual, firm, association, or corporation undertaking the performance of any part of the Work under the terms of the Contract Documents by virtue of an agreement between himself and the Contractor with the written approval of the Contracting Officer.

(15) SURETY: The corporate body, licensed under the laws of Alabama, bound with and for the Contractor for the full and complete performance of the Contract and also for the payment of all claims recoverable under the Contract Bonds.

(16) THE PROJECT: The total construction designed by the Architect of which the Work performed under the Contract Documents may be the whole or a part.

(17) THE WORK: The Work includes all labor necessary to produce the construction required by the Contract Documents, and all materials and equipment incorporated or to be incorporated in such construction.

(18) USPFO: The United States Property & Fiscal Officer. The USPFO is the State of Alabama representative for the National Guard Bureau, Washington, D.C., an agency of the United States Department of Defense.

B. INTENT:

The intent of the Contract Documents is to include all labor, materials, water, fuel, tools, plants, utility, and transportation services, and all other incidental services and expenses necessary or required for proper execution and completion of the work.

C. CORRELATION:

(1) ORDER OF PRECEDENCE: Should any discrepancy arise between the various elements of the Contract Documents, precedence shall be given the same in the following order:

- (a) The Contract Agreement
- (b) The Detailed Specification Requirements
- (c) Details appearing on the Drawings
- (d) The Working Drawings

(2) WORDS AND TERMS: Words used in the documents will be given their usual and common meaning unless from the entire Contract it is clear that some other meaning was intended. Words describing material or work which have a well known technical meaning or trade meaning unless specifically defined in the Contract Documents, will be construed in accordance with such well known meaning recognized by architects, engineers, and the trades. Technical terms will be construed in a technical sense, and a specially widely adopted trade meaning afforded certain terminology will be taken into account in any interpretation containing such terminology.

(3) GENERAL AND SPECIAL CONDITIONS: Where both General and Special Conditions relate to the same thing, the Special will prevail; that is, the specific language will take precedence over the more general wording. However, where both the General and Special Conditions may be given reasonable effect, both are to be retained.

(4) PRINTING, TYPING, AND WRITING: When a printed portion of the Contract Documents cannot be reconciled with a typewritten portion, the latter will prevail. Various types of duplicating processes will be considered typewriting instead of printing. Also, if one is typewritten and the other written in longhand, the one written in longhand will govern. Likewise, written numbers will govern.

Written specifications will take precedence over drawings. If a correction is made in specifications or on a drawing and the original conflicting statement is not crossed out, then the revision, written in or drawn in, will be considered what was meant.

Obvious clerical or drafting errors or omissions revealed by perusal of the Contract Documents as a whole will be discounted in determining the intent of the parties, insofar as this may be accomplished without contravention of legal principles or public policy.

(5) DRAWINGS AND SPECIFICATIONS: The intent of the Specifications is to outline or indicate items of work on both, that cannot readily be shown on the Drawings and, further, to indicate types and qualities of materials and workmanship. Drawings and Specifications will be considered complimentary, and items of work mentioned or indicated on one and not on the other shall be included as if mentioned in both, except items definitely noted "Not in Contract" or marked "N.I.C."

(6) CONTRACTOR'S CHECK: Prior to the execution of the Work, the Contractor shall check the Drawings and Specifications and shall immediately report all errors, discrepancies, and/or omissions discovered therein by letter to the Architect with a copy to the Contracting Officer. All such errors, discrepancies, and/or omissions will be adjusted by the Architect and/or the Contracting Officer, who will notify the Contractor. Any adjustments made by the Contractor without prior approval will be at his own risk and the settlement of any complications arising from such adjustment will be at his own expense.

(7) EXPLANATIONS: Any doubt as to the meaning of the Specifications, or any obscurity as to the wording of them, will be explained by the Architect and all directions and explanations requisite or necessary to complete, explain or make definite any of the provisions of the Specifications and Drawings and given them due effect, will be given by the Architect in writing.

D. STREAMLINING:

(1) OMISSION OF WORDS AND PHRASES: The detailed Standard and Project Specifications are of abbreviated or "streamlined" type and include incomplete sentences in order to avoid cumbersome and confusing repetition of expression. Omissions of words or phrases such as "the Contractor shall," "in conformity therewith," "as noted," or "as indicated on the Drawings," "according to the Drawings," are intentional. Omitted words or phrases will be supplied by inference in the same manner as they are when a "note" occurs on the Drawings.

Wherever in the Specifications or upon the Drawings, APPROVED, AUTHORIZED, CONTEMPLATED, CONSIDERED NECESSARY, DEEMED NECESSARY, DESIGNATED, DIRECTED, GIVEN, ORDERED, PERMITTED, PRESCRIBED, REQUIRED, or words of like import are used, they shall be construed to mean and intend "by the Contracting Officer;" and, similarly, the words ACCEPTABLE, SATISFACTORY, or words of like import shall be construed to mean acceptable to or satisfactory "to the Contracting Officer," unless otherwise expressly stated or the Contract clearly indicates another meaning.

Words "furnish," "install," "perform," "provide," and "work" shall mean that the Contractor shall furnish, install, perform, provide and connect up complete in operative condition and use all materials, equipment, apparatus, and required appurtenances of the particular item to which it has reference.

(2) APPLICABLE PUBLICATIONS: Reference to standard specifications, associations, bureaus, organizations, or industries, and the like, shall mean the latest edition of such references adopted and published at date of Advertisement for Bids.

3. ADDITIONAL DETAIL DRAWINGS AND INSTRUCTIONS:

Further information and instructions may be issued by the Contracting Officer or prepared by the Architect and transmitted to the Contractor by the Contracting Officer or the Architect, during the progress of the Work by means of additional detail drawings or otherwise as deemed necessary to make more clear or specific the Drawings and Specifications in the Contract Documents, when and as required by the Work. All such drawings and instructions shall be consistent with the Contract Documents, true developments thereof, and reasonably inferable therefrom.

Any discrepancies found between the Drawings and Specifications and site conditions shall be immediately reported in writing to the Architect who will promptly correct such error or omission in writing. Any work done by the Contractor after his discovery of such discrepancies, errors, or omissions shall be done at his own risk.

In case of differences between small and large scale drawings, the large scale drawings shall govern.

Where on any of the drawings a portion of the Work is drawn out and the remainder is indicated in outline, the parts drawn out shall apply also to all other portions of the Work.

Where the word "similar" occurs on the Drawings, it shall be interpreted in its general sense and not as meaning identical, and all details shall be worked out in relation to their location and their connection with other parts of the Work.

If the Contractor considers that any work is required in a manner to make it impossible to produce first-class work, or should discrepancies appear among the Contract Documents, the Contractor shall request interpretation before proceeding with such work. If he fails to make such request, no excuse will thereafter be entertained for failure to carry out the work in a satisfactory manner.

4. COPIES FURNISHED CONTRACTOR:

Except as otherwise provided, all required copies of Drawings and Specifications reasonably necessary for the execution of the Work will be furnished to the Contractor by the Architect or Contracting Officer without charge. Other copies requested will be furnished at reproduction cost.

5. SHOP DRAWINGS:

The Contractor shall check the Contract Drawings for accuracy and verify with field measurements as necessary. He shall submit to the Architect, with his criticism and/or approval, all layouts, detail schedules, shop drawings, and setting or erection drawings as required by the Specifications or requested by the Contracting Officer for proper installation of materials, without causing delay in the Work. The Contractor shall check Subcontractors' shop drawings for accuracy and see that work contiguous with and having bearing on work indicated on shop drawings is accurately and distinctly illustrated. Shop drawings shall be dated, numbered consecutively, show working and erection dimensions and necessary details, including complete information for connecting to other work. Any work required by shop drawings that is fabricated by the Contractor prior to approval shall be at his own risk.

All drawings and schedules, accompanied by a letter of transmittal containing project number, number of drawings, titles, or other pertinent data, shall be submitted to the Architect in quintuplicate by the Contractor (with his stamp of approval thereon) sufficiently in advance of construction requirements to allow checking, correcting, resubmitting, and rechecking. A duplicate of said letter, only, shall be mailed simultaneously to the Contracting Officer. If shop drawings show variations from the requirements of the Contract Documents because of standard shop practice or other reasons, specific mention of such variations shall be made in the letter of submittal.

Satisfactory drawings will be so identified, dated, approved, and three copies or sets returned to the Contractor by the Architect. Should shop drawings be disapproved, three sets will be returned to the Contractor by the Architect indicating corrections and changes to be made.

Such corrections, changes, including design and artistic effect, shall be made by the Contractor and bound sets of shop drawing prints shall be submitted in quintuplicate to the Architect until final approval is obtained. No corrections or changes indicated on shop drawings will be considered as Extra Work.

The approval of shop drawings, schedules, and setting drawings will be general and, except in departures found to be in the interest of the Owner and so minor as not to involve a change in the Contract Price or performance time, shall not be construed (1) as permitting any departure from contract requirements; (2) as relieving the Contractor of the responsibility for any error in details, dimensions, or otherwise that may exist in shop drawings or schedules; (3) as approving departures from Drawings and Specifications or from additional details or instructions previously furnished by the Architect, unless he has in writing called attention to such deviations at the time of submission, and secured written approval.

6. PROJECT AND RECORD DOCUMENTS:

The Contractor shall keep on the site of the work in good order, at least one set of his Contract Drawings including shop drawings, Specifications, and all authorized Change Orders, and shall at all times give the Owner, Architect, and their authorized representatives access thereto.

The Contractor shall also keep in his office on the site of the work the two sets of Contract Drawings and Specifications furnished by the Owner, herein referred to as RECORD DRAWINGS, on which shall be recorded all work as built or installed, and such other information as is specified or required. He shall carefully draw and letter notes of explanation, in ink, on both sets of Record Drawings, or furnish two copies of detailed sketches as the Contracting Officer may require, as a fully dimensioned record of all work. The Record Drawings, supplemented by any detailed sketches deemed necessary, shall indicate the Work "AS BUILT". The Contractor will be required to prepare new drawings if the indications on the Record Drawings or the detailed sketches are illegible or otherwise unsatisfactory for future reference. Each record or correction made on such drawings will be initialed and dated by the Supervisor or Inspector.

7. OWNERSHIP OF DRAWINGS:

All original or duplicated Drawings and Specifications, and other data prepared by the Architect, and copies thereof prepared and furnished to the Contractor by the Architect are the property of the Armory Commission.

Upon completion of the Work all copies of Drawings and Specifications, with the exception of two sets retained by the Contractor, and two sets of RECORD DRAWINGS, shall be returned by the Contractor to the Architect. The Record Drawings will be delivered by the Architect to the Owner on Completion of the Work.

8. SAMPLES:

The Contractor shall, without undue delay, furnish and submit to the Architect any samples that require the Architect's approval, and also any samples that may be requested by the Contracting Officer, of any and all materials or equipment he proposes to use, and shall prepay all shipping charges on the samples. Samples shall be furnished sufficiently in advance to allow the Architect and/or Contracting Officer reasonable time for examination, investigation, or consideration, without delay to the Work.

The Contractor shall provide Subcontractors and his prospective manufacturers, material dealers or suppliers with complete information of pertinent contract requirements and all transactions therewith shall be through the Contractor.

No materials or equipment of which samples are required to be submitted for approval shall be used on the Work until such approval has been received, save only at the Contractor's risk and expense.

Each sample shall have a label indicating the material represented, its place of origin and the name of the producers, the Contractor, and the building or Work for which the material is intended. Where manufacturer's printed instructions for installations are required, duplicate copies of such directions shall be submitted with samples.

Samples of finished material shall be marked to indicate where the materials represented are required by the Drawings or Specifications.

A letter, submitting each shipment of samples shall be mailed by the Contractor to the Architect containing a list of the samples, the name of the building or Work for which the materials are intended, and the brands of materials and names of the manufacturers.

After a material has been approved by the Architect with the approval of the Contracting Officer, if required, no additional samples of that material will be considered and no change in brand or make will be permitted.

Approved samples of hardware, in good condition, may be suitably marked for identification and used in the Work.

The approval of any sample by the Architect or Contracting Officer will be only for the characteristics or for the uses named in such approval and shall not be construed in itself to change or modify any Contract requirements.

Failure of any materials to pass the specified tests will be sufficient cause for refusal to consider any further samples of the same brand or make of that material for use in the Work.

Test samples as the Architect or Contracting Officer may deem necessary, will be produced from the various materials delivered to the Contractor for use in the Work. If any of these test samples fail to meet the specification requirements, any previous approval will be withdrawn and such materials shall be subject to removal and replacement by the Contractor with materials or equipment meeting the specification requirements, the defective materials may be permitted to remain in place subject to proper credit or adjustment of the Contract Price as hereinafter set forth under DEDUCTIONS FOR UNCORRECTED WORK.

The costs of tests will be borne by the Owner except where laboratory tests as hereinafter specified are required by the specifications.

9. PROGRESS SCHEDULE AND CHARTS:

The Contractor shall within five days after date of commencement of work, prepare and submit to the Architect for approval, a practicable schedule showing the order in which the Contractor proposes to carry on the Work, the date he will start the several salient features, including procurement of material, plant, and equipment and the contemplated date of completion of same.

The schedule shall be in the form of a conventional Progress Chart of suitable scale to indicate appropriately the percentage of work scheduled for completion at any time. The Contractor shall enter on the chart his actual progress, preferably at the end of each week, but in any event at the end of each month, and deliver to the Architect two copies thereof and attach one to his monthly Application for Partial Payment.

If, in the opinion of the Architect or the Contracting Officer, the Contractor falls materially behind his progress schedule, the Contractor shall take such steps as may be necessary to improve his progress and the Architect or the Contracting Officer may require him to increase the number of shifts, and/or overtime operations, and/or the amount of construction plant, and to submit for approval such supplementary schedules in chart form as may be deemed necessary to demonstrate the manner in which the agreed rate of progress will be regained, all without additional cost to the Owner.

Failure of the Contractor to comply with the requirements of the Architect or the Contracting Officer as above set forth will be grounds for determination by the Architect or the Contracting Officer that the Contractor is not prosecuting the Work with such diligence as will insure completion within the Contract Time. Upon determination of unreasonable delay, the Owner may terminate the Contractor's right to proceed with the Work, or any separable part thereof.

10. MATERIALS, EQUIPMENT, AND EMPLOYEES:

Unless otherwise stipulated, the Contractor shall furnish all material, equipment, tools, labor, water, light, power, transportation, other services or facilities and incidentals for the proper execution and completion of the Work. Unless otherwise stipulated, all materials and equipment incorporated in the Work shall be new.

All labor shall be performed in the best and most workmanlike manner by persons skilled in their respective assignments or trades. Workmen whose work is unsatisfactory to the Architect or the Contracting Officer, or who are considered unfit or unskilled, or otherwise objectionable, shall be dismissed upon notice from the Architect or Contracting Officer.

11. EQUIPMENT AND MATERIAL DEVIATIONS:

Whenever any material or piece of equipment is identified on the plans or in the specifications by reference to manufacturer's names, model numbers, etc., it is intended to establish a required standard of design and quality, and is not intended to limit competition. It shall be expressly understood that the phrase "or approved equal" is hereby inserted following the naming of manufacturers for any material or equipment, whether such phrase occurs in the specifications, or not.

When the specifications and/or drawings indicate only one or two manufacturers' names for material or equipment to be used, the bidder may submit his bid based on material or equipment of manufacturers not named but considered by the bidder to be equal to the standard of design and quality as specified; however, such substitutions must be approved by the Architect. If the bidder elects to bid on a substitution without securing written approval of the Architect prior to receipt of bids, then it will be understood that proof of compliance with specified requirements is the direct responsibility of the bidder and no such material or equipment may be purchased or installed without written approval by the Architect.

When the specifications and/or drawings indicate three or more manufacturers' names for material or equipment to be used, the bids shall be based upon the equipment and material so named, unless the bidder desires to bid on an "approved equal". In case the bidder desires to substitute an "equal" he must secure written approval by the Architect of qualification to bid prior to date for receiving bids. If no request to substitute an "approved equal" is made by the bidder, and approved by the Architect, then it will be expressly understood that all such material and equipment so named or described in the specifications and on the drawings will be furnished in full accordance with the Contract Documents.

12. ROYALTIES; PATENTS; AND COPYRIGHTS:

The Contractor shall pay all royalties and license fees. The Contractor shall hold and save the Owner and his agents and employees harmless from liability of any nature or kind, including cost and expenses, for or on account of any patented or unpatented invention, process, article, or appliance manufactured or used in the performance of the Contract, including its use by the Owner.

If the Contractor has information that any process, article or item specified or delineated by the Architect is an infringement of a patent, or a copyright, he shall promptly give such information to the Architect.

13. SURVEYS, PERMITS, LAWS, AND REGULATIONS:

The Contractor shall provide competent engineering services to execute the Work in accordance with contract requirements. He shall verify the figures given for the contours, approaches and locations shown on the Drawings before undertaking any construction work and be responsible for the accuracy of the finished work. Without extra cost to Owner, he shall engage a licensed surveyor if necessary to verify boundary lines, keep within property lines, and shall be responsible for encroachments on rights or property of public or surrounding property Owners.

The Contractor shall establish all base lines for the location of the principal components of the Work and make all detail surveys necessary for construction, including slope stakes, batter boards and other working points, lines and elevations.

If the Contractor finds any errors or discrepancies, or that any previously established references have been destroyed or misplaced, he shall promptly notify the Architect.

The Contractor shall obtain and pay for all licenses and permits and shall pay all fees and charges for connection to outside service and the use of property, other than the site of the Work, required for the execution and completion of the Work.

The Contractor shall give all notices and comply with all laws, ordinances, rules, regulations, and building code requirements applicable to or bearing on the conduct of the Work unless in conflict with Contract requirements. If the Contractor ascertains at any time that any requirement of the Contract is at variance with applicable laws, ordinances, regulations, or building code requirements, he shall promptly notify the Architect, and any necessary adjustment of the Contract will be made as hereinafter specified under CHANGES IN THE WORK.

The Contractor shall pay all applicable Federal, State and local taxes and assessments on the real property of the site of the Work.

Wherever the law of the place of building requires a special sales tax, consumer, use, occupation, or other tax, the Contractor shall pay such tax.

14. PROTECTION OF WORK AND PROPERTY:

The Contractor shall at all times adequately maintain, guard and protect his own work from damage, and safely guard and protect the Owner's property from injury or loss arising in connection with this Contract. He shall make good any such damage, injury or loss, except such as may be directly due to errors in the Contract Documents or caused by agents or employees of the Owner.

He shall adequately protect adjacent property as provided by law and Contract Documents.

Any damage to existing structures, or the interruption of a utility service shall be repaired or restored promptly by and at the expense of the Contractor.

The Contractor shall protect all existing vegetation such as trees, shrubs, and grass on or adjacent to the site which are not required to be removed or do not unreasonably interfere with construction, as may be determined by the Architect or Contracting Officer, and be responsible for all unauthorized cutting or damaging of trees and shrubs, including damage due to careless operation of equipment, stockpiling of materials, on grass areas by equipment.

Care shall be taken by the Contractor in felling trees that are to be removed to avoid any unnecessary damage to vegetation or other trees that are to remain in place. Any limbs or branches unavoidably broken during such operations shall be trimmed with a clean cut and painted with an approved tree priming compound. The Contractor may be required to replace or restore at his own expense all vegetation not protected and preserved, as above required, that may be destroyed or damaged.

The Contractor shall provide and maintain all passageways, guard fences, lights, and other facilities required for protection by state or municipal laws and regulations or local conditions.

The Contractor shall take all necessary precautions for the safety of employees on the Work and shall comply with all applicable provisions of federal, state, and municipal safety laws and building codes to prevent accidents or injury to persons on or about or adjacent to the premises where the Work is being performed. He shall erect and properly maintain at all times, as required by conditions and progress of the Work, all necessary safeguards for the protection of workmen and the public, and shall post danger signs warning against the hazards created by such features of construction as protruding nails, hoists, well holes, elevator hatchways, scaffolding, window openings, stairways, and falling materials.

Machinery, equipment and all hazards shall be guarded or eliminated in accordance with the latest edition of the Manual of Accident Prevention in Construction of the AGC to the extent that such provisions are not in contravention of applicable laws.

In case of an emergency which threatens loss or injury of property, and/or safety of life, the Contractor may act, without previous or special instructions from the Architect, or the Contracting Officer, at his discretion; and shall so act, without appeal, if so instructed or authorized by the Architect or the Contracting Officer.

Any compensation claimed by the Contractor as Extra Work on account of emergency work, together with substantiating documents in regard to expense, shall be submitted through the Architect to the Contracting Officer who will determine the amount of compensation.

15. CLIMATIC CONDITIONS:

When so ordered by the Architect or Contracting Officer, the Contractor shall suspend any work that may be subject to damage by climatic conditions.

16. TEMPORARY UTILITIES:

Unless otherwise agreed to by the Owner in writing, the Contractor shall provide all necessary utility services, at his expense, until the job is complete and accepted by the Owner. All utilities services shall include, but not be limited to, the following: electricity; gas; water; sewer; telecommunications; waste (dumpster) disposal, etc.

The Contractor shall provide all utility services as necessary to install and/or test all work and materials, and further to protect and maintain all work and materials against injury or damage from heat or cold and from humidity/dampness. The Contractor shall continue to provide these services, at his expense, until completion and final acceptance by the Owner of all work in the Contract. The Contractor may be relieved of utilities expenses, in whole or part, should the building(s) be fully occupied by the Owner prior to such final acceptance of the work. The Contractor may petition in writing for the Owner to consider this relief of utilities expenses (either partially or wholly) due to this full occupation of the building(s) by the Owner. The Owner must provide a written and signed agreement in order to relieve Contractor of the utilities expenses. Any such date of relief shall be as established in this written agreement.

In the absence of any such written agreement by the Owner, the Contractor shall continue to provide heat and conditioned air as necessary to protect all work and materials against injury from dampness and heat/cold until final acceptance of all work in the Contract as indicated herein.

A. HEATING: During cold weather or the winter months, the Contractor shall provide heat and weather protection as follows:

(1) At all times during the placing, setting, and curing period of concrete, sufficient heat to insure the heating of spaces to not less than 50° F. or in accordance with the manufacturer's recommendations.

(2) From the beginning of the application of plaster and during the setting and curing period, sufficient heat to produce a temperature of not less than 50° F. or in accordance with the manufacturer's recommendations.

(3) For a period of ten days previous to the placing of interior wood finish work and throughout the placing of wood finish and other interior finishing, varnishing, painting, etc., and until final acceptance of the Work, sufficient heat to produce a temperature of not less than 70° F. or in accordance with the manufacturer's recommendations.

(4) Provide temporary closures for windows, doors, and all temporary openings and take every reasonable precaution to prevent the escape of warm air from or entrance of cold air into the building. Except as elsewhere called for, the temperature required in the unoccupied spaces will be from 45° F. to 65° F.

B. VENTILATION and AIR CONDITIONING: During hot weather or the summer months, the Contractor shall provide ventilation and/or air conditioning as required in order to maintain the temperature of the interior of the building(s) between 70° F. and 80° F. The Contractor shall also maintain the humidity level of the interior of the building(s) within the ranges specified in the Contract Documents.

C. In all cases, Contractor shall be responsible to maintain the appropriate temperature range and humidity levels as is recommended by the manufacturer of all the various building materials, furnishings, equipment, components, systems, etc. to prevent any damage due to heat or cold or humidity.

D. Unless otherwise agreed to by the Owner in writing, the Contractor shall continue to provide these utility services, at his expense, until the job is complete and accepted by the Owner.

17. INSPECTION OF THE WORK:

The Architect, the Contracting Officer, any Federal or State agency having jurisdiction, and their representatives shall have access at all times to the Work for inspection whenever it is in preparation or progress, and the Contractor shall provide proper facilities for such access and inspection.

All materials, workmanship, processes of manufacture, and methods of construction, if not otherwise stipulated in the Specifications, shall be subject to inspection, examination, and test by the Architect (or his

duly authorized representative) at any and all places where such manufacture and/or construction are being carried on. The Architect shall have the right to reject defective material and workmanship or require its correction. Rejected workmanship shall be satisfactorily corrected, and rejected material shall be satisfactorily replaced with proper material without charge therefor, and the Contractor shall promptly segregate and remove the rejected material from the premises.

The Contracting Officer will appoint or assign architectural and engineering Inspectors, with designated duties and restricted authority, to inspect the Work as he may direct, or to make special inspections requested in advance by the Contractor, and to report to him progress of the Work, and manner of procedure, quality of the material and workmanship, and compliance with the Contract Documents. Inspectors shall have the authority to give directions for the safety and convenience of the public, and concerning the conduct of the Work; to advise the Contractor to avoid his making errors and to expedite his correction of deviations in the Work, to reject materials, workmanship, or equipment clearly defective or otherwise not in accordance with the Drawings and Specifications; but neither the presence nor absence of such Inspectors shall relieve the Contractor from any contract requirement.

Neither the Inspectors, nor the Architect, will be authorized to revoke, alter, relax, or waive, any requirements of the Contract Documents, to finally approve or accept any portion of the Work or to issue instructions contrary to the Drawings and Specifications; nor shall they supervise and direct work for the Contractor, nor unreasonably interfere with the Contractor's operations beyond the extent necessary to make certain that the Work is being carried out according to the contract requirements.

Any advice which they may give the Contractor shall not be construed as binding the Owner or the Contracting Officer in any way, nor as releasing the Contractor from any of the contract requirements.

If the Contractor considers any work demanded of him to be outside the contract requirements, or any record or ruling of the Architect or an Inspector to be unfair, he may immediately, upon such work being demanded or ruling made, request written instructions from the Architect, or Inspector, or within ten days file an appeal with the Contracting Officer, stating clearly and in detail the basis of his objections. However, pending the Contracting Officer's decision on such appeal, no work shall be done in disregard of the rulings of the Architect or Inspector or his instructions on items of work affected by such appeal.

The Contractor shall furnish promptly, without extra compensation, all reasonable facilities, labor, and material necessary for safe and convenient access, inspection, and tests that may be required by the Contracting Officer or the USPFO. All inspections and tests will be performed in such a manner as not to cause unnecessary delay of the work. Special, full size, and performance tests shall be as described in Sections of the Specifications. The Contractor shall be charged any extra cost of inspection incurred by the Owner on account of material and workmanship not being ready at time of inspection set by the Contractor.

Should it be considered necessary or advisable by the Owner, or by the representatives of the Chief, National Guard Bureau, at any time before final acceptance of the entire work to make an examination of work already completed by uncovering, or removing or tearing out same, the Contractor shall, on request, promptly furnish all necessary facilities, labor, and materials. If such work is found to be defective in any material respect, due to the fault of the Contractor or his subcontractors, he shall defray all expense of such examination and of satisfactory reconstruction. If, however, such work is found to meet the requirements of the Contract Documents, work of examination and replacement will be considered and compensated for as Extra Work ordered by the Architect or Contracting Officer and, in addition, if completion of the Work has been delayed thereby, an extension of time will be granted for such delay as estimated by the Architect or Contracting Officer. Federal funding support of the cost for examination and replacement of satisfactorily completed work that requires removal or that is damaged due to inspection requirements is subject to prior approval by the Chief, National Guard Bureau, or his duly authorized representative.

When the Architect considers the work as nearing completion, or substantially completed, after being notified by the Contractor that the Work is completed, the Architect and the Contracting Officer or his representatives, duly authorized in writing, will inspect all the work included in the Contract Documents. If it is found that the Work has not been satisfactorily completed, the Architect will notify the Contractor, in writing, as to the work to be done or the particular defects to be remedied to place the work in condition satisfactory for acceptance. After the work has been satisfactorily completed, the Architect and the Contracting Officer will make the final inspection or inspections and notify the Contractor in writing when the Work has been finally accepted.

18. SUPERINTENDENCE AND SUPERVISION:

The Contractor shall give his personal superintendence of the Work, using his best skill and personal attention, or have a qualified superintendent, and any necessary assistants acceptable to the Contracting Officer, on the Work at all times during progress, and with full authority to act in his behalf. The Contractor shall not remove a superintendent from the Work who is satisfactory to both him and the Architect, except with the Architect's consent, unless he ceases to be in his employ.

All instructions given the superintendent in the Contractor's absence by the Architect or the Contracting Officer or his representative shall be considered as given the Contractor. In general, the more important verbal instructions will be confirmed in writing to the Contractor; and upon written request of the Contractor, any other instructions will be confirmed in writing.

The Contractor shall carefully study and compare all Drawings, Specifications, other instructions and related data, and at once report in writing to the Architect, with a copy to the Owner, any inconsistency, discrepancy, error, or omission he may discover, for adjustment by the Architect. However, he shall not be liable to the Owner for any damage resulting from any errors or deficiencies in the Contract Documents, except that adjustments made without prior approval will be at his own risk.

19. CHANGES IN THE WORK:

The Owner may at any time make changes in the Work by changes in the Drawings and Specifications of the Contract and within the general scope thereof. Changes will be in the form of a Contract Change Order based upon a written request of the Owner and a written proposal of the Contractor. In making any change, the charge or credit for altering, adding to or deducting from the Work shall be determined by one of the following methods selected by the Owner:

A. By mutually agreed price or prices which will be added to or deducted from the Contract Price. Additions to the contract price shall include the Contractor's overhead and profit but shall not exceed 15 percent. Where subcontract work is involved, the total mark-up for the Contractor and subcontractors shall not exceed 25%. This percentage allowance for overhead and profit shall include the cost of superintendent, timekeeper, clerks, watchmen, use of small tools, incidental job burdens, and general office expenses. There will be no additional or separate charges for these items. No allowance for overhead and profit shall be figured on any change which involves a net credit to the Owner.

B. By estimating the number of unit quantities of each part of the Work which is changed and then multiplying the estimated number of such unit quantities by the applicable unit prices, if any, set forth in the Contract, or other mutually agreed unit prices. The percentage and criteria for overhead and profit shall be as detailed in paragraph A above. There will be no additional or separate charges allowed for superintendent, timekeeper, clerks, watchmen, use of small tools, incidental job burdens, and general office expenses.

C. By ordering the Contractor to proceed with the Work on a cost-plus-percentage-of-the-cost basis and to keep and present in such form as the Contracting Officer will approve, duplicate itemized statements of the cost of the change together with all vouchers therefor, detailed as to the following items:

(1) Name, classification, date, daily hours, total hours, rate, and extensions for such laborers and pro-rata charges for foreman.

(2) Designation, dates, daily hours, total hours, rental rates, and extensions for each piece of equipment or power tool actually used.

(3) Quantity of each material item actually used and extension.

(4) Transportation on materials used.

(5) Power and all items of cost such as cost of property damage, public liability and workmen's compensation insurance; also social security, old age and unemployment insurance.

(6) The percentage allowance for the Contractor's overhead and profit shall not exceed a total of 15 percent of the net cost of above items (1), (2), (3), (4) and (5). The percentage allowance for overhead

shall include the cost of bonds, superintendent, timekeeper, clerks, watchmen, use of small tools, incidental job burdens, general office expenses, and insurance other than items listed above in paragraph C(5).

(7) The credits to the Owner for deductive changes shall be the net cost to the Contractor, excluding project overhead and profit.

The Contractor shall furnish to the Owner an itemized breakdown of the quantities and prices to be used in estimating the value of any change that might be ordered.

Federal funding support of any change or extra is subject to prior approval by the Chief, National Guard Bureau, or his/her duly authorized representative.

20. CLAIMS FOR EXTRA COST OR EXTRA WORK:

If the Contractor claims that any instructions, by drawings or otherwise, are not in accordance with the Contract Documents, and involve extra cost under the Contract, he shall give the Architect and the Contracting Officer written notice thereof within ten (10) days after receipt of such instructions, and in any event before proceeding to execute the work, and the procedure shall then be as above under 19, CHANGES IN THE WORK. Otherwise no such claim will be considered.

Federal funding support of any change or extra is subject to prior approval by the Chief, National Guard Bureau, or his/her duly authorized representative.

21. DEDUCTIONS FOR UNCORRECTED WORK:

If the Owner deems it expedient to correct work injured or installed at variance with the Contract requirements, the Owner may, if he finds it to be in his interest, allow part or all of such work to remain in place, provided an equitable deduction from the Contract Price is offered by the Contractor and approved by the Contracting Officer.

22. DELAYS; EXTENSION OF TIME:

Delays: A delay beyond the Contractor's control at any time in the progress of Work by an act or omission of the Owner or the Architect, or the Contracting Officer or by any other Contractor employed by the Owner, or by strikes, fires, abnormal floods, tornadoes, or other cataclysmic phenomenon of nature, may entitle the Contractor to an extension of time in which to complete the Work as determined by the Contracting Officer provided, however, that the Contractor shall immediately give written notice to the Architect of the cause of such delay.

No such extension shall be made for delays due to rain, wind, flood, or other natural phenomenon of normal intensity for the locality, or for delay occurring more than seven (7) days before written claim therefor is submitted by the Contractor.

Extension of Time: In the event any material changes, alterations or additions are made as herein specified which in the opinion of the Contracting Officer, will require additional time for the execution of any work under the Contract, then, in that case, the time of completion of the Work will be extended by such a period of time as may be fixed by the Contracting Officer, and his decision shall be final and binding upon the Owner and the Contractor, provided that in such case the Contractor within seven (7) days after being notified in writing of such changes, alterations or additions shall request in writing an extension of time, but no extensions of time shall be given for any minor changes, alterations or additions. The Contractor shall not be entitled to any reparation or compensation on account of such additional time or extensions of time required for the execution of the Work. Only claims for compensation that are approved in accordance with the procedures outlined as above in Paragraph 19, CHANGES IN THE WORK and in Paragraph 20, CLAIMS FOR EXTRA COST OR EXTRA WORK and are also approved in writing by the Owner shall be considered. Otherwise no such claims will be considered.

23. CORRECTION OF WORK BEFORE FINAL PAYMENT:

Any defective work, whether the result of poor workmanship, the use of defective materials, damage through carelessness of the Contractor or his employees, or any other cause, shall be removed from the premises within ten (10) days after written notice is given by the Architect, and promptly replaced and re-

executed by the Contractor in accordance with the contract requirements and without expense to the Owner. The Contractor shall also bear the expense of making good all work of the Owner or his other contractors destroyed or damaged by such removal and replacement.

24. CORRECTION OF WORK AFTER FINAL PAYMENT:

Verification and approval of the Final Application for Payment and the making of the Final Payment by the Owner shall not relieve the Contractor of responsibility for faulty materials or workmanship. The Owner or the User shall promptly give notice of observed defects due to faulty materials or workmanship, and any damage to other work resulting therefrom, and in accordance with the terms of any special guarantees provided by the Contract, and the Contractor shall promptly replace any such defects discovered within one year from the date of written acceptance of the Work or Final Payment therefor, whichever is prior. All questions arising hereunder, notwithstanding Final Payment, shall be decided by the Contracting Officer.

25. OWNER'S RIGHT TO CORRECT DEFICIENCIES:

Upon failure or neglect by the Contractor to properly prosecute, or to perform the Work in accordance with the Contract Documents, including any requirements with respect to the Progress Schedule and/or Charts, and after ten (10) days' written notice to the Contractor by the Contracting Officer, the Owner may, without prejudice to any other remedy he may have, correct such deficiencies and may deduct the actual cost thereof to the Owner from payment then or thereafter due to the Contractor, provided, however, that the Contracting Officer shall approve both such action and the amount charged the Contractor.

26. OWNER'S RIGHT TO TERMINATE CONTRACT:

If the contractor refuses or fails to prosecute the work, or any separate part thereof, with such diligence as will insure its completion within the time specified in this contract, or any extension thereof, or fails to complete said work within such time, or if the Contractor should be adjudged a bankrupt, or if he should make a general assignment for the benefit of his creditors, or if a receiver should be appointed on account of his insolvency, or if he should refuse or should fail, except in cases for which extension of time is provided, to supply enough properly skilled workmen or proper materials, or if he should fail to make prompt payment to Subcontractors for material or labor, or disregard laws, ordinances, or the instructions of the Contracting Officer or the Architect, or otherwise be guilty of a substantial violation of any provision of the Contract, then the Owner, upon the certificate of the Contracting Officer that sufficient cause exists to justify such action, may, without prejudice to any other right or remedy and after giving the Contractor, and his Surety, ten (10) days' written notice, terminate the employment of the Contractor and take possession of the promises and of all materials, tools, equipment, and appliances thereon and finish the Work by whatever method he may deem expedient. In such cases, the Contractor shall not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Price shall exceed the expense of finishing the work, including compensation for additional architectural, engineering, managerial, and administrative services, such excess shall be paid to the Contractor. If such expense shall exceed such unpaid balance, the Contractor shall pay the difference to the Owner. The expense incurred by the Owner as herein provided, and the damage incurred through the Contractor's default, shall be certified by the Contracting Officer.

27. CONTRACTOR'S RIGHT TO STOP WORK OR TERMINATE THE CONTRACT:

If the Work should be stopped under an order of any court, or other public authority, for a period of ninety (90) days, through no act or fault of the Contractor or of anyone employed by him, then the Contractor may, upon fourteen (14) days' written notice to the Owner and the Contracting Officer, stop work or terminate this Contract at the Owner(s) will reimburse the Contractor for all work properly executed and any proven loss sustained upon any plant or materials and any other proper item of damage certified by the Contracting Officer.

28. APPLICATIONS FOR PARTIAL AND FINAL PAYMENTS:

The Contractor shall, within ten (10) days after the Notice to Proceed, submit to the Architect on the application for payment form approved or furnished by the Contracting Officer, a complete breakdown or schedule of values of the Contract price showing the value assigned to each of the various parts of the work, including an allowance for overhead and profit, aggregating the total contract price so divided as to facilitate payments to subcontractors. Upon approval, this breakdown of the contract price, unless later found to be in error, shall be used as a basis for all applications for payment.

Unless otherwise provided in the Special Conditions or the Contract Agreement, the Contractor may make application for partial payment once each calendar month based on an approved estimate of work completed. The application shall be submitted through and certified by the Architect. The Owner will make partial payments to the Contractor as soon as practicable after receipt of the certified application for payment.

An application for partial payment may include the Contractor's cost of materials not yet incorporated in the work but delivered and suitably stored on the site.

In making partial payments there shall be retained not more than five (5) percent of the estimated amount of work done and the value of materials stored on the site, and after 50 percent completion has been accomplished, no further retainage will be withheld. The retainage above set out shall be held until final completion and acceptance of all work covered by the contract.

If the Contractor's claim to amounts payable under the contract has been assigned under the Assignment of Claims Act of 1940, as amended (41 U.S.C. 15), a release may also be required of the assignee at the option of the Contracting Officer or USPFO of the State. The retainment on partial payments of Federal funds shall be determined by the USPFO of the State in conformance with the Defense Acquisition Regulations (DAR).

The Contractor, immediately after being notified by the Contracting Officer that all other requirements of the Contract have been completed, shall give notice of said completion by an advertisement for a period of four (4) successive weeks in some newspaper of general circulation published within the county where the work was performed. Proof of publication of said notice in duplicate shall be furnished by the Contractor to the Architect by affidavit of the publisher and a printed copy of the notice published in duplicate. If no newspaper is published in the county where the work was done, the notice may be given by posting at the Court House for thirty (30) days and proof of same made by the Probate Judge or Sheriff and the Contractor. Final payment shall be due as noted by the Contracting Officer's verification of the Final Application for Payment.

29. VERIFICATION, CERTIFICATION, AND APPROVALS FOR PAYMENT:

When the Contractor has made application for payment as above, the Contracting Officer shall, not later than the date when each payment falls due, verify the application for Payment to the Contractor for such amount as he decides to be properly due, or state in writing to the Contractor his reasons for withholding verification in whole or in part, and place the application in line for payment.

No such verification nor payment made to the Contractor, nor partial or entire use or occupancy of the work by the Owner, shall be an acceptance of any work or materials not in accordance with the Contract.

All material and work covered by partial payments made shall thereupon become the sole property of the Owner, but this provision shall not be construed as relieving the Contractor from the sole responsibility for the care and protection of material and work upon which payments have been made or the restoration of any damaged work or as a waiver of the right of the Owner to require the fulfillment of all the terms of the Contract.

30. PAYMENTS WITHHELD:

The Owner may withhold payment of the whole or any part of a verified or approved Application for Payment to such an extent as may be necessary to protect himself from loss on account of any of the following causes discovered subsequent to its verification or approvals:

- A. Defective work.
- B. Evidence indicating probable filing of claims by other parties against the Contractor.
- C. Failure of the Contractor to promptly make payments to subcontractors, or for materials, labor, equipment and supplies.
- D. Damage to another contractor under a separate Contract with the Owner.

When the above grounds are removed, applications for payments will then be verified and/or approved for amounts not previously verified and approved because of them.

31. CONTRACTOR AND SUBCONTRACTORS INSURANCE:

The Contractor shall not commence work under the Contract until he has obtained all insurance required thereunder from an insurance company authorized to do business in Alabama, and shall have filed the certificate of insurance showing type of coverage and correlation between the insurance furnished and that required or the certified copy of the insurance policy with the Contracting Officer through the Architect; nor shall the Contractor allow any subcontractor to commence work on his subcontract until all similar insurance has been so obtained and filed. Each insurance policy shall contain a clause that it shall not be cancelled by the insurance company without thirty (30) days' written notice to the Owner of intention to cancel. The amounts of such insurance shall not be less than the following:

- | | | |
|----|--|--------------|
| A. | Workmen's Compensation and Employer's Liability: | \$ Statutory |
| B. | Public Liability, Bodily Injury and Property Damage: | |
| | Injury or death of one person: | \$ 50,000 |
| | Injury or death to more than one person in a single occurrence: | \$200,000 |
| | Property Damage: | \$ 50,000 |
| C. | Automobile and Truck Liability, Bodily Injury and Property Damage: | |
| | Injury or death to one person: | \$ 50,000 |
| | Injury or death to more than one person in a single occurrence: | \$200,000 |
| | Property Damage: | \$ 50,000 |
| D. | Indemnity: | SEE BELOW |

The Contractor shall assume all liability for and shall indemnify and save harmless, the State, Owners, Architect, and employees of the Armory Commission, from all damages and liability for injury to any person or persons, and injury to or destruction of property, including the loss of use thereof, by reason of an accident or occurrence arising from operations under the Contract, whether such operations be by himself or by a Subcontractor or by any one directly or indirectly employed by either of them, occurring on or about the premises, or the ways and means immediately adjacent, during the term of the contract, or any extension thereof, and shall also assume the liability for injury and/or damages to adjacent or neighboring property by reason of work done under the Contract.

The Contractor shall take out and maintain during the life of the Contract, insurance covering his liability under the above save harmless provision, and shall show evidence of coverage on the certificate of coverage previously noted.

The obligations of the Contractor under this paragraph 31-D shall not extend to the liability of the Architect, his agents or employees arising out of (1) the preparation or approval of maps, drawings, opinions, reports, surveys, Change Orders, designs or specifications, or (2) the giving of or the failure to give directions or instructions by the Architect, his agents or employees provided such giving or failure to give is the primary cause of the injury or damage.

32. OWNER'S FIRE INSURANCE (NOT USED)

33. FIRE INSURANCE, EXTENDED COVERAGE, VANDALISM AND MALICIOUS MISCHIEF:

Unless otherwise provided in the Modified General or Special Conditions, the Contractor shall, at his own expense, insure the Work included in the Contract against loss or damage by fire and against loss or damage covered by the standard extended coverage endorsement, with an insurance company or companies qualified to do business in Alabama and acceptable to the Owner, the amount of insurance at all times to be at least equal to the amount paid on account of work or materials incorporated in the Work and plus the value of work or materials furnished or delivered but not yet paid for by the Owner. The policies shall be in the names

of the Owners and the Contractor and "all Subcontractors" as their interests appear, and certificates of the insurance company as to the amount and type of coverage, terms of policies, etc., shall be delivered to the Contracting Officer through the Architect before partial payments are made.

When changes in scope of the work by written Change Order or Change Orders/Supplemental Agreements aggregate an amount equal to 15% of the total contract, including the Change Orders/Supplemental Agreements, the insurance coverage included under this heading shall be increased accordingly. Proof of coverage shall be established by endorsement to the original policy or by reissue of the original policy to include the added coverage, or in accordance with any other acceptable policy of the insuring company for increasing the coverage.

34. CONTRACT BONDS:

In order to insure the faithful performance of each and every condition, stipulation, and requirement of the Contract, and to indemnify and save harmless the Owner from any and all damages, either directly or indirectly (arising out of any failure to perform same), the successful Bidder to whom the Contract is awarded shall, within ten (10) days from the date of the award, unless otherwise stipulated in the Modified General Conditions, furnish at his own expense and file with the Owner an acceptable Surety Bond in an amount equal to one hundred (100) percent of the contract bid price of the Contract as awarded. Said Bond shall be made on the approved bond form, shall be furnished by a reputable surety company authorized to do business in the State of Alabama, shall be countersigned by an authorized agent resident in the State who is qualified for the execution of such instruments, and shall have attached thereto power of attorney of the signing official. In case of default on the part of the Contractor, all expenses incident to ascertaining and collecting losses suffered by the Owner under the Bond, including architectural, engineering, administrative, and legal services, shall lie against the Contract Bond for Performance of the Work.

In addition thereto, the successful Bidder to whom the Contract is awarded shall, within ten (10) days, unless otherwise stipulated in the General Conditions, furnish at his expense and file with the Owner an acceptable surety bond for Payment of Labor, materials, equipment and supplies, payable to the Owner in an amount equal to fifty (50) percent of the Contract Price, with the obligation that the Contractor shall promptly make payment to all persons furnishing him or them with labor, materials, or supplies for, or in the prosecution of the Work, including the payment of reasonable attorneys fees incurred by successful claimants or plaintiffs in suits on said bond. The date of neither bond shall be earlier than the date of the Contract Agreement.

If any surety upon any bond furnished in connection with this contract becomes unacceptable to the State, or if any such surety shall fail to furnish reports as to his financial condition from time to time as requested by the State, the Contractor shall promptly furnish such additional security as may be required from time to time to protect the interests of the State or of persons supplying labor or materials in the prosecution of the work contemplated by the contract.

Bonds shall remain in force during the entire guarantee period stipulated in the Contract.

35. DAMAGES:

Should either party of the Contract suffer damages because of any wrongful act or neglect of the other party or of anyone employed by him, claim shall be made in writing to the other party within a reasonable time of the first observance of such damage, and not later than the date of the Application for Final Payment, except as expressly stipulated otherwise in the case of faulty work or materials.

36. LIENS:

The Owner may request a complete release of all liens and if this is done, neither the Final Payment nor any part of the retained percentage shall become due until the Contractor shall deliver to the Owner a complete release of all liens arising out of the Contract, and, an affidavit that so far as he has knowledge or information the releases include all the labor and material for which a lien could be filed; but the Contractor may, if any Subcontractor refuses to furnish a release or receipt in full, furnish a bond satisfactory to the Owner, to indemnify him against any lien. If any lien remains unsatisfied after all payments are made, the Contractor shall refund to the Owner all moneys that the latter may be compelled to pay in discharging such a lien, including all costs and a reasonable attorney's fee.

37. ASSIGNMENT:

The Contractor shall not assign the Contract or sublet it as a whole without the written consent of the Owner, nor shall the Contractor assign any moneys due or to become due to him hereunder without the previous written consent of the Owner.

38. MUTUAL RESPONSIBILITY OF CONTRACTORS:

If the Contractor or any of his Subcontractors cause any loss or damage to any separate contractor with a prior, concurrent, or subsequent contract on the Work or on the site, or any undue delay to such separate contractor on the Work or on the site, and if such contractor makes claim against the Owner, on account of any loss so sustained, the Owner shall notify the Contractor who shall indemnify and save harmless the Owner against any expenses arising therefrom.

39. SEPARATE CONTRACTS:

The Owner may award other contracts for additional new construction, buildings or equipment, or for reconstruction, alteration, equipment, and improvement of existing buildings on the site, and the Contractor shall fully cooperate in the storage of materials and the detailed execution of work, coordinate and integrate his operations with such other contractors, and carefully fit his own work to that provided under other contracts, as he may be directed by the Contracting Officer. The Contractor shall not commit or permit any act which will interfere with the performance of work by any other contractor.

The Contractor, including his Subcontractors, shall keep himself informed of the progress and the detailed work of other contractors and shall notify the Contracting Officer immediately of lack of progress or defective workmanship on the part of other contractors, where such delay or such defective workmanship will interfere with his own operations of the work.

40. SUBCONTRACTS:

Concurrent with the execution of the Contract by the Contractor he shall submit in writing in five (5) counterparts to the Architect for approval by the Architect and the Contracting Officer the names of the Subcontractors proposed for the work. Subcontractors that have been so approved may not be changed thereafter except at the request of or with the approval of the Contracting Officer.

The Contractor shall not employ any subcontractor to whom the Owner or Contracting Officer may have any objection, but he will not be required to employ any subcontractor against whom he himself has a reasonable objection.

The Contractor shall be as fully responsible to the Owner for the acts and omissions of Subcontractors, and of persons employed by them, as he is for the acts and omissions of persons directly employed by him.

Nothing contained in the Contract Documents shall be construed as creating any contractual relationship between any Subcontractor and the Owner.

41. RELATIONS OF CONTRACTOR AND SUBCONTRACTORS:

The Contractor shall cause appropriate provisions to be inserted in all Subcontracts relative to the Work, to bind Subcontractors to the Contractor by the terms of the Contract Documents insofar as applicable to the work of Subcontractors, and to give the Contractor the same power as regards terminating any provisions of the Contract Documents.

The Articles, Divisions, Sections, or Paragraphs of the Specifications are not intended to control the Contractor in dividing the work among Subcontractors or to limit the work performed by any trade.

The Contractor shall be responsible for the coordination of Subcontractors, of the trades, and material men engaged upon his work.

The Contractor shall, without additional expense to the Owner, utilize the services of specialty subcontractors on those parts of the work which are specified to be performed by specialty subcontractors.

The Contracting Officer or the Architect will not undertake to settle any differences between the Contractor and his Subcontractors or between Subcontractors.

42. ARCHITECT'S STATUS:

The Architect named in the Contract Documents, who prepared and furnished the Working Drawings and the Specifications contained therein, will prepare details and explanatory drawings, and provide instructions during the progress of the work for transmittal by the Contracting Officer or Architect as above set forth under paragraph 3, ADDITIONAL DETAIL DRAWINGS AND INSTRUCTIONS. He will make his check of manufacturers' data and shop drawings submitted by the Contractor for the Work as above set forth under 5, SHOP DRAWINGS.

The Architect will endeavor to require the Contractor to strictly adhere to the plans and specifications, to guard the Owner against defects and deficiencies in the work of Contractors, and shall promptly notify the Contracting Officer in writing of any significant departure in the quality of materials or workmanship from the requirements of the plans and specifications, but he does not guarantee the performance of the contracts.

The Architect shall not be responsible for construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the Work, unless spelled out in the Contract Documents, and he shall not be liable for results of the Contractor's failure to carry out the work in accordance with the Contract Documents.

The Architect shall have authority to require the Contractor to stop the Work whenever in his opinion it may be necessary for the proper performance of the Contract. The Architect shall not be liable to the Owner for the consequences of any decision made by him in good faith either to exercise or not to exercise his authority to stop the Work.

The Architect shall not be responsible for the acts or omissions of the Contractor, or any Subcontractors, or any of the Contractor's or Subcontractor's agents or employees, or any other persons performing any of the Work.

43. ARCHITECT'S DECISIONS:

The Architect's decisions in matters relating to the artistic effect of his work shall be final, if within the other terms of the Contract.

44. CONTRACTING OFFICER'S DECISIONS:

Except as hereinafter provided, any claim or question concerning the interpretation or meaning of the Contract Documents, or concerning a breach of the Contract, shall be submitted to the Contracting Officer and his decision shall be final, binding, and conclusive on the parties to the Contract. He shall have executive authority to enforce and make effective such decisions and orders as the Contractor fails to carry out promptly.

45. CASH ALLOWANCES:

No cash allowances shall be included in the Contract Price, unless specifically set forth under SPECIAL CONDITIONS or MODIFICATIONS of the GENERAL CONDITIONS. When so included, the Contractor shall include in the Contract Price all allowances named therein and shall cause the work so covered to be done by such subcontractors, material, and/or equipment men, and for such sums as the Contracting Officer approves, and the Contract Price shall be adjusted in conformance therewith. The Contract Price shall include all the Contractor's expense, overhead, and profit, and no allowance, other than that included in the Contract Price, will be paid by the Owner.

46. USE OF PREMISES; SANITARY PROVISIONS:

The Contractor shall take every precaution against injuries to persons or damages to property.

The Contractor shall comply with local and State regulations governing the operation of premises which are occupied and shall perform the Contract in such a manner as not to interrupt or interfere with the operation of any other facility.

The Contractor shall store his apparatus, materials, supplies, and equipment in such orderly fashion at the site of the Work as will not unduly interfere with the progress of his work or the work of any other contractors.

Unless otherwise provided, temporary storage sheds, shops, and office facilities may be erected on the premises with the approval of the Architect or the Contracting Officer. Such temporary buildings and/or utilities shall remain the property of the Contractor and be removed at his expense upon completion of the Work, unless the Owner authorized their abandonment without removal.

Necessary crossings of curbs, sidewalks, roadways, or parkways shall be protected against damage, and any damage shall be repaired by or at the expense of the Contractor.

The Contractor shall not place upon the Work or any part thereof loads inconsistent with the safety of that portion of the Work.

No Contractor shall perform any work necessary to be performed after regular working hours or on Sundays or legal holidays without extra compensation.

The Contractor shall provide and maintain such sanitary accommodations for the use of his employees and those of his subcontractors as may be necessary to comply with the requirements and regulations of the local and State Department of Health and as directed.

47. CUTTING AND PATCHING:

The Contractor shall do all necessary cutting, fitting, and patching of the Work that maybe required to properly receive the Work to make its several parts join together properly, receive and provide for the work of various trades, and be received by the work of other contractors, or as required by Drawings and Specifications to complete the Work. After such cutting, he shall replace or restore or repair and make good all defective or patched work as required by the Architect. He shall not cut, excavate, or otherwise alter any work in a manner or by a method or methods that will endanger the Work, adjacent property, workmen, the public, or the work of any other contractor.

The Contractor shall have his Subcontractor check the location of all sleeves, openings, slots, etc., for the piping, ducts, breeching, conduits, louvers, grilles, fans, etc., as they are laid out on the job.

Provision for openings, holes, and clearances through walls, beams, floors, ceilings, and partitions shall be made and checked by the Contractor and/or his Subcontractor in advance of constructing such parts of the Work, and unnecessary, superfluous or dangerous cutting avoided.

Pipes passing through concrete or masonry walls shall be protected by pipe sleeves two sizes larger than the pipe, plus its insulation, to provide free movement.

Under no condition shall structural, framing, or other parts or members subjected to computed stress be cut or disturbed without the approval of the Architect. Any plates, studs, or joists, and/or rafters that are approved to be cut to execute necessary work shall be securely strapped and braced to restore their original strength by an approved method.

The Architect's approval shall be obtained before cutting or drilling holes in concrete or masonry that tend to damage or weaken the load capacity.

48. PERIODIC AND FINAL CLEANUP:

The Contractor shall periodically, or as directed during the progress of the Work, clean up and remove from the premises all refuse, rubbish, scrap materials and debris caused by his employees, his Subcontractors, or resulting from his work, to the end that at all times the premises are sanitary, safe, reasonably clean, orderly, and workmanlike. Trash and combustible materials shall not be allowed to accumulate inside buildings or elsewhere on the premises. At no time shall any rubbish be thrown from window openings.

Before final completion and final acceptance the Contractor shall remove from the Owner's property, and from all public and private property, all tools, scaffolding, false work, temporary structures, and/or utilities

including the foundations thereof (except such as the Owner permits in writing to remain); rubbish and waste materials resulting from his operations or caused by his employees; and shall remove all surplus materials, leaving the site clean and true to line and grade, and the Work in a safe and clean condition, ready for use and operation.

In addition to the above, the Contractor shall be responsible for the following special cleaning for all trades as the work shall have been completed:

- A. Cleaning of all painted, enameled, stained, or baked enamel work: Removal of all marks, stains, finger prints and splatters from such surfaces.
- B. Cleaning of all glass: Cleaning and removing of all stickers, labels, stains, and paint from all glass, and the washing and polishing of same on interior and exterior.
- C. Cleaning and polishing of all hardware.
- D. Cleaning all tile, floor finish of all kinds: Removal of all splatter, stains, paint, dirt, and dust, the washing and polishing of all floors as recommended by the manufacturer or required by the Architect.
- E. Cleaning of all manufactured articles, materials, fixtures, appliances, and equipment: Removal of all stickers, rust stains, labels, and temporary covers, and cleaning and conditioning of all manufactured articles, material, fixtures, appliances, and electrical, heating, and air conditioning equipment as recommended or directed by the manufacturers, unless otherwise required by the Architect; blowing out or flushing out of all foreign matter from all dust pockets, piping, tanks, pumps, fans, motors, devices, switches, panels, fixtures, boilers, similar features; and freeing identification plates on all equipment of excess paint and the polishing thereof.

In case of failure to comply with the above requirements for any part of the work within the time specified by the Architect, he may cause the Work to be done and deduct the cost thereof from the Contract Price on the next or succeeding Application for Payment.

49. GUARANTEE OF THE WORK:

Except as otherwise specified in the General Conditions or the Special Conditions, all work shall be guaranteed by the Contractor against defects resulting from the use of inferior materials, equipment, or workmanship for one year from the date of final completion of the Contract, or from full occupancy of the building by the Owner, whichever is earlier.

If, within any guarantee period, repairs or changes are required in connection with guaranteed work, which, in the opinion of the Contracting Officer or Architect are required as the result of the use of materials, equipment, or workmanship which are inferior, defective, or not in accordance with the terms of the Contract requirements, the Contractor, shall, promptly upon receipt of notice from the Owner, and without expense to the Owner:

- A. Place in satisfactory condition in every particular all of such guaranteed work, correct all defects therein; and
- B. Make good all damage to the building or site, or equipment or contents thereof, which, in the opinion of the Contracting Officer or Architect, is the result of the use of materials, equipment, or workmanship which are inferior, defective, or not in accordance with the terms of the Contract; and
- C. Make good any work or material, or the equipment and contents of said building or site disturbed in fulfilling any such guarantee.

In any case where in fulfilling the requirements of the Contract or of any guarantee, embraced in or required thereby, the Contractor disturbs any work guaranteed under another contract, he shall restore such disturbed work to a condition satisfactory to the Contracting Officer and guarantee such restored work to the same extent as it was guaranteed under such other contract.

If the Contractor, after notice, fails to proceed promptly to comply with the terms of the guarantee, the Owner may have the defects corrected and the Contractor and his Surety shall be liable for all expense incurred.

All special guarantees applicable to definite parts of the work that may be stipulated in the Contract Documents shall be subject to the terms of this paragraph during the first year of the life of such special guarantee.

50. POSSESSION PRIOR TO COMPLETION:

The Owner shall have the right to use any completed or partially completed part of the Work. Such use shall not be deemed an acceptance of any work not completed in accordance with the contract requirements. If, however, such prior use by the Owner delays the progress of the Work or causes additional expenses to the Contractor, an equitable adjustment in the Contract Price and/or time of completion will be made and the Contract will be modified in writing accordingly.

51. LIQUIDATED DAMAGES:

Time is the essence of the Contract. Any delay in the completion of the Work as provided for in the Contract Documents will cause inconvenience to the public and loss and damage to the Owner in interest, and in additional administrative, architectural, inspection and supervision charges.

Therefore, a time charge equal to six per cent interest per annum on the total Contract Price will be made against the Contractor for the entire period that any part of the Work remains uncompleted after the time specified for the completion of the Work as provided in the Contract Documents, the amount of which shall be deducted by the Contracting Officer from the Final Estimate, and shall be retained by the Contracting Officer out of moneys otherwise due the Contractor in the Final Payment, not as a penalty, but as liquidated damages sustained, it being mutually understood and agreed between the parties hereto that such amount is reasonable as liquidated damages.

52. USE OF FOREIGN MATERIALS:

In accordance with ACT 876 of the 1961 Regular Session of the Alabama legislature the Contractor shall use only materials, supplies, and products manufactured, mined, processed or otherwise produced in the United States or its territories, if same are available at reasonable prices.

Breaching of this agreement shall render the Contractor liable for payment of liquidated damages in the amount of not less than \$500.00 nor more than 20% of the gross amount of the contract.

This requirement applies to all contracts for public works financed entirely with State of Alabama funds.

53. WITHHOLDING OF FUNDS (1977 DEC)

A. The Contracting Officer may withhold or cause to be withheld from the prime contractor so much of the accrued payments or advances as maybe considered necessary (1) to pay laborers and mechanics, including apprentices, trainees, watchmen and guards, employed by the Contractor or any subcontractor on the work the full amount of wages required by the contract, and (2) to satisfy any liability of the Contractor and any subcontractor for liquidated damages under paragraph (B) of the clause entitled "Contract Work Hours and Safety Standards Act - Overtime Compensation."

B. If the Contractor or any subcontractor fails to pay any laborer, mechanic, apprentice, trainee, watchman, or guard employed or working on the site of the work all or part of the wages required by the contract, the Contracting Officer may, after written notice to the prime contractor, take such action as may be necessary to cause suspension of any further payments or advances until such violations have ceased.

54. DISPUTES CONCERNING LABOR STANDARDS (ASPR 7-602.23)(77 DEC)

Disputes arising out of the labor standards provisions of this contract shall be subject to the DISPUTES clause except to the extent such disputes involve the meaning of classifications or wage rates contained in the wage determination decision of the Secretary of Labor or the applicability of the labor provisions of this

contract which questions shall be referred to the Secretary of Labor in accordance with the procedures of the Department of Labor.

55. DISPUTES

Except as otherwise specifically provided in this contract, and except as otherwise specifically provided by the State procedure for arbitration or other State procedure established by State law, any dispute concerning a question of fact arising under this contract which is not disposed of by mutual agreement shall be decided by the Contracting Officer, who shall reduce his decision to writing and send by registered mail, return receipt requested, a copy thereof to the Contractor at his address shown herein. Within thirty (30) days after the date of receipt of such copy, the Contractor may appeal in writing to the Governor of this State, whose written decision therein, or that of his designated representative or representatives, shall, unless determined by a court of competent jurisdiction to have been fraudulent or capricious or arbitrary or so grossly erroneous as necessarily to imply bad faith, or not supported by substantial evidence, be final and conclusive: Provided, that if no such appeal is taken, the decision of the Contracting Officer shall be final and conclusive. The Governor of this State may designate an individual or individuals other than the Contracting Officer, or a board, as his authorized representative to determine appeals under this Article. In connection with any appeal proceeding under this Clause, the Contractor shall be afforded an opportunity to be heard and to offer evidence in support of his appeal. Pending final decision of a dispute hereunder, the Contractor shall proceed diligently with the performance of the contract and in accordance with the Contracting Officer's decision. Any sum or sums allowed to the Contractor under the provisions of this Article or under the State Arbitration proceedings or under other State procedure shall be paid subject to approval of the Chief, National Guard Bureau, for the Government's share of the cost of the Articles or work herein disputed as deemed to be within the contemplation of this contract.

56. EQUAL OPPORTUNITY (FEDERALLY ASSISTED CONSTRUCTION) (ASPR 7-103.18)(1978 SEP)

If, during any twelve (12) month period (including the 12 months preceding the award of this contract), the Contractor has been or is awarded Federal contracts and/or subcontracts which have an aggregate value in excess of \$10,000, the Contractor shall comply with (A) through (G) below. Upon request, the Contractor shall provide information necessary to determine the applicability of this clause.)

The applicant hereby agrees that it will incorporate or cause to be incorporated into any contract for construction work, or modification thereof, as defined in the Regulations of the Secretary of Labor at 41 CFR Chapter 60, which is paid for in whole or in part with funds obtained from the Federal Government or borrowed on the credit of the Federal Government pursuant to a grant, contract, loan, insurance, or guarantee, or undertaken pursuant to any Federal program involving such grant, contract, loan, insurance, or guarantee, the following Equal Opportunity clause:

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

A. The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, or national origin. Such action shall include but not be limited to the following: Employment, upgrading, demotion, or transfer, recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

B. The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex or national origin.

C. The Contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers representatives of the Contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

D. The Contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, as amended by Executive Order 11375 of October 13, 1967, and of the rules, regulations and relevant orders of the Secretary of Labor.

E. The Contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, as amended by Executive Order 11375 of October 13, 1967, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records and accounts by the administering agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

F. In the event of the Contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations or orders, this contract may be cancelled, terminated or suspended in whole or in part and the Contractor may be declared ineligible for further Government contracts or Federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, as amended by Executive Order 11375 of October 13, 1967, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, as amended by Executive Order 11375 of October 13, 1967, or by rule, regulation or order of the Secretary of Labor, or as otherwise provided by law.

G. The Contractor will include the portion of the sentence immediately preceding paragraph (A) and the provisions of paragraphs (A) through (G) in every subcontract or purchase order unless exempted by rules, regulations or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order 11246 of September 24, 1965, as amended by Executive Order 11375 of October 13, 1967, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance: *Provided, however*, that in the event a Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency, the Contractor may request the United States to enter into such litigation to protect the interests of the United States. The applicant further agrees that it will be bound by the above Equal Opportunity Clause with respect to its own employment practices when it participates in Federally assisted construction work: *Provided*, that if the applicant so participating is a State or local government, the above Equal Opportunity Clause is not applicable to any agency, instrumentality or subdivision of such government which does not participate in work on or under the contract. The applicant agrees that it will assist and cooperate actively with the administering agency and the Secretary of Labor in obtaining the compliance of Contractors and subcontractors with the Equal Opportunity Clause and the rules, regulations and relevant orders of the Secretary of Labor, that it will furnish the administering agency and the Secretary of Labor such information as they may require for the supervision of such compliance, and that it will otherwise assist the administering agency in the discharge of the agency's primary responsibility for securing compliance. The applicant further agrees that it will refrain from entering into any contract or contract modification subject to Executive Order 11246 of September 24, 1965, as amended by Executive Order 11375 of October 13, 1967, with a Contractor debarred from, or who has not demonstrated eligibility for, Government contracts and Federally assisted construction contracts pursuant to the Executive Order and will carry out such sanctions and penalties for violation of the Equal Opportunity Clause as may be imposed upon Contractors and subcontractors by the administering agency or the Secretary of Labor pursuant to Part II, Subpart D of the Executive Order. In addition, the applicant agrees that if it fails or refuses to comply with these undertakings, the administering agency may take any or all of the following actions: cancel, terminate or suspend in whole or in part this grant (contract, loan, insurance, guarantee); refrain from extending any further assistance to the applicant under the program with respect to which the failure or refusal occurred until satisfactory assurance of future compliance has been received from such applicant; and refer the case to the Department of Justice for appropriate legal proceedings.

57. CERTIFICATION OF NONSEGREGATED FACILITIES (1970 AUG) (ASPR 7-2003.14)

(Applicable to contracts, subcontracts, and to agreements with applicants who are themselves performing Federally assisted construction contracts, exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity Clause). By the submission of this bid, the bidder, offeror, applicant, or subcontractor certifies that he does not maintain or provide for his employees any segregated facilities at any of his establishments, and that he does not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. He certifies further that he will not maintain or provide for his employees any segregated facilities at any of his establishments, and that he will not permit his employees to perform their services at any location, under his control, where segregated facilities are

maintained. The bidder, offeror, applicant, or subcontractor 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, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, color, religion or national origin, because of habit, local custom or otherwise. He further agrees that (except where he has obtained identical certifications from proposed subcontractors for specific time periods) he will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding \$10,000 which are not exempt from the provisions of Equal Opportunity Clause; that he will retain such certifications in his files; and that he will forward the following notice to such proposed subcontractors (except where the proposed subcontractors have submitted identical certifications for specific time periods).

NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENT FOR CERTIFICATIONS OF NONSEGREGATED FACILITIES:

A Certification of Nonsegregated Facilities must be submitted prior to the award of a subcontract exceeding \$10,000 which is not exempt from the provisions of the Equal Opportunity Clause. The certification may be submitted either for each subcontract or for all subcontracts during a period (i.e., quarterly, semiannually, or annually).

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

58. EXEMPTIONS TO EQUAL OPPORTUNITY CLAUSES (ASPR 12-805) (JUL 76)

A. *Transactions of \$10,000 or Under.* Contracts and subcontracts not exceeding \$10,000, other than Government bills of lading, are exempt from the requirements of the Equal Opportunity Clause. In determining the applicability of this exemption to any Federally assisted construction contract, or subcontract thereunder, the amount thereof rather than the amount of the Federal financial assistance shall govern. Indefinite delivery type contracts and subcontracts thereunder, basic agreements and basic ordering agreements shall include the Equal Opportunity Clause, except when the Contracting Officer (in the case of subcontractors, the prime contractor or subcontractors issuing the subcontract) determines that the amount to be ordered is not expected to extend \$10,000 in any single year. The applicability of the Equal Opportunity Clause shall be determined by the Contracting Officer at the time of award for the first year, and annually thereafter for succeeding years if any. Notwithstanding the above, the Equal Opportunity Clause shall be incorporated into such contract, subcontract, basic agreement or basic ordering agreement whenever the amount of a single order or procurement action exceeds \$10,000. Once the clause is incorporated, the contract, subcontract, basic agreement, or basic ordering agreement shall continue to be subject to such clause for its duration, regardless of the amounts ordered, or reasonably expected to be ordered, in any year. No Contracting Officer, Contractor, or Subcontractor, shall procure supplies or services in less than usual quantities to avoid applicability of the Equal Opportunity Clause.

B. *Work Outside the United States.* Contracts and subcontracts are exempt from the requirement of the Equal Opportunity Clause with regard to work performed outside the United States by employees who were not recruited within the United States.

C. *Contracts with State or Local Governments.* The requirements of the clause in any contract or subcontract with a State or local government (or any agency, instrumentality or subdivision thereof) shall not be applicable to any agency, instrumentality or subdivision of such government which does not participate in work on or under the contract or subcontract. In addition, State and local governments are exempt from the requirements of filing the annual compliance report provided for by 12-812(a) and maintaining a written affirmative action program prescribed by 12-807.1.

D. *Contracts Exempted by the Secretary of Defense in the Interest of National Security.*

(1) Any requirement set forth in this Part shall not apply to any contract or subcontract whenever the Secretary of Defense determines that such contract or subcontract is essential to the national security and that its award without complying with such requirement is necessary to the national security.

(2) *Requests for Exemption:* The Contracting Officer shall prepare a detailed justification for such determination which shall be submitted to the ASD(M&RA) in accordance with Departmental procedures.

The ASD(M&RA) shall submit the request for exemption to the Secretary of Defense for approval, and shall notify the Director, OFCC, within 30 days of such a determination.

E. Specific Contracts and Facilities Exempted by the Director, OFCC.

(1) *Specific Contracts.* The Director, OFCC, may exempt an agency or person from requiring the inclusion of any or all of the Equal Opportunity Clause in any specific contract or subcontract when he deems that special circumstances in the national interest so require. He may also exempt groups or categories of contracts or subcontracts of the same type where he finds it impracticable to act upon each request individually or where group exemptions will contribute to convenience in the administration of the Order.

(2) *Facilities Not Connected with Contracts.* The Director, OFCC, may exempt from the requirements of the clause any of a prime contractor's or a subcontractor's facilities which he finds to be in all respects separate and distinct from activities of the prime contractor or subcontractor related to the performance of the contract or subcontract, provided that he also finds that such an exemption will not interfere with or impede the effectuation of the Order.

(3) *Special Circumstances.* The Director, OFCC, may exempt a contract or subcontract when he finds that special circumstances indicate that use of either of the clauses in 7-103.18 in the contract or subcontract would not be in the national interest.

(4) *Request for Exemptions.* The Contracting Officer shall submit a detailed justification for omitting or modifying the clause under (1), (2) or (3) above to the ASD (M&RA) in accordance with Departmental procedures.

(5) *Withdrawal of Exemption by the Director, OFCC.* When any contract or subcontract is of a class exempted under this paragraph 12-805, the Director, OFCC, may withdraw the exemption for a specific contract or subcontract or group of contracts or subcontracts when in his judgement such action is necessary or appropriate to achieve the purposes of the Order. Such withdrawal shall not apply to contracts or subcontracts awarded prior to the withdrawal. In procurements entered into by formal advertising or the various forms of restricted formal advertising, such withdrawal shall not apply unless the withdrawal is made more than 10 calendar days before the date set for the opening of the bids.

59. CLEAN AIR AND WATER (1975 OCT)(ASPR 7-103.29)

(Applicable only if the contract exceeds \$100,000, or the Contracting Officer has determined that orders under an indefinite quantity contract in any one year will exceed \$100,000, or a facility to be used has been the subject of a conviction under the Clean Air Act (42 U.S.C. 1857c-8(c)(1) or the Federal Water Pollution Control Act (33 U.S.C. 1319(c) and is listed by EPA, or the contract is not otherwise exempt.)

A. The Contractor agrees as follows:

(1) To comply with all the requirements of Section 114 of the Clean Air Act, as amended (42 U.S.C. 1857, et seq., as amended by Public Law 91-604) and Section 308 of the Federal Water Pollution Control Act (33 U.S.C. 1251, as amended by Public Law 92-500), respectively, relating to inspection, monitoring, entry, reports, and information, as well as other requirements specified in Section 114 and Section 308 of the Air Act and the Water Act, respectively, and all regulations and guidelines issued thereunder before the award of this contract.

(2) That no portion of the work required by this prime contract will be performed in a facility listed on the Environmental Protection Agency List of Violating Facilities on the date this contract was awarded unless and until the EPA eliminates the name of such facility or facilities from such listing.

(3) To use his best efforts to comply with clean air standards and clean water standards at the facilities in which the contract is being performed; and

(4) To insert the substance of the provisions of this clause in any nonexempt subcontract, including this paragraph (4).

B. The terms used in this clause have the following meanings:

(1) The term "Air Act" means the Clean Air Act, as amended (42 U.S.C. 1857 et seq., as amended by Public Law 91-604).

(2) The term "Air Act" means Federal Water Pollution Control Act, as amended (33 U.S.C. 1251 et seq., as amended by Public Law 92-500).

(3) The term "Clean Air Standards" means any enforceable rules, regulations, guidelines, standards, limitations, orders, controls, prohibitions, or other requirements which are contained in, issued under, or otherwise adopted pursuant to the Air Act or Executive Order 11738, an applicable implementation plan as described in Section 110(d) of the Clean Air Act (42 U.S.C. 1857c-5(d), an approved implementation procedure or plan under Section 111(c) or Section 111(d), respectively of the Air Act (42 U.S.C. 1857c-6(c) or (d), or an approved implementation procedure under Section 112(d) of the Air Act (42 U.S.C. 1857c-7(d).

(4) The term "Clean Water Standards" means any enforceable limitation, control, condition, prohibition, standard or other requirement which is promulgated pursuant to the Water Act or obtained in a permit issued to a discharger by the Environmental Protection Agency or by a State under an approved program, as authorized by Section 402 of the Water Act (33 U.S.C. 1342), or by a local government to ensure compliance with pretreatment regulations as required by Section 307 of the Water Act (33 U.S.C. 1317).

(5) The term "compliance" means compliance with clean air or water standards. Compliance shall also mean compliance with a schedule or plan ordered or approved by a court of competent jurisdiction, the Environmental Protection Agency or an air or water pollution control agency in accordance with the requirement of the Air Act or Water Act and regulations issued pursuant thereto.

(6) The term "facility" means any building, plant, installation, structure, mine, vessel or other floating craft, location, or site of operations, owned, leased, or supervised by a contractor, subcontractor, to be utilized in the performance of a contract or subcontract. Where a location or site of operations contains or includes more than one building, plant, installation, or structure, the entire location or site shall be deemed to be a facility except there the Director, Office of Federal Activities, Environmental Protection Agency, determines that independent facilities are collocated in one geographical area.

(7) The term "nonexempt contract or subcontract" means a contract or subcontract of more than \$100,000 which is not otherwise exempted pursuant to the EPA regulations implementing the Air Act and Water Act (40 CFR 15.5), as further implemented in ASPR 1-2302.4 or in FPR 1-1.2302-4 whichever is applicable) and the procedures of the Department awarding the contract.

60. CLEAN AIR AND WATER CERTIFICATION (77 JUN) (DAR 7-2003.71)

Applicable if the bid or offer exceeds \$100,000, or the Contracting Officer has determined that orders under an indefinite quantity contract in any year will exceed \$100,000, or a facility to be used has been the subject of a conviction under the Clean Air Act (42 U.S.C. 1857c-8(c)(1)) or the Federal Water Pollution Control Act (33 U.S.C. 1319(c)) and is listed by EPA, or is not otherwise exempt.

The Bidder or offeror certifies as follows:

(1) Any facility to be utilized in the performance of this proposed contract is is () or is not (), listed on the Environmental Protection Agency List of Violating Facilities;

(2) He will promptly notify the Contracting Officer, prior to award, of the receipt of any communication from the Director, Office of Federal Activities, U. S. Environmental Protection Agency, indicating that any facility which he proposes to use for the performance of the contract is under consideration to be listed on the EPA List of Violating Facilities; and

(3) He will include substantially this solicitation certification, including this paragraph (3), in every nonexempt subcontract.

61. *EXEMPTIONS TO ENVIRONMENTAL PROTECTION CLAUSE (ASPR 1-2302.4) (JUL 76)*

Except as provided in (c) below, contracts and subcontracts are exempt from the requirements of this Part and 40 CFR Part 15, as follows:

- A. Contracts and subcontracts not exceeding \$100,000 are exempt.
- B. Contracts and subcontracts for indefinite quantities are exempt if the Contracting Officer determines that the amount to be ordered in any year under such contract will not exceed \$100,000.
- C. Except for small purchases, the foregoing exemptions shall not apply to a proposed contract under which the facility to be used is listed on the EPA List of Violating Facilities on the basis of a conviction either under the Air Act (40 U.S.C. 1857-8(c)(1) or the Water Act (33 U.S.C. 1319(c)).
- D. This part and 40 CFR Part 15 do not apply to the use of facilities located outside the United States. The term "United States," as used herein, includes the States, District of Columbia, Commonwealth of Puerto Rico, Virgin Islands, Guam and American Samoa, and Trust Territories of the Pacific Islands.
- E. Upon a determination that the paramount interest of the United States so requires, the Secretary concerned may except from the provisions of this Part any individual or class of contracts or subcontracts, for a period of one year. Prior to granting a class exemption, the Secretary shall consult with the Director, Office of Federal Activities, United States Environmental Protection Agency. The Secretary granting either an individual contract or class exemption shall notify the Director of such exemption as soon after granting the exemption as practicable. Such notification shall describe the purpose of the contract, and indicate the manner in which the paramount interest of the United States required that the exemption be made.

62. *AFFIRMATIVE ACTION FOR HANDICAPPED WORKERS (ASPR 7-103.28) (76 MAY)*

- A. The Contractor will not discriminate against any employee or applicant for employment because of physical or mental handicap in regard to any position for which the employee or applicant for employment is qualified. The Contractor agrees to take affirmative action to employ, advance in employment and otherwise treat qualified handicapped individuals without discrimination based upon either physical or mental handicap in all employment practices such as the following: employment, upgrading, demotion or transfer, recruitment, advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training, including apprenticeship.
- B. The Contractor agrees to comply with the rules, regulations, and relevant orders of the Secretary of Labor issued pursuant to the Act.
- C. In the event of the Contractor's noncompliance with the requirements of this clause, action for noncompliance may be taken in accordance with the rules, regulations and relevant orders of the Secretary of Labor issued pursuant to the Act.
- D. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices in a form to be prescribed by the Director, provided by or through the Contracting Officer. Such notices shall state the Contractor's obligation under the law to take affirmative action to employ and advance in employment qualified handicapped employees and applicants for employment, and the rights of applicants and employees.
- E. The Contractor will notify each labor union or representative of workers with which it has a collective bargaining agreement or other contract understanding, that the Contractor is bound by the terms of Section 503 of the Rehabilitation Act of 1973, and is committed to take affirmative action to employ and advance in employment physically and mentally handicapped individuals.
- F. The Contractor will include the provisions of this clause in every subcontract or purchase order of \$2500 or more unless exempt by rules, regulations, or orders of the Secretary issued pursuant to Section 503 of the Act, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as the Director of the Office of Federal Contract Compliance Programs may direct to enforce such provisions, including action for noncompliance.

63. COVENANT AGAINST CONTINGENT FEES

The Contractor warrants that no person or selling agency has been employed or retained to solicit or secure this contract upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bona fide employees or bona fide established commercial or selling agencies maintained by the Contractor for the purpose of securing business. For breach or violation of this warranty, the Owner shall have the right to annul this contract without liability or in its discretion to deduct from the contract price or consideration the full amount of such commission, percentage, brokerage, or contingent fee.

64. OFFICIALS NOT TO BENEFIT

No member of or delegate to Congress or resident commissioner shall be admitted to any share or part of this contract, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this contract if made with a corporation for its general benefit.

65. CONVICT LABOR

In connection with the performance of work under this contract, the Contractor agrees not to employ any person undergoing sentence of imprisonment, as provided by Public Law 89-176, September 10, 1965 (18 U.S.C. 4082(c)(2)) and Executive Order 11755, December 29, 1973.

66. NONDISCRIMINATION IN EMPLOYMENT

In connection with the performance of work under this contract, the Contractor agrees not to discriminate against any employee or applicant for employment because of sex, race, creed, color, or national origin; and further agrees to insert the foregoing provision in all subcontracts hereunder except subcontracts for standard commercial supplies or for raw materials.

67. GRATUITIES

A. The State may, by written notice to the Contractor, terminate the right of the Contractor to proceed under this contract if it is found, after notice and hearing, by the Contracting Officer or Governor or the duly authorized representative of either, that gratuities (in the form of entertainment, gifts, or otherwise) were offered or given by the Contractor, or any agent or representative of the Contractor, to any officer or employee of the State with a view toward securing a contract or securing favorable treatment with respect to the awarding or amending, or the making of any determinations with respect to the performance of such contract: Provided, that the existence of the facts upon which the Contracting Officer or Governor or the duly authorized representative of either makes such findings shall be in issue and may be reviewed in any competent court.

B. In the event this contract is terminated as provided in paragraph (a) hereof, the State shall be entitled (1) to pursue the same remedies against the Contractor as it could pursue in the event of a breach of the contract by the Contractor, and (2) as a penalty in addition to any other damages to which it may be entitled by law, to exemplary damages in an amount (as determined by the Contracting Officer or Governor or the duly authorized representative of either) which shall not be less than 3 nor more than 10 times the costs incurred by the Contractor in providing any such gratuities to any such officer or employee.

C. The rights and remedies of the State provided in this Clause shall not be exclusive and are in addition to any other rights and remedies provided by law or under this contract.

68. COPELAND ("ANTI-KICKBACK") ACT - NONREBATE OF WAGES

The regulations of the Secretary of Labor applicable to contractors and subcontractors (29 CFR, Part 3), made pursuant to the Copeland Act, as amended (40 U.S.C. 276c) and to aid in the enforcement of the Anti-Kickback Act (18 U.S.C. 874) are made a part of this contract by reference. The Contractor will comply with these regulations and any amendments or modifications thereof and the prime contractor will be responsible for the submission of affidavits required of subcontractors thereunder. The foregoing shall apply except as the Secretary of Labor may specifically provide for reasonable limitations, variations, tolerances and exemptions.

69. SUBCONTRACTS - TERMINATION

The Contractor agrees to insert the clauses hereof entitled COPELAND ("ANTI-KICKBACK") ACT - NONREBATE OF WAGES, WITHHOLDING OF FUNDS, and SUBCONTRACTS - TERMINATION physically in all subcontracts and the Contractor further agrees that a breach of any of the requirements of these clauses may be grounds for termination of this contract. The term "contractor" as used in such clauses in any subcontract shall be deemed to refer to the subcontractor except in the phrase "prime contractor."

70. AUDIT BY DEPARTMENT OF DEFENSE (1978 AUG)

A. General. The Contracting Officer or his representatives shall have the audit and inspection rights described in the applicable paragraphs (B), (C) and (D) below.

B. Examination of Costs. If this is a cost reimbursement type, incentive, time and materials, labor hour, or price redeterminable contract, or any combination thereof, the Contractor shall maintain, and the Contracting Officer or his representatives shall have the right to examine books, records, documents, and other evidence and accounting procedures and practices, sufficient to reflect properly all direct and indirect costs of whatever nature claimed to have been incurred and anticipated to be incurred for the performance of this contract. Such right of examination shall include inspection at all reasonable times of the Contractor's plants, or such parts thereof, as may be engaged in the performance of this contract.

C. Cost or Pricing Data. If the Contractor submitted cost or pricing data in connection with the pricing of this contract or any change or modification thereto, unless such pricing was based on adequate price competition, established catalog or market prices of commercial items sold in substantial quantities to the general public, or prices set by law or regulation, the Contracting Officer or his representatives who are employees of the United States Government shall have the right to examine all books, records, documents and other data of the Contractor related to the negotiation, pricing or performance of such contract, change or modification, for the purpose of evaluating the accuracy, completeness and currency of the cost or pricing data submitted. The right of examination shall extend to all documents necessary to permit adequate evaluation of the cost or pricing data submitted, along with the computations and projections used therein.

D. Reports. If the Contractor is required to furnish Contractor Cost Data Reports (CCDR), Contract Fund Status Reports (CFSR), or Cost Performance Reports (CPR), the Contracting Officer or his representatives shall have the right to examine books, records, other documents, and other supporting materials, for the purpose of evaluating (i) the effectiveness of the Contractor's policies and procedures to produce data compatible with the objectives of these reports, and (ii) the data reported.

E. Availability. The materials described in (B), (C) and (D) above shall be made available at the office of the Contractor, at all reasonable times, for inspection, audit, or reproduction, until the expiration of three (3) years from the date of final payment under this contract or such lesser time specified in Appendix M of the Defense Acquisition Regulation and for such longer period, if any, as is required by applicable statute, or by other clauses of this contract, or by (1) and (2) below:

(1) If this contract is completely or partially terminated, the records relating to the work terminated shall be made available for a period of three (3) years from the date of any resulting final settlement.

(2) Records which relate to appeals under the DISPUTES Clause of this contract, or litigation, or the settlement of claims arising out of the performance of this contract, shall be made available until such appeals, litigation, or claims have been disposed of.

F. The Contractor shall insert a clause containing all the provisions of this clause, including this paragraph (F), in all subcontracts exceeding \$10,000 hereunder, except altered as necessary for proper identification of the contracting parties and the Contracting Officer under the State primecontract.

71. SUBCONTRACTOR COST OR PRICING DATA - PRICE ADJUSTMENTS (1970 JAN)

A. Paragraphs (B) and (C) of this Clause shall become operative with respect to any modification made pursuant to one or more provisions of this contract which involves aggregate increases and/or decreases in costs plus applicable profits expected to exceed \$100,000. The requirements of this Clause shall be limited to such modifications.

B. The Contractor shall require subcontractors hereunder to submit cost or pricing data under the following circumstances:

(1) prior to the award of any subcontract the amount of which is expected to exceed \$100,000 when entered into;

(2) prior to the pricing of any subcontract modification which involves aggregate increases and/or decreases in costs plus applicable profits expected to exceed \$100,000; except where the price is based on adequate price competition, established catalog or market prices of commercial items sold in substantial quantities to the general public, or prices set by law or regulation.

C. The Contractor shall insert the substance of this clause including this paragraph (C) in each subcontract which exceeds \$100,000.

72. BUY AMERICAN ACT (1966 OCT)

A. Agreement. In accordance with the Buy American Act (41 U.S.C. 10a - 10d), the Contractor agrees that only domestic construction material will be used (by the Contractor, subcontractors, materialmen, and suppliers) in the performance of this contract, except for non-domestic construction material listed in the "Nondomestic Construction Materials" clause, if any, of this contract.

B. Domestic construction material. "Construction material" means any article, material, or supply brought to the construction site for incorporation in the building or work. An unmanufactured construction material is a "domestic construction material" if it has been mined or produced in the United States. A manufactured construction material is a "domestic construction material" if it has been manufactured in the United States and if the cost of its components which have been mined, produced, or manufactured in the United States exceeds 50 percent of the cost of all its components. "Component" means any article, material, or supply directly incorporated in a construction material.

C. Domestic component. A component shall be considered to have been mined, produced, or manufactured in the United States" (regardless of its source in fact) if the article, material, or supply in which it is incorporated was manufactured in the United States and the component is of a class or kind determined by the Government to be not mined, produced, or manufactured in the United States in sufficient and reasonably available commercial quantities and of a satisfactory quality.

D. Non-Domestic construction material. The Contractor/Vendor agrees that it will not expend any funds appropriated by Congress without complying with The Buy American Act (41 U.S.C. 10). The Buy American Act gives preference to domestic end products and domestic construction material. In addition, the Memorandum of Understanding between the United States of America and the European Economic Community on Government Procurement, and the North American Free Trade Agreement (NAFTA), provide that EC and NAFTA end products and construction materials are exempted from application of the Buy American Act.

73. APPROVAL

This contract and any subsequent terminations, modifications, or change orders (including those resulting from disputes and settlements of disputes) shall be subject to the written approval of the Chief, National Guard Bureau, or his duly authorized representative, and shall not be binding until so approved.

74. SUBJECT TO FEDERAL-STATE AGREEMENT

This contract is subject to all terms and conditions of the Federal-State Agreement between the United States of America and the State of Alabama.

75. RELATIONSHIP OF THE FEDERAL GOVERNMENT

This contract is funded in part by the Federal Government. The Federal Government is not a party to this contract. As a condition to receiving and expending Federal funds, there are certain rights of Federal inspection, Federal approval of contract changes and modifications, and Federal approval of settlements or dispute actions that the Federal Government will exercise prior to authorization of Federal funds. Therefore, no inspection or acceptance, change, modification, settlement, dispute claim payment, or dispute action will be

considered binding until the required Federal approval is obtained. The Chief, National Guard Bureau, or his designated representative, is the approval authority. This paragraph does not abrogate any rights conferred on the Federal Government by law or other clause required due to the use of Federal funding.

76. SUSPENSION OF WORK (1968 FEB) (DAR 7-602.46)

A. The Contracting Officer may order the Contractor in writing to suspend, delay, or interrupt all or any part of the work for such period of time as he may determine to be appropriate for the convenience of the Owner.

B. If the performance of all or any part of the work is, for an unreasonable period of time, suspended, delayed, or interrupted by an act of the Contracting Officer in the administration of this contract, or by his failure to act within the time specified in this contract (or if no time is specified, within a reasonable time), an adjustment shall be made for any increase in the cost of performance of this contract (excluding profit) necessarily caused by such unreasonable suspension, delay, or interruption and the contract modified in writing accordingly. However, no adjustment shall be made under this clause for any suspension, delay, or interruption to the extent (1) that performance would have been so suspended, delayed, or interrupted by any other cause, including the fault or negligence of the Contractor, or (2) for which an equitable adjustment is provided for or excluded under any other provision of this contract.

C. No claim under this clause shall be allowed (1) for any costs incurred more than 20 days before the Contractor shall have notified the Contracting Officer in writing of the act or failure to act involved (but this requirement shall not apply as to a claim resulting from a suspension order), and (2) unless the claim, in a amount stated, is asserted in writing as soon as practicable after the termination of such suspension, delay, or interruption, but not later than the date of final payment under the contract.

77. TERMINATION FOR CONVENIENCE OF THE OWNER - CONSTRUCTION (1974 APR) (DAR 7-602.29)

A. The performance of work under this contract may be terminated by the Owner in accordance with this clause in whole, or from time to time in part, whenever the Contracting Officer shall determine that such termination is in the best interest of the Owner. Any such termination shall be effected by delivery to the Contractor of a Notice of Termination specifying the extent to which performance of work under the contract is terminated, and the date upon which such termination becomes effective.

B. After receipt of a Notice of Termination, and except as otherwise directed by the Contracting Officer, the Contractor shall:

(1) Stop work under the contract on the date and to the extent specified in the Notice of Termination;

(2) Place no further orders or subcontracts for materials, services or facilities, except as may be necessary for completion of such portion of the work under the contract as is not terminated;

(3) Terminate all orders and subcontracts to the extent that they relate to the performance of work terminated by the Notice of Termination;

(4) Assign to the Owner, in the manner, at the times, and to the extent directed by the Contracting Officer, all of the right, title, and interest of the Contractor under the orders and subcontracts so terminated, in which case the Owner shall have the right, in its discretion, to settle or pay any or all claims arising out of the termination of such orders and subcontracts;

(5) Settle all outstanding liabilities and all claims arising out of such termination of orders and subcontracts, with the approval or ratification of the Contracting Officer, to the extent he may require, which approval or ratification shall be final for all the purposes of this clause;

(6) Transfer title and deliver to the Owner, in the manner, at the times, and to the extent, if any, directed by the Contracting Officer, (a) the fabricated or unfabricated parts, work in process, completed work, supplies, and other materials produced as a part of, or required in connection with the performance of, the work terminated by the Notice of Termination, and (b) the completed or partially completed plans,

drawings, information, and other property which, if the contract had been completed, would have been required to be furnished to the Owner;

(7) Use his best efforts to sell, in the manner, at the times, to the extent, and at the price or prices directed or authorized by the Contracting Officer, any property of the types referred to in (6) above; provided, however, that the Contractor (a) shall not be required to extend credit to any purchaser, and (b) may acquire any such property under the conditions prescribed by and at a price or prices approved by the Contracting Officer; and provided further that the proceeds of any such transfer or disposition shall be applied in reduction of any payments to be made by the Owner to the Contractor under this contract or shall otherwise be credited to the price or cost of the work covered by this contract or paid in such other manner as the Contracting Officer may direct;

(8) Complete performance of such part of the work as shall not have been terminated by the Notice of Termination; and

(9) Take such action as may be necessary, or as the Contracting Officer may direct, for the protection and preservation of the property related to this contract which is in the possession of the Contractor and in which the Owner has or may acquire an interest.

At any time after expiration of the plant clearance period, as defined in Section VIII, Armed Services Procurement Regulation, as it may be amended from time to time, the Contractor may submit to the Contracting Officer a list, certified as to quantity and quality, of any or all items of termination inventory not previously disposed of, exclusive of items the disposition of which has been directed or authorized by the Contracting Officer, and may request the Owner to remove such items or enter into a storage agreement covering them. Not later than fifteen (15) days thereafter, the Owner will accept title to such items and remove them or enter into a storage agreement covering the same; provided, that the list submitted shall be subject to verification by the Contracting Officer upon removal of the items, or if the items are stored, within forty-five (45) days from the date of submission of the list, and any necessary adjustment to correct the list as submitted shall be made prior to final settlement.

C. After receipt of a Notice of Termination, the Contractor shall submit to the Contracting Officer his termination claim, in the form and with certification prescribed by the Contracting Officer. Such claim shall be submitted promptly but in no event later than one year from the effective date of termination, unless one or more extensions in writing are granted by the Contracting Officer, upon request of the Contractor made in writing within such one year period or authorized extension thereof. However, if the Contracting Officer determines that the facts justify such action, he may receive and act upon any such termination claim at any time after such one year period or any extension thereof. Upon failure of the Contractor to submit his termination claim within the time allowed, the Contracting Officer may determine, on the basis of information available to him, the amount, if any, due to the Contractor by reason of the termination and shall thereupon pay to the Contractor the amount so determined.

D. Subject to the provisions of paragraph C, the Contractor and the Contracting Officer may agree upon the whole or any part of the amount or amounts to be paid to the Contractor by reason of the total or partial termination of work pursuant to this clause, which amount or amounts may include a reasonable allowance for profit on work done; provided, that such agreed amount or amounts, exclusive of settlement costs, shall not exceed the total contract price as reduced by the amount of payments otherwise made and as further reduced by the contract price of work not terminated. The contract shall be amended accordingly, and the Contractor shall be paid the agreed amount. Nothing in paragraph E of this clause, prescribing the amount to be paid to the Contractor in the event of failure of the Contractor and the Contracting Officer to agree upon the whole amount to be paid to the Contractor by reason of the termination of work pursuant to this clause, shall be deemed to limit, restrict, or otherwise determine or affect the amount or amounts which may be agreed upon to be paid to the Contractor pursuant to this paragraph D.

E. In the event of the failure of the Contractor and the Contracting Officer to agree, as provided in paragraph D, upon the whole amount to be paid to the Contractor by reason of the termination of work pursuant to this clause, the Contracting Officer shall pay to the Contractor the amounts determined by the Contracting Officer as follows, but without duplication of any amounts agreed upon in accordance with paragraph D:

(1) With respect to all contract work performed prior to the effective date of the Notice of Termination, the total (without duplication of any items) of:

(a) the cost of such work;

(b) the cost of settling and paying claims arising out of the termination of work under subcontracts or orders as provided in paragraph B(5) above, exclusive of the amounts paid or payable on account of supplies or materials delivered or services furnished by the subcontractor prior to the effective date of the Notice of Termination of Work under this contract, which amounts shall be included in the cost on account of which payment is made under (A) above, and

(c) a sum, as profit on "a" above, determined by the Contracting Officer pursuant to 8-303 of the Armed Services Procurement Regulation, in effect as of the date of execution of this contract, to be fair and reasonable; provided, however, that if it appears that the Contractor would have sustained a loss on the entire contract had it been completed, no profit shall be included or allowed under this subdivision "c" and an appropriate adjustment shall be made reducing the amount of the settlement to reflect the indicated rate of loss; and

(2) The reasonable cost of the preservation and protection of property incurred pursuant to paragraph B(9); and any other reasonable cost incidental to termination of work under this contract, including expense incidental to the determination of the amount due to the Contractor as the result of the termination of work under this contract.

The total sum to be paid to the Contractor under (1) above shall not exceed the total contract price as reduced by the amount of payments otherwise made and as further reduced by the contract price of work not terminated. Except for normal spoilage, and except to the extent that the Owner shall have otherwise expressly assumed the risk of loss, there shall be excluded from the amounts payable to the Contractor under (1) above, the fair value, as determined by the Contracting Officer, of property which is destroyed, lost, stolen, or damaged so as to become undeliverable to the Owner, or to a buyer pursuant to paragraph B(7).

F. Costs claimed, agreed to, or determined pursuant to C, D, E, and I hereof shall be in accordance with Section XV of the Armed Services Procurement Regulation as in effect on the date of this contract.

G. The Contractor shall have the right of appeal, under the clause of this contract entitled "Disputes", from any determination made by the Contracting Officer under paragraph C, E, or I hereof, except that if the Contractor has failed to submit his claim within the time provided in paragraph C or I hereof, and has failed to request extension of such time, he shall have no such right of appeal. In any case where the Contracting Officer has made a determination of the amount due under paragraph C, E, or I hereof the Owner shall pay to the Contractor the following: (1) if there is no right of appeal hereunder or if no timely appeal has been taken, the amount so determined by the Contracting Officer, or (2) if an appeal has been taken, the amount finally determined on such appeal.

H. In arriving at the amount due the Contractor under this clause there shall be deducted (1) all unliquidated advance or other payments on account theretofore made to the Contractor, applicable to the terminated portion of this contract, (2) any claim which the Owner may have against the Contractor in connection with the contract, and (3) the agreed price for, or the proceeds of sale of any materials, supplies, or other things acquired by the Contractor or sold, pursuant to the provisions of this clause, and not otherwise recovered by or credited to the Owner.

I. If the termination hereunder be partial, the Contractor may file with the Contracting Officer a claim for an equitable adjustment of the price or prices specified in the contract relating to the continued portion of the contract (the portion not terminated by the Notice of Termination), and such equitable adjustment as may be agreed upon shall be made in such price or prices. Any claim by the Contractor for an equitable adjustment under this clause must be asserted within ninety (90) days from the effective date of the termination notice, unless an extension is granted in writing by the Contracting Officer.

J. The Owner may from time to time, under such terms and conditions as it may prescribe, make partial payments and payments on account against costs incurred by the Contractor in connection with the terminated portion of this contract whenever in the opinion of the Contracting Officer the aggregate of such payments shall be within the amount to which the Contractor will be entitled hereunder. If the total of such payments is in excess of the amount finally agreed or determined to be due under this clause, such excess shall be payable by the Contractor to the Owner upon demand, together with interest computed at the rate established by the Secretary of the Treasury pursuant to Public Law 92-41, 85 STAT 97 for the Renegotiation Board for the period from the date such excess payment is received by the Contractor to the date on which

such excess is repaid to the Owner; provided, however, that no interest shall be charged with respect to any such excess payment attributable to a reduction in the Contractor's claim by reason of retention or other disposition of termination inventory until ten days after the date of such retention or disposition, or such later date as determined by the Contracting Officer by reason of the circumstances.

K. Unless otherwise provided for in this contract, or by applicable statute, the Contractor shall--from the effective date of termination until the expiration of three years after final settlement under this contract--preserve and make available to the Owner at all reasonable times at the office of the Contractor but without direct charge to the Owner, all his books, records, documents and other evidence bearing on the costs and expenses of the Contractor under this contract and relating to the work terminated hereunder, or, to the extent approved by the Contracting Officer, photographs, microphotographs, or other authentic reproductions thereof.

78. USE OF UNITED STATES FLAG VESSELS

A. To use privately-owned United States flag commercial vessels to ship at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo lines, and tankers) of any equipment, materials, or commodities that are both (1) procured, contracted for, or otherwise obtained with funds made available by State under this contract, and (2) transported by ocean vessel, to the extent such vessels are available at fair and reasonable rates;

B. To furnish within 20 working days following the date of loading for shipments originating within the United States or within 30 working days following the date of loading for shipments originating outside the United States, a legible copy of a rated, "on-board" commercial ocean bill-of-lading in English for each shipment of cargo described in paragraph A above to both State and to the Division of National Cargo, Office of Market Development, U.S. Maritime Administration, Washington, D.C. 20590; and,

C. Subject to existing contracts, to insert the substance of the provisions of this section in all contracts issued pursuant to this contract, and to cause such provisions to be inserted in all subcontracts issued pursuant to this contract, where the contract or subcontract is for \$100,000 or more and where there is a possibility of ocean transportation of procured equipment or materials.

79. DEBARMENT AND SUSPENSION

A. Contractor/Vendor shall not make any award or permit any award (subgrant or contract) at any tier to any party which is debarred or suspended or is otherwise excluded from or ineligible for participation in Federal assistance programs under Executive Order 12549, "Debarment and Suspension."

B. The Final Rule, Government-Wide Debarment and Suspension (Nonprocurement), issued by the Office of Management and Budget and the Department of Defense (32 CFR Part 25) to implement the provisions of Executive Order 12549, "Debarment and Suspension" is incorporated by reference and the Contractor/Vendor covenants and agrees to comply with all provisions thereof, including any amendments to the Final Rule that may hereafter be issued.

80. NONDISCRIMINATION

A. The Contractor/Vendor covenants and agrees that no person shall be denied benefits of, or otherwise be subjected to discrimination in connection with the Contractor/Vendor's performance under this MCA, on the ground of race, religion, color, national origin, sex or handicap. Accordingly and to the extent applicable, the Contractor/Vendor covenants and agrees to comply with the following:

(1) Title VII of the Civil Rights Act of 1964 (42 U.S.C. 2000d et seq.), and DOD Regulations (32 CFR Part 300) issued thereunder;

(2) Executive Order 11246 and Department of Labor Regulations issued thereunder (41 CFR Part 60);

(3) Section 504 of the Rehabilitation Act of 1973 (29 U.S.C. 794) and DOD Regulations issued thereunder (32 CFR Part 56); and,

(4) The Age Discrimination Act of 1975 (42 U.S.C. 6101 et seq.) and DOD Regulations issued thereunder (45 CFR Part 90).

81. LOBBYING

A. The Contractor/Vendor covenants and agrees that it will not expend any funds appropriated by Congress to pay any person for influencing or attempting to influence an officer or employee of any agency, or a Member of Congress in connection with any of the following covered Federal actions: the awarding of any Federal contract; the making of any Federal grant; the making of any Federal loan; the entering into of any cooperative agreement; and, the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

B. The Interim Final Rule, New Restrictions on Lobbying, issued by the Office of Management and Budget and the Department of Defense (32 CFR Part 28) to implement the provisions of Section 319 of Public Law 101-121 (31 U.S.C. 1352) is incorporated by reference.

82. DRUG-FREE WORK PLACE

A. The Contractor/Vendor covenants and agrees that it will comply with the provisions of the Drug-Free Work Place Act of 1988 (Public Law 100-690, Title V, Subtitle D; 41 U.S.C. 701 et seq.) and maintain a drug-free workplace.

B. The Final Rule, Government-Wide Requirements for Drug-Free Workplace (Grants), issued by the Office of Management and Budget and the Department of Defense (32 CFR Part 28, Subpart f) to implement the provisions of the Drug-Free Work Place Act of 1988 is incorporated by reference and the Contractor/Vendor covenants and agrees to comply with all the provisions thereof, including any amendments to the Final Rule that may hereafter be issued.

83. ENVIRONMENTAL STANDARDS

A. The Contractor/Vendor agrees that its performance under this contract shall comply with: the requirements of Section 114 of the Clean Air Act (42 U.S.C. § 7414) and Section 308 of the Federal Water Pollution Control Act (33 U.S.C. § 1318), that relate generally to inspection, monitoring, entry reports, and information, and with all regulations and guidelines issued thereunder; the Resources Conservation and Recovery Act (RCRA); the Comprehensive Environmental Response, Compensation and Liabilities Act (CERCLA); the National Environmental Policy Act (NEPA); and any applicable Federal, Contractor/Vendor or Local environmental regulation.

B. The Contractor/Vendor shall insure that no facility used in its performance under this contract is listed on the Environmental Protection Agency (EPA) list of violating facilities pursuant to 40 CFR Part 15 without the concurrence of State. The Contractor/Vendor shall notify State of the receipt of any communication from EPA indicating that a facility to be or being used in its performance under this contract is under consideration for listing on the EPA list of violating facilities.

C. For the purposes of this section, State agrees that the Contractor/Vendor's obligations in Paragraphs a. and b. of this section above shall not apply to any armory, base, training site, or other facility or portion thereof, the operation and maintenance of which is funded under this contract, that is currently listed as a violating facility, on the effective date of this contract, pursuant to 40 CFR Part 15; nor, shall such listing be the basis for State's termination for cause of this contract or for State's disallowance of any cost otherwise allowable under this contract. The Contractor/Vendor and State agree to cooperate to remediate, as expeditiously as possible, for any facility the operation and maintenance of which is within the scope of this contract, the condition giving rise to the listing of any such facility as a violating facility according to applicable statutes, regulations, or other agreements subject to the availability of funds.

84. NATIONAL HISTORIC PRESERVATION

Any construction, acquisition, modernization, or other activity that may impact a historic property.

A. The Contractor/Vendor agree to identify to the awarding agency any property listed or eligible for listing on the National Register of Historic Places that will be affected by this award, and to provide any help the awarding agency may need, with respect to this award, to comply with Section 106 of the National Historic Preservation Act of 1966 (16 U.S.C. 470, et seq.), as implemented by the Advisory Council on Historic Preservation regulations at 36 CFR Part 800 and Executive Order 11593 (3 CFR, 1971-1975 Comp., p. 559).

36 CFR Part 800 requires Grants Officers to get comments from the Advisory Council on Historic Preservation before proceeding with Federally assisted projects that may affect properties listed on or eligible for listing on the National Register of Historic Places.

85. HATCH ACT

A. The Contractor/Vendor agrees to comply with the Hatch Act (5 U.S.C. 1501 - 1508 and 7324 - 7328), as implemented by the Office of Personnel Management at 5 CFR Part 151, which limits political activity of employees or officers of State or local governments whose employment is connected to an activity financed in whole or part with Federal funds.

86. CARGO PREFERENCE

Any agreement under which international air travel may be supported by U.S. Government funds.

A. Travel supported by U.S. Government funds under this agreement shall use U.S.-flag air carriers (air carriers holding certificates under 49 U.S.C. 41102) for international air transportation of people and property to the extent that such service is available, in accordance with the International Air Transportation Fair Competitive Practices Act of 1974 (49 U.S.C. 40118) and the interpretative guidelines issued by the Comptroller General of the United States in the March 31, 1981, amendment to Comptroller General Decision B138942.

87. RELOCATION AND REAL PROPERTY ACQUISITION

A. The Contractor/Vendor agrees that it will comply with the provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (42 U.S.C. § 4601 et seq.) and regulations issued thereunder (49 CFR Part 24).

88. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

A. The Contractor/Vendor agrees that it will comply with Sections 103 and 107 of the Contract Work Hours and Safety Standards (40 U.S.C. 327-330) as supplemented by Department of Labor regulations (29 CFR Part 5). As applied to this agreement, the Contract Work Hours and Safety Standards Act specifies that no laborer or mechanic doing any part of the work contemplated by this agreement shall be required or permitted to work more than 40 hours in any workweek unless paid for all additional hours at not less than 1 1/2 times the basic rate of pay. This Act is applicable to any construction contract awarded in excess of \$2,000, and in excess of \$2,500 for other contracts which involve the employment of mechanics or laborers.

89. DAVIS-BACON ACT

When required by Federal assistance program legislation, such as the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, environmental remediation construction, the following provision applies.

A. The Contractor/Vendor agrees that it will comply with the Davis-Bacon Act (40 U.S.C. 276a to a-7) as supplemented by U.S. Department of Labor regulations (29 CFR Part 5). All rulings and interpretations of the Davis-Bacon Acts contained in 29 CFR Part 5 are incorporated by reference in this agreement. As applied to this agreement, the Davis-Bacon Act (40 U.S.C. 276a-276a-7) provides that contracts in excess of \$2,000 to which the Federal Government provides assistance funding for construction, alteration, or repair (including painting and decorating) of public buildings or public works within the United States, shall contain a provision that no laborer or mechanic employed directly upon the site of the work shall receive less than the prevailing wage rates as determined by the U.S. Secretary of Labor.

90. STATE ADDENDUM

A. "It is agreed that the terms and commitments contained herein shall not constitute a debt of The State of Alabama in violation of Article II, Section 213 of the Constitution of Alabama, 1901, as amended by Amendment 26. It is further agreed that if any provision of this contract shall contravene any statute, constitutional provision or amendment to the Constitution, now in effect or which may, during the course of this contract be enacted. Then that conflicting provision in the contract shall be deemed null and void."

B. “The Contractor’s sole remedy for settlement or any and all disputes arising under the Terms of this agreement shall be limited to filing a claim with The Board of Adjustment for the State of Alabama.”

C. “In event of proration of the fund from which payment under this contract is to be made; the contract will be subject to termination.”

D. “The Contractor acknowledges and understands this contract is not effective until it has received all requisite state government approvals and the Contractor shall not begin performance until notified to do so by State Property & Disbursing Office. The Contractor shall not be entitled to compensation for work performed prior to effective date of contract.”

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SECTION 00 73 00 - SPECIAL CONDITIONS OF THE CONTRACT

The following special conditions modify, change, delete, or add to the "General Conditions of the Contract", (June 2009) Section 00 72 00. Where any Article, Paragraph, or Clause of the General Conditions is modified or deleted by the Special Conditions, the unaltered provisions of that Article, Paragraph, or Clause remain in effect. These Special Conditions shall take precedence over and modify all other specification provisions to the extent in which there may be any conflict.

PARAGRAPH 2. DEFINITIONS, INTENT, CORRELATION, AND STREAMLINING

2.C(1) Modify the "Order of Precedence" as follows:

- (a) The Contract Agreement
- (b) Addenda, with those of later date having precedence over those of earlier date.
- (c) Special Conditions (or other Conditions which modify the General Conditions of the Contract).
- (d) General Conditions of the Contract
- (e) The Detailed Specification Requirements
- (f) Details appearing on the Drawings; large scale details shall take precedence over smaller scale details.
- (g) The Working Drawings; large scale drawings shall take precedence over smaller scale drawings.

2.C(5) Add the following:

In the case of inconsistency between Drawings and Specifications or within either document not clarified by addendum, the better quality or greater quantity of Work shall be provided in accordance with the Architect's interpretation.

PARAGRAPH 14. PROTECTION OF WORK AND PROPERTY

Add the following:

This project location/site is normally used as a U. S. Military facility.

If U. S. Military personnel are remaining in tenancy, the Contractor shall be required, for the duration of the project, to maintain the level of security that exists at the project site at the Notice to Proceed date. The Contractor shall make certain that at the end of each workday all doors, windows, walls penetrations, fencing, etc. is completely secured to prevent intruders, etc. In the event that the facility cannot be secured via Owner approved: locks, temporary partitions, etc. then the Contractor shall provide at his expense, a qualified security guard (pre-approved in writing by the Owner) to protect the site or building. Failure to maintain the security of the facility can be considered grounds for dismissal from the project.

For facilities where U. S. Military personnel are remaining in tenancy, the general operating hours of this facility are approximately 7:00 a.m. to 5:30 p.m. Tuesday - Friday. In the event that the Contractor must conduct work outside of the typical operating hours of the facility the Contractor must notify and request in writing to the Owner and Architect a minimum of five days prior to the time that Contractor desires to work. The Contractor shall not work outside typical operating hours unless it is approved, in writing, by the Owner.

The provisions in the previous two paragraphs can be modified by the Owner. These provisions may also be modified by Addenda.

The Contractor shall not permit a load to be applied, or forces introduced, to any part of the existing or new construction or site that may cause damage to the construction or site or endanger safety of the construction, site, or persons on or near the site.

PARAGRAPH 19. CHANGES IN THE WORK

Modify per the following:

A. By mutually agreed price or prices which will be added to or deducted from the Contract Price. Additions to the contract price shall include the Contractor's overhead and profit but shall not exceed 15 percent. Where subcontract work is involved, the total mark-up for the Contractor and subcontractors shall not exceed 25%. This percentage allowance for overhead and profit shall include the cost of superintendent, timekeeper, clerks, watchmen, use of small tools, incidental job burdens, and general office expenses. There will be no additional or separate charges for these items. ~~No allowance for overhead and profit shall be figured on any change which involves a net credit to the Owner.~~ Changes which involve a net credit to the Owner shall include credits for overhead and profit on the deducted work.

PARAGRAPH 28. APPLICATIONS FOR PARTIAL AND FINAL PAYMENTS

Add the following:

Unless otherwise provided in the Contract Documents, the Contractor's cost of materials and equipment to be incorporated into the Work, which are stored off site, may also be considered in Partial Applications for Payment under the following conditions:

- (1) the contractor has received written approval from the Owner to store the materials or equipment off site in advance of delivering materials to the off-site location;
- (2) a Certificate of Insurance is furnished to, and accepted by, the Owner evidencing that a special insurance policy, or rider to an existing policy, has been obtained by the Contractor providing all-risk property insurance coverage, specifically naming the materials or equipment stored and naming the Owner as an additionally insured party;
- (3) the Architect is provided with a detailed inventory of stored materials or equipment and the materials or equipment are clearly marked in correlation to the inventory to facilitate inspection and verification of the presence of the materials or equipment by the Architect or Owner;
- (4) the materials or equipment are properly and safely stored in a bonded warehouse, or a facility otherwise approved in advance by the Owner; and
- (5) compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest.

FINAL ACCEPTANCE of the WORK

Final Completion or Final Acceptance of the Work shall be achieved when all work including all "punch list" items recorded have been fully completed or corrected and accepted by the Owner and Architect.

PREREQUISITES to FINAL PAYMENT

The following conditions are prerequisites to Final Payment becoming due to the Contractor:

- (1) Full execution of the Certificate of Final Completion for the Work.
- (2) The Contractor's completion, to the satisfaction of the Architect and Owner, of all documentary requirements identified in sections 01 77 00 - Project Closeout and 01 78 13 Project Closeout Checklist.

PARAGRAPH 89. DAVIS BACON ACT

Delete this paragraph in its entirety.

ADD THE FOLLOWING PARAGRAPH:

PARAGRAPH 91. ADDITIONAL GENERAL CONTRACTOR ONE YEAR WARRANTY ITEMS

1. The General Contractor is required to provide the Manufacturer's recommended preventative maintenance, including inspections, for ALL items installed or refurbished in this project for a period of ONE year from the date of final acceptance.
2. The General Contractor will perform the preventative maintenance and inspections per Manufacturer's recommended intervals for each item.
3. The General Contractor will provide the Owner written documentation that the required preventative maintenance and inspections have been performed. This documentation will be provided at each Manufacturer's recommended interval and verified by the owner or tenant of each facility.

END OF SECTION

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SECTION 01 10 00 - SUMMARY OF WORK

(Revision Date: 14 June 2022)

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division-01 Specification sections, apply to work in this section.

1.02 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Project consists of work as described in the drawings and specifications entitled: AASF#3 ENTRY CONTROL POINT CONSTRUCTION prepared by THOMPSON ENGINEERING, dated 6/14/22.
- B. The types of work specified in this section include the following:
 - 1. Furnishing of all labor, materials, tools, equipment, staging areas, hoisting, qualified personnel and proper supervision for the work described in the drawings and specifications.
 - 2. Protection of the buildings, grounds, building personnel and visitors.
- C. Work to be performed under a single prime contract.

1.03 WORK UNDER OTHER CONTRACTS

- A. The Owner may at times have other work in progress at the site.
- B. Contractor shall cooperate fully with separate contractors (if any) so that work under those contracts may be carried out smoothly, without interfering with or delaying work under either contract.

1.04 CONTRACTOR USE OF PREMISES

- A. General: During the construction period the Contractor shall have access to all areas of the building where work is to be undertaken.
- B. OWNER OCCUPANCY
 - 1. Reference Section 00 73 00 – Special Conditions of the Contract, Paragraph 14.

1.05 JOB CONDITIONS

- A. Coordinate all work under this contract with interfacing and adjoining work for proper sequencing of each installation. Ensure best possible weather resistance and durability of the work and protection of materials and finishes.
- B. The Contractor is responsible for the water tightness of the Existing Building during the construction contract period (after work of this contract begins). In the event the Contractor fails to maintain buildings in a watertight condition, the Contractor shall be responsible for any damage caused to the Owner's property.
- C. In the event emergency action must be taken by the Owner's maintenance forces to protect property, due to the Contractor's failure to maintain buildings in a watertight condition, the Contractor shall be responsible for all of the Owners' labor and materials cost incurred due to emergency action and he shall reimburse the Owner for such cost by standard Change Order procedure.
- D. Work under this contract must be completed in a continuous fashion. If the Contract Documents show phased work, the phasing plan must be followed, unless the Contractor has requested, and received, written approval from the Owner to deviate from the phasing plan shown in the Contract Documents.
- E. CONTRACTOR USE OF SITE AND PREMISES
 - 1. Provide access to and from site as required by law and by Owner:
 - a. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
 - b. Do not obstruct roadways, sidewalks, or other public ways without permit.
 - c. The facility entrance road must be open during normal operating hours. All overhead canopy structural work shall occur on the weekends.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 WORK SEQUENCE

- A. The Notice to Proceed (NTP) is **14** calendar days from the email delivery of the fully executed contract to the Contractor, unless otherwise agreed upon, in writing, by the Owner and the Contractor.
- B. Contract Time begins at the NTP.
- C. Perform all work in not to exceed **240** days in accordance with the following (calculated as the sum of 3.01.C.1 through 3.01.C.2. [inclusive]):
 - 1. The Contractor has **195** calendar days to perform all Work, including but not limited to the following: providing all required operator training, the "Punch-List Inspection", correcting all deficiencies noted in the "Punch-List Inspection", and successful completion of the Final Inspection – with no noted deficiencies.
 - 2. The Contractor has **45** days, from 3.01.C.1. (above), to have submitted a complete Project Closeout package, as detailed and defined in Sections 01 77 00 and 01 78 13.

3.02 LIQUIDATED DAMAGES

- A. If final completion is not achieved within the time for contraction noted above, liquidated damages will be assessed in the amount of 6% per annum.
- B. The liquidated damages assessed will be deducted from the final pay application prior to payment by the Owner.

END OF SECTION

SECTION 01 23 00 - ALTERNATES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Administrative and procedural requirements for Additive Alternates.

1.02 DEFINITIONS

- A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added to or deducted from the Base Bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
 - 1. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.03 PROCEDURES

- A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
 - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
- B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.
- C. Execute accepted alternates under the same conditions as other work of the Contract.
- D. Schedule: A Schedule of Alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 SCHEDULE OF ALTERNATES

- A. Alternate No. 1: Flagpole
 - 1. Construction of a new flagpole and flagpole foundation per the specification and plans

END OF SECTION

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SECTION 01 25 13 - PRODUCT SUBSTITUTION PROCEDURES

PART 1 - GENERAL:

1.01 SUMMARY

- A. Section Includes: Administrative and procedural requirements for handling requests for substitutions made AFTER award of the Contract.
- B. Related Sections:
 - 1. 00 43 25 - Substitution Request Form During Bidding.
 - 2. 00 72 00 - General Conditions of the Contract
 - 3. 01 25 14 - Substitution Request Form During Construction.
 - 4. 01 33 00 - Submittal Procedures

1.02 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

1.03 SUBMITTALS

- A. Substitution Request Form: Submit all substitution requests using the form provided in this Project Manual. Use Section 01 25 14 - Substitution Request Form During Construction.
 - 1. Product substitutions will NOT be considered after award of the Contract unless the above substitution form is used.
 - 2. Architect will reject incomplete forms.
- B. Substitution Requests: Submit three (3) copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number(s), Specification Section title(s), Drawing number(s), and Drawing title(s).
 - 1. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified material or product cannot be provided.
 - b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
 - g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - h. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to the Owner.
 - i. Detailed comparison of Contractor's Construction Schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delays in delivery.
 - j. Cost information, including a proposal of change, if any, in the Contract Sum.
 - k. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
 - l. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
 - 2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven (7) days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution.

PART 2 - PRODUCTS

2.01 PRODUCT SUBSTITUTIONS

- A. Timing: Architect will consider requests for substitution if received within twenty (20) days after Notice to Proceed. Requests received after that time may be considered or rejected at discretion of Architect.
- B. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - 1. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
 - 2. Requested substitution does not require extensive revisions to the Contract Documents.
 - 3. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - 4. Substitution request is fully documented and properly submitted.
 - 5. Requested substitution will not adversely affect Contractor's Construction Schedule.
 - 6. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - 7. Requested substitution is compatible with other portions of the Work.
 - 8. Requested substitution has been coordinated with other portions of the Work.
 - 9. Requested substitution provides specified warranty.
 - 10. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
- C. Exceptions: The following are not considered substitutions and are not subject to requirements specified in this Section:
 - 1. Substitutions requested during the Bidding period, and accepted via Addenda.
 - 2. Revisions to Contract Documents requested by the Owner.
 - 3. Specified options on products and construction methods included in Contract Documents.

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 25 14 - SUBSTITUTION REQUEST FORM DURING CONSTRUCTION

(Revision Date: 14 Jan 2021)

CONTRACTOR SHALL USE THIS FORM FOR SUBMITTING SUBSTITUTION REQUEST AFTER AWARD OF CONTRACT. OTHER FORMS OF SUBSTITUTION REQUESTS WILL NOT BE CONSIDERED.

Project: AASF#3 Entry Control Point Construction Substitution Request Number: _____
Mobile Alabama

Contract #: _____

Architect: Thompson Engineering
2970 Cottage Hill Road
Mobile Alabama 36606

From: _____

Re: _____

Specification Title: _____ **Section:** _____

Description: _____ **Page:** _____ **Article/Paragraph:** _____

Proposed Substitution: _____

Manufacturer: _____ **Address:** _____ **Phone:** _____

Trade Name: _____ **Model No.:** _____

Installer: _____ **Address:** _____ **Phone:** _____

History: New Product 1 – 4 years old 5 – 10 years old Exceeds 10 years old

Differences between proposed substitution and specified product:

Point by Point comparative data attached:

Reason for not providing specified item:

Similar Installation:

Project: _____ Architect: _____
Address: _____ Owner: _____
Date Installed: _____

Proposed substitution affects other parts of Work: ___ No ___ Yes: Explain:

Rough order of magnitude of the savings to Owner for accepting substitution: (\$_____)

Proposed substitution changes Contract Time: ___ No ___ Yes [Add] [Deduct] _____ days.

NOTE: Acceptance of substitution request by the Owner will require the Contractor to submit a change order request in accordance with the General Conditions of the Contract. Should the Owner reject the change order request, the Substitution Request is therefore rejected, and the Contractor must comply with the requirements of the Contract Documents as if the Substitution Request was rejected by the Owner.

Supporting Data Attached:

Drawings Product Data Samples Tests Reports _____

The Undersigned Certifies:

Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product. Same warranty will be furnished for proposed substitution as for specified product. Same maintenance service and source of replacement parts, as applicable, is available. Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule. Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are waived. Proposed substitution does not affect dimensions and functional clearances. Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution. Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete by the Contractor in all respects.

Submitted By: _____ Signed By: _____

Firm: _____

Address: _____

Telephone: _____ Fax: _____

E-mail: _____ Website: _____

Attachments: _____

A/E's REVIEW AND ACTION (this section to be completed by Architect/Engineer)

Substitution recommended for Acceptance by the Owner (Strikethrough if NOT applicable)

Substitution recommended for Rejection by the Owner (Strikethrough if NOT applicable)

Signed By: _____ Date: _____

OWNER'S REVIEW AND ACTION (this section to be completed by Owner's KO/COR)

Substitution Accepted by the Owner (Strikethrough if NOT applicable)

Substitution Rejected by the Owner (Strikethrough if NOT applicable)

Signed By: _____ Date: _____

END OF SECTION

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SECTION 01 26 00 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section specifies administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Sections include the following:
 - 1. Specification 00 72 00 General Conditions of the Contract, Specification 00 73 00 Special Conditions of the Contract and Specification 01 26 14 Change Order Recap Form.

1.03 MINOR CHANGES IN THE WORK

- A. All changes in the Work will only be authorized by a fully executed Contract Modification Form, executed by both the Contractor and the Owner, or as otherwise authorized by the General Conditions of the Contract.

1.04 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Owner will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - 1. Proposal Requests issued by Owner are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
 - 2. Within time specified in Proposal Request after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change. The submission shall include:
 - a. A list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - b. Indication of applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Costs of labor directly attributable to the change.
 - d. An updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 - e. Other requirements of the General Conditions of the Contract.
 - f. Change Order Request Recap Form (01 26 14) completed by the Contractor.
 - g. Submission will be made as one complete packet, via electronic mail, to the Architect.
- B. Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change to Architect.
 - 1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time. The submission shall include:
 - a. A list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - b. Indication of applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Costs of labor directly attributable to the change.
 - d. An updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 - e. Other requirements of the General Conditions of the Contract.
 - f. Change Order Request Recap Form (01 26 14) completed by the Contractor.

- g. Submission will be made as one complete packet, via electronic mail, to the Architect.
 - C. Proposal Request Form: Request for Proposal will be on Owner's approved form.
- 1.05 CHANGE ORDER PROCEDURES
- A. On Owner's approval of a Proposal Request, the Owner will issue a Contract Modification for signatures of Owner, Surety and Contractor on Owner's "Contract Modification / Supplemental Agreement Form".

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

01 26 14 CHANGE ORDER RECAP FORM

Change Proposal Recap Sheet									
Date: _____ Contractor Name: _____ Project Name: _____ Contract Number: _____									
				Initiated By: _____		Owner/Architect			
				(Check One)		Contractor			
Reference RFP or RFI Number: _____						Subcontractor			
Brief Description of Proposed Change: _____									
GENERAL CONTRACTOR Direct Cost Summary									
Item/Description *	Quantity	Unit	Amount				Equipment		
			Unit \$	Material	Unit \$	Labor			
				\$0.00		\$0.00		\$0.00	
				\$0.00		\$0.00		\$0.00	
				\$0.00		\$0.00		\$0.00	
				\$0.00		\$0.00		\$0.00	
				\$0.00		\$0.00		\$0.00	
				\$0.00		\$0.00		\$0.00	
				\$0.00		\$0.00		\$0.00	
				\$0.00		\$0.00		\$0.00	
				\$0.00		\$0.00		\$0.00	
Sub Totals:				\$0.00		\$0.00		\$0.00	
Material:				\$0.00					
Labor:				\$0.00					
Equipment:				\$0.00					
Prime Contractor Subtotal:				\$0.00					
SUBCONTRACTOR Direct Cost Summary									
Item/Description *	Quantity	Unit	Amount				Equipment		
			Unit \$	Material	Unit \$	Labor			
				\$0.00		\$0.00		\$0.00	\$0.00
				\$0.00		\$0.00		\$0.00	\$0.00
				\$0.00		\$0.00		\$0.00	\$0.00
				\$0.00		\$0.00		\$0.00	\$0.00
				\$0.00		\$0.00		\$0.00	\$0.00
				\$0.00		\$0.00		\$0.00	\$0.00
				\$0.00		\$0.00		\$0.00	\$0.00
				\$0.00		\$0.00		\$0.00	\$0.00
				\$0.00		\$0.00		\$0.00	\$0.00
Sub Totals:				\$0.00		\$0.00		\$0.00	\$0.00
Material:				\$0.00					
Labor:				\$0.00					
Equipment:				\$0.00					
Sub-sub:				\$0.00					
Subcontractors Subtotal:				\$0.00					
Mark-up Calculations									
Subcontractors Subtotal:				\$0.00					
Prime Cntrtr Subtotal:				\$0.00					
Total Direct Cost:				\$0.00					
GC OH&P on Own Work:				\$0.00		15%			
Total OH&P on Sub Work:				\$0.00		25%			
Total Cost Change				<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; border-radius: 50%; padding: 2px 5px; margin-right: 5px;">Add</div> <div style="border-bottom: 1px solid black; width: 50px; text-align: center;">\$0.00</div> <div style="margin-left: 5px;">Deduct</div> </div>					
Total Time Change				<div style="display: flex; align-items: center;"> <div style="border-bottom: 1px solid black; width: 50px; text-align: center;">0</div> <div style="margin-left: 5px;">Calendar Days (Critical path impacts only)</div> </div>					
* Materials permanently installed in the building shall be sales tax free. * Any requests for additional time are only considered if the critical path of the project is extended. Attach additional pages with explanation of how the change affects the critical path of the project.									

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Armory Commission of Alabama

REQUEST FOR INFORMATION FORM

CONTRACTOR:

PROJECT:

RFI#:

DATE:

TO / ATTN:

FROM:

DESCRIPTION:

DRAWING NUMBER:

SPEC SECTION:

DESCRIPTION OF RFI:

RECOMMENDED SOLUTION BY GC:

SIGNATURE:

SCHEDULE IMPACT: ☐ YES ☐ NO ☐ UNKNOWN

RESPONSE REQUIRED: ☐ YES ☐ NO

COST IMPACT: ☐ YES ☐ NO ☐ UNKNOWN

RECOMMENDATION OR RESPONSE:

SIGNATURE:

DATE:

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SECTION 01 29 00 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Sections include the following:
 - 1. Section 01 31 00 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
 - 2. Section 01 32 00 "Construction Progress Documentation" for administrative requirements governing preparation and submittal of Contractor's Construction Schedule and Submittals Schedule.
 - 3. Section 00 62 76 "Contractor's Periodical Request for Partial Payment"

1.03 DEFINITIONS

- A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.04 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.
 - 1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including the following:
 - a. Application for Payment forms with Continuation Sheets.
 - b. Submittals Schedule.
 - c. Contractor's Construction Schedule.
 - 2. Submit the Schedule of Values to Architect in accordance with the requirements of the requirements of the Addenda and concurrent with both the initial Contractor's Draw Schedule (Section 00 62 83) and Contractor's Progress Schedule (Section 01 32 00).
- B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least one line item for each Specification Section.
 - 1. Identification: Utilize the Contractor's Periodical Request for Partial Payment form at Specification 00 62 83 for the Schedule of Values.
 - 2. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate or as directed by the Owner.
 - 3. To the greatest extent possible, round amounts to nearest whole dollar; total shall equal the Contract sum.
 - 4. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site per 00 62 78.
 - 5. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
 - 6. Allowances: Provide a separate line item in the Schedule of Values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by the allowance quantity. Use information indicated in the Contract Documents to determine quantities.
 - 7. Alternates: Provide a separate line item in the Schedule of Values for each alternate.
 - 8. There shall be a separate line in the amount of 2.5% of the Contract, as awarded, included on the Schedule of Values and titled "Closeout Documents"
 - 9. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.

- a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.

1.05 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as checked by Architect and paid for by Owner.
 1. Initial Application for Payment, Application for Payment at time of Completion, and Final Application for Payment involve additional requirements.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction Work covered by each Application for Payment is the period indicated in the Agreement.
- C. Payment Application Forms: Use Owner provided "Contractor's Periodical Request for Partial Payment" and Continuation Sheets as form for Applications for Payment.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. NOTE: If the Application is not signed by the person who submitted the Bid, the Architect and/or Owner reserve the right to reject the Application, unless and until the Contractor shall have provided the Owner a letter authorizing additional signatories, on Contractor's letterhead, and that Owner has accepted. Architect will return incomplete applications without action.
 1. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.
 2. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
- E. Transmittal: Submit three, signed in blue ink and notarized, original copies of each Application for Payment to Architect at the next Owner-Architect-Contractor (OAC) meeting. Include waivers of lien and similar attachments as required.
 1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- F. Initial Application for Payment: Administrative actions and submittals, to include Owner's acceptance, that must precede submittal of first Application for Payment include the following:
 1. List of subcontractors.
 2. Schedule of Values.
 3. Contractor's Construction Schedule.
 4. Submittals Schedule (preliminary if not final).
 5. List of Contractor's principal consultants.
 6. Initial settlement survey and damage report if required.
- G. Periodic Applications for Payment: Administrative actions and submittals that must coincide with submittal of each Application for Payment include the following:
 1. Contractor's Periodical Request for Partial Payment.
 2. Submittals Schedule (updated).
 3. Inventory of Stored Materials - submitted on form provided in Specification Section 00 62 78.
 4. Contractor's Draw Schedule on form provided in Specification Section 00 62 83.
 5. Weather Delay Documentation Form as provided in Specification Section 00 63 56.
 6. Updated LEED Scorecard (if Applicable)
- H. Final Payment Application: Submit final Application for Payment with releases and supporting documentation showing 100 percent completion for portion of the Work claimed as complete, including, but not limited to, the following:
 1. Evidence of completion of Project closeout requirements.
 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 3. Updated final statement, accounting for final changes to the Contract Sum.
 4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
 5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
 6. AIA Document G707, "Consent of Surety to Final Payment."

7. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Final Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
8. Final, liquidated damages settlement statement.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

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SECTION 01 31 00 - PROJECT MANGEMENT AND COORDINATION

(Revision Date: 8 April 2021)

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. Coordination Drawings.
 - 2. Administrative and supervisory personnel.
 - 3. Project meetings.
- B. Related Sections:
 - 1. Section 01 32 00 - Construction Progress Documentation: Preparing and submitting Contractor's Construction Schedule.
 - 2. Section 01 73 00 - Execution: Procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
 - 3. Section 01 77 00 - Closeout Procedures: Coordinating Contract closeout.
 - 4. Section 01 91 13 – General Commissioning Requirements: Meetings.

1.02 COORDINATION

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in the sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 - 2. Coordinate installation of different components to assure manufacturers and applicable code(s) [whichever is greater] accessibility for required maintenance, service, and repair.
 - 3. Make provisions to accommodate items scheduled for later installation.
- B. Where necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings.
 - 1. Prepare similar memoranda for the Owner and separate contractors where coordination of their work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
 - 1. Preparation of Contractor's Construction Schedule.
 - 2. Preparation of the Schedule of Values.
 - 3. Installation and removal of temporary facilities and controls.
 - 4. Delivery and processing of submittals.
 - 5. Progress meetings.
 - 6. Pre-installation conferences.
 - 7. Project closeout activities.
- D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.
 - 1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. Refer to other Sections for disposition of salvaged materials that are designated as Owner's property.

1.03 SUBMITTALS

- A. Coordination Drawings: Prepare Coordination Drawings if limited space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities.
 - 1. Content: Project-specific information, drawn accurately to scale. Do not base Coordination Drawings on reproductions of the Contract Documents or standard printed data. Include the following information, as applicable:

- a. Indicate functional and spatial relationships of components of architectural, structural, civil/site, mechanical, plumbing, and electrical systems.
 - b. Indicate dimensions shown on the Contract Drawings and make specific note of dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect for resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
 2. Sheet Size: At least 8-1/2 by 11 inches but no larger than 30 by 40 inches.
 3. Number of Copies: Submit two opaque copies of each submittal. Architect will return one copy.
 4. Refer to individual Sections for Coordination Drawing requirements for Work in those Sections.
- B. Staff Names: Within 15 days of commencement of construction operations, submit a list of the Contractor's principal staff assignments, including the superintendent and other personnel in attendance at the Project Site. Identify individuals and their duties and responsibilities. List their addresses and telephone numbers.
1. Post copies of the list in the Project meeting room, the temporary field office, and each temporary telephone.

1.04 PROJECT MEETINGS

- A. General: Architect will schedule and conduct meetings and conferences at Project site, unless otherwise indicated.
1. Attendees: Architect will inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Architect will notify Owner and Contractor of scheduled meeting dates and times.
 2. Agenda: Architect will prepare and distribute the meeting agenda to all invited attendees.
 - a. Architect shall provide Contractor and Owner with agenda items 48 hours before the Project Meeting.
 3. Minutes: Architect will record significant discussions and agreements achieved. Meeting minutes will be distributed to everyone concerned, including Owner and Contractor, within three (3) days of the meeting.
- B. Preconstruction Conference: Owner will schedule a preconstruction conference before starting construction, at a time convenient to Architect and Contractor, after execution of the Agreement. Hold the conference at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.
1. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 2. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Tentative construction schedule.
 - b. Phasing.
 - c. Critical work sequencing and long-lead items.
 - d. Designation of key personnel and their duties.
 - e. Procedures for processing Change Order Requests and Contract Modifications.
 - f. Procedures for requests for information (RFIs) utilizing the form in Section 01 26 20.
 - g. Procedures for testing and inspecting.
 - h. Procedures for processing Applications for Payment.
 - i. Distribution of the Contract Documents.
 - j. Submittal procedures.
 - k. LEED requirements (if applicable).
 - l. Preparation of Record Documents.
 - m. Use of the premises and existing building(s).
 - n. Work restrictions.
 - o. Owner's occupancy requirements.
 - p. Responsibility for temporary facilities and controls.
 - q. Construction waste management and recycling.
 - r. Parking availability.
 - s. Office, work, and storage areas.

- t. Equipment deliveries and priorities.
 - u. First aid.
 - v. Security.
 - w. Progress cleaning.
 - x. Working hours.
 - 3. Minutes: Architect will record and distribute meeting minutes.
- C. Commissioning Meetings: All Commissioning Meetings will be held and conducted in accordance with Section 01 91 13, Part 3.
- 1. Attendees: The mandatory attendees are the entire commissioning team, Owner, Contractor, affected sub-contractors, Architect and Architect's Consultants for items being commissioned.
 - 2. Agenda: The Commissioning Agent (CxA) will provide all attendees with an agenda.
 - 3. Reporting: CxA will take minutes and distribute to the Architect (for further distribution to Architect's Consultant), Owner and Contractor (for further distribution to Contractor's sub-contractor).
- D. Pre-installation Conferences: Conduct a pre-installation conference at Project site before each construction activity that requires coordination with other construction.
- 1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect of scheduled meeting dates.
 - 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
 - a. The Contract Documents.
 - b. Options.
 - c. Related requests for interpretations (RFIs).
 - d. Related Change Orders.
 - e. Purchases.
 - f. Deliveries.
 - g. Submittals.
 - h. Review of mockups.
 - i. Possible conflicts.
 - j. Compatibility problems.
 - k. Time schedules.
 - l. Weather limitations.
 - m. Manufacturer's written recommendations.
 - n. Warranty requirements.
 - o. Compatibility of materials.
 - p. Acceptability of substrates.
 - q. Temporary facilities and controls.
 - r. Space and access limitations.
 - s. Regulations of authorities having jurisdiction.
 - t. Testing and inspecting requirements.
 - u. Installation procedures.
 - v. Coordination with other work.
 - w. Required performance results.
 - x. Protection of adjacent work.
 - y. Protection of construction and personnel.
 - 3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
 - 4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.
 - 5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

- E. Progress Meetings: Conduct progress meetings at regular intervals (at least monthly) scheduled with the Owner and Architect, otherwise known as Owner-Architect-Contractor (OAC) meetings. Coordinate dates of meetings with preparation of payment requests.
1. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 2. Agenda: Review minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - 1) Review schedule for next period.
 - b. Review present and future needs of each entity present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Status of submittals.
 - 4) Deliveries.
 - 5) Off-site fabrication.
 - 6) Access.
 - 7) Site utilization.
 - 8) Temporary facilities and controls.
 - 9) Work hours.
 - 10) Hazards and risks.
 - 11) Progress cleaning.
 - 12) Quality and work standards.
 - 13) Status of correction of deficient items.
 - 14) Field observations.
 - 15) Requests for information (RFIs).
 - 16) Status of proposal requests.
 - 17) Pending Change Order Requests.
 - 18) Status of Contract Modifications.
 - 19) Pending claims and disputes.
 - 20) Review of executed Periodical Requests for Partial Payments.
 3. Minutes: Contractor will record the meeting minutes.
 4. Reporting: Not later than 3 days after each meeting, distribute minutes of the meeting to each party present and to parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.
 - a. Schedule Updating: Update Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 32 00 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Contractor's Construction Schedule.
 - 2. Submittals Schedule.
 - 3. Daily construction reports.
 - 4. Field condition reports.
- B. Related Sections:
 - 1. Section 012900 - Payment Procedures: Submitting the Schedule of Values.
 - 2. Section 013100 - Project Management and Coordination: Submitting and distributing meeting and conference minutes.
 - 3. Section 013300 - Submittal Procedures: Submitting schedules and reports.
 - 4. Section 014000 - Quality Assurance: Submitting a schedule of tests and inspections.

1.02 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
 - 1. Critical activities are activities on the critical path. They must start and finish on the planned early start and finish times.
 - 2. Predecessor Activity: An activity that precedes another activity in the network.
 - 3. Successor Activity: An activity that follows another activity in the network.
- B. Fragment: A partial or fragmentary network that breaks down activities into smaller activities for greater detail.
- C. Major Area: A story of construction, a separate building, or a similar significant construction element.

1.03 SUBMITTALS

- A. Submittals Schedule: Submit three (3) copies of schedule. Arrange the following information in a tabular format:
 - 1. Scheduled date for first submittal.
 - 2. Specification Section number and title.
 - 3. Submittal category (action or informational).
 - 4. Name of subcontractor.
 - 5. Description of the Work covered.
 - 6. Scheduled date for Architect's final release or approval.
- B. Field Condition Reports: Submit two (2) copies at time of discovery of differing conditions.

1.04 COORDINATION

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.
- B. Coordinate Contractor's Construction Schedule with the Schedule of Values (01 29 00) and Contractors Draw Schedule (00 62 83), list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.
 - 1. Secure time commitments for performing critical elements of the Work from parties involved.
 - 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.01 SUBMITTALS SCHEDULE

- A. Preparation: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, resubmittal, ordering, manufacturing, fabrication, and delivery when establishing dates.

1. Coordinate Submittals Schedule with list of subcontracts, the Schedule of Values, and Contractor's Construction Schedule.
2. Submit concurrently with the first complete submittal of Contractor's Construction Schedule.

2.02 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Time Frame: Extend schedule from date established for the NTP to date of Final Completion.
 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- B. Activities: Treat each story or separate area as a separate numbered activity for each principal element of the Work. Comply with the following:
 1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Owner.
 2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
 3. Submittal Review Time: Include review and resubmittal times indicated in Section 01 33 00 - Submittal Procedures in schedule. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.
 4. Startup and Testing Time: Include not less than three (3) days for startup and testing.
 5. Project Completion: Indicate completion in advance of date established for Project Completion, and allow time for Architect's administrative procedures necessary for certification of Project Completion.
- C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
 1. Phasing: Arrange list of activities on schedule by phase.
 2. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
 3. Work Restrictions: Show the effect of the following items on the schedule:
 - a. Coordination with existing construction.
 - b. Limitations of continued occupancies.
 - c. Uninterruptible services.
 - d. Partial occupancy before Final Acceptance.
 - e. Use of premises restrictions.
 - f. Provisions for future construction.
 - g. Seasonal variations.
 - h. Environmental control.
 4. Work Stages: Indicate important stages of construction for each major portion of the Work.
- D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Punch List Inspection, and Final Inspection.
- E. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using fragments to demonstrate the effect of the proposed change on the overall project schedule.

2.03 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)

- A. General: Prepare network diagrams using AON (activity-on-node) format. Submit two (2) opaque copies of initial schedule, large enough to show entire schedule for entire construction period.
- B. CPM Schedule: Submit Contractor's Construction Schedule, simultaneously with the Schedule of Values (01 29 00) and the Draw Schedule (00 62 83), using a computerized, time-scaled CPM network analysis diagram for the Work in accordance with General Conditions, Article 9.
 1. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates, regardless of Owner's approval of the schedule.
 2. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.

3. Use "one workday" as the unit of time. Include list of nonworking days and holidays incorporated into the schedule.
- C. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the preliminary network diagram, prepare a skeleton network to identify probable critical paths.
 1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:
 - a. Preparation and processing of submittals.
 - b. Mobilization and demobilization.
 - c. Purchase of materials.
 - d. Delivery.
 - e. Fabrication.
 - f. Utility interruptions.
 - g. Installation.
 - h. Work by Owner that may affect or be affected by Contractor's activities.
 - i. Testing and commissioning.
 2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
 3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
 4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.
 - a. Subnetworks on separate sheets are permissible for activities clearly off the critical path.
- D. Initial Issue of Schedule: Prepare initial network diagram from a list of straight "early start-total float" sort. Identify critical activities. Prepare tabulated reports showing the following:
 1. Contractor or subcontractor and the Work or activity.
 2. Description of activity.
 3. Principal events of activity.
 4. Immediate preceding and succeeding activities.
 5. Early and late start dates.
 6. Early and late finish dates.
 7. Activity duration in workdays.
 8. Total float or slack time.
 9. Average size of workforce.
- E. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:
 1. Identification of activities that have changed.
 2. Changes in early and late start dates.
 3. Changes in early and late finish dates.
 4. Changes in activity durations in workdays.
 5. Changes in the critical path.
 6. Changes in total float or slack time.
 7. Changes in the Contract Time.

2.04 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
 1. List of subcontractors at Project site.
 2. Equipment at Project site.
 3. Material deliveries.
 4. High and low temperatures and general weather conditions.
 5. Accidents.
 6. Stoppages, delays, shortages, and losses.
 7. Meter readings and similar recordings.

8. Orders and requests of authorities having jurisdiction.
 9. Services connected and disconnected.
 10. Equipment or system tests and startups.
- B. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare and submit a detailed report. Submit with a request for interpretation. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

PART 3 - EXECUTION

3.01 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
 3. As the Work progresses, indicate Actual Completion percentage for each activity.
- B. Distribution: Distribute copies of approved schedule to Architect, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
1. Post copies in Project meeting rooms and temporary field offices.
 2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION

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SECTION 01 32 01 - PROJECT SCHEDULE

PART 1 GENERAL

1.1 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.

U.S. ARMY CORPS OF ENGINEERS (USACE)

ER 1-1-11 (1995) Administration -- Progress, Schedules, and
Network Analysis Systems

1.2 SUBMITTALS

Owner approval is required for submittals with an "Owner" Classification. Submittals not having an "Owner" classification are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Preliminary Project Schedule; Owner

Initial Project Schedule; Owner

Periodic Schedule Update;

1.3 PROJECT SCHEDULER QUALIFICATIONS

Designate an authorized representative to be responsible for the preparation of the schedule and all required updating and production of reports. The authorized representative must have a minimum of two years' experience scheduling construction projects similar in size and nature to this project with scheduling software that meets the requirements of this specification. Representative must have a comprehensive knowledge of CPM scheduling principles and application.

PART 2 PRODUCTS

2.1 SOFTWARE

The scheduling software utilized to produce and update the schedules required herein must be capable of meeting all requirements of this specification.

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2.1.1 Owner's Default Software

The Owner does not currently use a scheduling software.

2.1.2 Contractor Software

Scheduling software used by the contractor must be commercially available.

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

Prepare for approval a Project Schedule, as specified herein. Show in the schedule the proposed sequence to perform the work and dates contemplated for starting and completing all schedule activities. The scheduling of the entire project is required. The scheduling of construction is the responsibility of the Contractor. Contractor management personnel must actively participate in its development. Subcontractors and suppliers working on the project must also contribute in developing and maintaining an accurate Project Schedule. Provide a schedule that is a forward planning as well as a project monitoring tool. Use the Critical Path Method (CPM) of network calculation to generate all Project Schedules. Prepare each Project Schedule using the Precedence Diagram Method (PDM).

3.2 PROJECT SCHEDULE DETAILED REQUIREMENTS

3.2.1 Level of Detail Required

Develop the Project Schedule to the appropriate level of detail to address major milestones and to allow for satisfactory project planning and execution. Failure to develop the Project Schedule to an appropriate level of detail will result in its disapproval. The Contracting Officer will consider, but is not limited to, the following characteristics and requirements to determine appropriate level of detail:

3.2.2 Activity Durations

Reasonable activity durations are those that allow the progress of ongoing activities to be accurately determined between update periods. Less than 2 percent of all non-procurement activities may have Original Durations (OD) greater than 20 work days or 30 calendar days.

3.2.3 Procurement Activities

Include activities associated with the critical submittals and their approvals, procurement, fabrication, and delivery of long lead materials, equipment, fabricated assemblies, and supplies. Long lead procurement activities are those with an anticipated procurement sequence of over 90 calendar days.

3.2.4 Mandatory Tasks

Include the following activities/tasks in the initial project schedule and all updates.

- a. Submission, review and acceptance of SD-01 Preconstruction Submittals (individual activity for each).
- b. Long procurement activities
- c. Submission and approval of testing and air balance (TAB).
- d. Submission of TAB specialist design review report.

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- e. Building commissioning - Functional Performance Testing.
- f. Controls testing plan submission.
- g. Controls testing.
- h. Performance Verification testing.
- i. Other systems testing, if required.
- j. Contractor's punch list inspection.
- k. Correction of punch list from Contractor's punch list inspection.
- l. Owner's punch list inspection.
- m. Correction of punch list from Owner's punch list inspection.
- n. Final inspection.

3.2.5 Owner Activities

Show Owner and other agency activities that could impact progress. These activities include, but are not limited to: approvals, acceptance, environmental permit approvals by Alabama Department of Environmental Management (ADEM), inspections, utility tie-in, Government Furnished Equipment (GFE) and Notice to Proceed (NTP) for phasing requirements.

3.2.6 Standard Activity Coding Dictionary

Use an activity coding structure. Develop and assign all Activity Codes to activities as detailed herein.

3.2.6.1 Area of Work Coding (AREA)

Assign Work Area code to activities based upon the work area in which the activity occurs. Define work areas based on resource constraints or space constraints that would preclude a resource, such as a particular trade or craft work crew from working in more than one work area at a time due to restraints on resources or space. Examples of Work Area Coding include different areas within a floor of a building, different floors within a building, and different buildings within a complex of buildings. Activities cannot have more than one Work Area Code.

Not all activities are required to be Work Area coded. A lack of Work Area coding indicates the activity is not resource or space constrained.

3.2.6.2 Modification Number (MODF)

Assign a Modification Number Code to any activity or sequence of activities added to the schedule as a result of a Contract Modification, when approved by Contracting Officer. Key all Code values to the Owner's modification numbering system. An activity can have only one Modification Number Code.

3.2.6.3 Bid Item Coding (BIDI)

Assign a Bid Item Code to all activities using the Contract Line Item Schedule (CLIN) to which the activity belongs, even when an activity is not cost loaded. An activity can have only one BIDI Code.

3.2.6.4 Phase of Work Coding (PHAS)

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Assign Phase of Work Code to all activities. Examples of phase of work are procurement phase and construction phase. Each activity can have only one Phase of Work code.

- a. Code proposed fast track construction phases proposed to allow filtering and organizing the schedule by fast track construction packages.
- b. If the contract specifies phasing with separately defined performance periods, identify a Phase Code to allow filtering and organizing the schedule accordingly.

3.2.7 Contract Milestones and Constraints

Milestone activities are to be used for significant project events including, but not limited to, project phasing, project start and end activities, or interim completion dates. The use of artificial float constraints such as "zero free float" or "zero total float" are prohibited.

Mandatory constraints that ignore or effect network logic are prohibited. No constrained dates are allowed in the schedule other than those specified herein. Submit additional constraints to the Contracting Officer for approval on a case by case basis.

3.2.7.1 Project Start Date Milestone and Constraint

The first activity in the project schedule must be a start milestone titled "NTP Issued," which must have a "Start On" constraint date equal to the date that the NTP is issued.

3.2.7.2 End Project Finish Milestone and Constraint

The last activity in the schedule must be a finish milestone titled "EndProject."

Constrain the project schedule to the Contract Completion Date in such a way that if the schedule calculates an early finish, then the float calculation for "End Project" milestone reflects positive float on the longest path. If the project schedule calculates a late finish, then the "End Project" milestone float calculation reflects negative float on the longest path. The Owner is under no obligation to accelerate Owner activities to support a Contractor's early completion.

3.2.7.3 Interim Completion Dates and Constraints

Constrain contractually specified interim completion dates to show negative float when the calculated late finish date of the last activity in that phase is later than the specified interim completion date.

3.2.7.3.1 Start Phase

Use a start milestone as the first activity for a project phase. Call the start milestone "Start Phase X" where "X" refers to the phase of work.

3.2.7.3.2 End Phase

Use a finish milestone as the last activity for a project phase. Call the finish milestone "End Phase X" where "X" refers to the phase of work.

3.2.8 Calendars

Schedule activities on a Calendar to which the activity logically belongs. Develop calendars to accommodate any contract defined work period such as a 7-day calendar for Owner Acceptance activities, concrete cure times, etc. Develop the default Calendar to match the physical work plan with non-work periods identified including weekends and holidays. Develop Seasonal Calendar(s) and assign to seasonally affected activities as applicable.

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3.2.9 Open Ended Logic

Only two open ended activities are allowed: the first activity "NTP Issued" may have no predecessor logic, and the last activity "End Project" may have no successor logic.

Predecessor open-ended logic may be allowed in a time impact analyses upon the Contracting Officer's approval.

3.2.10 Default Progress Data Disallowed

Actual Start and Finish dates must not automatically update with default mechanisms included in the scheduling software. Updating of the percent complete and the remaining duration of any activity must be independent functions. Disable program features that calculate one of these parameters from the other.

3.2.11 Out-of-Sequence Progress

Address out of sequence progress or logic changes in the periodic schedule update meetings.

3.2.12 Added and Deleted Activities

Do not delete activities from the project schedule or add new activities to the schedule without approval from the Contracting Officer. Activity ID and description changes are considered new activities and cannot be changed without Contracting Officer approval.

3.2.13 Original Durations

Activity Original Durations (OD) must be reasonable to perform the work item. OD changes are prohibited unless justification is provided and approval is granted by the Owner.

3.2.14 Leads, Lags, and Start to Finish Relationships

Lags must be reasonable as determined by the Owner and not used in place of realistic original durations, must not be in place to artificially absorb float, or to replace proper schedule logic.

3.2.14.1 Leads (negative lags) are prohibited.

3.2.14.2 Start to Finish (SF) relationships are prohibited.

3.2.15 Retained Logic

Schedule calculations must retain the logic between predecessors and successors ("retained logic" mode) even when the successor activity(s) starts and the predecessor activity(s) has not finished (out-of-sequence progress). Software features that in effect sever the tie between predecessor and successor activities when the successor has started and the predecessor logic is not satisfied ("progress override") are not be allowed.

3.2.16 Percent Complete

Update the percent complete for each activity started, based on the realistic assessment of earned value. Activities which are complete but for remaining minor punch list work and which do not restrain the initiation of successor activities may be declared 100 percent complete to allow for proper schedule management. Percent complete must be updated no later than each OAC/Periodic Schedule Update meeting.

3.2.17 Remaining Duration

Update the remaining duration for each activity based on the number of estimated work days it will take to complete the activity. Remaining duration may not mathematically correlate with

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percentage found under paragraph entitled Percent Complete.

3.2.18 Cost Loading of Closeout Activities

Cost load the "Correction of punch list from Owner's punch list inspection" activity(ies) not less than 1 percent of the present contract value. Activity(ies) may be declared 100 percent complete upon the Owner's verification of completion and correction of all punch list work identified during Owner's punch list inspection(s) – i.e. upon issuance of a fully executed Certificate of Final Completion.

3.2.18.1 As-Built Drawings / O&M Manuals

Activity will be declared 100 percent complete upon the Owner's approval and acceptance of the as-built drawings which will happen no earlier than Owner's Final Inspection.

3.2.19 Early Completion Schedule and the Right to Finish Early

An Early Completion Schedule is an Initial Project Schedule (IPS) that indicates all scope of the required contract work will be completed before the contractually required completion date.

3.2.19.1 The Owner is under no obligation to accelerate work items the Owner is responsible for to ensure that the early completion is met nor is the Owner responsible to modify incremental funding (if applicable) for the project to meet the contractor's accelerated work.

3.3 PROJECT SCHEDULE SUBMISSIONS

Provide the submissions as described below. The data and CPM/GANTT Charts (submitted in Adobe via CD/DVD and in hard copy) required for each submission are contained in paragraph SUBMISSION REQUIREMENTS. If the Contractor fails or refuses to furnish the information and schedule updates as set forth herein, then the Contractor may be deemed not to have provided an estimate upon which a progress payment can be made.

Review comments made by the Owner on the schedule(s) do not relieve the Contractor from compliance with requirements of the Contract Documents.

3.3.1 Preliminary Project Schedule Submission

Within 14 calendar days after the Notice to Proceed (NTP) is issued submit the Preliminary Project Schedule defining the planned operations detailed for the first 90 calendar days for approval. The Preliminary Project Schedule may be summary in nature for the remaining performance period. It must be early start and late finish constrained and logically tied as specified. The Preliminary Project Schedule forms the basis for the Initial Project Schedule specified herein and must include all of the required plan and program preparations, submissions and approvals identified in the contract (for example, Quality Control Plan, Safety Plan, and Environmental Protection Plan) as well as, permitting activities and other non-construction activities intended to occur within the first 90 calendar days. Activity code any activities that are summary in nature after the first 90 calendar days with Bid Item (CLIN) code (BIDI).

3.3.2 Initial Project Schedule Submission

Submit the Initial Project Schedule for approval within 28 calendar days after notice to proceed is issued. The schedule must demonstrate a reasonable and realistic sequence of activities which represent all work through the entire contract performance period.

3.3.3 Periodic Schedule Updates

Update the Project Schedule on a regular basis, monthly at a minimum. Provide a Periodic Schedule

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Update for review at the schedule update meetings as prescribed in the paragraph PERIODIC SCHEDULE REVIEW MEETINGS. These updates will enable the Owner to assess Contractor's progress.

3.3.3.1 Update information including Actual Start Dates (AS), Actual Finish Dates (AF), Remaining Durations (RD), and Percent Complete.

3.4 SUBMISSION REQUIREMENTS

Submit the following items for the Preliminary Schedule, Initial Schedule, and every Periodic Schedule Review meeting throughout the life of the project:

3.4.1 Data CD/DVDs

For the Preliminary and Initial Schedules, provide two sets of data CD/DVDs containing the current project schedule in Adobe format. Label each CD/DVD indicating the type of schedule (Preliminary or Initial), full contract number, Data Date and file name. Each schedule must have a unique file name and use project specific settings.

3.4.2 Hard Copies

Provide two hard copies for each of the Preliminary, Initial and Periodic Schedule Review meetings in CPM/GANTT chart form.

3.4.3 CPM/GANTT Chart

The CPM/GANTT Chart is required for the Preliminary, Initial and Periodic Schedule Review meetings. Depict and display the order and interdependence of activities and the sequence in which the work is to be accomplished. The Contracting Officer will use, but is not limited to, the following conditions to review compliance with this paragraph:

3.4.3.1 Continuous Flow

Show a continuous flow from left to right with no arrows from right to left. Show the activity number, description, and duration.

3.4.3.2 Project Milestone Dates

Show dates on the diagram for start of project, any contract required interim completion dates, and contract completion dates.

3.4.3.3 Critical Path

Show all activities on the critical path. The critical path is defined as the longest path.

3.4.3.4 Banding

Organize activities using the WBS or as otherwise directed to assist in the understanding of the activity sequence. Typically, this flow will group activities by major elements of work, category of work, work area and/or responsibility.

3.5 PERIODIC SCHEDULE UPDATE

3.5.1 Periodic Schedule Review Meetings/OAC

Conduct periodic schedule review meetings, concurrently with all OAC meetings, for the purpose of reviewing the proposed Periodic Schedule Update and progress payment. Conduct meetings at least monthly within five days of the proposed schedule data date. The Contractor's authorized

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scheduler must organize, group, sort, filter, perform schedule revisions as needed and review functions as requested by the Contractor and/or Owner. The meeting is a working interactive exchange which allows the Owner and Contractor the opportunity to review the updated schedule on a real time and interactive basis. The Contractor's Project Manager and scheduler must attend the meeting with the authorized representative of the Contracting Officer. The Superintendent, foremen and major subcontractors must attend the meeting as required to discuss the project schedule and work.

3.6 REQUESTS FOR TIME EXTENSIONS

Provide a justification of delay to the Contracting Officer in accordance with the contract provisions and clauses for approval within 10 days of a delay occurring. Also prepare a time impact analysis for each Owner request for proposal (RFP) to justify time extensions.

3.6.1 Justification of Delay

Provide a description of the event(s) that caused the delay and/or impact to the work. As part of the description, identify all schedule activities impacted. Provide a time impact analysis that demonstrates the effects of the delay or impact on the project completion date or interim completion date(s). Evaluate multiple impacts chronologically; each with its own justification of delay. With multiple impacts consider any concurrency of delay.

3.6.2 Time Impact Analysis (Prospective Analysis)

Prepare a time impact analysis for approval by the Contracting Officer based on the industry standard. Utilize a copy of the last approved schedule prior to the first day of the impact or delay for the time impact analysis. If Contracting Officer determines the time frame between the last approved schedule and the first day of impact is too great, prepare an interim updated schedule to perform the time impact analysis. Unless approved by the Contracting Officer, no other changes may be incorporated into the schedule being used to justify the time impact.

3.6.3 Time Extension

The Contracting Officer must approve the Justification of Delay including the time impact analysis before a time extension will be granted. No time extension will be granted unless the delay consumes all available Project Float and extends the projected finish date ("End Project" milestone) beyond the Contract Completion Date. The time extension will be in calendar days.

Actual delays that are found to be caused by the Contractor's own actions, which result in a calculated schedule delay will not be a cause for an extension to the performance period, completion date, or any interim milestone date.

3.7 FAILURE TO ACHIEVE PROGRESS

Should the progress fall behind the approved project schedule for reasons other than those that are excusable within the terms of the contract, the Contracting Officer may require provision of a written recovery plan for approval. The plan must detail how progress will be made-up to include which activities will be accelerated by adding additional crews, longer work hours, extra work days, etc.

3.7.1 Artificially Improving Progress

Artificially improving progress by means such as, but not limited to, revising the schedule logic, modifying or adding constraints, shortening activity durations, or changing calendars in the project schedule is prohibited. Indicate assumptions made and the basis for any logic, constraint, duration and calendar changes used in the creation of the recovery plan. Any additional resources, manpower, or daily and weekly work hour changes proposed in the recovery plan must be evident at the work site and documented in the daily report.

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3.7.2 Failure to Perform

Failure to perform work and maintain progress in accordance with the supplemental recovery plan may result in the full range of options available to the Contracting Officer; including, but not limited to, the Contractor being declared “non-responsible” and barred from bidding on future projects for a period of time, Liquidated Damages being imposed on the Contractor or early termination of the project.

3.8 OWNERSHIP OF FLOAT

Float available in the schedule, at any time, may not be considered for the exclusive use of either the Owner or the Contractor including activity and/or project float. Activity float is the number of work days that an activity can be delayed without causing a delay to the "End Project" finish milestone. Project float (if applicable) is the number of work days between the projected early finish and the contract completion date milestone.

-- End of Section --

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SECTION 01 33 00 - SUBMITTAL PROCEDURES

PART 1 - GENERAL:

1.01 SUMMARY

- A. Shop Drawings and samples shall be properly identified by project name, description or names of equipment, materials, and items, and complete identification of locations at which materials or equipment are to be installed.

1.02 SHOP DRAWINGS

- A. Submit Shop Drawings for all items called for in the detail Specifications. Submit a minimum of six (6) black line prints of each Drawing, unless otherwise specified in the detail Specifications. Two prints of each Drawing will be retained by the Architect, the remaining prints will be returned to the Contractor. One print of each Drawing, bearing the final approval stamp of Architect, shall be kept at the project office and shall be maintained in good condition. No Shop Drawings other than those stamped "Approved" shall be on the job for any purpose and any work installed incorrectly from any Shop Drawing shall be removed and corrected at no change in contract price.
- B. Approval will be for general design only and will not relieve Contractor from responsibility for errors or omissions in Shop Drawings, even though same were not indicated when approved.
- C. In checking Shop Drawings, The Architect shall not be required to check dimensions, quantities, electrical characteristics, specific capacities, or coordination with other trades, these being the responsibility of the Contractor. Contractor shall attest, either in writing, by stamp, or signature, that all Shop Drawings submitted for approval have been checked for compliance with the Drawings and Specifications prior to submissions to the Architect otherwise they will be returned unchecked.
- D. No Shop Drawings shall be submitted directly to the Architect from a manufacturer, jobber, or sub-contractor. All submittals shall be through the General Contractor.
- E. Approvals shall not be construed as approved departure from Contract Drawings and Specifications.

1.03 SAMPLES

- A. Furnish all samples called for in the detail Specifications and such other samples as the Architect may direct.
- B. Samples or color selections shall include a complete selection of available colors and finishes. After Owner has selected colors and finishes, submit four additional samples of the selected colors and finishes which will become a master color guide to be used throughout the progress of the work.

1.04 SUBMISSION

- A. Submission of Shop Drawings and samples shall be by a transmittal letter, in duplicate, containing project name, Contractor's name, Sub-contractor's and/or Vendor's name, a complete listing of Drawings or Samples submitted, and other pertinent data.
- B. Samples of materials in connection with mechanical and electrical work may not be submitted to the Engineer. All samples of materials are to be submitted to the Architect.
- C. Samples for the selection of colors and finishes shall be made in one submittal. No color selections will be made until samples on all items requiring color selection have been submitted.

END OF SECTION

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SECTION 01 40 00 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Quality Control Requirements.
 - 2. Administrative and procedural requirements for quality assurance and quality control.
- B. Related Sections:
 - 1. Section 01 32 00 - Construction Progress Documentation: Developing a schedule of required tests and inspections.
 - 2. Section 01 73 29 - Cutting and Patching: Repair and restoration of construction disturbed by testing and inspecting activities.
 - 3. Divisions 02 through 50 Sections: Specific test and inspection requirements.

1.02 QUALITY CONTROL REQUIREMENTS

- A. General: The Contractor shall establish a system of inspections and tests of his work and that of his subcontractors to insure that all applicable requirements of the specifications are met.
 - 1. The Contractor shall be diligent to insure that the quality of workmanship is satisfactory, that dimensional requirements are met, that defective materials are not used and that all required control and laboratory testing procedures are effected.
 - 2. Where specific testing procedures are not stipulated, the Contractor shall establish and conduct a test procedure to insure adherence to specified quality.
 - 3. The Contractor shall make an initial inspection of each phase of work as soon as a representative portion has been completed, and the Contractor shall make daily follow-up inspections, to insure that an acceptable quality of work is established and maintained.
 - 4. The Contractor shall perform a pre-final inspection and work off all punch list items prior to Architect's or Owner's inspection(s).

1.03 DEFINITIONS

- A. Conventional Inspections: Inspections, not specifically required by Code, which are considered essential to the proper performance of the building systems.
- B. Inspections: Evaluation of systems, primarily requiring observation and engineering judgment.
- C. Quality-Control Services: Conventional inspections, special inspections, tests, and related actions, including reports performed by Contractor, by independent agencies, and by governing authorities. Services do not include contract enforcement activities performed by Architect.
- D. Special Inspections: Inspections, required by Code, which monitor the quality of materials and workmanship critical to the structural integrity of the building.
- E. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- F. Mockups: Full-size, physical assemblies that are constructed on-site. Mockups are used to verify selections made under sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples. Approved mockups establish the standard by which the Work will be judged.
- G. Laboratory Mockups: Full-size, physical assemblies that are constructed at testing facility to verify performance characteristics.
- H. Preconstruction Testing: Tests and inspections that are performed specifically for the Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.
- I. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction and the Owner, to establish product performance and compliance with industry standards.
- J. Source Quality-Control Testing: Tests and inspections that are performed at the source, i.e., plant, mill, factory, or shop.

- K. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- L. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- M. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
 - 1. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespeople of the corresponding generic name.
- N. Experienced: When used with an entity, "experienced" means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.04 QUALITY ASSURANCE AND CONTROL SERVICES REQUIREMENTS

- A. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
- B. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner, the Contract Documents or authorities having jurisdiction are not limited by provisions of this Section.

1.05 CONFLICTING REQUIREMENTS

- A. General: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement, unless directed otherwise by the Owner. Refer uncertainties and requirements that are different, but apparently equal, to the Architect, in writing, for the Owner's decision before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect, in writing, for the Owner's decision before proceeding.

1.06 SUBMITTALS

- A. Qualification Data: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- B. Reports: Prepare and submit certified written reports that include the following:
 - 1. Date of issue.
 - 2. Project title and number.
 - 3. Name, address, and telephone number of testing agency.
 - 4. Dates and locations of samples and tests or inspections.
 - 5. Names of individuals making tests and inspections.
 - 6. Description of the Work and test and inspection method.
 - 7. Identification of product and Specification Section.
 - 8. Complete test or inspection data.
 - 9. Test and inspection results and an interpretation of test results.
 - 10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.

11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 12. Name and signature of laboratory inspector.
 13. Recommendations on retesting and re-inspecting.
- C. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.07 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this Article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- C. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar to those indicated for this Project in material, design, and extent.
- F. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 548; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.
 1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
 2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
- G. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- H. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
 1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
 2. Notify Architect seven days in advance of dates and times when mockups will be constructed.
 3. Demonstrate the proposed range of aesthetic effects and workmanship.
 4. Obtain Architect's approval of mockups before starting work, fabrication, or construction.
 5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 6. Demolish and remove mockups when directed, unless otherwise indicated.

1.08 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
 1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
 2. Payment for these services will be made from allowances, as authorized by the Owner.

3. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Modification.
- B. Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction, at no additional expense to the Owner or Architect. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
 1. Where services are not indicated as Owner's responsibility, engage a qualified testing agency to perform these quality-control services.
 2. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
 3. Notify testing agencies and Architect at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
 4. For all quality-control services that are not indicated as Owner's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 01 33 00 - Submittal Procedures.
- D. Retesting/Re-inspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and re-inspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- E. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
 1. Notify Architect, Owner, and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
 3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
 6. Do not perform any duties of Contractor.
- F. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
 1. Access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
 4. Facilities for storage and field curing of test samples.
 5. Delivery of samples to testing agencies.
 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 7. Security and protection for samples and for testing and inspecting equipment at Project site.
- G. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
 1. Schedule times for tests, inspections, obtaining samples, and similar activities.

1.09 STANDARD AND INDUSTRY SPECIFICATIONS

- A. Any material or operation specified by reference to the published specification of a manufacturer, The American Society for Testing and Materials (ASTM), The American Standards Association (ASA), Federal Specifications, or other published standard shall comply with the requirements of the current specification or standard listed. Should there be a discrepancy between the referenced specification and the contract documents the latter shall govern unless written interpretation is obtained from the Owner. Should there be discrepancies among referenced specifications or standards, the more stringent requirements shall govern.
- B. The Contractor shall, if requested, furnish an affidavit from the manufacturer(s) certifying that the materials or products being furnished meet the requirements specified. Such certification, however, shall not relieve the Contractor from the responsibility of complying with other requirements of the contract documents.

1.10 MANUFACTURER'S DIRECTIONS

- A. All manufactured articles, materials, and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned as directed by the manufacturers unless herein specified to the contrary. Should there be a discrepancy between an installation as required by the drawings and/or specifications and the manufacturer's directions and/or recommendations, such discrepancy shall be brought to the attention of the Architect and shall be resolved before the work may proceed.

1.11 APPROVED MATERIAL REQUIREMENTS

- A. In the event the architectural, plumbing, mechanical and/or electrical requirements of any "APPROVED" material is different from that specified and/or as indicated on the drawings, any additional cost involved shall be the responsibility of the Contractor. No extra cost to the Owner or Architect will be allowed because of the use of such materials.

1.12 USE OF FOREIGN MATERIALS

- A. The Contractor shall agree to use in the execution of this contract only materials, supplies, and products manufactured, mined, processed or otherwise produced in accordance with the Buy American Act (41 USC 10a-10d).

1.13 EXAMINATION OF SURFACES AND/OR CONDITIONS

- A. The Contractor shall examine all surfaces on which, or against which, their work is to be applied and shall notify the Architect in writing of any defects the Contractor may discover which, in the Contractor's opinion, would be detrimental to the proper installation or operation of the Contractor's products. Commencing of work by the Contractor denotes acceptance by Contractor of all surfaces and conditions affecting Contractor's work.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
 - 1. Comply with the Contract Document requirements for Section 01 73 29 - Cutting and Patching.
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION

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SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.01 TEMPORARY OFFICES AND SHEDS

- A. At the Contractor's Option, he may provide an office, storage sheds, and other structures as may be necessary to carry on the work.
- B. Storage sheds shall be of sufficient size to hold materials required on the job site at one time, and shall have floors raised at least 1' 0" above the ground on heavy joists or sleepers. Sheds shall be watertight.

1.02 TELEPHONE (CONTRACTORS OPTION)

- A. The Contractor may install, at his own expense, a single party job telephone, which shall be available for the use of all persons concerned with the construction of the project. All official long distance calls shall be paid by the General Contractor.

1.03 TOILET FACILITIES

- A. The Contractor shall, at the beginning of the work, provide on the premises toilet facilities and enclosures for the use of all workmen on the project; shall maintain same in a sanitary condition; and shall remove same at the completion of the building and/ or when directed by the Architect or Owner.
- B. The toilets shall, in construction details, equipment connections, and maintenance conform to all rules, regulations, and requirements of the City or County Health Department having jurisdiction.

1.04 RODENT AND VERMIN CONTROL

- A. The Contractor shall provide on the job site ample and suitable containers with covers, and shall be fully responsible for containing and removing from the site all refuse from meals eaten on the site and other rodent or vermin attracting refuse. If the Contractor has the entire site the Contractor is solely responsible for ensuring that the site is rodent and vermin free at the Final Inspection.

1.05 SIGNS

- A. No signs will be allowed on the premises except as required by the project specifications and/or as approved by the Owner.

1.06 PROTECTION

- A. Provide and maintain all fences, planking, bridges, bracing, shoring, sheet piling, lights, barricades, warning signs, and guards as necessary for the protection of streets, sidewalks, landscaping, adjoining property, and the streets adjacent.
- B. Provide protection for all shrubs, trees, lawns, walks, roads, drives, adjacent buildings and equipment, both on and off property, and in roads and streets adjacent.

1.07 REMOVAL

- A. Temporary facilities shall be removed promptly as each becomes no longer required, but in all cases no later than the date of Final Acceptance.

1.08 STORAGE AND PARKING AREA

- A. The amount of area and location that may be used for parking, storage of materials, equipment, sheds, and offices shall be as indicated by the Drawings or as directed by the Owner.

1.09 FIRST AID PROTECTION

- A. General Contractor shall provide the following:
 - 1. First Aid Accident Cabinets.
 - 2. Emergency telephone numbers posted at telephone.

1.10 FIRE PRECAUTION DURING CONSTRUCTION

- A. Emergency fire protection shall be provided for temporary sheds, new work, stacked materials, etc., using extinguishers, water pails and small hose streams, said equipment conforming to the requirements of the National Board of Fire Underwriters and relevant Insurance Co. Particular care shall be exercised when using open flame and welding and cutting equipment; use only flameproof type tarpaulins. Keep site clean and orderly with proper protection of combustibles while in use and in storage.

END OF SECTION

SECTION 01 60 00 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.01 PRODUCTS AND MATERIALS

- A. Products, Materials, and manufactured items or articles of like nature, shall as nearly as possible, be of one brand or manufacturer. No changes or substitutions shall be made without written consent of the Owner.

1.02 TRADE NAMES

- A. The use of manufacturer's names and model numbers are given to establish a standard of manufacture and not intended to be restrictive or preferential. Similar, equal, and approved materials of other manufacturers will be acceptable, subject to the approval of the Owner, pursuant to requirements set forth in Instruction to Bidders and as required by the Specifications.

1.03 MEASUREMENTS

- A. Before ordering any material or doing any work, the Contractor shall verify all measurements of the building and shall be responsible for correctness of same. No extra charge or compensation will be allowed because of differences between actual measurements and the dimensions indicated on the Drawings. Any Differences which may be found, shall be submitted to the Architect for consideration before proceeding with the work.

1.04 SALVAGEABLE MATERIAL

- A. Any salvageable material and or equipment shall remain the property of the Owner and upon removal from its existing location shall be stored where directed by the Owner. In the event that the Owner does not wish to keep the salvaged material, it shall be the responsibility of the Contractor to remove same promptly from the site.

PART 2 - PRODUCTS

2.01 PRODUCT OPTIONS

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged, and unless otherwise indicated, that are new at time of installation.
- B. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
- C. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
- D. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
- E. Where products are accompanied by the term "as selected," Architect will make selection.
- F. Where products are accompanied by the term "match sample," sample to be matched is Architect's.
- G. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.
- H. Or Equal: Where products are specified by name and accompanied by the term "or equal" or "or approved equal" or "or approved," comply with provisions in "Comparable Products" Article to obtain approval for use of an unnamed product.
- I. Product and Manufacturer Source: Where specification paragraphs or subparagraphs titled "Product" name a single product and manufacturer, provide the product names, unless otherwise indicated.

2.02 PRODUCT SUBSTITUTIONS

- A. Proposed Substitutions During Bidding: In the technical sections of the specifications under Products heading, where only one manufacturer's specific data - including material, model, specification, finish, color, or other specific identification - is noted, it is to indicate standards required and that manufacturer's data is automatically approved. If another manufacturers propose to bid on the work, including any other manufacturer listed in the specification section

as a manufacturer, the Bidder shall submit full data to the Architect no later than 10 days prior to bid date and shall gain specific approval, via Addendum, on specific products prior to bidding. In the event submitted data of any manufacturer gains approval through this method, the manufacturer and the specific products will be published in an addendum prior to bid date. Only manufacturer's products listed in the original specifications or listed as approved in a subsequent addendum shall be used on the project. No other manufacturers or their products will be considered without prior written consent from the Owner.

- B. Proposed Substitutions After Commencement Of The Work: Requests received during construction may be considered only when all of the following specific conditions are satisfied. IF the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
1. Submission, and approval of, Substitution Request Form During Construction – 01 25 14.
 2. None of the approved products of the specified type are available.
 3. Requested substitution has been coordinated with other portions of the Work.
 4. Requested substitution provides specified warranty.
 5. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

END OF SECTION

SECTION 01 73 00 - EXECUTION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. Construction layout.
 - 2. General installation of products.
 - 3. Progress cleaning.
 - 4. Starting and adjusting.
 - 5. Protection of installed construction.
 - 6. Correction of the Work.
- B. Related Sections include the following:
 - 1. 01 31 00 - "Project Management and Coordination" for procedures for coordinating field engineering with other construction activities.
 - 2. 01 33 00 - "Submittal Procedures" for submitting surveys.
 - 3. 01 77 00 - "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.
 - 1. Before construction, verify the location and points of connection of utility services.
- B. Existing Utilities: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning site work, investigate and verify the existence and location of underground utilities and other construction affecting the Work.
 - 1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; and underground electrical services.
 - 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- C. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
 - 1. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
 - a. Description of the Work.
 - b. List of detrimental conditions, including substrates.
 - c. List of unacceptable installation tolerances.
 - d. Recommended corrections.
 - 2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 - 3. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 - 4. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.

5. Proceed with installation only after unsatisfactory conditions have been corrected.
Proceeding with the Work indicates acceptance of surfaces and conditions.

3.02 PREPARATION

- A. Existing Utility Information: Furnish information to local utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents.

3.03 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 1. Make vertical work plumb and make horizontal work level.
 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
 4. Maintain minimum headroom clearance of 8 feet (2.4 m) in spaces without a suspended ceiling.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Final Acceptance.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- F. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- G. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
 2. Allow for building movement, including thermal expansion and contraction.
 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- H. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- I. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.04 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F (27 deg C).
 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
1. Remove liquid spills promptly.
 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Final Acceptance.
- G. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Final Acceptance.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.05 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Division 01 Section "Quality Requirements."

3.06 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Final Acceptance.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.07 CORRECTION OF THE WORK

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Division 01 Section "Cutting and Patching."
 1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- B. Restore permanent facilities used during construction to their specified condition.
- C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.

- D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION

SECTION 01 73 29 - CUTTING AND PATCHING

PART 1 - GENERAL

1.01 CUTTING AND PATCHING PROPOSAL:

- A. Submit a proposal describing procedures at least 10 days before the time cutting and patching will be performed, requesting approval to proceed. Include a description of cutting and patching and changes to existing construction, a list of products to be used and firms or entities that will perform the Work, dates when cutting and patching will be performed, and a list of utilities that cutting and patching procedures will disturb or affect.
- B. Structural Elements: Where cutting and patching involve adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with original structure.
 - 1. Architect's Approval: Obtain approval of cutting and patching proposal before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work.
- C. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.
- D. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.
- E. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
 - 1. If possible, retain original Installer or fabricator to cut and patch exposed Work listed below. If it is impossible to engage original Installer or fabricator, engage another recognized, experienced, and specialized firm.
- F. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS

2.01 GENERAL:

- A. Comply with requirements specified in other Sections of these Specifications.
- B. Existing Materials: Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
 - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of existing materials.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
- B. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 - 1. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.
- C. Temporary Support: Provide temporary support of Work to be cut.
- D. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- E. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

- F. Existing Services: Where existing services are required to be removed, relocated, or abandoned, bypass such services before cutting to minimize interruption of services to occupied areas or the remainder of the building(s).
- G. Performance: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - 1. Cut existing construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- H. Cutting: Cut existing construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. Existing Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 - 3. Concrete or Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 - 4. Excavating and Backfilling: Comply with requirements in applicable Division 2 Sections where required by cutting and patching operations.
 - 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 - 6. Proceed with patching after construction operations requiring cutting are complete.
- I. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications.
 - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
 - 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 - 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - 4. Ceilings: Patch, repair, or re-hang existing ceilings as necessary to provide an even-plane surface of uniform appearance.
 - 5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.

END OF SECTION

SECTION 01 77 00 - PROJECT CLOSEOUT

(Revision Date: 9 April 2021)

PART 1 - GENERAL:

1.01 SUMMARY

- A. The work under this Section consists of, but is not limited to; Submittals, Requirements and Procedures for Project close out.

1.02 RELATED SECTIONS

- A. Section 01 33 00 - Submittal Procedures
- B. Section 01 78 13 - Project Closeout Checklist
- C. Section 00 65 20 – Final Completion Form

1.03 SUBMITTALS

- A. Construction Completion Requests
 - 1. Certificate of Final completion
 - 2. Final Inspection
- B. Close out Submittals: Three printed (hard) copies and three electronic copies in Adobe PDF format on CD or DVD-5 of close out submittals of which receipt and acceptance are prerequisites for final payment shall include, but not necessarily be limited to, the following:
 - 1. Affidavit of "Advertisement of Completion". Refer to Section 00 65 13.
 - 2. Evidence of Payments, and Release of Liens.
 - 3. General Contractors "One Year Guarantee".
 - 4. General Contractors "State of Alabama Roofing Guarantee". Refer to Section 00 65 36 (If Applicable).
 - 5. Final Application for Payment.
 - 6. All required warranties and guarantees.

1.04 PUNCH LIST

- A. Any salvageable material and or equipment shall remain the property of the Owner and upon removal from its existing location shall be stored where directed by the Architect. In the event that the Owner does not wish to keep the salvaged material, it shall be the responsibility of the Contractor to remove same promptly from the site.
- B. Inspection:
 - 1. Prior to completion of the project, the Contractor shall fully prepare their own written Punch List. Upon completing correction of all Contractor generated Punch List items, the Contractor shall forward to the Owner and Architect a copy of their Punch List along with written notification that they have completed their entire list of items and are requesting a formal Punch List inspection.
 - 2. When the Owner confirms the Inspection date and time, the Architect will notify all parties in writing via e-mail the confirmed date and time for the Inspection. Cancellations of any scheduled Inspection must be received in writing no later than 48 hours prior to the scheduled Inspection. If the Inspection is canceled, it will be rescheduled subject to the Owner and Architect's availability. Cancellations received less than 48 hours in advance shall incur a minimum \$1,500.00 re-inspection fee.
 - 3. The Contractor is responsible for ensuring they and all their Sub-Contractors are completely ready for all Commissioning Activities and Inspections. If the Contractor and /or any of their associated Sub-contractors are not ready, then the Owner reserves the option to deduct from the Contractor all costs for the A/E team and Owner team participation due to failure of the Contractor and/or their Sub-contractors to be ready for Commissioning Activities or Inspections.
- C. Rejection of Certification by Contractor:
 - 1. Should the Architect consider that work is not complete he will, on completion of inspection, immediately notify Contractor, in writing, stating reasons. Contractor shall complete work and send second written notice to the Architect certifying that project, or designated portion of project, is complete, after which the Architect and Owner representative will inspect work.

1.05 FINAL INSPECTION

- A. Certification: Contractor shall submit written certification that: Contract Documents have been reviewed; project has been inspected for compliance with Contract Documents; Work has been completed in accordance with Contract Documents; Equipment and Systems have been tested in presence of Owner's Representative and are operational and Project is completed and ready for final inspection.
- B. Inspection: Architect and Owner will make final inspection of the project within a reasonable time after receipt of certification. Should Owner consider that work is in fact complete in accord with requirements of Contract Documents, he will request Contractor to make Project Closeout Submittals. Should Owner consider that work is not complete, he will notify Contractor, in writing, stating reasons. Contractor shall take immediate steps to remedy stated deficiencies, and send second written notice to Architect certifying that work is complete. The Architect and Owner will re-inspect the work.
- C. Certificate of Final Completion: Should the Owner consider that work is complete:
 - 1. Architect will prepare and issue a Certificate of Final Completion, or approved equal, complete with signatures of Owner and Contractor.
 - 2. For Owner occupancy of Project or designated portion of project, Contractor shall: perform final cleaning; and Contractor shall complete work listed for completion or correction, within designated time.

1.06 AS-BUILT DRAWINGS

- A. Upon completion of this contract, the Contractor shall deliver to the Owner, at the Final Inspection, the three complete sets of legible drawings which vary from the original contract documents, showing all construction equipment, mechanical and electrical systems and connections as installed or built. All lettering and drawings shall be neat and recorded in permanent ink. The record drawings shall be supplemented by detailed sketches or drawings when necessary. "As-Built" Drawings not legible shall be completely redone.
- B. The Owner shall approve Record Drawings, and shall be the sole judge of the acceptability of the Drawings.
- C. Submit three electronic copies of all as built documents in Adobe PDF format on CD or DVD-5, simultaneous with the Closeout Documents.

1.07 OPERATION AND MAINTENANCE DATA

- A. If applicable furnish three (3) complete sets of manuals containing manufacturer's instructions for operation and maintenance of each item of equipment and apparatus furnished under the Contract, detailed parts list and any additional data specifically required under various sections of the Specifications. Manuals shall be arranged in proper order, indexed and suitably bound in a 3-ring loose-leaf binder for 8 1/2" X 11" paper with black vinyl covers. Label binder with embossed plastic tape designating the name of Project, Owner, Contractor, and equipment of materials included in the manual. Certify by endorsement therein that each of the manuals is complete and accurate. Deliver manuals to the Owner at the Final Inspection of the project.
- B. Submit three electronic copies of all manuals and documents in Adobe PDF format on CD or DVD-5, simultaneous with the Closeout Documents.
- C. Special Requirements - Mechanical (if applicable): Operating instructions for the principal plant mechanical components, for use by operating personnel, shall be provided. They shall be laminated between thermoplastic sheets and affixed where directed by the Architect or Owner. Instructions shall describe the function of the equipment, its most economical operation, start-up and shut-down procedures, procedures to follow in event of failure, normal maintenance practices, and caution and warning notices.
- D. Special Requirements - Electrical (if applicable): Frame under glass, or clear plastic, one print of the "As-Built" power riser diagram at main switch or switchboard location or at a location directed by the Architect or Owner. Provide circuit identification for each circuit in each panel board cabinet.

1.08 GUARANTEES AND BONDS

- A. Contractor shall submit to the Architect, simultaneous with the Closeout Documents, all warranties, guarantees, and Surety Bonds. All such documents shall show the name and location of the Project and the name of the Owner.

1.09 INSTRUCTIONS

- A. Instruct Owner's personnel in required roof maintenance and operation of all systems, mechanical, electrical and other equipment, prior to requesting the Punch List Inspection.

1.10 ADVERTISEMENT OF COMPLETION

- A. Immediately after completion of the Contract, but not before receipt of a fully executed Final Completion Form, the General Contractor shall give notice of completion by an advertisement in the newspaper of general circulation published within the City or County wherein the work was done, once a week for four consecutive weeks.
- B. In no case will a final settlement be made upon the Contract until the expiration of thirty (30) days from commencement of advertisement or before receipt of advertisement with affidavit as required by law.
- C. Proof of publication of this Notice shall be submitted by the General Contractor, simultaneous with the Closeout Documents, by Affidavit of the publisher and a printed copy of the notice published. If no newspaper is published in the County, the notice must be posted at the Courthouse for thirty (30) days and proof shall be made by the Probate Judge or Sheriff and the Contractor.

1.11 EVIDENCE OF PAYMENTS AND RELEASE OF LIENS

- A. Submit contractor's Affidavit of Payment of Debts and Claims: AIA G706, or approved equal.
- B. Submit Contractor's Affidavit of Release of Liens: AIA G706A, or approved equal, with:
 - 1. Consent of Surety to Final Payment: AIA G707, or approved equal.
 - 2. Contractor's Release or Waiver of LIENS.
- C. All submittals shall be duly executed before delivery to the Architect.

1.12 GENERAL CONTRACTORS GUARANTEE

- A. The General Contractor shall submit in addition to any other expressed guarantees and/or warranties, a guarantee of all work under this Contract for a period of one year from date of final acceptance. Also, the General Contractor shall provide the State of Alabama Five-Year Roof Guarantee – if applicable.

1.13 FINAL ADJUSTMENT OF ACCOUNTS

- A. Submit final statement of accounting to the Architect. Statement shall reflect all adjustments, including, but not necessarily limited to, the following:
 - 1. Original Contract Sum.
 - 2. Additions and deductions resulting from:
 - a. Previous change orders.
 - b. Cash allowances.
 - c. Unit Prices.
 - d. Other adjustments.
 - e. Deductions for uncorrected work.
 - f. Penalties and bonuses.
 - g. Deductions for liquidated damages.
 - 3. Total Contract Sum, as adjusted.
 - 4. Previous payments.
 - 5. Sum remaining due.

1.14 FINAL APPLICATION FOR PAYMENT

- A. Contractor shall submit final application in accord with requirements of General and/or Supplementary Conditions, simultaneous with the Closeout Documents.

1.15 YEAR END INSPECTION

- A. Sixty days prior to expiration of one year from date of "Final Acceptance" Contractor shall notify the Architect, in writing, of year-end inspection. Year-end inspection shall occur no more than forty-five and no less than fifteen days before the expiration of the Contractor's one year warranty. The Architect will make visual inspection of project in company with Owner and Contractor to determine whether correction of work is required, in accordance with provisions of General Conditions. For guarantees beyond one year, Architect will make inspections at request of Owner, after notification to Contractor. The Architect will promptly notify Contractor, in writing, of any observed deficiencies.

END OF SECTION

SECTION 01 78 13 - PROJECT CLOSEOUT CHECKLIST

PART 1 - GENERAL:

1.01 SUMMARY

- A. This Section consists of a shortform checklist for required closeout documents / submittals.

1.02 RELATED SECTIONS

- A. Section 01 77 00 - Project Closeout

1.03 REQUIREMENTS

- A. See Section 01 77 00 for the full requirements of each of the following:
 - 1. Fully executed copy of the Certificate of Final Completion with copy of original punchlist
 - 2. Original Affidavit of "Advertisement of Completion" - a copy of the ad must be attached to the affidavit form. (Not required if original awarded contract is less than \$50,000.00)
 - 3. General Contractor's Affidavit of Release of Liens
 - 4. General Contractor's Affidavit of Payment of Debts and Claims - AIA G706A or approved equal
 - 5. Consent of Surety to Final Payment AIA G707 or approved equal (Not required if original awarded contract is less than \$50,000.00)
 - 6. General Contractors "One Year Guarantee"
 - 7. General Contractor's "State of Alabama Roof Guarantee" - if applicable
 - 8. Other warranties as required by contract
 - 9. As-Built Drawings - Changes should be legible, in permanent ink, and supplemented by detailed sketches or drawings when necessary
 - 10. Operating and Maintenance Manuals / Submittal / Product Literature & Technical Data

1.04 SUBMITTALS

- A. Closeouts shall be submitted to the Architect in the following packages:
 - 1. Package #1 - **Final Pay Application Package** contains at least two (2) original pay applications with items #1 - #5 attached with binder clip or stapled - not in three ring binder or paper clipped.
 - 2. Package #2 - **Warranty Package** contains items #6 - #8 attached with binder clip or stapled - not in three ring binder or paper clipped.
 - 3. Package #3 - **Copy Package** contains copies of items #1 - #8 attached with binder clip or stapled - not in three ring binder or paper clipped.
 - 4. Package #4 - **Compact Disc Package** contains scans of items #1 - #10 in PDF format on a single CD, three CDs total, with each item saved by number from 1.03.A (above).

END OF SECTION

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SECTION 01 78 39 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.01 SUMMARY

- A. This section includes administrative and procedural requirements for Project Record Documents, including the following:
 - 1. Record Drawings (As-Built)
 - 2. Record Product Data
- B. Related Sections:
 - 1. Section 01 77 00 - Project Closeout

1.02 SUBMITTALS

1.03 RECORD DRAWINGS: COMPLY WITH THE FOLLOWING:

- A. Record Drawings - number of copies:
 - 1. Punch-list Inspection: Submit one marked-up (red-lined) Record Drawings to the Architect and Owner's Representative at the start of the Punch-list Inspection for review. Any noted deficiencies are to be corrected prior to the Final Inspection.
 - 2. Final Inspection: Submit three marked-up (red-lined) Record Drawings and three electronic CD copies containing all drawings in PDF format to the Owner at the start of the Final Inspection. Failure to provide the Record Prints (hard copy and/or CD), in the required quantities at the start of the Final Inspection, may result in the Owner immediately terminating the Final Inspection.
- B. Record Project Data - number of copies:
 - 1. Punch-list Inspection: Submit one set of Record Product Data for each item to the Architect and Owner's Representative at the start of the Punch-list Inspection for review. Any noted deficiencies are to be corrected prior to the Final Inspection.
 - 2. Final Inspection: Submit three sets of corrected, bound Record Product Data and three electronic CD copies containing all Record Product Data in PDF format to the Owner at the start of the Final Inspection. Failure to provide the Record Product Data (hard copy and/or CD), in the required quantities at the start of the Final Inspection, may result in the Owner immediately terminating the Final Inspection.

PART 2 - PRODUCTS

2.01 RECORD DRAWINGS

- A. Record Prints: Maintain one set of black-line white prints of the Contract Drawings and Shop Drawings at Project Site.
 - 1. Preparation: Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.
 - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - b. Accurately record information in an understandable drawing technique.
 - c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
 - d. Content: Types of items requiring marking include, but are not limited to, the following:
 - 1) Dimensional changes to Drawings
 - 2) Revisions to details shown on Drawings
 - 3) Depths of foundations below first floor
 - 4) Locations and depths of underground utilities
 - 5) Revisions to routing of piping and conduits
 - 6) Revisions to electrical circuitry
 - 7) Actual equipment locations
 - 8) Duct size and routing
 - 9) Locations of concealed internal utilities
 - 10) Changes made by Change Order or Construction Change Directive

- 11) Changes made following Contract Modifications
- 12) Details not on the original Contract Drawings
- 13) Field records for variable and concealed conditions
- 14) Record information on the Work that is shown only schematically
- 15) Changes made by Addenda
- 16) Changes/Clarifications made by Contract Directive
- 17) Changes made by approved Shop Drawings
- e. Mark Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. If Shop Drawings are marked, show cross-reference on the Contract Drawings and physically append the Shop Drawings to final Record Drawings.
- f. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.
- g. Mark important additional information that was either shown schematically or omitted from original Drawings.
- h. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, Addendum number(s), and similar identification, where applicable.
- B. Record Drawings: When authorized, prepare a full sets of drawings of the corrected Contract Drawings, and record copy of all Shop Drawings.
 1. Incorporate changes and additional information previously marked on Record Prints. Erase, redraw and add details and notation where applicable.
 2. Refer instances of uncertainty to Architect for resolution.
 3. Architect will furnish Contractor one set of Contract Drawings in electronic format, or .pdf files, for use in recording information.
 4. Print the Contract Drawings and Shop Drawings for use as Record Drawings.
- C. Format: Identify and date Record Drawing; include the designation "PROJECT RECORD DRAWING (AS-BUILTS)" in prominent location on the cover sheet.
 1. Record Drawings: Organize into bound sets. Place Drawings in durable tube-type drawing containers with end caps. Mark end cap of each container with identification. If container does not include a complete set, identify Drawings included.
 2. Identification: As follows:
 - a. Project name
 - b. Date
 - c. Designation "PROJECT RECORD DRAWINGS (AS-BUILTS)"
 - d. Name of Architect
 - e. Name of Contractor

2.02 RECORD PRODUCT DATA

- A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
 3. Note related Change Orders, Record Specifications, and Record Drawings where applicable.

PART 3 - EXECUTION

3.01 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of the project.
- B. Maintenance of Record Documents and Samples: Store Record Documents and Samples in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Owner's and Architect's reference during normal working hours.

END OF SECTION

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SECTION 01 79 00 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Administrative and procedural requirements for instructing Owner's personnel, including the following:
 - 1. Demonstration of operation of systems, subsystems, and equipment.
 - 2. Training in operation and maintenance of systems, subsystems, and equipment.
 - 3. Demonstration and training video recordings.
- B. Related Requirements:
 - 1. Divisions 01 through 49 Sections: Specific requirements for demonstration and training for products in those Sections.

1.02 INFORMATIONAL SUBMITTALS

- A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module. This schedule must be submitted to the Architect **AT LEAST 14 DAYS IN ADVANCE** of the proposed training dates – if multiple dates are proposed, then the schedule must be submitted at least 14 days in advance of the earliest date on the schedule. Submission of the schedule after with less than fourteen days before the first date shall be sufficient grounds, by itself, for the Owner to reject the schedule, or any portion of the schedule. If the schedule is rejected by the Owner, then it will be rescheduled at no additional expense to the Owner or Architect. **ALL OPERATOR TRAINING MUST TAKE PLACE, AND RECORDINGS (1.03 A.) MUST BE PROVIDED TO ARCHITECT, PRIOR TO THE PUNCH LIST INSPECTION.** Failure to conduct and provide recordings prior to the Punch List Inspection will be grounds for cancellation of the Punch List Inspection.
 - 1. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.
- B. Qualification Data: For facilitator, instructor, and videographer.
- C. Attendance Record: For each training module, submit list of participants and length of instruction time.
- D. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

1.03 CLOSEOUT SUBMITTALS

- A. Demonstration and Training Video Recordings: Submit two (2) copies within seven (7) days of end of each training module.
 - 1. Identification: On each copy, provide an applied label with the following information:
 - a. Name of Project.
 - b. Name and address of videographer.
 - c. Name of Architect.
 - d. Name of Contractor.
 - e. Date of video recording.
 - 2. Transcript: Prepared in PDF electronic format. Include a cover sheet with same label information as the corresponding video recording and a table of contents with links to corresponding training components. Include name of Project and date of video recording on each page.
 - 3. At Final Inspection, submit complete training manual(s) for Owner's use prepared and bound in format matching operation and maintenance manuals and in PDF electronic file format on compact disc.

1.04 QUALITY ASSURANCE

- A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.

- B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in "Section 01 40 00 - Quality Requirements," experienced in operation and maintenance procedures and training.
- C. Videographer Qualifications: A professional videographer who is experienced photographing demonstration and training events similar to those required.
- D. Pre-instruction Conference: Conduct conference at Project site. Review methods and procedures related to demonstration and training including, but not limited to, the following:
 - 1. Inspect and discuss locations and other facilities required for instruction.
 - 2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.
 - 3. Review required content of instruction.
 - 4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

1.05 COORDINATION

- A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.
- B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
- C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Architect.

PART 2 - PRODUCTS

2.01 INSTRUCTION PROGRAM

- A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.
- B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:
 - 1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
 - a. System, subsystem, and equipment descriptions.
 - b. Performance and design criteria if Contractor is delegated design responsibility.
 - c. Operating standards.
 - d. Regulatory requirements.
 - e. Equipment function.
 - f. Operating characteristics.
 - g. Limiting conditions.
 - h. Performance curves.
 - 2. Documentation: Review the following items in detail:
 - a. Emergency manuals.
 - b. Operations manuals.
 - c. Maintenance manuals.
 - d. Project record documents.
 - e. Identification systems.
 - f. Warranties and bonds.
 - g. Maintenance service agreements and similar continuing commitments.
 - 3. Emergencies: Include the following, as applicable:
 - a. Instructions on meaning of warnings, trouble indications, and error messages.
 - b. Instructions on stopping.
 - c. Shutdown instructions for each type of emergency.
 - d. Operating instructions for conditions outside of normal operating limits.
 - e. Sequences for electric or electronic systems.
 - f. Special operating instructions and procedures.
 - 4. Operations: Include the following, as applicable:

- a. Startup procedures.
- b. Equipment or system break-in procedures.
- c. Routine and normal operating instructions.
- d. Regulation and control procedures.
- e. Control sequences.
- f. Safety procedures.
- g. Instructions on stopping.
- h. Normal shutdown instructions.
- i. Operating procedures for emergencies.
- j. Operating procedures for system, subsystem, or equipment failure.
- k. Seasonal and weekend operating instructions.
- l. Required sequences for electric or electronic systems.
- m. Special operating instructions and procedures.
- 5. Adjustments: Include the following:
 - a. Alignments.
 - b. Checking adjustments.
 - c. Noise and vibration adjustments.
 - d. Economy and efficiency adjustments.
- 6. Troubleshooting: Include the following:
 - a. Diagnostic instructions.
 - b. Test and inspection procedures.
- 7. Maintenance: Include the following:
 - a. Inspection procedures.
 - b. Types of cleaning agents to be used and methods of cleaning.
 - c. List of cleaning agents and methods of cleaning detrimental to product.
 - d. Procedures for routine cleaning
 - e. Procedures for preventive maintenance.
 - f. Procedures for routine maintenance.
 - g. Instruction on use of special tools.
- 8. Repairs: Include the following:
 - a. Diagnosis instructions.
 - b. Repair instructions.
 - c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 - d. Instructions for identifying parts and components.
 - e. Review of spare parts needed for operation and maintenance.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual.
- B. Set up instructional equipment at instruction location.

3.02 INSTRUCTION

- A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.
- B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
 - 1. Owner will furnish Contractor with names and positions of participants.
- C. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
 - 1. Schedule training with Architect with at least fourteen (14) days' advance notice.
- D. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.

- E. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of a performance-based test.
- F. Cleanup: Collect used and leftover educational materials and give to Owner. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

3.03 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

- A. General: Engage a qualified commercial videographer to record demonstration and training video recordings. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.
 - 1. At beginning of each training module, record each chart containing learning objective and lesson outline.
- B. Video: Provide minimum 640 x 480 video resolution converted to format file type acceptable to Owner, on electronic media.
 - 1. Electronic Media: Read-only format compact disc acceptable to Owner, with commercial-grade graphic label.
 - 2. File Hierarchy: Organize folder structure and file locations according to project manual table of contents. Provide complete screen-based menu.
 - 3. File Names: Utilize file names based upon name of equipment generally described in video segment, as identified in Project specifications.
 - 4. Contractor and Installer Contact File: Using appropriate software, create a file for inclusion on the Equipment Demonstration and Training DVD that describes the following for each Contractor involved on the Project, arranged according to Project table of contents:
 - a. Name of Contractor/Installer.
 - b. Business address.
 - c. Business phone number.
 - d. Point of contact.
 - e. E-mail address.
- C. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to adequately cover area of demonstration and training. Display continuous running time.
 - 1. Film training session(s) in segments not to exceed 15 minutes.
 - a. Produce segments to present a single significant piece of equipment per segment.
 - b. Organize segments with multiple pieces of equipment to follow order of Project Manual table of contents.
 - c. Where a training session on a particular piece of equipment exceeds 15 minutes, stop filming and pause training session. Begin training session again upon commencement of new filming segment.
- D. Light Levels: Verify light levels are adequate to properly light equipment. Verify equipment markings are clearly visible prior to recording.
 - 1. Furnish additional portable lighting as required.
- E. Narration: Describe scenes on video recording by audio narration by microphone while video recording is recorded. Include description of items being viewed.
- F. Transcript: Provide a transcript of the narration. Display images and running time captured from videotape opposite the corresponding narration segment.
- G. Pre-produced Video Recordings: Provide video recordings used as a component of training modules in same format as recordings of live training.

END OF SECTION

SECTION 01 91 13 - GENERAL COMMISSIONING REQUIREMENTS

(Revision Date: 9 April 2021)

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Commissioning: Commissioning is a systematic process of ensuring that all building energy systems perform interactively according to the design intent and the Owner's operational needs. The commissioning process for this project shall encompass and coordinate the traditionally separate functions of system documentation, equipment startup, control system calibration, testing and balancing, and performance testing. Commissioning during the construction phase includes a commissioning kick-off meeting, pre-functional checks, and any site visits prior to functional performance testing of mechanical and electrical systems. The acceptance phase includes the functional testing of the mechanical and electrical systems at the time each Bid Item is ready for the Owner's occupancy. Commissioning is intended to achieve the following specific objectives according to the Contract Documents:
1. Verify that applicable equipment and systems are installed according to the manufacturer's recommendations and to industry accepted minimum standards and that they receive adequate operational checkout by installing contractors.
 2. Verify and document proper performance of equipment and systems.
 3. Verify that the Owner's operating personnel are adequately trained.
- B. The commissioning process does not take away from or reduce the responsibility of the system designers or installing contractors to provide a finished and fully functioning product.
- C. Abbreviations: The following are common abbreviations used in the Specifications and in the Commissioning Plan. Definitions are found in Section 1.6.

A/E	Architect/Engineer	FPT	Functional Performance Test
CxA	Commissioning Authority	GC	General Contractor (prime)
CxE	Electrical Commissioning Specialist	CxM	Mechanical Commissioning Specialist
TAB	Test and Balance	PM	
Cx	Commissioning	PFT	Pre-functional Test Checklist

1.2 COORDINATION

- A. Commissioning Team: The members of the commissioning team consist of the Commissioning Authority (CxA), the Mechanical Commissioning Specialist (CxM), the Electrical Commissioning Specialist (CxE), the Project Manager (PM), the Field Coordinator (FC), the General Contractor (GC or Contractor), the Architect/Engineer and design engineers (particularly the mechanical and electrical engineers), the Mechanical Contractor (MC), the Electrical Contractor (EC), the TAB representative (TAB), the Controls Contractor (CC), and any other

installing subcontractors or suppliers of equipment. If known, the Owner's building or plant operator/engineer is also a member of the commissioning team.

- B. Management: The CxA is hired by the Owner or Owner's Representative directly. The CxA directs and coordinates the commissioning activities and is part of the PM team. All members work together to fulfill their contracted responsibilities and meet the objectives of the Contract Documents. The CxA's responsibilities are the same regardless of who hired the CxA. Refer to Section 019113 Part 1.5 for additional management details.
- C. Scheduling: The CxA will work with the PM, OR, and GC according to protocols established herein to schedule the commissioning activities. The CxA will provide sufficient notice to the OR and GC for scheduling commissioning activities. The GC will integrate all commissioning activities into the master schedule. All parties will address scheduling problems and make necessary notifications in a timely manner in order to expedite the commissioning process.
- D. The CxA will provide the initial schedule of primary commissioning events at the commissioning scoping meeting. The Construction Phase Commissioning Plan provides a format for this schedule. As construction progresses, more detailed schedules are developed by the CxA. The Commissioning Plan also provides a format for detailed schedules.

1.3 COMMISSIONING PROCESS

- A. Commissioning Plan: The commissioning plan provides guidance in the execution of the commissioning process. Just after the initial commissioning scoping meeting, the CxA will update the plan which is then considered the "final" plan, though it will continue to evolve and expand as the project progresses. The Commissioning Plan will act as a complementary document to the Specifications..
- B. Commissioning Process: The following narrative provides a brief overview of the typical commissioning tasks during construction and the general order in which they occur.
 - 1. Commissioning during construction begins with a scoping meeting conducted by the CxA where the commissioning process is reviewed with the commissioning team members.
 - 2. The CxA will provide to the Owner, who will issue to the Contractor as a contract directive, the mechanical and electrical contractors Pre-Functional Test (PFT) procedures that are based on the contract documents, manufacturers' start-up procedures, and best practices developed by the HVAC and Electrical industries.
 - 3. In general, the checkout and performance verification proceeds from simple to complex; from component level to equipment to systems and intersystem levels with pre-functional checklists being completed before functional testing.
 - 4. The Contractor, under their own direction, execute and document the pre-functional checklists and perform startup and initial checkout. The CxA documents that the checklists and startup were completed according to the approved plans. This may include the CxA or technical Cx representatives witnessing start-up of selected equipment.
 - 5. The CxA develops specific equipment and system functional performance test procedures. The Owner will provide the test procedures to the Contractor by contract directive. The Contractor will review the procedures and conduct internal tests of equipment and systems prior to requesting official functional performance testing with the CxA or technical Cx representatives. This helps the Contractor verify that the systems are ready for official testing, and it also minimizes failed tests and retesting efforts.
 - 6. The functional performance testing procedures are executed by the Contractor in

- accordance with the approved schedule and documented by the CxA.
7. Items of non-compliance in material, installation, or setup are corrected at the Contractor's sole expense and the system retested.
 8. Deferred testing is conducted as specified or required.

1.4 RELATED WORK

- A. Specific commissioning requirements are given in the following sections of these specifications. All of the following sections apply to the Work of this section.
1. Section 01 77 00 "Project Closeout" defines Substantial Completion and Functional Completion milestones, relative to commissioning.
 2. Section 23 08 00 "Commissioning of HVAC Systems" describes the mechanical contractor's responsibilities to commissioning as called out in Section 01 91 13 "General Commissioning Requirements."
 3. Section 26 08 00 "Commissioning of Electrical Systems" describes the electrical contractor's responsibilities to commissioning as called out in Section 01 91 13 "General Commissioning Requirements."
 4. Section 28 08 00 "Commissioning of Fire Alarm Systems" describes the fire alarm contractor's responsibilities to commissioning as called out in Section 01 91 13 "General Commissioning Requirements."

1.5 RESPONSIBILITIES

- A. The responsibilities of various parties in the commissioning process are provided in this section. The responsibilities of the mechanical contractor, TAB and controls contractor are in Division 23. The responsibilities of the electrical contractor are in Division 26. The responsibilities of the Fire Alarm Contractor are in Division 28. It is noted that the services for the Project Manager, Field Coordinator, Architect/Engineer, mechanical and electrical designers/engineers, and Commissioning Authority are not provided for in this contract. That is, the Contractor is not responsible for providing their services. Their responsibilities are listed here to clarify the commissioning process.

B. All Parties

1. Follow the Commissioning Plan.
2. Attend commissioning scoping meeting and additional meetings, as necessary.

C. Commissioning Authority (CxA)

The CxA is not responsible for design concept, design criteria, compliance with codes, design, or general construction scheduling, cost estimating, or construction management. The CxA may assist with problem-solving non-conformance or deficiencies, but ultimately, that responsibility resides with the General Contractor and the A/E. The primary role of the CxA is to develop and coordinate the execution of a testing plan, observe, and document performance that systems are functioning in accordance with the documented design intent and in accordance with the Contract Documents. The Contractors will provide all tools or the use of tools to start, check out, and functionally test equipment and systems, except for specified testing with portable data- loggers, which shall be supplied and installed by the CxA.

1. Construction and Acceptance Phases

- a. Coordinates the commissioning activities in a logical, sequential, and efficient manner using consistent protocols and forms, centralized documentation, clear and regular communications and consultations with all necessary parties, frequently updated timelines and schedules, and technical expertise.
- b. Plan and conduct a commissioning scoping meeting.
- c. Request and review additional information required to perform commissioning tasks, including O&M materials, contractor start-up, and checkout procedures.
- d. Before startup, gather and review the current control sequences and interlocks, and work with the Contractor and Architect until sufficient clarity has been obtained, in writing, to be able to write detailed testing procedures.
- e. Write and distribute pre-functional tests and checklists to the Owner.
- f. Draft pre-functional tests and checklist completion by reviewing pre-functional check-list reports and by site observation and spot checking.
- g. With necessary assistance and review from the Contractor, write the functional performance test procedures for equipment and systems. This may include energy management control system trending, stand-alone datalogger monitoring, or manual functional testing.
- h. Analyze any functional performance trend logs and monitoring data to verify performance.
- i. Coordinate, witness, and perform functional performance tests performed by the Contractor. Coordinate retesting as necessary until satisfactory performance is achieved.
- j. Maintain a master deficiency and resolution log (Issue Log). Provide the PM with electronic copy of issues with recommended actions.
- k. Compile test data, inspection reports, and certificates, and provide a final commissioning report (as described in this section) to the Owner.

2. Warranty Period

- a. Coordinate and supervise required seasonal or deferred testing and deficiency corrections.

D. General Contractor (GC)

1. Construction and Acceptance Phase

- a. Facilitate the coordination of the commissioning work by the CxA, and with the PM, ensure that commissioning activities are being scheduled into the master schedule.
- b. Include the cost of commissioning in the total contract price.
- c. Furnish a copy of all construction documents, addenda, change orders, and approved submittals and shop drawings related to commissioned equipment to the CxA.
- d. A representative shall attend a commissioning scoping meeting and other necessary meetings scheduled by the CxA to facilitate the Cx process.
- e. Coordinate owner training on commissioned systems. Provide minimum 10 days' notice prior to scheduling training activities. Provide training agenda and training sign-in sheet to document attendance. Provide copies of training agenda and completed sign-in sheet to CxA.
- f. Prepare O&M manuals according to the Contract Documents, including clarifying and updating the original sequences of operation to as-built conditions.

2. Warranty Period

- a. Ensure that the seasonal or deferred functional performance testing is executed, as witnessed by the CxA, according to the specifications.
- b. Ensure that deficiencies are corrected and make necessary adjustments to O&M manuals and as-built drawings for applicable issues identified in any seasonal testing.

1.6 DEFINITIONS

- A. Acceptance Phase - phase of construction after startup and initial checkout when functional performance tests, O&M documentation review, and training occurs.
- B. Basis of Design (BOD) - The basis of design is the documentation of the primary thought processes and assumptions behind design decisions that were made to meet the design intent. The basis of design describes the systems, components, conditions, and methods chosen to meet the intent. Some reiterating of the design intent may be included.
- C. Commissioning Authority (CxA) - an independent agent, not otherwise associated with the A/E team members or the Contractor, though he/she may be hired as a subcontractor to them. The CxA directs and coordinates the day-to-day commissioning activities. The CxA does not take an oversight role and will not make recommendations to the General Contractor for remediation. The CxA is part of the Owner's team and shall report directly to the Owner.
- D. Commissioning Plan - an overall plan, developed before or after bidding, that provides the organization, schedule, allocation of resources, and documentation requirements of the commissioning process.
- E. Control system - the central building energy management control system
- F. Data-logging - monitoring flows, currents, status, pressures, etc. of equipment using stand-alone data-loggers separate from the control system.
- G. Deferred Functional Performance Tests - FPTs that are performed later, after beneficial occupancy or final acceptance, due to partial occupancy, equipment, seasonal requirements, design, or other site conditions that disallow the test from being performed.
- H. Deficiency - a condition in the installation or function of a component, piece of equipment, or system that is not in compliance with the Contract Documents (that is, does not perform properly or is not complying with the design intent).
- I. Design Intent (Also see OPR) - a dynamic document that provides the explanation of the ideas, concepts, and criteria that are considered to be very important to the owner. It is initially the outcome of the programming and conceptual design phases. Sometimes it is referred to as Owner's Project Requirements.
- J. Design Narrative or Design Documentation - sections of either the Design Intent or Basis of Design.

- K. Electrical Commissioning Specialist (CxE) - commissioning specialist that reports directly to the CxA and performs the technical work associated with each electrical system to be commissioned.
- L. Factory Testing - testing of equipment on-site or at the factory, by factory personnel with an Owner's representative present.
- M. Functional Performance Test (FPT) - test of the dynamic function and operation of equipment and systems using manual (direct observation) or monitoring methods. Functional performance testing is the dynamic testing of systems (rather than just components) under full operation (e.g., the chiller pump is tested interactively with the chiller functions to see if the pump ramps up and down to maintain the differential pressure setpoint). Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied, varying outside air temperatures, fire alarm, power failure, etc. The systems are run through all the control system's sequences of operation and components are verified to be responding as the sequences state. Traditional air or water test and balancing (TAB) is not functional testing, in the commissioning sense of the word. TAB's primary work is setting up the system flows and pressures as specified, while functional testing is verifying that which has already been set up. The commissioning authority develops the functional test procedures in a sequential written form, coordinates, oversees, and documents the actual testing, which is usually performed by the installing contractor or vendor. FPTs are performed after pre-functional checklists, start-up, and TAB are complete.
- N. Indirect Indicators - indicators of a response or condition, such as a reading from a control system screen reporting a damper to be 100% closed.
- O. Manual Test - using hand-held instruments, immediate control system read-outs, or direct observation to verify performance (contrasted to analyzing monitored data taken over time to make the "observation").
- P. Mechanical Commissioning Specialist (CxM) – commissioning specialist that reports directly to the CxA and performs the technical work associated with each mechanical system to be commissioned.
- Q. Monitoring - the recording of parameters (flow, current, status, pressure, etc.) of equipment operation using data-loggers or the trending capabilities of control systems.
- R. Non-Compliance - see Deficiency.
- S. Non-Conformance - see Deficiency,
- T. Over-written Value - writing over a sensor value in the control system to see the response of a system (e.g., changing the outside air temperature value from 50°F to 75°F to verify economizer operation). See also "Simulated Signal."
- U. Owner-Contracted Tests - tests paid for by the Owner outside the GC's contract. These tests will not be repeated during functional tests if properly documented.
- V. Owner's Project Requirements (OPR) – A written document that details the functional requirements of a project and the expectations of how it will be used and operated. These include project goals, measurable performance criteria, cost considerations, benchmarks, success criteria, and supporting information. (The term Design Intent is used by some Owners for their Commissioning Process Owner's Project Requirements.)

- W. Phased Commissioning - commissioning that is completed in phases (by floors or by building, for example) due to the size of the structure or other scheduling issues, in order minimize the total construction time.
- X. Pre-functional Test (PFT) - a list of items to inspect and elementary component tests to conduct to verify proper installation of equipment, provided by the CxA to the Sub. Pre-functional tests are checklists to primarily conduct static inspections and procedures to prepare the equipment or system for initial operation (e.g., belt tension, oil levels OK, labels affixed, gages in place, sensors calibrated, etc.). However, some pre-functional tests entail simple testing of the function of a component, a piece of equipment, or system (such as measuring the voltage imbalance on a three-phase pump motor of a chiller system). The word pre-functional refers to before functional testing. Pre-functional tests augment and are combined with the manufacturer's start-up checklist. Even without a commissioning process, contractors typically perform some, if not many, of the pre-functional test items a CxA will recommend. However, few contractors document in writing the execution of these checklist items. Therefore, for most equipment, the contractors execute the checklists on their own. The CxA only requires that the procedures be documented in writing and does not witness much of the pre-functional tests, except for larger or more critical pieces of equipment.
- Y. Recommendations to the Owner - acceptance that a piece of equipment or system has been properly installed and is functioning in the tested modes according to the Contract Documents.
- Z. Sampling - Functionally testing only a fraction of the total number of identical or near identical pieces of equipment. Refer to 019113 Part 3.5 E.
- AA.. Seasonal Performance Tests - FPT that are deferred until the system(s) will experience conditions closer to their design conditions.
- BB. Simulated Condition - condition that is created for the purpose of testing the response of a system (e.g., applying a hair blower to a space sensor to see the response in a VAV box).
- CC. Simulated Signal - disconnecting a sensor and using a signal generator to send an amperage, resistance, or pressure to the transducer and DDC system to simulate a sensor value.
- DD. Specifications - the construction specifications of the Contract Documents
- EE. Startup - the initial starting or activating of dynamic equipment, including executing pre-functional checklists
- FF. Systems, Subsystems, Equipment, and Components: Where these terms are used together or separately, they shall mean "as-built" systems, subsystems, equipment, and components.
- GG. Test Procedures - the step-by-step process which must be executed to fulfill the test requirements. The test procedures are developed by the CxA, CxM, and CxE.
- HH. Test Requirements - requirements specifying what modes and functions, etc., shall be tested. The test requirements are not the detailed test procedures. The test requirements are specified in the Contract Documents (Sections 23 08 00; 26 08 00, etc.).
- II. Trending - monitoring using the building control system.

1.7 SYSTEMS TO BE COMMISSIONED

- A. The following equipment and systems will be commissioned in this project. Equipment types and quantities will vary per Bid Item.

1. Mechanical:

- a. Geothermal loop field with associated pumps and heat exchangers
- b. Hydronic building loop pumps
- c. Air/dirt separators
- d. Geothermal water-source heat pumps
- e. Water-cooled variable refrigerant flow (VRF) heat recovery units
- f. Air-cooled VRF outdoor units
- g. VRF indoor evaporator units
- h. Electric cooling / gas heating split-system units
- i. Packaged DX gas-fired air-conditioning units
- j. Ductless air-conditioning units and/or heat pumps
- k. Through-wall heat pump units
- l. Exhaust/supply fans
- m. Destratification fans
- n. Electric wall heaters
- o. Gas-fired unit heaters
- p. Gas infrared heaters
- q. Dehumidifiers
- r. Kitchen hoods and associated exhaust/supply fans
- s. Carbon monoxide detection system
- t. Gas submeters
- u. Water submeters
- v. Testing, Adjusting and Balancing (TAB) work
- w. Central Building Automation System including linkage of remote monitoring and control sites

2. Electrical:

- a. Lighting controls (interior and exterior)
- b. Exit egress lighting
- c. Power
 - i. Service entrance equipment
 - ii. Panelboards
 - iii. Disconnect switches
 - iv. Receptacles
 - v. Manual transfer switches and pin & sleeve connectors
 - vi. Submeters
- d. Fire alarm and mass notification systems

PART 2 - PRODUCTS

2.1 TEST EQUIPMENT

- A. All standard testing equipment required to perform startup and initial checkout and required functional performance testing shall be provided by the Contractor.
- B. Special equipment, tools, and instruments (only available from vendor, specific to a piece of equipment) required for testing equipment, according to these Contract Documents shall be included in the base bid price to the Contractor and left on site, except for stand-alone data-logging equipment that may be used by the CxA.
- C. Data-logging equipment and software required to test equipment may be provided by the CxA but shall not become the property of the Contractor.
- D. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified in the Specifications. If not otherwise noted, the following minimum requirements apply: Temperature sensors and digital thermometers shall have a certified calibration within the past year to accuracy of 0.5 deg-F and a resolution of + or - 0.1 deg-F. Relative humidity sensors and digital hygrometers shall have a certified calibration within the past year to accuracy of + or - 2.0% of the value range being measured (not full range of meter). Pressure sensors shall have an accuracy of + or - 2.0% of the value range being measured (not full range of meter) and have been calibrated within the last year. All equipment shall be calibrated according to the manufacturer's recommended intervals and when dropped or damaged. Calibration tags shall be affixed or certificates readily available.
- E. Refer to Part 3.5 E for details regarding equipment that may be required to simulate required test conditions.

PART 3 - EXECUTION

3.1 MEETINGS

- A. Scoping Meeting: Within 60 days of commencement of construction, the CxA will schedule, plan, and conduct a commissioning scoping meeting with the entire commissioning team in attendance. Meeting minutes will be distributed to all parties by the CxA. Information gathered from this meeting will allow the CxA to revise the Preliminary Commissioning Plan to its "final" version, which will also be distributed to all parties.

3.2 REPORTING

- A. The CxA will provide regular reports to the Owner with increasing frequency as construction and commissioning progresses.
- B. The CxA will regularly communicate with all members of the commissioning team, keeping them apprised of commissioning progress and scheduling changes through memos, progress reports, etc.
- C. Testing or review approvals and non-conformance and deficiency reports are made regularly with the review and testing as described in later sections.
- D. A final summary report (about four to six pages, not including backup documentation) by the CxA will be provided to the Owner, focusing on evaluating commissioning process issues and

identifying areas where the process could be improved. All acquired documentation, logs, minutes, reports, deficiency lists, communications, findings, unresolved issues, etc., will be compiled in appendices and provided with the summary report.

3.3 SUBMITTALS

- A. The CxA will provide the Contractor with a specific request for the type of submittal documentation the CxA requires to facilitate the commissioning work. These requests will be integrated into the normal submittal process and protocol of the construction team. At minimum, the request will include the manufacturer and model number, the manufacturer's printed installation and detailed start-up procedures, full sequences of operation, O&M data, performance data, any performance test procedures, control drawings, and details of owner contracted tests. **ALL SUBMITTALS SHALL BE PROVIDED IN PDF ELECTRONIC FORMAT.** In addition, the installation and checkout materials that are actually shipped inside the equipment and the actual field checkout sheet forms to be used by the factory or field technicians shall be submitted to the CxA. All documentation requested by the CxA will be included by the Contractor in their O&M manual contributions.
- B. The CxA will review and approve submittals related to the commissioned equipment for conformance to the Contract Documents as it relates to the commissioning process, to the functional performance of the equipment, and adequacy for developing test procedures. This review is intended primarily to aid in the development of functional testing procedures and only secondarily to verify compliance with equipment specifications. The Commissioning Authority will review the submittals concurrently with the Owner and will notify the Owner and PM of items missing or areas that are not in conformance with Contract Documents and which requires resubmission.
- C. The CxA may request additional design narrative from the A/E and/or Contractor, depending on the completeness of the design intent documentation and sequences provided with the Specifications.
- D. These submittals to the CxA do not constitute compliance for O&M manual documentation. The O&M manuals are the responsibility of the Contractor, though the CxA will review them.

3.4 START-UP, PREFUNCTIONAL CHECKLISTS, AND INITIAL CHECKOUT

- A. The following procedures apply to all equipment to be commissioned, according to Section 1.7, Systems to be Commissioned. Some systems that are not comprised of actual dynamic machinery, e.g., electrical system power quality, may have very simplified PFC's and startup.
- B. General. Pre-functional checklists are important to ensure that the equipment and systems are hooked up and operational. It ensures that functional performance testing (in-depth system checkout) may proceed without unnecessary delays. Each piece of equipment receives full pre-functional checkout. No sampling strategies are used. The pre-functional testing for a given system must be successfully completed prior to formal functional performance testing of equipment or subsystems of the given system.
- C. Start-up and Initial Checkout Plan: The CxA shall assist the commissioning team members responsible for startup of any equipment in developing detailed start-up plans for all equipment. The primary role of the CxA in this process is to ensure that there is written documentation that

each of the manufacturer-recommended procedures have been completed. Parties responsible for pre-functional checklists and startup are identified in the commissioning scoping meeting and in the checklist forms.

1. The CxA adapts, if necessary, the representative pre-functional checklists and procedures from the Commissioning Plan. These checklists indicate required procedures to be executed as part of startup and initial checkout of the systems and the party responsible for their execution.
2. These checklists and tests are provided by the CxA to the Contractor. The Contractor determines which trade is responsible for executing and documenting each of the line item tasks and notes that trade on the form. Each form will have more than one trade responsible for its execution.
3. The Contractor is responsible for developing the full start-up plan by combining (or adding to) the CxA's checklists with the manufacturer's detailed start-up and checkout procedures from the O&M manual and the normally used field checkout sheets. The plan will include checklists and procedures with specific boxes or lines for recording and documenting the checking and inspections of each procedure and a summary statement with a signature block at the end of the plan.

The full start-up plan could consist of something as simple as:

- a. The CxA copies the manufacturer's startup and initial checkout procedures from O&M submittals.
 - b. The CxA marks the applicable areas in the procedures and makes initial and date lines at each procedure or section.
 - c. The CxA transmits these procedures and the original pre-functional checklist procedures (see 1 above) to the Contractor as the startup and initial checkout plan.
4. The Contractor submits the full startup plan to the CxA for review and approval.
 5. The CxA reviews and approves the procedures and the format for documenting them, noting any procedures that need to be added.

D. Execution of Pre-Functional Checklists and Startup

1. Four weeks prior to startup, the Contractor schedules startup and checkout with the PM, A/E, and CxA. The performance of the pre-functional checklists, startup, and checkout are directed and executed by the designee of the Contractor (i.e., Sub or vendor). When checking off pre-functional checklists, signatures may be required for verification of completion of their work.
2. The Contractor's designee (i.e., Subs and vendors) shall execute startup and provide the CxA with a signed and dated copy of the completed start-up and pre-functional tests and checklists.
3. Only individuals that have direct knowledge and witnessed that a line-item task on the pre-functional checklist was actually performed shall initial or check that item off. It is not acceptable for witnessing supervisors to fill out these forms.

E. Deficiencies, Non-Conformance, and Approval in Checklists and Startup.

1. The Contractor shall clearly list any outstanding items of the initial start-up and pre-functional procedures that were not completed successfully, at the bottom of the procedures form or on an attached sheet. The procedures form and any outstanding deficiencies are provided to the CxA within two days of test completion.

2. The CxA reviews the report and submits either a non-compliance report or an approval form to the Contractor, A/E, and PM. The CxA shall work with the Contractor to correct and re-test deficiencies or uncompleted items. The CxA will involve the PM and others as necessary. The Contractor shall correct all areas that are deficient or incomplete in the checklists and tests in a timely manner and shall notify the CxA as soon as outstanding items have been corrected and resubmit an updated start-up report and a Statement of Correction on the original non-compliance report. When satisfactorily completed, the CxA recommends approval of the execution of the checklists and startup of each system to the PM using a standard form.
3. Items left incomplete, which later cause deficiencies or delays during functional testing, may result in back-charges to the responsible party. Refer to Part 3.6 herein for details.

3.5 FUNCTIONAL PERFORMANCE TESTING

- A. This sub-section applies to all commissioning functional testing for all divisions.
- B. The general list of equipment to be commissioned is found in Paragraph 1.7.
- C. Objectives and Scope: The objective of functional performance testing is to demonstrate that each system is operating according to the documented design intent and Contract Documents. Functional testing facilitates bringing the systems from a state of substantial completion to full dynamic operation. Additionally, during the testing process, areas of deficient performance are identified and corrected, improving the operation and functioning of the systems.

In general, each system should be operated through all modes of operation (seasonal, occupied, unoccupied, warm-up, cool-down, part-and full-load) where there is a specified system response. Verifying each sequence in the sequences of operation is required. Proper responses to such modes and conditions as power failure, freeze condition, low oil pressure, no flow, equipment failure, etc., shall also be tested.

- D. Development of Test Procedures. Before test procedures are written, the CxA shall obtain all requested documentation and a current list of change orders affecting equipment or systems, including an updated points list, program code, control sequences and parameters. Using the testing parameters and requirements in Sections 23 08 00, 26 08 00, and 28 08 00, the CxA shall develop specific test procedures and forms to verify and document proper operation of each piece of equipment and system. The Contractor shall provide limited assistance to the CxA in developing the procedures review (answering questions about equipment, operation, sequences, etc.). Prior to execution, the CxA shall provide a copy of the test procedures to the Contractor who shall review the tests for feasibility, safety, equipment, and warranty protection. The CxA may submit the tests to the A/E for review, if requested by the Owner.

The test procedure forms developed by the CxA shall include (but not be limited to) the following information:

1. System and equipment or component name(s)
2. Equipment location and ID number
3. Unique test ID number and reference to unique pre-functional checklist and start-up documentation ID numbers for the piece of equipment
4. Date
5. Project name
6. Participating parties
7. A copy of the specification section describing the test requirements

8. A copy of the specific sequence of operations or other specified parameters being verified
9. Formulas used in any calculations
10. Required pre-test field measurements
11. Instructions for setting up the test.
12. Special cautions, alarm limits, etc.
13. Specific step-by-step procedures to execute the test, in a clear, sequential, and repeatable format
14. Acceptance criteria of proper performance with a Yes / No check box to allow for clearly marking whether or not proper performance of each part of the test was achieved.
15. A section for comments
16. Signatures and date block for the CxA

E. Test Methods.

1. Functional performance testing and verification may be achieved by manual testing (persons manipulate the equipment and observe performance) or by monitoring the performance and analyzing the results using the control system's trend log capabilities or by stand-alone data-loggers. CxA may substitute specified methods or require an additional method to be executed, other than what was specified, with the approval of the Owner. This may require a change order and adjustment in charge to the Owner. The CxA will determine which method is most appropriate for tests that do not have a method specified.

F. Coordination and Scheduling: The Contractor shall provide sufficient notice to the CxA regarding their completion schedule for the pre-functional checklists and startup of all equipment and systems. The CxA will schedule functional tests through the PM, GC, and A/E. The CxA or technical Cx representatives shall direct, witness, and document the functional testing of all equipment and systems. The Contractor shall execute the tests.

In general, functional testing is conducted after pre-functional testing and startup has been satisfactorily completed. The control system must have been sufficiently tested by the Contractor and found in accordance with the Contract Documents by the CxA before it is used for TAB or to verify performance of other components or systems. The air and water balancing is to be completed and de-bugged before functional testing of air-related or water-related equipment or systems. Testing proceeds from components to subsystems to systems. When the proper performance of all interacting individual systems has been achieved, the interface or coordinated responses between systems is checked. The Contractor is responsible for reviewing the functional testing procedure documents provided by the CxA and conducting internal tests of equipment and systems prior to requesting official functional performance testing with the CxA or technical Cx representatives. This allows the Contractor to verify that the systems are ready for official testing, and it also minimizes failed tests and retesting efforts. Functional Performance Testing will occur simultaneously for all buildings in a particular Bid Item, so all systems and equipment in that Bid Item must be ready for final testing prior to the arrival of the CxA. If the CxA, CxM, or CxE arrive on-site for FPT's and it becomes evident that some or all systems are not ready for final testing (i.e., other than minor operational issues, equipment and systems do not perform as expected when going through the various control sequences), the tests will be considered "failed." **The Owner reserves the right to deduct from the Contract Amount the costs to the Owner for re-testing for failed tests.**

G. Problem Solving: The CxA will recommend solutions to problems found. However, the burden of responsibility to solve, correct, and retest problems is with the Contractor.

3.6 DOCUMENTATION, NON-CONFORMANCE, AND APPROVAL OF TESTS

- A. Documentation: The CxA, CxM, or CxE shall witness and document the results of all functional performance tests using the specific procedural forms developed for that purpose. Prior to testing, these forms are provided to the Contractor for review. The CxA will include the filled-out forms in the final commissioning report.
- B. Non-Conformance
 - 1. The CxA will record the results of the functional test on the procedure or test form. All deficiencies or non-conformance issues shall be noted and reported to the Owner on a standard non-compliance form.
 - 2. Corrections of minor deficiencies identified may be made during the tests at the discretion of the CxA. In such cases the deficiency and resolution will be documented on the procedure form.
 - 3. Every effort will be made to expedite the testing process and minimize unnecessary delays, while not compromising the integrity of the procedures. However, the CxA will not be pressured into overlooking deficient work or loosening acceptance criteria to satisfy scheduling or cost issues, unless there is an overriding reason to do so at the request of the Owner.
 - 4. As tests progress and a deficiency is identified, the CxA discusses the issue with the Contractor.
 - a. When there is no dispute on the deficiency and the Contractor accepts responsibility to correct it:
 - 1) The CxA documents the deficiency and the Contractor's response and intentions and they go on to another test or sequence. The deficiency is added to the Issue Log. A copy is provided to the Contractor and CxA. The Contractor corrects the deficiency, signs the Issue Log correction certifying that the equipment is ready to be retested and sends it back to the CxA.
 - 2) The CxA reschedules the test and the test is repeated.
 - b. If there is a dispute about a deficiency regarding whether it is a deficiency or who is responsible:
 - 1) The deficiency shall be documented on the non-compliance form with the Contractor's response and a copy given to the Owner and to the A/E.
 - 2) Resolutions are made at the lowest management level possible. Other parties are brought into the discussions as needed. Final interpretive authority is with the Owner. Final acceptance authority is also with the Owner.
 - 3) The CxA documents the resolution process.
 - 4) Once the interpretation and resolution have been decided, the appropriate party corrects the deficiency, signs the statement of correction on the non-compliance form, and provides it to the CxA. The CxA reschedules the test and the test is repeated until satisfactory performance is achieved.
 - 5. Cost of Retesting
 - a. The cost of retesting will be allocated in accordance with the General Conditions of the Contract.
 - 6. The Contractor shall respond in writing to the CxA and Owner at least as often as

commissioning meetings are being scheduled concerning the status of each apparent outstanding discrepancy identified during commissioning. Discussion shall cover explanations of any disagreements and proposals for their resolution.

7. The CxA retains the original non-conformance forms until the end of the project.
8. Any required retesting by the Contractor shall not be considered a justified reason for a claim of delay or for a time extension.

C. Failure Due to Manufacturer Defect: If 10%, or three, whichever is greater, of identical pieces (size alone does not constitute a difference) of equipment fail to perform to the Contract Documents (mechanically or substantively) due to manufacturing defect, not allowing it to meet its submitted performance spec, all identical units may be considered unacceptable by the Owner. In such case, the Contractor shall provide the Owner with the following:

1. Within one week of notification from the Owner, the Contractor or manufacturer's representative shall examine all other identical units making a record of the findings. The findings shall be provided to the Owner within two weeks of the original notice.
2. Within two weeks of the original notification, the Contractor or manufacturer shall provide a signed and dated, written explanation of the problem, cause of failures, etc. and all proposed solutions which shall include full equipment submittals. The proposed solutions shall not significantly exceed the specification requirements of the original installation.
3. The Owner will determine whether a replacement of all identical units or a repair is acceptable.
4. Two examples of the proposed solution will be installed by the Contractor, and the Owner will be allowed to test the installations for up to one week, upon which the Owner will decide whether to accept the solution.
5. Upon acceptance, the Contractor and/or manufacturer shall replace or repair all identical items, at their expense. The replacement/repair work shall proceed with reasonable speed beginning within one week from when parts can be obtained.

D. Approval: The CxA notes each satisfactorily demonstrated function on the test form. Formal approval of the functional test is made later after review by the CxA and by the Owner. The CxA recommends acceptance of each test to the Owner using a standard form. The Owner gives final approval on each test using the same form, providing a signed copy to the CxA and the Contractor.

3.7 OPERATION AND MAINTENANCE MANUALS

A. Standard O&M Manuals

1. The specific content and format requirements for the standard O&M manuals are detailed in Section 01 77 00.

B. Commissioning Report

1. The CxA is responsible to compile, organize, and index the following commissioning data by equipment into labeled, indexed, and tabbed electronic media and deliver it to the Owner. The format of the manuals shall be:
 - a. Executive Summary
 - b. Cx Meeting Minutes
 - c. Commissioning Specifications
 - d. Commissioning Plan

- e. Issue Log
- f. Commissioning Forms (Pre-functional Test forms, Functional Performance Test Forms and Trend Log)
- g. Equipment Start-up Reports
- h. Training Reports
- i. Additional Forms and Reports (TAB Report, BAS Point-to Point Check List, As-Built Control Drawings, O&M Manuals).

3.8 DEFERRED TESTING

- A. Unforeseen Deferred Tests: If any check or test cannot be completed due to the building structure, required occupancy condition, or other deficiency, execution of checklists and functional testing may be delayed upon approval of the Owner. These tests will be conducted in the same manner as the seasonal tests as soon as possible. Services of necessary parties will be negotiated.
- B. Seasonal Testing: During the warranty period, seasonal testing (tests delayed until weather conditions are closer to the system's design) specified in Section 23 08 00 shall be completed as part of this contract. The CxA shall coordinate this activity. Tests will be executed, documented and deficiencies corrected by the Contractor, with PM facilities staff and the CxA witnessing. Any final adjustments to the O&M manuals and as-builts due to the testing will be made.

3.9 WRITTEN WORK PRODUCTS

- A. The commissioning process generates a number of written work products described in various parts of the Specifications. The Commissioning Plan—Construction Phase, lists all the formal written work products, describes briefly their contents, who is responsible to create them, their due dates, who receives and approves them, and the location of the specification to create them. In summary, the written products are as follows:

Product	Developed By
1. Final commissioning plan	CxA
2. Meeting minutes	CxA
3. Commissioning schedules	CxA with GC and PM
4. Equipment documentation submittals	GC
5. Sequence clarifications	GC and A/E as needed
6. Pre-functional checklists	CxA
7. Startup and initial checkout plan	GC and CxA (compilation of existing documents)
8. Startup and initial checkout	GC forms filled out
9. Final TAB report	TAB
10. Issues log (deficiencies)	CxA
11. Commissioning Progress Record	CxA
12. Deficiency reports	CxA
13. Functional test forms	CxA
14. Final commissioning report	CxA

END OF SECTION 01 91 13

SECTION 024119 - SELECTIVE STRUCTURE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Demolition and removal of selected building or structure.
 - 2. Salvage of existing items to be reused or recycled.
- B. Related Sections include the following:
 - 1. Division 01 Section "Summary" for use of premises and Owner-occupancy requirements.
 - 2. Division 01 Section "Temporary Facilities and Controls" for temporary construction and environmental-protection measures for selective demolition operations.

1.3 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.
- C. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.4 MATERIALS OWNERSHIP

- A. Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to Owner that may be encountered during selective demolition remain Owner's property. Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to Owner.
 - 1. Coordinate with Owner's project manager, who will establish special procedures for removal and salvage.

1.5 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ANSI A10.6 and NFPA 241.

1.6 PROJECT CONDITIONS

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- A. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- B. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- C. Hazardous Materials: It is unknown whether hazardous materials will be encountered in the Work.
 - 1. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Owner will remove hazardous materials under a separate contract.
- D. Storage or sale of removed items or materials on-site is not permitted.
- E. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
 - 1. Maintain fire-protection facilities in service during selective demolition operations.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- B. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.
- C. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.
- D. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems: Maintain services/systems indicated to remain and protect them against damage during selective demolition operations.
 - 1. Comply with requirements for existing services/systems interruptions specified in Division 01 Section "Summary."
- B. Service/System Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
 - 1. If services/systems are required to be removed, relocated, or abandoned, before proceeding with selective demolition provide temporary services/systems that bypass

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- area of selective demolition and that maintain continuity of services/systems to other parts of building.
 - 2. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.
 - C. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 - 1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
 - 2. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
 - 3. Maintain adequate ventilation when using cutting torches.
 - 4. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
 - 5. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 - 6. Dispose of demolished items and materials promptly.
 - D. Removed and Reinstalled Items:
 - 1. Clean and repair items to functional condition adequate for intended reuse.
 - 2. Pack or crate items after cleaning and repairing. Identify contents of containers.
 - 3. Protect items from damage during transport and storage.
 - 4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
 - E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.
- ### 3.3 DISPOSAL OF DEMOLISHED MATERIALS
- A. General: Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.
 - 1. Do not allow demolished materials to accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

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- 3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
 - B. Burning: Do not burn demolished materials.
 - C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.
- 3.4 CLEANING
- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 024119

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Special Conditions, Special Instructions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.
- B. Related Sections:
 - 1. Division 31 Section "Earth Moving" for drainage fill under slabs-on-grade.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Design Mixtures: For each concrete mixture.
- C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement.
- D. Welding certificates.
- E. Material certificates.
- F. Material test reports.
- G. Floor surface flatness and levelness measurements.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
 - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- B. Testing Agency Qualifications: An independent agency qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.
- C. Welding Qualifications: Qualify procedures and personnel according to AWS D1.4/D 1.4M, "Structural Welding Code - Reinforcing Steel."
- D. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
 - 1. ACI 301, "Specifications for Structural Concrete," Sections 1 through 5.
 - 2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

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- E. Concrete Testing Service: Contractor will engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.
- F. Preinstallation Conference: Conduct conference at Project site.

PART 2 - PRODUCTS

2.1 FORM-FACING MATERIALS

- A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

2.2 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60d.
- B. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, plain, fabricated from as-drawn steel wire into flat sheets.
- C. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice."

2.3 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
 - 1. Portland Cement: ASTM C 150, Type I/II, gray. Supplement with the following:
 - a. Fly Ash: ASTM C 618, Class F.
 - b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.
- B. Normal-Weight Aggregates: ASTM C 33, graded.
 - 1. Maximum Coarse-Aggregate Size: 3/4 inch
 - 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Water: ASTM C 94/C 94M and potable.

2.4 ADMIXTURES

- A. Air-Entraining Admixture: ASTM C 260.
- B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
 - 1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
 - 2. Retarding Admixture: ASTM C 494/C 494M, Type B.
 - 3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.

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4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

2.5 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
- B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd..
- C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- D. Water: Potable.
- E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.

2.6 CONCRETE MIXTURES

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
- B. Cementitious Materials: Use fly ash, pozzolan, ground granulated blast-furnace slag, and silica fume as needed to reduce the total amount of portland cement, which would otherwise be used, by not less than 40 percent.
- C. Admixtures: Use admixtures according to manufacturer's written instructions.
 1. Use water-reducing admixture in concrete, as required, for placement and workability.
 2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
 3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.
- D. Proportion normal-weight concrete mixture as follows:
 1. Minimum Compressive Strength 4000 psi ys.
 2. Maximum Water-Cementitious Materials Ratio:—0.45.
 3. Slump Limit: 4 inches minus 1 inch tent: 3/4-inch maximum aggregate size.
 4. Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.

2.7 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.8 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and ASTM C 1116/C 1116M, and furnish batch ticket information.
 1. When air temperature is between 85 and 90 deg F mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F mixing and delivery time to 60 minutes.

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PART 3 - EXECUTION

3.1 FORMWORK

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows (see "Finishing Formed Surfaces" in other Part 3 articles this section for designation of location for surface irregularity requirements):
 - 1. Rough-Formed Surfaces - Class B, 1/4 inch.
 - 2. Smooth-Formed Surfaces - Class A, 1/8 inch.
 - 3. Limit deflection of form facing panels to not exceed ACI 303.1 requirements.
 - 4. Construct forms tight enough to prevent loss of concrete mortar.

3.2 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

3.3 VAPOR BARRIERS

- A. Basis of design - WR Meadows, Perminator, 10 mil sheet, or similar product from another manufacturer that meet the requirements and published characteristics of the basis of design material.
- B. Place, protect, and repair sheet vapor retarder according to manufacturer's written instructions.

3.4 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
 - 1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

3.5 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
- C. Control Joints in Slabs-on-Grade: Form weakened-plane control joints, sectioning concrete into areas as indicated. Construct control joints for a depth equal to at least one-fourth of concrete thickness as follows:
 - 1. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-concrete when cutting action will not

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tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

3.6 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
 - 1. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
- C. Cold-Weather Placement: Comply with ACI 306.1.
- D. Hot-Weather Placement: Comply with ACI 301.

3.7 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x hnd during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
 - 1. Moisture Curing: Keep surfaces continuously moist for not less than three days.
 - 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches by waterproof tape or adhesive. Cure for not less than 3 days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
 - 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
 - a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound will not interfere with bonding of floor covering used on Project.
 - 4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

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3.8 EXPOSED TO VIEW CONCRETE - FINISH

- A. Within 24 hours after form removal, repair and patch tie holes and defects and remove fins and other projections that exceed specified limits for rough formed surface irregularities. Entire surface shall be wetted with a brush and rubbed with a No. 16 carborundum stone or an abrasive of equal quality, bringing the surface to a paste. The rubbing shall be continued sufficiently to remove all form marks and projections, producing a smooth dense surface without pits or irregularities. The material, which in the above process has been ground to a paste, shall then be carefully spread or brushed uniformly over the entire surface and allowed to take a rest. Curing shall continue on this surface as required in Section 3.11. The final finish shall be obtained by a complete rubbing with a No. 30 carborundum stone or an abrasive of equal quality. This rubbing shall continue until the entire surface is of a smooth texture and uniform in color.

3.9 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

3.10 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Contractor will engage at his expense a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

END OF SECTION

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SECTION 033053 – CAST IN PLACE CONCRETE – SITE WORK ONLY

PART 1 - GENERAL

1.1 SCOPE

A. Description of Work:

1. Provide all labor, material and equipment to furnish and install all concrete formwork, concrete reinforcement and cast-in-place concrete as shown on the Drawings and specified herein.
2. The work also includes the removal of forms at completion of the concrete work.

1.2 APPLICABLE SPECIFICATIONS

A. The CONTRACTOR shall follow the practices and standards of the following American Concrete Institute Specifications, which are made part of this Specification:

1. ACI-201.2, "Guide to Durable Concrete".
2. ACI-211, "Recommended Practice for Selecting Proportions for Concrete".
3. ACI-304, "Recommended Practice for Measuring, Mixing and Placing Concrete".
4. ACI-305, "Recommended Practice for Hot Weather Concreting".
5. ACI-306, "Recommended Practice for Cold Weather Concreting".
6. ACI-301, "Specifications for Structural Concrete".
7. ACI-315, "Manual of Standard Practice for Detailing Concrete Structures".
8. ACI-318, "Building Code Requirements for Reinforced Concrete".
9. ACI-347, "Recommended Practice for Concrete Formwork".
10. ACI-350, "Concrete Sanitary Engineering Structures".

B. The CONTRACTOR shall follow the practices and standards of the following Concrete Reinforcing Steel Institute, which are made a part of this Specification:

1. "The Manual of Standard Practice for Reinforced Concrete Construction".
2. "Placing Reinforcing Bars".
3. "Splicing Reinforcing Bars".

C. The CONTRACTOR shall follow the practices and standards of the following American Society for Testing and Materials, which are made a part of this Specification:

1. ASTM A82, "Specification for Cold-Drawn Steel Wire for Concrete Reinforcement".
2. ASTM A185, "Specification for Welded Steel Wire Fabric for Concrete Reinforcement".
3. ASTM A615, "Specification for Deformed and Plain Billet Steel Bars for Concrete Reinforcement".
4. ASTM C33, "Specification for Concrete Aggregates".
5. ASTM C150, "Specification for Portland Cement".

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- 6. ASTM E8, "Tension Testing of Metallic Materials."
 - D. 2009 International Building Code
- 1.3 SUBMITTALS
 - A. Submittals shall include, but also not be limited to, the following:
 - 1. Type and brand of cement used.
 - 2. Design mix including aggregates, admixtures and cementitious materials.
- 1.4 CLASS OF CONCRETE
 - A. Class "A" concrete shall be steel reinforced and used for the following construction:
 - 1. Steps.
 - 2. Storm and Utility Structures
 - 3. Sidewalks

PART 2 - PRODUCTS

- 2.1 REINFORCEMENT
 - A. Material
 - 1. All reinforcing steel shall meet the requirements of Section 835 of the Alabama Department of Transportation Standard Specification for Highway Construction, 2018 Edition.
 - B. Fabrication
 - 1. All reinforcement shall be of clean new stock, free from defects, mill or rust scales, or coatings that will reduce bond. Reinforcement shall be cold bent to the shapes shown on the Drawings. The heating of reinforcement for bending will not be permitted. Reinforcing bars shall not be bent or straightened in a manner that will injure the material.
 - 2. All hooks shall be bent using the pin diameters and dimensions as defined as "ACI Standard Hooks" in "The Manual of Standard Practice for Reinforced Concrete Construction" as published by the Concrete Reinforcing Steel Institute unless otherwise shown on the Drawings.
 - 3. Reinforcing bars shall conform accurately to the dimensions shown on the Drawings and within the fabricating tolerances as shown in the "Manual of Standard Practice for Reinforced Concrete Construction" as published by the Concrete Reinforcing Steel Institute.
- 2.2 CONCRETE
 - A. Materials:
 - 1. Cement shall be an acceptable brand of Portland Cement, ASTM C150, Type I. In the event field conditions require, and the ENGINEER finds it acceptable, a high-early strength Portland Cement, Type III may be used.
 - 2. Water: ASTM C94
 - 3. Fine Aggregate shall meet the requirements of Section 802 of the Alabama Department of Transportation Standard Specification for Highway Construction, 2018 Edition.

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4. Coarse Aggregate shall meet the requirements of Section 801 of the Alabama Department of Transportation Standard Specification for Highway Construction, 2018 Edition.
 5. Fly Ash, Class F or C, shall meet the requirements of Section 806 of the Alabama Department of Transportation Standard Specification for Highway Construction, 2018 Edition.
- B. Proportioning:
1. Concrete mix shall have a consistency enabling it to be readily worked into all corners of the form and around all reinforcing by usual methods of placing and consolidating without permitting segregation or excessive free water.
 2. All concrete on project shall be air-entrained to the recommended air content set forth in table 4.1, ACI 201.2, but under no condition shall the air content be less than 5%. Tolerance for air entrainment shall be +/- 1.5% per ACI 301-10.
 3. Concrete mix shall be proportioned by an acceptable independent testing and/or inspection laboratory. The design shall provide the following minimum 28 day compressive strengths:
 - a. Class A Concrete - 4000 psi
 4. Regardless of the strengths shown by testing, all Class A concrete shall have a maximum water cement ratio of 0.44.
 5. The slump of the concrete mix shall be 4 inches (+/- 1 inch) or 8 inches (+/- 1 inch) for concrete mixes containing admixtures. (Per ACI 310-10, Section 4.2.2.2)
 6. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than Portland cement in concrete as follows:
 1. Fly Ash: 15 percent.
 7. Concrete design mix shall be submitted to the ENGINEER for review before work commences. No concrete shall be placed until the ENGINEER has reviewed and accepted the design mix.
- C. Non-Shrink Grout:
1. Non-Shrink, Non-Metallic Grout shall be Sika Grout 212 or approved equal.
- D. Epoxy Bonding Compound:
1. The epoxy bonding compound shall be Sikadur 32, Hi-Mod or approved equal.
- E. Expansion Joint Material:
1. Shall be preformed bituminous type meeting the specification of ASTM D994, unless otherwise specified.
- F. Expansion Joint Sealer:
1. Shall meet the requirements of Section 832 of the Alabama Department of Transportation Standard Specification for Highway Construction, 2018 Edition.
- G. Curing Compounds:
1. Shall meet the requirements of Section 830 of the Alabama Department of Transportation Standard Specification for Highway Construction, 2018 Edition.
- H. Epoxy Adhesives:

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1. Epoxy grouts and adhesives shall be used where shown on the Drawings and specified herein, and shall be as manufactured by Hilti, or approved equal.

PART 3 - INSTALLATION

3.1 FORMWORK

A. Formwork General:

1. Boards may be used for concrete which will not be exposed in the finished work, and which are not otherwise scheduled or specified.
2. The CONTRACTOR, at his option, may use plywood for forms in lieu of boards.
3. Steel forms may be used in lieu of plywood forms.
4. Forms for circular structures shall be either circular or chords with a maximum length of flat surface of 18 inches.

B. Earth Forms

1. Forms Below Grade:

- a. The vertical faces of Wall Footings and Spread Footings need not be formed where top of footing is below frost line 3 feet - 6 inches below finish grade or the nature of the virgin soil and/or compacted fill is such, in the judgment of the ENGINEER, that the sides of the excavations will properly receive the pour.

2. Construction:

- a. Trench earth forms shall be at least 2 inches wider than footing widths shown on Drawings, unless otherwise indicated.

C. Wood and Steel Forms

1. General:

- a. Wood and/or steel forms shall be constructed of sound material, shall be of the correct shape and dimensions, mortar tight, of sufficient strength, and so braced and tied together that the movement of men, equipment, materials, or placing and vibrating the concrete will not throw them out of line or position. For circular structures, circular forms or chords having a maximum length of flat service of 18 inches shall be used.

2. Forms for Exposed Concrete:

- a. Forming panels shall be clean, smooth, uniform in size, and free from damaged edges and holes. All edges of plywood shall be backed to prevent separation.

3. Framing and Bracing:

- a. Space studs at 16 inches on center maximum for boards and 12 inches on center maximum for plywood.

4. Tolerances:

- a. Variation from plumb in lines and surfaces of columns, walls, and arises shall not exceed 1/8 inch in 10 feet with maximum "in" and "out" variation occurring in not less than 20 feet.

5. Chamfered Corners:

- a. For all exposed corners, provide moldings in forms for all chamfering.

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6. Form Ties:
 - a. Form ties shall be of sufficient strength and used in sufficient quantities to prevent spreading of the forms.
7. Cleanouts and Access Panels:
 - a. All forms and surfaces to receive concrete shall be cleaned of all chips, sawdust, and other debris and shall be thoroughly blown out with compressed air just before concrete is placed.
8. Construction Joints:
 - a. Construction joints shall be formed where shown on the Drawings or permitted by the ENGINEER. Provide a surfaced pouring strip where construction joints intersect exposed surfaces to provide straight line at joints.
 - b. In general, formed construction joints or keys shall be in width one-third (1/3) of the width of the concrete and in depth one-sixth (1/6) of the width of the concrete. All keys shall be continuous and none smaller than 2 inches in width and 2 inches in depth shall be used.
 - c. Before concreting is resumed, the surfaces of previously placed concrete shall be cleaned and coated with an acceptable epoxy bonding compound as manufactured by the Euclid Chemical Co. or Sika Chemical Corp. or equal. New concrete shall be placed after the bonding compound becomes tacky.
9. Embedded Items:
 - a. Provisions shall be made for pipes, sleeves, anchors, inserts, reglets, anchor bolts, nailers, waterstops and other features. No wood shall be embedded in concrete.
10. Openings for Items Passing Through Concrete:
 - a. Frame openings in concrete where shown on the Drawings. The CONTRACTOR shall establish exact locations, sizes, and other conditions required for openings and attachment of work specified under other sections. The CONTRACTOR shall be held responsible for proper coordination of all work of this nature.
11. Shores and False Work:
 - a. The CONTRACTOR shall be fully responsible for the proper strength, safety, and adequacy of all falsework, supports, posts, footings, etc., used on and in connection with the work.
12. Reuse and Coating of Forms:
 - a. Thoroughly clean forms and recoat with specified form coating before each reuse. Do not reuse any form for exposed work which cannot be reconditioned to "like new" condition.
13. Inspection:
 - a. Prior to placing of any concrete, and after placement of reinforcing steel in the forms, the CONTRACTOR shall notify the ENGINEER so that proper inspection may be made.
14. Rejection of Defective Work Due to Improper Forms:
 - a. Reconstruction of forms and new concrete shall be furnished at no additional cost to the OWNER in the event of rejection or defective work.

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D. Removal of Forms and Shores:

1. The supporting forms and shoring shall not be removed until the members have acquired sufficient strength to support their weight and the loads superimposed thereon safely.
2. During the period that forms are in place on the concrete work, said forms shall be kept wet at all times.
3. In removing plywood forms, no metal pinch bars shall be used and special care shall be taken in stripping.
4. Nothing herein shall be construed as relieving the CONTRACTOR of any responsibility for the safety of the structure.
5. After stripping, the CONTRACTOR shall properly protect all concrete to be exposed in the finish work from damage, with boards and non-staining building paper to prevent staining, spalled edges, chips, etc.

3.2 REINFORCEMENT

A. Placing:

1. The placement of the bars shall conform to "Placing Reinforcing Bars" as published by the Concrete Reinforcing Steel Institute.
2. Bars shall be securely tied to prevent displacement during the pouring operation and all dowels must be wired in place before depositing concrete.
3. All splicing of bars, concrete cover, and bar spacings shall conform to "Building Code Requirements for Reinforced Concrete" (ACI-318) as published by the American Concrete Institute and to recommended practices in "Splicing Reinforcing Bars" by the Concrete Reinforcing Steel Institute unless shown otherwise on the Drawings.
4. The CONTRACTOR shall exercise extreme care in placing the reinforcement in areas where the earth is used as a form. If any soil or foreign material is displaced into the excavation, the reinforcement shall be removed, the excavation cleaned, and the reinforcement replaced.

B. Splicing:

1. Lapped ends of bars shall be placed in contact and securely wired or may be separated sufficiently to permit the embedment of the entire surface of each bar in concrete. Lapped splices shall not be used for bars larger than Size No. 11 and at locations shown on the Drawings. Splices in adjacent bars shall be staggered. Splice adjacent sheets of mesh reinforcement by lapping not less than 6 inches, the lapped ends being securely wired or clipped together with standard clips.

C. Protection of Exposed Reinforcement:

1. Exposed reinforcement intended for bonding to future work shall be thoroughly protected from corrosion. Such reinforcement shall be given a heavy wrapping of burlap saturated and sealed with a bituminous compound.

3.3 CONCRETE

A. Delivery of Concrete:

1. A delivery ticket shall be submitted with each batch at the time of delivery. Failure to render such ticket to the CONTRACTOR's Job Superintendent shall automatically be cause for rejection of the concrete. The delivery ticket shall show the following:

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- a. Amount of aggregate water.
 - b. Amount of batch water.
 - c. Quantities of sand, stone and cement.
 - d. Design strength.
 - e. Time that truck left batch plant.
 2. The CONTRACTOR's Job Superintendent shall write on the back of the delivery ticket:
 - a. The time of arrival of the truck mixer on the site.
 - b. The time of deposit of the concrete from the truck.
 - c. The place of deposit of the concrete.
 3. The completed delivery ticket shall be delivered to the ENGINEER. Failure to deliver such completed ticket to the ENGINEER will be cause for the ENGINEER to reject the deposited concrete at any time and cause it to be removed and replaced at the CONTRACTOR's expense.
 4. Delivery of concrete to the jobsite shall be in accordance with ACI 301.
 5. Delivery of concrete shall be in accordance with ACI 301-10, Section 4.3.2.
- B. Placing Concrete:
1. Before placing concrete site shall be made available for inspection by ENGINEER.
 2. Concrete placed in electrical ductbanks shall contain red dye.
 3. Before placing concrete, all construction debris, water and ice shall be removed from the places to be occupied by the concrete.
 4. Rock surfaces upon which concrete is to be placed shall be level, free from oil, water, mud, loose semi-detached or unsound rock fragments and rough enough to assure bond with concrete.
 5. Where reinforcing bars are required, said bars shall be securely tied to prevent displacement during the pouring operation.
 6. Concrete shall be deposited in approximately horizontal layers not to exceed 18 inches in thickness to avoid flowing.
 7. Falling concrete shall be closely confined in a drop chute of the proper size to within two or three feet of the place of deposit in the forms and the final drop must be vertical to avoid segregation of aggregates. In no case shall concrete be deposited from a height that will cause separation of the aggregates.
 8. Concrete shall be mixed in such quantities as required for immediate use and shall be placed while fresh before loss of slump occurs. Retempering by adding water to restore slump lost during excessive mixing or due to too long a lapse of time since initial mixing will not be permitted.
 9. All slabs shall be placed for full thickness in one operation without any change in proportions.
 10. Contractor shall designate an area for clean out and management of clean-out materials. All waste concrete materials shall be contained, allowed to solidify, and shall be removed from the site and disposed of at a proper facility in accordance with all state and local requirements.

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C. Temperature of Concrete:

1. Concrete, when deposited, shall have a temperature ranging between a minimum of 50 deg. F. and a maximum of 90 deg. F.
2. When the temperature of the surrounding air is below 40 deg. F. or above 90 deg. F., concreting shall be done in accordance with the recommendations noted in ACI-306 and ACI-305 respectively.

D. Protection of New Work:

1. All freshly placed concrete shall be adequately protected from mechanical injury or by action of the elements until such time as the concrete is thoroughly set.

E. Curing:

1. Beginning immediately after placement and continuing for at least 7 days, except for concrete made with Type III cement, at least 3 days, all concrete shall be cured and protected from premature drying, extremes in temperature, rapid temperature change, freezing, mechanical damage, and exposure to rain or flowing water. All materials and equipment needed for adequate curing and protection shall be available and at the site of the placement prior to the start of concrete placement. Preservation of moisture for concrete surfaces not in contact with forms shall be accomplished by one of the following methods:

1. Continuous sprinkling or ponding.
2. Application of absorptive mats or fabrics kept continuously wet.
3. Application of sand kept continuously wet.
4. Application of impervious sheet material conforming to ASTM C 171.
5. Application of membrane-forming curing compound conforming to ASTM C 309, Type 1-D, on surfaces permanently exposed to view and Type 2 on other surfaces shall be accomplished in accordance with manufacturer's instructions.

The preservation of moisture for concrete surfaces placed against wooden forms shall be accomplished by keeping the forms continuously wet for 7 days . If forms are removed prior to end of the required curing period, other curing methods shall be used for the balance of the curing period. During the period of protection removal, the temperature of the air in contact with the concrete shall not be allowed to drop more than 25 degrees F within a 24 hour period.

F. Defective Concrete:

1. Defective concrete is defined as concrete in place, which does not conform to strength, shapes, alignments and/or elevations as shown on the Drawings.
2. All defective concrete shall be removed and replaced in a manner meeting with the ENGINEER's satisfaction.

G. Grout:

1. Non-Shrink Grout shall be placed in accordance with the manufacturer's recommendations. This grout shall be used for closing concrete openings at pipe and sleeve locations and other areas where a non-shrink grout is required.

H. Finishing:

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1. Unless otherwise noted in the drawings or other prevailing specification, all exposed concrete surfaces shall receive a light broom finish.

3.4 SAMPLING AND TESTING

A. TESTING LABORATORY

1. Contractor shall establish the mix proportions and test the concrete. One test shall be performed for each 100 cu. yds. of concrete or one per day. The laboratory shall maintain records showing brand of cement, brand and quantity of admixtures, time and location of the batch from which the test was made, air content, slump, and compressive strength. The laboratory shall supply the test cylinders, slump cones, field technicians and all equipment necessary for performance of field and laboratory testing specified herein. The Contractor shall notify the laboratory with sufficient time before all required samples can be made.
2. One strength test shall consist of four field specimens, one (1) specimen for testing at seven (7) days, two (2) specimens for testing at twenty-eight (28) days and one specimen to hold. The samples for strength tests shall be taken in accordance with "Method of Sampling Fresh Concrete" (ASTM C-172). Cylinders for acceptance tests shall be molded and laboratory-cured in accordance with "Method of Test for Compressive Strength of Molded Concrete Cylinders" (ASTM C-39). Each strength test result shall be the average of two cylinders from the same sample tested at twenty-eight (28) days.
3. The materials and workmanship to be furnished under this specification shall be subject to inspection in the mill, shop, and field by the ENGINEER.
4. Inspection and acceptance, or failure to inspect, shall in no way relieve the Contractor or the mill and shops from their responsibility to furnish materials and workmanship in accordance with contract requirements. When materials and/or workmanship do not conform to the specification requirements, the Engineer reserves the right to reject such material and/or workmanship at any time before final acceptance of the concrete work.
5. Additional in situ testing such as Swiss/Schmidt Hammer, Windsor Probe, etc., may be required should any cylinder break results be questionable.

END OF SECTION 033053

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SECTION 051200 - STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Structural steel.
2. Grout.

B. Related Sections:

1. Division 01 Section "Quality Requirements" for independent testing agency procedures and administrative requirements.
2. Division 05 Section "Architecturally Exposed Structural Steel Framing" for additional requirements for architecturally exposed structural steel.
3. Division 05 Section "Steel Decking" for field installation of shear connectors through deck.
4. Division 05 Section "Metal Fabrications" for steel lintels and shelf angles not attached to structural-steel frame, miscellaneous steel fabrications, and other metal items not defined as structural steel.
5. Division 09 painting Sections for surface-preparation and priming requirements.
6. Division 13 Section "Metal Building Systems" for structural steel.

1.2 DEFINITIONS

- A. Structural Steel:** Elements of structural-steel frame, as classified by AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."

1.3 SUBMITTALS

- A. Product Data:** For each type of product indicated.

- B. Shop Drawings:** Show fabrication of structural-steel components.

1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
2. Include embedment drawings.
3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical high-strength bolted connections.

- C. Welding Procedure Specifications (WPSs) and Procedure Qualification Records (PQRs):** Provide according to AWS D1.1/D1.1M, "Structural Welding Code - Steel," for each welded joint whether prequalified or qualified by testing, including the following:

1. Power source (constant current or constant voltage).
2. Electrode manufacturer and trade name, for demand critical welds.

- D. Qualification Data:** For qualified Installer, fabricator, professional engineer and testing agency.

- E. Welding certificates.**

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- F. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
- G. Mill test reports for structural steel, including chemical and physical properties.
- H. Product Test Reports: For the following:
 - 1. Bolts, nuts, and washers including mechanical properties and chemical analysis.
 - 2. Direct-tension indicators.
 - 3. Tension-control, high-strength bolt-nut-washer assemblies.
 - 4. Shear stud connectors.
 - 5. Shop primers.
 - 6. Nonshrink grout.
- I. Source quality-control reports.

1.4 QUALITY ASSURANCE

- A. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category STD.
- B. Installer Qualifications: A qualified installer who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector, Category CSE.
- C. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- D. Comply with applicable provisions of the following specifications and documents:
 - 1. AISC 303.
 - 2. AISC 360.
 - 3. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- E. Preinstallation Conference: Conduct conference at Project site.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.
 - 1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.
- B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.
 - 1. Fasteners may be repackaged provided Contractor's testing and inspecting agency observes repackaging and seals containers.
 - 2. Clean and relubricate bolts and nuts that become dry or rusty before use.
 - 3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F 1852 fasteners and for retesting fasteners after lubrication.

1.6 COORDINATION

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- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

PART 2 - PRODUCTS

2.1 STRUCTURAL-STEEL MATERIALS

- A. Recycled Content of Steel Products: Provide products with an average recycled content of steel products so postconsumer recycled content plus one-half of preconsumer recycled content is not less than 25 percent.
- B. W-Shapes: ASTM A 572/A 572M, Grade 50
- C. Channels, Angles, M, S-Shapes: ASTM A 572/A 572M, Grade 50
- D. Plate and Bar: ASTM A 572/A 572M, Grade 50
- E. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B, structural tubing.
- F. Steel Pipe: ASTM A 53/A 53M, Type E or S, Grade B.
 - 1. Finish: Black except where indicated to be galvanized.
- G. Steel Castings: ASTM A 216/A 216M, Grade WCB with supplementary requirement S11.
- H. Steel Forgings: ASTM A 668/A 668M.
- I. Welding Electrodes: Comply with AWS requirements.

2.2 BOLTS, CONNECTORS, AND ANCHORS

- A. High-Strength Bolts, Nuts, and Washers: ASTM A 325 Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade C, heavy-hex carbon-steel nuts; and ASTM F 436 Type 1, hardened carbon-steel washers; all with plain finish.
 - 1. Direct-Tension Indicators: ASTM F 959, Type 325 compressible-washer type with plain finish.
- B. Shear Connectors: ASTM A 108, Grades 1015 through 1020, headed-stud type, cold-finished carbon steel; AWS D1.1/D1.1M, Type B.
- C. Headed Anchor Rods: ASTM F 1554, Grade 36 or Grade 55 where indicated, weldable, straight.
 - 1. Nuts: ASTM A 563 heavy-hex carbon steel.
 - 2. Plate Washers: ASTM A 36/A 36M carbon steel.
 - 3. Washers: ASTM F 436 Type 1, hardened carbon steel.
 - 4. Finish: Plain unless indicated to be Hot-dip zinc coating, ASTM A 153/A 153M, Class C.
- D. Threaded Rods: ASTM A 36/A 36M.
 - 1. Nuts: ASTM A 563 heavy-hex carbon steel.

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2. Washers: ASTM F 436 Type 1, hardened carbon steel.
3. Finish: Plain unless indicated to be Hot-dip zinc coating, ASTM A 153/A 153M, Class C.

2.3 PRIMER

- A. Primer: Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer complying with MPI#79 and compatible with topcoat.
- B. Galvanizing Repair Paint: ASTM A 780.

2.4 GROUT

- A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.5 FABRICATION

- A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC 360.
 1. Camber structural-steel members where indicated.
 2. Fabricate beams with rolling camber up.
 3. Identify high-strength structural steel according to ASTM A 6/A 6M and maintain markings until structural steel has been erected.
 4. Mark and match-mark materials for field assembly.
 5. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.
- B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
 1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/D1.1M.
- C. Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces.
- D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.
- E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted according to SSPC-SP 2, "Hand Tool Cleaning."
- F. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1/D1.1M and manufacturer's written instructions.
- G. Steel Wall-Opening Framing: Select true and straight members for fabricating steel wall-opening framing to be attached to structural steel. Straighten as required to provide uniform, square, and true members in completed wall framing.
- H. Welded Door Frames: Build up welded door frames attached to structural steel. Weld exposed joints continuously and grind smooth. Plug-weld fixed steel bar stops to frames. Secure removable stops to frames with countersunk machine screws, uniformly spaced not more than 10 inches o.c. unless otherwise indicated.
- I. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel framing members.

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1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
2. Baseplate Holes: Cut, drill, or punch holes perpendicular to steel surfaces.
3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.6 SHOP CONNECTIONS

- A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

1. Joint Type: Snug tightened.

- B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

1. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances in AISC 303 for mill material.

2.7 SHOP PRIMING

- A. Shop prime steel surfaces except the following:

1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches
2. Surfaces to be field welded.
3. Surfaces to be high-strength bolted with slip-critical connections.
4. Surfaces to receive sprayed fire-resistive materials (applied fireproofing).
5. Galvanized surfaces.

- B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:

1. SSPC-SP 2, "Hand Tool Cleaning."
2. SSPC-SP 3, "Power Tool Cleaning."
3. SSPC-SP 7/NACE No. 4, "Brush-Off Blast Cleaning."
4. SSPC-SP 11, "Power Tool Cleaning to Bare Metal."
5. SSPC-SP 14/NACE No. 8, "Industrial Blast Cleaning."
6. SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
7. SSPC-SP 10/NACE No. 2, "Near-White Blast Cleaning."
8. SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning."
9. SSPC-SP 8, "Pickling."

- C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
2. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

- D. Painting: Prepare steel and apply a one-coat, nonasphaltic primer complying with SSPC-PS Guide 7.00, "Painting System Guide 7.00: Guide for Selecting One-Coat Shop Painting Systems," to provide a dry film thickness of not less than 1.5 mils

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2.8 GALVANIZING

- A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A 123/A 123M.
 - 1. Fill vent and drain holes that will be exposed in the finished Work unless they will function as weep holes, by plugging with zinc solder and filing off smooth.
 - 2. Galvanize lintels, shelf angles, welded door frames and other indicated items attached to structural-steel frame and located in exterior walls.

2.9 SOURCE QUALITY CONTROL

- A. Testing Agency: Contractor will engage an independent testing and inspecting agency to perform shop tests and inspections and prepare test reports.
 - 1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.
- B. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.
- C. Bolted Connections: Shop-bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- D. Welded Connections: In addition to visual inspection, shop-welded connections will be tested and inspected according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
 - 1. Liquid Penetrant Inspection: ASTM E 165.
 - 2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
 - 3. Ultrasonic Inspection: ASTM E 164.
 - 4. Radiographic Inspection: ASTM E 94.
- E. In addition to visual inspection, shop-welded shear connectors will be tested and inspected according to requirements in AWS D1.1/D1.1M for stud welding and as follows:
 - 1. Bend tests will be performed if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear connector.
 - 2. Tests will be conducted on additional shear connectors if weld fracture occurs on shear connectors already tested, according to requirements in AWS D1.1/D1.1M.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify, with steel Erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.
 - 1. Prepare a certified survey of bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

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- A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.

3.3 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.
- B. Base, Bearing and Leveling Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.
 - 1. Set plates for structural members on wedges, shims, or setting nuts as required.
 - 2. Weld plate washers to top of baseplate.
 - 3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
 - 4. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.
- C. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."
- D. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
 - 1. Level and plumb individual members of structure.
 - 2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.
- E. Splice members only where indicated.
- F. Do not use thermal cutting during erection.
- G. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.
- H. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1/D1.1M and manufacturer's written instructions.

3.4 FIELD CONNECTIONS

- A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
 - 1. Joint Type: Snug tightened.
- B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

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1. Comply with AISC 303 and AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
2. Remove backing bars or runoff tabs where indicated, back gouge, and grind steel smooth.
3. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances in AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Contractor will engage a qualified independent testing and inspecting agency to inspect field welds and high-strength bolted connections.
- B. Bolted Connections: Bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- C. Welded Connections: Field welds will be visually inspected according to AWS D1.1/D1.1M.
 1. In addition to visual inspection, field welds will be tested and inspected according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
 - a. Liquid Penetrant Inspection: ASTM E 165.
 - b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
 - c. Ultrasonic Inspection: ASTM E 164.
 - d. Radiographic Inspection: ASTM E 94.
- D. In addition to visual inspection, test and inspect field-welded shear connectors according to requirements in AWS D1.1/D1.1M for stud welding and as follows:
 1. Perform bend tests if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear connector.
 2. Conduct tests on additional shear connectors if weld fracture occurs on shear connectors already tested, according to requirements in AWS D1.1/D1.1M.
- E. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

3.6 REPAIRS AND PROTECTION

- A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing and repair galvanizing to comply with ASTM A 780.
- B. Touchup Painting: Immediately after erection, clean exposed areas where primer is damaged or missing and paint with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.
- C. Touchup Painting: Cleaning and touchup painting are specified in Division 09 painting Sections.

END OF SECTION

SECTION 054250 - PRE-ENGINEERED COLD-FORMED STEEL TRUSSES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Pre-engineered, factory-built light gage cold-formed steel framing elements.
 - 1. Light gage cold-formed steel open web floor trusses.
 - 2. Light gage cold-formed steel roof trusses.
 - 3. Anchorage, bracing and bridging.

1.2 REFERENCES

- A. AISI - Specification for Design of Cold-Formed Steel Structural Members, 1996, with 2000 Supplement.
- B. ASTM - A 653/A 653M Standard Specification for Sheet Steel, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanealed) by the Hot Dip Process; 2000.
- C. ASTM - A 780 Standard Practice for Repair of Damaged and Uncoated Areas of Hot Dip Galvanized Coatings; 2000.
- D. AWS - D 1.1 Structural Welding Code – Steel; 2002.
- E. AWS - D 1.3 Structural Welding Code – Sheet Steel; 1998.
- F. AWS B2.1 - Specification for Welding Procedure and Performance Qualification; 2000.

1.3 PERFORMANCE REQUIREMENTS

- A. AISI Specifications: Calculate structural characteristics of cold-formed steel truss members according to AISI's Specification for Design of Cold-Formed Steel Structural Members.
- B. Structural Performance: Design, engineer, fabricate, and erect cold-form steel trusses to withstand specified design loads within limits and under conditions required.
 - 1. Design Loads: As specified.
 - 2. Deflections: Live load deflection meeting the following (unless otherwise specified):
Vertical deflection less than or equal to 1/360 of span for live loading.
Vertical deflection less than or equal to 1/240 of span for total load.
 - 3. Design framing systems to provide for movement of framing members without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to maximum ambient temperature change (range) of 120 degrees F (67degrees C).

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's product data and installation instructions for each type of cold-formed steel framing and accessory required.
- B. Shop Drawings:
 - 1. Submit shop drawings showing member type, location, spacing, size and gage, methods of attachment to supporting members and all necessary erection details. Indicate supplemental bracing, strapping, splices, bridging, accessories and details required for proper installation.
 - 2. Submit detailed roof truss layouts.

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3. Submit truss drawings, sealed and signed by a qualified registered Professional Engineer, verifying truss ability to meet local code and design requirements. Include the following:
 - a. Description of design criteria.
 - b. Engineering analysis depicting member stresses and truss deflection.
 - c. Truss member sizes and gages and connections at truss joints.
 - d. Truss support reactions.
 - e. Top chord, bottom chord and web bracing requirements.
 - f. Truss to wall connection requirements.
 - g. Roof diaphragm to wall transfer requirements.

1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: Cold-formed steel truss fabricator with experience designing and fabricating cold-formed steel truss systems equal in material, design and extent to the systems required for this project and approved by truss component manufacturer.
- B. Installer Qualifications: Experienced installer approved by truss system fabricator.
- C. Welding Standards: Comply with applicable provisions of AWS D 1.1 and AWS D 1.3.
 1. Qualify welding processes and welding operators in accordance with AWS B2.1.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's unopened containers or bundles, fully identified by name, brand, type and grade. Exercise care to avoid damage during unloading, storing and erection.
- B. Store trusses on blocking, pallets platforms or other supports off the ground and in an upright position sufficiently braced to avoid damage from excessive bending.
- C. Protect trusses and accessories from corrosion, deformation, damage and deterioration when stored at job site. Keep trusses free of dirt and other foreign matter.

1.7 PROJECT CONDITIONS

- A. During construction, adequately distribute all loads applied to trusses so as not to exceed the carrying capacity of any one joist, truss or other component.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Truss Components: Light gage roof truss components.
 1. Provide manufacturer's standard steel truss members, bracing, bridging, blocking, reinforcements, fasteners and accessories with each type of steel framing required, as recommended by the manufacturer for the application indicated and as needed to provide a complete light gage cold-formed steel truss system
 2. Fabricate components of structural quality steel sheet complying with ASTM A 653/A 653M with a minimum yield strength of 33,000 psi.
 3. Finish: Hot-dipped galvanized zinc coating complying with ASTM A 653/A 653M, minimum G90/Z275 Coating.
- B. Bracing, Bridging and Blocking Members: Fabricate components of commercial quality steel sheet complying with ASTM A 653/A 653M with a minimum yield strength of 33,000 psi (227 MPa).

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1. Finish: Hot-dipped galvanized zinc coating complying with ASTM A 653/A 653M, minimum G90/Z275 Coating.
- C. Fasteners:
 1. Manufacturer recommended self-drilling, self-tapping screws with corrosion-resistant plated finish. Fasteners shall be sufficient size and number to ensure the strength of the connection.
 2. Welding: Comply with AWS D 1.1 when applicable and AWS D 1.3 for welding base metals less than 1/8 inch (3.2 mm) thick.
 3. Other fasteners as accepted by the truss engineer.

2.2 FABRICATION

- A. Factory fabricate cold-formed steel trusses plumb, square, true to line, and with connections securely fastened, according to manufacturer's recommendations and the requirements of this Section.
 1. Fabricate truss assemblies in jig templates.
 2. Cut truss members by sawing, shearing or plasma cutting.
 3. Fasten cold-formed steel truss members by welding or screw fastening, or other methods as standard with fabricator. Wire tying of framing members is not permitted.
 4. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 5. Locate mechanical fasteners and install according to cold-formed steel truss component manufacturer's instructions with screw penetrating joined members by not less than 3 exposed screw threads.
- B. Care shall be taken during handling, delivery and erection. Brace, block, or reinforce truss as necessary to minimize member and connection stresses.
- C. Fabrication Tolerances: Fabricate trusses to a maximum allowable tolerance variation from plumb, level, and true line of 1/8 inch in 10 feet (1:960) and as follows:
 1. Spacing: Space individual trusses no more than plus or minus 1/8 inch (3.2 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
 2. Squareness: Fabricate each cold-formed steel truss to a maximum out-of-square tolerance of 1/8 inch (3.2 mm).

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine structure, substrates and installation conditions. Do not proceed with cold-formed steel truss installation until satisfactory conditions have been corrected.
- B. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

3.2 INSTALLATION - GENERAL

- A. Erection of trusses, including proper handling, safety precautions, temporary bracing and other safeguards or procedures, is the responsibility of the Contractor and the Contractor's installer.
- B. Exercise care and provide erection bracing required to prevent toppling of trusses during erection.

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- C. Erect trusses with plane of truss webs vertical and parallel to each other, accurately located at design spacing indicated.
- D. Provide proper lifting equipment suited to sizes and types of trusses required, applied at lift points recommended by truss fabricator. Exercise care to avoid damage to truss members during erection and to keep horizontal bending of the trusses to a minimum.
- E. Provide framing anchors as indicated or accepted on the engineering design drawing or erection drawings. Anchor trusses securely at bearing points.
- F. Install trusses and accessories plumb, square, true to line, and with connections securely fastened, according to manufacturer's recommendations.
 - 1. Do not cut truss members without prior approval of the truss engineer.
 - 2. Fasten trusses by welding or screw fastening, as is standard with fabricator. Wire tying of framing is not permitted.
 - 3. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - 4. Locate mechanical fasteners and install according to truss manufacturer's instructions with screw penetrating joined members by not less than 3 exposed screw threads.
 - 5. Install trusses in one-piece lengths, unless splice connections indicated.
 - 6. Provide temporary bracing and leave in place until trusses are permanently stabilized.
- G. Erection Tolerances: Install trusses to a maximum allowable tolerance variation from plumb, level, and true to line of 1/8 inch in 10 feet (1:960) and as follows:
 - 1. Space individual trusses no more than plus or minus 1/8 inch (3.2 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.3 INSTALLATION - ROOF TRUSS

- A. Install, bridge, and brace trusses according to manufacturer's recommendations and requirements of this specification.
- B. Space trusses as follows:
 - 1. Truss spacing: 48 inches (1220 mm).
- C. Do not alter, cut, or remove truss members or connections of truss members.
- D. Erect trusses with plane of truss webs plumb and parallel to each other, align, and accurately position at spacing indicated.
- E. Erect trusses without damaging truss members or connections.
- F. Align truss bottom chords with load-bearing studs or continuously reinforce track to transfer loads to structure. Anchor trusses securely at all bearing points.
- G. Install continuous bridging and permanent truss bracing per truss design requirements.
- H. Install necessary roof cross and diagonal bracing per design professional recommendations.

3.4 REPAIR

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- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanizing repair paint according to ASTM A 780 and the manufacturer's instructions.

END OF SECTION 054250

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SECTION 061600 - SHEATHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Roof sheathing.
- B. Related Sections include the following:
 - 1. Division 6 Section "Rough Carpentry Miscellaneous Carpentry" for plywood backing panels.

1.3 SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
 - 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Indicate type of preservative used and net amount of preservative retained.
 - 2. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
 - 3. Include copies of warranties from chemical treatment manufacturers for each type of treatment.
- B. Research/Evaluation Reports: For the following, showing compliance with building code in effect for Project:
 - 1. Preservative-treated plywood.

1.4 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: For assemblies with fire-resistance ratings, provide materials and construction identical to those of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory."

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1.5 DELIVERY, STORAGE, AND HANDLING

- A. Stack plywood and other panels flat with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 PRESERVATIVE-TREATED PLYWOOD

- A. Preservative Treatment by Pressure Process: AWPA C9.
 - 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
- B. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having jurisdiction.
- C. Application: Treat items indicated on Drawings and plywood in contact with masonry or concrete or used with roofing, flashing, vapor barriers, and waterproofing.

2.2 ROOF SHEATHING

- A. Plywood Roof Sheathing: Exterior Exposure 1 sheathing.
 - 1. Span Rating: Not less than 24/0.
 - 2. Nominal Thickness: as indicated on dwgs.
- B. Oriented-Strand-Board Roof Sheathing: Exposure 1 sheathing.
 - 1. Span Rating: Not less than 24/0.
 - 2. Nominal Thickness: as indicated on dwgs.

2.3 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
 - 1. For roof sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
- B. Nails, Brads, and Staples: ASTM F 1667.
- C. Power-Driven Fasteners: NES NER-272.
- D. Wood Screws: ASME B18.6.1.
- E. Screws for Fastening Wood Structural Panels to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.

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1. For roof sheathing panels, provide screws with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117.

2.4 WEATHER-RESISTANT SHEATHING PAPER

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction, unless otherwise indicated.
- C. Securely attach to substrate by fastening as indicated, complying with the following:
 1. NES NER-272 for power-driven fasteners.
 2. Table 2304.9.1, "Fastening Schedule," in ICC's "International Building Code."
 3. Table 23-II-B-1, "Nailing Schedule," and Table 23-II-B-2, "Wood Structural Panel Roof Sheathing Nailing Schedule," in ICBO's "Uniform Building Code."
 4. Table 2305.2, "Fastening Schedule," in BOCA's "BOCA National Building Code."
 5. Table 2306.1, "Fastening Schedule," in SBCCI's "Standard Building Code."
- D. Use common wire nails, unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections. Install fasteners without splitting wood.
- E. Coordinate wall and roof sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.
- F. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.
- G. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

3.2 WOOD STRUCTURAL PANEL INSTALLATION

- A. General: Comply with applicable recommendations in APA Form No. E30S, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.
- B. Fastening Methods: Fasten panels as indicated below:
 1. Roof Sheathing:
 - a. Screw to cold-formed metal framing.
 - b. Space panels **1/8 inch (3 mm)** apart at edges and ends.

AASF #3 ENTRY CONTROL POINT CONSTRUCTION
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END OF SECTION 061600

SECTION 074110 - STANDING-SEAM METAL ROOF PANELS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes standing-seam metal roof panels.
- B. Related Sections:
 - 1. Section 07421 "Metal Soffit Panels" for metal panels used in horizontal soffit applications.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.
- B. Shop Drawings:
 - 1. Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
 - 2. Accessories: Include details of the flashing, trim, and anchorage systems, at a scale of not less than 1-1/2 inches per 12 inches.
- C. Samples for Initial Selection: For each type of metal panel indicated with factory-applied color finishes.
 - 1. Include similar Samples of trim and accessories involving color selection.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Sample Warranties: For special warranties.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver components, metal panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.
- B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.

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- D. Retain strippable protective covering on metal panels during installation.

1.7 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed according to manufacturers' written instructions and warranty requirements.

1.8 COORDINATION

- A. Coordinate sizes and locations of roof curbs, equipment supports, and roof penetrations with actual equipment provided.
- B. Coordinate metal panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.9 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.

- 1. Failures include, but are not limited to, the following:

- a. Structural failures including rupturing, cracking, or puncturing.
 - b. Deterioration of metals and other materials beyond normal weathering.

- 2. Warranty Period: 20 years from date of Final Completion.

- B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

- 1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:

- a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

- 2. Finish Warranty Period: 20 years from date of Final Completion.

- C. Special Weathertightness Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace standing-seam metal roof panel assemblies that fail to remain weathertight, including leaks, within specified warranty period.

- 1. Warranty Period: 20 years from date of Final Completion.

PART 2 - PRODUCTS

2.1 STANDING-SEAM METAL ROOF PANELS

- A. General: Provide factory-formed metal roof panels designed to be installed by lapping and interconnecting raised side edges of adjacent panels with joint type indicated and mechanically attaching panels to supports using concealed clips in side laps. Include clips, cleats, pressure plates, and accessories required for weathertight installation.

- 1. Steel Panel Systems: Unless more stringent requirements are indicated, comply with ASTM E 1514.

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- B. Standing-Seam Metal Roof Panels: Formed with vertical ribs at panel edges and a flat pan between ribs; designed for sequential installation by mechanically attaching panels to supports using concealed clips located under one side of panels, engaging opposite edge of adjacent panels, and mechanically seaming panels together.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ATAS International, Inc.
 - b. Berridge Manufacturing Company.
 - c. IMETCO.
 - d. McElroy Metal, Inc.
 2. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with ASTM A 653/A 653M, G90 coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A 792/A 792M, Class AZ50 coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
 - a. Nominal Thickness: 0.028 inch.
 - b. Color: As selected by Architect from Manufacturers full range of colors to match existing roofs at Building 1060 & WAC Chapel.
 3. Clips: Manufacturers two-piece floating to accommodate thermal movement.
 4. Joint Type: Double folded.
 5. Panel Coverage: 16 inches.
 6. Panel Height: 2.0 inches.

2.2 MISCELLANEOUS MATERIALS

- A. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.
1. Closures: Provide closures at eaves and ridges, fabricated of same metal as metal panels.
 2. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch-thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
- B. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, corners, ridges, fasciae, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.
- C. Gutters: Formed from same material as roof panels, complete with end pieces, outlet tubes, and other special pieces as required. Fabricate in minimum 96-inch-long sections, of size and metal thickness according to SMACNA's "Architectural Sheet Metal Manual." Furnish gutter brackets and straps spaced alternating at maximum of 24 inches o.c., fabricated from same metal as gutters. Provide wire ball strainers of compatible metal at outlets. Finish gutters to match metal roof panels.

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- D. Downspouts: Formed from same material as roof panels. Fabricate in 10-foot-long sections, complete with formed elbows and offsets, of size and metal thickness according to SMACNA's "Architectural Sheet Metal Manual." Finish downspouts to be selected from Manufacturer full range of colors.
- E. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.
 - 1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
 - 2. Joint Sealant: ASTM C 920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended in writing by metal panel manufacturer.
- F. Self Adhering Underlayment:
 - 1. Adhesive-Coated HDPE sheet for Vertical or Horizontal Applications rated for high temperature applications: 46-mil-(1.2 mm) thick, uniform, flexible sheets consisting of 30-mil-(0.76-mm) thick, HDPE sheet coated with a pressure-sensitive rubber adhesive, a protective adhesive coating, a detackifying surface treatment, an uncoated self-adhering side lap strip, and a release liner with the following physical properties:
 - a. Tensile Strength, Film: 4000 psi (27.6 MPa) minimum; ASTM D 412.
 - b. Low-Temperature Flexibility: Pass at minum 10 deg F (minum 23 deg C); ASTM D 1970.
 - c. Peel Adhesion to Concrete: 5 lbf/in. (875 N/m); ASTM D 903, modified.
 - d. Lap Adhesion: 2.5 lbf/in. (440 N/m); ASTM D 1976, modified.
 - e. Hydrostatic-Head Resistance: 231 fet (70 m); ASTM D 5385 modified.
 - f. Vapor Permeance: 0.01 perms (0.6 ng/Pa x s x s sq.m); ASTM E 96, Water Method.
 - g. Water Absorption: 0.5 percent; ASTM D 570.

2.3 FABRICATION

- A. General: Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- B. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.
- C. Fabricate metal panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.
- D. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.
 - 1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.

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2. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
3. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.
4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
5. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.
 - a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal panel manufacturer for application, but not less than thickness of metal being secured.

2.4 FINISHES

- A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are unacceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- C. Steel Panels and Accessories:
 1. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 2. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of the Work.
 1. Examine primary and secondary roof framing to verify that rafters, purlins, angles, channels, and other structural panel support members and anchorages have been installed within alignment tolerances required by metal roof panel manufacturer.
- B. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal panel manufacturer's written recommendations.

3.3 METAL PANEL INSTALLATION

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- A. General: Install metal panels according to manufacturer's written instructions in orientation, sizes, and locations indicated. Install panels perpendicular to supports unless otherwise indicated. Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.
 - 1. Shim or otherwise plumb substrates receiving metal panels.
 - 2. Flash and seal metal panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by metal panels are installed.
 - 3. Install screw fasteners in predrilled holes.
 - 4. Locate and space fastenings in uniform vertical and horizontal alignment.
 - 5. Install flashing and trim as metal panel work proceeds.
 - 6. Align bottoms of metal panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
 - 7. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.
- B. Fasteners:
 - 1. Steel Panels: Use stainless-steel fasteners for surfaces exposed to the exterior; use galvanized-steel fasteners for surfaces exposed to the interior.
- C. Anchor Clips: Anchor metal roof panels and other components of the Work securely in place, using manufacturer's approved fasteners according to manufacturers' written instructions.
- D. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal panel manufacturer.
- E. Standing-Seam Metal Roof Panel Installation: Fasten metal roof panels to supports with concealed clips at each standing-seam joint at location, spacing, and with fasteners recommended in writing by manufacturer.
 - 1. Install clips to supports with self-tapping fasteners.
 - 2. Install pressure plates at locations indicated in manufacturer's written installation instructions.
 - 3. Seamed Joint: Crimp standing seams with manufacturer-approved, motorized seamer tool so clip, metal roof panel, and factory-applied sealant are completely engaged.
 - 4. Watertight Installation:
 - a. Apply a continuous ribbon of sealant or tape to seal joints of metal panels, using sealant or tape as recommend in writing by manufacturer as needed to make panels watertight.
 - b. Provide sealant or tape between panels and protruding equipment, vents, and accessories.
 - c. At panel splices, nest panels with minimum 6-inch end lap, sealed with sealant and fastened together by interlocking clamping plates.
- F. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.

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1. Install components required for a complete metal panel system including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal roof panel manufacturers; or, if not indicated, types recommended by metal roof panel manufacturer.
 - G. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
 1. Install exposed flashing and trim that is without buckling and tool marks, and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and achieve waterproof and weather-resistant performance.
 2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).
 - H. Gutters: Join sections with riveted and soldered or lapped and sealed joints. Attach gutters to eave with gutter hangers spaced not more than 36 inches o.c. using manufacturer's standard fasteners. Provide end closures and seal watertight with sealant. Provide for thermal expansion.
 - I. Downspouts: Join sections with telescoping joints. Provide fasteners designed to hold downspouts securely 1 inch away from walls; locate fasteners at top and bottom and at approximately 60 inches o.c. in between.
 1. Connect downspouts to underground drainage system indicated.
 - J. Pipe Flashing: Form flashing around pipe penetration and metal roof panels. Fasten and seal to metal roof panels as recommended by manufacturer.
- 3.4 FIELD QUALITY CONTROL
- A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect metal roof panel installation, including accessories. Report results in writing.
 - B. Remove and replace applications of metal roof panels where tests and inspections indicate that they do not comply with specified requirements.
 - C. Additional tests and inspections, at Contractor's expense, are performed to determine compliance of replaced or additional work with specified requirements.
 - D. Prepare test and inspection reports.
- 3.5 CLEANING AND PROTECTION
- A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.
 - B. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 07411

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SECTION 074210 - METAL SOFFIT PANELS

PART 1 - GENERAL

- 1.1 RELATED DOCUMENTS
 - A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- 1.2 SUMMARY
 - A. Section includes metal soffit panels.
 - B. Related Sections:
 - 1. Section 074110 "Standing Seam Metal Roof Panels".
- 1.3 ACTION SUBMITTALS
 - A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.
 - B. Shop Drawings:
 - 1. Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
 - 2. Accessories: Include details of flashing, trim, and anchorage systems, at a scale of not less than 1-1/2 inches per 12 inches.
 - C. Samples for Initial Selection: For each type of metal panel indicated with factory-applied color finishes.
 - 1. Include similar Samples of trim and accessories involving color selection.
- 1.4 INFORMATIONAL SUBMITTALS
 - A. Sample Warranties: For special warranties.
- 1.5 QUALITY ASSURANCE
 - A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- 1.6 DELIVERY, STORAGE, AND HANDLING
 - A. Deliver components, metal panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.
 - B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.
 - C. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.
 - D. Retain strippable protective covering on metal panels during installation.
- 1.7 FIELD CONDITIONS

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- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed according to manufacturers' written instructions and warranty requirements.

1.8 COORDINATION

- A. Coordinate metal panel installation with rain drainage work, flashing, trim, construction of walls, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.9 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.

- 1. Failures include, but are not limited to, the following:

- a. Structural failures including rupturing, cracking, or puncturing.
 - b. Deterioration of metals and other materials beyond normal weathering.

- 2. Warranty Period: 20 years from date of Final Completion.

- B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

- 1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:

- a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

- 2. Finish Warranty Period: 20 years from date of Final Completion.

PART 2 - PRODUCTS

2.1 METAL SOFFIT PANELS

- A. Flush-Profile Metal Soffit Panels: Solid and Perforated panels formed with vertical panel edges and a flat pan between panel edges; with flush joint between panels.

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. ATAS International, Inc.
 - b. Berridge Manufacturing Company.
 - c. McElroy Metal, Inc.

- 2. Material: Same material and finish, as metal roof panels and color to be selected from manufacturers full range.

- 3. Panel Coverage: 8 inches.

- 4. Panel Height: 0.875 inch.

2.2 MISCELLANEOUS MATERIALS

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- A. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.
 - 1. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch-thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
- B. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Finish flashing and trim with same finish system as soffit panels.
- C. Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal panels by means of plastic caps or factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.
- D. Panel Sealants: Provide sealant types recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.
 - 1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
 - 2. Joint Sealant: ASTM C 920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended in writing by metal panel manufacturer.
 - 3. Joint Sealant: ASTM C 920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended in writing by metal panel manufacturer.

2.3 FABRICATION

- A. General: Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- B. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.
- C. Fabricate metal panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.
- D. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.
 - 1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
 - 2. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.
 - 3. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.

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4. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.
 - a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal soffit panel manufacturer for application but not less than thickness of metal being secured.

2.4 FINISHES

- A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of the Work.
 1. Examine framing to verify that girts, angles, channels, studs, and other structural panel support members and anchorage have been installed within alignment tolerances required by metal panel manufacturer.
- B. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal panel manufacturer's written recommendations.

3.3 METAL PANEL INSTALLATION

- A. General: Install metal panels according to manufacturer's written instructions in orientation, sizes, and locations indicated. Install panels perpendicular to supports unless otherwise indicated. Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.
 1. Shim or otherwise plumb substrates receiving metal panels.
 2. Flash and seal metal panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by metal panels are installed.
 3. Install screw fasteners in predrilled holes.
 4. Locate and space fastenings in uniform vertical and horizontal alignment.
 5. Install flashing and trim as metal panel work proceeds.
 6. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.

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7. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.
 - B. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal panel manufacturer.
 - C. Lap-Seam Metal Panels: Fasten metal panels to supports with fasteners at each lapped joint at location and spacing recommended by manufacturer.
 1. Apply panels and associated items true to line for neat and weathertight enclosure.
 2. Provide metal-backed washers under heads of exposed fasteners bearing on weather side of metal panels.
 3. Locate and space exposed fasteners in uniform vertical and horizontal alignment. Use proper tools to obtain controlled uniform compression for positive seal without rupture of washer.
 4. Install screw fasteners with power tools having controlled torque adjusted to compress washer tightly without damage to washer, screw threads, or panels. Install screws in predrilled holes.
 - D. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
 1. Install components required for a complete metal panel system including trim, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal panel manufacturer; or, if not indicated, provide types recommended by metal panel manufacturer.
 - E. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that are permanently watertight.
 1. Install exposed flashing and trim that is without buckling, and tool marks, and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to achieve waterproof performance.
 2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).
- 3.4 CLEANING AND PROTECTION
- A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.
 - B. After metal panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.
 - C. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 07421

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SECTION 076200 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Formed Products:

- a. Formed steep-slope roof sheet metal fabrications.
 - b. Formed wall sheet metal fabrications.

- B. Related Sections:

- 1. Division 06 Section "Rough Carpentry" for wood nailers, curbs, and blocking.

1.3 PERFORMANCE REQUIREMENTS

- A. General: Sheet metal flashing and trim assemblies as indicated shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
- B. Thermal Movements: Provide sheet metal flashing and trim that allows for thermal movements from ambient and surface temperature changes.
 - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.
- B. Shop Drawings: Show fabrication and installation layouts of sheet metal flashing and trim, including plans, elevations, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work. Include the following:
 - 1. Identification of material, thickness, weight, and finish for each item and location in Project.

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2. Details of expansion joints and expansion-joint covers, including showing direction of expansion and contraction.
 3. Details of edge conditions, including eaves, ridges, valleys, rakes, crickets, and counterflashings as applicable.
- C. Samples for Initial Selection: For each type of sheet metal flashing, trim, and accessory indicated with factory-applied color finishes involving color selection.
- D. Qualification Data: For qualified fabricator.
- E. Warranty: Sample of special warranty.

1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.
- B. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" unless more stringent requirements are specified or shown on Drawings.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.
- B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to the extent necessary for the period of sheet metal flashing and trim installation.

1.7 WARRANTY

- A. Special Warranty on Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SHEET METALS

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- A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying a strippable, temporary protective film before shipping.
- B. Aluminum Sheet: ASTM B 209, alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required.
 - 1. Surface: Smooth, flat.
 - 2. Exposed Coil-Coated Finishes:
 - a. Three-Coat Fluoropolymer: AAMA 620. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - 3. Color: As selected by Architect from manufacturer's full range.
 - 4. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.
- C. Lead Sheet: ASTM B 749, Type L51121, copper-bearing lead sheet.

2.2 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and recommended by manufacturer of primary sheet metal unless otherwise indicated.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal.
 - 1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
 - a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating.
 - b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
 - 2. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
- C. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
- D. Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant; low modulus; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- E. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.

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- F. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.
- G. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.
- H. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

2.3 FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, geometry, metal thickness, and other characteristics of item indicated. Fabricate items at the shop to greatest extent possible.
 - 1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
 - 2. Obtain field measurements for accurate fit before shop fabrication.
 - 3. Form sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
 - 4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces exposed to view.
- B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.
- C. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant.
- D. Expansion Provisions: Where lapped expansion provisions cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.
- E. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
- F. Fabricate cleats and attachment devices of sizes as recommended by ARMA's "Residential Asphalt Roofing Manual" and asphalt shingle recommendations in NRCA's "The NRCA Roofing and Waterproofing Manual" for application, but not less than thickness of metal being secured.
- G. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use.
- H. Do not use graphite pencils to mark metal surfaces.

2.4 SLOPE ROOF SHEET METAL FABRICATIONS

- A. Apron, Step, Cricket, and Backer Flashing: Fabricate from the following materials:
 - 1. Aluminum: 0.032 inch thick.

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- B. Drip Edges: Fabricate from the following materials:
 - 1. Aluminum: 0.032 inch thick.
- C. Eave and Rake Flashing: Fabricate from the following materials:
 - 1. Aluminum: 0.032 inch thick.
- D. Vent Pipe Flashing:
 - 1. Lead: 4.0 lb/sq. ft., hard tempered.

2.5 WALL SHEET METAL FABRICATIONS

- A. Opening Flashings in Frame Construction: Fabricate head, sill, jamb, and similar flashings to extend 4 inches beyond wall openings. Form head and sill flashing with 2-inch- high, end dams. Fabricate from the following materials:
 - 1. Aluminum: 0.032 inch thick.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of the Work.
 - 1. Verify compliance with requirements for installation tolerances of substrates.
 - 2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
- B. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
 - 1. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
 - 2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
 - 3. Space cleats not more than 12 inches apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.

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4. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
 5. Install sealant tape where indicated.
 6. Torch cutting of sheet metal flashing and trim is not permitted.
 7. Do not use graphite pencils to mark metal surfaces.
- B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by SMACNA.
1. Coat back side of uncoated aluminum sheet metal flashing and trim with bituminous coating where flashing and trim will contact wood or ferrous metal.
- C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.
- D. Fastener Sizes: Use fasteners of sizes that will penetrate wood sheathing not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws.
- E. Seal joints as shown and as required for watertight construction.
1. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 deg F, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F.
 2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."

3.3 ROOF FLASHING INSTALLATION

- A. General: Install sheet metal flashing and trim to comply with performance requirements and ARMA's "Residential Asphalt Roofing Manual" and asphalt shingle recommendations in NRCA's "The NRCA Roofing and Waterproofing Manual." Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
- B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in ARMA's "Residential Asphalt Roofing Manual," according to recommendations in asphalt shingle recommendations in NRCA's "The NRCA Roofing and Waterproofing Manual" and as indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at staggered 3-inch centers.
- C. Vent Pipe Flashing: Coordinate installation of vent pipe flashing with installation of roofing and other items penetrating roof. Install flashing as follows:
1. Turn lead flashing down inside vent piping, being careful not to block vent piping with flashing.

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3.4 WALL FLASHING INSTALLATION

- A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to SMACNA recommendations and as indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.
- B. Opening Flashings in Frame Construction: Install continuous head, sill, jamb, and similar flashings to extend 4 inches beyond wall openings.

3.5 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.6 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder.
- C. Clean off excess sealants.
- D. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of installation, remove unused materials and clean finished surfaces. Maintain in a clean condition during construction.
- E. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 076200

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SECTION 07920 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Special Conditions, Special Instructions and other Division 1 Specification Sections, apply to this Section.

1.2 Submittals: In addition to Product Data, submit the following:

- A. Samples of each type and color of joint sealant required.
- B. Test reports for joint sealants evidencing compliance with requirements.

PART 2 - PRODUCTS

2.1 Sealants:

- A. General Purpose Exterior Sealant: Polyurethane or Polysulfide; ASTM C920, Grade NS; Class 25; Uses M, G, and A; single component
 - 1. Joints between concrete and other materials.
 - 2. Joints between metal frames and other materials.
 - 3. Other exterior joints for which no other sealant is indicated.
- B. General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C834; single component; paintable. Standard colors matching finished surfaces.
 - 1. Interior wall and ceiling control joints.
 - 2. Joints between door or window frames and wall surfaces.
 - 3. Other exterior joints for which no other sealant is indicated.
- C. Tile Sealant: White silicone; ASTM C920; Uses M and A; single component; mildew resistant. Omni Plus manufactured by Sonneborn.
 - 1. Joints between plumbing fixtures and floor & wall surfaces.
 - 2. Joints between kitchen & bath countertops and wall surfaces.
 - 3. Joints between gypsum wall board and tile.
- D. Acoustical Sealant: Butyl or acrylic sealant; ASTM C920; Grade NS; Class 12-1/2; Uses M and A; single component; solvent release curing; non-skinning. Tremstop Acrylic manufactured by Tremco.
 - 1. Use for concealed locations only.
 - 2. Sealant bead between top stud runner & structure and between bottom stud track & floor.
- E. Interior Floor Joint Sealant: Polyurethane, self-leveling; ASTM C920; Grade P; Class 25; Uses T, M and A; single component.
 - 1. Approved by manufacturer for wide joints up to 1-1/2 inches.

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- 2. Standard colors matching finished surfaces.
- 2.2 Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by testing and field experience.
- 2.3 Colors: Provide colors indicated for exposed joint sealants or, if not indicated, as selected by Architect from manufacturer's full range for this characteristic.
- 2.4 Accesories:
 - A. Primer: Non-staining type; recommended by sealant manufacturer to suit application.
 - B. Joint Cleaner: Non-corrosive and non-staining type; recommended by sealant manufacturer; compatible with joint forming materials.
 - C. Joint Backing: Round foam rod compatible with sealant; ASTM D1056; sponge or expanded rubber oversized 30 to 50 percent larger than joint width; Everlastic manufactured by Williams Products, Inc.
 - D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 - EXECUTION

- 3.1 General: Comply with joint sealant manufacturer's instructions for products and applications indicated.
- 3.2 Sealant Installation Standard: Comply with ASTM C 1193.
- 3.3 Acoustical Sealant Application Standard: Comply with ASTM C 919 for use of joint sealants in acoustical applications.

END OF SECTION

SECTION 09912 - PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Painting and finishing of exposed exterior items and surfaces.
2. Field painting of exposed bare electrical items.
3. Field painting of exposed bare mechanical items.
4. Painting of exposed sprinkler pipes and hangers.
5. Special epoxy coatings for use in areas noted.

B. Section does not include:

1. Prefinished items, including but not limited to, prefinished wood doors.
2. Concealed surfaces.
3. Finished metal surfaces.
4. Operating parts.

C. Related Sections:

1. Shop priming of ferrous metal: Division 5.

1.2 REFERENCES

- A. ASTM D 16 – Standard Definitions of Terms Relating to Paint, Varnish, Lacquer, and Related Products; latest edition.**

1.3 DEFINITIONS

- A. Conform to ASTM D 16 for interpretation of terms used in this section.**

1.4 SUBMITTALS

- A. Product Data:** Submit manufacturer's technical information, including paint label analysis and application instructions for each material proposed for use.

- B. Samples:** Prior to beginning work, submit samples for the Architect's review of color and texture only. Label and identify each material application and location for each coat of each finish sample.

1. Submit samples as requested by the Architect until acceptable sheen, color, and texture are achieved.
2. On 12-by 12-inch hardboard, submit 2 samples of each color and material.
3. On actual wood surfaces, submit two 4- by 8-inch samples of each wood finish specified.
4. On concrete masonry, submit two 4-inch-square samples of masonry for each type of finish and color, defining filler, prime, and finish coat.

C. Field Samples:

1. On actual surfaces, as directed by the Architect, provide full-coat finish samples until required sheen, color, and texture are obtained; simulate finished lighting conditions for review of in-place work.
2. Accepted sample may remain as part of the work.

- D. Final acceptance of colors will be from samples applied on the job.**

1.5 QUALITY ASSURANCE

- A. Single Source Responsibility:**

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1. To the maximum extent practicable, select a single manufacturer to provide all materials required by the section, using additional manufacturers to provide systems not offered by the selected principal manufacturer.
 2. For each individual system: Provide primer and other undercoat paint produced by same manufacturer as finish coat. Use only thinners approved by paint manufacturer, and use only within recommended limits.
- B. Applicator: Firm with not less than 3 years of successful experience in painting work similar in scope of work of this project.

1. Maintain throughout duration of the work a crew of painters who are fully qualified to satisfy requirements of the specifications.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials to project site in original, new, unopened packages and containers bearing the manufacturer's name and label and the following information:

1. Name or title of material.
2. Manufacturer's stock number and date of manufacture.
3. Manufacturer's name.
4. Content by volume for major pigment and vehicle constituents.
5. Thinning instructions.
6. Application instructions.
7. Color name and number.

- B. Store materials in tightly covered containers.

1. Maintain containers in a clean condition, free of foreign materials and residue.

- C. Store materials at ambient temperature of between 45 degrees F minimum and 90 degrees F maximum, in a well-ventilated area.
- D. Ensure that storage area is neat and orderly. Remove oily rags and waste daily.
- E. Take precautionary measures to prevent fire and health hazards.

1.7 PROJECT CONDITIONS

- A. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F. Maintain storage containers in a clean condition, free of foreign materials and residue.
- B. Apply waterborne paints only when temperatures of surfaces to be painted and surrounding air are between 50 and 90 deg F.
- C. Apply solvent-thinned paints only when temperatures of surfaces to be painted and surrounding air are between 45 and 95 deg F.
- D. Do not apply paint in snow, rain, fog, or mist; or when relative humidity exceeds 85 percent; or at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.
- E. Provide continuous ventilation and heating to prevent accumulation of hazardous fumes and to maintain surface and ambient temperatures above 45 degrees F for 24 hours before, during, and for 48 hours after application of finishes.

1.8 EXTRA MATERIALS

- A. Furnish extra paint materials from the same production run as the materials applied and in the quantities described below. Package with protective covering for storage and identify with labels describing contents. Deliver extra materials to Owner.

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1. Quantity: 5 percent, but not less than 1 gal. or 1 case, as appropriate, of each material and color applied.

1.9 COORDINATION

- A. General: Perform painting work in proper sequence with work of other trades to avoid damage to finished work.
- B. Primers: Provide finish coats which are compatible with prime paints used. Review other sections of these specifications in which prime paints are to be provided to ensure compatibility of total coatings system for various substrates.

1. Upon request, furnish information to other trades on characteristics of finish materials proposed for use.
2. Provide barrier coats over incompatible primers, or remove and reprime as required.
3. Notify the Architect in writing of any anticipated problems using specified coating systems with substrates primed by others.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in other Part 2 articles.
- B. Products: Subject to compliance with requirements, provide one of the products listed in other Part 2 articles.
- C. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in other Part 2 articles:
 1. Benjamin Moore & Co. (Benjamin Moore).
 2. ICI Dulux Paint Centers (ICI Dulux Paints).
 3. Kelly-Moore Paint Co. (Kelly-Moore).
 4. PPG Industries, Inc. (Pittsburgh Paints).
 5. Sherwin-Williams Co. (Sherwin-Williams).

2.2 PAINT MATERIALS, GENERAL

- A. Material Compatibility: Provide block fillers, primers, and finish-coat materials that are compatible with one another and with the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
- B. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified that are factory formulated and recommended by manufacturer for application indicated. Paint-material containers not displaying manufacturer's product identification will not be acceptable.
- C. Colors: As selected from manufacturer's full range.

2.3 PREPARATORY COATS

- A. Concrete Unit Masonry Block Filler: High-performance latex block filler of finish coat manufacturer and recommended in writing by manufacturer for use with finish coat and on substrate indicated.
- B. Exterior Primer: Exterior alkyd or latex-based primer of finish coat manufacturer and recommended in writing by manufacturer for use with finish coat and on substrate indicated.

1. Ferrous-Metal and Aluminum Substrates: Rust-inhibitive metal primer.

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2. Zinc-Coated Metal Substrates: Galvanized metal primer.
 3. Where manufacturer does not recommend a separate primer formulation on substrate indicated, use paint specified for finish coat.
- C. Interior Primer: Interior latex-based or alkyd primer of finish coat manufacturer and recommended in writing by manufacturer for use with finish coat and on substrate indicated.
1. Ferrous-Metal Substrates: Quick drying, rust-inhibitive metal primer.
 2. Zinc-Coated Metal Substrates: Galvanized metal primer.
 3. Where manufacturer does not recommend a separate primer formulation on substrate indicated, use paint specified for finish coat.
- D. Mildewcide Paint Additive: Stay-Clean I/E or similar EPA registered fungicide product designed to provide long-lasting protection against mold & mildew on most standard latex and oil-based paints
1. Active Ingredients: 2-(4-thiazolyn-benzimidazole)

2.4 EXTERIOR FINISH COATS

- A. Exterior Semigloss Acrylic Enamel:
1. Benjamin Moore; Moorcraft Super Spec Latex House & Trim Paint No. 170.
 2. ICI Dulux Paints; 2406-XXXX Dulux Professional Exterior 100 Percent Acrylic Semi-Gloss Finish.
 3. Kelly-Moore; 1250 Acry-Lustre Exterior Semi-Gloss Acrylic Finish.
 4. Pittsburgh Paints; 6-900 Series SpeedHide Exterior House & Trim Semi-Gloss Acrylic Latex Paint.
 5. Sherwin-Williams; A-100 Latex Gloss A8 Series.

2.5 INTERIOR FINISH COATS

- A. Interior Semigloss Acrylic Enamel:
1. Benjamin Moore; Moorcraft Super Spec Latex Semi-Gloss Enamel No. 276.
 2. ICI Dulux Paints; 1406-XXXX Dulux Professional Acrylic Semi-Gloss Interior Wall & Trim Enamel.
 3. Kelly-Moore; 1649 Acrylic-Latex Semi-Gloss Enamel.
 4. Kelly-Moore; 1685 Dura-Poxy Semi-Gloss Acrylic Enamel.
 5. Pittsburgh Paints; 6-500 Series SpeedHide Interior Semi-Gloss Latex.
 6. Sherwin-Williams; ProMar 200 Interior Latex Semi-Gloss Enamel B31W200 Series.
- B. Interior Semigloss Alkyd Enamel:
1. Benjamin Moore; Moorcraft Super Spec Alkyd Semi-Gloss Enamel No. 271.
 2. ICI Dulux Paints; 1516-XXXX Ultra-Hide Alkyd Semi-Gloss Interior Wall & Trim Enamel.
 3. Kelly-Moore; 1630--Kel-Cote Interior Alkyd Semi-Gloss Enamel.
 4. Pittsburgh Paints; 6-1110 Series SpeedHide Interior Enamel Wall & Trim Semi-Gloss Oil.
 5. Sherwin-Williams; ProMar 200 Interior Alkyd Semi-Gloss Enamel B34W200 Series.
- C. Interior Full-Gloss Alkyd Enamel for Wood and Metal Surfaces:
1. Benjamin Moore; Moore's IMC Urethane Alkyd Enamel No. M22.
 2. ICI Dulux Paints; 4308-XXXX Devguard Alkyd Industrial Gloss Enamel.
 3. Kelly-Moore; 1630--Kel-Cote Interior Alkyd Semi-Gloss Enamel.
 4. Pittsburgh Paints; 7-814 Series Pittsburgh Paints Industrial Gloss-Oil Interior/Exterior Enamel.
 5. Sherwin-Williams; ProMar 200 Alkyd Gloss Enamel B35W200 Series.

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PART 3 - EXECUTION

3.1 APPLICATION

- A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for paint application.
- B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.
- C. Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible because of size or weight of the item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.
- D. Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified.
 - 1. Provide barrier coats over incompatible primers or remove and reprime.
 - 2. Cementitious Materials: Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen as required to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods of surface preparation.
 - 3. Wood: Clean surfaces of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sand surfaces exposed to view smooth and dust off.
 - a. Scrape and clean small, dry, seasoned knots, and apply a thin coat of white shellac or other recommended knot sealer before applying primer. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sand smooth when dried.
 - b. Prime, stain, or seal wood to be painted immediately on delivery. Prime edges, ends, faces, undersides, and back sides of wood, including cabinets, counters, cases, and paneling.
 - c. If transparent finish is required, backprime with spar varnish.
 - d. Backprime paneling on interior partitions where masonry, plaster, or other wet wall construction occurs on back side.
 - e. Seal tops, bottoms, and cutouts of unprimed wood doors with a heavy coat of varnish or sealer immediately on delivery.
 - 4. Ferrous Metals: Clean ungalvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with SSPC's recommendations.
 - a. Blast steel surfaces clean as recommended by paint system manufacturer and according to SSPC-SP 6/NACE No. 3.
 - b. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.
 - c. Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by paint manufacturer, and touch up with same primer as the shop coat.

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5. Galvanized Surfaces: Clean galvanized surfaces with nonpetroleum-based solvents so surface is free of oil and surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.
- E. Material Preparation:
 1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
 2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
- F. Exposed Surfaces: Include areas visible when permanent or built-in fixtures, grilles, convactor covers, covers for finned-tube radiation, and similar components are in place. Extend coatings in these areas, as required, to maintain system integrity and provide desired protection.
 1. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 2. Paint interior surfaces of ducts with a flat, nonspecular black paint where visible through registers or grilles.
 3. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.
 4. Finish exterior doors on tops, bottoms, and side edges the same as exterior faces.
 5. Finish interior of wall and base cabinets and similar field-finished casework to match exterior.
- G. Sand lightly between each succeeding enamel or varnish coat.
- H. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
 1. Omit primer over metal surfaces that have been shop primed and touchup painted.
 2. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance.
- I. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.
- J. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate. Provide total dry film thickness of the entire system as recommended by manufacturer.
- K. Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to items exposed in equipment rooms and occupied spaces.
- L. Block Fillers: Apply block fillers to concrete masonry block at a rate to ensure complete coverage with pores filled.
- M. Prime Coats: Before applying finish coats, apply a prime coat, as recommended by manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn-through or other defects due to insufficient sealing.
- N. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.

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- O. Transparent (Clear) Finishes: Use multiple coats to produce a glass-smooth surface film of even luster. Provide a finish free of laps, runs, cloudiness, color irregularity, brush marks, orange peel, nail holes, or other surface imperfections.
 - P. Stipple Enamel Finish: Roll and redistribute paint to an even and fine texture. Leave no evidence of rolling, such as laps, irregularity in texture, skid marks, or other surface imperfections.
- 3.2 CLEANING AND PROTECTING
- A. At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from Project site.
 - B. Protect work of other trades, whether being painted or not, against damage from painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Architect.
 - C. Provide "Wet Paint" signs to protect newly painted finishes. After completing painting operations, remove temporary protective wrappings provided by others to protect their work.
- 1. After work of other trades is complete, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.
- 3.3 EXTERIOR PAINT SCHEDULE
- A. Concrete, Stucco, and Masonry (Other Than Concrete Unit Masonry):
 - 1. Acrylic Finish: One finish coat over a primer.
 - a. Primer: Exterior concrete and masonry primer.
 - b. Finish Coats: Exterior flat acrylic paint.
 - B. Ferrous Metal:
 - 1. Alkyd-Enamel Finish: Two finish coats over a rust-inhibitive primer.
 - a. Primer: Exterior ferrous-metal primer (not required on shop-primed items).
 - b. Finish Coats: Exterior full-gloss alkyd enamel.
 - C. Zinc-Coated Metal:
 - 1. Alkyd-Enamel Finish: Two finish coats over a galvanized metal primer.
 - a. Primer: Exterior galvanized metal primer.
 - b. Finish Coats: Exterior full-gloss alkyd enamel.
- 3.4 INTERIOR PAINT SCHEDULE
- A. Concrete and Masonry (Other Than Concrete Unit Masonry):
 - 1. Acrylic Finish: Two finish coats over a primer.
 - a. Primer: Interior concrete and masonry primer.
 - b. Finish Coats: Interior low-luster acrylic enamel .
 - B. Concrete Unit Masonry:
 - 1. Acrylic Finish: Two finish coats over a block filler.
 - a. Block Filler: Concrete unit masonry block filler.

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- b. Finish Coats: Interior low-luster acrylic enamel .
- C. Ferrous Metal:
 - 1. Alkyd-Enamel Finish: Two finish coats over a primer.
 - a. Primer: Interior ferrous-metal primer.
 - b. Finish Coats: Interior semigloss alkyd enamel.
- D. Zinc-Coated Metal:
 - 1. Alkyd-Enamel Finish: Two finish coats over a primer.
 - a. Primer: Interior zinc-coated metal primer.
 - b. Finish Coats: Interior semigloss alkyd enamel .

END OF SECTION

SECTION 107500 - FLAGPOLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes ground-mounted flagpoles made from aluminum.
- B. Owner-Furnished Material: Flags.
- C. Flag pole to accommodate Two (2) Flags.
- D. Related Sections:
 - 1. Division 26 Section "Site Lighting" for site lighting fixtures.

1.3 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Flagpole assemblies, including anchorages and supports, shall withstand the effects of gravity loads, and the following loads and stresses within limits and under conditions indicated according to the following design criteria:
 - 1. Wind Loads: 163 mph, Exposure B according to NAAMM FP 1001, "Guide Specifications for Design of Metal Flagpoles."
 - 2. Base flagpole design on polyester flags of maximum standard size suitable for use with flagpole or flag size indicated, whichever is more stringent.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, operating characteristics, fittings, accessories, and finishes for flagpoles.
- B. Shop Drawings: For flagpoles. Include plans, elevations, details, and attachments to other work. Show general arrangement, jointing, fittings, accessories, grounding, anchoring, and support.
 - 1. Include section, and details of foundation system for ground-mounted flagpoles.
- C. Delegated-Design Submittal: For flagpole assemblies indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- D. Qualification Data: For qualified professional engineer.

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1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain flagpole as complete unit, including fittings, accessories, bases, and anchorage devices, from single source from single manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. General: Spiral wrap flagpoles with heavy paper and enclose in a hard fiber tube or other protective container.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. American Flagpole; a Kearney-National Inc. company.
 - 2. Concord Industries, Inc.
 - 3. Ewing Flagpoles.
 - 4. Pole-Tech Company Inc.

2.2 FLAGPOLES

- A. Flagpole Construction, General: Construct flagpoles in one piece if possible. If more than one piece is necessary, comply with the following:
 - 1. Fabricate shop and field joints without using fasteners, screw collars, or lead caulking.
 - 2. Provide flush hairline joints using self-aligning, snug-fitting, internal sleeves.
 - 3. Provide self-aligning, snug-fitting joints.
- B. Exposed Height: 25 feet.
- C. Metal Foundation Tube: Manufacturer's standard corrugated-steel foundation tube, not less than 0.064-inch-nominal wall thickness. Provide with 3/16-inch steel bottom plate and support plate; 3/4-inch-diameter, steel ground spike; and steel centering wedges welded together. Galvanize steel after assembly. Provide loose hardwood wedges at top of foundation tube for plumbing pole.
 - 1. Provide flashing collar of same material and finish as flagpole.

2.3 FITTINGS

- A. Finial Ball: Manufacturer's standard flush-seam ball, sized as indicated or, if not indicated, to match flagpole-butt diameter.
 - 1. 0.063-inch spun aluminum, finished to match flagpole.

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- B. External Halyard: Ball-bearing, nonfouling, revolving truck assembly of cast metal with continuous 5/16-inch-diameter, braided polypropylene halyard and 9-inch cast-metal cleats with fasteners. Finish exposed metal surfaces to match flagpole.
 - 1. Provide two halyards and two cleats at each flagpole.
 - 2. Provide cast-metal cleat covers, finished to match flagpole, secured with cylinder locks.
 - 3. Provide halyard covers consisting of a 2-inch channel, 60 inches long, finished to match flagpole.
 - 4. Halyard Flag Snaps: Provide two bronze swivel snap hooks per halyard.
 - a. Provide with neoprene or vinyl covers.

2.4 MISCELLANEOUS MATERIALS

- A. Drainage Material: Crushed stone, or crushed or uncrushed gravel; coarse aggregate.
- B. Sand: ASTM C 33, fine aggregate.
- C. Elastomeric Joint Sealant: Single-component neutral- and basic-curing silicone joint sealant complying with requirements in Division 07 Section "Joint Sealants" for Use NT (nontraffic) and for Use M, G, A, and, as applicable to joint substrates indicated, for Use O.
- D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.5 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.6 ALUMINUM FINISHES

- A. Color Anodic Finish: AAMA 611, AA-M12C22A32/A34, Class II, 0.010 mm or thicker.
 - 1. Color: TBD.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, including foundation; accurate placement, pattern, orientation of anchor bolts, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

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- A. Prepare uncoated metal flagpoles that are set in foundation tubes by painting below-grade portions with a heavy coat of bituminous paint.
- B. Foundation Excavation: Excavate to neat clean lines in undisturbed soil. Remove loose soil and foreign matter from excavation and moisten earth before placing concrete. Place and compact drainage material at excavation bottom.
- C. Provide forms where required due to unstable soil conditions and for perimeter of flagpole base at grade. Secure and brace forms to prevent displacement during concreting.
- D. Place concrete, as specified in Division 03 Section "Cast-in-Place Concrete." Compact concrete in place by using vibrators. Moist-cure exposed concrete for not less than seven days or use nonstaining curing compound.
- E. Trowel exposed concrete surfaces to a smooth, dense finish, free of trowel marks, and uniform in texture and appearance. Provide positive slope for water runoff to perimeter of concrete base.

3.3 FLAGPOLE INSTALLATION

- A. General: Install flagpoles as shown and according to Shop Drawings and manufacturer's written instructions.
- B. Ground Set: Place foundation tube, center, and brace to prevent displacement during concreting. Place concrete. Plumb and level foundation tube and allow concrete to cure. Install flagpole, plumb, in foundation tube.
 - 1. Foundation Tube: Place tube seated on bottom plate between steel centering wedges and install hardwood wedges to secure flagpole in place. Place and compact sand in foundation tube and remove hardwood wedges. Seal top of foundation tube with a 2-inch layer of elastomeric joint sealant and cover with flashing collar.

END OF SECTION 107500

SECTION 260500 - COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Sleeves for raceways and cables.
 - 2. Sleeve seals.
 - 3. Grout.
 - 4. Common electrical installation requirements.

1.2 SUBMITTALS

- A. Product Data: For sleeve seals.

PART 2 - PRODUCTS

2.1 SLEEVES FOR RACEWAYS AND CABLES

- A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.
- B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- C. Sleeves for Rectangular Openings: Galvanized sheet steel.
 - 1. Minimum Metal Thickness:
 - a. For sleeve cross-section rectangle perimeter less than 50 inches and no side more than 16 inches, thickness shall be 0.052 inch.
 - b. For sleeve cross-section rectangle perimeter equal to, or more than, 50 inches and 1 or more sides equal to, or more than, 16 inches, thickness shall be 0.138 inch.

2.2 SLEEVE SEALS

- A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

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- a. Advance Products & Systems, Inc.
 - b. Calpico, Inc.
 - c. Metraflex Co.
 - d. Pipeline Seal and Insulator, Inc.
2. Sealing Elements: NBR interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
 3. Pressure Plates: Plastic. Include two for each sealing element.
 4. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.3 GROUT

- A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

PART 3 - EXECUTION

3.1 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

- A. Comply with NECA 1.
- B. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.
- C. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.
- D. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.
- E. Right of Way: Give to piping systems installed at a required slope.

3.2 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Electrical penetrations occur when raceways, cables, wireways, cable trays, or busways penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.
- B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.
- C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

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- D. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.
- E. Cut sleeves to length for mounting flush with both surfaces of walls.
- F. Extend sleeves installed in floors 2 inches above finished floor level.
- G. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and raceway or cable, unless indicated otherwise.
- H. Seal space outside of sleeves with grout for penetrations of concrete and masonry
 - 1. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.
- I. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Division 07 Section "Joint Sealants."
- J. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway and cable penetrations. Install sleeves and seal raceway and cable penetration sleeves with firestop materials. Comply with requirements in Division 07 Section "Penetration Firestopping."
- K. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.
- L. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
- M. Underground, Exterior-Wall Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch annular clear space between raceway or cable and sleeve for installing mechanical sleeve seals.

3.3 SLEEVE-SEAL INSTALLATION

- A. Install to seal exterior wall penetrations.
- B. Use type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.4 FIRESTOPPING

- A. Apply firestopping to penetrations of fire-rated floor and wall assemblies for electrical installations to restore original fire-resistance rating of assembly. Firestopping materials

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and installation requirements are specified in Division 07 Section "Penetration Firestopping."

END OF SECTION 260500

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SECTION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Building wires and cables rated 600 V and less.
 - 2. Connectors, splices, and terminations rated 600 V and less.
 - 3. Sleeves and sleeve seals for cables.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Field quality-control test reports.

1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

- A. Copper Conductors: Comply with NEMA WC 70.
- B. Conductor Insulation: Comply with NEMA WC 70 for Types THHN-THWN.
- C. Multiconductor Cable: Comply with NEMA WC 70 for metal-clad cable, Type MC with ground wire.

2.2 CONNECTORS AND SPLICES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. AFC Cable Systems, Inc.
 - 2. Hubbell Power Systems, Inc.

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3. O-Z/Gedney; EGS Electrical Group LLC.
4. 3M; Electrical Products Division.
5. Tyco Electronics Corp.

- B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

2.3 SLEEVES FOR CABLES

- A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.
- B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- C. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

- A. Feeders: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
- B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

- A. Service Entrance: Type THHN-THWN, single conductors in raceway.
- B. Exposed Feeders: Type THHN-THWN, single conductors in raceway.
- C. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspace: Type THHN-THWN, single conductors in raceway.
- D. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-THWN, single conductors in raceway.
- E. Exposed Branch Circuits, Including in Crawlspace: Type THHN-THWN, single conductors in raceway.
- F. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN, single conductors in raceway, Metal-clad cable, Type MC.
- G. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-THWN, single conductors in raceway.

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- H. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless-steel, wire-mesh, strain relief device at terminations to suit application.
- I. Class 1 Control Circuits: Type THHN-THWN, in raceway.
- J. Class 2 Control Circuits: Type THHN-THWN, in raceway.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

- A. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.
- B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- D. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
- E. Support cables according to Division 26 Sections "Hangers and Supports for Electrical Systems."
- F. Identify and color-code conductors and cables according to Division 26 Section "Identification for Electrical Systems."
- G. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
- H. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
 - 1. Use oxide inhibitor in each splice and tap conductor for aluminum conductors.
- I. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.

3.4 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."
- B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.
- C. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.
- D. Cut sleeves to length for mounting flush with both wall surfaces.

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- E. Extend sleeves installed in floors 2 inches above finished floor level.
- F. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and cable unless sleeve seal is to be installed.
- G. Seal space outside of sleeves with grout for penetrations of concrete and masonry and with approved joint compound for gypsum board assemblies.
- H. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and cable, using joint sealant appropriate for size, depth, and location of joint according to Division 07 Section "Joint Sealants."
- I. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at cable penetrations. Install sleeves and seal with firestop materials according to Division 07 Section "Penetration Firestopping."
- J. Roof-Penetration Sleeves: Seal penetration of individual cables with flexible boot-type flashing units applied in coordination with roofing work.
- K. Aboveground Exterior-Wall Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Size sleeves to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
- L. Underground Exterior-Wall Penetrations: Install cast-iron "wall pipes" for sleeves. Size sleeves to allow for 1-inch annular clear space between cable and sleeve for installing mechanical sleeve seals.

3.5 SLEEVE-SEAL INSTALLATION

- A. Install to seal underground exterior-wall penetrations.
- B. Use type and number of sealing elements recommended by manufacturer for cable material and size. Position cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.6 FIRESTOPPING

- A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Division 07 Section "Penetration Firestopping."

3.7 FIELD QUALITY CONTROL

- A. Perform tests and inspections and prepare test reports.
- B. Tests and Inspections:
 - 1. After installing conductors and cables and before electrical circuitry has been energized, test all service entrance and feeder conductors.

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2. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
 3. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each splice in cables and conductors No. 3 AWG and larger. Remove box and equipment covers so splices are accessible to portable scanner.
 - a. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each splice 11 months after date of Substantial Completion.
 - b. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
 - c. Record of Infrared Scanning: Prepare a certified report that identifies splices checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.
- C. Test Reports: Prepare a written report to record the following:
1. Test procedures used.
 2. Test results that comply with requirements.
 3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.
- D. Remove and replace malfunctioning units and retest as specified above.

END OF SECTION 260519

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SECTION 260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes methods and materials for grounding systems and equipment.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Field quality-control test reports.

1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with UL 467 for grounding and bonding materials and equipment.

PART 2 - PRODUCTS

2.1 CONDUCTORS

- A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
- B. Bare Copper Conductors:
 - 1. Solid Conductors: ASTM B 3.
 - 2. Stranded Conductors: ASTM B 8.
 - 3. Tinned Conductors: ASTM B 33.
 - 4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch in diameter.
 - 5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
 - 6. Bonding Jumper: Copper tape, braided conductors, terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
 - 7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors, terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.

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2.2 CONNECTORS

- A. Listed and labeled by a nationally recognized testing laboratory acceptable to authorities having jurisdiction for applications in which used, and for specific types, sizes, and combinations of conductors and other items connected.
- B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, bolted pressure-type, with at least two bolts.
 - 1. Pipe Connectors: Clamp type, sized for pipe.
- C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

2.3 GROUNDING ELECTRODES

- A. Ground Rods: Copper-clad 3/4 inch by 10 feet in diameter.

PART 3 - EXECUTION

3.1 APPLICATIONS

- A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger, unless otherwise indicated.
- B. Underground Grounding Conductors: Install bare copper conductor, No. 2/0 AWG minimum. Bury at least 24 inches below grade.
- C. Isolated Grounding Conductors: Green-colored insulation with continuous yellow stripe. On feeders with isolated ground, identify grounding conductor where visible to normal inspection, with alternating bands of green and yellow tape, with at least three bands of green and two bands of yellow.
- D. Conductor Terminations and Connections:
 - 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
 - 2. Underground Connections: Welded connectors, except at test wells and as otherwise indicated.
 - 3. Connections to Ground Rods at Test Wells: Bolted connectors.
 - 4. Connections to Structural Steel: Welded connectors.

3.2 EQUIPMENT GROUNDING

- A. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:
 - 1. Feeders and branch circuits.
 - 2. Lighting circuits.

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3. Receptacle circuits.
 4. Single-phase motor and appliance branch circuits.
 5. Three-phase motor and appliance branch circuits.
 6. Flexible raceway runs.
 7. Armored and metal-clad cable runs.
 8. Busway Supply Circuits: Install insulated equipment grounding conductor from grounding bus in the switchgear, switchboard, or distribution panel to equipment grounding bar terminal on busway.
 9. Computer and Rack-Mounted Electronic Equipment Circuits: Install insulated equipment grounding conductor in branch-circuit runs from equipment-area power panels and power-distribution units.
 10. X-Ray Equipment Circuits: Install insulated equipment grounding conductor in circuits supplying x-ray equipment.
- B. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers, humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.
- C. Water Heater, Heat-Tracing, and Antifrost Heating Cables: Install a separate insulated equipment grounding conductor to each electric water heater and heat-tracing cable. Bond conductor to heater units, piping, connected equipment, and components.
- D. Isolated Grounding Receptacle Circuits: Install an insulated equipment grounding conductor connected to the receptacle grounding terminal. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service, unless otherwise indicated.
- E. Isolated Equipment Enclosure Circuits: For designated equipment supplied by a branch circuit or feeder, isolate equipment enclosure from supply circuit raceway with a nonmetallic raceway fitting listed for the purpose. Install fitting where raceway enters enclosure, and install a separate insulated equipment grounding conductor. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service, unless otherwise indicated.
- F. Signal and Communication Equipment: For telephone, alarm, voice and data, and other communication equipment, provide No. 4 AWG minimum insulated grounding conductor in raceway from grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location.
1. Service and Central Equipment Locations and Wiring Closets: Terminate grounding conductor on a 1/4-by-2-by-12-inch grounding bus.
 2. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.
- G. Metal and Wood Poles Supporting Outdoor Lighting Fixtures: Install grounding electrode and a separate insulated equipment grounding conductor in addition to grounding conductor installed with branch-circuit conductors.

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3.3 INSTALLATION

- A. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- B. Ground Rods: Drive rods until tops are 2 inches below finished floor or final grade, unless otherwise indicated.
 - 1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating, if any.
 - 2. For grounding electrode system, install at least three rods spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes, and connect to the service grounding electrode conductor.
- C. Test Wells: Ground rod driven through drilled hole in bottom of handhole. Handholes are specified in Division 26 Section "Underground Ducts and Raceways for Electrical Systems," and shall be at least 12 inches deep, with cover.
 - 1. Test Wells: Install at least one test well for each service, unless otherwise indicated. Install at the ground rod electrically closest to service entrance. Set top of test well flush with finished grade or floor.
- D. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance, except where routed through short lengths of conduit.
 - 1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
 - 2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install so vibration is not transmitted to rigidly mounted equipment.
 - 3. Use exothermic-welded connectors for outdoor locations, but if a disconnect-type connection is required, use a bolted clamp.
- E. Grounding and Bonding for Piping:
 - 1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes, using a bolted clamp connector or by bolting a lug-type connector to a pipe flange, using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
 - 2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
 - 3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.
- F. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install bonding jumper to bond across flexible duct connections to achieve continuity.

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3.4 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections and prepare test reports:
 - 1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
 - 2. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, and at ground test wells.
 - a. Measure ground resistance not less than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
 - b. Perform tests by fall-of-potential method according to IEEE 81.
- B. Report measured ground resistances that exceed the following values:
 - 1. Power and Lighting Equipment or System with Capacity 500 kVA and Less: 10 ohms.
 - 2. Power and Lighting Equipment or System with Capacity 500 to 1000 kVA: 5 ohms.
 - 3. Power and Lighting Equipment or System with Capacity More Than 1000 kVA: 3 ohms.
 - 4. Power Distribution Units or Panelboards Serving Electronic Equipment: 1 ohm(s).
- C. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

END OF SECTION 260526

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SECTION 260533 - RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.
- B. See Division 26 Section "Underground Ducts and Raceways for Electrical Systems" for exterior ductbanks and manholes, and underground handholes, boxes, and utility construction.

1.2 SUBMITTALS

- A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.
- B. Shop Drawings: For custom enclosures and cabinets. Include plans, elevations, sections, details, and attachments to other work.

1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 METAL CONDUIT AND TUBING

- A. Rigid Steel Conduit: ANSI C80.1.
- B. IMC: ANSI C80.6.
- C. EMT: ANSI C80.3.
- D. FMC: Zinc-coated steel.
- E. LFMC: Flexible steel conduit with PVC jacket.
- F. Fittings for Conduit (Including all Types and Flexible and Liquidtight), EMT, and Cable: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.

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1. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886.
2. Fittings for EMT: Steel, set-screw type.

2.2 NONMETALLIC CONDUIT AND TUBING

- A. ENT: NEMA TC 13.
- B. RNC: NEMA TC 2, Type EPC-40-PVC, unless otherwise indicated.
- C. LFNC: UL 1660.
- D. Fittings for ENT and RNC: NEMA TC 3; match to conduit or tubing type and material.
- E. Fittings for LFNC: UL 514B.

2.3 METAL WIREWAYS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Cooper B-Line, Inc.
 2. Hoffman.
 3. Square D; Schneider Electric.
- C. Description: Sheet metal sized and shaped as indicated, NEMA 250, Type 1, 3R, unless otherwise indicated.
- D. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.
- E. Wireway Covers: Hinged , Screw-cover or Flanged-and-gasketed type.
- F. Finish: Manufacturer's standard enamel finish.

2.4 NONMETALLIC WIREWAYS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Hoffman.
 2. Lamson & Sessions; Carlon Electrical Products.

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- C. Description: PVC plastic, extruded and fabricated to size and shape indicated, with snap-on cover and mechanically coupled connections with plastic fasteners.
- D. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

2.5 SURFACE RACEWAYS

- A. Surface Metal Raceways: Galvanized steel with snap-on covers. Manufacturer's standard enamel finish in color selected by Architect.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Walker Systems, Inc.; Wiremold Company (The).
 - b. Wiremold Company (The); Electrical Sales Division.

2.6 BOXES, ENCLOSURES, AND CABINETS

- A. Sheet Metal Outlet and Device Boxes: NEMA OS 1.
- B. Cast-Metal Outlet and Device Boxes: NEMA FB 1, aluminum, Type FD, with gasketed cover.
- C. Nonmetallic Outlet and Device Boxes: NEMA OS 2.
- D. Metal Floor Boxes: Cast or sheet metal, fully adjustable, rectangular.
- E. Nonmetallic Floor Boxes: Nonadjustable, round.
- F. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- G. Cast-Metal Access, Pull, and Junction Boxes: NEMA FB 1, cast aluminum with gasketed cover.
- H. Hinged-Cover Enclosures: NEMA 250, Type 1, with continuous-hinge cover with flush latch, unless otherwise indicated.
 - 1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
 - 2. Nonmetallic Enclosures: Plastic.
- I. Cabinets:
 - 1. NEMA 250, Type 1, galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
 - 2. Hinged door in front cover with flush latch and concealed hinge.
 - 3. Key latch to match panelboards.
 - 4. Metal barriers to separate wiring of different systems and voltage.
 - 5. Accessory feet where required for freestanding equipment.

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PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

- A. Outdoors: Apply raceway products as specified below, unless otherwise indicated:
 - 1. Exposed Conduit: Rigid steel conduit, IMC.
 - 2. Concealed Conduit, Aboveground: Rigid steel conduit, IMC.
 - 3. Underground Conduit: RNC, Type EPC-40 PVC, direct buried.
 - 4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
 - 5. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.
- B. Comply with the following indoor applications, unless otherwise indicated:
 - 1. Exposed, Not Subject to Physical Damage: EMT.
 - 2. Exposed, Not Subject to Severe Physical Damage: EMT.
 - 3. Exposed and Subject to Severe Physical Damage: Rigid steel conduit, IMC. Includes raceways in the following locations:
 - a. Loading dock.
 - b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
 - c. Mechanical rooms.
 - 4. Concealed in Ceilings and Interior Walls and Partitions: EMT.
 - 5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
 - 6. Damp or Wet Locations: Rigid steel conduit, IMC.
 - 7. Raceways for Optical Fiber or Communications Cable: EMT.
 - 8. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4, nonmetallic in damp or wet locations.
- C. Minimum Raceway Size: 3/4-inch trade size.
- D. Raceway Fittings: Compatible with raceways and suitable for use and location.
 - 1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.

3.2 INSTALLATION

- A. Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or in this Article are stricter.
- B. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- C. Complete raceway installation before starting conductor installation.

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- D. Support raceways as specified in Division 26 Section "Hangers and Supports for Electrical Systems."
- E. Arrange stub-ups so curved portions of bends are not visible above the finished slab.
- F. Install no more than the equivalent of three 90-degree bends in any conduit run except for communications conduits, for which fewer bends are allowed.
- G. Conceal conduit and EMT within finished walls, ceilings, and floors, unless otherwise indicated.
- H. Raceways Embedded in Slabs:
 - 1. Run conduit larger than 1-inch trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support.
 - 2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
 - 3. Change from ENT to RNC, Type EPC-40-PVC, rigid steel conduit, or IMC before rising above the floor.
- I. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.
- J. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire.
- K. Raceways for Optical Fiber and Communications Cable: Install as follows:
 - 1. 3/4-Inch Trade Size and Smaller: Install raceways in maximum lengths of 50 feet.
 - 2. 1-Inch Trade Size and Larger: Install raceways in maximum lengths of 75 feet.
 - 3. Install with a maximum of two 90-degree bends or equivalent for each length of raceway unless Drawings show stricter requirements. Separate lengths with pull or junction boxes or terminations at distribution frames or cabinets where necessary to comply with these requirements.
- L. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:
 - 1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
 - 2. Where otherwise required by NFPA 70.
- M. Expansion-Joint Fittings for RNC: Install in each run of aboveground conduit that is located where environmental temperature change may exceed 30 deg F, and that has straight-run length that exceeds 25 feet.
 - 1. Install expansion-joint fittings for each of the following locations, and provide type and quantity of fittings that accommodate temperature change listed for location:
 - a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F temperature change.

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- b. Indoor Spaces: Connected with the Outdoors without Physical Separation: 125 temperature change.
 - c. Attics: 135 deg F temperature change.
 - 2. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F of temperature change.
 - 3. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at the time of installation.
 - N. Flexible Conduit Connections: Use maximum of 72 inches of flexible conduit for recessed and semirecessed lighting fixtures, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
 - 1. Use LFMC in damp or wet locations subject to severe physical damage.
 - 2. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.
 - O. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall.
 - P. Set metal floor boxes level and flush with finished floor surface.
 - Q. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.
- ### 3.3 INSTALLATION OF UNDERGROUND CONDUIT
- A. Direct-Buried Conduit:
 - 1. Excavate trench bottom to provide firm and uniform support for conduit. Prepare trench bottom as specified in Division 31 Section "Earth Moving" for pipe less than 6 inches in nominal diameter.
 - 2. Install backfill as specified in Division 31 Section "Earth Moving."
 - 3. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction as specified in Division 31 Section "Earth Moving."
 - 4. Install manufactured duct elbows for stub-ups at poles and equipment and at building entrances through the floor, unless otherwise indicated. Encase elbows for stub-up ducts throughout the length of the elbow.
 - 5. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through the floor.
 - a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches of concrete.
 - b. For stub-ups at equipment mounted on outdoor concrete bases, extend steel conduit horizontally a minimum of 60 inches from edge of equipment pad or foundation. Install insulated grounding bushings on terminations at equipment.

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6. Warning Planks: Bury warning planks approximately 12 inches above direct-buried conduits, placing them 24 inches o.c. Align planks along the width and along the centerline of conduit.

3.4 FIRESTOPPING

- A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 07 Section "Penetration Firestopping."

END OF SECTION 260533

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SECTION 262726 - WIRING DEVICES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Receptacles, receptacles with integral GFCI, and associated device plates.
 - 2. Wall-box motion sensors.
 - 3. Toggle switches and wall-box dimmers.
 - 4. Solid-state fan speed controls.
 - 5. Wall-switch and exterior occupancy sensors.
 - 6. Communications outlets.
- B. See Division 27 Section "Communications Horizontal Cabling" for workstation outlets.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: List of legends and description of materials and process used for premarking wall plates.
- C. Operation and Maintenance Data: For wiring devices to include in all manufacturers' packing label warnings and instruction manuals that include labeling conditions.

1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in other Part 2 articles:
 - 1. Hubbell Incorporated; Wiring Device-Kellems (Hubbell).
 - 2. Pass & Seymour/Legrand; Wiring Devices & Accessories (Pass & Seymour).

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2.2 STRAIGHT BLADE RECEPTACLES

- A. Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 configuration 5-20R, and UL 498.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Hubbell; HBL5351 (single), CR5352 (duplex).
 - b. Pass & Seymour; 5381 (single), 5352 (duplex).

2.3 GFCI RECEPTACLES

- A. General Description: Straight blade, non-feed-through type. Comply with NEMA WD 1, NEMA WD 6, UL 498, and UL 943, Class A, and include indicator light that is lighted when device is tripped.
- B. Duplex GFCI Convenience Receptacles, 125 V, 20 A:
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Pass & Seymour; 2084.

2.4 TOGGLE SWITCHES

- A. Comply with NEMA WD 1 and UL 20.
- B. Switches, 120/277 V, 20 A:
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Hubbell; CS1221 (single pole), CS1222 (two pole), CS1223 (three way), CS1224 (four way).
 - b. Pass & Seymour; 20AC1 (single pole), 20AC2 (two pole), 20AC3 (three way), 20AC4 (four way).
- C. Pilot Light Switches, 20 A:
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Hubbell; HPL1221PL for 120 V and 277 V.
 - b. Pass & Seymour; PS20AC1-PLR for 120 V.
 - 2. Description: Single pole, with neon-lighted handle, illuminated when switch is "ON."
- D. Key-Operated Switches, 120/277 V, 20 A:
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Hubbell; HBL1221L.
 - b. Pass & Seymour; PS20AC1-L.
 - 2. Description: Single pole, with factory-supplied key in lieu of switch handle.
- E. Single-Pole, Double-Throw, Momentary Contact, Center-Off Switches, 120/277 V, 20 A; for use with mechanically held lighting contactors.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Hubbell; HBL1557.
 - b. Pass & Seymour; 1251.

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- F. Key-Operated, Single-Pole, Double-Throw, Momentary Contact, Center-Off Switches, 120/277 V, 20 A; for use with mechanically held lighting contactors, with factory-supplied key in lieu of switch handle.

- 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Hubbell; HBL1557L.
 - b. Pass & Seymour; 1251L.

2.5 WALL-BOX DIMMERS

- A. Dimmer Switches: Modular, full-wave, solid-state units with integral, quiet on-off switches, with audible frequency and EMI/RFI suppression filters.
- B. Control: Continuously adjustable slider/toggle switch; with single-pole or three-way switching. Comply with UL 1472.
- C. Lamp Dimmer Switches: Modular; compatible with dimmer ballasts/drivers; trim potentiometer to adjust low-end dimming; dimmer-ballast combination capable of consistent dimming with low end not greater than 10 percent of full brightness.

2.6 FAN SPEED CONTROLS

- A. Modular, 120-V, full-wave, solid-state units with integral, quiet on-off switches and audible frequency and EMI/RFI filters. Comply with UL 1917.
 - 1. Three-speed adjustable rotary knob, 1.5 A.

2.7 OCCUPANCY SENSORS

- A. Wall-Switch Sensors:
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Hubbell; WS1277.
 - b. Pass & Seymour; WS3000.
 - c. Watt Stopper (The); WS-200.
 - 2. Description: Passive-infrared type, 120/277 V, adjustable time delay up to 30 minutes, 180-degree field of view, with a minimum coverage area of 900 sq. ft..
- B. Long-Range Wall-Switch Sensors:
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Watt Stopper (The); DT-200.
 - 2. Description: Dual technology, with both passive-infrared- and ultrasonic-type sensing, 120/277 V, adjustable time delay up to 30 minutes, 110-degree field of view, and a minimum coverage area of 1200 sq. ft..
- C. Wide-Range Wall-Switch Sensors:
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Watt Stopper (The); CX-100-3.

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2. Description: Passive-infrared type, 120/277 V, adjustable time delay up to 30 minutes, 150-degree field of view, with a minimum coverage area of 1200 sq. ft..

2.8 COMMUNICATIONS OUTLETS

2.9 WALL PLATES

- A. Single and combination types to match corresponding wiring devices.
 1. Plate-Securing Screws: Metal with head color to match plate finish.
 2. Material for Finished Spaces: 0.035-inch- thick, satin-finished stainless steel.
 3. Material for Unfinished Spaces: Galvanized steel
 4. Material for Damp Locations: Cast aluminum with spring-loaded lift cover, and listed and labeled for use in "wet locations."
- B. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with type 3R weather-resistant, die-cast aluminum with lockable cover.

2.10 FLOOR SERVICE FITTINGS

- A. Type: Modular, flush-type, dual-service units suitable for wiring method used.
- B. Compartments: Barrier separates power from voice and data communication cabling.
- C. Service Plate: Rectangular, solid brass with satin finish.
- D. Power Receptacle: NEMA WD 6 configuration 5-20R, gray finish, unless otherwise indicated.
- E. Voice and Data Communication Outlet: Two modular, keyed, color-coded, RJ-45 Category 5e jacks for UTP cable.

2.11 FINISHES

- A. Color: Wiring device catalog numbers in Section Text do not designate device color.
 1. Wiring Devices Connected to Normal Power System: As selected by Architect, unless otherwise indicated or required by NFPA 70 or device listing.
 2. Wiring Devices Connected to Emergency Power System: Red.
 3. TVSS Devices: Blue.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with NECA 1, including the mounting heights listed in that standard, unless otherwise noted.

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B. Coordination with Other Trades:

1. Take steps to insure that devices and their boxes are protected. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of the boxes.
2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.
4. Install wiring devices after all wall preparation, including painting, is complete.

C. Conductors:

1. Do not strip insulation from conductors until just before they are spliced or terminated on devices.
2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
3. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.
4. Existing Conductors:
 - a. Cut back and pigtail, or replace all damaged conductors.
 - b. Straighten conductors that remain and remove corrosion and foreign matter.
 - c. Pigtailling existing conductors is permitted provided the outlet box is large enough.

D. Device Installation:

1. Replace all devices that have been in temporary use during construction or that show signs that they were installed before building finishing operations were complete.
2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
4. Connect devices to branch circuits using pigtails that are not less than 6 inches in length.
5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, 2/3 to 3/4 of the way around terminal screw.
6. Use a torque screwdriver when a torque is recommended or required by the manufacturer.
7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
8. Tighten unused terminal screws on the device.
9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device mounting screws in yokes, allowing metal-to-metal contact.

E. Receptacle Orientation:

1. Install ground pin of vertically mounted receptacles up, and on horizontally mounted receptacles to the right.

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- F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.
- G. Dimmers:
 - 1. Install dimmers within terms of their listing.
 - 2. Verify that dimmers used for fan speed control are listed for that application.
 - 3. Install unshared neutral conductors on line and load side of dimmers according to manufacturers' device listing conditions in the written instructions.
- H. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.

3.2 IDENTIFICATION

- A. Comply with Division 26 Section "Identification for Electrical Systems."
 - 1. Receptacles: Identify panelboard and circuit number from which served. Use engraved machine printing with black-filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.

3.3 FIELD QUALITY CONTROL

- A. Perform tests and inspections and prepare test reports.
 - 1. Test Instruments: Use instruments that comply with UL 1436.
 - 2. Test Instrument for Convenience Receptacles: Digital wiring analyzer with digital readout or illuminated LED indicators of measurement.
- B. Tests for Convenience Receptacles:
 - 1. Line Voltage: Acceptable range is 105 to 132 V.
 - 2. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is not acceptable.
 - 3. Ground Impedance: Values of up to 2 ohms are acceptable.
 - 4. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
 - 5. Using the test plug, verify that the device and its outlet box are securely mounted.
 - 6. The tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new, and retest as specified above.

END OF SECTION 262726

SECTION 265600 - EXTERIOR LIGHTING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Exterior luminaires with lamps and ballasts.
 - 2. Luminaire-mounted photoelectric relays.
 - 3. Poles and accessories.
- B. See Division 26 Section "Interior Lighting" for exterior luminaires normally mounted on exterior surfaces of buildings.

1.2 STRUCTURAL ANALYSIS CRITERIA FOR POLE SELECTION

- A. Dead Load: Weight of luminaire and its horizontal and vertical supports and supporting structure, applied as stated in AASHTO LTS-4.
- B. Wind Load: Pressure of wind on pole and luminaire, calculated and applied as stated in AASHTO LTS-4.
 - 1. Wind speed for calculating wind load for poles 50 feet or less in height is 140 mph.

1.3 SUBMITTALS

- A. Product Data: For each luminaire, pole, and support component, arranged in order of lighting unit designation. Include data on features, accessories, and finishes.
- B. Shop Drawings: Include anchor-bolt templates keyed to specific poles and certified by manufacturer.

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with IEEE C2, "National Electrical Safety Code."
- C. Comply with NFPA 70.

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PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Refer to fixture schedule located in plans.
 - 1. Basis of Design Product: The design of each item of exterior luminaire and its support is based on the product named. Subject to compliance with requirements, provide either the named product or a prior approved comparable product.

2.2 LUMINAIRES, GENERAL REQUIREMENTS

- A. Luminaires shall comply with UL 1598 and be listed and labeled for installation in wet locations by an NRTL acceptable to authorities having jurisdiction.
- B. Comply with IESNA RP-8 for parameters of lateral light distribution patterns indicated for luminaires.
- C. Metal Parts: Free of burrs and sharp corners and edges.
- D. Sheet Metal Components: Corrosion-resistant aluminum, unless otherwise indicated. Form and support to prevent warping and sagging.
- E. Housings: Rigidly formed, weather- and light-tight enclosures that will not warp, sag, or deform in use. Provide filter/breather for enclosed luminaires.
- F. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position. Doors shall be removable for cleaning or replacing lenses. Designed to disconnect ballast when door opens.
- G. Exposed Hardware Material: Stainless steel.
- H. Plastic Parts: High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
- I. Light Shields: Metal baffles, factory installed and field adjustable, arranged to block light distribution to indicated portion of normally illuminated area or field.
- J. Reflecting surfaces shall have minimum reflectance as follows, unless otherwise indicated:
 - 1. White Surfaces: 85 percent.
 - 2. Specular Surfaces: 83 percent.
 - 3. Diffusing Specular Surfaces: 75 percent.
- K. Lenses and Refractors Gaskets: Use heat- and aging-resistant resilient gaskets to seal and cushion lenses and refractors in luminaire doors.

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- L. Luminaire Finish: Manufacturer's standard paint applied to factory-assembled and -tested luminaire before shipping. Where indicated, match finish process and color of pole or support materials.
- M. Factory-Applied Finish for Aluminum Luminaires: Color shall be dark bronze. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

2.3 POLES AND SUPPORT COMPONENTS, GENERAL REQUIREMENTS

- A. Structural Characteristics: Comply with AASHTO LTS-4.
 - 1. Wind-Load Strength of Poles: Adequate at indicated heights above grade without failure, permanent deflection, or whipping in steady winds of speed indicated in Part 1 "Structural Analysis Criteria for Pole Selection" Article, with a gust factor of 1.3.
 - 2. Strength Analysis: For each pole, multiply the actual equivalent projected area of luminaires and brackets by a factor of 1.1 to obtain the equivalent projected area to be used in pole selection strength analysis.
- B. Luminaire Attachment Provisions: Comply with luminaire manufacturers' mounting requirements. Use stainless-steel fasteners and mounting bolts, unless otherwise indicated.
- C. Mountings, Fasteners, and Appurtenances: Corrosion-resistant items compatible with support components.
 - 1. Materials: Shall not cause galvanic action at contact points.
 - 2. Anchor Bolts, Leveling Nuts, Bolt Caps, and Washers: Hot-dip galvanized after fabrication, unless stainless-steel items are indicated.
 - 3. Anchor-Bolt Template: Plywood or steel.
- D. Concrete Pole Foundations: Cast in place, with anchor bolts to match pole-base flange. Concrete, reinforcement, and formwork are specified in Division 03 Section "Cast-in-Place Concrete."

2.4 ALUMINUM POLES

- A. Poles: Seamless, extruded structural tube complying with ASTM B 429, Alloy 6063-T6 with access handhole in pole wall.
- B. Pole-Top Tenons: Fabricated to support luminaire or luminaires and brackets indicated, and securely fastened to pole top.
- C. Grounding and Bonding Lugs: Welded 1/2-inch threaded lug, complying with requirements in Division 26 Section "Grounding and Bonding for Electrical Systems," listed for attaching grounding and bonding conductors of type and size listed in that Section, and accessible through handhole.
- D. Brackets for Luminaires: Detachable, with pole and adapter fittings of cast aluminum. Adapter fitting welded to pole and bracket, then bolted together with stainless-steel bolts.

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1. Tapered oval cross section, with straight tubular end section to accommodate luminaire.
2. Finish: Same as luminaire.

E. Prime-Coat Finish: Manufacturer's standard prime-coat finish ready for field painting.

F. Aluminum Finish: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Color shall be as selected by Architect from manufacturer's full range.

2.5 POLE ACCESSORIES

A. Base Covers: Manufacturers' standard metal units, arranged to cover pole's mounting bolts and nuts. Finish same as pole.

PART 3 - EXECUTION

3.1 LUMINAIRE INSTALLATION

- A. Install lamps in each luminaire.
- B. Fasten luminaire to indicated structural supports.
- C. Adjust luminaires that require field adjustment or aiming. Include adjustment of photoelectric device to prevent false operation of relay by artificial light sources.

3.2 POLE INSTALLATION

- A. Align pole foundations and poles for optimum directional alignment of luminaires and their mounting provisions on the pole.
- B. Clearances: Maintain the following minimum horizontal distances of poles from surface and underground features, unless otherwise indicated on Drawings:
 1. Fire Hydrants and Storm Drainage Piping: 60 inches.
 2. Water, Gas, Electric, Communication, and Sewer Lines: 10 feet.
 3. Trees: 15 feet.
- C. Concrete Pole Foundations: Set anchor bolts according to anchor-bolt templates furnished by pole manufacturer. Concrete materials, installation, and finishing requirements are specified in Division 03 Section "Cast-in-Place Concrete."
- D. Foundation-Mounted Poles: Mount pole with leveling nuts, and tighten top nuts to torque level recommended by pole manufacturer.
 1. Grout void between pole base and foundation. Use nonshrink or expanding concrete grout firmly packed to fill space.
 2. Install base covers, unless otherwise indicated.
 3. Use a short piece of 1/2-inch- diameter pipe to make a drain hole through grout. Arrange to drain condensation from interior of pole.

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- E. Poles and Pole Foundations Set in Concrete Paved Areas: Install poles with minimum of 6-inch- wide, unpaved gap between the pole or pole foundation and the edge of adjacent concrete slab. Fill unpaved ring with pea gravel to a level 1 inch below top of concrete slab.
- F. Raise and set poles using web fabric slings (not chain or cable).

3.3 BOLLARD LUMINAIRE INSTALLATION

- A. Align units for optimum directional alignment of light distribution.
- B. Install on concrete base with top 4 inches above finished grade or surface at bollard location. Cast conduit into base, and shape base to match shape of bollard base. Finish by troweling and rubbing smooth. Concrete materials, installation, and finishing are specified in Division 03 Section "Cast-in-Place Concrete."

3.4 INSTALLATION OF INDIVIDUAL GROUND-MOUNTING LUMINAIRES

- A. Install on concrete base with top 4 inches above finished grade or surface at luminaire location. Cast conduit into base, and finish by troweling and rubbing smooth. Concrete materials, installation, and finishing are specified in Division 03 Section "Cast-in-Place Concrete."

3.5 CORROSION PREVENTION

- A. Aluminum: Do not use in contact with earth or concrete. When in direct contact with a dissimilar metal, protect aluminum by insulating fittings or treatment.
- B. Steel Conduits: Comply with Division 26 Section "Raceway and Boxes for Electrical Systems." In concrete foundations, wrap conduit with 0.010-inch- thick, pipe-wrapping plastic tape applied with a 50 percent overlap.

3.6 GROUNDING

- A. Ground metal poles and support structures according to Division 26 Section "Grounding and Bonding for Electrical Systems."
 - 1. Install grounding electrode for each pole, unless otherwise indicated.
 - 2. Install grounding conductor pigtail in the base for connecting luminaire to grounding system.
- B. Ground nonmetallic poles and support structures according to Division 26 Section "Grounding and Bonding for Electrical Systems."
 - 1. Install grounding electrode for each pole.
 - 2. Install grounding conductor and conductor protector.
 - 3. Ground metallic components of pole accessories and foundations.

END OF SECTION 265600

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SECTION 311000 - SITE CLEARING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Protecting existing vegetation to remain.
2. Removing existing vegetation.
3. Clearing and grubbing.
4. Stripping and stockpiling topsoil.
5. Removing above- and below-grade site improvements.
6. Disconnecting, capping or sealing, removing site utilities, and abandoning site utilities in place.
7. Temporary erosion- and sedimentation-control measures.

B. Related Sections:

1. Section 201 of the Alabama Department of Transportation Standard Specification for Highway Construction, 2018 Edition.
2. Section 206 of the Alabama Department of Transportation Standard Specification for Highway Construction, 2018 Edition.

1.3 DEFINITIONS

- A. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.
- B. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil; but in disturbed areas such as urban environments, the surface soil can be subsoil.
- C. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil and is the zone where plant roots grow.
- D. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.4 MATERIAL OWNERSHIP

- A. Except for stripped topsoil and other materials indicated to be stockpiled or otherwise remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

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1.5 SUBMITTALS

- A. Existing Conditions: Documentation of existing trees and plantings, adjoining construction, and site improvements that establishes preconstruction conditions that might be misconstrued as damage caused by site clearing.
 - 1. Use sufficiently detailed photographs or videotape.
- B. Record Drawings: Identifying and accurately showing locations of capped utilities and other subsurface structural, electrical, and mechanical conditions.

1.6 PROJECT CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
 - 2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.
- B. Utility Locator Service: Notify utility locator service providers or One Call (811) for area where Project is located before site clearing.
- C. Do not commence site clearing operations until temporary erosion- and sedimentation-control measures are in place.
- D. Do not direct vehicle or equipment exhaust towards protection zones.
- E. Soil Stripping, Handling, and Stockpiling: Perform only when the topsoil is dry or slightly moist.

PART 2 - PRODUCTS - NONE

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect and maintain benchmarks and survey control points from disturbance during construction.
- B. Locate and clearly identify trees, shrubs, and other vegetation to remain. Install orange construction fencing around each tree trunk as indicated by the details provided in the construction drawings.
- C. Protect existing site improvements to remain from damage during construction.
 - 1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- A. Provide temporary erosion- and sedimentation-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings and requirements of the Alabama Department of Environmental Management.
- B. Inspect, maintain, and repair erosion- and sedimentation-control measures during construction until permanent vegetation has been established.

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- C. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.
 - D. All temporary erosion and sedimentation control measures shall be installed and maintained in accordance with the Alabama Handbook for Erosion Control, Sediment Control and Stormwater Management on Construction Sites and Urban Areas, latest edition.
- 3.3 EXISTING UTILITIES
- A. Locate, identify, disconnect, and seal or cap utilities indicated to be removed or abandoned in place.
 - 1. Arrange with utility companies to shut off indicated utilities.
 - B. Interrupting Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 - 1. Notify Owner not less than **two** days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Owner's written permission.
 - C. Excavate for and remove underground utilities indicated to be removed.
- 3.4 CLEARING AND GRUBBING
- A. Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.
 - 1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
 - 2. Grind down stumps and remove roots, obstructions, and debris to a depth of 24 inches below exposed subgrade.
 - 3. Chip removed tree branches and dispose of off-site.
 - B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.
 - 1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches, and compact each layer to a density equal to adjacent original ground.
- 3.5 TOPSOIL STRIPPING
- A. Remove sod and grass before stripping topsoil.
 - B. Strip topsoil in a manner to prevent intermingling with underlying subsoil or other waste materials.
 - C. Stockpile topsoil away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust and erosion by water.
 - 1. Limit height of topsoil stockpiles to 72 inches.
 - 2. Dispose of surplus topsoil. Surplus topsoil is that which exceeds quantity indicated to be stockpiled or reused.

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3.6 SITE IMPROVEMENTS

- A. Remove existing above- and below-grade improvements as indicated and necessary to facilitate new construction.
- B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.
 - 1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut along line of existing pavement to remain before removing adjacent existing pavement. Saw-cut faces vertically.
 - 2. Paint cut ends of steel reinforcement in concrete to remain with two coats of antirust coating, following coating manufacturer's written instructions. Keep paint off surfaces that will remain exposed.

3.7 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.

END OF SECTION 311000

SECTION 312000 - EARTH MOVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, apply to this Section.

B. The following geotechnical reports have been prepared for the subject site:

1.

1.2 SUMMARY

A. Section Includes:

1. Preparing subgrades for walks, pavements, turf and grasses, and plants.
2. Excavating and backfilling for structures.
3. Subbase course for concrete walks.
4. Subbase course and base course for asphalt paving.
5. Excavating and backfilling trenches for utilities and pits for buried utility structures.

B. Related Sections:

1. Division 31 Section "Site Clearing" for site stripping, grubbing, stripping and stockpiling topsoil, and removal of above- and below-grade improvements and utilities.
2. Division 31 Section "Excavation Support and Protection" for shoring, bracing, and sheet piling of excavations.
3. Section 230 of the Alabama Department of Transportation Standard Specification for Highway Construction, 2018 Edition.
4. Section 210 of the Alabama Department of Transportation Standard Specification for Highway Construction, 2018 Edition.

1.3 DEFINITIONS

A. Backfill: Soil material or controlled low-strength material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Aggregate layer placed between the subbase course and hot-mix asphalt paving.

C. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.

D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

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- E. Unclassified Excavation: Removal of all material encountered above subgrade elevations and to lines and dimensions indicated.
- F. Fill: Soil materials used to raise existing grades.
- G. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
- H. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.
- I. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.4 SUBMITTALS

- A. Product Data: For each type of the following manufactured products required:
 - 1. Geotextiles.
 - 2. Controlled low-strength material, including design mixture.
 - 3. Warning tapes.
- B. Samples for Verification: For the following products, in sizes indicated below:
 - 1. Geotextile: 12 by 12 inches
 - 2. Warning Tape: 12 inches long; of each color.
- C. Qualification Data: For qualified testing agency.
- D. Material Test Reports: For each borrow soil material proposed for fill and backfill as follows:
 - 1. Classification according to ASTM D 2487.
 - 2. Laboratory compaction curve according to ASTM D 698.

1.5 QUALITY ASSURANCE

- A. Geotechnical Testing Agency Qualifications: Qualified according to ASTM E 329 and ASTM D 3740 for testing indicated.

1.6 PROJECT CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth moving operations.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
 - 2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.
- B. Utility Locator Service: Notify **"811 - One Call"** for area where Project is located before beginning earth moving operations.
- C. Do not commence earth moving operations until temporary erosion- and sedimentation-control measures are in place as indicated in the construction drawings.

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PART 2 - PRODUCTS

2.1 SOIL MATERIALS

1. Reference section 3 - EXECUTION for soil materials.

2.2 GEOTEXTILES

- A. Separation Geotextile: Woven geotextile fabric, manufactured for separation applications, made from polyolefins or polyesters; with elongation less than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:

1. Survivability: Class 2; AASHTO M 288.
2. Grab Tensile Strength: 247 lbf; ASTM D 4632.
3. Sewn Seam Strength: 222 lbf; ASTM D 4632.
4. Tear Strength: 90 lbf; ASTM D 4533.
5. Puncture Strength: 90 lbf; ASTM D 4833.
6. Apparent Opening Size: No. 60 sieve, maximum; ASTM D 4751.
7. Permittivity: 0.02 per second, minimum; ASTM D 4491.
8. UV Stability: 50 percent after 500 hours' exposure; ASTM D 4355.

2.3 CONTROLLED LOW-STRENGTH MATERIAL

- A. Controlled Low-Strength Material: Self-compacting, flowable concrete material produced from the following:

1. Portland Cement: ASTM C 150, Type I.
2. Fly Ash: ASTM C 618, Class C or F.
3. Normal-Weight Aggregate: ASTM C 33, 3/8-inch nominal maximum aggregate size.
4. Air-Entraining Admixture: ASTM C 260.

- B. Produce conventional-weight, controlled low-strength material with 140-psi compressive strength when tested according to ASTM C 495.

2.4 ACCESSORIES

- A. Detectable Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:

1. Red: Electric.
2. Yellow: Gas, oil, steam, and dangerous materials.
3. Orange: Telephone and other communications.
4. Blue: Water systems.
5. Green: Sewer systems.

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PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth moving operations.
- B. Protect and maintain erosion and sedimentation controls during earth moving operations.
- C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.
- D. Protect geotextiles from sunlight per manufacturer's recommendations.

3.2 DEWATERING

- A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.
- B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
 - 1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

3.3 EXCAVATION, GENERAL

- A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.
 - 1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.
 - 2. Rock encounter during excavation shall be removed to a minimum depth of 12" below finish subgrade elevation in all areas.

3.4 EXCAVATION FOR STRUCTURES

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.

3.5 EXCAVATION FOR WALKS AND PAVEMENTS

- A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.6 EXCAVATION FOR UTILITY TRENCHES

- A. Excavate trenches to indicated gradients, lines, depths, and elevations.
- B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit unless otherwise indicated.

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1. Clearance: 12 inches each side of pipe or conduit.
- C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.
 1. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.
- 3.7 SUBGRADE INSPECTION
 - A. Notify Engineer when excavations have reached required subgrade.
 - B. If Engineer determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
 - C. Proof-roll subgrade below pavements with a pneumatic-tired and loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
 1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.
 2. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Engineer, and replace with compacted backfill or fill as directed.
 - D. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Engineer, without additional compensation.
- 3.8 STORAGE OF SOIL MATERIALS
 - A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.
- 3.9 BACKFILL
 - A. Place and compact backfill in excavations promptly, but not before completing the following:
 1. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation.
 2. Surveying locations of underground utilities for Record Documents.
 3. Testing and inspecting underground utilities if allowed by the utility with jurisdiction.
 4. Removing concrete formwork.
 5. Removing trash and debris.
 6. Removing temporary shoring and bracing, and sheeting.
 7. Installing permanent or temporary horizontal bracing on horizontally supported walls.
 - B. Place backfill on subgrades free of mud, frost, snow, or ice.

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3.10 UTILITY TRENCH BACKFILL

- A. Place backfill on subgrades free of mud, frost, snow, or ice.
- B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
- C. Trenches under Footings: Backfill trenches excavated under footings and within 18 inches of bottom of footings with satisfactory soil; fill with concrete to elevation of bottom of footings. Concrete is specified in Division 03 Section "Cast-in-Place Concrete."
- D. Trenches under Roadways: Contractor shall backfill trenches within existing roadway crossings with ALDOT #57 stone. Trenches located within proposed pavement and landscape areas shall be backfilled with approved fill material and compacted in accordance with the Geotechnical Report recommendations but not less than 98% Standard Proctor.
- E. Backfill voids with satisfactory soil while removing shoring and bracing.
- F. Place and compact initial backfill of satisfactory soil, free of particles larger than 1 inch in any dimension, to a height of 12 inches over the pipe or conduit.
 - 1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.
- G. Place and compact final backfill of satisfactory soil to final subgrade elevation.
- H. Install detectable warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs. The contractor shall review the requirements of the utility providers prior to installation of detectable warning tape to verify any changes that may have occurred following the preparation of the project specifications.

3.11 SOIL FILL

- A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- B. Place fill material in accordance with Geotechnical Engineer's recommendations.
- C. Place soil fill on subgrades free of mud, frost, snow, or ice.

3.12 SOIL MOISTURE CONTROL

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 3 percent of optimum moisture content.
 - 1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
 - 2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 3 percent.

3.13 COMPACTION OF SOIL BACKFILLS AND FILLS

- A. From existing grade to within one foot of finish earthen fill grade, fill material shall be placed in maximum loose lift thicknesses of eight (8) inches and compacted to a minimum 95 percent of the material's Standard Proctor Density and to within plus or minus two (2) percent of the material's Optimum Moisture Content in accordance with ASTM D-698, except

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that “underwater backfill” (clean sand material with less than 5 percent passing the No. 200 sieve) shall not have a specified moisture content requirement. The final 1 ft. of fill, beneath the pavement base layer, shall be compacted to a minimum of 98 percent Standard Proctor Density.

- B. As per the Basis of Design document, all fill material shall less than 30 percent passing the No. 200 sieve.
- C. Wet or soft areas may proceed with an initial lift of up to 24 inches of “underwater backfill” to be proof rolled with no specific compaction requirement so long as the bottom of the initial lift is a minimum three (3) feet below finish earthen grade.
- D. For areas where the existing ground surface consists of concrete rubble and rebar, an initial lift thickness of up to 18 inches may be placed using Underwater Backfill as previously specified. The top of this lift shall be no higher than 3 feet below finish earthen fill grade. The upper 8 inches of this layer should be compacted to a minimum of 95% Standard Proctor Density as per ASTM D698. A significant rain event, soaking this layer and allowing movement of particles into potential voids, should occur before filling on top of this layer with General Site Fill. Alternately, a water truck can be used on this layer to saturate it, allowing for particle movement prior to continued fill activities.
- E. “Underwater backfill” may be utilized to fill the trenches and pits to the existing grade, if adequate amounts of water exist or be supplied to ensure self-compaction of the underwater backfill. The “underwater backfill” should be a clean sand material with less than 5% fines (passing the No. 200 sieve). The sand may be placed for the full depth of the trench. No mechanical compaction of the sand placement is required; however, the top surface of the sand at the existing site grade should be compacted to a minimum of 95% Standard Proctor Density per ASTM D698 using vibratory equipment.
- F. The dense graded crushed aggregate base layer shall be placed in maximum compacted lift thicknesses of six (6) inches and compacted to 95 percent of the material's Modified Proctor Density and to within plus or minus two (2) percent of the material's Optimum Moisture Content in accordance with ASTM D-1557
- G. Compaction testing shall be performed at a minimum rate equivalent of equivalent to one (1) test per 10,000 Square feet of fill material placement for each lift in accordance with ASTM D-6938.

3.14 GRADING

- A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
 - 1. Provide a smooth transition between adjacent existing grades and new grades.
 - 2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
- B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within 0.10 foot of required elevations.

3.15 BASE COURSES UNDER PAVEMENTS AND WALKS

- A. Place base course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place base course under pavements as follows:
 - 1. Place base course material over subbase course under hot-mix asphalt pavement.

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2. Shape base course to required crown elevations and cross-slope grades.
3. Place base course 6 inches or less in compacted thickness in a single layer.
4. Place base course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
5. The dense graded crushed aggregate base layer shall be placed in maximum compacted lift thicknesses of six (6) inches and compacted to 95 percent of the material's Modified Proctor Density and to within plus or minus two (2) percent of the material's Optimum Moisture Content in accordance with ASTM D-1557
6. Compaction testing shall be performed at a minimum rate equivalent of equivalent to one (1) test per 10,000 Square feet of fill material placement for each lift in accordance with ASTM D-6938.

3.16 FIELD QUALITY CONTROL

- A. Refer to Construction QA/QC Plan for quality control procedures

3.17 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
 1. Scarify or remove and replace soil material to depth as directed by Engineer; reshape and compact.
- C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
 1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.18 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

END OF SECTION 312000

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SECTION 312500 – EROSION AND SEDIMENT CONTROL

PART 1 – GENERAL

1.1 SCOPE

- A. This specification covers the furnishing of all labor, material and equipment necessary to provide site erosion control as required, shown on the drawings or specified herein.
- B. This may include, but not be limited to; seeding, sodding, fences, berms, dikes, drains, netting, sand bags, wattles, etc. as specified herein.
- C. The CONTRACTOR is responsible for implementing any and all measures necessary to control erosion and sedimentation on the site in order to comply with the National Pollutant Discharge Elimination System (NPDES) rules and regulations and the Alabama Department of Environmental Management (ADEM) General Permit No ALR100000.

1.2 SUMMARY

- A. This work shall cover providing, establishing, maintaining, and installing erosion and sediment control as determined by the Contractor and approved by the Engineer or as directed by the Owner.
- B. All erosion and sediment control shall be maintained by the Contractor during the contract period, and until contract acceptance.
- C. The Contractor shall examine the site and site conditions to determine the type of equipment that may be required to complete the scope of work.
- D. Once the work has begun on a section it will be the responsibility of the Contractor to continuously control erosion and sediment that should develop during construction.
- E. The Contractor shall review all specifications included in the Contract Documents for related work referenced in but not covered by this section.

1.3 RELATED SECTIONS, REFERENCE PUBLICATIONS, CODES AND STANDARDS

- A. The editions in effect as of the date of this agreement of the following publications, codes, and standards shall be deemed part of this specification as applicable:
 - 1. USEPA, 1992, *"Storm Water Management for Construction Activities, Developing pollution Prevention Plans and Best Management Practices"*.
 - 2. Alabama Soil and Water Conservation Committee, September 2014, "Alabama Handbook for Erosion Control, Sediment Control and Stormwater Management on Construction Sites and Urban Areas"
 - 3. Alabama Department of Transportation (ALDOT) Standard Specification for Highway Construction, 2018 Edition.

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1.4 SUBMITTALS

- A. Product Data: For each type of the following manufactured products required:
 - 1. Seed Mix
 - 2. Silt Fencing
 - 3. Wattles

PART 2 – PRODUCTS

2.1 MATERIALS

- A. All required materials shall meet the requirements of Section 665 of the Alabama Department of Transportation Standard Specification for Highway Construction, 2018 Edition.
- B. Temporary pipe may be constructed of any type material which will carry water.
- C. Temporary wire fence and post may be any type fencing that will adequately serve the intended purpose as determined by the Engineer.
- D. Polypropylene sheets may be of any size or color capable of serving the intended purpose but not less than 4 mils in thickness.
- E. Hay bales may either be hay or straw containing approximately five (5) cubic feet of material.
- F. Sand bags may be of cotton or burlap which will confine the sand inside the bag and be of a volume of approximately one (1) cubic foot.
- G. Silt fences shall consist of Alabama Department of Transportation (ALDOT) silt fence or Alabama Handbook "Type A" silt fence.
- H. Wattles: A wattle is a tubular shaped or other elongated shaped sediment filter that is a manufactured product specifically produced for sediment control. It is made from interwoven biodegradable plant material such as straw, coir, or wood shavings in biodegradable or photodegradable netting. Wattles are also known as sediment logs and are designed to provide intimate contact with the soil, which prevents undermining and blowouts. They are porous and this property allows water to pass through the matrix of biodegradable plant material (straw, coir, or wood shavings) which slows velocity and filters sediment as it passes through the log. Wattles and sediment logs may be placed across channel bottoms or on slopes. Wattles used in a tidal environment should be made of coir or other matrix which is not as likely to float.

2.1 DELIVERY AND STORAGE

- A. Laydown and storage areas shall be coordinated as required for the scope of work.

PART 3 – EXECUTION

3.1 PERFORMANCE REQUIREMENTS AND WORKMANSHIP

- A. Temporary pipe will be of the size as required for the application. Special bedding requirements are not required.
- B. Temporary wire fences shall be constructed with the wire securely attached to the post.
- C. Polypropylene sheets shall be placed only in areas where water flow and silt must be contained.
- D. Sand bags shall be securely fastened when placed. The bags shall have a thickness of approximately six (6) inches.

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- E. Hay bales shall be securely anchored by the use of stakes and wire or other approved methods. Hay bales shall not be used without prior approval by the Engineer.
- F. Silt fences shall be constructed at locations as required. Field splices can be made by overlapping the fabric a minimum of one (1) feet and securely fastening the fabric to the wire fence. Contractor shall maintain the fence until the contract has been accepted.
- G. If the fabric should become damaged an additional layer of fabric can be attached with at least a one (1) foot overlap.
- H. Temporary drainage sumps or sediment basins can be constructed near the ends of drainage structures or ditches to control silting.
- I. Sumps shall be cleaned periodically by the removal of the silt to keep the sump functional.

3.2 INSPECTIONS, TESTING AND QUALITY ASSURANCE

- A. The Contractor shall be solely responsible for protecting the site from any and all erosion.
- B. If erosion does occur, the contractor shall repair all damage and provide all additionally needed top soil at the Contractor's expense.
- C. CONTRACTOR shall be responsible for all inspections, monitoring, recordkeeping and reporting as required by NPDES regulations (Chapter 335-6-12).

END OF SECTION 312500

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SECTION 315000 - EXCAVATION SUPPORT AND PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, apply to this Section.
- B. 29 CFR Part 1926 – Safety and Health Regulations for Construction, Subpart P - Excavations

1.2 SUMMARY

- A. Section includes temporary excavation support and protection systems.

1.3 PERFORMANCE REQUIREMENTS

- A. Furnish, install, monitor, and maintain excavation support and protection system capable of supporting excavation sidewalls and of resisting soil and hydrostatic pressure and superimposed and construction loads.
 - 1. Prevent surface water from entering excavations by grading, dikes, or other means.
 - 2. Install excavation support and protection systems without damaging existing buildings, structures, and site improvements adjacent to excavation.
 - 3. Monitor vibrations, settlements, and movements.

1.4 PROJECT CONDITIONS

- A. Interruption of Existing Utilities: Do not interrupt any utility serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility according to requirements indicated:
 - 1. Notify Owner and Engineer no fewer than two days in advance of proposed interruption of utility.
 - 2. Do not proceed with interruption of utility without Owner's written permission.
- B. Project-Site Information: A geotechnical report has been prepared for this Project and is available. The opinions expressed in this report are those of geotechnical engineer and represent interpretations of subsoil conditions, tests, and results of analyses conducted by geotechnical engineer. Owner will not be responsible for interpretations or conclusions drawn from the data.
 - 1. Make additional test borings and conduct other exploratory operations necessary for excavation support and protection.
 - 2. The geotechnical report is included elsewhere in the Project Manual.
- C. Survey Work: Engage a qualified land surveyor or professional engineer to survey adjacent existing buildings, structures, and site improvements; establish exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.
 - 1. During installation of excavation support and protection systems, regularly resurvey benchmarks, maintaining an accurate log of surveyed elevations and positions for comparison with original elevations and positions. Promptly notify Architect if changes

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in elevations or positions occur or if cracks, sags, or other damage is evident in adjacent construction.

PART 2 - PRODUCTS

None

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards that could develop during excavation support and protection system operations.
 - 1. Shore, support, and protect utilities encountered.
- B. Install excavation support and protection systems to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
- C. Locate excavation support and protection systems clear of permanent construction so that forming and finishing of concrete surfaces are not impeded.
- D. Monitor excavation support and protection systems daily during excavation progress and for as long as excavation remains open. Promptly correct bulges, breakage, or other evidence of movement to ensure that excavation support and protection systems remain stable.
- E. Promptly repair damages to adjacent facilities caused by installing excavation support and protection systems.

3.2 BRACING

- A. Bracing: Locate bracing to clear columns, floor framing construction, and other permanent work. If necessary to move brace, install new bracing before removing original brace.
 - 1. Do not place bracing where it will be cast into or included in permanent concrete work unless otherwise approved by Architect.
 - 2. Install internal bracing, if required, to prevent spreading or distortion of braced frames.
 - 3. Maintain bracing until structural elements are supported by other bracing or until permanent construction is able to withstand lateral earth and hydrostatic pressures.

3.3 REMOVAL AND REPAIRS

- A. Remove excavation support and protection systems when construction has progressed sufficiently to support excavation and bear soil and hydrostatic pressures. Remove in stages to avoid disturbing underlying soils or damaging structures, pavements, facilities, and utilities.
 - 1. Fill voids immediately with approved backfill compacted to density specified in Division 31 Section "Earth Moving."

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2. Repair or replace, as approved by Architect, adjacent work damaged or displaced by removing excavation support and protection systems.

END OF SECTION 315000

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SECTION 321216 - ASPHALT PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Cold milling of existing hot-mix asphalt pavement.
2. Hot-mix asphalt patching.
3. Hot-mix asphalt paving.
4. Hot-mix asphalt paving overlay.
5. Pavement-marking paint.

B. Related Sections:

1. Division 02 Section "Structure Demolition" for demolition and removal of existing asphalt pavements.
2. Division 31 Section "Earth Moving" for aggregate subbase and base courses and for aggregate pavement shoulders.
3. Division 32 Section "Concrete Paving Joint Sealants" for joint sealants and fillers at paving terminations.

1.3 DEFINITION

- A. Hot-Mix Asphalt Paving Terminology: Refer to ASTM D 8 and Alabama Department of Transportation (ALDOT) Standard Specifications for Highway Construction, 2018 Edition, for definitions of terms.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated. Include technical data and tested physical and performance properties.

1. Job-Mix Designs: For each job mix proposed for the Work as required by ALDOT Standard Specifications for Highway Construction, 2018 Edition and ALDOT Construction Manual, Latest Edition

- B. Material Certificates: For each paving material, from manufacturer.

- C. Material Test Reports: For each paving material.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A paving-mix manufacturer registered with and approved by ALDOT.

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- B. Testing Agency Qualifications: Qualified according to ASTM D 3666 for testing indicated.
- C. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements of ALDOT Standard Specifications for Highway Construction, 2018 Edition for asphalt paving work.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver pavement-marking materials to Project site in original packages with seals unbroken and bearing manufacturer's labels containing brand name and type of material, date of manufacture, and directions for storage.
- B. Store pavement-marking materials in a clean, dry, protected location within temperature range required by manufacturer. Protect stored materials from direct sunlight.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: The contractor shall install asphalt paving materials only when environmental conditions are in accordance with ALDOT Standard Specifications for Highway Construction, 2018 Edition, Sections 410 and 424.
- B. Pavement-Marking Paint: The contractor shall install pavement-marking paint only when environmental conditions are in accordance with ALDOT Standard Specifications for Highway Construction, 2018 Edition, Section 701.

PART 2 - PRODUCTS

2.1 AGGREGATES

- A. General: All aggregate materials used for asphalt paving shall be in accordance with ALDOT Standard Specifications for Highway Construction, 2018 Edition. The contractor shall provide material certifications from the manufacturer and/or provider for all materials used for this project. All course and fine aggregates furnished shall come from an approved producer who is participating in and meeting the requirements of ALDOT-249, Procedure for Acceptance of Course and Fine Aggregates.
- B. Coarse and Fine Aggregate: All aggregates used in producing asphalt paving shall be in compliance with Section 424 of the ALDOT Standard Specifications for Highway Construction, 2018 Edition.
- C. Mineral Filler: Mineral Filler shall consist of finely divided mineral matter such as rock dust, slag dust, hydrated lime, hydraulic cement, or fly ash meeting the requirements of ALDOT Standard Specifications for Highway Construction, 2018 Edition, Section 805.
- D. Base Course: Shall be a Type B, plant mixed aggregate material and shall comply with ALDOT Standard Specifications for Highway Construction, 2018 Edition, Section 825.

2.2 ASPHALT MATERIALS

- A. Asphalt Cement: All asphalt cement material shall comply with ALDOT Standard Specifications for Highway Construction, 2018 Edition, Section 410.
- B. Prime Coat: Asphalt emulsion prime coat complying with ALDOT Standard Specifications for Highway Construction, 2018 Edition, Section 401.
- C. Tack Coat: Shall comply with ALDOT Standard Specifications for Highway Construction, 2018 Edition, Section 405.
- D. Water: Potable.

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2.3 AUXILIARY MATERIALS

- A. Sand: AASHTO M 29, Grade Nos. 2 or 3.
- B. Pavement-Marking Paint: All marking paint shall comply with ALDOT Standard Specifications for Highway Construction, 2018 Edition, Section 701 for Class 1, Type B.
 - 1. Color: White - Parking Stripe
 - 2. Color: Blue - Handicap Striping and Symbols

2.4 MIXES

- A. Hot-Mix Asphalt: Dense, hot-laid, hot-mix asphalt plant mixes in accordance with ALDOT Standard Specifications for Highway Construction, 2018 Edition, Section 424 and complying with the following requirements:
 - 1. Binder Course: Superpave Bituminous Concrete Upper Binder Layer, 3/4" Maximum Aggregate Size Mix, ESAL Range C/D.
 - 2. Surface Course: Superpave Bituminous Concrete Wearing Surface Layer, 1/2" Maximum Aggregate Size Mix, ESAL Range C/D.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that subgrade is dry and in suitable condition to begin paving.
- B. Proof-roll subgrade below pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
 - 1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.
 - 2. Proof roll with a loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons.
 - 3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Architect, and replace with compacted backfill or fill as directed.
- C. Proceed with paving only after unsatisfactory conditions have been corrected.
- D. Verify that utilities, storm drainage, and other items requiring a cut and installation beneath the asphalt surface have been completed and that asphalt surface has been repaired flush with adjacent asphalt prior to beginning installation of imprinted asphalt.

3.2 PATCHING

- A. Hot-Mix Asphalt Pavement: Saw cut perimeter of patch and excavate existing pavement section to sound base. Excavate rectangular patches, extending 12 inches into adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Remove excavated material. Recompact existing unbound-aggregate base course to form new subgrade.
- B. Portland Cement Concrete Pavement: Break cracked slabs and roll as required to reseal concrete pieces firmly.

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1. Pump hot undersealing asphalt under rocking slab until slab is stabilized or, if necessary, crack slab into pieces and roll to reseat pieces firmly.
 2. Remove disintegrated or badly cracked pavement. Excavate rectangular or trapezoidal patches, extending into adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Recompact existing unbound-aggregate base course to form new subgrade.
- C. Tack Coat: Apply uniformly to vertical surfaces abutting or projecting into new, hot-mix asphalt paving at a rate of 0.07 gal./sq. yd.
1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
 2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.
- D. Patching: Fill excavated pavements with hot-mix asphalt base mix for full thickness of patch and, while still hot, compact flush with adjacent surface.

3.3 SURFACE PREPARATION

- A. Prime Coat: Apply uniformly over surface of compacted unbound-aggregate base course at a rate of 0.10 gal./sq. yd. Apply enough material to penetrate and seal but not flood surface. Allow prime coat to cure.
1. If prime coat is not entirely absorbed within 24 hours after application, spread sand over surface to blot excess asphalt. Use enough sand to prevent pickup under traffic. Remove loose sand by sweeping before pavement is placed and after volatiles have evaporated.
 2. Protect primed substrate from damage until ready to receive paving.
- B. Tack Coat: Apply uniformly to surfaces of existing pavement at a rate of 0.07 gal./sq. yd.
1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
 2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

3.4 BASE COURSE PLACEMENT

- A. The subgrade material shall be free of standing water and debris. The contractor shall verify that proper grades have been established prior to installation of the base course. The contractor shall re-establish any required grade elevations that are not within the required tolerances.
- B. Following the proof-rolling of the subgrade material, the contractor shall install the base course material. A maximum 6" lift of material shall be allowed. If the material thickness is greater than 6", the material shall be install in equal lifts and compacted.
- C. Compaction of the base course material shall be conducted in accordance with ALDOT Standard Specifications for Highway Construction, 2018 Edition. A minimum compaction of 98% Modified Proctor in accordance with ASTM D 1557 is required.

3.5 HOT-MIX ASPHALT PLACING

- A. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand to areas inaccessible to equipment in a manner that prevents

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segregation of mix. Place each course to required grade, cross section, and thickness when compacted.

1. Place hot-mix asphalt base course in number of lifts and thicknesses indicated.
 2. Place hot-mix asphalt surface course in single lift.
 3. Spread mix at minimum temperature of 250 deg F.
 4. Begin applying mix along centerline of crown for crowned sections and on high side of one-way slopes unless otherwise indicated.
 5. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.
 6. Ensure base courses are free of moisture in accordance with ALDOT specifications.
- B. Place paving in consecutive strips not less than 10 feet wide unless infill edge strips of a lesser width are required.
1. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Complete a section of asphalt base course before placing asphalt surface course.
- C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

3.6 JOINTS

- A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions, with same texture and smoothness as other sections of hot-mix asphalt course.
1. Clean contact surfaces and apply tack coat to joints.
 2. Offset longitudinal joints, in successive courses, a minimum of 6 inches.
 3. Offset transverse joints, in successive courses, a minimum of 24 inches.
 4. Construct transverse joints at each point where paver ends a day's work and resumes work at a subsequent time. Construct these joints as specified by the ALDOT standard specifications.
 5. Compact joints as soon as hot-mix asphalt will bear roller weight without excessive displacement.
 6. Compact asphalt at joints to a density within 2 percent of required density.

3.7 COMPACTION

- A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or with vibratory-plate compactors in areas inaccessible to rollers.
1. Complete compaction before mix temperature cools to 185 deg F.

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- B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.
- C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted as required by ALDOT Standard Specifications for Highway Construction, 2018 Edition, Section 424.
- D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.
- E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.
- F. Repairs: Remove paved areas that are defective or contaminated with foreign materials and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.
- G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened in accordance with ALDOT specifications.
- H. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.8 INSTALLATION TOLERANCES

- A. Pavement Thickness: Compact each course to produce the thickness indicated within the following tolerances:
 - 1. Base Course: Plus or minus 1/2 inch.
 - 2. Surface Course: Plus 1/4 inch, no minus.
- B. Pavement Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot straightedge applied transversely or longitudinally to paved areas:
 - 1. Base Course: 1/4 inch.
 - 2. Surface Course: 1/8 inch.

3.9 PAVEMENT MARKING

- A. Allow paving to age for minimum of 14 days before starting pavement marking.
- B. Sweep and clean surface to eliminate loose material and dust.
- C. Apply paint with mechanical equipment to produce pavement markings, of dimensions indicated, with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness as required by ALDOT Standard Specifications for Highway Construction, 2018 Edition, Section 701.

3.10 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

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- B. Thickness: In-place compacted thickness of hot-mix asphalt courses will be determined according to ASTM D 3549.
 - C. Surface Smoothness: Finished surface of each hot-mix asphalt course will be tested for compliance with smoothness tolerances.
 - D. In-Place Density: Testing agency will take samples of compacted pavement according to ALDOT Standard Specifications for Highway Construction, 2018 Edition.
 - 1. Reference maximum theoretical density will be determined by averaging results from four samples of hot-mix asphalt-paving mixture delivered daily to site, prepared according to ASTM D 2041, and compacted according to job-mix specifications.
 - 2. In-place density of compacted pavement will be determined by testing core samples according to ASTM D 1188 or ASTM D 2726.
 - a. One core sample will be taken for every 1000 sq. yd. or less of installed pavement, with no fewer than 3 cores taken.
 - b. Field density of in-place compacted pavement may also be determined by nuclear method according to ASTM D 2950 and correlated with ASTM D 1188 or ASTM D 2726.
 - E. Replace and compact hot-mix asphalt where core tests were taken.
 - F. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.
- 3.11 DISPOSAL
- A. Remove excavated materials from Project site and legally dispose of them in an EPA-approved landfill.
 - 1. Do not allow milled materials to accumulate on-site.

END OF SECTION 321216

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SECTION 321313 – CONCRETE PAVING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Driveways.
 - 2. Roadways.
 - 3. Parking lots.
 - 4. Curbs and gutters.
 - 5. Walks.
- B. Related Sections:
 - 1. Section 033053 "Cast-in-Place Concrete" for general building applications of concrete.
 - 2. Section 321373 "Concrete Paving Joint Sealants" for joint sealants in expansion and contraction joints within concrete paving and in joints between concrete paving and asphalt paving or adjacent construction.

1.3 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, and ground granulated blast-furnace slag.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Other Action Submittals:
 - 1. Design Mixtures: For each concrete paving mixture. Include alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified ready-mix concrete manufacturer.
- B. Material Certificates: For the following, from manufacturer:
 - 1. Cementitious materials.
 - 2. Steel reinforcement and reinforcement accessories.
 - 3. Fiber reinforcement.
 - 4. Admixtures.
 - 5. Curing compounds.
 - 6. Applied finish materials.

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- 7. Bonding agent or epoxy adhesive.
 - 8. Joint fillers.
 - C. Material Test Reports: For each of the following:
 - 1. Aggregates
 - D. Field quality-control reports.
- 1.6 QUALITY ASSURANCE
- A. Ready-Mix-Concrete Manufacturer Qualifications: Shall be approved by the Alabama Department of Transportation.
 - B. Testing Agency Qualifications: Qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.
 - 1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
 - C. Concrete Testing Service: Engage a qualified testing agency to perform material evaluation tests and to design concrete mixtures.
 - D. ACI Publications: Comply with ACI 301 (ACI 301M) unless otherwise indicated.
- 1.7 PROJECT CONDITIONS
- A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.
 - B. Pavement-Marking Paint: Proceed with pavement marking in accordance with ALDOT Standard Specifications for Highway Construction, Section 701.
- PART 2 - PRODUCTS
- 2.1 FORMS
- A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, and smooth exposed surfaces.
 - 1. Use flexible or uniformly curved forms for curves with a radius of 100 feet (30.5 m) or less. Do not use notched and bent forms.
 - B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and that will not impair subsequent treatments of concrete surfaces.
- 2.2 STEEL REINFORCEMENT
- A. All Steel reinforcement and accessories shall meet the requirements of Section 502 of the ALDOT Standard Specifications for Highway Construction, 2018 Edition.
- 2.3 CONCRETE MATERIALS
- A. Cementitious Material: Use the following cementitious materials, of same type, brand, and source throughout Project:
 - 1. Portland Cement: Shall meet the requirements of Section 450 of the ALDOT Standard Specifications for Highway Construction, 2018 Edition.
 - a. Fly Ash: Shall meet the requirements of Section 806 of the ALDOT Standard Specifications for Highway Construction, 2018 Edition.
 - B. Normal-Weight Aggregates: Shall meet the requirements of Section 801 and 802 of the ALDOT Standard Specifications for Highway Construction, 2018 Edition.

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- C. Water: Potable and complying with ASTM C 94/C 94M.
- D. Air-Entraining Admixture: Shall meet the requirements of Section 808 of the ALDOT Standard Specifications for Highway Construction, 2018 Edition.
- E. Chemical Admixtures: Shall meet the requirements of Section 809 of the ALDOT Standard Specifications for Highway Construction, 2018 Edition.
 - 1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
 - 2. Retarding Admixture: ASTM C 494/C 494M, Type B.
 - 3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
 - 4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
 - 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
 - 6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

2.4 CURING MATERIALS

- A. Absorptive Cover: Shall meet the requirements of Section 830 of the ALDOT Standard Specifications for Highway Construction, 2018 Edition.
- B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- C. Water: Potable.
- D. Evaporation Retarder: Waterborne, monomolecular, film forming, manufactured for application to fresh concrete.

2.5 RELATED MATERIALS

- A. Joint Fillers: Shall meet the requirements of Section 832 of the ALDOT Standard Specifications for Highway Construction, 2018 Edition.
- B. Chemical Surface Retarder: Water-soluble, liquid, set retarder with color dye, for horizontal concrete surface application, capable of temporarily delaying final hardening of concrete to a depth of 1/8 to 1/4 inch (3 to 6 mm).

2.6 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Furnish batch certificates for each batch discharged and used in the Work.
 - 1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.
- B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum-type batch machine mixer.
 - 1. For concrete batches of 1 cu. yd. (0.76 cu. m) or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
 - 2. For concrete batches larger than 1 cu. yd. (0.76 cu. m), increase mixing time by 15 seconds for each additional 1 cu. yd. (0.76 cu. m).

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3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixing time, quantity, and amount of water added.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.
- B. Proof-roll prepared subbase surface below concrete paving to identify soft pockets and areas of excess yielding.
 1. Completely proof-roll subbase in one direction and repeat in perpendicular direction. Limit vehicle speed to 3 mph (5 km/h).
 2. Proof-roll with a pneumatic-tired and loaded, 10-wheel, tandem-axle dump truck weighing not less than 15 tons (13.6 tonnes).
 3. Correct subbase with soft spots and areas of pumping or rutting exceeding depth of 1/2 inch (13 mm) according to requirements in Section 312000 "Earth Moving."
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove loose material from compacted subbase surface immediately before placing concrete.

3.3 EDGE FORMS AND SCREED CONSTRUCTION

- A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.
- B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.4 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.
- C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.
- D. Install welded wire reinforcement in lengths as long as practicable. Lap adjoining pieces at least one full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.
- E. Install fabricated bar mats in lengths as long as practicable. Handle units to keep them flat and free of distortions. Straighten bends, kinks, and other irregularities, or replace units as required before placement. Set mats for a minimum 2-inch (50-mm) overlap of adjacent mats.

3.5 JOINTS

- A. General: Form construction, isolation, and contraction joints and tool edges true to line, with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline unless otherwise indicated.

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1. When joining existing paving, place transverse joints to align with previously placed joints unless otherwise indicated.
- B. Construction Joints: Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than one-half hour unless paving terminates at isolation joints.
 1. Continue steel reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of paving strips unless otherwise indicated.
 2. Provide tie bars at sides of paving strips where indicated.
 3. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.
- C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, other fixed objects, and where indicated.
 1. Locate expansion joints at intervals of 50 feet (15.25 m) unless otherwise indicated.
 2. Extend joint fillers full width and depth of joint.
 3. Terminate joint filler not less than 1/2 inch (13 mm) or more than 1 inch (25 mm) below finished surface if joint sealant is indicated.
 4. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
 5. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
 6. During concrete placement, protect top edge of joint filler with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.
- D. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows:
 1. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3-mm-) wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.
 - a. Tolerance: Ensure that sawed joints are within 3 inches (75 mm) either way from centers of dowels.
 2. Doweled Contraction Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.
- E. Edging: After initial floating, tool edges of paving, gutters, curbs, and joints in concrete with an edging tool to a 3/8-inch (10-mm) radius. Repeat tooling of edges after applying surface finishes. Eliminate edging-tool marks on concrete surfaces.

3.6 CONCRETE PLACEMENT

- A. Before placing concrete, inspect and complete formwork installation, steel reinforcement, and items to be embedded or cast-in.

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- B. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.
- C. Comply with ACI 301 (ACI 301M) requirements for measuring, mixing, transporting, and placing concrete.
- D. Do not add water to concrete during delivery or at Project site. Do not add water to fresh concrete after testing.
- E. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.
- F. Consolidate concrete according to ACI 301 (ACI 301M) by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.
 - 1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating reinforcement dowels and joint devices.
- G. Screed paving surface with a straightedge and strike off.
- H. Commence initial floating using bull floats or darbies to impart an open-textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.
- I. Curbs and Gutters: Use design mixture for automatic machine placement. Produce curbs and gutters to required cross section, lines, grades, finish, and jointing.
- J. Slip-Form Paving: Use design mixture for automatic machine placement. Produce paving to required thickness, lines, grades, finish, and jointing.
 - 1. Compact subbase and prepare subgrade of sufficient width to prevent displacement of slip-form paving machine during operations.
- K. Cold-Weather Placement: Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing, or low temperatures. Comply with ACI 306.1 and the following:
 - 1. When air temperature has fallen to or is expected to fall below 40 deg F (4.4 deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F (10 deg C) and not more than 80 deg F (27 deg C) at point of placement.
 - 2. Do not use frozen materials or materials containing ice or snow.
 - 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in design mixtures.
- L. Hot-Weather Placement: Comply with ACI 301 (ACI 301M) and as follows when hot-weather conditions exist:
 - 1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated in total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 - 2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.

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3. Fog-spray forms and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.7 FLOAT FINISHING

- A. General: Do not add water to concrete surfaces during finishing operations.
- B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.

3.8 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
- B. Comply with ACI 306.1 for cold-weather protection.
- C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete but before float finishing.
- D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.
- E. Curing Methods: Cure concrete by a combination of these as follows:
 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
 - a. Water.
 - b. Continuous water-fog spray.
 - c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.
 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm) and sealed by waterproof tape or adhesive. Immediately repair any holes or tears occurring during installation or curing period using cover material and waterproof tape.
 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas that have been subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating, and repair damage during curing period.

3.9 PAVING TOLERANCES

- A. Comply with tolerances in ACI 117 and as follows:
 1. Elevation: 3/4 inch (19 mm).
 2. Thickness: Plus 3/8 inch (10 mm), minus 1/4 inch (6 mm).
 3. Surface: Gap below 10-foot- (3-m-) long, unlevelled straightedge not to exceed 1/2 inch (13 mm).
 4. Alignment of Tie-Bar End Relative to Line Perpendicular to Paving Edge: 1/2 inch per 12 inches (13 mm per 300 mm) of tie bar.

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5. Lateral Alignment and Spacing of Dowels: 1 inch (25 mm).
6. Vertical Alignment of Dowels: 1/4 inch (6 mm).
7. Alignment of Dowel-Bar End Relative to Line Perpendicular to Paving Edge: 1/4 inch per 12 inches (6 mm per 300 mm) of dowel.
8. Joint Spacing: 3 inches (75 mm).
9. Contraction Joint Depth: Plus 1/4 inch (6 mm), no minus.
10. Joint Width: Plus 1/8 inch (3 mm), no minus.

3.10 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to ALDOT Standard Specifications for Highway Construction, 2018 Edition or as following.
 1. Testing Frequency: Obtain at least one composite sample for each 5000 sq. ft. (465 sq. m) or fraction thereof of each concrete mixture placed each day.
 - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
 2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
 3. Air Content: ASTM C 231, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when it is 80 deg F (27 deg C) and above, and one test for each composite sample.
 5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.
 6. Compressive-Strength Tests: ASTM C 39/C 39M; test one specimen at seven days and two specimens at 28 days.
 - a. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at 28 days.
- C. Strength of each concrete mixture will be satisfactory if average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa).
- D. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

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- E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Engineer but will not be used as sole basis for approval or rejection of concrete.
- F. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Engineer.
- G. Concrete paving will be considered defective if it does not pass tests and inspections.
- H. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- I. Prepare test and inspection reports.

3.11 REPAIRS AND PROTECTION

- A. Remove and replace concrete paving that is broken, damaged, or defective or that does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by Engineer.
- B. Drill test cores, where directed by Engineer, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory paving areas with portland cement concrete bonded to paving with epoxy adhesive.
- C. Protect concrete paving from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.
- D. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep paving not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 321313

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SECTION 321373 – CONCRETE PAVING JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General, Supplementary Conditions and the Basis of Design apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Cold-applied joint sealants.
 - 2. Hot-applied joint sealants.
 - 3. Cold-applied, fuel-resistant joint sealants.
 - 4. Hot-applied, fuel-resistant joint sealants.
 - 5. Joint-sealant backer materials.
 - 6. Primers.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of joint sealant and accessory.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. Product Testing: Test joint sealants using a qualified testing agency.

1.6 FIELD CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
 - 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer.
 - 2. When joint substrates are wet.
 - 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
 - 4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.7 REFERENCE STANDARDS

- A. Reference Standards: Comply with applicable provisions and recommendations of the following except as otherwise shown or specified.
 - 1. ASTM D 2628 - Standard Specification for Preformed Polychloroprene Elastomeric Joint Seals for Concrete Pavements
 - 2. ASTM D 5249 – Specification for Backer Material for Use with Cold and Hot-Applied Joint Sealants in Portland-Cement Concrete and Asphalt Joints.

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3. ASTM D 6690 - Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, backing materials, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

2.2 FIELD POURED, COLD-APPLIED JOINT SEALANTS

- A. Shall be in two-component, polymer based, cold-applied heat and fuel resistant joint materials. Must meet Federal Specification SS-S0200E or ASTM D 2628.

2.3 FIELD POURED, HOT-APPLIED JOINT SEALANTS

- A. Shall be rubberized asphalt sealant or rubberized tar sealant, heat-applied and fuel resistant joint materials. Must meet ASTM D 6690.

2.4 JOINT-SEALANT BACKER MATERIALS

- A. Joint-Sealant Backer Materials: Non-staining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by joint-sealant manufacturer, based on field experience and laboratory testing.
- B. Round Backer Rods for Cold- and Hot-Applied Joint Sealants: ASTM D 5249, Type 1, of diameter and density required to control sealant depth and prevent bottom-side adhesion of sealant.
- C. Backer Strips for Cold- and Hot-Applied Joint Sealants: ASTM D 5249; Type 2; of thickness and width required to control joint-sealant depth, prevent bottom-side adhesion of sealant, and fill remainder of joint opening under sealant.

2.5 PRIMERS

- A. Primers: Product recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Before installing joint sealants, clean out joints immediately to comply with joint-sealant manufacturer's written instructions.
 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
- B. Joint Priming: Prime joint substrates where indicated or where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written

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instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

3.3 INSTALLATION OF JOINT SEALANTS

- A. Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated unless more stringent requirements apply.
- B. Joint-Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions.
- C. Install joint-sealant backings to support joint sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - 1. Do not leave gaps between ends of joint-sealant backings.
 - 2. Do not stretch, twist, puncture, or tear joint-sealant backings.
 - 3. Remove absorbent joint-sealant backings that have become wet before sealant application and replace them with dry materials.
- D. Install joint sealants immediately following backing installation, using proven techniques that comply with the following:
 - 1. Place joint sealants so they fully contact joint substrates.
 - 2. Completely fill recesses in each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
 - 4. Place joint sealants so they are not protruding above adjacent concrete surfaces.
- E. Tooling of Nonsag Joint Sealants: Immediately after joint-sealant application and before skinning or curing begins, tool sealants according to the following requirements to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint:
 - 1. Remove excess joint sealant from surfaces adjacent to joints.
 - 2. Use tooling agents that are approved in writing by joint-sealant manufacturer and that do not discolor sealants or adjacent surfaces.
- F. Provide joint configuration to comply with joint-sealant manufacturer's written instructions unless otherwise indicated.

3.4 CLEANING AND PROTECTION

- A. Clean off excess joint sealant as the Work progresses, by methods and with cleaning materials approved in writing by joint-sealant manufacturers.
- B. Protect joint sealants, during and after curing period, from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately and replace with joint sealant so installations in repaired areas are indistinguishable from the original work.

END OF SECTION 321373

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SECTION 321723 – PAVEMENT MARKINGS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes painted markings applied to asphalt and concrete pavement.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include technical data and tested physical and performance properties.
- B. LEED Submittals:
 - 1. Product Data for Credit IEQ 4.2: For interior, field-applied, pavement-marking paints, documentation including printed statement of VOC content.

1.4 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements of Standard Specifications for Highway Construction, 2012 Edition of Alabama Department of Transportation for pavement-marking work.
 - 1. Measurement and payment provisions and safety program submittals included in standard specifications do not apply to this Section.

PART 2 - PRODUCTS

2.1 PAVEMENT-MARKING PAINT

- A. Pavement-Marking Paint, Parking Areas: Class 1, Type B per ALDOT Section 701
 - 1. Color: As indicated on Drawings.
- B. Pavement-Marking Paint, Roadways and Assembly Areas: Class 1, Type A per ALDOT Section 701.
 - 1. Color: As indicated on Drawings.
- C. Pavement-Marking Standard Thermoplastic Material, as indicated on plans: Class 2, Type B per ALDOT Section 701
 - 1. Color: As indicated on Drawings.
- D. Glass Beads: AASHTO M 247, Type 1.
- E. VOC Content: Pavement markings used on building interior shall have a VOC content of 150 g/L or less.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that pavement is dry and in suitable condition to begin pavement marking according to manufacturer's written instructions.
- B. Proceed with pavement marking only after unsatisfactory conditions have been corrected.

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3.2 PAVEMENT MARKING

- A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Engineer.
- B. Allow asphalt paving to age for a minimum of 14 days before starting pavement marking. Allow concrete paving to cure for a minimum of 30 days before starting pavement marking.
- C. Sweep and clean surface to eliminate loose material and dust.
- D. Apply paint in accordance with ALDOT Standard Specifications, Section 701.
 - 1. Apply graphic symbols and lettering with paint-resistant, die-cut stencils, firmly secured to pavement. Mask an extended area beyond edges of each stencil to prevent paint application beyond the stencil. Apply paint so that it cannot run beneath the stencil.
 - 2. Broadcast glass beads uniformly into wet markings at a rate of 8 lbs/100 sf. (3.63 kg/9.29 sq. meters).

3.3 PROTECTING AND CLEANING

- A. Protect pavement markings from damage and wear during remainder of construction period.
- B. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 321723

SECTION 323113 - CHAIN LINK FENCES AND GATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Chain-link fences.
 - 2. Gates: swing.
- B. Related Sections:
 - 1. Section 033053 "Cast-in-Place Concrete – Site Work Only" for cast-in-place concrete for post footings.

1.3 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Chain-link fence and gate framework shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated according to ASCE/SEI 7.
- B. Lightning Protection System: Maximum grounding-resistance value of 25 ohms under normal dry conditions.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
 - 1. Fence and gate posts, rails, and fittings.
 - 2. Chain-link fabric, reinforcements, and attachments.
 - 3. Accessories: Barbed wire.
 - 4. Gates and hardware.

1.5 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For framing strength according to ASTM F 1043.
- B. Field quality-control reports.

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- C. Warranty: Sample of special warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For the following to include in emergency, operation, and maintenance manuals:
 - 1. Gate hardware.

1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify layout information for chain-link fences and gates shown on Drawings in relation to property survey and existing structures. Verify dimensions by field measurements.

1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which Installer agrees to repair or replace components of chain-link fences and gates that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Faulty operation of gate operators and controls.
 - b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CHAIN-LINK FENCE FABRIC

- A. General: Provide fabric in one-piece heights measured between top and bottom of outer edge of selva ge knuckle or twist. Comply with CLFMI Product Manual and with requirements indicated below:
 - 1. Fabric Height: 7 feet.
 - a. Zinc-Coated Fabric: ASTM A 392, Type II, Class 1, 1.2 oz./sq. ft. with zinc coating applied after weaving.
 - b. Polymer-Coated Fabric: ASTM F 668, Class 1 over zinc-coated steel wire.
 - 1) Color: As selected by Architect from manufacturer's full range, complying with ASTM F 934.

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- c. Coat selvage ends of fabric that is metallic coated before the weaving process with manufacturer's standard clear protective coating.
2. Selvage: Knuckled at both selvages.

2.2 FENCE FRAMING

- A. Posts and Rails: Comply with ASTM F 1043 for framing, including rails, braces, and line; terminal; and corner posts. Provide members with minimum dimensions and wall thickness according to ASTM F 1043 based on the following:
 1. Fence Height: 84 inches.
 2. Light Industrial Strength: Material Group IC-L, round steel pipe, electric-resistance-welded pipe.
 - a. Line Post: 1.9 inches in diameter.
 - b. End, Corner and Pull Post: 2.375 inches.
 3. Horizontal Framework Members: top rails complying with ASTM F 1043.
 - a. Top Rail: 1.66 inches.
 4. Brace Rails: Comply with ASTM F 1043.
 5. Metallic Coating for Steel Framing:
 - a. Type A, consisting of not less than minimum 2.0-oz./sq. ft. average zinc coating per ASTM A 123/A 123M or 4.0-oz./sq. ft. zinc coating per ASTM A 653/A 653M.
 - b. Type B, zinc with organic overcoat, consisting of a minimum of 0.9 oz./sq. ft. of zinc after welding, a chromate conversion coating, and a clear, verifiable polymer film.
 - c. External, Type B, zinc with organic overcoat, consisting of a minimum of 0.9 oz./sq. ft. of zinc after welding, a chromate conversion coating, and a clear, verifiable polymer film. Internal, Type D, consisting of 81 percent, not less than 0.3-mil-thick, zinc-pigmented coating.
 - d. Type C, Zn-5-Al-MM alloy, consisting of not less than 1.8-oz./sq. ft. coating.
 - e. Coatings: Any coating above.

2.3 TENSION WIRE

- A. Metallic-Coated Steel Wire: 0.177-inch-diameter, marcelled tension wire complying with ASTM A 817 and ASTM A 824, with the following metallic coating:
 1. Type I, aluminum coated (aluminized).
 2. Type II, zinc coated (galvanized) by hot-dip process, with the following minimum coating weight:
 - a. Class 4: Not less than 1.2 oz./sq. ft. (366 g/sq. m) of uncoated wire surface.
 3. Type III, Zn-5-Al-MM alloy with the following minimum coating weight:

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- a. Class 60: Not less than 0.6 oz./sq. ft. (183 g/sq. m) of uncoated wire surface.
- b. Class 100: Not less than 1 oz./sq. ft. (305 g/sq. m) of uncoated wire surface.
- c. Matching chain-link fabric coating weight.

2.4 SWING GATES

- A. General: Comply with ASTM F 900 for gate posts and double swing gate types.
 - 1. Gate Leaf Width: As indicated.
 - 2. Gate Fabric Height: 84 inches.
- B. Pipe and Tubing:
 - 1. Zinc-Coated Steel: Comply with ASTM F 1043 and ASTM F 1083; manufacturer's standard protective coating and finish.
 - 2. Gate Posts: Round tubular steel.
 - 3. Gate Frames and Bracing: Round tubular steel.
- C. Frame Corner Construction: Welded.
- D. Extended Gate Posts and Frame Members: Extend gate posts and frame end members above top of chain-link fabric at both ends of gate frame as indicated to attach barbed wire assemblies.
- E. Hardware:
 - 1. Hinges: 180-degree outward swing.
 - 2. Latches permitting operation from both sides of gate with provision for padlocking accessible from both sides of gate.

2.5 FITTINGS

- A. General: Comply with ASTM F 626.
- B. Post Caps: Provide for each post.
 - 1. Provide line post caps with loop to receive tension wire or top rail.
- C. Rail and Brace Ends: For each gate, corner, pull, and end post.
- D. Rail Fittings: Provide the following:
 - 1. Top Rail Sleeves: Pressed-steel or round-steel tubing not less than 6 inches long.
 - 2. Rail Clamps: Line and corner boulevard clamps for connecting intermediate and bottom rails in the fence line-to-line posts.

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- E. Tension and Brace Bands: Pressed steel.
- F. Tension Bars: Steel, length not less than 2 inches shorter than full height of chain-link fabric. Provide one bar for each gate and end post, and two for each corner and pull post, unless fabric is integrally woven into post.
- G. Truss Rod Assemblies: Steel, hot-dip galvanized after threading rod and turnbuckle or other means of adjustment.
- H. Barbed Wire Arms: Pressed steel or cast iron, with clips, slots, or other means for attaching strands of barbed wire, integral with post cap; for each post unless otherwise indicated, and as follows:
 - 1. Provide line posts with arms that accommodate top rail or tension wire.
 - 2. Provide corner arms at fence corner posts, unless extended posts are indicated.
 - 3. Type I, single slanted arm.
- I. Tie Wires, Clips, and Fasteners: According to ASTM F 626.
 - 1. Standard Round Wire Ties: For attaching chain-link fabric to posts, rails, and frames, complying with the following:
 - a. Hot-Dip Galvanized Steel: 0.106-inch-diameter wire; galvanized coating thickness matching coating thickness of chain-link fence fabric.
- J. Finish:
 - 1. Metallic Coating for Pressed Steel or Cast Iron: Not less than 1.2 oz. /sq. ft. zinc.
 - a. Polymer coating over metallic coating.
 - 2. Aluminum: Mill finish.

2.6 BARBED WIRE

- A. Steel Barbed Wire: Comply with ASTM A 121, for two-strand barbed wire, 0.099-inch-diameter line wire with 0.080-inch-diameter, four-point round barbs spaced not more than 5 inches o.c.
 - 1. Aluminum Coating: Type A.
 - 2. Zinc Coating: Type Z, Class 3.

2.7 GROUT AND ANCHORING CEMENT

- A. Non-shrink, Nonmetallic Grout: Premixed, factory-packaged, non-staining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout, recommended in writing by manufacturer, for exterior applications.

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- B. Erosion-Resistant Anchoring Cement: Factory-packaged, non-shrink, non-staining, hydraulic-controlled expansion cement formulation for mixing with potable water at Project site to create pourable anchoring, patching, and grouting compound. Provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended in writing by manufacturer, for exterior applications.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for a verified survey of property lines and legal boundaries, site clearing, earthwork, pavement work, and other conditions affecting performance of the Work.
 - 1. Do not begin installation before final grading is completed unless otherwise permitted by Architect.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Stake locations of fence lines, gates, and terminal posts. Do not exceed intervals of 500 feet (152.5 m) or line of sight between stakes. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks, and property monuments.

3.3 INSTALLATION, GENERAL

- A. Install chain-link fencing to comply with ASTM F 567 and more stringent requirements indicated.
 - 1. Install fencing on established boundary lines inside property line.

3.4 CHAIN-LINK FENCE INSTALLATION

- A. Post Excavation: Drill or hand-excavate holes for posts to diameters and spacing indicated, in firm, undisturbed soil.
- B. Post Setting: Set posts in concrete at indicated spacing into firm, undisturbed soil.
 - 1. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during setting with concrete or mechanical devices.
 - 2. Concrete Fill: Place concrete around posts to dimensions indicated and vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter.

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- C. Line Posts: Space line posts uniformly at 10 feet o.c.
- D. Post Bracing and Intermediate Rails: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Diagonally brace terminal posts to adjacent line posts with truss rods and turnbuckles. Install braces at end and gate posts and at both sides of corner and pull posts.
 - 1. Locate horizontal braces at mid-height of fabric 84 inches (1830 mm) or higher, on fences with top rail and at two-third fabric height on fences without top rail. Install so posts are plumb when diagonal rod is under proper tension.
- E. Tension Wire: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Pull wire taut, without sags. Fasten fabric to tension wire with 0.120-inch- (3.05-mm-) diameter hog rings of same material and finish as fabric wire, spaced a maximum of 24 inches (610 mm) o.c. Install tension wire in locations indicated before stretching fabric. Provide horizontal tension wire at the following locations:
 - 1. Extended along [top] [and] [bottom] of fence fabric. Install top tension wire through post cap loops. Install bottom tension wire within 6 inches (152 mm) of bottom of fabric and tie to each post with not less than same diameter and type of wire.
- F. Top Rail: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Run rail continuously through line post caps, bending to radius for curved runs and terminating into rail end attached to posts or post caps fabricated to receive rail at terminal posts. Provide expansion couplings as recommended in writing by fencing manufacturer.
- G. Intermediate and Bottom Rails: Install and secure to posts with fittings.
- H. Chain-Link Fabric: Apply fabric to outside of enclosing framework. Leave 1 inch between finish grade or surface and bottom selvage unless otherwise indicated. Pull fabric taut and tie to posts, rails, and tension wires. Anchor to framework so fabric remains under tension after pulling force is released.
- I. Tension or Stretcher Bars: Thread through fabric and secure to end, corner, pull, and gate posts with tension bands spaced not more than 15 inches o.c.
- J. Tie Wires: Use wire of proper length to firmly secure fabric to line posts and rails. Attach wire at one end to chain-link fabric, wrap wire around post a minimum of 180 degrees, and attach other end to chain-link fabric per ASTM F 626. Bend ends of wire to minimize hazard to individuals and clothing.
 - 1. Maximum Spacing: Tie fabric to line posts at 12 inches (300 mm) o.c. and to braces at 24 inches (610 mm) o.c.
- K. Fasteners: Install nuts for tension bands and carriage bolts on the side of the fence opposite the fabric side.

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- L. Barbed Wire: Install barbed wire uniformly spaced , angled toward security side of fence. Pull wire taut, install securely to extension arms, and secure to end post or terminal arms.

3.5 GATE INSTALLATION

- A. Install gates according to manufacturer's written instructions, level, plumb, and secure for full opening without interference. Attach fabric as for fencing. Attach hardware using tamper-resistant or concealed means. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation and lubricate where necessary.

3.6 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's personnel to adjust, operate, and maintain chain-link fences and gates.

END OF SECTION 323113

SECTION 323188 FORTRESS HEAVY DUTY SLIDE GATE (CHAIN LINK)

PART 1 - GENERAL:

1.01 SECTION INCLUDES:

- A. The work in this section shall include furnishing all labor, materials, equipment and appliances necessary to complete all Fortress Heavy Duty Cantilever Slide Gate(s) required for this project in strict accordance with this specification section and drawings.

1.02 REFERENCES:

- A. Underwriters Laboratory Gate Operator Requirements (UL 325). See 3.02 C.
 - 1. Automated/operated vehicular gates are not to be used for pedestrian traffic. Separate pedestrian gates must always be provided if pedestrian traffic is expected.
- B. ASTM F 2200 – Standard Specification for Automated Vehicular Gate Construction. See 2.01 C.
- C. ASTM F 1184 – Standard Specification for Industrial and Commercial Horizontal Slide Gates, Type II, Class 2. See 3.02 B.
- D. American Welding Society AWS D1.2 Structural Welding Code. See 2.01 D and 2.03 D.

1.03 SUBMITTAL:

- A. Product Data:
 - 1. Provide manufacturer's catalog cuts with printed specifications and installation instructions.
 - 2. If operated gate system, furnish two (2) copies of operation and maintenance data covering the installed products.
- B. Shop Drawings:
 - 1. Supply shop drawings showing the gate system, including details of all major components.
 - 2. Include details of gate construction, gate height, and post spacing dimensions.
- C. Certification of Performance Criteria:
 - 1. Manufacturer of gate system shall provide certification stating the gate system includes the following material components that provide superior performance and longevity. Alternate designs built to minimum standards that do not include these additional structural features shall not be accepted.
 - a. Gate track system shall be keyed to interlock into gate frame member (providing 200% additional strength when compared to weld only keyless systems). When interlocked with and welded to the "keyed" frame top member, gate track forms a composite structure.
 - b. Gate shall have a minimum counterbalance length of 50% opening width which provides a 36% increase in lateral resistance (when compared to ASTM minimum of 40% counterbalance). If gate is ever to be automated, counterbalance section shall be filled with fabric or other specified material.
 - c. To provide superior structural integrity, intermediate vertical members shall be used - with spacing between verticals to be less than 50% of the gate frame height.
 - d. Entire gate frame (including counterbalance section) shall include 2 adjustable stainless or galvanized steel cables (minimum 3/16") per bay to allow complete

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- gate frame adjustment (maintaining strongest structural square and level orientation).
 - e. Gate truck assemblies shall be tested for continuous duty and shall have precision ground and hardened components. Bearings shall be pre-lubricated and contain shock resistant outer races and captured seals.
 - f. Gate truck assemblies shall be supported by a minimum 5/8" plated steel bolt with self aligning capability, rated to support a 2,000 # reaction load.
 - g. Hanger brackets shall be hot dipped galvanized steel with a minimum 3/8" thickness that is also gusseted for additional strength.
 - h. Gate top track and supporting hanger bracket assemblies shall be certified by a licensed professional engineer to withstand a 2,000 lb. vertical reaction load without exceeding allowable stresses.
- D. Certifications:
- 1. Gate in compliance with ASTM F 2200, Standard Specification for Automated Vehicular Gate Construction per section 2.01 C.
 - 2. If operated gate system, gate operator shall be in compliance with UL 325 as evidenced by UL listing label attached to gate operator.
 - 3. The aluminum welders and welding process must be certified per section 2.03 D.
 - 4. Manufacturer shall supply gate design performance certification as per section 1.03 C.

PART 2 - PRODUCTS:

2.01 CANTILEVER SLIDE GATE MANUFACTURERS:

- A. The cantilever sliding gate system shall be manufactured by Tymetal Corp., 678 Wilbur Avenue, Greenwich, NY 12834 - (800) 328 – 4283 or approved equal.
- B. Approved substitution – All other systems must be submitted to the design team in accordance with substitution requirements as set forth in the general provisions of the specification manual for approval. Products submitted must meet performance criteria as per section 1.03 C.
- C. Gate manufacturer shall certify gate is manufactured in compliance with ASTM F 2200, Standard Specification for Automated Vehicular Gate Construction. See 1.03 D.1.
- D. Gate manufacturer shall provide independent certification as to the use of a documented Welding Procedure Specification and Procedure Qualification Record to insure conformance to the AWS D1.2 welding code. Upon request, Individual Certificates of Welder Qualification documenting successful completion of the requirements of the AWS D1.2 code shall also be provided. See 1.03 D.3.

2.02 GATE DIMENSIONS:

- A. Fortress Heavy Duty Cantilever Slide Gate dimensions shall be as shown on the detail drawings. Two (2) 20 FT Clear Opening Gate Systems shall be provided.

2.03 GATE CONSTRUCTION DETAILS:

- A. Gate Frame:
 - 1. The gate frame shall be fabricated from 6063-T6 aluminum alloy extrusions. The top member shall be a 3" x 5" (76mm x 127mm) aluminum structural channel/tube extrusion weighing not less than 3.0 lb/lf (4.4kg/m). To maintain structural integrity this frame member shall be "keyed" to interlock with the "keyed" track member. If fabricated as a single horizontal piece, the bottom member shall be a 2" x 5" (51mm x

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127mm) aluminum structural tube weighing not less than 2.0 lb/lf (2.9kg/m). If fabricated in two horizontal pieces, the bottom member shall be a 5" (127mm) aluminum structural channel weighing not less than 2.6 lb/lf (3.8kg/m). When the gate frame is manufactured in two horizontal pieces or sections, they shall be spliced in the field (the gate frame shall be fabricated in one or multiple sections depending on size requirements or project constraints).

B. Vertical Members (Chain Link):

1. The vertical members at the ends of the gate frame shall be "P" shaped in cross section with a nominal base dimension of no less than 2" x 2" (51mm x 51mm) and weighing not less than 1.6 lb/lf (2.3kg/m). Major 2" x 2" (51mm x 51mm) vertical members weighing not less than 1.1 lb/lf shall separate each bay and shall be spaced at less than gate height intervals.
2. Intermediate 1" x 2" (25mm x 51mm) vertical members weighing not less than .82 lb/lf shall alternate between 2" x 2" major members.

C. Gate Track:

1. The gate frame shall have a separate semi-enclosed "keyed" track, extruded from 6005A-T61 or 6105-T5 aluminum alloy, weighing not less than 2.9 lb/lf (4.2kg/m). The track member is to be located on only one side of the top primary. Welds to be placed alternately along the top and side of the track at 9" (229mm) centers with welds being a minimum of 2" (51mm).

D. All welds on the gate frame shall conform to Welding Procedure Specification and Procedure Qualification Record to insure conformance to the AWS D1.2 Structural Welding Code. All individual welders shall be certified to AWS D1.2 welding code. See 1.02 D.

E. Gate Mounting:

1. The gate frame is to be supported from the track by two (2) swivel type, self-aligning, 4-wheeled, sealed lubricant, ball-bearing truck assemblies.
2. The bottom of each support post shall have a bracket equipped with a pair of 3" (76mm) UHMW guide wheels. Wheel cover protectors shall be included with bottom guides to comply with UL325.
3. Gap protectors shall be provided and installed, compliant with ASTM F 2200-05.

F. Diagonal Bracing:

1. Diagonal "X" bracing of 3/16" or 1/4" diameter stainless or galvanized steel cable shall be installed throughout the entire gate frame.

G. The gate shall be completed by installation of approved filler as specified.

1. Chain Link: 2" x 2" x 9 gauge aluminized steel chain link fabric shall extend the entire length of the gate (if operated gate, counterbalance must also have fabric to prevent reach through and comply with ASTM F2200, see 1.03 C.1) Fabric shall be attached at each end of the gate frame by standard fence industry tension bars and tied at each 2" x 2" (51mm x 51mm) vertical member with standard fence industry ties. ASTM F2200 requires attachment method that leaves no leading or bottom edge protrusions (cannot exceed 0.5 inch).

2.04 POSTS:

- A. A single set of support posts shall be minimum 4" O.D. (102mm) round SS40 or 4" x 4" x 3/16" wall square steel tubing, grade 500. Gate posts shall be galvanized or coated and supported in concrete footings as specified by the design team.**

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2.05 FINISH:

- A. Gate to be mill finish aluminum or color coated with polyester powder as specified. If powder coated, the gate (including track member) and all accessories shall be pretreated chemically by sand blasting or other acceptable method to ensure proper coating adherence.

2.06 WARRANTY:

- A. The truck assembly shall be warranted against manufacturing defects by the manufacturer for a period of (5) five years from date of sale.

PART 3 - EXECUTION:

- 3.01 Final grades and installation conditions shall be examined. Installation shall not begin until all unsatisfactory conditions are corrected.

3.02 INSTALLATION:

- A. Equipment in this section shall be installed in strict accordance with the company's printed instructions unless otherwise shown on the contract drawings.
- B. The gate and installation shall conform to ASTM F 1184 standards for aluminum cantilever slide gates, Type II, Class 2. See 1.02 C.
- C. If the gate system is to be automated, the gate and installation shall also comply with ASTM F 2200 and UL 325. See 1.02 A and 1.02 B..

3.03 SYSTEM VALIDATION:

- A. The complete system shall be adjusted to assure it is performing properly.
- B. The system shall be operated for a sufficient period of time to determine that the system is in proper working order.
- C. For operated gate systems - test and explain safety features:
 - 1. Each system feature and device is a separate component of the gate system.
 - 2. Read and follow all instructions for each component.
 - 3. Ensure that all instructions for mechanical components, safety devices and the gate operator are available for everyone who will be using the gate system.
 - 4. The warning signs shipped with the gate operator must be installed in prominent position on both sides of the gate.
 - 5. Ensure the owner is clear with regard to the safety points concerning the basic operational guidelines of the safety features of the gate operator system. These safety points are listed in the gate operator manual and must be read prior to system use.

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SECTION 323199 SLIDE GATE OPERATOR

(Revision Date - 14 June 22)

PART 1 – GENERAL

1.1. INCLUDED IN THIS SECTION

- A. Pre-wired gate operator for horizontal sliding gates, including all selected attachments and accessory equipment.

1.2. RELATED WORK SPECIFIED ELSEWHERE

- A. Fencing: See section 32 31 13 & 32 31 88
- B. Cast in place concrete: See section 03 30 00.
- C. Electrical service and connections: See Division 26.

1.3. SUBMITTALS

- A. Shop drawings: Submit shop drawings under the provisions of Section 01 3300. Submit drawings showing connections to adjacent construction, range of travel, and all electrical and mechanical connections to the operator. All underground runs of electrical lines and inductive vehicle obstruction loop locations shall be indicated on drawings. Drawings shall also show the size and location of the concrete mounting pad.
- B. Installation instructions: Submit two copies of manufacturer's installation instructions for this specific project.
- C. Submit manufacturer's completed warranty registration form to Project Manager.
- D. Project list: Submit list of product installations comparable to the subject job. Include date of product installation, installer, and owner's name and location of the project.
- E. Test reports:
 - 1. Submit affidavits from the manufacturer demonstrating that the gate operator mechanism has been tested to 200,000 cycles without breakdown.
 - 2. Each operator shall bear a label indicating that the operator mechanism has been tested. Operator is tested for full power and pressure of all hydraulic components, full stress tests of all mechanical components and electrical tests of all overload devices.

1.4. QUALITY ASSURANCE

- A. Manufacturer: A company specializing in the manufacture of gate operators of the type specified, with a minimum of five years' experience manufacturing operators of this type and design.
- B. Installer: Must have a minimum of three years' experience installing similar equipment, provide proof of attending a HySecurity Technical Training or approved equal within the previous three years, or obtain other significant manufacturer endorsement of technical aptitude, if required, during the submittal process.

1.5. CODES AND REGULATORY REQUIREMENTS

- A. Operators shall be built to UL 325 standards and be listed by a nationally recognized testing laboratory. Complete all electrical work according to local codes and National Electrical Code. All fieldwork shall be performed in a neat and professional manner, completed to journeyman standards.
- B. Current safety standards require the use of multiple external sensors to be capable of reversing the gate in either direction upon sensing an obstruction. See also 2.2D.
- C. Vehicular gates should never be used by pedestrians. A separate pedestrian gate must always be provided when foot traffic is present.
- D. Gate must have physical stops to prevent over travel in both the open and close directions.
- E. Current safety standards require gate operators to be designed and labeled for specific usage classes.

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1.6. PRODUCT DELIVERY AND STORAGE

- A. Comply with 01 6000.
- B. Store products upright in the original shipping containers, covered, ventilated and protected from all weather conditions.

1.7. WARRANTY

- A. Provide a warranty against all defects in materials or workmanship for five years or 500,000 gate cycles (whichever occurs first) after the date of installation. Defective materials shall be replaced at manufacturer's discretion with new or reconditioned materials furnished by the manufacturer, at no cost to the owner. Freight, labor and other incidental costs are not covered under the factory warranty, but may be covered by a separate service agreement between installing company and the owner.

PART 2 – PRODUCTS

2.1. GATE OPERATORS

- A. HySecurity gate operator model SlideDriver 40 (222 E ST) with Smart Touch Controller,
- B. Or other comparable operator, as approved by the architect or specifier. Substitute operators that are approved will be published in an addendum, not less than ten days prior to bid opening. Requests for substitution will include the amount of savings to be passed on to the owner.

2.2. OPERATION

- A. Operation shall be by means of a metal rail passing between a pair of reinforced composite wheels with polyurethane treads. Operator motors shall be hydraulic, geroller type, and system shall not include belts, gears, pulleys, roller chains or sprockets to transfer power from operator to gate panel. The operator shall generate a minimum horizontal pull of 300 lb (136 kg) without the drive wheels slipping and without distortion of supporting arms. Operator shall be capable of handling gates weighing up to 4,000 lb (1,814 kg). Gate panel velocity shall not be less than 1 ft/s (304 mm/s) and shall be stopped gradually to prevent shock loads to the gate and operator assembly. The "soft-stop" feature of the gate operator shall be controlled by two adjustable hydraulic brake valves (one for each direction).
- B. Minimum standard mechanical components:
 - 1. Supporting arms: Cast aluminum channel. Arms shall incorporate a fully bushed, 1 1/2" (38 mm) bronze bearing surface, acting on arm pivot pins. (item 2 below)
 - 2. Arm pivot pins: 3/4" (19 mm) diameter, stainless steel, with integral tabs for ease of removal.
 - 3. Tension spring: 2 1/2" (63 mm) heavy duty, 800 lb (363 kg) capacity.
 - 4. Tension adjustment: Finger tightened nut, not requiring the use of tools.
 - 5. Drive release: Must instantly release tension on both drive wheels, and disengage them from contact with drive rail in a single motion, for manual operation.
 - 6. Limit switches: Fully adjustable, toggle types, with plug connection to control panel.
 - 7. Chassis: 1/4" (6 mm) steel base plate, and 12 Ga. (3 mm) sides and back welded and ground smooth.
 - 8. Cover: 16 Ga. (1 mm) zinc plated steel with textured TGIC polyester powder coat finish. All joints welded, filled and ground smooth. Finished corners square and true with no visible joints.

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9. Finish: Zinc plated steel with textured TGIC polyester powder coat finish, proven to withstand 1,000 hour salt spray test.
 10. Drive wheels: Two 6" diam (152 mm) AdvanceDrive wheels. High-strength composite hub with polyurethane over mold.
 11. Drive rail: Shall be extruded 6061 T6, not less than 1/8" (3 mm) thick. Drive rail shall incorporate alignment pins for ease of replacement or splicing. Pins shall enable a perfect butt splice.
 12. Hydraulic hose: Shall be 1/4" (6 mm) synthetic, rated to 3,000 psi (20.6 MPa).
 13. Hydraulic valves: Shall be individually replaceable cartridge type, in an integrated hydraulic manifold.
 14. Hose fittings: At manifold shall be quick-disconnect type, others shall be swivel type.
 15. Hydraulic fluid: High performance type with a viscosity index greater than 375 and temperature range -40° F to 158° F (-40° C to 70° C).
 16. A zero to 2,000 psi (13.7 MPa) pressure gauge, mounted on the manifold for diagnostics, shall be a standard component.
 17. The hydraulic fluid reservoir shall be formed from a single piece of metal, non-welded, and shall be powder painted on the inside and the outside, to prevent fluid contamination.
- C. Minimum standard electrical components:
1. Pump motor: 1 hp, 3450 RPM, 56C, TEFC. Standard voltages available in single or three phase.
 2. All components shall have overload protection.
 3. Electrical enclosure: Type 1, metal, with hinged lid gasketed for protection from intrusion of foreign objects.
 4. Controls: Smart Touch Controller Board containing:
 - a. inherent entrapment sensor;
 - b. built in audible "warn before operate" system;
 - c. built in timer to close;
 - d. 32 character OLED display for reporting of functions and codes;
 - e. multiple programmable output relay options;
 - f. anti-tailgate mode;
 - g. built-in power surge/lightning strike protection;
 - h. menu configuration, event logging and system diagnostics easily accessible with a PC.
 - i. RS-232 port for connection to laptop or other computer peripheral and RS-485 connection for network interface.
 - j. Dual gate communication connection for bi-parting, sally port, or sequenced gates.
 - k. Electromechanical and solid state relays.
 - l. Radio option outputs.
 - m. 21 inputs for site specific configurations.
 5. Transformer: 75 VA, non-jumpered taps, for all common voltages.
 6. Control circuit: 24 VDC.
- D. Required external sensors: See 1.5B. Specify photo eyes or gate edges or a combination thereof to be installed such that the gate will reverse in either direction upon sensing an obstruction.
- E. Required access control device to be coordinated with owner and to include access card reader, camera, and call button.

2.3. FACTORY TESTING

- A. Fully assemble and test, at the factory, each gate operator to assure smooth operation, sequencing and electrical connection integrity.
- B. Proof test with simulated physical and electrical loads to exceed the fully rated capacity of the operator components.

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- C. Inspect and test all hydraulics are leak free.
- D. All testing data shall be individually logged and recorded by serial number.
- E. Check all mechanical connections for tightness and alignment. Check all welds for completeness and continuity.
- F. Inspect finishes for completeness. Touch up imperfections prior to shipment.
- G. Check all hydraulic hoses and electrical wires to assure that chafing cannot occur during shipping or operation.

PART 3 – EXECUTION

3.1. SITE EXAMINATION

- A. Locate concrete mounting pad in accordance with approved shop drawings and in compliance with local building codes.
- B. Make sure that gate is operating smoothly under manual conditions before installation of gate operators. Do not proceed until gate panel is aligned and operates without binding.

3.2. INSTALLATION

- A. Install gate operator in accordance with the safety regulations and the manufacturer's product literature and installation instructions, current at the time of installation. Coordinate locations of operators with contract drawings; other trades and shop drawings.
- B. Installer shall ensure that the electrical service to the operator is at least 20A. Electrical wiring to conform to NEC and manufacturer's installation instructions. SlideDriver 40 is 1500W.

3.3. FIELD QUALITY CONTROL

- A. Test operator through ten full open and close cycles and adjust for operation without binding, scraping or uneven motion. Test limit switches for proper open and close limit positions.
- B. All anchor bolts shall be fully tightened in the finished installation.
- C. Owner, or owner's representative, shall complete "check list" with installing contractor prior to final acceptance of the installation and submit completed warranty documentation to manufacturer.

3.4. CONTINUED SERVICE AND DOCUMENTATION

- A. Train owner's personnel on how to safely shut off electrical power, release and manually operate the gate. Additionally, demonstrate the general maintenance of the gate operator and accessories and provide one copy of "Programming and Operations Manual" for the owner's use. Manuals will identify parts of the equipment for future procurement.

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SECTION 329113 SOIL PREPARATION

PART 1 - GENERAL

1.1 SCOPE

- A. The Contractor shall furnish labor, material, and equipment as required to install topsoil in those areas of the site disturbed during construction, to prepare this soil for sod and to sod these areas as is hereinafter specified.

PART 2 - PRODUCTS

2.1 TOPSOIL

- A. It is the intent that any existing stockpiled topsoil be reused and that additional topsoil be hauled onto the site. It shall be the responsibility of the Contractor to verify the existing conditions of the topsoil, auger to determine how much topsoil is there, what can be stockpiled and used and what additional topsoil will be needed. Additional topsoil shall meet the conditions as specified below.
 - 1. Natural, fertile, friable soil, possessing characteristics of representative productive soils in the vicinity.
 - 2. Obtain topsoil from natural, well drained areas.
 - 3. Topsoil shall be without admixture of subsoil and shall not contain stones, stumps, roots, or similar substances.
 - 4. Quality of the topsoil shall be approved by the Architect.
 - 5. Topsoil shall be collected from sites that are free growth or reproductive parts of noxious weeds.
 - 6. Topsoil shall not be stripped, collected or deposited while wet.

2.2 SOIL CONDITIONERS

- A. Lime
 - 1. Shall be a ground agricultural limestone (dolomite) containing not less than 85 percent of total carbonates.
 - 2. Shall be ground to such fineness that 50 percent will pass through a 100 mesh sieve and 90 percent will pass through a 20 mesh sieve.

2.3 Water

- A. Hose and other equipment required for watering shall be furnished by this section.
- B. Water shall be suitable for irrigation and free of substances harmful to plant life.

2.4 Fertilizer

- A. Conform to all applicable State fertilizer laws.
- B. Deliver in original, unopened containers, each bearing the manufacturer's guaranteed analysis.
- C. Fertilizer shall be uniform in composition, dry, and free flowing.
- D. Fertilizer which becomes caked or otherwise damaged and unsuitable for use will not be accepted.
- E. Complete fertilizer type shall be as determined by soil tests.

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2.5 PRE-EMERGENT HERBICIDE

- A. Suitable pre-emergent herbicide shall be used for control of voluntary Bermuda grassed other broadleaf weeds.
 - 1. Shall be approved by the Architect.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examine areas to receive soil preparation to assure work of other trades has been completed.
- B. Verify that plants to remain undisturbed have been identified.
- C. Do not proceed with soil preparation until unsatisfactory conditions are corrected.

3.2 PERFORMANCE

- A. Subsoil
 - 1. The ground surface shall be cleared of all materials which might hinder proper grading and tillage, and materials which might be harmful to plant growth or subsequent maintenance operations.
 - 2. Thoroughly till, disking, harrowing, or other approved methods to a minimum depth of six (6) inches (152 mm) until the conditions of the soil will insure adequate permeability and it suitable to receive topsoil as approved by the Architect. Topsoil will not be permitted on hardened compacted strata.
 - 3. Uniformly distribute over the subsoil fertilizer and lime at the rate determined by soil tests.
 - 4. The entire areas over which fertilizer and lime have been distributed shall be harrowed or raked smooth in such a manner that the fertilizer and lime will be well worked into the upper six (6) inches (152 mm) of the soil.
 - 5. Apply herbicide as recommended by the government agency having jurisdiction.
 - 6. Scarify undisturbed subsoil to a depth of four (4) inches (102 mm) prior to placement of topsoil.
 - 7. Remove rocks and other objects over two (2) inches (51 mm) in diameter.
- B. Topsoil
 - 1. Remove unacceptable materials such as clay, asphalt, brick, concrete, wood products and metals to a minimum depth of 12" from existing grades.
 - 2. Locate bench marks and other reference points for final elevations for topsoil. Notify Architect of any discrepancies in indicated reference points.
 - 3. Place topsoil to a minimum depth of four (4) inches (102 mm) evenly over subsoil areas according to elevations set forth on grading plans or to match existing grade. The finish surface shall be reasonable smooth, compacted, free from irregular surface changes, and ready for planting. The degree of finish shall be that ordinarily obtainable from a blade grader. The finished surface shall not be more than .15 foot above or below the established grade and .08 foot below final grades of curbs and sidewalks.
 - 4. The finish grade shall be inspected and approved by the Architect.

3.3 CLEAN UP

- A. Immediately clean up spills, soil and conditioners on paved and finished surface areas.
- B. Remove debris and excess materials from project site.

END OF SECTION 329113

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SECTION 329200 TURF AND GRASSES

PART 1 - GENERAL

- A. Submittals: In addition to Product Data for each type of product indicated, submit a planting schedule indicating anticipated planting dates.
- B. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when planting is in progress.
- C. Topsoil Analysis: Furnish soil analysis by a qualified soil-testing laboratory.
- D. Seed and Other Packaged Materials: Deliver packaged materials in original, unopened containers showing weight certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws, as applicable.
- E. Sod: Harvest, deliver, store, and handle sod according to requirements in TPI's "Specifications for Turfgrass Sod Materials" and "Specifications for Turfgrass Sod Transplanting and Installation" in its "Guideline Specifications to Turfgrass Sodding."
- F. Lawn Maintenance: Begin maintenance immediately after each area is planted and continue until acceptable lawn is established, but for not less than the following periods:
 - 1. Sodded Lawns: 30 days from date of Substantial Completion.
 - 2. Seeded Turf: 60 days from date of Substantial Completion.
 - 3. Mow lawn as soon as top growth is tall enough to cut. Remove no more than 40 percent of grass-leaf growth in initial or subsequent mowings.
 - 4. Mow turf as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than 1/3 of grass height. Remove no more than 1/3 of grass-leaf growth in initial or subsequent mowing. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Schedule initial and subsequent mowings to maintain a grass height of 1/2 to 1 inch.

PART 2 - PRODUCTS

- A. Grass Seed: Fresh, clean, dry, new-crop seed complying with AOSA's "Journal of Seed Technology: Rules for Testing Seeds" for purity and germination tolerances.
- B. Seed Species: State-certified seed of grass species as follows:
 - 1. Centipede (*Eremochloa ophiuroides*).
- C. Turfgrass Sod: ASPA Certified grade; cultivated grass sod, of type indicated below, complying with TPI's "Specifications for Turfgrass Sod Materials" in its "Guideline Specifications to Turfgrass Sodding." Furnish viable sod of uniform density, color, and texture, strongly rooted, and capable of vigorous growth and development when planted, as follows:
 - 1. Turfgrass Species: Centipede (*Eremochloa*) Grass Type: 98 percent.
- D. Topsoil: ASTM D 5268, pH range of 5.5 to 7, a minimum of 4 percent organic material content; free of stones 1 inch or larger in any dimension and other extraneous materials harmful to plant growth.
 - 1. Topsoil Source: Reuse surface soil stockpiled on-site and supplement with imported or manufactured topsoil from off-site sources when quantities are insufficient. Verify suitability of stockpiled surface soil to produce topsoil.
- E. Soil Amendments:

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1. Lime: ASTM C 602, Class T or O, agricultural limestone containing a minimum 80 percent calcium carbonate equivalent.
2. Sulfur: Granular, biodegradable, containing a minimum of 90 percent sulfur, with a minimum 99 percent passing through No. 6 sieve and a maximum 10 percent passing through No. 40 sieve.
3. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.
4. Aluminum Sulfate: Commercial grade, unadulterated.
5. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8.
6. Wood Derivatives: Decomposed, nitrogen-treated sawdust, ground bark, or wood waste; of uniform texture, free of chips, stones, sticks, soil, or toxic materials.

F. Fertilizer:

1. Bonemeal: Commercial, raw or steamed, finely ground; a minimum of 4 percent nitrogen and 10 percent phosphoric acid.
2. Superphosphate: Commercial, phosphate mixture, soluble; a minimum of 20 percent available phosphoric acid.
3. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:
 - a. Composition: 1 lb/1000 sq. ft. of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.
4. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:
 - a. Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.

G. Mulches:

1. Fiber Mulch: Biodegradable, dyed-wood, cellulose-fiber mulch; nontoxic and free of plant-growth or germination inhibitors; with a maximum moisture content of 15 percent and a pH range of 4.5 to 6.5.
2. Nonasphaltic Tackifier: Colloidal tackifier recommended by fiber-mulch manufacturer for slurry application; nontoxic and free of plant-growth or germination inhibitors.

PART 3 - EXECUTION

- A. Newly Graded Subgrades: Loosen subgrade to a minimum depth of 4 inches. Remove stones larger than 1-1/2 inches in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
 1. Apply fertilizer directly to subgrade before loosening.
 2. Thoroughly blend planting soil mix off-site before spreading or spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil mix.
 3. Spread planting soil mix to a depth of 6 inches but not less than required to meet finish grades after light rolling and natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.
- B. Unchanged Subgrades: If lawns are to be planted in areas unaltered or undisturbed by excavating, grading, or surface soil stripping operations, prepare surface soil as follows:

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1. Remove existing grass, vegetation, and turf. Do not mix into surface soil.
 2. Loosen surface soil to a depth of at least of 6 inches. Apply soil amendments and fertilizers according to planting soil mix proportions and mix thoroughly into top 4 inches of soil. Till soil to a homogeneous mixture of fine texture.
 3. Remove stones larger than 1-1/2 inches in any dimension and sticks, roots, trash, and other extraneous matter.
 4. Legally dispose of waste material, including grass, vegetation, and turf, off Owner's property.
- C. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus 1/2 inch of finish elevation.
- D. Moisten prepared lawn areas before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.
- E. Restore areas if eroded or otherwise disturbed after finish grading and before planting.
- F. Hydroseeding: Mix specified seed, fertilizer, and fiber mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application.
1. Mix slurry with fiber-mulch manufacturer's recommended tackifier.
 2. Apply slurry uniformly to all areas to be seeded in a one step process. Apply slurry at a rate so that mulch component is deposited not less than 1500-lb/acre dry weight, and seed component is deposited at grass seed manufacturer's recommended rate but not less than 30-lb/acre.
- G. Sodding: Lay sod within 24 hours of harvesting. Do not lay sod if dormant or if ground is frozen or muddy.
1. Lay sod to form a solid mass with tightly fitted joints. Butt ends and sides of sod; do not stretch or overlap. Stagger sod strips or pads to offset joints in adjacent courses. Avoid damage to subgrade or sod during installation. Tamp and roll lightly to ensure contact with subgrade, eliminate air pockets, and form a smooth surface. Work sifted soil or fine sand into minor cracks between pieces of sod; remove excess to avoid smothering sod and adjacent grass.
 2. Lay sod across angle of slopes exceeding 1:3.
 3. Anchor sod on slopes exceeding 1:6 with wood pegs spaced as recommended by sod manufacturer but not less than 2 anchors per sod strip to prevent slippage.
 4. Saturate sod with fine water spray within two hours of planting. During first week, water daily or more frequently as necessary to maintain moist soil to a minimum depth of 1-1/2 inches below sod.
- H. Satisfactory Seeded Turf: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 90 percent over any 10 sq. ft and bare spots not exceeding 5 by 5 inches.
- I. Satisfactory Sodded Lawn: At end of maintenance period, a healthy, well-rooted, even-colored, viable lawn has been established, free of weeds, open joints, bare areas, and surface irregularities.
- J. Reestablish lawns that do not comply with requirements and continue maintenance until lawns are satisfactory.

END OF SECTION 329200

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SECTION 330500 - COMMON WORK FOR UTILITIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.
- B. Mobile Area Water and Sewer System Standard Specifications

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Piping joining materials.
 - 2. Transition fittings.
 - 3. Sleeves.
 - 4. Grout.
 - 5. Flowable fill.
 - 6. Piped utility demolition.
 - 7. Piping system common requirements.

1.3 DEFINITIONS

- A. Exposed Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions.
- B. Concealed Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.
- C. DI: Ductile Iron.
- D. PVC: Polyvinyl chloride plastic.

1.4 QUALITY ASSURANCE

- A. Comply with ASME A13.1 for lettering size, length of color field, colors, and viewing angles of identification devices.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.
- B. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

1.6 COORDINATION

- A. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.

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- B. Coordinate installation of identifying devices after completing covering and painting if devices are applied to surfaces.
- C. Coordinate size and location of concrete bases. Formwork, reinforcement, and concrete requirements are specified in Division 03.

PART 2 - PRODUCTS

2.1 PIPING JOINING MATERIALS

- A. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.
 - 1. AWWA C110, rubber, flat face, 1/8 inch thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.
- B. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.
- C. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.
- D. Solvent Cements for Joining Plastic Piping:
 - 1. PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.

2.2 TRANSITION FITTINGS

- A. Transition Fittings, General: Same size as, and with pressure rating at least equal to and with ends compatible with, piping to be joined.
- B. AWWA Transition Couplings NPS 2 and Larger:
 - 1. Description: AWWA C219, metal sleeve-type coupling for underground pressure piping.
- C. Flexible Transition Couplings for Underground Non-pressure Drainage Piping:
 - 1. Description: ASTM C 1173 with elastomeric sleeve, ends same size as piping to be joined, and corrosion-resistant metal band on each end.

2.3 SLEEVES

- A. Cast-Iron Sleeves: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

2.4 GROUT

- A. Description: ASTM C 1107, Grade B, non-shrink and nonmetallic, dry hydraulic-cement grout.
 - 1. Characteristics: Post hardening, volume adjusting, non-staining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
 - 2. Design Mix: 5000-psi, 28-day compressive strength.
 - 3. Packaging: Premixed and factory packaged.

2.5 FLOWABLE FILL

- A. Description: Low-strength-concrete, flowable-slurry mix.

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1. Cement: ASTM C 150, Type I, Portland.
2. Density: 115- to 145-lb/cu. ft..
3. Aggregates: ASTM C 33, natural sand, fine.
4. Admixture: ASTM C 618, fly-ash mineral.
5. Water: Comply with ASTM C 94/C 94M.
6. Strength: 100 to 200 psi at 28 days.

PART 3 - EXECUTION

3.1 PIPED UTILITY DEMOLITION

- A. Disconnect, demolish, and remove piped utility systems, equipment, and components indicated to be removed.
 1. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
 2. Piping to Be Abandoned in Place: Drain piping. Fill abandoned piping with flowable fill, and cap or plug piping with same or compatible piping material.
 3. Equipment to Be Removed: Disconnect and cap services and remove equipment.
 4. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make operational.
 5. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
- B. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

3.2 PIPING INSTALLATION

- A. Install piping according to the following requirements and Division 33 Sections specifying piping systems.
- B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on the Coordination Drawings.
- C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- D. Install piping to permit valve servicing.
- E. Install piping at indicated slopes.
- F. Install piping free of sags and bends.
- G. Install fittings for changes in direction and branch connections.

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- H. Select system components with pressure rating equal to or greater than system operating pressure.

3.3 PIPING JOINT CONSTRUCTION

- A. Join pipe and fittings according to the following requirements and Division 33 Sections specifying piping systems.
- B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- D. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.
- E. Pressure-Sealed Joints: Assemble joints for plain-end copper tube and mechanical pressure seal fitting with proprietary crimping tool to according to fitting manufacturer's written instructions.
- F. Plastic Piping Solvent-Cemented Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
 - 1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
 - 2. ABS Piping: Join according to ASTM D 2235 and ASTM D 2661 appendixes.
 - 3. CPVC Piping: Join according to ASTM D 2846/D 2846M Appendix.
 - 4. PVC Pressure Piping: Join schedule number ASTM D 1785, PVC pipe and PVC socket fittings according to ASTM D 2672. Join other-than-schedule-number PVC pipe and socket fittings according to ASTM D 2855.
 - 5. PVC Non-pressure Piping: Join according to ASTM D 2855.
 - 6. PVC to ABS Non-pressure Transition Fittings: Join according to ASTM D 3138 Appendix.
- G. Plastic Pressure Piping Gasketed Joints: Join according to ASTM D 3139.
- H. Plastic Non-pressure Piping Gasketed Joints: Join according to ASTM D 3212.
- I. Plastic Piping Heat-Fusion Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join according to ASTM D 2657.
 - 1. Plain-End PE Pipe and Fittings: Use butt fusion.
 - 2. Plain-End PE Pipe and Socket Fittings: Use socket fusion.
- J. Bonded Joints: Prepare pipe ends and fittings, apply adhesive, and join according to pipe manufacturer's written instructions.

3.4 EQUIPMENT INSTALLATION

- A. Install equipment level and plumb, unless otherwise indicated.
- B. Install equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference with other installations. Extend grease fittings to an accessible location.

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- C. Install equipment to allow right of way to piping systems installed at required slope.

3.5 GROUTING

- A. Mix and install grout for equipment base bearing surfaces, pump and other equipment base plates, and anchors.
- B. Clean surfaces that will come into contact with grout.
- C. Provide forms as required for placement of grout.
- D. Avoid air entrapment during placement of grout.
- E. Place grout, completely filling equipment bases.
- F. Place grout on concrete bases and provide smooth bearing surface for equipment.
- G. Place grout around anchors.
- H. Cure placed grout.

END OF SECTION 330500

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SECTION 334100 - STORM UTILITY DRAINAGE PIPING

PART 1 - GENERAL

- 1.1 RELATED DOCUMENTS
 - A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.
- 1.2 SUMMARY
 - A. Section Includes:
 - 1. Pipe and fittings.
 - 2. Manholes.
 - 3. Catch basins
 - 4. Stormwater inlets
 - 5. Pipe outlets.
 - 6. Stormwater disposal systems.
- 1.3 SUBMITTALS
 - A. Product Data: For each type of product indicated.
 - B. Shop Drawings:
 - 1. Manholes: Include plans, elevations, sections, details, frames, and covers.
 - 2. Catch basins and stormwater inlets. Include plans, elevations, sections, details, frames, covers, and grates.
 - C. Product Certificates: The contractor shall provide a material certification for each material supplied. All concrete pipe and pre-cast concrete storm drainage boxes shall include certification which indicates compliance with Alabama Department of Transportation Standard Specifications for Highway Construction, 2018 Edition.
 - D. Field quality-control reports.
- 1.4 DELIVERY, STORAGE, AND HANDLING
 - A. Do not store plastic manholes, pipe, and fittings in direct sunlight.
 - B. Protect pipe, pipe fittings, and seals from dirt and damage.
 - C. Handle manholes according to manufacturer's written rigging instructions.
 - D. Handle catch basins and stormwater inlets according to manufacturer's written rigging instructions.

PART 2 - PRODUCTS

- 2.1 DUCTILE-IRON, CULVERT PIPE AND FITTINGS
 - A. Pipe: ASTM A 716, for push-on joints.

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- B. Standard Fittings: AWWA C110, ductile or gray iron, for push-on joints.
- C. Compact Fittings: AWWA C153, for push-on joints.
- D. Gaskets: AWWA C111, rubber.

2.2 PVC PIPE AND FITTINGS

- A. PVC Corrugated Sewer Piping:
 - 1. Pipe: ASTM F 949, PVC, corrugated pipe with bell-and-spigot ends for gasketed joints.
 - 2. Fittings: ASTM F 949, PVC molded or fabricated, socket type.
 - 3. Gaskets: ASTM F 477, elastomeric seals.
- B. PVC Sewer Piping:
 - 1. Pipe: ASTM F 794, PVC profile, gravity sewer pipe with bell-and-spigot ends for gasketed joints.
 - 2. Fittings: ASTM D 3034, PVC with bell ends.
 - 3. Gaskets: ASTM F 477, elastomeric seals.

2.3 CONCRETE PIPE AND FITTINGS

- A. Reinforced-Concrete Sewer Pipe and Fittings: Shall be in compliance with ALDOT Standard Specifications for Highway Construction, 2018 Edition, Section 530.
 - 1. All pipe shall be Class V unless specified otherwise.
 - 2. All pipe at the western drainage system located west of the perimeter retaining wall inclusive of pipe running between structures 58, 59, 60, 61, 62, 63, 64, 65 and 66 shall be Class III.
 - 3. All arch pipe that is not manufactured in Class V shall be Class IV.

2.4 CLEANOUTS

- A. Plastic Cleanouts:
 - 1. Description: PVC body with PVC threaded plug. Include PVC sewer pipe fitting and riser to cleanout of same material as sewer piping.

2.5 MANHOLES

- A. Standard Precast Concrete Manholes:
 - 1. Description: ASTM C 478, precast, reinforced concrete, of depth indicated, with provision for sealant joints. All structures shall be capable of supporting highway traffic loads AASHTO HL-93.
 - 2. Diameter: 48 inches minimum unless otherwise indicated.
 - 3. Ballast: Increase thickness of precast concrete sections or add concrete to base section as required to prevent flotation.

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4. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section, and separate base slab or base section with integral floor.
5. Riser Sections: 4-inch minimum thickness, and lengths to provide depth indicated.
6. Top Section: Concentric-cone type, and top of cone of size that matches grade rings.
7. Joint Sealant: ASTM C 990, bitumen or butyl rubber.
8. Resilient Pipe Connectors: ASTM C 923, cast or fitted into manhole walls, for each pipe connection.
9. Steps: Individual FRP steps, wide enough to allow worker to place both feet on one step and designed to prevent lateral slippage off step. Cast or anchor steps into sidewalls at 12- to 16-inch intervals.
10. Adjusting Rings: Interlocking cast iron rings with level or sloped edge in thickness and diameter matching manhole frame and cover, and of height required to adjust manhole frame and cover to indicated elevation and slope. Include sealant recommended by ring manufacturer.

2.6 CONCRETE

- A. All concrete material for storm drainage manhole shall be in accordance with ALDOT Standard Specifications for Highway Construction, 2018 Edition, Section 621.

2.7 CATCH BASINS

- A. Standard Precast Concrete Catch Basins: All storm drainage catch basins shall be in accordance with ALDOT Standard Specifications for Highway Construction, 2018 Edition, Section 621. All structures shall be capable of supporting highway traffic loads AASHTO HL-93.

2.8 STORMWATER INLETS

- A. Curb and Grate Inlets: All storm drainage inlets shall be in accordance with ALDOT Standard Specifications for Highway Construction, 2018 Edition, Section 621. All structures shall be capable of supporting highway traffic loads AASHTO HL-93.

PART 3 - EXECUTION

3.1 EARTHWORK

- A. Excavation, trenching, and backfilling are specified in Division 31 Section "Earth Moving."

3.2 PIPING INSTALLATION

- A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.
- B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.

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- C. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated.
- D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.
- E. When installing pipe under streets or other obstructions that cannot be disturbed, use pipe-jacking process of microtunneling.
- F. Install gravity-flow, nonpressure drainage piping according to the following:
 - 1. Install ductile-iron piping and special fittings according to AWWA C600 or AWWA M41.
 - 2. Install PVC sewer piping according to ASTM D 2321 and ASTM F 1668.
 - 3. Install reinforced-concrete sewer piping according to ASTM C 1479 and ACPA's "Concrete Pipe Installation Manual."

3.3 PIPE JOINT CONSTRUCTION

- A. Join gravity-flow, nonpressure drainage piping according to the following:
 - 1. Join ductile-iron culvert piping according to AWWA C600 for push-on joints.
 - 2. Join ductile-iron piping and special fittings according to AWWA C600 or AWWA M41.
 - 3. Join corrugated PE piping according to ASTM D 3212 for push-on joints.
 - 4. Join PVC cellular-core piping according to ASTM D 2321 and ASTM F 891 for solvent-cemented joints.
 - 5. Join PVC corrugated sewer piping according to ASTM D 2321 for elastomeric-seal joints.
 - 6. Join PVC sewer piping according to ASTM D 2321 and ASTM D 3034 for elastomeric-seal joints or ASTM D 3034 for elastomeric-gasketed joints.
 - 7. Join reinforced-concrete sewer piping according to ALDOT Standard Specifications for Highway Construction, 2018 Edition, Section 530.

3.4 CLEANOUT INSTALLATION

- A. Install cleanouts and riser extensions from sewer pipes to cleanouts at grade. Use cast-iron soil pipe fittings in sewer pipes at branches for cleanouts and cast-iron soil pipe for riser extensions to cleanouts. Install piping so cleanouts open in direction of flow in sewer pipe.
 - 1. Use Heavy-Duty, top-loading classification cleanouts in all areas.
- B. Set cleanout frames and covers in concrete pavement and roads with tops flush with pavement surface.

3.5 MANHOLE INSTALLATION

- A. General: Install manholes, complete with appurtenances and accessories indicated.
- B. Install precast concrete manhole sections with sealants according to ASTM C 891.
- C. Where specific manhole construction is not indicated, follow manhole manufacturer's written instructions.

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- D. Set tops of frames and covers flush with finished surface of manholes that occur in pavements. Set tops 3 inches above finished surface elsewhere unless otherwise indicated.
- 3.6 CATCH BASIN INSTALLATION
 - A. Construct catch basins to sizes and shapes indicated.
 - B. Set frames and grates to elevations indicated.
- 3.7 STORMWATER INLET AND OUTLET INSTALLATION
 - A. Construct inlet head walls, aprons, and sides of reinforced concrete, as indicated.
 - B. Construct riprap of broken stone, as indicated.
 - C. Install outlets that spill onto grade, with end sections as indicated that match pipe, where indicated.
 - D. Construct energy dissipaters at outlets, as indicated.
- 3.8 CONCRETE PLACEMENT
 - A. Place cast-in-place concrete according to ACI 318.
- 3.9 FIELD QUALITY CONTROL
 - A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.
 - 1. Submit separate reports for each system inspection.
 - 2. Defects requiring correction include the following:
 - a. Alignment: Less than full diameter of inside of pipe is visible between structures.
 - b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
 - c. Damage: Crushed, broken, cracked, or otherwise damaged piping.
 - d. Infiltration: Water leakage into piping.
 - e. Exfiltration: Water leakage from or around piping.
 - 3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
 - 4. Reinspect and repeat procedure until results are satisfactory.
- 3.10 CLEANING
 - A. Clean interior of piping of dirt and superfluous materials.

END OF SECTION 334100