STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISION 1

PROPOSAL

DATE AND TIME OF BID OPENING: DECEMBER 2, 2026 AT 2:00 PM

CONTRACT ID: DA00713

WBS ELEMENT NO.: 15RE.23.3

FEDERAL AID NO.: STATE FUNDED

COUNTY: CURRITUCK

TIP NO.: N/A

MILES: 0

ROUTE NO.: US-158

LOCATION: CURRITUCK COUNTY REST AREA, US-158, POPULAR BRANCH, NC

TYPE OF WORK: REST AREA RENOVATION AND ADDITION

NOTICE:

ALL BIDDERS SHALL COMPLY WITH ALL APPLICABLE LAWS REGULATING THE PRACTICE OF GENERAL CONTRACTING AS CONTAINED IN CHAPTER 87 OF THE GENERAL STATUTES OF NORTH CAROLINA WHICH REQUIRES THE BIDDER TO BE LICENSED BY THE N.C. LICENSING BOARD FOR CONTRACTORS WHEN BIDDING ON ANY NON-FEDERAL AID PROJECT WHERE THE BID IS $40,000 OR MORE, EXCEPT FOR CERTAIN SPECIALTY WORK AS DETERMINED BY THE LICENSING BOARD. BIDDERS SHALL ALSO COMPLY WITH ALL OTHER APPLICABLE LAWS REGULATING THE PRACTICES OF ELECTRICAL, PLUMBING, HEATING AND AIR CONDITIONING AND REFRIGERATION CONTRACTING AS CONTAINED IN CHAPTER 87 OF THE GENERAL STATUTES OF NORTH CAROLINA. NOTWITHSTANDING THESE LIMITATIONS ON BIDDING, THE BIDDER WHO IS AWARDED ANY FEDERAL - AID FUNDED PROJECT SHALL COMPLY WITH CHAPTER 87 OF THE GENERAL STATUTES OF NORTH CAROLINA FOR LICENSING REQUIREMENTS WITHIN 60 CALENDAR DAYS OF BID OPENING.

THIS IS A REST AREA PROJECT. **BID BOND IS REQUIRED.**

NAME OF BIDDER

ADDRESS OF BIDDER

PROPOSAL FOR THE CONSTRUCTION OF
CONTRACT No. DA00713 IN CURRITUCK COUNTY, NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION,
RALEIGH, NORTH CAROLINA

The Bidder has carefully examined the location of the proposed work to be known as Contract No. **DA00713**; has carefully examined the plans and specifications, which are acknowledged to be part of the proposal, the special provisions, the proposal, the form of contract, and the forms of contract payment bond and contract performance bond; and thoroughly understands the stipulations, requirements and provisions. The undersigned bidder agrees to bound upon his execution of the bid and subsequent award to him by the Department of Transportation in accordance with this proposal to provide the necessary contract payment bond and contract performance bond within fourteen days after the written notice of award is received by him. The undersigned Bidder further agrees to provide all necessary machinery, tools, labor, and other means of construction; and to do all the work and to furnish all materials, except as otherwise noted, necessary to perform and complete the said contract in accordance with the *2024 Standard Specifications for Roads and Structures* by the dates(s) specified in the Project Special Provisions and in accordance with the requirements of the Engineer, and at the unit or lump sum prices, as the case may be, for the various items given on the sheets contained herein.

The Bidder shall provide and furnish all the materials, machinery, implements, appliances and tools, and perform the work and required labor to construct and complete Contract No. **DA00713** in **Currituck County**, for the unit or lump sum prices, as the case may be, bid by the Bidder in his bid and according to the proposal, plans, and specifications prepared by said Department, which proposal, plans, and specifications show the details covering this project, and hereby become a part of this contract.

The published volume entitled *North Carolina Department of Transportation, Raleigh, Standard Specifications for Roads and Structures, January 2024* with all amendments and supplements thereto, is by reference incorporated into and made a part of this contract; that, except as herein modified, all the construction and work included in this contract is to be done in accordance with the specifications contained in said volume, and amendments and supplements thereto, under the direction of the Engineer.

If the proposal is accepted and the award is made, the contract is valid only when signed either by the Contract Officer or such other person as may be designated by the Secretary to sign for the Department of Transportation. The conditions and provisions herein cannot be changed except over the signature of the said Contract Officer or Division Engineer.

The quantities shown in the itemized proposal for the project are considered to be approximate only and are given as the basis for comparison of bids. The Department of Transportation may increase or decrease the quantity of any item or portion of the work as may be deemed necessary or expedient.

An increase or decrease in the quantity of an item will not be regarded as sufficient ground for an increase or decrease in the unit prices, nor in the time allowed for the completion of the work, except as provided for the contract.

Accompanying this bid is a bid bond secured by a corporate surety, or certified check payable to the order of the Department of Transportation, for five percent of the total bid price, which deposit is to be forfeited as liquidated damages in case this bid is accepted and the Bidder shall fail to provide the required payment and performance bonds with the Department of Transportation, under the condition of this proposal, within 14 calendar days after the written notice of award is received by him, as provided in the *Standard Specifications*; otherwise said deposit will be returned to the Bidder.

TABLE OF CONTENTS

COVER SHEET
PROPOSAL SHEET

PROJECT SPECIAL PROVISIONS

BIDS OVER LIMIT: G-1
DIVISION LET CONTRACT PREQUALIFICATION: G-1
BOND REQUIREMENTS: G-1
CONTRACTOR CLAIM SUBMITTAL FORM: G-1
CONTRACT TIME AND LIQUIDATED DAMAGES: G-1
NO MAJOR CONTRACT ITEMS: G-2
NO SPECIALTY ITEMS: G-2
MINORITY BUSINESS ENTERPRISE AND WOMEN BUSINESS ENTERPRISE (DIVISIONS): G-2
RESTRICTIONS ON ITS EQUIPMENT AND SERVICES: G-17
USE OF UNMANNED AIRCRAFT SYSTEM (UAS): G-18
EQUIPMENT IDLING GUIDELINES: G-18
ELECTRONIC BIDDING: G-19
TWELVE MONTH GUARANTEE: G-19
OUTSOURCING OUTSIDE THE USA: G-20
EROSION AND SEDIMENT CONTROL/STORMWATER CERTIFICATION: G-20
PROCEDURE FOR MONITORING BORROW PIT DISCHARGE: G-25

STANDARD SPECIAL PROVISIONS

AVAILABILITY OF FUNDS – TERMINATION OF CONTRACTS SSP-1
NCDOT GENERAL SEED SPECIFICATION FOR SEED QUALITY SSP-2
ERRATA SSP-5
PLANT AND PEST QUARANTINES SSP-8
MINIMUM WAGES SSP-9
TITLE VI AND NONDISCRIMINATION: SSP-10
ON-THE-JOB TRAINING SSP-19

UNIT PROJECT SPECIAL PROVISIONS

REST AREA RA-1

PROPOSAL ITEM SHEET

ITEM SHEET(S)

INSTRUCTIONS TO BIDDERS

PLEASE READ ALL INSTRUCTIONS CAREFULLY
BEFORE PREPARING AND SUBMITTING YOUR BID.

All bids shall be prepared and submitted in accordance with the following requirements. Failure to comply with any requirement may cause the bid to be considered irregular and may be grounds for rejection of the bid.

For preparing and submitting the bid electronically, refer to Subarticle 102-8(B) of the *Standard Specifications.*

Bidders that bid electronically on Raleigh Central-Let projects will need a separate request to bid from the approved electronic bidding website for Division Contracts.

ELECTRONIC ON-LINE BID:

1. Plans and the proposal can be found on the Connect NCDOT website.
2. In accordance with Subarticle 102-8(B)(1) of the *Standard Specifications*, obtain an account and valid Digital Signature to bid with Bid Express (bidx.com)
3. In accordance with Subarticle 102-8(B)(3) of the *Standard Specifications*, if bid bond is required and bid deposit is not chosen register bond with Surety2000 or Tinubu and submit with the online bid.
4. In accordance with Article 102-3 of the *Standard Specifications*, registration on the Interested Parties List is required unless SP1 G02 Interested Parties List Not Required provision is included in the proposal.
5. Prepare and submit a bid electronically using the approved electronic bidding provider website.
6. Electronic bidding website necessary for electronic bidding can be found on the Bid Express website following the directions at: https://connect.ncdot.gov/letting/Pages/Electronic-Bidding.aspx.
7. Questions should be emailed 7 calendar days prior to the bid opening to **Mark S. Winslow** at **NCDOTDiv01Contracts@ncdot.gov** . Contact with any other NCDOT personnel concerning this project is strictly prohibited, unless otherwise noted, and may result in bids being considered non-responsive.

PROJECT SPECIAL PROVISIONS

GENERAL

BIDS OVER LIMIT:

(08-01-16) SPD 01-400

In accordance with GS 136-28.1(b), if the total bid amount of the contract exceeds $5.0 million, the bid will not be considered for award.

DIVISION LET CONTRACT PREQUALIFICATION:

(07-01-14)(12-1-16) SPD 01-410

Any firm that wishes to bid as a prime contractor shall be prequalified as a Bidder or PO Prime Contractor prior to submitting a bid. Information regarding prequalification can be found at: https://connect.ncdot.gov/business/Prequal/Pages/default.aspx.

Prior to performing the work, the prime contractor and/or subcontractor(s) shall be prequalified in the work code(s) which are identified as work items in the prime contractor's construction progress schedule that they will complete themselves. Any contractor identified as working outside their expertise may be considered in default of contract.

BOND REQUIREMENTS:

(6-1-16)(Rev.1-16-24) 102-8, 102-10 SPD 01-420A

A Bid Bond is required in accordance with Article 102-10 of the *Standard Specifications for Roads and Structures.*

Contract Payment and Performance Bonds are required in accordance with Article 103-7 of the *Standard Specifications*.

CONTRACTOR CLAIM SUBMITTAL FORM:

(2-12-14) 104-3 SPD 01-440

If the Contractor elects to file a written claim or requests an extension of contract time, it shall be submitted on the *Contractor Claim Submittal Form (CCSF)* available through the Construction Unit or at https://connect.ncdot.gov/projects/construction/Pages/Construction-Resources.aspx as Form CCSF under Construction Forms.

Any claims for additional compensation and/or extensions of the completion date shall be submitted to the Division Engineer in writing, with detailed justification, prior to submitting the final invoice payment. Once an invoice is received and accepted that is marked as "Final", the Contractor shall be barred from recovery.

CONTRACT TIME AND LIQUIDATED DAMAGES:

(7-1-95) (Rev. 12-18-07) 108 SP1 G10 A

The date of availability for this contract is **January 4, 2027**.

The completion date for this contract is **May 7, 2027**.

Except where otherwise provided by the contract, observation periods required by the contract will not be a part of the work to be completed by the completion date and/or intermediate contract times stated in the contract. The acceptable completion of the observation periods that extend beyond the final completion date shall be a part of the work covered by the performance and payment bonds.

The liquidated damages for this contract are **One Thousand Dollars ($ 1,000.00)** per calendar day.

NO MAJOR CONTRACT ITEMS:
(2-19-02) (Rev. 8-21-07) 104 SP1 G31

None of the items included in this contract will be major items.

NO SPECIALTY ITEMS:
(7-1-95)(Rev. 1-16-24) 108-6 SP1 G34

None of the items included in this contract will be specialty items (see Article 108-6 of the *Standard Specifications*).

MINORITY BUSINESS ENTERPRISE AND WOMEN BUSINESS ENTERPRISE (DIVISIONS):
(10-16-07)(Rev. 10-21-25) 102-15(J) SP1 G67

Description

The purpose of this Special Provision is to carry out the North Carolina Department of Transportation's policy of ensuring nondiscrimination in the award and administration of contracts financed in whole or in part with State funds.

Definitions

Additional MBE/WBE Subcontractors - Any MBE/WBE submitted at the time of bid that will not be used to meet the Combined MBE/WBE goal. No submittal of a Letter of Intent is required.

Combined MBE/WBE Goal: A portion of the total contract, expressed as a percentage that is to be performed by committed MBE/WBE subcontractors.

Committed MBE/WBE Subcontractor - Any MBE/WBE submitted at the time of bid that is being used to meet the Combined MBE / WBE goal by submission of a Letter of Intent. Or any MBE or WBE used as a replacement for a previously committed MBE or WBE firm.

Contract Goal Requirement - The approved participation at time of award, but not greater than the advertised Combined MBE/WBE contract goal.

Goal Confirmation Letter - Written documentation from the Department to the bidder confirming the Contractor's approved, committed participation along with a listing of the committed MBE and WBE firms.

Manufacturer - A firm that owns (or leases) and operates or maintains a factory or establishment that produces on the premises, the materials or supplies obtained by the Contractor. A firm that makes minor modifications to the materials, supplies, articles, or equipment is not a manufacturer.

MBE Participation (Anticipated) - A portion of the total contract, expressed as a percentage that is anticipated to be performed by committed MBE subcontractor(s).

Minority Business Enterprise (MBE) - A firm certified as a Disadvantaged Minority-Owned Business Enterprise through the North Carolina Unified Certification Program.

Regular Dealer - A firm that owns (or leases), and operates a store, warehouse, or other establishment in which the materials or supplies required for the performance of the contract are bought, kept in sufficient quantities, and regularly sold to the public in the usual course of business. A regular dealer engages in, as its principal business and in its own name, the purchase and sale or lease of the products in question. A regular dealer in such bulk items as steel, concrete or concrete products, gravel, stone, asphalt and petroleum products need not keep such products in stock, if it owns and operates distribution equipment for the products. Any supplement of regular dealers' own distribution equipment shall be by a long-term operating lease and not on an ad hoc or contract-by-contract basis.

Distributor – A firm that engages in the regular sale or lease of the items specified by the contract. A distributor assumes responsibility for the items it purchases once they leave the point of origin (e.g., a manufacturer's facility), making it liable for any loss or damage not covered by the carrier's insurance.

Replacement / Substitution – A full or partial reduction in the amount of work subcontracted to a committed (or an approved substitute) MBE/WBE firm.

North Carolina Unified Certification Program (NCUCP) - A program that provides comprehensive services and information to applicants for MBE/WBE certification. The MBE/WBE program follows the same regulations as the federal Disadvantaged Business Enterprise (DBE) program in accordance with 49 CFR Part 26.

United States Department of Transportation (USDOT) - Federal agency responsible for issuing regulations (49 CFR Part 26) and official guidance for the DBE program.

WBE Participation (Anticipated) - A portion of the total contract, expressed as a percentage that is anticipated to be performed by committed WBE subcontractor(s).

Women Business Enterprise (WBE) - A firm certified as a Disadvantaged Women-Owned Business Enterprise through the North Carolina Unified Certification Program.

Forms and Websites Referenced in this Provision

Payment Tracking System - On-line system in which the Contractor enters the payments made to MBE and WBE subcontractors who have performed work on the project. https://apps.dot.state.nc.us/Vendor/PaymentTracking/

DBE-IS *Subcontractor Payment Information* - Form for reporting the payments made to all MBE/WBE firms working on the project. This form is for paper bid projects only. https://connect.ncdot.gov/business/Turnpike/Documents/Form%20DBE-IS%20Subcontractor%20Payment%20Information.pdf

RF-1 *MBE/WBE Replacement Request Form* - Form for replacing a committed MBE or WBE. https://connect.ncdot.gov/projects/construction/Construction%20Forms/DBE%20MBE%20WBE%20Replacement%20Form%20and%20Instructions.pdf

SAF *Subcontract Approval Form* - Form required for approval to sublet the contract. https://connect.ncdot.gov/projects/construction/Construction%20Forms/SAF%20Form%20-%20Subcontract%20Approval%20Form%20Revised%2004-19.xlsm

JC-1 *Joint Check Notification Form* - Form and procedures for joint check notification. The form acts as a written joint check agreement among the parties providing full and prompt disclosure of the expected use of joint checks. http://connect.ncdot.gov/projects/construction/Construction%20Forms/Joint%20Check%20Notification%20Form.pdf

Letter of Intent - Form signed by the Contractor and the MBE/WBE subcontractor, manufacturer or regular dealer that affirms that a portion of said contract is going to be performed by the signed MBE/WBE for the estimated amount (based on quantities and unit prices) listed at the time of bid. http://connect.ncdot.gov/letting/LetCentral/Letter%20of%20Intent%20to%20Perform%20as%20a%20Subcontractor.pdf

Listing of MBE and WBE Subcontractors Form - Form for entering MBE/WBE subcontractors on a project that will meet the Combined MBE/WBE goal. This form is for paper bids only. http://connect.ncdot.gov/municipalities/Bid%20Proposals%20for%20LGA%20Content/09%20MBE-WBE%20Subcontractors%20(State).docx

Subcontractor Quote Comparison Sheet - Spreadsheet for showing all subcontractor quotes in the work areas where MBEs and WBEs quoted on the project. This sheet is submitted with good faith effort packages. http://connect.ncdot.gov/business/SmallBusiness/Documents/DBE%20Subcontractor%20Quote%20Comparison%20Example.xls

DBE Regular Dealer/Distributor Affirmation Form – Form is used to make a preliminary counting determination for each DBE listed as a regular dealer or distributor to assess its eligibility for 60 or 40 percent credit, respectively of the cost of materials or supplies based on its demonstrated capacity and intent to perform as a regular dealer or distributor, as defined in section 49 CFR 26.55 under the contract at issue. A Contractor will submit the completed form with the Letter of Intent. https://connect.ncdot.gov/projects/construction/Construction%20Forms/DBE%20Regular%20Dealer-Distributor%20Affirmation%20Form%20-%20USDOT%202024.pdf

Combined MBE/WBE Goal

There is NO MBE/WBE Goal for this project.

Directory of Transportation Firms (Directory)

Real-time information is available about firms doing business with the Department and firms that are certified through NCUCP in the Directory of Transportation Firms. Only firms identified in the Directory as MBE and WBE certified shall be used to meet the Combined MBE / WBE goal. The Directory can be found at the following link.

https://www.ebs.nc.gov/VendorDirectory/default.html

The listing of an individual firm in the directory shall not be construed as an endorsement of the firm's capability to perform certain work.

Listing of MBE/WBE Subcontractors

At the time of bid, bidders shall submit all MBE and WBE participation that they anticipate to use during the life of the contract. Only those identified to meet the Combined MBE/WBE goal will be considered committed, even though the listing shall include both committed MBE/WBE subcontractors and additional MBE/WBE subcontractors. Any additional MBE/WBE subcontractor participation above the goal will follow the banking guidelines found elsewhere in this provision. All other additional MBE/WBE subcontractor participation submitted at the time of bid will be used toward the Department's overall race-neutral goals. Only those firms with current MBE and WBE certification at the time of bid opening will be acceptable for listing in the bidder's submittal of MBE and WBE participation. The Contractor shall indicate the following required information:

(A) Electronic Bids

Bidders shall submit a listing of MBE and WBE participation in the appropriate section of the electronic submittal file.

(1) Submit the names and addresses of MBE and WBE firms identified to participate in the contract. If the bidder uses the updated listing of MBE and WBE firms shown in the electronic submittal file, the bidder may use the dropdown menu to access the name and address of the firms.

(2) Submit the contract line numbers of work to be performed by each MBE and WBE firm. When no figures or firms are entered, the bidder will be considered to have no MBE or WBE participation.

(3) The bidder shall be responsible for ensuring that the MBE and WBE are certified at the time of bid by checking the Directory of Transportation Firms. If the firm is not certified at the time of the bid-letting, that MBE's or WBE's participation will not count towards achieving the Combined MBE/WBE goal.

(B) Paper Bids

(1) *If the Combined MBE/ WBE goal is more than zero,*

(a) Bidders, at the time the bid proposal is submitted, shall submit a listing of MBE/WBE participation, including the names and addresses on *Listing of MBE and WBE Subcontractors* contained elsewhere in the contract documents in order for the bid to be considered responsive. Bidders shall indicate the total dollar value of the MBE and WBE participation for the contract.

(b) If bidders have no MBE or WBE participation, they shall indicate this on the *Listing of MBE and WBE Subcontractors* by entering the word "None" or the number "0." This form shall be completed in its entirety. **Blank forms will not be deemed to represent zero participation.** Bids submitted that do not have MBE and WBE participation indicated on the appropriate form will not be read publicly during the opening of bids. The Department will not consider these bids for award and the proposal will be rejected.

(c) The bidder shall be responsible for ensuring that the MBE/WBE is certified at the time of bid by checking the Directory of Transportation Firms. If the firm is not certified at the time of the bid-letting, that MBE's or WBE's participation will not count towards achieving the Combined MBE/WBE goal.

(2) *If the Combined MBE/WBE Goal is zero,* entries on the *Listing of MBE and WBE Subcontractors* are not required for the zero goal, however any MBE or WBE participation that is achieved during the project shall be reported in accordance with requirements contained elsewhere in the special provision.

MBE or WBE Prime Contractor

When a certified MBE or WBE firm bids on a contract that contains a Combined MBE/WBE Goal, the firm is responsible for meeting the goal or making good faith efforts to meet the goal, just like any other bidder. In most cases, a MBE or WBE bidder on a contract will meet the Combined MBE/WBE goal by virtue of the work it performs on the contract with its own forces. However, all the work that is performed by the MBE or WBE bidder and any other similarly certified subcontractors will count toward the goal. The MBE or WBE bidder shall list itself along with any MBE or WBE subcontractors, if any, in order to receive credit toward the goals.

MBE/WBE prime contractors shall also follow Sections A or B listed under *Listing of MBE/WBE Subcontractors* just as a non-MBE/WBE bidder would.

Written Documentation – Letter of Intent

The bidder shall submit written documentation for each MBE/WBE that will be used to meet the Combined MBE/WBE goal of the contract, indicating the bidder's commitment to use the MBE/WBE in the contract. This documentation shall be submitted on the Department's form titled *Letter of Intent*.

The documentation shall be received in the office of the Engineer no later than 2:00 p.m. of the fifth calendar day following opening of bids, unless the fifth day falls on Saturday, Sunday or an official state holiday. In that situation, it is due in the office of the Engineer no later than 10:00 a.m. on the next official state business day.

If the bidder fails to submit the Letter of Intent from each committed MBE and WBE to be used toward the Combined MBE/WBE goal, or if the form is incomplete (i.e. both signatures are not present), the MBE/WBE participation will not count toward meeting the Combined MBE/WBE goal. If the lack of this participation drops the commitment below the Combined MBE/WBE goal, the Contractor shall submit evidence of good faith efforts for the goal not met, completed in its entirety, to the Engineer no later than 2:00 p.m. of the eighth calendar day following opening of bids, unless the eighth day falls on Saturday, Sunday or an official state holiday. In that situation, it is due in the office of the Engineer no later than 10:00 a.m. on the next official state business day.

Banking MBE/WBE Credit

If the committed MBE/WBE participation submitted exceeds the algebraic sum of the Combined MBE/WBE goal by $1,000 or more, the excess will be placed on deposit by the Department for future use by the bidder. Separate accounts will be maintained for MBE and WBE participation and these may accumulate for a period not to exceed 24 months.

When the apparent lowest responsive bidder fails to submit sufficient participation by MBE and WBE firms to meet the advertised goal, as part of the good faith effort, the Department will consider allowing the bidder to withdraw funds to meet the Combined MBE/WBE goal as long as there are adequate funds available from the bidder's MBE and WBE bank accounts.

Submission of Good Faith Effort

If the bidder fails to meet or exceed the Combined MBE/WBE goal, the apparent lowest responsive bidder shall submit to the Department documentation of adequate good faith efforts made to reach that specific goal.

One complete set and **0** copies of this information shall be received in the office of the Engineer no later than 2:00 p.m. of the fifth calendar day following opening of bids, unless the fifth day falls on Saturday, Sunday or an official state holiday. In that situation, it is due in the office of the Engineer no later than 10:00 a.m. on the next official state business day.

Note: Where the information submitted includes repetitious solicitation letters, it will be acceptable to submit a representative letter along with a distribution list of the firms that were solicited. Documentation of MBE/WBE quotations shall be a part of the good faith effort

submittal. This documentation may include written subcontractor quotations, telephone log notations of verbal quotations, or other types of quotation documentation.

Consideration of Good Faith Effort for Projects with a Combined MBE/WBE Goal More Than Zero

Adequate good faith efforts mean that the bidder took all necessary and reasonable steps to achieve the goal which, by their scope, intensity, and appropriateness, could reasonably be expected to obtain sufficient MBE/WBE participation. Adequate good faith efforts also mean that the bidder actively and aggressively sought MBE/WBE participation. Mere *pro forma* efforts are not considered good faith efforts.

The Department will consider the quality, quantity, and intensity of the different kinds of efforts a bidder has made. Listed below are examples of the types of actions a bidder will take in making a good faith effort to meet the goals and are not intended to be exclusive or exhaustive, nor is it intended to be a mandatory checklist.

(A) Soliciting through all reasonable and available means (e.g. attendance at pre-bid meetings, advertising, written notices, use of verifiable electronic means through the use of the NCDOT Directory of Transportation Firms) the interest of all certified MBEs/WBEs that are also prequalified subcontractors. The bidder must solicit this interest within at least 10 days prior to bid opening to allow the MBEs/WBEs to respond to the solicitation. Solicitation shall provide the opportunity to MBEs/WBEs within the Division and surrounding Divisions where the project is located. The bidder must determine with certainty if the MBEs/WBEs are interested by taking appropriate steps to follow up initial solicitations.

(B) Selecting portions of the work to be performed by MBEs/WBEs in order to increase the likelihood that the Combined MBE/WBE goal will be achieved.

(1) Where appropriate, break out contract work items into economically feasible units to facilitate MBE/WBE participation, even when the prime contractor might otherwise prefer to perform these work items with its own forces.

(2) Negotiate with subcontractors to assume part of the responsibility to meet the advertised goal when the work to be sublet includes potential for MBE/WBE participation (2nd and 3rd tier subcontractors).

(C) Providing interested certified MBEs/WBEs that are also prequalified subcontractors with adequate information about the plans, specifications, and requirements of the contract in a timely manner to assist them in responding to a solicitation.

(D) (1) Negotiating in good faith with interested MBEs/WBEs. It is the bidder's responsibility to make a portion of the work available to MBE/WBE subcontractors and suppliers and to select those portions of the work or material needs consistent with the available MBE/WBE subcontractors and suppliers, so as to facilitate MBE/WBE participation. Evidence of such negotiation includes the names, addresses, and telephone numbers of MBEs/WBEs that were considered;

a description of the information provided regarding the plans and specifications for the work selected for subcontracting; and evidence as to why additional agreements could not be reached for MBEs/WBEs to perform the work.

(2) A bidder using good business judgment would consider a number of factors in negotiating with subcontractors, including MBE/WBE subcontractors, and would take a firm's price and capabilities as well as the advertised goal into consideration. However, the fact that there may be some additional costs involved in finding and using MBEs/WBEs is not in itself sufficient reason for a bidder's failure to meet the advertised goal, as long as such costs are reasonable. Also, the ability or desire of a prime contractor to perform the work of a contract with its own organization does not relieve the bidder of the responsibility to make good faith efforts. Bidding contractors are not, however, required to accept higher quotes from MBEs/WBEs if the price difference is excessive or unreasonable.

(E) Not rejecting MBEs/WBEs as being unqualified without sound reasons based on a thorough investigation of their capabilities. The bidder's standing within its industry, membership in specific groups, organizations, or associates and political or social affiliations (for example, union vs. non-union employee status) are not legitimate causes for the rejection or non-solicitation of bids in the bidder's efforts to meet the project goal.

(F) Making efforts to assist interested MBEs/WBEs in obtaining bonding, lines of credit, or insurance as required by the recipient or bidder.

(G) Making efforts to assist interested MBEs/WBEs in obtaining necessary equipment, supplies, materials, or related assistance or services.

(H) Effectively using the services of available minority/women community organizations; minority/women contractors' groups; Federal, State, and local minority/women business assistance offices; and other organizations as allowed on a case-by-case basis to provide assistance in the recruitment and placement of MBEs/WBEs. Contact within 7 days from the bid opening the Business Opportunity and Work Force Development Unit at BOWD@ncdot.gov to give notification of the bidder's inability to get MBE or WBE quotes.

(I) Any other evidence that the bidder submits which shows that the bidder has made reasonable good faith efforts to meet the advertised goal.

In addition, the Department may take into account the following:

(1) Whether the bidder's documentation reflects a clear and realistic plan for achieving the Combined MBE/WBE goal.

(2) The bidders' past performance in meeting the contract goal.

(3) The performance of other bidders in meeting the advertised goal. For example, when the apparent successful bidder fails to meet the goal, but others meet it, you may reasonably raise the question of whether, with additional reasonable efforts the

apparent successful bidder could have met the goal. If the apparent successful bidder fails to meet the advertised goal, but meets or exceeds the average MBE and WBE participation obtained by other bidders, the Department may view this, in conjunction with other factors, as evidence of the apparent successful bidder having made a good faith effort.

If the Department does not award the contract to the apparent lowest responsive bidder, the Department reserves the right to award the contract to the next lowest responsive bidder that can satisfy to the Department that the Combined MBE/WBE goal can be met or that an adequate good faith effort has been made to meet the advertised goal.

Non-Good Faith Appeal

The Engineer will notify the Contractor verbally and in writing of non-good faith. A Contractor may appeal a determination of non-good faith made by the Goal Compliance Committee. If a Contractor wishes to appeal the determination made by the Committee, they shall provide written notification to the Engineer. The appeal shall be made within 2 business days of notification of the determination of non-good faith.

Counting MBE/WBE Participation Toward Meeting the Combined MBE/WBE Goal

(A) Participation

The total dollar value of the participation by a committed MBE/WBE will be counted toward the contract goal requirements. The total dollar value of participation by a committed MBE/WBE will be based upon the value of work performed by the MBE/WBE and the actual payments to MBE/WBE firms by the Contractor.

(B) Joint Checks

Prior notification of joint check use shall be required when counting MBE/WBE participation for services or purchases that involves the use of a joint check. Notification shall be through submission of Form JC-1 *(Joint Check Notification Form)* and the use of joint checks shall be in accordance with the Department's Joint Check Procedures.

(C) Subcontracts (Non-Trucking)

A MBE/WBE may enter into subcontracts. Work that a MBE subcontracts to another MBE firm may be counted toward the anticipated MBE participation. The same holds for work that a WBE subcontracts to another WBE firm. Work that a MBE/WBE subcontracts to a non-MBE/WBE firm does <u>not</u> count toward the contract goal requirement. It should be noted that every effort shall be made by MBE and WBE contractors to subcontract to the same certification (i.e., MBEs to MBEs and WBEs to WBEs), in order to fulfill the MBE or WBE participation breakdown. This, however, may not always be possible due to the limitation of firms in the area. If the MBE or WBE firm shows a good faith effort has been made to reach out to similarly certified firms and there is no interest or availability, and they can get assistance from other certified firms, the Engineer will not hold the prime

responsible for meeting the individual MBE or WBE breakdown. If a MBE or WBE contractor or subcontractor subcontracts a significantly greater portion of the work of the contract than would be expected on the basis of standard industry practices, it shall be presumed that the MBE or WBE is not performing a commercially useful function.

(D) Joint Venture

When a MBE or WBE performs as a participant in a joint venture, the Contractor may count toward its contract goal requirement a portion of the total value of participation with the MBE or WBE in the joint venture, that portion of the total dollar value being a distinct clearly defined portion of work that the MBE or WBE performs with its forces.

(E) Manufacturer, Regular Dealer, Distributor

A Contractor may count toward its MBE/WBE requirement 40 percent of its expenditures for materials or supplies (including transportation costs) from a MBE/WBE distributor, 60 percent of its expenditures for materials or supplies (including transportation costs) from a MBE/WBE regular dealer and 100 percent of such expenditures obtained from a MBE/WBE manufacturer.

A Contractor may count toward its MBE/WBE requirement the following expenditures to MBE/WBE firms that are not manufacturers, regular dealers or distributors:

(1) The fees or commissions charged by a MBE/WBE firm for providing a *bona fide* service, such as professional, technical, consultant, or managerial services, or for providing bonds or insurance specifically required for the performance of a DOT-assisted contract, provided the fees or commissions are determined to be reasonable and not excessive as compared with fees and commissions customarily allowed for similar services.

(2) With respect to materials or supplies purchased from a MBE/WBE, which is neither a manufacturer, regular dealer, nor a distributor count the entire amount of fees or commissions charged that the Department deems to be reasonable, including transportation charges for the delivery of materials or supplies. Do not count any portion of the cost of the materials and supplies themselves.

A Contractor will submit a completed *DBE Regular Dealer/Distributor Affirmation Form* with the Letter of Intent to the Engineer. The Engineer will forward to the State Contractor Utilization Engineer or DBE@ncdot.gov. The State Contractor Utilization Engineer will make a preliminary assessment as to whether a MBE/WBE supplier has the demonstrated capacity to perform a commercially useful function (CUF) on a contract-by-contract basis *prior* to its participation.

Commercially Useful Function

(A) MBE/WBE Utilization

The Contractor may count toward its contract goal requirement only expenditures to MBEs and WBEs that perform a commercially useful function in the work of a contract. A MBE/WBE performs a commercially useful function when it is responsible for execution of the work of the contract and is carrying out its responsibilities by performing, managing, and supervising the work involved. To perform a commercially useful function, the MBE/WBE shall also be responsible with respect to materials and supplies used on the contract, for negotiating price, determining quality and quantity, ordering the material and installing (where applicable) and paying for the material itself. To determine whether a MBE/WBE is performing a commercially useful function, the Department will evaluate the amount of work subcontracted, industry practices, whether the amount the firm is to be paid under the contract is commensurate with the work it is performing and the MBE/WBE credit claimed for its performance of the work, and any other relevant factors. If it is determined that a MBE or WBE is not performing a Commercially Useful Function, the contractor may present evidence to rebut this presumption to the Department.

(B) MBE/WBE Utilization in Trucking

The following factors will be used to determine if a MBE or WBE trucking firm is performing a commercially useful function:

(1) The MBE/WBE shall be responsible for the management and supervision of the entire trucking operation for which it is responsible on a particular contract, and there shall not be a contrived arrangement for the purpose of meeting the Combined MBE/WBE goal.

(2) The MBE/WBE shall itself own and operate at least one fully licensed, insured, and operational truck used on the contract.

(3) The MBE/WBE receives credit for the total value of the transportation services it provides on the contract using trucks it owns, insures, and operates using drivers it employs.

(4) The MBE may subcontract the work to another MBE firm, including an owner-operator who is certified as a MBE. The same holds true that a WBE may subcontract the work to another WBE firm, including an owner-operator who is certified as a WBE. When this occurs, the MBE or WBE who subcontracts work receives credit for the total value of the transportation services the subcontracted

MBE or WBE provides on the contract. It should be noted that every effort shall be made by MBE and WBE contractors to subcontract to the same certification (i.e., MBEs to MBEs and WBEs to WBEs), in order to fulfill the participation breakdown. This, however, may not always be possible due to the limitation of firms in the area. If the MBE or WBE firm shows a good faith effort has been made to reach out to similarly certified transportation service providers and there is no interest or availability, and they can get assistance from other certified providers, the Engineer will not hold the prime responsible for meeting the individual MBE or WBE participation breakdown.

(5) The MBE/WBE may also subcontract the work to a non-MBE/WBE firm, including from an owner-operator. The MBE/WBE who subcontracts the work to a non-MBE/WBE is entitled to credit for the total value of transportation services provided by the non-MBE/WBE subcontractor not to exceed the value of transportation services provided by MBE/WBE-owned trucks on the contract. Additional participation by non-MBE/WBE subcontractors receives credit only for the fee or commission it receives as a result of the subcontract arrangement. The value of services performed under subcontract agreements between the MBE/WBE and the Contractor will not count towards the MBE/WBE contract requirement.

(6) A MBE/WBE may lease truck(s) from an established equipment leasing business open to the general public. The lease must indicate that the MBE/WBE has exclusive use of and control over the truck. This requirement does not preclude the leased truck from working for others during the term of the lease with the consent of the MBE/WBE, so long as the lease gives the MBE/WBE absolute priority for use of the leased truck. This type of lease may count toward the MBE/WBE's credit as long as the driver is under the MBE/WBE's payroll.

(7) Subcontracted/leased trucks shall display clearly on the dashboard the name of the MBE/WBE that they are subcontracted/leased to and their own company name if it is not identified on the truck itself. Magnetic door signs are not permitted.

MBE/WBE Replacement

When a Contractor has relied on a commitment to a MBE or WBE subcontractor (or an approved substitute MBE or WBE subcontractor) to meet all or part of a contract goal requirement, the contractor shall not terminate the MBE/WBE subcontractor or any portion of its work for convenience. This includes, but is not limited to, instances in which the Contractor seeks to perform the work of the terminated subcontractor with another MBE/WBE subcontractor, a non-MBE/WBE subcontractor, or with the Contractor's own forces or those of an affiliate.

The Contractor must give notice in writing both by certified mail and email to the MBE/WBE subcontractor, with a copy to the Engineer of its intent to request to terminate a MBE/WBE subcontractor or any portion of its work, and the reason for the request. The Contractor must give the MBE/WBE subcontractor five (5) business days to respond to the Contractor's Notice of Intent to Request Termination and/or Substitution. If the MBE/WBE subcontractor objects to the intended termination/substitution, the MBE/WBE, within five (5) business days must advise the Contractor and the Department of the reasons why the action should not be approved. The five-

day notice period shall begin on the next business day after written notice is provided to the MBE/WBE subcontractor.

A committed MBE/WBE subcontractor may only be terminated or any portion of its work after receiving the Department's written approval based upon a finding of good cause for the proposed termination and/or substitution. Good cause does not exist if the Contractor seeks to terminate a MBE/WBE or any portion of its work that it relied upon to obtain the contract so that the Contractor can self-perform the work for which the MBE/WBE was engaged, or so that the Contractor can substitute another MBE/WBE or non- MBE/WBE contractor after contract award. For purposes of this section, good cause shall include the following circumstances:

(a) The listed MBE/WBE subcontractor fails or refuses to execute a written contract;
(b) The listed MBE/WBE subcontractor fails or refuses to perform the work of its subcontract in a way consistent with normal industry standards. Provided, however, that good cause does not exist if the failure or refusal of the MBE/WBE subcontractor to perform its work on the subcontract results from the bad faith or discriminatory action of the prime contractor;
(c) The listed MBE/WBE subcontractor fails or refuses to meet the prime contractor's reasonable, nondiscriminatory bond requirements;
(d) The listed MBE/WBE subcontractor becomes bankrupt, insolvent, or exhibits credit unworthiness;
(e) The listed MBE/WBE subcontractor is ineligible to work on public works projects because of suspension and debarment proceedings pursuant to 2 CFR parts 180, 215 and 1200 or applicable State law;
(f) The listed MBE/WBE subcontractor is not a responsible contractor;
(g) The listed MBE/WBE voluntarily withdraws from the project and provides written notice of withdrawal;
(h) The listed MBE/WBE is ineligible to receive MBE/WBE credit for the type of work required;
(i) A MBE/WBE owner dies or becomes disabled with the result that the listed MBE/WBE contractor is unable to complete its work on the contract; and
(j) Other documented good cause that compels the termination of the MBE/WBE subcontractor.

The Contractor shall comply with the following for replacement of a committed MBE/WBE:

(A) Performance Related Replacement

When a committed MBE/WBE is terminated for good cause as stated above, an additional MBE/WBE that was submitted at the time of bid may be used to fulfill the MBE/WBE commitment to meet the Combined MBE/WBE Goal. A good faith effort will only be required for removing a committed MBE/WBE if there were no additional MBE/WBEs submitted at the time of bid to cover the same amount of work as the MBE/WBE that was terminated.

If a replacement MBE/WBE is not found that can perform at least the same amount of work as the terminated MBE/WBE, the Contractor shall submit a good faith effort documenting the steps taken. Such documentation shall include, but not be limited to, the following:

(1) Copies of written notification to MBE/WBEs that their interest is solicited in contracting the work defaulted by the previous MBE/WBE or in subcontracting other items of work in the contract.

(2) Efforts to negotiate with MBE/WBEs for specific subbids including, at a minimum:

(a) The names, addresses, and telephone numbers of MBE/WBEs who were contacted.
(b) A description of the information provided to MBE/WBEs regarding the plans and specifications for portions of the work to be performed.

(3) A list of reasons why MBE/WBE quotes were not accepted.

(4) Efforts made to assist the MBE/WBEs contacted, if needed, in obtaining bonding or insurance required by the Contractor.

(B) Decertification Replacement

(1) When a committed MBE/WBE is decertified by the Department after the SAF (*Subcontract Approval Form*) has been received by the Department, the Department will not require the Contractor to solicit replacement MBE/WBE participation equal to the remaining work to be performed by the decertified firm. The participation equal to the remaining work performed by the decertified firm will count toward the contract goal requirement but not the overall goal.

(i) If the MBE/WBE's ineligibility is caused solely by its having exceeded the size standard during the performance of the contract. The Department may continue to count participation equal to the remaining work performed by the decertified firm which will count toward the contract goal requirement and overall goal.

(ii) If the MBE/WBE's ineligibility is caused solely by its acquisition by or merger with a non- MBE/WBE during the performance of the contract. The Department may not continue to count the portion of the decertified firm's performance on the contract remaining toward either the contract goal or the overall goal, even if the Contractor has executed a subcontract with the firm or the Department has executed a prime contract with the MBE/WBE that was later decertified.

(2) When a committed MBE/WBE is decertified prior to the Department receiving the SAF (*Subcontract Approval Form*) for the named MBE/WBE firm, the Contractor shall take all necessary and reasonable steps to replace the MBE/WBE subcontractor with another MBE/WBE subcontractor to perform at least the same

amount of work to meet the Combined MBE/WBE goal requirement. If a MBE/WBE firm is not found to do the same amount of work, a good faith effort must be submitted to NCDOT (see A herein for required documentation).

All requests for replacement of a committed MBE/WBE firm shall be submitted to the Engineer for approval on Form RF-1 *(DBE Replacement Request).* If the Contractor fails to follow this procedure, the Contractor may be disqualified from further bidding for a period of up to 6 months.

Changes in the Work

When the Engineer makes changes that result in the reduction or elimination of work to be performed by a committed MBE/WBE, the Contractor will not be required to seek additional participation. When the Engineer makes changes that result in additional work to be performed by a MBE/WBE based upon the Contractor's commitment, the MBE/WBE shall participate in additional work to the same extent as the MBE/WBE participated in the original contract work.

When the Engineer makes changes that result in extra work, which has more than a minimal impact on the contract amount, the Contractor shall seek additional participation by MBEs/WBEs unless otherwise approved by the Engineer.

When the Engineer makes changes that result in an alteration of plans or details of construction, and a portion or all of the work had been expected to be performed by a committed MBE/WBE, the Contractor shall seek participation by MBEs/WBEs unless otherwise approved by the Engineer.

When the Contractor requests changes in the work that result in the reduction or elimination of work that the Contractor committed to be performed by a MBE/WBE, the Contractor shall seek additional participation by MBEs/WBEs equal to the reduced MBE/WBE participation caused by the changes.

Reports and Documentation

A SAF (*Subcontract Approval Form*) shall be submitted for all work which is to be performed by a MBE/WBE subcontractor. The Department reserves the right to require copies of actual subcontract agreements involving MBE/WBE subcontractors.

When using transportation services to meet the contract commitment, the Contractor shall submit a proposed trucking plan in addition to the SAF. The plan shall be submitted prior to beginning construction on the project. The plan shall include the names of all trucking firms proposed for use, their certification type(s), the number of trucks owned by the firm, as well as the individual truck identification numbers, and the line item(s) being performed.

Within 30 calendar days of entering into an agreement with a MBE/WBE for materials, supplies or services, not otherwise documented by the SAF as specified above, the Contractor shall furnish the Engineer a copy of the agreement. The documentation shall also indicate the percentage (60% or 100%) of expenditures claimed for MBE/WBE credit.

Reporting Minority and Women Business Enterprise Participation

The Contractor shall provide the Engineer with an accounting of payments made to all MBE and WBE firms, including material suppliers and contractors at all levels (prime, subcontractor, or second tier subcontractor). This accounting shall be furnished to the Engineer for any given month by the end of the following month. Failure to submit this information accordingly may result in the following action:

(A) Withholding of money due in the next partial pay estimate; or

(B) Removal of an approved contractor from the prequalified bidders' list or the removal of other entities from the approved subcontractors list.

While each contractor (prime, subcontractor, 2nd tier subcontractor) is responsible for accurate accounting of payments to MBEs/WBEs, it shall be the prime contractor's responsibility to report all monthly and final payment information in the correct reporting manner.

Failure on the part of the Contractor to submit the required information in the time frame specified may result in the disqualification of that contractor and any affiliate companies from further bidding until the required information is submitted.

Failure on the part of any subcontractor to submit the required information in the time frame specified may result in the disqualification of that contractor and any affiliate companies from being approved for further work on future projects until the required information is submitted.

Contractors reporting transportation services provided by non-MBE/WBE lessees shall evaluate the value of services provided during the month of the reporting period only.

At any time, the Engineer can request written verification of subcontractor payments.
The Contractor shall report the accounting of payments through the Department's DBE Payment Tracking System.

Failure to Meet Contract Requirements

Failure to meet contract requirements in accordance with Subarticle 102-15(J) of the *Standard Specifications* may be cause to disqualify the Contractor.

RESTRICTIONS ON ITS EQUIPMENT AND SERVICES:
(11-17-20) SP01 G090

All telecommunications, video or other ITS equipment or services installed or utilized on this project must be in conformance with UNIFORM ADMINISTRATIVE REQUIREMENTS, COST PRINCIPLES, AND AUDIT REQUIREMENTS FOR FEDERAL AWARDS **2 CFR, § 200.216 Prohibition on certain telecommunications and video surveillance services or equipment.**

USE OF UNMANNED AIRCRAFT SYSTEM (UAS):

(8-20-19)(Rev. 12-15-26) SP1 G092

The Contractor shall adhere to all Federal, State and Local regulations and guidelines for the use of Unmanned Aircraft Systems (UAS). This includes but is not limited to US 14 CFR Part 107, NC GS 15A-300*,* American Security Drone Act of 2023 (ASDA), Office of Management and Budget (OMB) Memorandum M-26-02, FHWA UAS Policy No. FHWA-HIF-26-011, all FAA rules, regulations and policies and all NCDOT UAS Policies. The required operator certifications include possessing a current Federal Aviation Administration (FAA) Remote Pilot Certificate, as well as operating a UAS registered with the FAA.

All UAS operations shall be approved by the Engineer prior to beginning the operations. The Contractor shall provide, upon request, documentation of the manufacturer and supply chain provenance for all UAS used on the project.

All contractors or subcontractors operating UAS shall have UAS specific general liability insurance to cover all operations under this contract.

The use of UAS is at the Contractor's discretion. No measurement or payment will be made for the use of UAS. In the event that the Department directs the Contractor to utilize UAS, payment will be in accordance with Article 104-7 Extra Work.

EQUIPMENT IDLING GUIDELINES:

(1-19-21) 107 SP1 G096

Exercise reduced fuel consumption and reduced equipment emissions during the construction of all work associated with this contract. Employees engaged in the construction of this project should turn off vehicles when stopped for more than thirty (30) minutes and off-highway equipment should idle no longer than fifteen (15) consecutive minutes.

These guidelines for turning off vehicles and equipment when idling do not apply to:

1. Idling when queuing.
2. Idling to verify the vehicle is in safe operating condition.
3. Idling for testing, servicing, repairing or diagnostic purposes.
4. Idling necessary to accomplish work for which the vehicle was designed (such as operating a crane, mixing concrete, etc.).
5. Idling required to bring the machine system to operating temperature.
6. Emergency vehicles, utility company, construction, and maintenance vehicles where the engines must run to perform needed work.
7. Idling to ensure safe operation of the vehicle.
8. Idling when the propulsion engine is providing auxiliary power for other than heating or air conditioning. (such as hydraulic systems for pavers)
9. When specific traffic, safety, or emergency situations arise.
10. If the ambient temperature is less than 32 degrees Fahrenheit. Limited idling to provide for the safety of vehicle occupants (e.g. to run the heater).

11. If the ambient temperature is greater than 90 degrees Fahrenheit. Limited idling to provide for the safety of vehicle occupants of off-highway equipment (e.g. to run the air conditioning) no more than 30 minutes.
12. Diesel powered vehicles may idle for up to 30 minutes to minimize restart problems.

Any vehicle, truck, or equipment in which the primary source of fuel is natural gas or electricity is exempt from the idling limitations set forth in this special provision.

ELECTRONIC BIDDING:

(8-18-26) 101, 102, 103 SP1 G140

Revise the *Standard Specifications* as follows:

Page 1-4, Article 101-3, DEFINITIONS, BID (OR PROPOSAL) ***Electronic Bid,*** **line 3,** replace "electronic bidding software" with "electronic bidding website".

Page 1-16, Subarticle 102-8(B), Electronic Bids, lines 13-14, replace "electronic bidding software" with "electronic bidding website".

Page 1-18, Article 102-10, BID BOND OR BID DEPOSIT, line 43, replace "electronic bidding software" with "electronic bidding website".

Page 1-18, Article 102-11, DELIVERY OF BIDS, line 47, replace "electronic bidding software" with "electronic bidding website".

Page 1-25, Subarticle 103-4(B)(2), Electronic Bids, line 20, replace the first paragraph with the following:

This form is located on the electronic submittal website. The bidder shall click on yes or no to indicate whether or not the bidder desires to limit the award, provide the award limit if desiring to limit the award, and provide the project number and county of the projects associated with the award limit.

TWELVE MONTH GUARANTEE:

(7-15-03) 108 SP1 G145

(A) The Contractor shall guarantee materials and workmanship against latent and patent defects arising from faulty materials, faulty workmanship or negligence for a period of twelve months following the date of final acceptance of the work for maintenance and shall replace such defective materials and workmanship without cost to the Department. The Contractor will not be responsible for damage due to faulty design, normal wear and tear, for negligence on the part of the Department, and/or for use in excess of the design.

(B) Where items of equipment or material carry a manufacturer's guarantee for any period in excess of twelve months, then the manufacturer's guarantee shall apply for that particular piece of equipment or material. The Department's first remedy shall be through the manufacturer although the Contractor is responsible for invoking the warranted repair work with the manufacturer. The Contractor's responsibility shall be limited to the term of the

manufacturer's guarantee. NCDOT would be afforded the same warranty as provided by the Manufacturer.

This guarantee provision shall be invoked only for major components of work in which the Contractor would be wholly responsible for under the terms of the contract. Examples would include pavement structures, bridge components, and sign structures. This provision will not be used as a mechanism to force the Contractor to return to the project to make repairs or perform additional work that the Department would normally compensate the Contractor for. In addition, routine maintenance activities (i.e. mowing grass, debris removal, ruts in earth shoulders,) are not parts of this guarantee.

Appropriate provisions of the payment and/or performance bonds shall cover this guarantee for the project.

To ensure uniform application statewide the Division Engineer will forward details regarding the circumstances surrounding any proposed guarantee repairs to the Chief Engineer for review and approval prior to the work being performed.

OUTSOURCING OUTSIDE THE USA:

(9-21-04) (Rev. 5-16-06) SP1 G150

All work on consultant contracts, services contracts, and construction contracts shall be performed in the United States of America. No work shall be outsourced outside of the United States of America.

Outsourcing for the purpose of this provision is defined as the practice of subcontracting labor, work, services, staffing, or personnel to entities located outside of the United States.

The North Carolina Secretary of Transportation shall approve exceptions to this provision in writing.

EROSION AND SEDIMENT CONTROL/STORMWATER CERTIFICATION:

(1-16-07) (Rev. 10-15-24) 105-16, 225-2, 16 SP1 G180

General

Schedule and conduct construction activities in a manner that will minimize soil erosion and the resulting sedimentation and turbidity of surface waters. Comply with the requirements herein regardless of whether or not a National Pollution discharge Elimination System (NPDES) permit for the work is required.

Establish a chain of responsibility for operations and subcontractors' operations to ensure that the *Erosion and Sediment Control/Stormwater Pollution Prevention Plan* is implemented and maintained over the life of the contract.

(A) *Certified Supervisor* - Provide a certified Erosion and Sediment Control/Stormwater Supervisor to manage the Contractor and subcontractor operations, insure compliance with Federal, State and Local ordinances and regulations, and manage the Quality Control Program.

(B) *Certified Foreman* - Provide a certified, trained foreman for each construction operation that increases the potential for soil erosion or the possible sedimentation and turbidity of surface waters.

(C) *Certified Installer* - Provide a certified installer to install or direct the installation for erosion or sediment/stormwater control practices.

(D) *Certified Designer* - Provide a certified designer for the design of the erosion and sediment control/stormwater component of reclamation plans and, if applicable, for the design of the project erosion and sediment control/stormwater plan.

Roles and Responsibilities

(A) *Certified Erosion and Sediment Control/Stormwater Supervisor* - The Certified Supervisor shall be Level II and responsible for ensuring the erosion and sediment control/stormwater plan is adequately implemented and maintained on the project and for conducting the quality control program. The Certified Supervisor shall be on the project within 24 hours notice from initial exposure of an erodible surface to the project's final acceptance. Perform the following duties:

(1) Manage Operations - Coordinate and schedule the work of subcontractors so that erosion and sediment control/stormwater measures are fully executed for each operation and in a timely manner over the duration of the contract.

(a) Oversee the work of subcontractors so that appropriate erosion and sediment control/stormwater preventive measures are conformed to at each stage of the work.
(b) Prepare the required National Pollutant Discharge Elimination System (NPDES) Inspection Record and submit to the Engineer.
(c) Attend all weekly or monthly construction meetings to discuss the findings of the NPDES inspection and other related issues.
(d) Implement the erosion and sediment control/stormwater site plans requested.
(e) Provide any needed erosion and sediment control/stormwater practices for the Contractor's temporary work not shown on the plans, such as, but not limited to work platforms, temporary construction, pumping operations, plant and storage yards, and cofferdams.
(f) Acquire applicable permits and comply with requirements for borrow pits, dewatering, and any temporary work conducted by the Contractor in jurisdictional areas.
(g) Conduct all erosion and sediment control/stormwater work in a timely and workmanlike manner.
(h) Fully perform and install erosion and sediment control/stormwater work prior to any suspension of the work.
(i) Coordinate with Department, Federal, State and Local Regulatory agencies on resolution of erosion and sediment control/stormwater issues due to the Contractor's operations.

(j) Ensure that proper cleanup occurs from vehicle tracking on paved surfaces or any location where sediment leaves the Right-of-Way.

(k) Have available a set of erosion and sediment control/stormwater plans that are initialed and include the installation date of Best Management Practices. These practices shall include temporary and permanent groundcover and be properly updated to reflect necessary plan and field changes for use and review by Department personnel as well as regulatory agencies.

(2) Requirements set forth under the NPDES Permit - The Department's NPDES Stormwater permit (NCS000250) outlines certain objectives and management measures pertaining to construction activities. The permit references *NCG010000, General Permit to Discharge Stormwater* under the NPDES, and states that the Department shall incorporate the applicable requirements into its delegated Erosion and Sediment Control Program for construction activities disturbing one or more acres of land. The Department further incorporates these requirements on all contracted bridge and culvert work at jurisdictional waters, regardless of size. Some of the requirements are, but are not limited to:

(a) Control project site waste to prevent contamination of surface or ground waters of the state, i.e. from equipment operation/maintenance, construction materials, concrete washout, chemicals, litter, fuels, lubricants, coolants, hydraulic fluids, any other petroleum products, and sanitary waste.

(b) Inspect erosion and sediment control/stormwater devices and stormwater discharge outfalls at least once every 7 calendar days and within 24 hours after a rainfall event equal to or greater than 1.0 inch that occurs within a 24 hour period. Additional monitoring may be required at the discretion of Division of Water Resources personnel if the receiving stream is 303(d) listed for turbidity and the project has had documented problems managing turbidity.

(c) Maintain an onsite rain gauge or use the Department’s Multi-Sensor Precipitation Estimate website to maintain a daily record of rainfall amounts and dates.

(d) Maintain erosion and sediment control/stormwater inspection records for review by Department and Regulatory personnel upon request.

(e) Implement approved reclamation plans on all borrow pits, waste sites and staging areas.

(f) Maintain a log of turbidity test results as outlined in the Department's Procedure for Monitoring Borrow Pit Discharge.

(g) Provide secondary containment for bulk storage of liquid materials.

(h) Provide training for employees concerning general erosion and sediment control/stormwater awareness, the Department’s NPDES Stormwater Permit NCS000250 requirements, and the applicable requirements of the *General Permit, NCG010000*.

(i) Report violations of the NPDES permit to the Engineer immediately who will notify the Division of Water Quality Regional Office within 24 hours of becoming aware of the violation.

(3) Quality Control Program - Maintain a quality control program to control erosion, prevent sedimentation and follow provisions/conditions of permits. The quality control program shall:

(a) Follow permit requirements related to the Contractor and subcontractors' construction activities.
(b) Ensure that all operators and subcontractors on site have the proper erosion and sediment control/stormwater certification.
(c) Notify the Engineer when the required certified erosion and sediment control/stormwater personnel are not available on the job site when needed.
(d) Conduct the inspections required by the NPDES permit.
(e) Take corrective actions in the proper timeframe as required by the NPDES permit for problem areas identified during the NPDES inspections.
(f) Incorporate erosion control into the work in a timely manner and stabilize disturbed areas with mulch/seed or vegetative cover on a section-by-section basis.
(g) Use flocculants approved by state regulatory authorities where appropriate and where required for turbidity and sedimentation reduction.
(h) Ensure proper installation and maintenance of temporary erosion and sediment control devices.
(i) Remove temporary erosion or sediment control devices when they are no longer necessary as agreed upon by the Engineer.
(j) The Contractor's quality control and inspection procedures shall be subject to review by the Engineer. Maintain NPDES inspection records and make records available at all times for verification by the Engineer.

(B) *Certified Foreman* - At least one Certified Foreman shall be onsite for each type of work listed herein during the respective construction activities to control erosion, prevent sedimentation and follow permit provisions:

(1) Foreman in charge of grading activities
(2) Foreman in charge of bridge or culvert construction over jurisdictional areas
(3) Foreman in charge of utility activities

The Contractor may request to use the same person as the Level II Supervisor and Level II Foreman. This person shall be onsite whenever construction activities as described above are taking place. This request shall be approved by the Engineer prior to work beginning.

The Contractor may request to name a single Level II Foreman to oversee multiple construction activities on small bridge or culvert replacement projects. This request shall be approved by the Engineer prior to work beginning.

(C) *Certified Installers* - Provide at least one onsite, Level I Certified Installer for each of the following erosion and sediment control/stormwater crew:

(1) Seeding and Mulching
(2) Temporary Seeding
(3) Temporary Mulching

(4) Sodding
(5) Silt fence or other perimeter erosion/sediment control device installations
(6) Erosion control blanket installation
(7) Hydraulic tackifier installation
(8) Turbidity curtain installation
(9) Rock ditch check/sediment dam installation
(10) Ditch liner/matting installation
(11) Inlet protection
(12) Riprap placement
(13) Stormwater BMP installations (such as but not limited to level spreaders, retention/detention devices)
(14) Pipe installations within jurisdictional areas

If a Level I *Certified Installer* is not onsite, the Contractor may substitute a Level II Foreman for a Level I Installer, provided the Level II Foreman is not tasked to another crew requiring Level II Foreman oversight.

(D) *Certified Designer* - Include the certification number of the Level III Certified Designer on the erosion and sediment control/stormwater component of all reclamation plans and if applicable, the certification number of the Level III Certified Designer on the design of the project erosion and sediment control/stormwater plan.

Preconstruction Meeting

Furnish the names of the *Certified Erosion and Sediment Control/Stormwater Supervisor, Certified Foremen, Certified Installers* and *Certified Designer* and notify the Engineer of changes in certified personnel over the life of the contract within 2 days of change.

Ethical Responsibility

Any company performing work for the North Carolina Department of Transportation has the ethical responsibility to fully disclose any reprimand or dismissal of an employee resulting from improper testing or falsification of records.

Revocation or Suspension of Certification

Upon recommendation of the Chief Engineer to the certification entity, certification for *Supervisor*, *Certified Foremen*, *Certified Installers* and *Certified Designer* may be revoked or suspended with the issuance of an *Immediate Corrective Action (ICA), Notice of Violation (NOV),* or C*ease and Desist Order* for erosion and sediment control/stormwater related issues.

The Chief Engineer may recommend suspension or permanent revocation of certification due to the following:

(A) Failure to adequately perform the duties as defined within this certification provision.
(B) Issuance of an ICA, NOV, or Cease and Desist Order.
(C) Failure to fully perform environmental commitments as detailed within the permit conditions and specifications.

(D) Demonstration of erroneous documentation or reporting techniques.
(E) Cheating or copying another candidate's work on an examination.
(F) Intentional falsification of records.
(G) Directing a subordinate under direct or indirect supervision to perform any of the above actions.
(H) Dismissal from a company for any of the above reasons.
(I) Suspension or revocation of one's certification by another entity.

Suspension or revocation of a certification will be sent by certified mail to the certificant and the Corporate Head of the company that employs the certificant.

A certificant has the right to appeal any adverse action which results in suspension or permanent revocation of certification by responding, in writing, to the Chief Engineer within 10 calendar days after receiving notice of the proposed adverse action.

Chief Engineer
1536 Mail Service Center
Raleigh, NC 27699-1536

Failure to appeal within 10 calendar days will result in the proposed adverse action becoming effective on the date specified on the certified notice. Failure to appeal within the time specified will result in a waiver of all future appeal rights regarding the adverse action taken. The certificant will not be allowed to perform duties associated with the certification during the appeal process.

The Chief Engineer will hear the appeal and make a decision within 7 days of hearing the appeal. Decision of the Chief Engineer will be final and will be made in writing to the certificant.

If a certification is temporarily suspended, the certificant shall pass any applicable written examination and any proficiency examination, at the conclusion of the specified suspension period, prior to having the certification reinstated.

Measurement and Payment

All work described within this provision and the role of Certified Erosion and Sediment Control/Stormwater Supervisor, Certified Foremen, Certified Installers and Certified Designer will be incidental to the project for which no direct compensation will be made.

PROCEDURE FOR MONITORING BORROW PIT DISCHARGE:

(2-20-07) (Rev. 1-16-24) 105-16, 230, 801 SP1 G181

Water discharge from borrow pit sites shall not cause surface waters to exceed 50 NTUs (nephelometric turbidity unit) in streams not designated as trout waters and 10 NTUs in streams, lakes or reservoirs designated as trout waters. For lakes and reservoirs not designated as trout waters, the turbidity shall not exceed 25 NTUs. If the turbidity exceeds these levels due to natural background conditions, the existing turbidity level shall not be increased.

If during any operating day, the downstream water quality exceeds the standard, the Contractor shall do all of the following:

(A) Either cease discharge or modify the discharge volume or turbidity levels to bring the downstream turbidity levels into compliance, or

(B) Evaluate the upstream conditions to determine if the exceedance of the standard is due to natural background conditions. If the background turbidity measurements exceed the standard, operation of the pit and discharge can continue as long as the stream turbidity levels are not increased due to the discharge.

(C) Measure and record the turbidity test results (time, date and sampler) at all defined sampling locations 30 minutes after startup and at a minimum, one additional sampling of all sampling locations during that 24-hour period in which the borrow pit is discharging.

(D) Notify DWQ within 24 hours of any stream turbidity standard exceedances that are not brought into compliance.

During the Environmental Assessment required by Article 230-4 of the *Standard Specifications*, the Contractor shall define the point at which the discharge enters into the State's surface waters and the appropriate sampling locations. Sampling locations shall include points upstream and downstream from the point at which the discharge enters these waters. Upstream sampling location shall be located so that it is not influenced by backwater conditions and represents natural background conditions. Downstream sampling location shall be located at the point where complete mixing of the discharge and receiving water has occurred.

The discharge shall be closely monitored when water from the dewatering activities is introduced into jurisdictional wetlands. Any time visible sedimentation (deposition of sediment) on the wetland surface is observed, the dewatering activity will be suspended until turbidity levels in the stilling basin can be reduced to a level where sediment deposition does not occur. Staining of wetland surfaces from suspended clay particles, occurring after evaporation or infiltration, does not constitute sedimentation. No activities shall occur in wetlands that adversely affect the functioning of a wetland. Visible sedimentation will be considered an indication of possible adverse impacts on wetland use.

The Engineer will perform independent turbidity tests on a random basis. These results will be maintained in a log within the project records. Records will include, at a minimum, turbidity test results, time, date and name of sampler. Should the Department's test results exceed those of the Contractor's test results, an immediate test shall be performed jointly with the results superseding the previous test results of both the Department and the Contractor.

The Contractor shall use the *NCDOT Turbidity Reduction Options for Borrow Pits Matrix,* available at https://connect.ncdot.gov/resources/roadside/FieldOperationsDocuments/TurbidityReductionOptionSheet.pdf to plan, design, construct, and maintain BMPs to address water quality standards. Tier I Methods include stilling basins which are standard compensatory BMPs. Other Tier I methods are noncompensatory and shall be used when needed to meet the stream turbidity standards. Tier II Methods are also noncompensatory and are options that may be needed for protection of rare or unique resources or where special environmental conditions exist at the site which have led to additional requirements being placed in the DWQ's 401 Certifications and approval letters, Isolated Wetland Permits, Riparian Buffer Authorization or a DOT Reclamation Plan's Environmental Assessment for the specific site. Should the Contractor

exhaust all Tier I Methods on a site exclusive of rare or unique resources or special environmental conditions, Tier II Methods may be required by regulators on a case by case basis per supplemental agreement.

The Contractor may use cation exchange capacity (CEC) values from proposed site borings to plan and develop the bid for the project. CEC values exceeding 15 milliequivalents per 100 grams of soil may indicate a high potential for turbidity and should be avoided when dewatering into surface water is proposed.

No additional compensation for monitoring borrow pit discharge will be paid.

STANDARD SPECIAL PROVISION
AVAILABILITY OF FUNDS – TERMINATION OF CONTRACTS

(5-20-08)(Rev. 1-16-24) Z-2

General Statute 143C-6-11. (h) Highway Appropriation is hereby incorporated verbatim in this contract as follows:

(h) Amounts Encumbered. – Transportation project appropriations may be encumbered in the amount of allotments made to the Department of Transportation by the Director for the estimated payments for transportation project contract work to be performed in the appropriation fiscal year. The allotments shall be multiyear allotments and shall be based on estimated revenues and shall be subject to the maximum contract authority contained in *General Statute 143C-6-11(c)*. Payment for transportation project work performed pursuant to contract in any fiscal year other than the current fiscal year is subject to appropriations by the General Assembly. Transportation project contracts shall contain a schedule of estimated completion progress, and any acceleration of this progress shall be subject to the approval of the Department of Transportation provided funds are available. The State reserves the right to terminate or suspend any transportation project contract, and any transportation project contract shall be so terminated or suspended if funds will not be available for payment of the work to be performed during that fiscal year pursuant to the contract. In the event of termination of any contract, the contractor shall be given a written notice of termination at least 60 days before completion of scheduled work for which funds are available. In the event of termination, the contractor shall be paid for the work already performed in accordance with the contract specifications.

Payment will be made on any contract terminated pursuant to the special provision in accordance with Subarticle 108-13(D) of the *Standard Specifications*.

STANDARD SPECIAL PROVISION
NCDOT GENERAL SEED SPECIFICATION FOR SEED QUALITY

(5-17-11) Z-3

Seed shall be sampled and tested by the North Carolina Department of Agriculture and Consumer Services, Seed Testing Laboratory. When said samples are collected, the vendor shall supply an independent laboratory report for each lot to be tested. Results from seed so sampled shall be final. Seed not meeting the specifications shall be rejected by the Department of Transportation and shall not be delivered to North Carolina Department of Transportation warehouses. If seed has been delivered it shall be available for pickup and replacement at the supplier's expense.

Any re-labeling required by the North Carolina Department of Agriculture and Consumer Services, Seed Testing Laboratory, that would cause the label to reflect as otherwise specified herein shall be rejected by the North Carolina Department of Transportation.

Seed shall be free from seeds of the noxious weeds Johnsongrass, Balloonvine, Jimsonweed, Witchweed, Itchgrass, Serrated Tussock, Showy Crotalaria, Smooth Crotalaria, Sicklepod, Sandbur, Wild Onion, and Wild Garlic. Seed shall not be labeled with the above weed species on the seed analysis label. Tolerances as applied by the Association of Official Seed Analysts will NOT be allowed for the above noxious weeds except for Wild Onion and Wild Garlic.

Tolerances established by the Association of Official Seed Analysts will generally be recognized. However, for the purpose of figuring pure live seed, the found pure seed and found germination percentages as reported by the North Carolina Department of Agriculture and Consumer Services, Seed Testing Laboratory will be used. Allowances, as established by the NCDOT, will be recognized for minimum pure live seed as listed on the following pages.

The specifications for restricted noxious weed seed refers to the number per pound as follows:

Restricted Noxious **Weed**	Limitations per Lb. Of Seed	Restricted Noxious **Weed**	Limitations per Lb. of Seed
Blessed Thistle	4 seeds	Cornflower (Ragged Robin)	27 seeds
Cocklebur	4 seeds	Texas Panicum	27 seeds
Spurred Anoda	4 seeds	Bracted Plantain	54 seeds
Velvetleaf	4 seeds	Buckhorn Plantain	54 seeds
Morning-glory	8 seeds	Broadleaf Dock	54 seeds
Corn Cockle	10 seeds	Curly Dock	54 seeds
Wild Radish	12 seeds	Dodder	54 seeds
Purple Nutsedge	27 seeds	Giant Foxtail	54 seeds
Yellow Nutsedge	27 seeds	Horsenettle	54 seeds
Canada Thistle	27 seeds	Quackgrass	54 seeds
Field Bindweed	27 seeds	Wild Mustard	54 seeds
Hedge Bindweed	27 seeds		

Seed of Pensacola Bahiagrass shall not contain more than 7% inert matter, Kentucky Bluegrass, Centipede and Fine or Hard Fescue shall not contain more than 5% inert matter whereas a maximum of 2% inert matter will be allowed on all other kinds of seed. In addition, all seed shall

not contain more than 2% other crop seed nor more than 1% total weed seed. The germination rate as tested by the North Carolina Department of Agriculture shall not fall below 70%, which includes both dormant and hard seed. Seed shall be labeled with not more than 7%, 5% or 2% inert matter (according to above specifications), 2% other crop seed and 1% total weed seed.

Exceptions may be made for minimum pure live seed allowances when cases of seed variety shortages are verified. Pure live seed percentages will be applied in a verified shortage situation. Those purchase orders of deficient seed lots will be credited with the percentage that the seed is deficient.

FURTHER SPECIFICATIONS FOR EACH SEED GROUP ARE GIVEN BELOW:

Minimum 85% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 144 restricted noxious weed seed per pound. Seed less than 83% pure live seed will not be approved.

Sericea Lespedeza
Oats (seeds)

Minimum 80% pure live seed; maximum 1% total weed seed; maximum 2% total other crop; maximum 144 restricted noxious weed seed per pound. Seed less than 78% pure live seed will not be approved.

Tall Fescue (all approved varieties)
Kobe Lespedeza
Korean Lespedeza
Weeping Lovegrass
Carpetgrass
Bermudagrass
Browntop Millet
German Millet – Strain R
Clover – Red/White/Crimson

Minimum 78% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 144 restricted noxious weed seed per pound. Seed less than 76% pure live seed will not be approved.

Common or Sweet Sundangrass

Minimum 76% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 144 restricted noxious weed seed per pound. Seed less than 74% pure live seed will not be approved.

Rye (grain; all varieties)
Kentucky Bluegrass (all approved varieties)
Hard Fescue (all approved varieties)
Shrub (bicolor) Lespedeza

Minimum 70% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 144 noxious weed seed per pound. Seed less than 70% pure live seed will not be approved.

Centipedegrass
Crownvetch
Pensacola Bahiagrass
Creeping Red Fescue
Japanese Millet
Reed Canary Grass
Zoysia

Minimum 70% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 5% inert matter; maximum 144 restricted noxious weed seed per pound.

Barnyard Grass
Big Bluestem
Little Bluestem
Bristly Locust
Birdsfoot Trefoil
Indiangrass
Orchardgrass
Switchgrass
Yellow Blossom Sweet Clover

STANDARD SPECIAL PROVISION
ERRATA

(1-16-24)(Rev. 12-15-26) Z-4

Revise the *2024 Standard Specifications* as follows:

Division 1

Page 1-1, Article 101-2 ABBREVIATIONS, line 25, replace "American Wood-Preservers' Association" with "American Wood Protection Association".

Page 1-18, Article 102-10 BID BOND OR BID DEPOSIT, line 26, replace " Subarticle 102-8(A)(8)(b)" with "Subarticle 102-8(A)(12)(b)".

Page 1-20, Subarticle 102-14(A) State Funded Projects, line 3, replace "$30,000" with "$40,000".

Page 1-20, Subarticle 102-14(B) Federal Aid Projects, line 7, replace "$30,000" with "$40,000".

Page 1-36, Subarticle 104-12(B) Evaluation of Proposals, line 21, replace "Design-Build Unit" with "Alternative Delivery Unit".

Page 1-36, Subarticle 104-12(D) Preliminary Review, line 37, replace "Design-Build Unit" with "Alternative Delivery Unit".

Page 1-37, Subarticle 104-12(E) Final Proposal, line 3, replace "Design-Build Unit" with "Alternative Delivery Unit".

Page 1-37, Subarticle 104-12(F) Design-Build VEPs, line 36, replace "Design-Build Unit" with "Alternative Delivery Unit".

Page 1-38, Subarticle 104-12(G) Modifications, line 1, replace "Design-Build Unit" with "Alternative Delivery Unit".

Division 3

Page 3-5, Article 305-2 MATERIALS, after line 16, replace " 1032-3(A)(7)" with "1032-3" and add the item "Galvanized Corrugated Steel Pipe" with Section "1032-3".

Page 3-6, Article 310-2 MATERIALS, after line 9, add the item "Galvanized Corrugated Steel Pipe" with Section "1032-3".

Division 6

Page 6-15, Article 610-1 DESCRIPTION, line 20, replace "The work includes" with "The work includes, but is not limited to,".

Page 6-15, Article 610-1 DESCRIPTION, line 22, replace “applying the tack coat as specified.” with “applying the tack coat in accordance with Section 605.”.

Page 6-30, Article 610-14 DENSITY ACCEPTANCE, line 39, replace “QC process.” with “QC process in accordance with Section 609.”.

Page 6-31, Article 610-16 MEASUREMENT AND PAYMENT, line 13, replace "*Hot Mix Asphalt Pavement*” with “*Asphalt Concrete _____ Course, Type _____*”.

Page 6-41, Article 657-3 CONSTRUCTION METHODS, line 11, delete "(air-jacketed flow)”.

Page 6-50, Subarticle 661-4(A) Equipment, lines 4-7, replace the first two sentences of the seventh paragraph with the following:

When an erected fixed stringline is utilized for longitudinal profile and cross slope control furnish and erect the necessary guide line for the equipment.

Division 7

Page 7-18, Subarticle 710-10(A) General, lines 7-8, delete “for *Surface Testing Concrete Pavement*” from the last paragraph.

Division 8

Page 8-27, Article 846-1 DESCRIPTION, line 8, delete “4 inch” from the first paragraph.

Division 9

Page 9-17, Article 904-4 MEASUREMENT AND PAYMENT, prior to line 1, replace " Sign Erection, Relocate Type (Ground Mounted)” with “Sign Erection, Relocate Type ___ (Ground Mounted)”.

Division 10

Page 10-51, Article 1024-4 WATER, prior to line 1, delete the “unpopulated blank row” in Table 1024-2 between “Time of set, deviation from control” and “Chloride Ion Content, Max.”.

Page 10-170, Subarticle 1081-1(C) Requirements, line 4, replace "maximum” with “minimum”.

Division 11

Page 11-15, Article 1160-4 MEASUREMENT AND PAYMENT, line 24, replace “Where barrier units are moved more than one” with “Where barrier units are moved more than once”.

Division 15

Page 15-10, Article 1515-4 MEASUREMENT AND PAYMENT, lines 11, replace " All piping" with "All labor, the manhole, other materials, excavation, backfilling, piping".

Division 16

Page 16-14, Article 1633-5 MEASUREMENT AND PAYMENT, line 20-24 and prior to line 25, delete and replace with the following " *Flocculant* will be measured and paid in accordance with Article 1642-5 applied to the temporary rock silt checks."

Page 16-3, Article 1609-2 MATERIALS, after line 26, replace "Type 4" with "Type 4a".

Page 16-25, Article 1644-2 MATERIALS, after line 22, replace "Type 4" with "Type 4a".

Page 16-27, Article 1644-5 MEASUREMENT AND PAYMENT, line 31, replace "Article 1630-4" with "Article 1630-3".

Division 17

Page 17-15, Article 1715-4 MEASUREMENT AND PAYMENT, line 23, delete and replace "1.25" with "1-1/4".

Page 17-15, Article 1715-4 MEASUREMENT AND PAYMENT, line 24, delete and replace ")(1.25" with ", 1-1/4".

STANDARD SPECIAL PROVISION

PLANT AND PEST QUARANTINES

(Imported Fire Ant, Guava Root Knot Nematode, Spongy Moth (formerly known as gypsy moth), Witchweed, Cogon Grass, And Any Other Regulated Noxious Weed or Plant Pest)

(3-18-03)(Rev. 3-18-25) Z-04a

Within Quarantined Area

This project may be within a county regulated for plant and/or pests. If the project or any part of the Contractor's operations is located within a quarantined area, thoroughly clean all equipment prior to moving out of the quarantined area. Comply with federal/state regulations by obtaining a certificate or limited permit for any regulated article moving from the quarantined area.

Originating in a Quarantined County

Obtain a certificate or limited permit issued by the N.C. Department of Agriculture/United States Department of Agriculture. Have the certificate or limited permit accompany the article when it arrives at the project site.

Contact

Contact the N.C. Department of Agriculture/United States Department of Agriculture at 1-800-206-9333, 919-707-3730, or *https://www.ncagr.gov/divisions/plant-industry/plant-protection/plant-industry-plant-pest-quarantines* to determine those specific project sites located in the quarantined area or for any regulated article used on this project originating in a quarantined county.

Regulated Articles Include

1. Soil, sand, gravel, compost, peat, humus, muck, and decomposed manure, separately or with other articles. This includes movement of articles listed above that may be associated with cut/waste, ditch pulling, and shoulder cutting.
2. Plants with roots including grass sod.
3. Plant crowns and roots.
4. Bulbs, corms, rhizomes, and tubers of ornamental plants.
5. Hay, straw, fodder, and plant litter of any kind.
6. Clearing and grubbing debris.
7. Used agricultural cultivating and harvesting equipment.
8. Used earth-moving equipment.
9. Any other products, articles, or means of conveyance of any character, if determined by an inspector present a hazard of spreading imported fire ant, guava root knot nematode, spongy moth (formerly known as gypsy moth), witchweed, cogon grass, or other regulated noxious weed or plant pest.

STANDARD SPECIAL PROVISION

MINIMUM WAGES

(7-21-09) Z-5

FEDERAL: The Fair Labor Standards Act provides that with certain exceptions every employer shall pay wages at the rate of not less than SEVEN DOLLARS AND TWENTY FIVE CENTS ($7.25) per hour.

STATE: The North Carolina Minimum Wage Act provides that every employer shall pay to each of his employees, wages at a rate of not less than SEVEN DOLLARS AND TWENTY FIVE CENTS ($7.25) per hour.

The minimum wage paid to all skilled labor employed on this contract shall be SEVEN DOLLARS AND TWENTY FIVE CENTS ($7.25) per hour.

The minimum wage paid to all intermediate labor employed on this contract shall be SEVEN DOLLARS AND TWENTY FIVE CENTS ($7.25) per hour.

The minimum wage paid to all unskilled labor on this contract shall be SEVEN DOLLARS AND TWENTY FIVE CENTS ($7.25) per hour.

This determination of the intent of the application of this act to the contract on this project is the responsibility of the Contractor.

The Contractor shall have no claim against the Department of Transportation for any changes in the minimum wage laws, Federal or State. It is the responsibility of the Contractor to keep fully informed of all Federal and State Laws affecting his contract.

STANDARD SPECIAL PROVISION

TITLE VI AND NONDISCRIMINATION:

(6-28-77)(Rev 1/16/2024) Z-6

The North Carolina Department of Transportation is committed to carrying out the U.S. Department of Transportation's policy of ensuring nondiscrimination in the award and administration of contracts.

The provisions of this section related to United States Department of Transportation (US DOT) Order 1050.2A, Title 49 Code of Federal Regulations (CFR) part 21, 23 United States Code (U.S.C.) 140 and 23 CFR part 200 (or 49 CFR 303, 49 U.S.C. 5332 or 49 U.S.C. 47123) are applicable to all North Carolina Department of Transportation (NCDOT) contracts and to all related subcontracts, material supply, engineering, architectural and other service contracts, regardless of dollar amount. Any Federal provision that is specifically required not specifically set forth is hereby incorporated by reference.

(1) **Title VI Assurances (USDOT Order 1050.2A, Appendix A)**

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

(a) Compliance with Regulations

The contractor (hereinafter includes consultants) shall comply with the Acts and the Regulations relative to Nondiscrimination in Federally-assisted programs of the U.S. Department of Transportation, Federal Highway Administration (FHWA), as they may be amended from time to time, which are herein incorporated by reference and made a part of this contract.

(b) Nondiscrimination

The contractor, with regard to the work performed by it during the contract, shall not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor shall not participate directly or indirectly in the discrimination prohibited by the Acts and the Regulations, including employment practices when the contract covers any activity, project, or program set forth in Appendix B of 49 CFR Part 21.

(c) Solicitations for Subcontractors, Including Procurements of Materials and Equipment

In all solicitations, either by competitive bidding, or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials, or leases of equipment, each potential subcontractor or supplier shall be notified by the contractor of the contractor's obligations under this contract and the Acts and the Regulations relative to Nondiscrimination on the grounds of race, color, or national origin.

(d) Information and Reports

The contractor shall provide all information and reports required by the Acts, the Regulations, and directives issued pursuant thereto and shall permit access to its books,

records, accounts, other sources of information, and its facilities as may be determined by the Recipient or the FHWA to be pertinent to ascertain compliance with such Acts, Regulations, and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish the information, the contractor shall so certify to the Recipient or the FHWA, as appropriate, and shall set forth what efforts it has made to obtain the information.

(e) Sanctions for Noncompliance:

In the event of a contractor's noncompliance with the Non-discrimination provisions of this contract, the Recipient will impose such contract sanctions as it and/or the FHWA may determine to be appropriate, including, but not limited to:

(i) Withholding payments to the contractor under the contract until the contractor complies; and/or

(ii) Cancelling, terminating, or suspending a contract, in whole or in part.

(f) Incorporation of Provisions

The contractor shall include the provisions of paragraphs (a) through (f) in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts, the Regulations and directives issued pursuant thereto. The contractor shall take action with respect to any subcontract or procurement as the Recipient or the FHWA may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, that if the contractor becomes involved in, or is threatened with litigation by a subcontractor, or supplier because of such direction, the contractor may request the Recipient to enter into any litigation to protect the interests of the Recipient. In addition, the contractor may request the United States to enter into the litigation to protect the interests of the United States.

(2) **Title VI Nondiscrimination Program (23 CFR 200.5(p))**

The North Carolina Department of Transportation (NCDOT) has assured the USDOT that, as a condition to receiving federal financial assistance, NCDOT will comply with Title VI of the Civil Rights Act of 1964 and all requirements imposed by Title 49 CFR part 21 and related nondiscrimination authorities to ensure that no person shall, on the ground of race, color, national origin, limited English proficiency, sex, age, or disability (including religion/creed or income-level, where applicable), be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any programs, activities, or services conducted or funded by NCDOT. Contractors and other organizations under contract or agreement with NCDOT must also comply with Title VI and related authorities, therefore:

(a) During the performance of this contract or agreement, contractors (e.g., subcontractors, consultants, vendors, prime contractors) are responsible for complying with NCDOT's Title VI Program. Contractors are not required to prepare or submit Title VI Programs. To comply with this section, the prime contractor shall:

1. Post NCDOT's Notice of Nondiscrimination and the Contractor's own Equal Employment Opportunity (EEO) Policy in conspicuous locations accessible to all employees, applicants and subcontractors on the jobsite.

2. Physically incorporate the required Title VI clauses into all subcontracts on federally-assisted and state-funded NCDOT projects, and ensure inclusion by subcontractors into all lower-tier subcontracts.

3. Required Solicitation Language. The Contractor shall include the following notification in all solicitations for bids and requests for work or material, regardless of funding source:

   "The North Carolina Department of Transportation, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 US.C. §§ 2000d to 2000d-4) and the Regulations, hereby notifies all bidders that it will affirmatively ensure that any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full and fair opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, or national origin in consideration for an award. In accordance with other related nondiscrimination authorities, bidders and contractors will also not be discriminated against on the grounds of sex, age, disability, low-income level, creed/religion, or limited English proficiency in consideration for an award."

4. Physically incorporate the FHWA-1273, in its entirety, into all subcontracts and subsequent lower tier subcontracts on Federal-aid highway construction contracts only.

5. Provide language assistance services (i.e., written translation and oral interpretation), free of charge, to LEP employees and applicants. Contact NCDOT OCR for further assistance, if needed.

6. For assistance with these Title VI requirements, contact the NCDOT Title VI Nondiscrimination Program at 1-800-522-0453.

(b) Subrecipients (e.g. cities, counties, LGAs, planning organizations) may be required to prepare and submit a Title VI Plan to NCDOT, including Title VI Assurances and/or agreements. Subrecipients must also ensure compliance by their contractors and subrecipients with Title VI. (23 CFR 200.9(b)(7))

(c) If reviewed or investigated by NCDOT, the contractor or subrecipient agrees to take affirmative action to correct any deficiencies found within a reasonable time period, not to exceed 90 calendar days, unless additional time is granted by NCDOT. (23 CFR 200.9(b)(15))

(d) The Contractor is responsible for notifying subcontractors of NCDOT's External Discrimination Complaints Process.

1. Applicability

   Title VI and related laws protect participants and beneficiaries (e.g., members of the public and contractors) from discrimination by NCDOT employees, subrecipients and contractors, regardless of funding source.

2. Eligibility

   Any person—or class of persons—who believes he/she has been subjected to discrimination based on race, color, national origin, Limited English Proficiency (LEP), sex, age, or disability (and religion in the context of employment, aviation, or transit) may file a written complaint. The law also prohibits intimidation or retaliation of any sort.

3. Time Limits and Filing Options

   Complaints may be filed by the affected individual(s) or a representative and must be filed no later than 180 calendar days after the following:

   (i) The date of the alleged act of discrimination; or

   (ii) The date when the person(s) became aware of the alleged discrimination; or

   (iii) Where there has been a continuing course of conduct, the date on which that conduct was discontinued or the latest instance of the conduct.

   Title VI and related discrimination complaints may be submitted to the following entities:

   - North Carolina Department of Transportation, Office of Civil Rights, Title VI Program, 1511 Mail Service Center, Raleigh, NC 27699-1511; toll free 1-800-522-0453
   - Federal Highway Administration, North Carolina Division Office, 310 New Bern Avenue, Suite 410, Raleigh, NC 27601, 919-747-7010
   - US Department of Transportation, Departmental Office of Civil Rights, External Civil Rights Programs Division, 1200 New Jersey Avenue, SE, Washington, DC 20590; 202-366-4070

4. Format for Complaints

   Complaints must be in writing and signed by the complainant(s) or a representative, and include the complainant's name, address, and telephone number. Complaints received by fax or e-mail will be acknowledged and processed. Allegations received by telephone will be reduced to writing and provided to the complainant for confirmation or revision before processing. Complaints will be accepted in other languages, including Braille.

5. Discrimination Complaint Form

   Contact NCDOT Civil Rights to receive a full copy of the Discrimination Complaint Form and procedures.

6. Complaint Basis

   Allegations must be based on issues involving race, color, national origin (LEP), sex, age, disability, or religion (in the context of employment, aviation or transit). "Basis" refers to the complainant's membership in a protected group category.

TABLE 103-1
COMPLAINT BASIS

Protected Categories	Definition	Examples	Applicable Nondiscrimination Authorities
Race and Ethnicity	An individual belonging to one of the accepted racial groups; or the perception, based usually on physical characteristics that a person is a member of a racial group	Black/African American, Hispanic/Latino, Asian, American Indian/Alaska Native, Native Hawaiian/Pacific Islander, White	Title VI of the Civil Rights Act of 1964; 49 CFR Part 21; 23 CFR 200; 49 U.S.C. 5332(b); 49 U.S.C. 47123. *(Executive Order 13166)*
Color	Color of skin, including shade of skin within a racial group	Black, White, brown, yellow, etc.	
National Origin *(Limited English Proficiency)*	Place of birth. Citizenship is not a factor. (*Discrimination based on language or a person's accent is also covered)*	Mexican, Cuban, Japanese, Vietnamese, Chinese	
Sex	Gender. The sex of an individual. *Note:* Sex under this program does not include sexual orientation.	Women and Men	1973 Federal-Aid Highway Act; 49 U.S.C. 5332(b); 49 U.S.C. 47123.
Age	Persons of any age	21-year-old person	Age Discrimination Act of 1975 49 U.S.C. 5332(b); 49 U.S.C. 47123.
Disability	Physical or mental impairment, permanent or temporary, or perceived.	Blind, alcoholic, para-amputee, epileptic, diabetic, arthritic	Section 504 of the Rehabilitation Act of 1973; Americans with Disabilities Act of 1990
Religion (in the context of employment) *(Religion/ Creed in all aspects of any aviation or transit-related construction)*	An individual belonging to a religious group; or the perception, based on distinguishable characteristics that a person is a member of a religious group. In practice, actions taken as a result of the moral and ethical beliefs as to what is right and wrong, which are sincerely held with the strength of traditional religious views. ***Note:*** Does not have to be associated with a recognized religious group or church; if an individual sincerely holds to the belief, it is a protected religious practice.	Muslim, Christian, Sikh, Hindu, etc.	Title VII of the Civil Rights Act of 1964; 23 CFR 230; FHWA-1273 Required Contract Provisions. *(49 U.S.C. 5332(b);* *49 U.S.C. 47123)*

(3) **Pertinent Nondiscrimination Authorities**

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest agrees to comply with the following non-discrimination statutes and authorities, including, but not limited to:

(a) Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d et seq., 78 stat. 252), (prohibits discrimination on the basis of race, color, national origin); and 49 CFR Part 21.

(b) The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 U.S.C. § 4601), (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);

(c) Federal-Aid Highway Act of 1973, (23 U.S.C. § 324 et seq.), (prohibits discrimination on the basis of sex);

(d) Section 504 of the Rehabilitation Act of 1973, (29 U.S.C. § 794 et seq.), as amended, (prohibits discrimination on the basis of disability) and 49 CFR Part 27;

(e) The Age Discrimination Act of 1975, as amended, (42 U.S.C. § 6101 et seq.), (prohibits discrimination on the basis of age);

(f) Airport and Airway Improvement Act of 1982, (49 USC § 471, Section 47123), as amended, (prohibits discrimination based on race, creed, color, national origin, or sex);

(g) The Civil Rights Restoration Act of 1987, (PL 100-209), (Broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, The Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms "programs or activities" to include all of the programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);

(h) Titles II and III of the Americans with Disabilities Act, which prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities (42 U.S.C. §§ 12131-12189) as implemented by Department of Transportation regulations at 49 C.F.R. parts 37 and 38;

(i) The Federal Aviation Administration's Nondiscrimination statute (49 U.S.C. § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);

(j) Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which ensures Nondiscrimination against minority populations by discouraging programs, policies, and activities with disproportionately high and adverse human health or environmental effects on minority and low-income populations;

(k) Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of Limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. at 74087 to 74100);

(l) Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 U.S.C. 1681 et seq).

(m) Title VII of the Civil Rights Act of 1964 (42 U.S.C. § 2000e et seq., Pub. L. 88-352), (prohibits employment discrimination on the basis of race, color, religion, sex, or national origin).

(4) **Additional Title VI Assurances**

***The following Title VI Assurances (Appendices B, C and D) shall apply, as applicable*

(a) Clauses for Deeds Transferring United States Property (1050.2A, Appendix B)

The following clauses will be included in deeds effecting or recording the transfer of real property, structures, or improvements thereon, or granting interest therein from the United States pursuant to the provisions of Assurance 4.

NOW, THEREFORE, the U.S. Department of Transportation as authorized by law and upon the condition that the North Carolina Department of Transportation (NCDOT) will accept title to the lands and maintain the project constructed thereon in accordance with the North Carolina General Assembly, the Regulations for the Administration of the Federal-Aid Highway Program, and the policies and procedures prescribed by the Federal Highway Administration of the U.S. Department of Transportation in accordance and in compliance with all requirements imposed by Title 49, Code of Federal Regulations, U.S. Department of Transportation, Subtitle A, Office of the Secretary, Part 21, Nondiscrimination in Federally-assisted programs of the U.S Department of Transportation pertaining to and effectuating the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252; 42 U.S.C. § 2000d to 2000d-4), does hereby remise, release, quitclaim and convey unto the NCDOT all the right, title and interest of the U.S. Department of Transportation in and to said lands described in Exhibit A attached hereto and made a part hereof.

(HABENDUM CLAUSE)

TO HAVE AND TO HOLD said lands and interests therein unto the North Carolina Department of Transportation (NCDOT) and its successors forever, subject, however, to the covenants, conditions, restrictions and reservations herein contained as follows, which will remain in effect for the period during which the real property or structures are used for a purpose for which Federal financial assistance is extended or for another purpose involving the provision of similar services or benefits and will be binding on the NCDOT, its successors and assigns.

The NCDOT, in consideration of the conveyance of said lands and interests in lands, does hereby covenant and agree as a covenant running with the land for itself, its successors and assigns, that (1) no person will on the grounds of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination with regard to any facility located wholly or in part on, over, or under such lands hereby conveyed [,] [and]* (2) that the NCDOT will use the lands and interests in lands and interests in lands so conveyed, in compliance with all requirements imposed by or pursuant to Title 49, Code of Federal Regulations, U.S. Department of Transportation, Subtitle A, Office of the Secretary, Part 21, Non-discrimination in Federally-assisted programs of the U.S. Department of Transportation, Effectuation of Title VI of the Civil Rights Act of 1964, and as said Regulations and Acts may be amended [, and (3) that in the event of breach of any of the above-mentioned nondiscrimination conditions, the Department will have a right to enter or re-enter said lands and facilities on said land, and that above described land and facilities will thereon revert to and vest in and become the absolute property of the U.S. Department of Transportation and its assigns as such interest existed prior to this instruction].*

(*Reverter clause and related language to be used only when it is determined that such a clause is necessary in order to make clear the purpose of Title VI.)

(b) Clauses for Transfer of Real Property Acquired or Improved Under the Activity, Facility, or Program (1050.2A, Appendix C)

The following clauses will be included in deeds, licenses, leases, permits, or similar instruments entered into by the North Carolina Department of Transportation (NCDOT) pursuant to the provisions of Assurance 7(a):

1. The (grantee, lessee, permittee, etc. as appropriate) for himself/herself, his/her heirs, personal representatives, successors in interest, and assigns, as a part of the consideration hereof, does hereby covenant and agree [in the case of deeds and leases add "as a covenant running with the land"] that:

   (i.) In the event facilities are constructed, maintained, or otherwise operated on the property described in this (deed, license, lease, permit, etc.) for a purpose for which a U.S. Department of Transportation activity, facility, or program is extended or for another purpose involving the provision of similar services or benefits, the (grantee, licensee, lessee, permittee, etc.) will maintain and operate such facilities and services in compliance with all requirements imposed by the Acts and Regulations (as may be amended) such that no person on the grounds of race, color, or national origin, will be excluded from participation in, denied the benefits of, or be otherwise subjected to discrimination in the use of said facilities.

2. With respect to licenses, leases, permits, etc., in the event of breach of any of the above Nondiscrimination covenants, the NCDOT will have the right to terminate the (lease, license, permit, etc.) and to enter, re-enter, and repossess said lands and facilities thereon, and hold the same as if the (lease, license, permit, etc.) had never been made or issued. *

3. With respect to a deed, in the event of breach of any of the above Nondiscrimination covenants, the NCDOT will have the right to enter or re-enter the lands and facilities thereon, and the above described lands and facilities will there upon revert to and vest in and become the absolute property of the NCDOT and its assigns. *

(*Reverter clause and related language to be used only when it is determined that such a clause is necessary to make clear the purpose of Title VI.)

(c) Clauses for Construction/Use/Access to Real Property Acquired Under the Activity, Facility or Program (1050.2A, Appendix D)

The following clauses will be included in deeds, licenses, permits, or similar instruments/ agreements entered into by the North Carolina Department of Transportation (NCDOT) pursuant to the provisions of Assurance 7(b):

1. The (grantee, licensee, permittee, etc., as appropriate) for himself/herself, his/her heirs, personal representatives, successors in interest, and assigns, as a part of the consideration hereof, does hereby covenant and agree (in the case of deeds and leases add, "as a covenant running with the land") that (1) no person on the ground of race, color, or national origin, will be excluded from participation in, denied the benefits of, or be otherwise subjected to discrimination in the use of said facilities, (2) that in the construction of any improvements on, over, or under such land, and the furnishing of services thereon, no person on the ground of race, color, or national origin, will be excluded from participation in, denied the benefits of, or otherwise be subjected to discrimination, (3) that the (grantee, licensee, lessee, permittee, etc.) will use the premises in compliance with all other requirements imposed by or pursuant to the Acts and Regulations, as amended, set forth in this Assurance.
2. With respect to (licenses, leases, permits, etc.), in the event of breach of any of the above Non¬ discrimination covenants, the NCDOT will have the right to terminate the (license, permit, etc., as appropriate) and to enter or re-enter and repossess said land and the facilities thereon, and hold the same as if said (license, permit, etc., as appropriate) had never been made or issued. *
3. With respect to deeds, in the event of breach of any of the above Nondiscrimination covenants, the NCDOT will there upon revert to and vest in and become the absolute property of the NCDOT and its assigns. *

(*Reverter clause and related language to be used only when it is determined that such a clause is necessary to make clear the purpose of Title VI.)

STANDARD SPECIAL PROVISION

ON-THE-JOB TRAINING

(10-16-07) (Rev. 6-16-26) Z-10

Description

The North Carolina Department of Transportation administers a custom version of the Federal On-the-Job Training (OJT) Program, commonly referred to as the Alternative OJT Program. All Contractors will be automatically placed in the Alternative OJT Program.

The Alternate OJT Program will allow a Contractor to train employees on Federal, State and privately funded projects located in North Carolina. However, priority shall be given to training employees on NCDOT Federal-Aid funded projects.

On the Job Training shall meet the requirements of 23 CFR 230.107 (b), 23 USC – Section 140, this special provision and the NCDOT On-the-Job Training Program Manual.

Minorities and Women

Developing, training and upgrading of minorities and women toward journeyman level status is a primary objective of this special provision. Accordingly, the Contractor shall make every effort to enroll minority and women as trainees to the extent that such persons are available within a reasonable area of recruitment. This training commitment is not intended, and shall not be used, to discriminate against any applicant for training, whether a member of a minority group or not.

Assigning Training Goals

The Department, through the OJT Program Unit, will assign annual training goals based on the Contractor's activity over the past three years' on federal projects with the Department. At the beginning of each year, all eligible Contractors will be contacted by the Department to determine the number of trainees that will be assigned for the upcoming calendar year. At that time, the Contractor shall enter into an agreement with the Department to implement a self-imposed on-the-job training program for the calendar year. This agreement will specify the annual training goals agreed upon by both parties. The number of training assignments may range from 1 to 15 per Contractor per calendar year, unless a higher number is agreed to by the Contractor. The Contractor shall sign an agreement committing to fulfill their annual goal for the year.

Training Classifications

The Contractor shall provide on-the-job training aimed at developing full journeyman level workers in the construction craft/operator positions.

The Department has established common training classifications and their respective training requirements that may be used by the Contractors. However, the classifications established are not all-inclusive. Where the training is oriented toward construction applications, training will be allowed in lower-level management positions such as office engineers and estimators. Contractors shall submit new classifications for specific job functions that their employees are performing.

The Department will review and recommend for acceptance to FHWA the new classifications proposed by contractors, if applicable. New classifications shall meet the following requirements:

Proposed training classifications are reasonable and realistic based on the job skill classification needs, and

The number of training hours specified in the training classification is consistent with common practices and provides enough time for the trainee to obtain journeyman level status.

The Contractor may allow trainees to be trained by a subcontractor provided that the Contractor retains primary responsibility for meeting the training and this special provision is made applicable to the subcontract. However, only the Contractor will receive credit towards the annual goal for the trainee.

Where feasible, 25 percent of trainees in each occupation shall be in their first year of training. The number of trainees shall be distributed among the work classifications on the basis of the Contractor's needs and the availability of journeymen in the various classifications within a reasonable area of recruitment.

No employee shall be employed as a trainee in any classification in which they have successfully completed a training course leading to journeyman level status or in which they have been employed as a journeyman.

Records and Reports

The Contractor shall maintain enrollment, monthly and completion reports documenting company compliance under these contract documents. These documents and any other information as requested shall be submitted to the OJT Program Manager.

Upon completion and graduation of the program, the Contractor shall provide each trainee with a certification Certificate showing the type and length of training satisfactorily completed.

Trainee Interviews

All trainees enrolled in the program will receive at minimum an initial and Trainee/Post graduate interview conducted by the OJT program staff.

Trainee Wages

Contractors shall compensate trainees on a graduating pay scale based upon a percentage of the prevailing minimum journeyman wages (Davis-Bacon Act). Minimum pay shall be as follows:

60 percent	of the journeyman wage for the first half of the training period
75 percent	of the journeyman wage for the third quarter of the training period
90 percent	of the journeyman wage for the last quarter of the training period

In no instance shall a trainee be paid less than the local minimum wage. The Contractor shall adhere to the minimum hourly wage rate that will satisfy both the NC Department of Labor (NCDOL) and the Department.

Achieving or Failing to Meet Training Goals

The Contractor will be credited for each trainee currently enrolled or becomes enrolled in an approved program and who receives training for at least 50 percent of the specific program requirement. Trainees will be allowed to be transferred between projects if required by the Contractor's scheduled workload to meet training goals.

If a Contractor fails to attain their training assignments for the calendar year, they may be taken off the NCDOT's Bidders List.

Measurement and Payment

No compensation will be made for providing required training in accordance with these contract documents.

RA-1

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

DIVISION ONE

County: CURRITUCK

State ID#: 26-31654-01

Description: CURRITUCK COUNTY REST AREA
RENOVATION & ADDITION
US 158,
POPULAR BRANCH, NC

PROJECT MANUAL

Docusign Envelope ID: 7B55AA2B-1FF2-8E7F-837A-24E614A93FF1

CERTIFICATIONS PAGE

Architect/Engineer's Certification: The undersigned certifies that, to the best of his or her knowledge, information & belief, the design of this project conforms to all applicable provisions of the State of North Carolina

Architect

W. S. Architects, PA
Ginger Summer, Architect
3305-109 Durham Dr.
Raleigh, NC 27603
(919) 779-9797
Corp . Cert. 549



DocuSigned by:
Ginger S. Summer
E9D28345662C4...
10/27/2026

Structural Engineer
Lysaght & Assoc.

Mark Blankinship, PE
120 Saint Mary's Street
Raleigh, NC 27605
(919) 833-0495
Corp. License C-0621



Signed by:
Mark R. Blankinship
FA1617244B0A4D8...
10/27/2026

Plumbing, Mechanical
& Electrical Engineer

Burke Design Group, PA
Ben Burke, PE
3305-109 Durham Dr.
Raleigh, NC 27603
(919) 771-1916
Corp. License C-2652



DocuSigned by:
C93761FB80F34D5...
10/28/2026

TABLE OF CONTENTS

SECTION	TITLE	PAGES
	DIVISION 1 - GENERAL REQUIREMENTS	
01026	Payment and Completion Procedures	-4
01100	Compensation for General Construction	-3
01200	Progress Documentation and Procedures	-2
01300	Submittals	-4
01600	Substitutions	-2
	DIVISION 2 - SITE WORK	
02072	Demolition for Remodeling	-3
	DIVISION 3	
03310	Cast in place Concrete	-5
03530	Concrete Topping	-3
	DIVISION 4 – not used	
	Not used	
	DIVISION 5	
05510	Ships Ladder	-2
	DIVISION 6 - WOOD AND PLASTICS	
06100	Rough Carpentry	-2
06200	Finish Carpentry	-3
06600	Plastic Fabrications	-3
06651	Solid Surface Fabrication	-5
	DIVISION 7 - THERMAL & MOISTURE PROTECTION	
07130	Waterproofing Membrane	-3
07210	Building Insulation	-2
07250	Weather Barrier	-4
07260	Vapor Barrier	-2

07310	Asphalt Shingles	-6
07462	Fiber Cement siding	-4
07625	Sheet Metal Gutters and Downspouts	-2
07900	Joint Sealers	-3
	DIVISION 8 - DOORS AND WINDOWS	
08110	Steel door frames	-2
08211	Flush Wood Doors	-4
08310	Access Doors	-2
08410	Metal framed storefronts	-4
08460	Automatic entrance doors	-4
08551	Vinyl Clad wood windows	-4
08710	Door hardware	-4
08800	Glazing	-3
08900	Louvers & Vents	-3
	DIVISION 9 - FINISHES	
09252	Cement backer board	-3
09260	Gypsum Board System	-2
09300	Tile	-8
09900	Painting	-5
	DIVISION 10 - SPECIALTIES	
10100	Visual Display Boards	-2
10170	Plastic Toilet Compartments	-2
10425	Signs	-2
10522	Fire Extinguisher, Cabinets & access.	-2
10810	Toilet Accessories	-3
	DIVISION 11 -14 Not Used	

DIVISION 15 - PLUMBING AND MECHANICAL

15010	Basic Plumbing Requirements	-7
15140	Hangers and Supports	-3
15190	Plumbing Identification	-2
15250	Plumbing Piping Insulation	-4
15410	Plumbing Piping	-4
15430	Plumbing Specialties	-2
15440	Plumbing Fixtures	-2
15450	Water Heaters	-2
15500	Basic Mechanical Requirements	-7
15501	Hangers and Supports	-3
15503	Mechanical Identification	-2
15505	Piping Insulation	-3
15507	Ductwork Insulation	-2
15675	Ductless Outdoor Air Systems	-6
15870	Power Ventilators	-3
15891	Metal Ductwork	-3
15910	Duct Accessories	-2
15932	Air Outlets and Inlets	-3
15990	Testing, Adjusting & Balancing	-6

DIVISION 16 - ELECTRICAL

16010	Basic Electrical Requirements	-7
16050	Basic Electrical Materials and Methods	-4
16100	Raceways, Boxes and Cabinets	-5
16120	Wires and Cables	-3
16140	Wiring Devices	-4
16190	Supporting Devices	-3
16195	Electrical Identification	-3
16452	Grounding	-4
16470	Panel Boards	-4
16476	Disconnects	-2
16515	Interior Lighting	-6
16525	Exterior Lighting	-4

SECTION 01026 - PAYMENT AND COMPLETION PROCEDURES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Schedule of values.
   2. Payment procedures.
   3. Completion procedures.
B. Related Requirements Specified Elsewhere in the Project Manual: Overhead and profit distribution.

1.02 CONTRACT CONDITIONS

A. See the conditions of the contract for additional requirements.
B. Progress payments will be made on or about the 25th of each month.
C. The Architect/Engineer will act upon the Contractor's application for payment within 5 days after receipt.
D. The Owner will act upon the application for payment within 15 days after receipt.
E. No payment will be made for materials or equipment stored off site unless specifically approved in advance, in writing by the owner. Submit copy of the owner's agreement to pay for such materials and equipment with the application for payment covering such materials and equipment.
F. Payments may be withheld if the contractor fails to make dated submittals within the time periods specified.

1.03 DEFINITIONS

A. Final Completion: The stage at which all incomplete and incorrect work has been completed or corrected in accordance with the contract documents.
B. List of Incomplete Work: A comprehensive list of items to be completed or corrected, prepared by the Designer/Owner/Contractor for the purpose of obtaining certification of substantial completion. This list is also referred to as a "Pre-Final and Final Punch List."
C. Schedule of Values: A detailed breakdown of the contract sum into individual cost items, which will serve as the basis for evaluation of applications for progress payments during construction.
D. Substantial Completion: The time at which the work, or a portion of the work which the owner agrees to accept separately, is sufficiently complete in accordance with the contract documents so that the owner can occupy or use the work for its intended purpose.
E. Time and Material Work: Work which will be paid for on the basis of the actual cost of the work, including materials, labor, equipment, and other costs as defined elsewhere, as documented by detailed records. This basis is also referred to using the terms "cost-plus," "cost of the work," "force account," and similar terms.

1.04 SUBMITTALS

A. Schedule of Values: First application for payment will not be reviewed without schedule of values. (use AIA G702 or equal)
   1. Submit in size not larger than 8-1/2 by 11 inches.
   2. Submit at Pre-Construction Conference and digitally.
   3. Identify with:
      a. Project name, Project number, Architect's name, Owner's name, Contractor's name and address, and Submittal date.

B. Applications for Progress Payments: Submit sufficiently in advance of date established for the progress payment to allow for the processing indicated. This will be based on schedule of values.

PART 2 - PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 SCHEDULE OF VALUES

A. Prepare a schedule of values prior to the first application for payment.
B. Schedule of Values: Break costs down into line items which will be comparable with line items in applications for payment.
   1. Coordinate line items in the schedule of values with portions of the contract documents which identify units or subdivisions of work; provide cross-referencing if necessary to clarify.
      a. Specifically, correlate with the project manual table of contents.
   2. Divide major subcontracts into individual cost items.
   3. Where applications for payment are likely to include products purchased or fabricated but not yet installed, provide individual line items for material cost, installation cost, and other applicable phases of completion.
   4. Include the following information for each line item, using AIA G703, Continuation Sheet.
      a. Item name.
      b. Applicable specification section.
      c. Dollar value, rounded off to the nearest whole dollar (with the total equal to the contract sum).
      d. Proportion of the contract sum represented by this item, to the nearest one-hundredth percent (with the total adjusted to 100 percent).
   5. Provide the following supporting data for each line item:
      a. Subcontractor's name.
      b. Manufacturer or fabricator's name.
      c. Supplier's name.
C. Submit schedule of values not later than 10 days prior to submittal of first application for payment.
D. The Architect/Engineer will notify the contractor if schedule is not satisfactory; revise and resubmit acceptable schedule.
E. Submit a revised schedule of values when modifications change the contract sum or change individual line items.
   1. Make each modification a new line item.
   2. Show the following information for each line item:
      a. All information required for original submittal.
      b. Identification of modifications which have affected its value.
   3. Submit prior to next application for payment.

3.02 APPLICATIONS FOR PAYMENT

A. Application for Payment will be through Architect.
B. Provide the following information with every application for payment which involves work completed on a time and material basis:
   1. Detailed records of work done, including:
      a. Dates and times work was performed, and by whom.
      b. Time records and wage rates paid.
      c. Invoices and receipts for products.
   2. Provide similar detailed records for subcontracts.

C. Transmit application for payment with a transmittal form itemizing supporting documents attached.

3.03 FIRST PAYMENT PROCEDURE

A. The first application for payment will not be reviewed until the following submittals have been received:

1. Schedule of values.
2. List of subcontractors, principal suppliers, and fabricators.
3. Contractor's construction schedule. Monthly Progress Schedules are required, see Section 01200.
4. Names of the contractor's principal staff assigned to the project.
5. All submittals specified to occur prior to first application for payment or prior to first payment.

3.04 SUBSTANTIAL COMPLETION PROCEDURES

A. The architect will perform a Pre-Final Inspection with the contractor two weeks before substantial completion inspection, upon request of the contractor. Plumbing, Mechanical, & Electrical subcontractors shall be present for all Final Inspections.

B. The architect will perform a Final Inspection with the contractor for substantial completion and verification that the Pre-Final Inspection Punchlist is complete, upon request of the contractor.
   1. Only one certificate of substantial completion will be issued, for the entire project.

C. Submit the following with application for payment following substantial completion:
   1. Certificate of Substantial Completion; use AIA original current editions of G704.
   4. Final Inspection list of incomplete work.
   5. Other data required by the contract documents.

3.05 FINAL COMPLETION PROCEDURES

A. Request for Final Inspection and final application for payment may coincide.

B. The architect/engineer will perform inspection for final completion, upon request of the contractor.
   1. Submit the following with request for inspection:
      a. Previous inspection lists indicating completion of all items.
      b. If any items cannot be completed, obtain prior approval of such delay.

C. Do not submit request for Final Inspection until the following activities have been completed:
   1. Completion of all work, Pre-Final Inspection Punch List, except those items agreed upon by the owner.
   2. Final cleaning.
   3. All activities specified to occur between substantial completion and final completion.

D. Do not submit request for final inspection until the following submittals have been completed:
   1. Startup reports; HVAC balance and test reports.
   2. Operation and maintenance data. Demonstration reports. Instruction reports.
   3. Water bacterial test report of new domestic water supply.
   4. Final Electrical Inspection and certification by the State Construction Office electrical inspector.
   5. Project record documents, record drawings or as-built drawings.
   6. All other outstanding specified submittals.

E. Submit the following with the final application for payment:
   1. Certified copy of the previous list of items to be completed or corrected, stating that each has been completed or otherwise resolved for acceptance.
   2. Contractor's Affidavit of Payment of Debts and Claims; use AIA original current editions of G706
   3. Contractor's Affidavit of Release of Liens; use AIA original current editions of G706A.
   4. Consent of surety to final payment; use AIA original current editions of G707.

5. Final liquidated damages statement.
6. Certification that financial obligations to governing authorities and public utilities have been fulfilled.
7. Description of unsettled claims.
8. Other data required by the contract documents.

END OF SECTION 01026

SECTION 01100- COMPENSATION FOR GENERAL CONSTRUCTION

US HWY 158
REST AREA RENVOVATION AND ADDITION
FALL 2026
CURRITUCK COUNTY, NORTH CAROLINA

1.1 COMPENSATION

A. The work of furnishing all materials and constructing/renovating the existing Rest Area Building, additions and site work in accordance with the plans and specifications, completed and accepted, will be paid for at the contract lump sum price for the "General Construction of Rest Area Building-Currituck". Such price and payment will be full compensation for all work included in construction documents for the renovation and addition to the Rest Area Building, including but not limited to furnishing all transportation, materials, labor, tools, equipment, fees and incidentals necessary to complete the work. Payment will be made under:

"General Construction of Rest Area Building-Currituck"……..Lump Sum

US HWY 158
REST AREA RENVOVATION AND ADDITION
FALL 2026
CURRITUCK COUNTY, NORTH CAROLINA

DIVISION 15A- COMPENSATION FOR PLUMBING --

COMPENSATION

A. The work of furnishing materials and constructing the Plumbing installation and demolition for the Rest Area Building and addition in accordance with the plans and specifications, completed and accepted, will be paid for at the contract lump sum price for the "Plumbing Installation of Rest Area Building-Currituck". Such price and payment will be full compensation for all work of constructing the Plumbing installation for the Rest Area Building and addition as indicated within construction documents, including but not limited to furnishing all transportation, materials, labor, tools, equipment, fees and incidentals necessary to complete the work. Payment will be made under:

"Plumbing Installation of Rest Area Building-Currituck"……..Lump Sum

US HWY 158
REST AREA RENVOVATION AND ADDITION
FALL 2026
CURRITUCK COUNTY, NORTH CAROLINA

DIVISION 15B- COMPENSATION FOR MECHANICAL

COMPENSATION

A. The work of furnishing materials and constructing the Mechanical installation for the Rest Area Building and addition in accordance with the plans and specifications, completed and accepted, will be paid for at the contract lump sum price for the "Mechanical Installation for Rest Area Building-Currituck". Such price and payment will be full compensation for all work of constructing the Mechanical installation for the Rest Area Building and addition, including but not limited to furnishing all transportation, materials, labor, tools, equipment, fees and incidentals necessary to complete the work. Payment will be made under:

"Mechanical Installation for Rest Area Building- Currituck"…….Lump Sum

US HWY 158
REST AREA RENVOVATION AND ADDITION
FALL 2026
CURRITUCK COUNTY, NORTH CAROLINA

A. The work of furnishing materials and constructing the Electrical installation for the Rest Area Building and additions in accordance with the plans and specifications, completed and accepted, will be paid for at the contract lump sum price for the "Electrical Installation for Rest Area Building-Currituck". Such price and payment will be full compensation for all work of constructing the Electrical installation for the Rest Area Building, including but not limited to furnishing all transportation, materials, labor, tools, equipment, fees and incidentals necessary to complete the work. Payment will be made under:

"Electrical Installation for Rest Area Building- Currituck"…….Lump Sum

SECTION 01200 - PROGRESS DOCUMENTATION AND PROCEDURES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Progress documentation requirements:
      a. Contractor's construction schedule.
   2. Progress procedures:
      a. Progress meetings.

B. Contract time is indicated elsewhere.

1.02 SUBMITTALS

A. Contractor's Construction Schedule.
   1. Submit within 14 days after execution of contract.
   2. Submit revised schedule with application for payment to the Architect/ Engineer

1.03 FORM OF SUBMITTALS

A. Schedules - General:
   1. Provide legend of symbols and abbreviations for each schedule.
   2. Use the same terminology as that used in the contract documents.
   3. When transparencies are submitted, use only media which will not fade or lose contrast over time.

B. Bar Charts:
   1. Provide individual horizontal bars representing the duration of each major activity.
   2. Coordinate each element on the schedule with other construction activities.
   3. Show activities in proper sequence.
   4. Show percentage of completion of each activity.
   5. Include cost bar at top of chart, showing estimated and actual costs of work performed at the date of each application for payment.
   6. Use vertical lines to mark the time scale at not more than one week intervals.
   7. Prepare on reproducible transparency.
   8. Use sheets of sufficient number and width to show the full schedule clearly.

1.04 COORDINATION

A. In preparation of schedules, take into account the time allowed or required for the Engineer's administrative procedures.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Prepare and submit a construction schedule.

B. Provide construction schedule in the form of bar charts:
   1. Where related activities must be performed in sequence, show relationship graphically.
   2. Indicate activities separately for:
      a. Each separate building.
   3. Incorporate the submittal schedule specified elsewhere.
   4. Show dates of:
      a. Each activity that influences the construction time.
      b. Ordering dates for products requiring long lead time.
      c. All submittals required.

d. Completion of structure.
e. Completion of permanent enclosure.
f. Instruction of the owner's personnel in operation and maintenance of equipment and systems.
g. Substantial and final completion, with time frames for the Engineer's completion procedures.

5. In developing the schedule take into account:
   a. Work by owner.
   b. Need for temporary heating, ventilating, or air-conditioning.

C. The Engineer will notify the contractor if schedule is not satisfactory; revise and resubmit.
   1. Resubmit within 7 days.
D. Make and distribute copies of schedule to the Engineer, to subcontractors, and to other entities whose work will be influenced by schedule dates.
   1. Hang a copy of the schedule up in each field office or meeting room.
E. Update the schedule whenever changes occur or are made, or when new information is received, but not less often than at the same intervals at which applications for payment are made.
   1. Indicate changes made since last issue; show actual dates for activities completed.
   2. Submit updated schedule with application for payment.
   3. Issue updated schedule with report of meeting at which revisions are made.
   4. Issue updated schedule in same manner as original schedule.

3.02 PROGRESS MEETINGS

A. Schedule and conduct periodic progress meetings during construction period.
   1. Have meetings once a month.
   2. Notify the Engineer at least one week in advance of date of meeting.
B. The following are required to attend:
   1. Project superintendent.
   2. Major subcontractors and suppliers.
   3. Others who have an interest in the agenda.
   4. State inspectors.
C. Prepare and distribute agenda prior to meetings; cover the following topics when applicable:
   1. Review minutes of previous meeting.
   2. Status of submittals and impending submittals.
   3. Actual progress of activities in relation to the schedule.
   4. Actual and anticipated delays, their impact on the schedule, and corrective actions taken or proposed.
   5. Actual and potential problems.
   6. Status of change order work.
   7. Status of corrective work ordered by the Engineer.
   8. Progress expected to be made during the next period.

END OF SECTION 01200

SECTION 01300 - SUBMITTALS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Preparing and processing of submittals for review and action.
   2. Preparing and processing of informational submittals.
B. Submit the following for the Architect/Engineer's review and action:
   1. Shop drawings.
   2. Product data.
   3. Samples.
C. Submit the following as informational submittals:
   1. Reports.
D. Specific submittals are described in individual sections.
E. Do not commence work which requires review of any submittals until receipt of returned submittals with an acceptable action.
F. Submit all submittals to the Engineer.
G. Related Sections: The following are specified elsewhere in Division 1:
   1. Progress of work submittals:
      a. Contractor's construction schedules.
   2. Quality control submittals:
      a. Test reports.

1.02 DEFINITIONS

A. "Shop drawings" are drawings and other data prepared, by the entity who is to do the work, specifically to show a portion of the work.
   1. Shop drawings also include:
      a. Product data specifically prepared for this project.
      b. Shop or plant inspection and test reports, when made on specific materials, products, or systems to be used in the work.
B. "Product data submittals" are standard printed data which show or otherwise describe a product or system, or some other portion of the work.
C. "Samples" are actual examples of the products or work to be installed.
D. Informational Submittals: Submittals identified in the contract documents as to be submitted for information only.

1.03 FORM OF SUBMITTALS

A. Sheets Larger Than 8-1/2 by 14 Inches:
   1. Maximum sheet size: 36 by 48 inches.
      a. Exception: Full size pattern or template drawings.
   2. Number of copies:
      a. Submittals for review:
         1. One correctable reproducible print, not folded and 6 copies] of blue- or black-line print(s).
         2. Reproducible will be returned.
B. Small Sheets or Pages:
   1. Minimum sheet size: 8-1/2 by 11 inches.
   2. Maximum sheet size for opaque copies: 8-1/2 by 17 inches.
   3. Number of copies:
      a. One (1) Electronic Submittal Copy: General Contractor to Email one (1) stamped and signed copy to the Architect, and Engineer.

b. Electronic Submittal shall be in PDF. format.
c. Architect and Engineer shall review, stamp and sign submittal; scan and return 1 set to the General Contractor and Roadside Engineer for distribution to his subcontractors, suppliers, and retain 1 copy for his field office.

C. If additional sets are needed by other entities involved in work represented by the samples, submit with original submittal.
D. Copies in excess of the number requested will not be returned.

1.04 COORDINATION OF SUBMITTALS

A. Coordinate submittals and activities that must be performed in sequence, so that the Engineer has enough information to properly review the submittals.
B. Coordinate submittals of different types for the same product or system so that the Engineer has enough information to properly review each submittal.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 TIMING OF SUBMITTALS

A. Transmit each submittal at or before the time indicated on the approved schedule of submittals.
   1. Prepare and submit for approval a schedule showing the required dates of submittal of all submittals.
   2. Organize the schedule by the applicable specification section number.
   3. Incorporate the contractor's construction schedule specified elsewhere.
   4. Submit within 14 days after commencement of the work.
   5. Revise and resubmit the schedule for approval when requested.
B. Deliver each submittal requiring approval in time to allow for adequate review and processing time, including resubmittals if necessary; failure of the contractor in this respect will not be considered as grounds for an extension of the contract time.
C. Deliver each informational submittal prior to start of the work involved, unless the submittal is of a type which cannot be prepared until after completion of the work; submit promptly.
D. If a submittal must be processed within a certain time in order to maintain the progress of the work, state so clearly on the submittal.

3.02 SUBMITTAL PROCEDURES - GENERAL

A. Contractor Review: Sign each copy of each submittal certifying compliance with the requirements of the contract documents.
B. Notify the Engineer, in writing and at time of submittal, of all points upon which the submittal does not conform to the requirements of the contract documents, if any.
C. Preparation of Submittals:
   1. Label each copy of each submittal, with the following information:
      a. Project name.
      b. Date of submittal.
      c. Contractor's name and address.
      d. Engineer's name and address.
      e. Subcontractor's name and address.
      f. Other necessary identifying information.
   2. Pack submittals suitably for shipment.
   3. Submittals to receive Engineer's action marking:

   Provide blank space on the label or on the submittal itself for action marking; minimum 4 inches wide by 5 inches high.

D. Transmittal of Submittals:
   1. Submittals will be accepted from the contractor only. Submittals received from other entities will be returned without review or action.
   2. Submittals received without a transmittal form will be returned without review or action.
   3. Transmittal form: Similar to AIA G810.
   4. Fill out a separate transmittal form for each submittal; also include the following:
      a. Other relevant information.
      b. Requests for additional information.

3.03 SHOP DRAWINGS

A. Content: Include the following information:
   1. Dimensions, at accurate scale.
   2. All field measurements that have been taken, at accurate scale.
   3. Names of specific products and materials used.
   4. Coordination requirements; show relationship to adjacent or critical work.
   5. Name of preparing firm.
B. Preparation:
   1. Identify as indicated for all submittals.
   2. Space for Engineer's action marking shall be adjacent to the title block.

3.04 PRODUCT DATA

A. When product data submittals are prepared specifically for this project (in the absence of standard printed information) submit such information as shop drawings and not as product data submittals.
B. Content:
   1. Submit manufacturer's standard printed data sheets.
   2. Show compliance with properties specified.
   3. Show compliance with the specific standards referenced.
   4. Show compliance with specified testing agency listings; show the limitations of their labels or seals, if any.
   5. Identify dimensions which have been verified by field measurement.
   6. Show special coordination requirements for the product.

3.05 SAMPLES

A. Samples:
   1. Provide samples that are the same as proposed product.
   2. Where unavoidable variations must be expected, submit "range" samples, minimum of 3 units, and describe or identify variations among units of each set.
B. Preparation:
   1. Attach a description to each sample.
   2. Attach name of manufacturer or source to each sample.
C. Keep final sample set(s) at the project site, available for use during progress of the work.

3.06 REVIEW OF SUBMITTALS

A. Submittals for approval will be reviewed, marked with appropriate action, and returned.
B. Informational submittals: Submittals will be reviewed.
   1. "X" action: No action taken.
   2. "Not Approved" action: Revise the submittal or prepare a new submittal complying with the comments made.
   3. A copy will be returned if submittal is unsatisfactory.

3.07 RETURN, RESUBMITTAL, AND DISTRIBUTION

A. Submittals will be returned to the contractor by mail.
B. Perform resubmittals in the same manner as original submittals; indicate all changes other than those requested by the Engineer.
C. Distribution:
   1. Make extra copies for operation and maintenance data submittals, as required.

END OF SECTION 01300

SECTION 01600 -SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 DESCRIPTION

A. Section includes Substitution Bid and Submittal Process.

1.2 SUBSTITUTION REQUIREMENTS

A. When material, article, or method is specified using name of proprietary product manufacturer, vendor, or method followed by phrase "or equal," specific item mentioned establishes basis upon which bids are to be prepared.
   1. Other manufacturers' materials, articles, and methods not named will be considered as substitutions provided required information is submitted on “FORM FOR SUBSTITUTIONS FOR SPECIFIED ITEMS” and will not require substantial revisions of Contract Documents.
   2. This applies to specific construction methods when required by Contract Documents.

B. Whenever material, article, or method is specified or described without phrase "or equal," no substitutions will be allowed.

C. Cost for redesigns due to substituted items are responsibility of Contractor.

D. Bidder represents the following in making their request for substitution(s).
   1. Has personally investigated proposed product or method and determined it is equal in all respects to that specified.
   2. Will furnish same guarantee for substitution as for product or method specified.
   3. Will coordinate installation of accepted substitution into Work, making design and construction changes to complete Work in all respects following Contract requirements without additional cost to the Commission.

E. Request for substitutions received after bids are open will not be considered except as stated herein.

1.3 SUBMITTAL OF DATA FOR PROPOSED SUBSTITUTIONS

A. In order for substitutions that do not change design intent to be considered, submit no later than 30 days after date of Notice to Proceed, 3 copies of complete data set forth herein to permit complete analysis of proposed substitutions
   1. For Products.
      a. Identification including manufacturer's name and address.
      b. Manufacturer's literature, including but not necessarily limited to:
         1) Product description, performance, and test data.
         2) Reference standards.
      c. Samples where appropriate.
      d. Name and address of similar projects on which product was used and dates of installation with contact name and telephone number.
   2. For Construction Methods.
      a. Detailed description of proposed method.
      b. Drawings illustrating methods.
      c. Name and address of similar projects on which method was used and dates of use with contact name and telephone number.
   3. Comparison of proposed substitution with product or method specified.
   4. Data relating to impact on construction schedule by proposed substitution.
   5. Impact on other contracts.

1.4 SUBSTITUTIONS RECEIVED AFTER 30 DAYS AFTER NOTICE

A. No request for substitutions submitted after 30 days after Notice to Proceed will be considered unless following evidence is submitted to the Architect.
   1. Specified material or method is unavailable, due to cause(s) stated in General Conditions, Article 15.5.1.
      a. Submit data to permit complete analysis of the proposed substitution.

1.5 APPROVAL OF SUBSTITUTION

A. Architect/Engineer's decision regarding evaluation of substitutions will be final and binding.
B. Request for time extensions and additional costs based on submission, acceptance, or rejection of substitutions will be evaluated following Contract Documents.
C. All approved substitutions will be incorporated into Contract by Change Order.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

PART 4 - MEASUREMENT AND PAYMENT

1.1 Providing for and complying with requirements in this Section will not be measured for payment, but cost will be considered incidental to Contract.

SECTION 02072 - DEMOLITION FOR REMODELING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Demolition and removal of portions of the existing Rest Area building or structure; including exterior storefront, interior sheathing/drywall/tile walls, wall & roof fiberglass insulation, roofing, roof framing, exterior fencing, plumbing and electrical systems.
      a. Site Clearing including sidewalks
      b. See Section 01151 for the Construction and Demolition Materials Recycling Requirements.
   2. Owner shall have the right to salvage the Contractor removed gutters and toilet partitions.
      a. Removal of existing small shrubbery (may be by NCDOT, Division office).

1.02 SUBMITTALS

A. Project Record Documents:
   1. Identify location of capped utilities.
   2. Submit form Sections 01151A and 01151B per Section 01151 for the Construction and Demolition Materials Recycling Requirements.

1.03 PROJECT CONDITIONS

A. Existing Conditions:
   1. After the project is begun, the contractor is responsible for the condition of structures. The owner does not warrant that the condition of structures will not have changed since the time of inspection for bidding purposes.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that utilities have been disconnected and sealed.
B. Survey existing conditions and correlate with drawings and specifications to determine extent of demolition required; see Architectural and Electrical drawings. Salvage costs shall be reflected in the Contractor's bid.
C. In so far as is practicable, arrange operations to reveal unknown or concealed structural conditions for examination and verification before removal or demolition.

3.02 PREPARATION

A. Protection:
   1. Provide for the protection of persons passing around or through the area of demolition.
   2. Perform demolition so as to prevent damage to adjacent improvements and facilities to remain.
B. Construct and maintain shoring, bracing, and supports as necessary to ensure the stability of structures.

3.03 UTILITY SERVICES

A. Arrange with utility companies and shut off indicated utilities serving structures.
B. Disconnect and cap indicated utilities before starting demolition operations.
C. Identify location of capped utilities on project record documents.

3.04 POLLUTION CONTROLS

A. Observe environmental protection regulations.
B. Do not allow water usage that results in freezing or flooding.

3.05 DEMOLITION - GENERAL

A. Remove: Unless items are otherwise indicated to be reinstalled or salvaged, remove and scrap.
B. Remove and Reinstall: Remove items indicated; clean, service, and otherwise prepare for service; reinstall in the same location (or in the location indicated).
C. Remove and Install New: Remove and dispose of items indicated and install new items in the same location (or in the location indicated).
D. Remove and Salvage: Items indicated to be salvaged will remain the Owner's property. Carefully remove and clean items indicated to be salvaged; protect against damage; Owner may salvage some of the toilet fixtures, and toilet partitions.
E. Remove and Scrap: Remove and dispose of items indicated in Section 01151 for the Construction and Demolition Materials Recycling Requirements.
    1. Items of value to the contractor: Do not store removed items on site.
F. Existing to Remain: Construction or items indicated to remain shall be protected against damage during demolition operations. Where practicable, and with the architect's permission, the contractor may elect to remove items to a suitable storage location during demolition and then properly clean and reinstall the items.
G. Perform work in a systematic manner.
H. Perform selective demolition using methods which are least likely to damage work to remain and which will provide proper surfaces for patching.

3.06 DEMOLITION ON OR BELOW GRADE

A. Where portions of concrete slabs-on-grade are to be removed, first outline the portion with a concrete saw to a depth of at least 1 inch.

3.07 FILLING BELOW-GRADE AREAS AND VOIDS

A. Below-grade areas and voids resulting from demolition of structures shall be filled or excavated further, as appropriate, according to requirements specified elsewhere.

3.08 DISPOSAL OF DEMOLISHED MATERIALS

A. Promptly dispose of materials resulting from demolition operations. Do not allow materials to accumulate on site. See Section 01151 for the Construction and Demolition Materials Recycling Requirements.
B. Transport concrete or masonry debris resulting from demolition operations and dispose off the Owner's property.
C. Transport all other materials resulting from demolition operations and legally dispose of off-site.

D. Do not burn removed materials on project site.
F. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.

3.09 CLEANING

A. Clean soil, smudges, and dust from surfaces to remain.

END OF SECTION 02072

THIS PAGE LEFT BLANK INTENTIONALLY.

SECTION 03300 – CAST IN PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Cast-in-place concrete and concrete curing.
   1. Sidewalks, see Roadside Environmental concrete section.
   2. New concrete slab
   3. Repair of concrete slabs

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's product data / Mix Design to the Engineer:
   1. Concrete mix, reinforcing, admixtures and curing compound.

1.3 QUALITY ASSURANCE

A. Codes and Standards: Comply with the following documents, except where requirements of the contract documents or of governing codes and governing authorities are more stringent:
   1. Sidewalks, curb ramps, steps, curb & gutters, and parking lot paving shall comply with **NCDOT Standard Specifications** dated January 2012, Divisions 7 and 8; Sections 710, 846 and 848; Class "A" concrete for Portland Cement Production and Delivery.
   2. ACI 301 & ACI 318.
B. Testing Agency Services:
   1. NCDOT's testing agency will conduct tests and perform other services specified for quality control during construction.

PART 2 - PRODUCTS

2.1 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150, and as follows:
   1. Type I, except where other type is specifically permitted or required.
      a. Type I may be replaced by Type III (high early strength) for concrete placed during cold weather.
B. Water: Potable.
C. Aggregates: Normal weight concrete: ASTM C 33.
D. Admixtures - General: Admixtures which result in more than 0.1 percent of soluble chloride ions by weight of cement are prohibited.
E. Air-Entraining Admixture: ASTM C 260 and certified by manufacturer for compatibility with other mix components.
F. Water-Reducing Admixture: ASTM C 494, Type A.

2.2 CONCRETE REPAIR MATERIALS

A. Fast-drying, cement-based underlayment skim coat
   1. Manufacturer: Basis of Design: Laticrete NXT Skim (or approved equal. All concrete repair products to be of the same manufacturer. Also the tile installation materials shall be the same manufacturer to ensure compatibility.)
   2. Prep slab according to manufacturer's instructions
   3. Use to level/repair any cracks per manufacturer's instructions.

B. Fast set two-component hybrid urethane for permanent concrete repair
   1. Manufacturer: Basis of Design: Laticrete, Spartacote Fast Fix (or approved equal. All concrete repair products to be of the same manufacturer. Also the tile installation materials shall be the same manufacturer to ensure compatibility.)
   2. Prep slab according to manufacturer's instructions
   3. Use to level/repair any cracks per manufacturer's instructions
C. Fast-Drying Cement Based underlayment for patching
   1. Manufacturer: Basis of Design: Laticrete, NXT Patch (or approved equal. All concrete repair products to be of the same manufacturer. Also the tile installation materials shall be the same manufacturer to ensure compatibility.)
   2. Prep slab according to manufacturer's instructions
   3. Use to level/repair any cracks per manufacturer's instructions

2.3 MISCELLANEOUS MATERIALS AND ACCESSORIES

A. Formwork:
   1. Facing Materials: Unexposed finish concrete: Any standard form materials that produce structurally sound concrete.
   2. Formwork Accessories:
      a. Form coating: Form release agent that will not adversely affect concrete surfaces or prevent subsequent application of concrete coatings.
      b. Metal ties: Commercially manufactured types; cone snap ties, taper removable bolt, or other type which will leave no metal closer than 1-1/2 inches from surface of concrete when forms are removed, leaving not more than a 1-inch-diameter hole in concrete surface.
B. Reinforcing Materials:
   1. Reinforcing Bars: Provide deformed bars complying with the following, except where otherwise
      indicated: ASTM A 615, Grade 60.
   2. Welded Wire Fabric: ASTM A 185, cold-drawn steel, plain.
   3. Tie wire: Black annealed type, 16-1/2 gage or heavier.
   4. Supports: Bar supports conforming to specifications of CRSI "Manual of Standard Practice."
C. Vapor Retarder: Membrane for installation beneath slabs on grade, resistant to decay when tested in accordance with ASTM E 1745, and as follows:
   1. 15 mils thick, multi-layer, fabric-, cord-, grid-, or aluminum-reinforced polyethylene or equivalent, Class A; stated by manufacturer as suitable for installation in contact with soil or granular fill under concrete slabs Single ply polyethylene sheet is prohibited.
   2. See also spec section 07260.
D. Moisture-Retaining Cover: ASTM C 171, and as follows:
   1. Polyethylene film.
E. Liquid Curing Compounds: Comply with ASTM C 309, Type 1 and compatible with flooring.

2.4 CONCRETE MIX DESIGN

A. Proportioning of Normal Weight Concrete: Comply with recommendations of ACI 211.1.
B. Specified Compressive Strength f'c at 28 Days for Locations as Indicated on Drawings:
   1. Footings: 3000 psi., maximum w/c ratio = 0.58
   2. Interior Slabs: 4000 psi, maximum w/c ratio = 0.50.
   3. Exterior slabs: 5000 psi, maximum w/c ratio = 0.40.
C. Admixtures:
   1. Air-entraining admixture: Use in mixes for exterior exposed concrete unless otherwise specifically indicated. Add at rate to achieve total air content in accordance with Table

1.4.3 of ACI 201.2. For concrete not exposed to exterior, add at rate to achieve total air content between 1 percent and 3 percent.
   a. Do not use in slabs-on-grade scheduled to receive topping, unless manufacturer of topping recommends use over air-entrained concrete.
2. Do not use admixtures not specified or approved.

PART 3 - EXECUTION

3.01 EXISTING SLAB PREP

A. General: Remove mud bed tile and thin-set tile as indicated on drawings. Clean surface as needed. Grind surface for proper bonding. Apply bonding agent as recommended by concrete repair and tile setting materials. See also spec section 09300.

3.02 VAPOR RETARDER INSTALLATION

A. General: Place vapor retarder sheet over prepared base material, aligning longer dimension parallel to direction of pour and lapped 6 inches. Seal joints with appropriate tape. Cover with sand to depth shown on drawings.

3.03 JOINT CONSTRUCTION

A. Construction Joints: Locate and install construction joints as indicated on drawings. If construction joints are not indicated, locate in manner which will not impair strength and will have least impact on appearance, as acceptable to the Engineer.
   1. Keyways: Provide keyways not less than 1-1/2 inches deep.
   2. Reinforcement: Continue reinforcement across and perpendicular to construction joints, unless details specifically indicate otherwise.
B. Control Joints: Construct contraction joints in slabs poured on grade to form panels of sizes indicated on drawings, but not more than 12 feet apart in either direction.
   1. Saw cuts: Form control joints by means of saw cuts one-fourth slab depth.

3.04 CONCRETE PLACEMENT

A. Inspection: Before beginning concrete placement, inspect formwork, reinforcing steel, and items to be embedded, verifying that all such work has been completed.
   1. Wood forms: Moisten immediately before placing concrete in locations where form coatings are not used.
B. Placement - General: Comply with requirements of ACI 304 and as follows:
   1. Schedule continuous placement of concrete to prevent the formation of cold joints.
   2. Provide construction joints if concrete for a particular element or component cannot be placed in a continuous operation.
   3. Deposit concrete as close as possible to its final location, to avoid segregation.
C. Placement in Forms: Limit horizontal layers to depths which can be properly consolidated, but in
no event greater than 24 inches.
   1. Vibrate concrete sufficiently to achieve consistent consolidation without segregation of coarse aggregates.
   2. Do not use vibrators to move concrete laterally.
D. Slab Placement: Schedule continuous placement and consolidation of concrete within planned construction joints.
   1. Thoroughly consolidate concrete without displacing reinforcement or embedded items, using internal vibrators, vibrating screeds, roller pipe screeds, or other means acceptable to Engineer.

2. Strike off and level concrete slab surfaces, using highway straightedges, darbies, or bull floats before bleed water can collect on surface. Do not work concrete further until finishing operations are commenced.

3.05 FINISHING FORMED SURFACES

A. Repairs, General: Repair surface defects, including tie holes, immediately after removing formwork.
   1. Smooth rubbed finish: Apply to surfaces indicated no later than 24 hours after form removal.
      a. Wet concrete surfaces to be finished and rub with Carborundum brick or other abrasive until uniform color and texture are achieved.
      b. Do not apply separate grout mixture.

3.06 FINISHING SLABS

A. Finishing Operations - General:
   1. Do not directly apply water to slab surface or dust with cement.
   2. Use hand or powered equipment only as recommended in ACI 302.1R.
   3. Screeding: Strikeoff to required grade and within surface tolerances indicated. Verify conformance to surface tolerances. Correct deficiencies while concrete is still plastic.
   4. Bull Floating: Immediately following screeding, bull float or darby before bleed water appears to eliminate ridges, fill in voids, and embed coarse aggregate. Recheck and correct surface tolerances.
   5. Final floating: Float to embed coarse aggregate, to eliminate ridges, to compact concrete, to consolidate mortar at surface, and to achieve uniform, sandy texture. Recheck and correct surface tolerances.
   6. Troweling: Trowel immediately following final floating. Apply first troweling with power trowel except in confined areas, and apply subsequent trowelings with hand trowels. Wait between trowelings to allow concrete to harden. Do not over trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over it. Consolidate concrete surface by final troweling operation. Completed surface shall be free of trowel marks, uniform in texture and appearance, and within surface tolerance specified.
      a. Grind smooth surface defects which would telegraph through final floor covering system.
B. Coordinate appearance and texture of required final finishes with the Engineer before application.
C. Broomed Float Finish: After floating and when water sheen has practically disappeared, apply uniform transverse corrugations approximately 1/16 inch deep, without tearing surface.
D. Trowel Finish: As specified above.
E. Trowel and Fine Broom Finish: Follow trowel finishing operation immediately with fine brooming to achieve slightly scarified surface.
F. Slab Surface Tolerances:
   1. Achieve flat, level planes except where grades are indicated. Slope uniformly to drains.
   2. Floated finishes: Depressions between high spots shall not exceed 5/16 inch under a 10-foot straightedge.
   3. Troweled finishes: Achieve level surface plane so that depressions between high spots do not exceed the following dimension, using a 10-foot straightedge:
      a. 1/8 inch.
G. Slab Finish Schedule: Apply finishes in the following typical locations and as otherwise shown on the drawings:
   1. Trowel finish:
      a. Exposed interior floors not otherwise scheduled.
      b. Surfaces to receive resilient tile.
   2. Trowel and fine broom: Surfaces to receive terrrazo.

3. Broom float finish: Exterior slabs and stairs.

3.07 CONCRETE CURING AND PROTECTION

A. General:
   1. Prevent premature drying of freshly placed concrete, and protect from excessively cold or hot temperatures until concrete has cured.

   2. Provide curing of concrete by one of the methods listed and as appropriate to service conditions and type of applied finish in each case.
B. Curing Period:
   1. Not less than 7 days for standard cements and mixes.
   2. Not less than 4 days for high early strength concrete using Type III cement.
C. Formed Surfaces: Cure formed concrete surfaces by moist curing with forms in place for full curing period or until forms are removed.
D. Surfaces Not in Contact with Forms:
   1. Start initial curing as soon as free water has disappeared, but before surface is dry.
   2. Keep continuously moist for not less than 3 days by uninterrupted use of any of the following:
      a. Water ponding.
      b. Water-saturated sand.
      c. Water-fog spray.
      d. Saturated burlap: Provide 4-inch minimum overlap at joints.
   3. Begin final curing procedures immediately following initial curing and before concrete has dried.
   4. Continue final curing to end of curing period.
E. Avoid rapid drying at end of curing period.
F. Protect slabs during construction process, especially from spillage.

3.08 QUALITY CONTROL TESTING DURING CONSTRUCTION

A. Composite Sampling, and Making and Curing of Specimens: ASTM C 172 and ASTM C 31.
B. Slump: ASTM C 143. One test per batch.
   1. Modify sampling to comply with ASTM C 94.
C. Air Content of Normal Weight Concrete: ASTM C 173 or ASTM C 231. One test per strength test performed on air-entrained concrete.
D. Compressive Strength Tests: ASTM C 39.
   1. Testing for acceptance of potential strength of as-delivered concrete:
      a. Obtain samples on a statistically sound, random basis.
      b. Minimum frequency:
         1. One set per 100 cubic yards or fraction thereof for each day's pour of each concrete class.
         2. One set per 3500 square feet of slab or wall area or fraction thereof for each day's pour of each concrete class.

END OF SECTION 03310

This page left blank intentionally.

Section 03530 – Concrete Topping

PART 1 – GENERAL

1.1 **SUMMARY**

A. Provide Self-Leveling Portland Cement and Underlayment for placement over existing concrete substrate**.**

B. Related Sections: Other specification sections which relate directly to the work of this section include the following:

Section 030100 – Maintenance of Concrete
Section 035300 – Concrete Topping

1.20 **SUBMITTALS**

A. Product Data: Submit manufacturer's product data and installation for each material and product used. Include manufacturer's Material Safety Data Sheets.

1.30 **REFERENCES**

A. ASTM C 109: Compressive Strength of Hydraulic Mortars.
B. ASTM C 191: Setting Time of Hydraulic Cement.
C. ASTM C 1059: Standard Specifications for Latex Agents for Bonding Fresh to Hardened Concrete.

1.40 **QUALITY ASSURANCE**

A. Manufacturer's Qualifications: The manufacturer shall be a company with at least fifteen years experience and regularly engaged in the manufacturer and marketing of products specified herein.
B. Installer's Qualifications: The contractor shall be qualified to perform the work specified by reason of experience.

1.50 **DELIVERY, STORAGE AND HANDLING**

A. Deliver products in original packaging, labeled with product identification, manufacturer, batch number and shelf life.
B. Store products in a dry area. Protect from direct sunlight.
C. Handle products in accordance with manufacturer's printed recommendations.

PART 2 – **PRODUCTS**

2.10 **MATERIALS**

A. Self-leveling, Portland Cement Based, Self Finishing, One Component Underlayment . Comply with the following:

1. Manufacturer: Self-Leveling Floor Resurfacer – Fast-Setting (No. 1249-51) as manufactured by the QUIKRETE® Companies, One Securities Centre, 3490 Piedmont Road, NE, Suite 1300,

   Atlanta, GA 30305; telephone (404) 634-9100.

2. Performance and Physical Properties at 73 degrees F and 50 percent relative humidity:

   A. Working time, ASTM C 191: 20-40 minutes

B. Compressive Strength, ASTM C 109 Modified: 1800 psi (12.4 MPa) @ 24 hours, 4000 psi (27.6 MPa) @ 7 days, 5500 psi (37.9 MPa) @ 28 days

C. Slant Shear Bond Strength, ASTM C 1059: Exceeds 1250 psi (8.6 MPa) @ 28 days

D. Walk On Time: 2-4 hours maximum

E. Tensile Bond Strength, ASTM C 1059: 300 psi (2.1 MPa) @ 7 days, 400 psi (2.8 MPa) @ 28 days

PART 3 – **EXECUTION**

3.10 **EXAMINATION**

A. Examine substrates and conditions under which materials will be installed. Do not proceed with installation until unsatisfactory conditions are corrected.

B. Coordinate installation with adjacent work to ensure proper sequence of construction. Protect adjacent areas landscaping from contact due to mixing and handling of materials.

3.20 **SURFACE PREPARATION:**

Comply with manufacturer's printed instructions and the following:

A. Clean the concrete slab or floor of all dirt, dust, oil, grease, paint and water-soluble material.
B. Fill any deep holes or depressions to existing floor elevation with QUIKRETE® FastSet™ Non-Shrink Grout (No. 1585-09), comply with manufacturer's printed instructions. Allow filled areas to cure before pouring Floor Resurfacer.
C. Seal all perimeter openings to prevent leakage. These dams should be able to retain resurfacer material at a height greater than the finished floor elevation.
D. Prime the clean dry floor surface with QUIKRETE® Bonding Adhesive (No. 9902) in accordance with manufacturer's instructions. Dilute 1 part Bonding Adhesive with 2 parts clean water. Blend Bonding Adhesive completely before using.

E. Apply with broom, roller or garden sprayer to saturate the surface.

3.30 **MIXING:**

Comply with manufacturer's printed instructions and the following:

A. Material should be mechanically mixed for a minimum of 4 minutes at 250-500 RPM's using a five-gallon (19L) bucket with a ½" (12mm) drill and paddle mixer. For large grouting applications, a standard mortar mixer may be used.

B. Add approximately 4.5 quarts (4.26L) of clean mixing water per 50 lb (22.7 kg) bag.

C. Slowly pour the powder into the water and mix to a lump free consistency. If more water is needed, add small amounts at a time and continue to mix until the desired consistency is achieved.

D. Use minimum amount of water necessary to achieve the desired flow characteristics. Excessive water can cause separation, reduction of strength and shrinkage of cured resurfacer.

3.40 **APPLICATION:**

Comply with manufacturer's printed instructions and the following:

A. Place the resurfacer by pouring directly from the mixing container. Placing should be done as one continuous operation.

B. Pour in continuous strips about 1 foot (0.30 m) in width across the narrow section of floor.

C. QUIKRETE® Self-Leveling Floor Resurfacer can be installed from 1" (25 mm) thick to a feather edge in one application.

D. Protect the leveled floor until resurfacer has developed sufficient strength. Fast-Setting Self-Leveling Floor Resurfacer may be walked on within 2 - 4 hours, depending on conditions, and finished flooring may be applied in 24 hours depending on conditions.

E. Do not apply if temperatures are below 50°F (10°C) or are expected to go below 40° (4°C) within a 24 hour period. Use cold water in hot weather or hot water in cold weather to achieve desired grout temperature.

3.50 **CURING**

A. Areas to receive Self-Leveling Floor resurfacer should be protected from the sun or wind which can cause a rapid moisture loss leading to incomplete hydration and potential cracking.

3.60 **CLEANING**

A. Remove excess material before material cures. If material has cured, remove using mechanical methods that will not damage substrate.

END OF SECTION

SECTION 055100 - FIXED METAL LADDERS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Fixed aluminum ship's ladders.
B. Fasteners and installation accessories.

1.2 RELATED SECTIONS

A. Section 06 10 00 - Rough Carpentry: Blocking in metal wall studs and partitions for anchorage of access ladders

1.3 REFERENCES

A. ANSI A14.3 - American National Standard for Ladders -- Fixed -- Safety Requirements; 1992.
B. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2001.
C. ASTM B 209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric); 2001.
D. ASTM B 210 - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes; 2002.
E. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2000.
F. ASTM B 221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2000.
G. ASTM B 308 - Standard Specification for Aluminum - Alloy T6061-T6 Standard Structural; 2002
H. ASTM B 308M - Standard Specification for Aluminum - Alloy T6061-T6 Standard Structural; 2002
I. OSHA 29 CFR Standard 1910.27 - Fixed ladders; Occupational Safety and Health Standards; current edition

1.4 SUBMITTALS

A. Submit under provisions of Section 01 30 00.
B. Product Data: Manufacturer's data sheets on each product to be used, including:
    1. Preparation instructions and recommendations.
    2. Storage and handling requirements and recommendations.
    3. Installation methods.
C. Shop Drawings: Detailed drawings showing complete dimensions, all materials, mounting attachments, and fabrication details.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in the engineering and manufacturing of metal ladders, with not less than fifty years of experience.

1.6 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
B. Provide manufacturer's standard limited five-year warranty against defects in materials and workmanship.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. ALACO Ladder Co.,
B. Precision Ladders, LLC.,
C. O'Keeffee's Inc.
D. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00.

2.2 MATERIALS

A. Extruded Aluminum Profiles: ASTM B 221/B 221M, ASTM B 210, ASTM B 308/B 308M, Alloy 6061-T6; standard mill finish.
B. Aluminum Sheet and Plate: ASTM B 209/B 209M, Alloy 6061-T6; standard mill finish.
C. Fasteners: Aluminum solid aircraft rivets rated at 300 lbs (1335 N) shear strength.
D. Cast fittings, connectors and rung ends: Cast Aluminum alloy 356

2.3 LADDERS

A. Ladders - General: Comply with ANSI A14.3 and OSHA regulations.

B. Ship's Ladders: 24 inches (610 mm) wide.
   1. Capacity: 500 lbs (225 kg).
      a. Slope: 80 degrees; 3-inch (76 mm) wide aluminum steps mounted on 12 inch (305 mm) centers to 2-7/8 inch (73 mm) aluminum side rails.
   2. Fasten each step with not less than eight aluminum aircraft rivets.
   3. Provide handrails of 1-1/4 in (32 mm) round serrated aluminum tubing with cast or extruded aluminum fittings.
   4. Furnish ladder with four mounting brackets.

2.4 FINISHES

A. Provide all aluminum in standard mill finish.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.
B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions and approved shop drawings, and in compliance with ANSI A14.3 and OSHA 1910.27.

3.3 PROTECTION

A. Protect installed products until completion of project.
B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 06100 - ROUGH CARPENTRY

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Rough carpentry for:
      a. Wood framing and sheathing for the renovation of the existing rest area and addition.
      b. Miscellaneous lumber for attachment and support of other work.
   2. Preservative treatment.

1.02 SUBMITTALS

A. Product Data:
B. Framing Connectors and Supports: Submit manufacturer's standard data demonstrating compliance with building code requirements.
C. Treated Wood: Treating plant's instructions for use, including storage, cutting, and finishing.
   1. Pressure preservative treatment: Treating plant's certification of compliance with specified standards and stating process employed and preservative retention values.
      a. Treatment for above-ground use: Certification of kiln drying after treatment.

1.03 QUALITY ASSURANCE

A. Inspection Agencies:
   1. SPIB: Southern Pine Inspection Bureau; for all structural framing of roof joists and headers.

PART 2 – PRODUCTS

2.01 DIMENSION LUMBER

A. Size: Provide nominal sizes indicated, complying with NIST PS 20 except where actual sizes are specifically required. Provide continuous members; splicing is not acceptable.
   1. Surfacing: Dressed lumber (S4S).
   2. Moisture content: Kiln-dry or MC15 (15 percent maximum moisture content).
C. Joist and Small Beam Framing -- 2 x 6 through 2 x 12:
   1. Species: Spruce-Pine-Fir (SPF), Grade: No. 2.
D. Miscellaneous Lumber: Provide dimension lumber and boards necessary for the support of work specified in other sections, whether or not specifically indicated, and including but not limited to blocking, nailers, etc.
   1. Lumber: S4S, No. 2 or better, 15 percent maximum (kiln-dry).

2.02 CONSTRUCTION PANELS

2. A. Roof Sheathing: Oriented Strand Board sheathing: APA Rated, OSB Structural Panels, Exposure 1 (exterior glue), PS-2 or APA PRP-108 performance standards, 40/20 APA rated, and 5/8” thick.

   B. Wall Sheathing: Oriented Strand Board (OSB), square edged, APA Rated (exterior glue) sheathing panels with nailing pattern recommended by the manufacturer for shear walls, and nominal ½” thick.

2.03 MISCELLANEOUS MATERIALS

A. Fasteners: Provide as required by applicable codes and as otherwise indicated.
   1. Provide fasteners with a hot-dip zinc coating (ASTM A 153) for treated lumber and where wood is in ground contact, subjected to high relative humidity, or exposed to weather.
B. Framing Connectors and Supports: Prefabricated, formed steel units; hot-dip galvanized finish unless otherwise indicated; type and size as required; approved by applicable codes.
   1. The following manufacturer’s products, or approved equal, provided they comply the the requirements of the contract documents, will be among those considered acceptable:

a. Cleveland Steel Specialty Company.
b. Simpson Strong-Tie Company.
c. United Steel Products (USP) Company.

C. Saturated Building Felt (30#)
D. Sill Sealer Gaskets: Glass fiber insulation strips; uncompressed thickness, 1 inch (1/32 inch compressed); width to match sill members.

2.04 WOOD TREATMENT BY PRESSURE PROCESS

A. Aboveground Lumber: AWPB LP-2 (waterborne preservatives).
1. Kiln dried after treatment to 19 percent maximum moisture content.
2. Treat the following:
a. Wood in contact with masonry or concrete.
b. Sill plate.
c. Other members indicated.
B. Fasteners for Preservative Treated Wood: Hot-dip galvanized steel (ASTM A153).

PART 3 - EXECUTION

3.01 INSTALLATION - GENERAL

A. Arrange work to use full length pieces except where lengths would exceed commercially available lengths. Discard pieces with defects that would lower the required strength or appearance of the work.
B. Cut and fit members accurately. Install plumb and true to line and level.
C. Fasten carpentry in accordance with applicable codes and recognized standards.
D. Where exposed, countersink nails and fill flush with suitable wood filler.

3.02 MISCELLANEOUS CARPENTRY

A. Provide miscellaneous blocking, nailers, grounds, and framing as shown and as required for support of facing materials, fixtures, specialty items, and trim. Cut and shape to the required size. Provide in locations required by other work.
B. Use countersunk fasteners appropriate to applied loading.

3.03 WOOD FRAMING - GENERAL

A. Comply with sizes, spacing, and configurations indicated. Where not specifically indicated, comply with applicable codes and NFPA "Manual for Wood Frame Construction." Splice members only where specifically indicated or approved.
B. Space fasteners as indicated. Where not specifically indicated, comply with applicable codes and the "Recommended Nailing Schedule" of NFPA "Manual for Wood Frame Construction" and "National Design Specification for Wood Construction."

3.04 INSTALLATION OF CONSTRUCTION PANELS

A. Employ the following fastening methods:
1. Nail roof and wall sheathing to framing.
a. Provide solid blocking under panel edges other than intact tongue and groove edges.

3.05 AIR INFILTRATION BARRIER

A. Install air infiltration barrier in accordance with manufacturer's instructions.

END OF SECTION 06100

SECTION 06200 - FINISH CARPENTRY

PART 1 - GENERAL

1.01 SUMMARY

A. Misc. trim
B. Fiber-cement lap siding, siding panels, and trim see Section 07462.

1.02 SUBMITTALS

A. Plastic Laminate:
   1. Product data.
   2. Samples for verification: 8- by 10-inch piece of each type, pattern, and color.
B. Coordinate installation of woodwork with other work to avoid damage.

PART 2 - PRODUCTS

2.01 WOODWORK

A. All Woodwork Finishes: As indicated on drawings.

2.02 WOOD MATERIALS

A. Lumber: Species and grade as indicated; lumber ready for installation shall comply with WM 4, "General Requirements For Wood Molding," Wood Molding and Millwork Producers (WMMP).
   1. Specie(s):
      a. "Pine": Plain sawn Spruce or Idaho white pine at window extensions and window trim
   2. Softwood: Comply with NIST PS 20 and grade in accordance with the grading rules of the grading and inspection agency applicable to the species.
   3. For transparent finish, use only solid pieces of lumber; WM 4 N-grade.
   4. For opaque finish, pieces which are glued up may be used; WM 4 N- or P-grade.
   5. Moisture content: Not greater than that required by applicable grading rules; provide kiln-dried lumber.
   6. Provide lumber dressed on all exposed faces, unless otherwise indicated.
   7. Do not use twisted, warped, bowed, or otherwise defective lumber.
   8. Sizes indicated are nominal, unless otherwise indicated.
   9. Do not mark or color lumber, except where such marking will be concealed in finish work.
B. Plywood: Types, grades, and cores as indicated.
   1. Medium density overlaid plywood: NBS PS 1, Special Exterior MDO.
   1. Plywood in concealed locations: Comply with NBS PS 1, Grade C minimum.
C. Finish hardwood:
   1. Specie(s):
      a. Cherry: FAS grade, for lobby trim and display cabinets
   2. For transparent finish, use only solid pieces of lumber.
   3. Moisture content: Not greater than that required by applicable grading rules; provide kiln-dried lumber.
   4. Provide lumber dressed on all exposed faces, unless otherwise indicated.
   5. Do not use twisted, warped, bowed, or otherwise defective lumber.
   6. Sizes indicated are nominal, unless otherwise indicated.
   7. Do not mark or color lumber, except where such marking will be concealed in finish work.

2.03 MELAMINE SHELVING:

A. Shelving: 3/4” thick premium MDF, Medium Density Fiber boards

2.04 FABRICATION

A. Fabricate in sizes and shapes indicated and using details indicated.
B. Complete fabrication and assembly in shop.
   1. Ease edges of solid lumber members where indicated, using:
      a. 1/16-inch radius for members 1 inch or less nominal thickness.
      b. 1/8-inch radius for members more than 1 inch nominal thickness.
C. Where woodwork is indicated to be field finished, sand smooth, fill nail holes, clean thoroughly, and otherwise prepare for finishing.
D. Standing and Running Trim: Miter exposed ends of members to match profile.
   1. Rout out backs of flat members over 2 inches wide, unless ends are exposed.
   2. Kerf backs of flat members over 4 inches wide, except where ends are exposed.

PART 3 - EXECUTION

3.01 PREPARATION

A. Verify that blocking and backings have been installed at appropriate locations for anchorage.

3.02 INSTALLATION – GENERAL

A. Do not begin installation of interior woodwork until potentially damaging construction operations are complete in the installation area.
B. Make joints neatly, with uniform appearance.
C. Install woodwork in correct location, plumb and level, without rack or warp.
   1. Where adjoining surfaces are flush, install with maximum 1/16-inch offset.
   2. Where adjoining surfaces are separated by a reveal, install with maximum 1/8-inch offset.
D. Cut woodwork precisely to fit.
E. Secure woodwork to blocking or use anchors indicated.
   1. Where anchorage method is not indicated, conceal all fasteners where possible.
   2. Where exposed nailing is required or indicated, use finishing nails, countersink, and fill.
F. Repair damaged and defective woodwork to eliminate visual and functional defects; where repair is not possible, replace woodwork.
G. Standing and Running Trim: Use longest pieces available and as few joints as possible.
   1. Stagger joints in built-up trim members. Miter all vertical joints tight at 45 degrees at interior T&G Cedar wall siding and fascia corners. Miter external and miter internal corners.
   2. Use diagonal (scarfed) joints in lengths of trim.
   3. Cope or miter at inside corners and miter at outside corners; fit tightly.
   4. Allowed variation in plumb and level: Not more than 1/8 inch in 8 feet.
   5. Install by blind-nailing where possible. Use face-nailing with fine finishing nails countersunk and filled at starter course only.
H. Panel Type Paneling:
   1. Arrange panels for best appearance.
   2. Install with tight joints, unless otherwise indicated.
   1. Install by face-nailing with fine finishing nails countersunk and filled.

3.03 PROTECTION

A. Protect woodwork from damage and maintain design environmental conditions.

END OF SECTION 06200

This page left blank intentionally.

SECTION 06600 – CELLULAR PVC FABRICATIONS

PART 1 - GENERAL

1.01 SUMMARY

A. Cellular PVC fabrications including the following:
   1. Trim.
   2. Mouldings.

1.2 RELATED SECTIONS

A. Section 061000 - Rough Carpentry.

B. Section 062000 - Finish Carpentry.

1.3 REFERENCES

A. ASTM International (ASTM): ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

1.4 SUBMITTALS

A. Submit under provisions of Section 01300 - Administrative Requirements.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

C. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square representing actual product, color, and patterns.

1.5 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with requirements of authorities having jurisdiction and applicable codes at the location of the project.

B. Manufacturer Qualifications: Minimum 5 years experience manufacturing similar products.

C. Installer Qualifications: Minimum 2 years experience installing similar products.

D. Mock-Ups: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
   1. Construct area designated by Architect.
   2. Do not proceed with remaining work until workmanship is accepted by Architect.
   3. Remodel mock-up area as required to produce acceptable work.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.

B. Comply with manufacturer's recommendations. Handle materials to avoid damage.

1.7 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.8 WARRANTY

A. Provide manufacturer's standard limited warranty for products, stating that components will be free from defects in material that occur as a direct result of the manufacturing process, occur under normal use and service, occur during the warranty period and result in blistering, peeling, flaking, cracking, splitting, cupping, rotting or structural defects from termites or fungal decay.
   1. Warranty Period: 25 years.

PRODUCTS

1.9 MANUFACTURERS

A. Acceptable Manufacturer: AZEK Building Products, Inc., which is located at: 894 Prairie Ave.; Wilmington, OH 45177; ASD Toll Free Tel: 877-ASK-AZEK; Email:request info; Web:https://www.azek.com;https://timbertech.com

B. Alternate manufacturers: Versatex, PVC Direct, Miratec.

1.10 TRIM

A. Fire Performance Characteristics: Provide products complying with the following:
   1. Flame Spread Index: Less than 25, ASTM E 84.

B. PVC Trim: Material shall have the following characteristics:
   1. Style: Traditional.
   2. Style: Frontier.
   3. Trim Size, 5/8 Thickness:
      a. multiple.

1.11 ACCESSORIES

A. Fasteners: Stainless steel or hot-dip galvanized, with thin shank, blunt point, full round head as recommended by the manufacturer.

B. Adhesives: AZEK Adhesive, a non-toxic, odorless, UV stable, water-based PVC cement.

C. Sealants: Urethane, polyurethane or acrylic based sealants without silicone.

EXECUTION

1.12 EXAMINATION

A. Verification of Conditions: Examine areas and conditions under which Work is to be

performed and identify conditions that may be detrimental to proper or timely completion.

B. Do not proceed until unsatisfactory conditions have been corrected.

1.13 INSTALLATION

A. General: Install products in accordance with manufacturer's instructions, approved submittals, and in proper relationship with adjacent construction.
   1. Use manufacturer's recommended fasteners, not more than 2 inches from ends.
   2. Glue joints to eliminate joint separation.
   3. Allow for expansion and contraction at ends of the runs.

1.14 CLEANING AND PROTECTION

A. Protect from damage during construction operations. Promptly repair any damaged surfaces. Remove and replace work which cannot be satisfactorily repaired.

B. Clean products, prior to Substantial Completion, using materials recommended by the manufacturer to remove stains, dirt and debris prior to final acceptance.

END OF SECTION 06600

SECTION 06651 - SOLID SURFACE FABRICATIONS

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 horizontal and trim solid surface product types:
    1. Changing tables
    2. Benches
    3. Windowsills & seats
    4. Cove backsplashes
B. Related Sections include the following:
    1. Division 6 Section “Rough Carpentry” for Blocking.

1.3 DEFINITION

A. Solid surface is defined as nonporous, homogeneous material maintaining the same composition throughout the part with a composition of acrylic polymer, aluminum trihydrate filler and pigment.

1.4 SUBMITTALS

A. Product data:
    1. For each type of product indicated.
    2. Product data for the following:
        a. Chemical-resistant tops: chlorine bleach
B. Shop drawings:
    1. Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices and other components.
        a. Show full-size details, edge details, thermoforming requirements, attachments, etc.
        b. Show locations and sizes of furring, blocking, including concealed blocking and reinforcement specified in other Sections.
C. Samples:
    1. For each type of product indicated.
        a. Submit minimum 6-inch by 6-inch sample in specified gloss.
        b. Cut sample and seam together for representation of inconspicuous seam.
        c. Indicate full range of color and pattern variation.
    2. Approved samples will be retained as a standard for work.
D. Product data:
    1. Indicate product description, fabrication information and compliance with specified performance requirements.
E. Maintenance data:
    1. Submit manufacturer’s care and maintenance data, including repair and cleaning instructions.
        a. Maintenance kit for finishes shall be submitted.
    2. Include in project closeout documents.

1.5 QUALITY ASSURANCE

A. Qualifications:
    1. Shop that employs skilled workers who custom fabricate products similar to those required for this project and whose products have a record of successful in-service performance.
B. Fabricator/installer qualifications:
    1. Work of this section shall be by a certified fabricator/installer, certified in writing by the manufacturer.
C. Applicable standards:
    1. Standards of the following, as referenced herein:
        a. American National Standards Institute (ANSI)
        b. American Society for Testing and Materials (ASTM)
        c. National Electrical Manufacturers Association (NEMA)
        d. NSF International
    2. Fire test response characteristics:
        a. Provide with the following Class A (Class I) surface burning characteristics as determined by testing identical products per UL 723 (ASTM E84) or another testing and inspecting agency acceptable to authorities having jurisdiction:
            1) Flame Spread Index: 25 or less.
            2) Smoke Developed Index: 450 or less.

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver no components to project site until areas are ready for installation.
B. Store components indoors prior to installation.
C. Handle materials to prevent damage to finished surfaces.
    1. Provide protective coverings to prevent physical damage or staining following installation for duration of project.

1.7 WARRANTY

A. Provide manufacturer's warranty against defects in materials.
    1. Warranty shall provide material and labor to repair or replace defective materials.
    2. Damage caused by physical or chemical abuse or damage from excessive heat will not be warranted.
B. Manufacturer's warranty period:
    1. Ten years from date of substantial completion.

1.8 MAINTENANCE

A. Provide maintenance requirements as specified by the manufacturer.

PART 2 — PRODUCTS

2.1 MATERIALS

A. Solid polymer components: Manufact. Corian, Color: Juniper or approved equal
    1. Cast, nonporous, filled polymer, not coated, laminated or of composite construction with through body colors meeting ANSI Z124.3 or ANSI Z124.6, having minimum physical and performance properties specified.

2. Superficial damage to a depth of 0.010 inch (.25 mm) shall be repairable by sanding and/or polishing.
3. Thickness: 1/2 inch
4. Edge treatment: Bullnose
5. Backsplash: Coved.
6. Sidesplash: Applied.

2.2. PERFORMANCE CHARACTERISTICS (polymer):

Property	Typical Result	Test
Tensile Strength	6,000 psi	ASTM D 638
Tensile Modulus	1.5 x 10^{-6} psi	ASTM D 638
Tensile Elongation	0.4% min.	ASTM D 638
Flexural Strength	10,000 psi	ASTM D 790
Flexural Modulus	1.2 x 10^{-6} psi	ASTM D 790
Hardness	>85	Rockwell "M" Scale ASTM D 785
	56	Barcol Impressor ASTM D 2583
Thermal Expansion	3.02 x 10^{-5} in./in./°C (1.80 x 10^{-5} in./in./°F)	ASTM D 696
Gloss (60° Gardner)	5–75 (matte—highly polished)	ANSI Z124
Light Resistance	(Xenon Arc) No effect	NEMA LD 3-2000 Method 3.3
Wear and Cleanability	Passes	ANSI Z124.3 & Z124.6
Stain Resistance: Sheets	Passes	ANSI Z124.3 & Z124.6
Fungus and Bacteria Resistance	Does not support microbial growth	ASTM G21&G22
Boiling Water Resistance	No visible change	NEMA LD 3-2000 Method 3.5
High Temperature Resistance	No change	NEMA LD 3-2000 Method 3.6
Izod Impact (Notched Specimen)	0.28 ft.-lbs./in. of notch	ASTM D 256 (Method A)
Ball Impact Resistance: Sheets	No fracture—1⁄2 lb. ball: 1⁄4" slab—36" drop 1⁄2" slab—144" drop	NEMA LD 3-2000 Method 3.8
Weatherability	ΔE^*_{94}<5 in 1,000 hrs.	ASTM G 155
Specific Gravity †	1.7	
Water Absorption	Long-term 0.4% (3⁄4") 0.6% (1⁄2") 0.8% (1⁄4")	ASTM D 570
Toxicity	99 (solid colors) 66 (patterned colors)	Pittsburgh Protocol Test ("LC50"Test)
Flammability	All colors (Class I and Class A)	ASTM E 84, NFPA 255 & UL 723
Flame Spread Index	<25	
Smoke Developed Index	<25	

† Approximate weight per square foot: 1⁄4" (6 mm) 2.2 lbs., 1⁄2" (12.3 mm) 4.4 lbs.
Shapes meet or exceed the ANSI Z124.3 and ANSI Z124.6 standards for plastic sinks and lavatories.
NEMA results based on the NEMA LD 3-2000

2.3 ACCESSORIES

A. Joint adhesive:
1. Manufacturer's standard one- or two-part adhesive kit to create inconspicuous, nonporous joints.

B. Sealant:
1. Manufacturer's standard mildew-resistant, FDA-compliant, NSF 51-compliant (food zone — any type), UL-listed silicone sealant in colors matching components.

2.4 FACTORY FABRICATION

A. Shopx assembly
1. Fabricate components to greatest extent practical to sizes and shapes indicated, in accordance with approved shop drawings and manufacturer's printed instructions and technical bulletins.
2. Form joints between components using manufacturer's standard joint adhesive without conspicuous joints.
    a. Reinforce with strip of solid polymer material, 2" wide.
3. Provide factory cutouts for plumbing fittings and bath accessories as indicated on the drawings.
4. Rout and finish component edges with clean, sharp returns.
    a. Rout cutouts, radii and contours to template.
    b. Smooth edges.
    c. Repair or reject defective and inaccurate work.

2.5 FINISHES

A. Solid polymer product-Select from the manufacturer's color chart.
1. Corian, basis of design, color : Juniper
2. Other acceptable manufacturers (color to be selected by architect)
    a. Wilsonart-Gibraltar
    b. Avonite

PART 3 — EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with fabricator present for compliance with requirements for installation tolerances and other conditions affecting performance of work.
B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install components plumb, level and rigid, scribed to adjacent finishes, in accordance with approved shop drawings and product data.
1. Provide product in the largest pieces available.
2. Form field joints using manufacturer's recommended adhesive, with joints inconspicuous in finished work.

a. Exposed joints/seams shall not be allowed.
3. Reinforce field joints with solid surface strips extending a minimum of 1 inch on either side of the seam with the strip being the same thickness as the top.
4. Cut and finish component edges with clean, sharp returns.
5. Rout radii and contours to template.
6. Anchor securely to base cabinets or other supports.
7. Align adjacent countertops and form seams to comply with manufacturer's written recommendations using adhesive in color to match countertop.
8. Carefully dress joints smooth, remove surface scratches and clean entire surface.
9. Install countertops with no more than 1/8-inch (3 mm) sag, bow or other variation from a straight line.

B. Coved backsplashes and applied sidesplashes:
1. Install applied sidesplashes using manufacturer's standard color-matched silicone sealant.
2. Adhere applied sidesplashes to countertops using manufacturer's standard color-matched silicone sealant.

3.3 REPAIR

A. Repair or replace damaged work which cannot be repaired to architect's satisfaction.

3.4 CLEANING AND PROTECTION

A. Keep components clean during installation.
B. Remove adhesives, sealants and other stains.

END OF SECTION

THIS PAGE LEFT BLANK INTENTIONALLY.

SECTION 07130 - SHEET WATERPROOFING

PART 1 GENERAL

1.1 SECTION INCLUDES
A. Self-adhering sheet waterproofing membranes.

1.2 RELATED SECTIONS
A. Section 03300 - Concrete.
B. Section 04220 - CMU.
C. Section 06100 - Rough carpentry.
D. Section 07210 - Thermal Insulation.

1.3 REFERENCES
A. ASTM International:
   1. ASTM D 412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers-Tension.
   2. ASTM D 779 - Standard Test Method for Water Resistance of Paper, Paperboard, and Other Sheet Materials by the Dry Indicator Method.
   3. ASTM D 882 - Standard Test Method for Tensile Properties of Thin Plastic Sheeting.
   4. ASTM D 1970 - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.
   5. ASTM E 96 - Standard Test Methods for Water Vapor Transmission of Materials.
B. International Code Council - Evaluation Service (ICC-ES):
   1. ICC-ES AC 38 - Acceptance Criteria for Water-Resistive Barriers.
   2. ICC-ES ESR 2783 - Evaluation Report.

1.4 SUBMITTALS
A. Submit under provisions of Section 013300.
B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.
C. Shop Drawings: Submit shop drawings including details of construction and relationship with adjacent construction.
D. Manufacturer's Certification: Submit manufacturer's certification that materials comply with specified requirements and are suitable for intended application.
E. Warranty: Submit manufacturer's standard warranty.

1.5 QUALITY ASSURANCE
A. Installer Qualifications: Experienced in installation of specified material type with working knowledge of specified products and Project specific application requirements.

1.6 DELIVERY, STORAGE, AND HANDLING
A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
B. Storage:
   1. Store materials in clean, dry, heated area indoors in accordance with manufacturer's instructions.
   2. Store cartons on end and protect from moisture and damage.
   3. Protect from temperatures above 100 degrees F (38 degrees C).
   4. Do not remove rolls from cartons until application.

1.7 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.8 WARRANTY

A. Limited Warranty:
   1. Manufacturer warrants materials to be free from leaks caused by defects in material or manufacturing for a period of 5 years from the date of purchase when applied according to published directions.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:
   1. MFM Building Products Corp., Web:www.mfmbp.com
   2. W.R. Meadows, Inc., Web: www.wrmeadows.com
   3. Tamko Building Products, Inc., Web: www.tamko.com

B. Requests for substitutions will be considered by Architect upon written request.

2.2 WATERPROOFING MEMBRANES

A. Product: Underlayment
   1. Description: Prefabricated self-adhering sheet-type waterproofing membrane.
   2. Composition: High-tensile polyester film coated with a layer of specially formulated rubberized asphalt adhesive.
   3. Release Liners: Protect asphalt, removed as membrane is installed.
   4. Technical Properties:
      a. Installation Temperature Range: Greater than 50 degrees F (10 degrees C).
      b. Material Color: Black.
      c. Material Thickness (ASTM D 1970): 40 Mils (1.0 mm) Nominal.
      d. Flexibility at -20 degrees F (-29 degrees C) (ASTM D 1970): Pass.
      e. Vapor Permeance (ASTM E 96): 0.08 g/m2 Maximum.
      f. Nail Sealability (ASTM D 1970): Pass.
      g. Tensile (ASTM D 412): 37 lbf/in2 (0.04 ksi).
      h. Elongation (ASTM D 412): 135 percent Minimum.

B. Product: Waterproofing membrane for basement walls.
   1. Description: Prefabricated, 40 mil (1 mm) self adhering sheet-type waterproofing membrane.
   2. Composition: Multi-layer high-strength polymer film that is coated with a layer of specially formulated rubberized asphalt adhesive.
   3. Release Liners: Protect asphalt, removed as membrane is installed.
   4. Technical Properties:
      a. Tested to ICC-ES AC 38, ICC-ES ESR 2783.
      b. Material Thickness (ASTM D 1970): 40 Mils (1.0 mm) Nominal.
      c. Pliability (ICC-ES AC 38): Pass.
      d. Vapor Permeance (ASTM E 96): 0.02 g/m2 Maximum.
      e. Water Resistance (ASTM D 779): Greater than 30 hours
      f. Nail Sealability (ASTM D 1970): Pass.
      g. Tensile MD (ASTM D 882): 21 lbf/in2 (0.02 ksi).
      h. Tensile CMD (ASTM D 882): 28 lbf/in2 (0.03 ksi).
      i. Installation Temperature Range: Greater than 50 degrees F (10 degrees C).
      j. Material Color: Black.

2.3 ACCESSORIES

A. Adhesive: MFM Spray Adhesive as manufactured by MFM Building Products Corp.
B. Primer: Asphalt-based commercial primer.
C. Termination Bar.

PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Inspect and prepare substrates using the methods recommended by the manufacturer for achieving best result for the substrates under project conditions.
B. Clean surfaces thoroughly prior to installation. Do not proceed with installation until substrates have been prepared using the methods recommended by the manufacturer and deviations from manufacturer's recommended tolerances are corrected. Commencement of installation constitutes acceptance of conditions.
C. If preparation is the responsibility of another installer, notify Architect in writing of deviations from manufacturer's recommended installation tolerances and conditions.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions including the following:
    1. Apply in clear, dry weather.
    2. Surface must be clean, dry and free from oil.
    3. Masonry must be clean, fully cured and primed with an asphalt primer.
    4. Prime weathered surfaces as necessary - clean, dry, wood and metal surfaces do not require priming.
    5. Use 3 inches (76 mm) side laps and 6 inches (152 mm) head laps.
    6. Apply uniform pressure with a 2 to 3 inches (51 to 76 mm) hand roller to entire surface.
    7. Do not install over solvent-based sealants unless fully cured - active solvents may liquefy bottom adhesive surface.
    8. Test for compatibility with caulks and sealants.
    9. Do not install over flexible vinyl gaskets.
    10. Do not expose installed product to direct sunlight for more than 90 days.

3.3 PROTECTION

A. Protect installed products until completion of project.
B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 07130

THIS PAGE LEFT BLANK INTENTIONALLY.

SECTION 07210 - BUILDING INSULATION

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Extruded polystyrene board.
   2. Foamed in place insulation
   3. Fiberglass batt insulation

1.02 DEFINITIONS

A. Thermal Resistance (R-value): The temperature difference in degrees F between the two surfaces of a material of given thickness, required to make 1 Btu of energy flow through 1 square foot of the material in 1 hour.

1.03 SUBMITTALS

A. Product Data: Submit for each product specified in this section.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Foamed Plastic Insulation: Minimize period between product delivery and actual installation. Protect against exposure to flame, sparks, or excessive heat. Minimize exposure to sunlight.

1.05 REGULATORY REQUIREMENTS

A. Conform to applicable code for concealment limitations.

1.06 FIELD CONDITIONS

A. Do not apply foam when temperature is below that specified by the manufacturer for ambient air and substrate.
B. Do not apply foam when temperature is within 5 F of dew point.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Provide manufacturer's standard preformed insulation units, sized for proper fit in indicated applications.
B. Blanket/Batt Insulation: Where installation of blanket/batt insulation is indicated, glass fiber blanket/batt complying with requirements below.
C. Extruded Polystyrene Board Insulation: Manufactured by extrusion process with integral high density skin:
   1. Type VII (ASTM C 578): 60.0 psi compressive strength.
   2. Total R-value: 5.
   3. Manufacturers: Products of the following manufacturers or approved equal, provided they comply with requirements of the contract documents, will be among those considered acceptable:
      a. Amoco Foam Products Company.
      b. Dow U.S.A.
      c. DiversiFoam Products Company.
      d. UC Industries, Inc.
D. Foamed-In-Place Insulation: Medium-density, rigid or semi-rigid, closed cell polyurethane foam; foamed on-site, using blowing agent of water or non-ozone-depleting gas.

1. Aged Thermal Resistance (R-value): 6.5 (deg F hr sq ft)/Btu, minimum, when tested at 1 inch thickness in accordance with ASTM C518 after aging for 180 days at 41 degrees F.
2. Water Vapor Permeance: Vapor retarder; 1 perm, maximum, when tested at intended thickness in accordance with ASTM E96/E96M, desiccant method.
3. Water Absorption: Less than 2 percent by volume, maximum, when tested in accordance with ASTM D2842.
4. Air Permeance: 0.004 cfm/sq ft, maximum, when tested at intended thickness in accordance with ASTM E2178 at 1.5 psf.
5. Closed Cell Content: At least 90 percent.
6. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/450, maximum, when tested in accordance with ASTM E84.

2.02 ACCESSORIES

A. Provide accessories as necessary to properly install specified products.
Adhesive: Insulation manufacturer's recommended adhesive, complying with fire performance requirements.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Comply with insulation manufacturer's recommendations and installation sequence. Provide permanent placement and support of insulation.
B. Install materials in a manner which will maximize continuity of thermal envelope. Use a single layer of insulation wherever possible to achieve indicated requirements, unless otherwise indicated.
C. Insulation Boards:
   1. Extruded polystyrene insulation:
      a. Foundation installation: Provide installation capable of sustaining subsequent construction work without damage or displacement.
         1. Adhesive: Use insulation manufacturer's recommended adhesive to attach insulation boards to foundation. Maximize contact between board surface and substrate.
      b. Under-slab installation: Do not install insulation before compaction of subgrade is verified. Provide installation capable of sustaining subsequent construction work without damage or displacement.
D. Insulation Blankets/Batts:
   1. Application: Wood-framed construction:
      a. Unfaced insulation: Friction-fit insulation between framing members.
      b. Support ceiling insulation with plastic mesh.
E. Foamed-in-place insulations
   1. Apply insulation in accordance with manufacturer's instructions.
   2. Apply insulation by spray method, to a uniform monolithic density without voids.
   3. Apply to a minimum cured thickness of 3 at walls and 6 inch at ceilings/roofs.
   4. Patch damaged areas.
   5. Where applied to voids and gaps assure space for expansion to avoid pressure on adjacent materials that may bind operable parts.
   6. Trim excess away for applied trim or remove as required for continuous sealant bead.

3.02 PROTECTION

A. Do not permit subsequent construction work to disturb applied insulation.

END OF SECTION 07210

SECTION 07250 - WEATHER BARRIER

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Sheet applied weather barrier and related accessories for wall air/moisture barrier system.

1.2 REFERENCES

A. The American Association of Textile Chemists and Colorists (AATCC) 127 - Water Resistance: Hydrostatic Pressure Test.
B. American Society for Testing and Materials (ASTM) E-96 - Standard Test Methods for Water Vapor Transmission of Materials.
C. American Society for Testing and Materials (ASTM) D1117 - Standard Guide for Evaluating Nonwoven Fabrics.
D. American Society for Testing and Materials (ASTM) D3330 - Standard Test Method for Peel Adhesion of Pressure-Sensitive Tape1.
E. American Society for Testing and Materials (ASTM) D3759 - Standard Test Method for Tensile Strength and Elongation of Pressure-Sensitive Tapes.
F. PSTC-1 - Peel Adhesion of Single Coated Pressure-Sensitive Tapes at 180 Degree Angle.
G. TAPPI T-460 - Porosity - Gurley.

1.3 SYSTEM DESCRIPTION

A. The airtight components and secondary moisture protection of the building enclosure and the joints, junctures and transitions between materials, products, and assemblies forming the air-tightness and moisture barrier of the building enclosure are called "the air/moisture barrier system". Services include coordination between the trades, the proper scheduling and sequencing of the work, preconstruction meetings, inspections, tests, and related actions, including reports performed by Contractor, by independent agencies, and by governing authorities. They do not include contract enforcement activities performed by the Architect.
B. Air Barrier Penetrations: All penetrations of the air/moisture barrier and paths of air infiltration / exfiltration through the air/moisture barrier system shall be made air-tight.
C. Moisture Barrier Penetrations: All penetrations of the air/moisture barrier and paths of water migration through the air/moisture barrier system shall be made water shedding.

1.4 SUBMITTALS

A. Submit under provisions of Section 013300.
B. Product Data: Manufacturer's data sheets on each product to be used, including:
    1. Preparation instructions and recommendations.
    2. Storage and handling requirements and recommendations.
    3. Installation methods.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Minimum of 2 years experience with installation of similar products.

B. Mock-Up: Provide a mock-up for evaluation of surface preparation and sealing techniques and application workmanship.
   1. Finish areas designated by Architect.
   2. Do not proceed with remaining work until workmanship is approved by Architect.
   3. Repair mock-up area as required to produce acceptable work.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.
B. Do not store in direct sunlight. Weather barrier shall be stored in a covered area. Do not expose to building site chemicals.
C. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.7 PROJECT CONDITIONS

A. Anticipate environmental conditions and schedule installation when conditions are within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.8 WARRANTY

A. Product Warranty: Limited product warranty against manufacturing defects.
   1. Weather Barrier and related products for 10 years.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:
   1. DuPont.
   2. James Hardie
   3. Henry
   4. Dow Corning
B. Requests for approval of equal substitutions will be considered in accordance with provisions of Section 016000.

2.2 WEATHER BARRIER SYSTEM

A. Moisture Air Barrier Sheet:
   1. Composition: Non-woven, non-perforated polyolefin.
   2. Film: MicroTech Coating with micropores to balance water holdout and breathability.
   3. Thickness: 11 mil (0.28 mm).
   4. UV Stability: Up to 180 days.
   5. Water Holdout (AATCC127): 128 inches (3250 mm).
   6. Breathability/Water Vapor Permeance (ASTM E-96A): 15 perms.
   7. Air Resistance (TAPPI T-460): >1800 sec/100 cc.
   8. Tear Strength (ASTM D1117): 15 to 18 lb (6.8 to 8.2 kg).
   9. Basis Weight: 19.4 lbs/1000 sf (9.5 kgs/100 sm).
B. Self-adhering Flashing: Designed for peel and stick application.
   1. Composition: Butyl rubber adhesive non-woven polyolefin backing; coated Kraft paper release.
   2. Total Thickness: 25 mil (0.64 mm).

3. UV Stability: Up to 180 days.
4. Application Temperature: 30 degree F to 180 degree F (-1 degree C to 82 degree C).
5. Operating Temperature: -30 degree F to 200 degree F (-34 degree C to 93 degree C).
6. Packaging: Individually shrink-wrapped.
7. Roll Weight: 4 inch (102 mm) = 4.6 lb (2 kg)/roll, 6 inches (152 mm) = 6.9 lb (3 kg) /roll, 9 inches (229 mm) = 9.9 lb (4.5 kg)/roll.
8. Provide Width for Application Required: 4 inches by 100 feet (102 mm by 30.5 m) (2x4 construction), 6 inches by 100 feet (152 mm by 30.5 m) (2x4 construction), 9 inches by 100 feet (229 mm by 30.5) (2x6 construction).

C. Flexible Flashing:
1. Composition: Butyl rubber adhesive; creped cross-laminated polyolefin backing; polyethylene film release.
2. Total Thickness: 60 mil (1.5 mm).
3. Tensile Strength (ASTM D3759): 18 lb/inch (3.2kg/cm).
4. UV Stability: Up to 180 days.
5. Water Vapor Transfer Rate (≈STM E96-94): <.2g/100 square inches/24hrs.
6. Application Temperature: 30 degree F to 180 degree F (-1 degree C to 82 degree C).
7. Operating Temperature: -30 degree F to 200 degree F (-34 degree C to 93 degree C).
8. Packaging: Each roll is packed in a convenient dispenser box
9. Roll Weight: 6 inches (152 mm) = 22.2 lb (10kg)/roll, 9 inches (229 mm) = 33.3 lb (15 kg)/roll.
10. Provide Width for Application Required: 6 inches by 75 feet (152 mm by 23.9 m) (2x4 construction), 9 inches by 75 feet (229 mm by 23.9) (2x6 construction).

D. Seam Tape:
1. Composition: Polypropylene film coated with acrylic adhesive Total Thickness: 3.0 mil (.08 mm).
2. Adhesion Peel to HardieWrap (PSTC-1): 22 oz/inch (25 N/100 mm).
3. Tensile Strength (ASTM D3759): 32 lb/in (.58 kg/mm).
4. Elongation: 136 percent.
5. UV Stability: Up to 90 days.
6. Application Temperature: 30 degree F to 180 degree F (-1 degree C to 82 degree C).
7. Operating Temperature: -30 degree F to 200 degree F (-34 degree C to 93 degree C).
8. Packaging: Individually shrink-wrapped.
9. Roll Weight: 1 lb(0.5 kg)/roll.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.
B. If framing preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.
B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
C. Weather barrier shall be installed before window and door installation. Do not install on

saturated sheathing. Weather barrier can become slippery and should not be used in any application where it may be walked on.

D. Weather barrier shall be installed on vertical wall applications only.

E. Manufacturer warrants weather barrier sheet only when covered within 180 days of its installation.

3.3 INSTALLATION

A. Moisture Air Barrier Sheet:
   1. Weather barrier shall be installed before window and door installation. Do not install on saturated sheathing. Weather barrier can become slippery and should not be used in any application where it may be walked on.
   2. Begin by affixing weather barrier extending at least 6 inches (152 mm) around a building corner. Unroll horizontally (with print side facing out) around the building covering rough window and door openings.
   3. Fasten to studs or nailable sheathing material with galvanized construction grade staples a maximum of 18 inches (457 mm) in the vertical and horizontal direction.
   4. Attach weather barrier so that it is taut and flat. The vertical overlap shall have a minimum of 6 inches (152 mm) and the vertical seam shall be taped.
   5. Assure that the bottom edge of the weather barrier extends over the sill plate and foundation interface by at least 1 inch (25 mm).
   6. Overlap upper layers of weather barrier (in shingle lap fashion) by a minimum of 6 inches below the horizontal edge, and tape the horizontal seam line.
   7. At roof to wall intersection (or wall to deck), affix wrap to the wall such that it overlaps any step flashing already in place on the wall by at least 2 inches (51 mm).

B. Flexible Flashing:
   1. Windows and Doors: Weather barrier is not designed nor guaranteed as a flashing material to prevent moisture or air from intruding behind weather barrier. Verify that flashing has previously been installed around all windows and door openings. Install flexible flashing per manufacturer's instructions.
      a. Use the inverted "Y" cut method at rough window and door openings. Do not place fasteners within 9 inches (229 mm) of the rough opening, door or window heads. This area shall not be fastened to allow for proper head flashing installation. At the top corners of the rough opening, cut the weather barrier at 45 degree to extend 9 inches (229 mm) past the joint.
      b. Fold the top flap up and out of the way and fasten temporarily.
      c. Fold the remaining three flaps in through the opening fastening them inside the opening with staples.
   2. Rough Electrical and Plumbing Penetrations: Seal with a double layer of flashing. Install the top flashing piece over the bottom flashing piece overlapping flashing layers to cover flashing cut-out necessary for placement around penetration.

C. Repairs: For minor punctures or tears, less than 3 inches (76 mm), cover and completely seal with seam tape. For larger holes, greater than 3 inches (76 mm), use slit flashing technique.
      a. Slit flashing requires making a horizontal slit above the damaged area and placing a cut piece of weather barrier into the slit, covering the damaged area. Tape the perimeter of the patched area.

3.4 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 07250

SECTION 072600 - UNDER-SLAB VAPOR BARRIER

PART 1 – GENERAL

1.1 SUMMARY

A. Products supplied under this section:
   1. Vapor barrier and installation accessories for installation under concrete slabs.
B. Related sections:
   1. Section 03 30 00 Cast-in-Place Concrete

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM):
   1. ASTM E 1745- 11Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs.
   2. ASTM E 154- 08 Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover.
   3. ASTM F 1249-06 (2011) Standard Test Method for Water Vapor Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor.
   4. ASTM D 882-10 Standard Test Method for Tensile Properties of Thin Plastic Sheeting.
   5. ASTM D 1709-09 Standard Test Methods for Impact Resistance of Plastic Film by the Free-Falling Dart Method.
   6. ASTM E 1643- 11Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.
B. American Concrete Institute (ACI):
   1. ACI 302.2R-06 Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials.

1.3 SUBMITTALS

A. Quality control/assurance:
   1. Summary of test results per paragraph 9.3 of ASTM E 1745.
   2. Manufacturer's samples and literature.
   3. Manufacturer's installation instructions for placement, seaming and penetration repair instructions.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Vapor barrier shall have all of the following qualities:
   1. Maintain permeance of less than 0.01 Perms [grains/(ft^2 · hr · inHg)] as tested after conditioning tests per ASTM E 1745 Section 7.1.
   2. Other performance criteria:
      a. Strength: ASTM E 1745 Class A.
      b. Thickness: 15 mils minimum
B. Acceptable Manf.:
   1. Stego Industries LLC.
   2. CertainTeed
   3. WR Meadows.
   4. Or approved equal

2.2 ACCESSORIES

A. Seams : to be taped per manf. recommended product
B. Penetrations of Vapor barrier: use tape or mastic per manf. recommended product
C. Perimeter/edge seal: per manf. recommended product
D. Term Bar per manf. recommended product.

PART 3 – EXECUTION

3.1 PREPARATION

A. Ensure that subsoil is approved by Architect or Geotechnical Engineer.
   1. Level and compact base material.

3.2 INSTALLATION

A. Install vapor barrier in accordance ASTM E 1643.
   1. Unroll vapor barrier with the longest dimension parallel with the direction of the concrete placement and face laps away from the expected direction of the placement whenever possible.
   2. Extend vapor barrier over footings and grade beams to a distance acceptable to the structural engineer or stop at impediments such as dowels and waterstops.
   3. Seal vapor barrier to foundation wall or footing/grade beam with tape, termination bar, or a combination of both.
   4. Overlap joints 6 inches and seal with manufacturer's tape.
   5. Apply tape/sealant to a clean and dry vapor barrier.
   6. Seal all penetrations (including pipes) per manufacturer's instructions.
   7. No penetration of the vapor barrier is allowed except for reinforcing steel and permanent utilities.
   8. Repair damaged areas by cutting patches of vapor barrier, overlapping damaged area 6 inches and taping all sides with tape.

END OF SECTION

SECTION 07310 - ASPHALT SHINGLES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Asphalt roofing shingles.
B. Leak barrier and moisture shedding roof deck protection.
C. Underlayment.
D. Metal flashing associated with shingle roofing.

1.2 RELATED SECTIONS

A. Section 06 10 00 - Rough Carpentry.

1.3 REFERENCES

A. American Society of Civil Engineers (ASCE): ASCE 7 - Minimum Design Loads for Buildings and Other Structures.
B. Asphalt Roofing Manufacturers Association (ARMA).
C. ASTM International (ASTM):
    1. ASTM D 3018 - Standard Specification for Class A Asphalt Shingles Surfaced with Mineral Granules.
    2. ASTM D 3161 - Standard Test Method for Wind-Resistance of Asphalt Shingles (Fan-Induced Method).
    3. ASTM D 3462 - Standard Specification for Asphalt Shingles Made from Glass Felt and Surfaced with Mineral Granules.
    4. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
    5. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
    6. ASTM B 370 - Standard Specification for Copper Sheet and Strip for Building Construction.
    7. ASTM C 1549 - Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer.
    8. ASTM D 4586 - Standard Specification for Asphalt Roof Cement, Asbestos-Free.
    9. ASTM E 903 - Standard Test Method for Solar Absorption, Reflectance and Transmission of Materials Using Integrating Spheres.
D. National Roofing Contractors Association (NRCA).
E. Sheet Metal and Air Conditioning Contractors National Association, 1nc. (SMACNA) - Architectural Sheet Metal Manual.
F. Underwriters Laboratory (UL)
    1. UL 790 - Tests for Fire Resistance of Roof Covering Materials.
    2. UL 997 - Wind Resistance of Prepared Roof Covering Materials.

1.4 DEFINITIONS

A. Roofing Terminology: Refer to ASTM D1079 and the glossary of the National Roofing Contractors Association (NRCA) Roofing and Waterproofing Manual for definitions of roofing terms related to this section.

1.5 SUBMITTALS

A. Submit under provisions of Section 01 30 00 - Administrative Requirements.
B. Product Data: Manufacturer's data sheets on each product to be used, showing compliance with requirements.
C. Installation Instructions: Manufacturer's installation instructions, showing required preparation and installation procedures.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Provide all primary roofing products, including shingles, underlayment, leak barrier, and ventilation, by a single manufacturer.
B. Installer Qualifications: Installer must be approved by manufacturer for installation of all roofing products to be installed under this section.

1.7 REGULATORY REQUIREMENTS

A. Provide a roofing system achieving an Underwriters Laboratories (UL) Class A fire classification.
B. Install all roofing products in accordance with all federal, state and local building codes.
C. All work shall be performed in a manner consistent with current OSHA guidelines.

1.8 PRE-INSTALLATION MEETINGS

A. Convene a pre-installation meeting a minimum two weeks prior to starting work of this section.
    1. Contractor shall schedule and arrange meeting and meeting place and notify attendees.
    2. Mandatory Attendees: Roofing installer and manufacturer's steep slope technical representative (not sales agent).
    3. Optional Attendees: Owner's representative, Architect's representative, prime Contractor's representative.
    4. Review all pertinent requirements for achieving the warranty specified below and set schedule for final warranty inspection.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened labeled packaging until ready for installation.
B. Store products in a covered, ventilated area, at temperature not more than 110 degrees F; do not store near steam pipes, radiators, or in sunlight.
C. Store bundles on flat surface to maximum height recommended by manufacturer; store rolls on end.
D. Store and dispose of solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.10 WEATHER CONDITIONS

A. Proceed with work only when existing and forecasted weather conditions will permit work to be performed in accordance with roofing shingle manufacturer's recommendations.

1.11 WARRANTY

A. Provide manufacturer's standard limited warranty:
   1. Provide to the Owner the manufacturer's warranty.
      a. Warranty Duration: 25 years.

B. Provide complete workmanship warranty to the Owner as required:
   1. Warranty duration: 5 years

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers: CertainTeed, John Mansville, GAF or approved equal

2.2 SHINGLES

A. Architectural Shingles:
   1. Granule surfaced, self-sealing asphalt shingle with a strong fiberglass reinforced Micro Weave core and StainGuard protection, which prevents pronounced discoloration from blue-green algae through formulation/unique blends of granules.
   2. Extra thick tabs and bold profile provide a bold unique appearance with a 7.5in. exposure.
   3. UL 790 Class A rated with UL 997 Wind Resistance Label; ASTM D 7158, Class H; ASTM D 3161, Type 1; ASTM D 3018, Type 1; ASTM D 3462; AC438 compliant; CSA 123.5-98; Dade County Approved, Florida Building Code Approved, Texas Dept of Insurance Approved, ICC Report Approval.

2.3 HIP AND RIDGE SHINGLES

A. Distinctive self-sealing hip and ridge cap shingle complementing the color of selected roof shingle.

2.4 STARTER STRIPS

A. Self sealing starter shingle designed for premium roof shingles.

2.5 LEAK BARRIER

A. Self-adhering, self-sealing, bituminous leak barrier surfaced with fine, skid-resistant granules. Approved by UL and ICC.

2.6 UNDERLAYMENT

A. Premium, water repellant, breather type non-asphaltic underlayment. UV stabilized polypropylene construction. Meets or exceeds ASTM D226 and D4869. Approved by ICC.

2.7 ROOFING CEMENT

A. Asphalt Plastic Roofing Cement meeting the requirements of ASTM D 4586, Type I or II.

2.8 ROOF ACCESSORIES

A. Paint: Exterior acrylic rust resistant aerosol roof accessory paint. Each 6 oz can is available in boxes of 6 and in color to compliment the roof. Shingle-Match Roof Accessory Paint by GAF.
B. Compression Collars: UV stable solid molded PVC compression collar, Kynar PVDF coated 24 gauge galvanized flange, Ultimate Pipe Flashing by Lifetime Tool.

2.9 VENTILATION

A. Ridge Vents:
   1. Flexible rigid plastic ridge ventilator designed to allow the passage of hot air from vented insulation panels, while resisting snow infiltration.

2.10 NAILS

A. Nails: Standard round wire, zinc-coated steel or aluminum; 10 to 12 gauge, smooth, barbed or deformed shank, with heads 3/8 inch (9mm) to 7/16 inch (11mm) in diameter. Length must be sufficient to penetrate into solid wood at least 3/4 inch (19mm) or through plywood or oriented strand board by at least 1/8 inch (3.18mm).

2.11 METAL FLASHING

A. Aluminum: 0.032-inch (0.8mm) aluminum sheet, complying with ASTM B 209.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until roof deck has been properly prepared.
B. If roof deck preparation is the responsibility of another installer, notify Architect or building owner of unsatisfactory preparation before proceeding.

3.2 PREPARATION OF SUBSTRATE

A. Clean deck surfaces thoroughly prior to installation of leak barrier and roof deck protection.
B. At areas to receive leak barrier, fill knot holes and cracks with latex filler.

3.3 INSTALLATION OF UNDERLAYMENT

A. Install using methods recommended by manufacturer in accordance with local building code. When local codes and application instructions are in conflict, the more stringent requirements shall take precedence.
B. Eaves:
   1. Place eave edge metal flashing tight with fascia boards; lap joints 2 inches and seal with plastic cement; nail at top of flange.
   2. On roofs with slope between 2:12 and 4:12, install leak barrier up the slope from eave edge to 36 inches from the edge or at least 24 inches beyond the interior face of the warm exterior wall, whichever is greater; lap ends 6 inches and bond.
C. Valleys:
   1. Install leak barrier at least 36 inches wide centered on valley; lap ends 6 inches and

seal.
2. Where valleys are indicated to be "open valleys", install metal flashing over leak barrier before roof deck protection is installed; DO NOT NAIL THROUGH metal flashing; secure by nailing at 18 inches on center just beyond edge of flashing so that nail heads hold down edge.

D. Hips and Ridges:
1. Install leak barrier along entire lengths. If ridge vents are to be installed, position the leak barrier so that the ridge slots will not be covered.

E. Roof Deck:
1. Install one layer of roof deck protection over entire area not protected by eave or valley membrane; run sheets horizontally lapped so water sheds; nail in place.
2. On roofs sloped at more than 4 in 12, lap horizontal edges at least 2 inches and at least 2 inches over eave protection membrane.
3. On roofs sloped between 2 in 12 and 4 in 12, lap horizontal edges at least 19 inches and at least 19 inches over eave protection membrane.
4. Lap ends at least 4 inches; stagger end laps of each layer at least 36 inches.
5. Lap roof deck protection over valley protection at least 6 inches

F. Penetrations:
1. At vent pipes, install a 24 inch square piece of leak barrier lapping over roof deck protection; seal tightly to pipe.
2. At vertical walls, install leak barrier extending at least 6 inches up the wall and 12 inches on to the roof surface lapping over roof deck protection.
3. At rake edges, install metal edge flashing over leak barrier and roof deck protection; set tight to rake boards; lap joints at least 2 inches and seal with plastic cement; secure with nails.
4. At hips and ridges, install leak barrier along entire lengths. If ridge vents are to be installed, position the leak barrier so that the ridge slots are not covered.

3.4 INSTALLATION OF SHINGLES

A. Install in accordance with manufacturer's instructions and requirements of local building code.
1. Avoid breakage of shingles by avoiding dropping bundles on edge, by separating shingles carefully (not by "breaking" over ridge or bundles), and by taking extra precautions in temperatures below 40 degrees F.
2. Handle carefully in hot weather to avoid damaging shingle edges.
3. Secure with 4 to 6 nails per shingle; use number of nails required by manufacturer or by code, whichever is greater. Nails must be long enough to penetrate through plywood or OSB, or 3/4 inch into dimensional lumber.

B. Install hip and ridge shingles as required by the manufacturer. At ridges, install hip and ridge shingles over ridge or ridge vent material.

C. Make valleys using "woven valley" technique.
1. Run shingles from both roof slopes at least 12 inches (305 mm) across center of valley, lapping alternate sides in a woven pattern.
2. Nail not closer than 6 inches (150 mm) to center of valley.

D. All penetrations are to be flashed according to manufacturer, ARMA and NRCA application instructions and construction details.

3.5 INSTALLATION OF VENTILATION

A. Code Requirements: Ventilation shall meet or exceed current FHA, HUD and local code requirements.

B. Ridge Vents:

1. Cut continuous vent slot through sheathing, stopping 6 inches (150 mm) from each end of ridge.
2. On roofs without ridge board, make slot 2 inches (50 mm) wide, centered on ridge.
3. On roofs with ridge board, make two slots 1-3/4 inches (89 mm) wide, one on each side.
4. Install ridge vent material full length of ridge, including uncut areas.
5. Butt ends of lengths of ridge vent material and join using plastic cement.
6. Install eave vents in sufficient quantity to equal or exceed the ridge vent area, calculated as specified by manufacturer.
7. Install ridge shingles over ridge vent material; use nails of specified length; do not drive nails home, leaving 3/4 inch (19 mm) slot open between ridge and roof shingles.

3.6 PROTECTION

A. Stage work progress so that traffic is minimized over completed roofing.
B. Protect installed products until completion of project

END OF SECTION

SECTION 07462 – FIBER CEMENT SIDING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Fiber cement vertical siding, shingle siding, battens, trim, and accessories;

1.2 RELATED SECTIONS

A. Section 06100 - Rough Carpentry

1.3 REFERENCES

A. ASTM D3359 - Standard Test Method for Measuring Adhesion by Tape Test, Tool and Tape.
B. ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 degrees C.

1.4 SUBMITTALS

A. Submit under provisions of Section 01300.
B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.
C. Shop Drawings: Provide detailed drawings of atypical non-standard applications of cementitious siding materials which are outside the scope of the standard details and specifications provided by the manufacturer.
D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
E. Verification Samples: For each finish product specified, two samples, minimum size 4 by 6 inches (100 by 150 mm), representing actual product, color, and patterns.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Minimum of 2 years experience with installation of similar products.
B. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
   1. Finish areas designated by Architect.
   2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
   3. Refinish mock-up area as required to produce acceptable work.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.
B. Store siding on edge or lay flat on a smooth level surface. Protect edges and corners from chipping. Store sheets under cover and keep dry prior to installing.
C. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.7 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.8 WARRANTY

A. Product Warranty: Limited, non-pro-rated product warranty.
   1. Horizontal siding for 30 years.
   2. Trim boards for 15 years.
B. Workmanship Warranty: Application limited warranty for 2 years.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer:
   1. James Hardie-basis of design-Hardi Panel and Hardi-trim
   2. CertainTeed
   3. Nichiha
B. Requests for approval of equal substitutions will be considered in accordance with provisions of Section 01600.

2.2 SIDING

A. Siding requirement for Materials:
   1. Fiber-cement Siding - complies with ASTM C 1186 Type A Grade II.
   2. Fiber-cement Siding - complies with ASTM E 136 as a noncombustible material.
   3. Fiber-cement Siding - complies with ASTM E 84 Flame Spread Index = 0, Smoke Developed Index = 5.
   4. Warnock Hersey Product Listing.
   5. Manufacturer's Technical Data Sheet.
B. Vertical Siding:
   1. Type: Panel with wood grain texture and vertical batten strips.
C. Shingle Siding: Individual shingles, installed with straight edge
   1. Type: Texture 15 -1/4 inches (184 mm) with 6 inches exposure.
D. Trim:
   1. Trim boards
      a. Product: Batten Boards, 2-1/2 inch (63 mm) width, smooth texture.
      b. Product: 5/4 Boards, width varies, smooth texture
      c. Product: 1-1/2” thick trim for adjacent to heavy lap siding
      d. Length: 12 feet (3658 mm).

2.3 FASTENERS

A. Framing Fasteners: see manf. requirements
B. Masonry Walls:
   1. Masonry Walls: Aerico Stud Nail, ET&F ASM No.-144-125, 0.14 inch (3.6 mm) shank by 0.30 inch (7.6 mm) head by 2 inches (51 mm) long corrosion resistant nails.

2.4 FINISHES

A. Factory Primer: Provide factory applied universal primer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.
B. If framing preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.
B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
C. Install a water-resistive barrier is required in accordance with local building code requirements.
D. The water-resistive barrier must be appropriately installed with penetration and junction flashing in accordance with local building code requirements.
E. Openings and penetrations to be properly flashed

3.3 INSTALLATION - Siding

A. Install materials in strict accordance with manufacturer's installation instructions.
B. Starting: Install a minimum 1/4 inch (6 mm) thick lath starter strip at the bottom course of the wall. Apply planks horizontally with minimum 1-1/4 inches (32 mm) wide laps at the top. The bottom edge of the first plank overlaps the starter strip.
C. Allow minimum vertical clearance between the edge of siding and any other material in strict accordance with the manufacturer's installation instructions.
D. Align vertical joints of the planks over framing members.
E. Maintain clearance between siding and adjacent finished grade.
F. Locate splices at least one stud cavity away from window and door openings.
G. Use off-stud metal joiner in strict accordance with manufacturer's installation instructions.
H. Wind Resistance: Where a specified level of wind resistance is required Hardieplank lap siding is installed to framing members and secured with fasteners described in Table No. 2 in National Evaluation Service Report No. NER-405.
I. Face nail to sheathing.
J. Locate splices at least 12 inches (305 mm) away from window and door openings.

3.4 INSTALLATION – Trim Boards

A. Install materials in strict accordance with manufacturer's installation instructions. Install flashing around all wall openings.
B. Fasten through trim into structural framing or code complying sheathing. Fasteners must penetrate minimum 3/4 inch (19 mm) or full thickness of sheathing. Additional fasteners may be required to ensure adequate security.
C. Place fasteners no closer than 3/4 inch (19 mm) and no further than 2 inches (51 mm) from side edge of trim board and no closer than 1 inch (25 mm) from end. Fasten maximum 16 inches (406 mm) on center.
D. Maintain clearance between trim and adjacent finished grade.
E. Trim inside corner with a single board trim both side of corner.

F. Outside Corner Board Attach Trim on both sides of corner with 16 gage corrosion resistant finish nail 1/2 inch (13 mm) from edge spaced 16 inches (406 mm) apart, weather cut each end spaced minimum 12 inches (305 mm) apart.
G. Allow 1/8 inch gap between trim and siding.
H. Seal gap with high quality, paint-able caulk.
I. Shim frieze board as required to align with corner trim..
J. Fasten through overlapping boards. Do not nail between lap joints.
K. Overlay siding with single board of outside corner board then align second corner board to outside edge of first corner board. Do not fasten HardieTrim boards to HardieTrim boards.
L. Shim frieze board as required to align with corner trim.

3.5 FINISHING

A. Finish primed siding with a two coat high quality, alkali resistant primer and one coat of either, 100 percent acrylic or latex or oil based, exterior grade topcoats or two coats high quality alkali resistant 100 percent acrylic or latex, exterior grade topcoat within 90 days of installation. Follow paint manufacturer's written product recommendation and written application instructions.
B. Finish factory primed siding with a two coat of high quality 100 percent acrylic or latex or oil based exterior grade paint within 180 days of installation. Follow paint manufacturer's written product recommendation and written application instructions.

3.6 PROTECTION

A. Protect installed products until completion of project.
B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 07625 - SHEET METAL GUTTERS AND DOWNSPOUTS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Gutters and downspouts for the renovated **Currituck County Rest Area and Visitor Center.**

1.02 SUBMITTALS

A. Product Data.
B. Samples: Submit 3x6 -inch samples of each type of metal and finish required.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Seamless gutter to match existing consisting of Prefinished Aluminum Sheet: ASTM B 209, manufacturer's standard alloy and temper for indicated applications.
   1. Minimum thickness: 0.027 inch thick, unless indicated otherwise.
   2. Finish: 70 percent "Kynar 500" or "Hylar 5000" resin finish over epoxy primer; minimum system thickness 1.0 mil. Provide manufacturer's standard prime coat on underside.
      a. Color: to be determined.
   3. Provide strippable plastic protective film on prefinished surface.
   4. Acceptable manufacturers: match existing

2.02 ACCESSORY MATERIALS

A. Fasteners: Corrosion-resistant metal of same material as the material being fastened, or other material recommended by sheet metal manufacturer. Match finish and color of exposed fastener heads to finish and color of sheet material being fastened.
B. Joint Adhesive: Two-component noncorrosive epoxy adhesive, recommended by metal manufacturer for sealing of nonmoving joints.
C. Bituminous Coating: Heavy bodied, sulfur-free, asphalt-based paint; FS TT-C-494.

2.03 FABRICATION - GENERAL

A. Form sheet metal to match profiles indicated, substantially free from oil-canning, fish-mouths, and other defects.
B. Comply with SMACNA "Engineer rural Sheet Metal Manual" for applications indicated.
C. Conceal fasteners and expansion provisions wherever possible.
   1. Exposed fasteners are not allowed on faces of sheet metal exposed to public view.
D. Fabricate cleats and attachment devices from same material as sheet metal component being anchored or from compatible, noncorrosive metal recommended by sheet metal manufacturer.
   1. Gage: As recommended by SMACNA or metal manufacturer for application, but in no case less than gage of metal being secured.

2.04 GUTTERS AND DOWNSPOUTS

A. Fabricate from prefinished aluminum sheet.
   1. Gutter: see roof plan for size.
   2. Downspouts: see roof plan for size.
B. Provide expansion joints in gutters at spacing not to exceed 30 feet.
C. Provide sheet metal baffles 6 inches high with legs 18 inches long at gutter corners below roof valleys.

D. Gutter Supports: Brackets.
E. Downspout Supports: Brackets.

PART 3 - EXECUTION

3.01 INSTALLATION

A. General: Except as indicated otherwise, comply with sheet metal manufacturer's installation instructions and recommendations in the SMACNA "Architectural Sheet Metal Manual."

3.02 CLEANING AND PROTECTION

A. Repair or replace work which is damaged or defaced, as directed by the Engineer.
B. Protect sheet metal work as recommended by the installer so that completed work will be clean, secured, and without damage at substantial completion.

END OF SECTION 07625

SECTION 07900 - JOINT SEALERS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. The sealing of joints indicated on schedule at the end of this section.
   2. The sealing of other joints indicated on drawings.
B. Joints of a nature similar to that of joints indicated on the schedule shall be sealed with same sealer, whether indicated on drawings to be sealed or not.

1.02 DEFINITIONS

A. Substrates:
   1. M-type substrates: Concrete, concrete masonry units, brick, mortar, natural stone. The term “masonry” means brick, stone, and concrete masonry work.
   2. G-type substrates: Glass and transparent plastic glazing sheets.
   3. A-type substrates: Metals, porcelain, glazed tile, and smooth plastics.
   4. O-type substrates: Wood, unglazed tile; substrates not included under other categories.

1.03 SUBMITTALS

A. Product data.
B. Samples for Color Selection. (Products exposed to view only.)

1.04 PROJECT CONDITIONS

A. Environmental Limitations: Do not install sealers if any of the following conditions exist:
   1. Air or substrate temperature exceeds the range recommended by sealer manufacturers.
   2. Substrate is wet, damp, or covered with snow, ice, or frost.
B. Dimensional Limitations: Do not install sealers if joint dimensions are less than or greater than that recommended by sealer manufacturer; notify the Engineer and get sealer manufacturer’s recommendations for alternative procedures.

1.05 WARRANTY

A. Submit Manufacturer’s written warranty for failures in sealer work that occur within 5 years after substantial completion, without reducing or otherwise limiting any other rights to correction which the owner may have under the contract documents. Failure is defined as failure to remain weather-tight due to faulty materials. Correction is limited to replacement of sealers.

PART 2 - PRODUCTS

2.01 MATERIALS - GENERAL

A. General: Provide only products which are recommended and approved by their manufacturer for the specific use to which they are put and which comply with all requirements of the contract documents.
   1. Provide only materials which are compatible with each other and with joint substrates.
   2. Colors of exposed sealers: As selected by the Engineer from manufacturer’s standard colors.
B. Manufacturers: Products of the manufacturers listed or approved equal, provided they comply with requirements of the contract documents will be among those considered acceptable.
   1. Silicone sealants:

a. Dow Corning Corporation.
b. Pecora Corporation.
c. GE Silicones.

2.02 ELASTOMERIC SEALANTS

A. Elastomeric Sealants - General: Chemically curing elastomeric sealants of types indicated, complying with ASTM C 920, including specific Type, Grade, Class, and Uses indicated, as well as all other requirements specified.
   1. Where movement capability exceeding that measured by ASTM C 920 is specified, sealant shall withstand the total movement indicated while remaining in compliance with the other requirements specified, when tested in accord with ASTM C 719, with base joint width measured at the time of application.
   2. For M-type substrates: Comply with requirements for Use M.
   3. For G-type substrates: Comply with requirements for Use G.
   4. For A-type substrates: Comply with requirements for Use A.
   5. For O-type substrates: Comply with requirements for Use M (minimum) and Use O for the particular substrate.

B. Medium Movement Silicone Sealant: One- or two-part non-acid-curing, Grade NS, Class 25, Use NT, plus movement capability of more than 25 percent but less than 50 percent in both extension and compression.

C. Mildew-Resistant Silicone Sealant: One-part, Type S, Grade NS, Class 25, Use NT, formulated with fungicide, for interior use on nonporous substrates, color to match glazed wall tile.

2.03 SILICONE-LATEX SEALANTS

A. Silicone-Latex Emulsion Sealant: One-part, nonsag, mildew-resistant, paintable at H.M. frames and gray to match wall tile; complying with ASTM C 834 use at fiber-cement siding and panel joints.

2.04 SEALANT BACKERS

A. Backers - General: Nonstaining; recommended or approved by sealant manufacturer for specific use.

PART 3 - EXECUTION

3.01 PREPARATION

A. Do not begin joint sealer work until unsatisfactory conditions have been corrected.

B. Masking Tape: Use masking tape to keep primers and sealers off of adjacent surfaces which would be damaged by contact or by cleanup. Remove tape as soon as practical.

3.02 INSTALLATION

A. Comply with sealer manufacturers' installation instructions and recommendations, except where more restrictive requirements are specified.

3.03 SCHEDULE OF JOINT SEALERS

A. Exterior Joints at fiber-cement siding and panel joints.
   1. Use Silicone-Latex sealants, paintable type.
   2. Joint shape: Concave joint configuration.

B. Interior inside corners of all glazed tile walls; Mildew-Resistant Silicone Sealant color to match tile.

C. Interior Joints for Which No Other Sealer Is Indicated:
   1. Use one of the following sealants:

a. Use Silicone-Latex sealants, paintable type.
b. Mildew-resistant silicone sealant at all ceramic tile corners (color to match gray wall tile) and at fixtures.

2. Use bond-breaker tape.
3. Joint shape: Concave joint configuration.

END OF SECTION 07900

This page left blank intentionally.

SECTION 08110 - STEEL DOOR FRAMES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Standard steel doors and frames.

1.02 REFERENCES

A. SDI 100-1991 -- Recommended Specifications: Standard Steel Doors and Frames; Steel Door Institute; 1991.

1.03 SUBMITTALS

A. Product Data: Submit manufacturer's printed product information indicating compliance with specified requirements.
B. Shop Drawings: Submit drawings for fabrication and installation of specified items, coordinated with opening schedule included in contract documents.

1.04 QUALITY ASSURANCE

A. Quality Standard: Comply with SDI 100.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver products in crates or cartons suitable for storage at the site.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers: Products of the following manufacturers or approved equal, provided they comply with requirements of the contract documents, will be among those considered acceptable:
   1. Benchmark Commercial Door Products.
   2. Curries Company/Essex Industries, Inc.
   3. Steelcraft Manufacturing Company/Masco Industries.

2.02 MATERIALS

A. Steel Sheets, Hot-Rolled: ASTM A 569 and ASTM A 568, commercial quality, pickled and oiled.
B. Steel Sheets, Cold-Rolled: ASTM A 366 and ASTM A 568, commercial quality, matte finish exposed, oiled.
C. Steel Sheets, Galvanized: ASTM A 591, electrolytic zinc-coated, Class A, mill phosphatized.
D. Anchorages: Galvanized steel, minimum 18 gage.
E. Fasteners and Inserts: Units standard with manufacturer.
   1. Exterior walls: ASTM A 153, hot-dip galvanized, Class C or D.
F. Primer Paint: Manufacturer's standard rust-inhibitive coating, suitable to receive finish coatings specified.

2.03 FABRICATION

A. Exposed Door Faces: Fabricate from cold-rolled steel.
B. Frames: Fabricate from cold-rolled or hot-rolled steel.

C. Seal top and bottom edges integrally with door construction, or use minimum 16 gage steel channels to form flush closure.
D. Exposed Screws and Bolts: Where required, provide only countersunk, flat Phillips-head fasteners.
E. Hardware Preparation: Comply with DHI A115 series specifications.
   1. Locations: Comply with final shop drawings.
F. Shop Painting:
   1. Primer: Apply primer evenly to achieve full protection of all exposed surfaces.

2.04 STEEL FRAMES

A. General: Fabricate steel frames for scheduled openings, in styles and profiles as shown, using concealed fasteners.
   1. Minimum thickness: 14 gage.
   2. Construction: Mitered and welded corners; foam frames for insulated installation.
B. Guards: Weld protective covers to back of hardware openings at locations where grout, plaster, or other materials might interfere with hardware operation.

PART 3 - EXECUTION

3.01 INSTALLATION

A. General: Install steel doors, frames, and accessories to comply with manufacturer's recommendations.
   1. Comply with detailed installation requirements of final shop drawings.
B. Frame Installation: General: Adhere to provisions of SDI 105.
   1. Seal all exterior door frames with polyurethane foam sealant.
   2. Anchors: Provide 3 wall anchors per jamb at hinge and strike levels and minimum 18 gage base anchors.
   3. Fire-rated openings: Comply with requirements of NFPA 80.
C. Door Installation:
   1. General: Comply with requirements and clearances specified in SDI 100.

3.02 ADJUST AND CLEAN

A. Touch-Up: At locations where primer has been abraded or minor rusting has occurred, sand smooth and spray-apply compatible primer.
B. Final Operating Adjustments: Check hardware at all openings for proper operation of doors, making final corrections as required to assure that work of this section is complete and undamaged.

END OF SECTION 08110

SECTION 08211 - FLUSH WOOD DOORS

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. Solid core veneer-faced doors.
B. Related Requirements:
   1. Section 088000 "Glazing" for glass view panels in flush wood doors for factory installation.

1.3 SUBMITTALS

A. Product Data: For each type of door. Include details of core, edge construction and factory-finishing specifications.
B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; and the following:
   1. Requirements for veneer matching.
   2. Doors to be factory finished and finish requirements.
C. Samples for Initial Selection
D. Sample Warranty.
E. Test Data
   1. Submit test data indicating compliance with the Sound Transmission Class (STC) requirements.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications:
   1. A qualified manufacturer that is a member in good standing of the Window and Door Manufacturers Association.
B. Installer Qualifications: Minimum 2 years experience installing similar products.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of referenced standard and manufacturer's written instructions.
B. Package factory-finished doors individually in manufacturer's standard plastic bags, stretch wrap, or cardboard cartons.
C. Mark each door on top rail with opening number used on Shop Drawings. Include manufacturer's order number and date of manufacture.

1.4 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weather tight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining temperature between 60 and 90 deg F and relative humidity between 25 and 55 percent during remainder of construction period.

1.5 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
      b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.
   2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
   3. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:
   1. Marshfield Door Systems
   2. Algoma Hardwoods, Inc.
   3. Eggers Industries.
   4. Assa Abloy

B. Source Limitations: Obtain flush wood doors from single manufacturer.

2.2 FLUSH WOOD DOORS, GENERAL

A. Quality Standard: In addition to requirements specified, comply with WDMA I.S.1-A-11, "Architectural Wood Flush Doors."

B. WDMA I.S.1-A Performance Grade:
   1. Heavy Duty unless otherwise indicated.

C. Wood-Based Particleboard-Core Doors:
   1. Provide wood-based particleboard core doors with a minimum density per ANSI A208.1, Grade LD-2 as required to meet WDMA Performance Duty level specified without added blocking.

2.3 VENEER-FACED DOORS FOR TRANSPARENT FINISH

A. Interior Solid-Core Doors
   1. Veneer Grade: AA.
   2. Species: White birch
   3. Cut: Plain sliced.
   4. Match between Veneer Leaves: Book match.
   5. Assembly of Veneer Leaves on Door Faces: Running match.
   6. Pair and Set Match: Provide for doors hung in same opening
   7. Transom Match: Continuous match.
   8. Core: Wood-based Particleboard, fire-resistant composite, or specialty core as required per Article 2.2 and schedule.
   9. Construction: Five plies. Stiles and rails are bonded to core, and then entire unit is abrasive planed before veneering.
   10. WDMA I.S.1-A Performance Grade: As specified in Article 2.2.

2.4 LIGHT FRAMES AND LOUVERS

A. Factory Glazing: Refer to Section 088000 "Glazing" for glass view panels in flush wood doors. Factory install glass. Fill glazing bead nail holes in factory finished doors.
B. Wood Beads for Light Openings in Wood Doors: Provide manufacturer's standard flush wood beads unless otherwise indicated.
   1. Wood Species: Same species as door
   2. Profile: Lipped tapered beads.

2.5 FABRICATION

A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
   1. Comply with NFPA 80 requirements for fire-rated doors.
B. Transom and Side Panels: Fabricate matching panels with same construction, exposed surfaces, and finish as specified for associated doors. Finish bottom edges of transoms and top edges of rabbeted doors same as door stiles.
C. Openings: Factory cut and trim openings through doors.
   1. Light Openings: Trim openings with moldings of material and profile indicated.

2.6 SHOP PRIMING

A. Doors for Transparent Finish: Factory finish door faces and vertical stile edges with stain (if required).

2.7 FACTORY FINISHING

A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
   1. Finish faces and vertical edges, seal top and bottom edges as required for warranty purposes
B. Factory finish doors.
C. Transparent Finish:
   1. Grade: Custom.
   2. Finish: Manufacturer's standard UV cured polyurethane, equal to WDMA TR-6 catalyzed polyurethane.
   3. Staining: As selected by Architect from manufacturer's full range
   4. Sheen: Satin.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and installed door frames, with Installer present, before hanging doors.
   1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs. Any deficiencies must be corrected prior to door installation.
   2. Reject doors with defects.
B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Hardware: per schedule and manufacturers requirements.
B. Installation Instructions: Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.
   1. Install fire-rated doors according to NFPA 80.
C. Job-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors. Machine doors for hardware. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
   1. Clearances: Provide 1/8 inch at heads, jambs, and between pairs of doors. Provide 1/8 inch from bottom of door to top of decorative floor finish or covering unless otherwise indicated. Where threshold is shown or scheduled, provide 1/4 inch (6.4 mm) from bottom of door to top of threshold unless otherwise indicated.
      a. Comply with NFPA 80 for fire-rated doors.
   2. Bevel non-fire-rated doors 1/8 inch in 2 inches (3-1/2 degrees) at lock and hinge edges.
   3. Trim bottom rail only to extent permitted by labeling agency.
D. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.
E. Factory-Finished Doors: Do not trim factory finished doors for width.

3.3 ADJUSTING

A. Operation: Correct any deficiency that prohibits the door from swinging or operating freely. Do not remove hinge screws after initial insertion. Shims used for alignment purposes must be inserted between hinge and frame. Do not insert shims between hinge and door.
B. To prevent stile failure, insure that door closers are properly adjusted and do not limit the door opening swing. Limit door opening swing only with a properly located stop.
C. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION

SECTION 08310- ACCESS DOORS AND FRAMES

PART 1 GENERAL

1.1 RELATED SECTIONS

A. Section 06100 - Rough Carpentry: opening support.

1.2 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Manufacturer's data sheets, including:

1.3 DELIVERY, STORAGE, AND HANDLING

A. Store access door in manufacturer's unopened packaging until ready for installation.

B. Store access door until installation inside under cover in dry area out of direct sunlight.

1.4 WARRANTY

A. Limited Warranty: One year against defective material and workmanship, covering parts only, no labor or freight. Defective parts, if deemed so by the manufacturer, will be replaced at no charge, freight excluded, upon inspection at manufacturer's plant which warrants same.

PART 2 PRODUCTS

2.1 ACCESS DOOR AND FRAME

A. Stainless steel vertical access door
   1. Door: 16 ga. Rounded safety corners
   2. Frame: 14 ga. With continuous concealed hinge
   3. Lock: Mortise cylinder, 4 keys included

PART 3 EXECUTION

3.1 EXAMINATION

A. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

B. Examine materials upon arrival at site. Notify the carrier and manufacturer of any damage.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

3.3 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Final Acceptance.

END OF SECTION

SECTION 08410-METAL-FRAMED STOREFRONTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Aluminum-framed storefront windows, doors, and door hardware.
B. Perimeter sealant.

1.02 REFERENCES

A. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; American Architectural Manufacturers Association; 1997.
B. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels; 1998.
C. ASCE 7 - Minimum Design Loads for Buildings and Other Structures; American Society of Civil Engineers; 2002.
D. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 1996.
E. ASTM B 221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 1996.
F. ASTM E 283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 1991.
G. ASTM E 330 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference; 1997.
H. ASTM E 331 - Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference; 1996.

1.03 PERFORMANCE REQUIREMENTS

A. Design and size components to withstand the following load requirements without damage or permanent set, when tested in accordance with ASTM E 330, using loads 1.5 times the design wind loads and 10 second duration of maximum load.
   1. Design Wind Loads: Comply with requirements of ASCE 7.
   2. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.
B. Movement: Accommodate movement between storefront and perimeter framing and deflection of lintel, without damage to components or deterioration of seals.
C. Air Infiltration: Limit air infiltration through assembly to 0.06 cu ft/min/sq ft of wall area, measured at a reference differential pressure across assembly of 1.57 psf as measured in accordance with ASTM E 283.
D. Water Leakage: None, when measured in accordance with ASTM E 331 with a test pressure difference of 2.86 lbf/sq ft.
E. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
F. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.
G. Windborne Debris Resistance: Provide glazed windows capable of resisting impact from windborne debris, based on pass/fail criteria as determined from testing glazed windows identical to those specified, according to ASTM E 1886 and testing information in ASTM E 1996, and

requirements of authorities having jurisdiction.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, door hardware, internal drainage details.
C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work, expansion and contraction joint location and details, and field welding required.
D. Manufacturer's Certificate: Certify that the products supplied meet or exceed the specified requirements.

1.05 DELIVERY, STORAGE, AND PROTECTION

A. Handle products of this section in accordance with AAMA CW-10. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings, which bond to aluminum when exposed to sunlight or weather.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Kawneer Company; Product Tri-Fab Versaglaze 601UT framing system with center plane.
B. Other Acceptable Manufacturers:
   1. United States Aluminum Corp.
   2. Vistawall Architectural Products: www.vistawall.com.

2.02 COMPONENTS

A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
   1. Finish: High performance organic coating.
   2. Color: Clear Anodized, to be confirmed with architect.
B. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
   1. Alloy & temper recommended by aluminum storefront manufacturer for strength, corrosion resistance and application of required finish.
   2. Glazing stops: Flush.
   3. Cross-Section: 2x 6 inch nominal dimension.
C. Doors: Glazed aluminum.
   1. Thickness: 1-3/4 inches.
   2. Top Rail: 4 inches wide.
   3. Vertical Stiles: 4-1/2 inches wide.
   4. Bottom Rail: 12 inches wide.
   5. Glazing Stops: Beveled.
   6. Finish: Same as storefront.

2.03 MATERIALS

A. Extruded Aluminum: ASTM B221 (ASTM B221M).
B. Fasteners: Stainless steel.
C. Perimeter Sealant: Type 1 specified in Section 07900.
D. Glass: As specified in Section 08800.
   1. Glass in Exterior Framing and Doors: Type 2, 1” insulated glass.
E. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.
F. U-Factor: 0.77 max. and SHGC: 0.25 max.

2.04 FINISHES

A. High Performance Organic Finish: AAMA 2604; multiple coats, thermally cured fluoropolymer system, 20-year finish.

2.05 HARDWARE

A. Weatherstripping: Wool pile, continuous and replaceable; provide on all doors.
B. Sill Sweep Strips: Resilient seal type, retracting, of neoprene; provide on all doors.
C. Pivots: Center type; top and bottom; provide on all doors.
D. Push/Pull Set: 1" bar, Hager No.160; provide on all doors.
E. Threshold: Aluminum, ¼” high maximum; provide on all doors.
F. Closers: Surface mounted on interior.
   1. Provide on all doors.
G. Locks: Double cylinder mortise lock with key inside; keyed cylinder outside.
   1. Provide on all doors.

2.06 FABRICATION

A. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
B. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
C. Prepare components to receive anchor devices. Fabricate anchors.
D. Arrange fasteners and attachments to conceal from view.
E. Reinforce components internally for door hardware.
F. Reinforce framing members for imposed loads.
G. Finishing: Apply factory finish to all surfaces that will be exposed in completed assemblies.
   1. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify dimensions, tolerances, and method of attachment with other work.
B. Verify that wall openings and adjoining air and vapor seal materials are ready to receive work of this section.

3.02 INSTALLATION

A. Install wall system in accordance with manufacturer's instructions.

B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
C. Provide alignment attachments and shims to permanently fasten system to building structure.
D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
E. Provide thermal isolation where components penetrate or disrupt building insulation.
F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.
G. Coordinate attachment and seal of perimeter air and vapor barrier materials.
H. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
I. Set thresholds in bed of mastic and secure.
J. Install hardware using templates provided.
K. Install glass in accordance with Section 08800, using glazing method required to achieve performance criteria.
L. Install perimeter sealant in accordance with Section 07900.

3.03 ERECTION TOLERANCES

A. Maximum Variation from Plumb: 0.06 inches every 3 ft non-cumulative or 1/16 inches per 10 ft, whichever is less.
B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

3.04 ADJUSTING

A. Adjust operating hardware for smooth operation.

3.05 CLEANING AND PROTECTION

A. Remove protective material from pre-finished aluminum surfaces.
B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.
C. Remove excess sealant by method acceptable to sealant manufacturer.
D. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

END OF SECTION

SECTION 08460 - AUTOMATIC ENTRANCE DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Automatic sliding doors, with frames. Furnish specified complete automatic aluminum door system, that has been manufactured, fabricated & installed to meet manufacturer's standards without defects, damage or failure.
B. Safety devices.

1.02 REFERENCES

A. BHMA A156.10 - American National Standard for Power Operated Pedestrian Doors; Builders Hardware Manufacturers Association; 1999 (ANSI/BHMA A156.10).
B. BHMA A156.19 - American National Standard for Power Assist and Low Energy Power Operated Doors; Builders Hardware Manufacturers Association; 1997 (ANSI/BHMA A156.19).
C. NEMA MG 1 - Motors and Generators; National Electrical Manufacturers Association; 1998.
D. NFPA 70 - National Electrical Code; National Fire Protection Association; 1999.
E. UL (ECMD) - Electrical Construction Materials Directory; Underwriters Laboratories Inc.; current edition.
F. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems; Underwriters Laboratories Inc.; 1995.

1.03 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.
B. Shop Drawings:
C. Product Data: Provide data on system components, sizes, features, and finishes.
D. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention, and manufacturer's hardware and component templates.
E. Maintenance Data: Include manufacturer's parts list and maintenance instructions for each type of hardware and operating component.
F. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.04 QUALITY ASSURANCE

A. INSTALLERS QUALIFICATIONS: Installer shall be factory trained, certified by AAADM, and experienced to perform work of this section
B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories, Inc., as suitable for the purpose specified and indicated.
C. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

1.05 WARRANTY

A. See Section 01780 - Closeout Submittals, for additional warranty requirements.
B. Correct defective Work within a 1 year period after Date of Project Substantial Completion.
C. Provide five year manufacturer warranty for motor and belt.

1.06 MAINTENANCE SERVICE

A. Provide service and maintenance of operating equipment for one year from Date of Project Final Acceptance.

1.07 PERFORMANCE REQUIREMENTS

A. General: Provide automatic door operators capable of withstanding loads and thermal movements based on testing manufacturer's standard units in assemblies similar to those indicated for this Project.
B. Operating Range: Minus 30 deg F to 130 deg F.
C. Opening-Force Requirements for Egress Doors: In the event power failure to the operator, swinging automatic entrance doors shall open with a manual force, not to exceed 30 lbft (133 N) applied at 1" (25 mm) form the latch edge of the door.
D. Break Away Requirements: Automatic door operators shall breakaway with no more than 30 lbs (133 N) applied at 1" (25 mm) from the latch edge of the door.
E.

1.8 PROJECT CONDITIONS

A. Field Measurements: General Contractor shall verify openings to receive automatic door operators by field measurements before fabrication and indicate measurements on Shop Drawings.
B. Mounting Surfaces: General Contractor shall verify all surfaces to be plumb, straight and secure; substrates to be of proper dimension and material.
C. Other trades: General Contractor Advise of any inadequate conditions or equipment.

PART 2 - PRODUCTS-Sliding doors

2.01 MANUFACTURERS

A. Automatic Entrance Doors: **Horton* Series 2310**, Stanley, NABCO Entrances, Dorma or approved equal.

2.02 AUTOMATIC ENTRANCE DOORS

A. Configuration: Bi parting with adjacent side-lites
B. Automatic Sliding Door Type: track-mounted, electric operation, extruded aluminum glazed door, with frame, and operator concealed overhead.
C. Finish: **Anodized-clear**, 20-year finish.

2.03 LAMINATED GLASS

A. GLASS AND GLAZING: Glass stops, glazing vinyl and setting blocks for field glazing as per Safety Glazing standard ANSI Z97.1.2. Contractor to coordinate acquisition of glass in thickness and type in accordance with the following manufacturer's recommendations for prescribed design:
   1. 1" (25mm) overall thickness insulating glass unit consisting of an interior and exterior glass lite; both lites to be 1/4 inch (6mm) clear tempered glass. Airspace to be 90% argon filled.
   2. Glazing shall meet the following listed requirements specified for U-Factor and Solar Heat Gain Coefficient:

   a. U-Factor Summer (BTU/(h oF ft2) 0.22
   b. U-Factor Summer (W/(m2K) 1.27
   d. U-Factor Winter (BTU/(h oF ft2) 0.25
   e. U-Factor Winter (W/(m2K) 1.4
   f. Solar Heat Gain Coefficient 0.37

.

2.04 DOOR OPERATORS

A. Door Operators - General Requirements: Comply with BHMA A156.10, BHMA A156.19 and UL 325, as applicable.
B. Door Locking: Provide electronic locking from interior for securing door at maintenance times with Adams Rite 8600 panic device; with key control on the outside of each exterior door; and an on/off key switch on the interior side of each door.
C. Egress Function: Provide emergency egress function in compliance with the 2018 NCSBC, Section 1010.1.3 and 1010.1.4.3.

2.05 ACTUATORS

A. ACTIVATION SENSORS: Microwave or active infrared sensor shall be header-mounted each side of door unit for detection of traffic from each direction.
B. THRESHOLD PRESENCE SENSORS:
   1. Header mounted sensors shall provide active infrared presence detection on each side of the door unit and shall remain active throughout the entire door opening and closing cycle.
   2. Hold-open beams: Two pulsed infrared photoelectric beams to be mounted in vertical rails of sidelite or in jambs. Sender/receiver arrangement parallels door opening.

2.06 ELECTRICAL CHARACTERISTICS AND COMPONENTS

A. Electrical Characteristics:
B. Motors: NEMA MG 1.
C. Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Enclose terminal lugs in terminal box sized to NFPA 70.
D. Disconnect Switch: Factory mount disconnect switch in control panel.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive work and dimensions are as indicated on shop drawings.
B. Verify that electric power is available and of the correct characteristics.

3.02 INSTALLATION

A. Install equipment in accordance with manufacturer's instructions.
B. Coordinate installation of components with related and adjacent work; level and plumb.
C. DISSIMILAR MATERIALS: Comply with AAMA 101, Appendix Dissimilar Materials by separating aluminum materials and other corrodible surfaces from sources of corrosion or electrolytic action contact points.

3.03 ADJUSTING

A. Adjust door equipment for correct function and smooth operation.

3.04 CLEANING

A. Remove temporary protection, clean exposed surfaces.

3.05 DEMONSTRATION AND INSTRUCTIONS

A. Demonstrate operation, operating components, adjustment features, and lubrication requirements.

END OF SECTION

SECTION 08552 – VINYL CLAD WOOD WINDOWS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Vinyl-clad wood windows.

1.2 RELATED SECTIONS

A. Section 07900 - Joint Sealants: Sealants and caulking.

1.3 REFERENCES

A. American Architectural Manufacturer Association (AAMA):
   1. AAMA 1304: Voluntary Specification for Forced-Entry Resistance of Side-Hinged Door Systems.
   2. ANSI/AAMA/NWWDA 101/I.S.2 /NAFS - Voluntary Specifications for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors.

B. ASTM International (ASTM):
   1. ASTM E 283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
   2. ASTM E 330 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.

C. National Fenestration Rating Council (NFRC):
   1. NFRC 100 - Procedure for Determining Fenestration Thermal Properties.
   2. NFRC 200 - Solar Heat Gain Coefficient and Visible Transmittance.

Window and Door Manufacturers Association (WDMA): WDMA I.S.4; Water Repellent Preservative Non-Pressure treatment for Millwork.

1.4 PERFORMANCE REQUIREMENTS

A. Windows shall be Hallmark certified to a rating of LC – PG50 specifications in accordance with ANSI/WDMA/CSA 101/.S.2/A440-08.
B. Window Unit Air Leakage, ASTM E 283, 1.57 psf (25 mph): 0.05 cfm per square foot of frame or less.
C. Window Unit Water Penetration: No water penetration through window unit when tested in accordance with ASTM E 547, under static pressure of 7.5 psf (52 mph) after 4 cycles of 5 minutes each, with water being applied at a rate of 5 gallons per hour per square foot.

1.5 SUBMITTALS

A. Comply with Division 1 requirements.
B. Product Data: Submit manufacturer's product data, including installation instructions.
C. Shop Drawings: Submit manufacturer's shop drawings, indicating dimensions, construction, component connections and locations, anchorage methods and locations, hardware locations, and installation details.
D. Warranty: Submit manufacturer’s standard warranty.
E. Color chart

1.6 QUALITY ASSURANCE

A. Mockup:
   1. Provide sample installation for field testing window performance requirements and to determine acceptability of window installation methods.
   2. Approved mockup shall represent minimum quality required for the Work.
   3. Approved mockup shall [not] remain in place within the Work.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to site undamaged in manufacturer's or sales branch's original, unopened containers and packaging, with labels clearly identifying manufacturer and product name. Include installation instructions.
B. Storage: Store materials in an upright position, off ground, under cover, and protected from weather, direct sunlight, and construction activities.
C. Handling: Protect materials and finish during handling and installation to prevent damage.

PART 2 PRODUCTS

2.1 MANUFACTURER

A. Pella Corporation, Andersen, Marvin

2.2 VINYL-CLAD WOOD AWNING WINDOWS

A. Vinyl-Clad Wood Casement Windows: Architect Series factory-assembled clad wood windows
B. Frame:
   1. Select woods, water-repellent, preservative-treated with EnduraGuard® in accordance with WDMA I.S.-4. EnduraGuard includes water-repellency, three active fungicides and an insecticide applied to the frame.
   2. Interior Exposed Surfaces: Pine, pre-finished
   3. Exterior Surfaces: Clad with Vinyl.
   4. Overall Frame Depth: 5 inches (127 mm).
C. Sash:
   1. Select woods, water water-repellent, preservative-treated with EnduraGuard in accordance with WDMA I.S.-4. EnduraGuard includes water-repellency, three active fungicides and an insecticide applied to the sash.
   2. Interior Exposed Surfaces: Pine, pre-finished
   3. Exterior Surfaces: Clad with aluminum, lap-jointed at corners.
   4. Corners: Mortised and tenoned, glued and secured with metal fasteners.
   5. Sash Thickness: 1-3/4 inches (45 mm).
D. Weather Stripping:
   1. Dual weather stripping.
   2. Continuous, flexible, Santoprene material in dual-durometer design.
   3. Units shall have welded corners, compressed between frame and sash for positive seal on all 4 sides.
   4. Secondary PVC leaf-type weather strip between sash and frame for positive seals on all 4 sides.

2.3 GLAZING

A. Glazing:
   1. Float Glass: ASTM C 1036, Quality 1.
      a. Tempered Glass: ASTM C 1048.

2. Type: Silicone-glazed 11/16-inch dual-seal, insulating glass, multi-layer Low-E
3. Integral Light Technology Glazing and Grilles:
   a. Insulating glass contains non-glare grid between 2 panes of glass.
   b. Finish: Finish color matches interior and exterior finish colors.

2.4 OPTIONS

A. Insect Screens: Standard.
   1. Compliance: ASTM D 3656 and SMA 1201.
   2. Screen Cloth: Vinyl-coated fiberglass, 18/16 mesh.
   3. Set in aluminum frame fitted to inside of window.
   4. Complete with necessary hardware.
   5. Screen Frame Finish: match
B. Grilles-Between-the-Glass:
   1. Profile: 3/4 inch.
   2. Contoured aluminum grilles installed between 2 panes of the sealed insulating glass.
   3. Interior Grille Color: White
   4. Exterior color: White, confirm with architect

2.5 TOLERANCES

A. Windows shall accommodate the following opening tolerances:
   1. Vertical Dimensions Between High and Low Points: Plus 1/4 inch, minus 0 inch.
   2. Width Dimensions: Plus 1/4 inch, minus 0 inch.
   3. Building Columns or Masonry Openings: Plus or minus 1/4 inch from plumb.

2.6 FINISH

A. Exterior cladding:
   1. Vinyl.
   2. Color: to be selected by architect.
B. Interior Finish: Factory finished with 1 prime coat and 1 top coat color to be determined

2.8 INSTALLATION ACCESSORIES

A. Flashing/Sealant Tape:
   1. Aluminum-foil-backed butyl window and door flashing tape.
   2. Maximum Total Thickness: 0.013 inch.
   3. UV resistant.
   4. Verify sealant compatibility with sealant manufacturer.
B. Interior Insulating-Foam Sealant: Low-expansion, low-pressure polyurethane insulating window and door foam sealant.
C. Exterior Perimeter Sealant: high quality, multi-purpose sealant as specified in the joints sealant section.

2.9 SOURCE QUALITY CONTROL

A. Factory Testing: Factory test individual standard operable windows for air infiltration in accordance with ASTM E 283, to ensure compliance with this specification.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine areas to receive windows. Notify Architect of conditions that would adversely affect installation or subsequent use. Do not proceed with installation until unsatisfactory conditions are corrected.

3.2 INSTALLATION

A. Install windows in accordance with manufacturer's instructions and approved shop drawings.
B. Install windows to be weather-tight and freely operating.
C. Maintain alignment with adjacent work.
D. Secure assembly to framed openings, plumb and square, without distortion.
E. Integrate window system installation with exterior water-resistant barrier using flashing/sealant tape. Apply and integrate flashing/sealant tape with water-resistant barrier using watershed principles in accordance with window manufacturer's instructions.
F. Place interior seal around window perimeter to maintain continuity of building thermal and air barrier using insulating-foam sealant.
G. Seal window to exterior wall cladding with sealant and related backing materials at perimeter of assembly.
H. Leave windows closed and locked.

3.3 CLEANING

A. Clean window frames and glass in accordance with Division 1 requirements.
B. Do not use harsh cleaning materials or methods that would damage finish.
C. Remove labels and visible markings.

3.4 PROTECTION

A. Protect installed windows to ensure that, except for normal weathering, windows will be without damage or deterioration at time of Final Acceptance.

END OF SECTION 08551

SECTION 08710 - DOOR HARDWARE

PART 1 - GENERAL

1.01 SUBMITTALS

A. Product Data.
B. Final Hardware Schedule.
C. Keying Schedule: Separate schedule showing how each lock is keyed.

PART 2 - PRODUCTS

A. Latching and Locking Devices: Mortise locks, unless otherwise indicated, with appropriate locking function; provide on every door.

2.01 MATERIALS – GENERAL

A. Manufacturers:
   1. Where a particular manufacturer's product is specified, products of other manufacturers will be considered for substitution.
B. Fasteners: Provide hardware prepared by the manufacturer with fastener holes for machine screws, unless otherwise indicated.
   1. Provide all fasteners required for secure installation.
   2. Select fasteners appropriate to substrate and material being fastened.
   3. Use wood screws for installation in wood.
   4. Use fasteners impervious to corrosion outdoors and on exterior doors.
   5. Exposed screws: Match hardware finish.
C. Finish on All Exposed Metal Items: Satin chrome plated (626).
   1. Exceptions:
      a. Plates and bars: Satin stainless steel (630).
      b. Hinges: Where steel hinges are acceptable, use matching plated finish.
      c. As indicated for specific items.

2.02 LOCKS, LATCHES, AND BOLTS

A. Mortise Locksets and Latchsets:
   1. Comply with requirements of BHMA A156.13, Operational Grade 2.
      a. Security Grade 1.
   2. Trim: Cast lever with escutcheon plate.
B. Strikes: Provide strike for each latch bolt and lock bolt.
   1. Finish to match other hardware on door.
   2. Use wrought box strikes with curved lips unless otherwise indicated.
   3. Open strike plates may be used on interior wood door frames.

2.03 LOCK CYLINDERS AND KEYING

A. Keying: Obtain the owner's keying instructions.
   1. Match existing master key system.
   2. Provide standard cylinders for locks on all doors, unless otherwise indicated.
B. Cylinders: Minimum 7-pin pin tumbler cylinders.
   1. Construction: All parts brass, bronze, nickel silver or stainless steel.

2. Cylinders made by manufacturers other than the lockset manufacturer will not be acceptable.

C. Keys: Nickel silver.
1. Stamp each key with manufacturer's change symbol.
2. Provide individual change key for each lock which is not designated to be keyed alike with a group of related locks.
3. Provide 3 of each change key. Master key system shall match existing: 5 master keys.

2.04 DOOR CONTROL DEVICES

A. Closers - General:
1. Use closers of sizes recommended by manufacturer, unless a larger size is specified.
2. Size closer or adjust closer opening force to comply with applicable codes.

B. Surface-Mounted Closers:
1. Comply with requirements of BHMA A156.4, Grade 2.
a. Provide the following features:
1. PT 4D: Adjustable hydraulic back check.
2. PT 4F: Delayed action.
2. Style: CO2021.
3. Parallel arms: Provide for all closers; use larger size than normal.
1. Finish: Metallic paint finish, color similar to metal hardware on same door.

B. Recessed-Mounted Closers: Replace existing closers at the 2-Welcome Center entry doors.

C. Wall/Floor-Mounted Stops/Holders: Comply with requirements of ANSI A156.16.
1. Floor-mounted stops: Style: L12121.
2. Resilient bumpers: Gray.

2.05 SEALS AND THRESHOLDS

A. Weatherstripping:
1. At jambs and head: Replaceable bumper in surface-mounted extruded aluminum housing.
a. Bumper: Solid neoprene, hollow bulb or loop.
2. At bottom: Replaceable sweep in surface-mounted extruded aluminum housing.
a. Sweep: Solid neoprene.
3. Housing finish: Natural anodized.

B. Thresholds: Ribbed aluminum.
1. Select style to suit changes in elevation and to fit door hardware and frames.
2. Interlocking hook type threshold: Hook strip on bottom of door, interlocking with top lip of threshold.
a. At doors that swing in, provide internal drain and drain pan.

C. Sealant for Setting Thresholds: Butyl-rubber or butyl-polyisobutylene sealant.

2.06 ARCHITECTURAL DOOR TRIM

A. Manufacturers:
1. Architectural door trim: Products of the following manufacturers, or approved equal, provided they comply with requirements of the contract documents, will be among those considered acceptable:
a. Yale Security, Inc.
b. Hiawatha, Inc.
c. H. B. Ives, a Harrow Company.
d. Rockwood Manufacturing Company.
e. Triangle Brass Manufacturing Company, Inc.

B. Push / pulls:

1. Decorative pulls: 1 inch round bars, radius ends, vertical(pull side) and horizontal(push side), 12 & 32 inches long respectively.
2. Pull handles which are not mounted on plates: Fasten with through-bolts concealed under plate on opposite side.
3. Where matching handles or bars are installed on each side of door, mount back-to-back with concealed fasteners.

PART 3 - EXECUTION

3.01 PREPARATION

A. Factory- or shop-prepare all work for installation of hardware.

3.02 INSTALLATION

A. Follow hardware manufacturer's recommendations and instructions.
B. Mount at heights specified in the Door and Hardware Institute's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
   1. Exception(s): As required by applicable regulations.
C. Install hardware in correct location, plumb and level.
D. Reinforce substrates as required for secure attachment and proper operation.
E. Thresholds: Apply continuous bead of sealant to all contact surfaces before installing.

3.03 ADJUSTMENT

A. Adjust each operable unit for correct function and smooth, free operation.
B. Adjust door closers to overcome air pressure produced by HVAC systems.
C. If hardware adjustment is completed more than one month before substantial completion, readjust hardware not more than one week before substantial completion.

3.04 CONTRACT CLOSEOUT

A. Deliver all keys to the owner.

PART 4 - SCHEDULE

Manufacturers Code Name:

Ad	Adams Rite	Na	National Guard
Gl	Glynn Johnson	Ro	Rockwood
Ha	Hager	Sa	Sargent
Mc	McKinney		

Group # 1
Automatic sliding door with break away operation (see spec)

Group # 2

3 Hinges	TA 2314 4 1/2 X 4 1/2	US32D	Mc	Pemko or Ives Equivalent
1 Handleset	8215-27 LNJ X 3 Keys	US32D	Sa	Schlage or Best Access Equivalent
1 Closer	281 PS	26D	Sa	LCN or Dorma Equivalent
1 Protection Plate	K1050 10" X 34"	US32D	Ro	Von Duprin or Hager Equivalent
3 Door Silencer	GJ64	Gray	Gl	Ives or Rockwood Equivalent
1 Wall Bumper	409	US32d	Ro	Ives or Baldwin Equivalent

Group #3				
3 Hinges	TA 2314 4 1/2 X 4 1/2	US32D	Mc	Pemko or Ives Equivalent
1 Lockset	8237-27 LNJ X 3 Keys	US32D	Sa	Schlage or Best Access Equivalent
1 Closer	281 PS	26D	Sa	LCN or Dorma Equivalent
1-louver	18" X 18"	powder coated steel-color to be determined		
3 Door Silencer	GJ64	Gray	Gl	Ives or Rockwood Equivalent
1 Wall Bumper	409	US32d	Ro	Ives or Baldwin Equivalent
1 Half saddle threshold	350	AL	Na	Pemko or Hager Equivalent

END OF SECTION 08710

SECTION 08800 – GLAZING

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Insulated, display, and obscure glass.
   2. Glazing accessories.
B. Types of work in this section include work for:
   1. Exterior entry door and sidelights; see Section 08410-Metal-Framed Storefronts.
   2. Sliding glass entry door; see Section 08460.

1.02 PERFORMANCE REQUIREMENTS

A. Exterior Glazing: Provide glazing assemblies which will withstand normal conditions without failure, loss of weathertightness, or deterioration.
   a. Wind Loads-completed system shall withstand all wind and service pressure loads normal to wall plane.
   b. Thermal Movement-provide for thermal movement caused by 180 degrees F surface temperature, without causing buckling stresses on glass, joint seal failure, undue stress on structural elements, damaging loads on fasteners, reduction of performance or detrimental effects.
B. Deterioration includes:
   1. For insulating glass:
      a. Moisture or dirt between panes.
      b. Development of condensation between panes.
      c. Damage to internal coating, if any.
      d. Development of other visible indication of seal failure.
   2. For laminated glass: Development of visible delamination.

1.03 SUBMITTALS

A. Product Data.
B. Insulating Unit Warranty.

1.04 WARRANTY

A. Warranty on Insulating Glass: Fabricator's standard warranty for 5 years.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers:
   1. Laminated glass: Products of the following manufacturers or approved equal, provided they comply with requirements of the contract documents, will be among those considered acceptable:
      a. Falconer-Lewistown, Inc.
      b. Globe Amerada Glass Company.

c. Guardian Industries Corporation.
d. Viracon, Inc.

2.02 GLASS TYPES

A. Glass Types - General: Provide glass types fabricated of the glass products indicated.
   1. Exterior glass thickness: 6 mm (1/4 inch nominal), unless otherwise indicated.
   2. Where safety glazing is required by governing authorities, provide certified safety glazing per ANSI Z97.1.
   3. Cut or drill holes in laminated units.
B. Glass Type I - 1: Sealed insulating units at fixed, sliding and storefront entry doors and sidelights.
   1. Total thickness: 1 inch, nominal.
   2. Exterior and Interior pane: Tempered, impact resistant glass.
      a. Two-ply.
      b. Thickness of plies: 6 mm.
      c. All plies: Heat-strengthened float glass.
      d. Color: Outer: tinted and inner ply: Clear.
      e. Interlayer thickness: 0.05 inch.
      f. see cover sheet for energy values.
C. Glass Type I - 2: Sealed insulating units at windows
   1. Total thickness: 1 inch, nominal.
   2. Exterior and Interior pane: Obscure glass.
      a. Two-ply.
      b. Thickness of plies: 6 mm.
      c. All plies: Heat-strengthened float glass.
      d. Color: Outer Tinted and inner ply: Obscure.
      e. Interlayer thickness: 0.05 inch.
      f. see cover sheet for energy values.
D. Glass Type SG - 2: at Display case High Impact resistant Polycarbonate sheet, with mar-resistant coating;
   1. Provide certified safety glazing, thickness: ¼ inch for use at display cases.
   2. Color: Clear.
      1. Acceptable glazing methods: Sealant, both sides.
D. Glass Type SG - 3: Obscure glass at Unisex Restroom door; thickness: ¼ inch safety glass.

2.03 BASIC GLASS PRODUCTS

A. Sealed Insulating Units: Factory-assembled multiple panes separated by and sealed to spacers forming air-tight, dehydrated air space(s).
   1. ASTM E 774, Class B.
   2. Spacer seals: Manufacturer's standard.
   3. Exception: For structural adhesive glazed units use only a dual seal system, using materials determined by structural adhesive manufacturer to be compatible with structural adhesive.
B. Float Glass: Quality q3, unless otherwise indicated.
   1. Heat-strengthened: ASTM C 1048, Kind HS, Type I.
C. Laminated Units: Multiple plies laminated together with interlayer, using heat and pressure, without air pockets or contaminants between plies.
   1. Interlayer for all-glass units: Polyvinyl butyral sheet, specifically designed for lamination and with demonstrated long-term ability to maintain physical and visual properties under installed conditions.
D. Polycarbonate Sheet: Rigid, flat polycarbonate sheet; thicknesses as indicated.
   1. Flammability: Average extent of burning less than 1 inch, when tested in accordance with ASTM D 635, using the thickness of material to be used on the project.

3. UV- and mar-resistant coating: Apply on all surfaces exposed to air.

2.04 INSTALLATION MATERIALS

A. Installation Materials - General: Select products which have appropriate performance characteristics as recommended by glass and glazing materials manufacturers and which are compatible with all materials with which they will come into contact.
B. Heel and Toe Bead Sealant: Noncuring, nonskinning, minimum 75 percent solids, butyl or polyisobutylene rubber, complying with 802.3, Type II ductile back bedding compound, as described in AAMA 800.

PART 3 – EXECUTION

3.01 INSTALLATION - GENERAL

A. Comply with recommendations for installation contained in the FGMA "Glazing Manual" and "Sealant Manual" except when specifically not recommended or prohibited by the glass or glazing material manufacturer; comply with manufacturer's recommendations.
B. Protect glazing from edge damage during handling and installation.
C. Do not install glass that has edge damage or defects that reduce glass strength or performance or diminish appearance.

3.02 GLAZING IN FRAMES

A. Use continuous heel or toe bead at all exterior glazing.
B. Do not block weep holes.
C. Structural Adhesive Glazing: Perform glazing in strict accordance with instructions of structural glazing adhesive manufacturer and additional requirements elsewhere in the contract documents.

3.03 PROTECTION AND CLEANING

A. Cover exposed polycarbonate surfaces with heavy paper secured with tape, without touching glazing.
   1. Clean polycarbonate surfaces using only methods recommended by manufacturer.

END OF SECTION 08800

THIS PAGE LEFT BLANK INTENTIONALLY.

SECTION 08900 – LOUVERS AND VENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Fixed, extruded-aluminum wall louvers.
B. See Division 8 Section "Steel Doors and Frames" for louvers in hollow-metal doors.
C. See Division 15 Sections for louvers that are a part of mechanical equipment.

1.2 PERFORMANCE REQUIREMENTS

A. Design: Design louvers, including comprehensive engineering analysis by a qualified engineer, using structural performance requirements and design criteria indicated.
B. Structural Performance: Louvers shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated without permanent deformation of louver components, noise or metal fatigue caused by louver blade rattle or flutter, or permanent damage to fasteners and anchors.
   1. Wind Loads: Determine loads based on a uniform pressure of 30 lb./sq. ft. (1435 Pa), acting inward or outward.
C. Louver Performance Ratings: Provide louvers complying with requirements specified, as demonstrated by testing manufacturer's stock units identical to those provided, except for length and width according to AMCA 500-L.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.
   1. For louvers specified to bear AMCA seal, include printed catalog pages showing specified models with appropriate AMCA Certified Ratings Seals.
B. Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other work. Show frame profiles and blade profiles, angles, and spacing.
C. Samples: For each type of metal finish required.
D. Submittal: For louvers indicated to comply with structural performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
E. Product Test Reports: Based on tests performed according to AMCA 500-L.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Aluminum Extrusions: ASTM B 221M, Alloy 6063-T5.
B. Aluminum Sheet: ASTM B 209M, Alloy 3003 with temper as required for forming.
C. Fasteners: Use types and sizes to suit unit installation conditions.
   1. For fastening aluminum, use aluminum or 300 series stainless-steel fasteners.

2.2 FABRICATION, GENERAL

A. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.
B. Join frame members to each other and to fixed louver blades with fillet welds concealed from view welds, threaded fasteners, or both, as standard with louver manufacturer unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

2.3 FIXED, EXTRUDED-ALUMINUM LOUVERS

A. Horizontal High Performance Drainable-Blade Louver
1. Basis-of-Design Product: Architectural Louvers; Model E6DP. Subject to compliance with requirements, provide the specified product or comparable product by one of the following:
a. Manufacturers of equivalent products submitted and approved in accordance with Section 01630 - Product Substitution Procedures.
2. Louver Depth: 6 inches (150 mm)
3. Blade Profile: Drainable blade with front gutter for water diversion to jambs
4. Frame and Blade Nominal Thickness: Not less than 0.080 inch (2.03 mm) for blades and frames.
5. Louver Performance Ratings:
a. Free Area: Not less than 9.2 sq. ft. (0.85 sq. m) for 48-inch- (1220-mm-) wide by 48-inch- (1220-mm-) high louver.
b. Point of Beginning Water Penetration: Not less than 1046 fpm (5.4 m/s).
c. Air Performance: Not more than 0.13-inch wg (25-Pa) static pressure drop at 1000 fpm (5.1-m/s) free-area velocity.
6. AMCA Seal: Mark units with AMCA Certified Ratings Seal.

2.4 LOUVER SCREENS

A. General: Provide screen at each exterior louver.
B. Louver Screen Frames: Same kind and form of metal as indicated for louver to which screens are attached.
C. Louver Screening: Same kind of metal as indicated for louver.
1. Insect Screening: Aluminum, 16 x 18 square mesh, 0.011-inch (0.28-mm) wire.
2. Bird Screening: Flattened, expanded aluminum, 3/4 by 0.050 inch (19 by 1.27 mm) thick.

2.5 ALUMINUM FINISHES

A. High-Performance Organic Finish: 3-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pre-treat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

1. Color and Gloss: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Locate and place louvers and vents level, plumb, and at indicated alignment with adjacent work.

B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weather-tight connection.

C. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.

D. Repair damaged finishes so no evidence remains of corrective work. Return items that cannot be refinished in the field to the factory and refinish entire unit or provide new units.

E. Protect galvanized and nonferrous-metal surfaces that will be in contact with concrete, masonry, or dissimilar metals from corrosion and galvanic action by applying a heavy coating of bituminous paint.

END OF SECTION 08 90 00

This page left blank intentionally.

SECTION 09252 - CEMENTITIOUS BACKER BOARD

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Fiber cement backer board panels.

1.2 RELATED SECTIONS

A. Section 06100 - Rough Carpentry: framing and bracing.
B. Section 09260 - Gypsum Board: Vapor barrier material and installation requirements.

1.3 REFERENCES

A. ANSI 108/A118/A136 - American National Standards for the Installation of Ceramic Tile.
B. ANSI A108.11 - Installation of Cementitious Backer Units.
C. ANSI A118.4 - Specifications for Latex Portland Cement Mortar
D. ANSI A118.9- Cementitous Baker Units.
E. ANSI A136.1 - Organic Adhesives for Installation of Ceramic Tile
F. ASTM C1288 - Discrete Non-Asbestos Fiber-Cement Interior Substrate Sheets.

1.4 SUBMITTALS

A. Submit under provisions of Section 01300.
B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.
C. Verification Samples: For each finish product specified, two samples, minimum size 4 by 6 inches (100 by 150 mm) square, representing actual product, color, and patterns.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Minimum of 2 years experience with installation of similar products.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.
B. Store boards flat on a smooth level surface. Protect edges and corners from chipping. Store sheets under cover and keep dry prior to installing.

1.7 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.8 WARRANTY

A. Product Warranty: limited product warranty against manufacturing defects:
   1. 1/2 inch (13 mm) nominal cement board for 20 years.
B. Workmanship Warranty: application limited warranty for 2 years.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer:
   1. James Hardie Building Products, Inc.,
   2. National Gypsum
   3. Durock
B. Requests for approval of equal substitutions will be considered in accordance with provisions of Section 01600.

2.2 BACKERBOARD

A. Type: thickness varies
B. Material shall meet the following building code compliance:
   1. Non-asbestos fiber-cement board to comply with ASTM C1288 and ANSI A118.9.
   2. Board shall meet the building code compliance National Evaluation Report No. NER 405.

2.3 FASTENERS

A. Metal Framing fasteners
   1. Metal framing: 1-1/2 inches (32 mm) No. 8 by 0.375 inch (9.5 mm) HD self-drilling, corrosion resistant ribbed wafer head screws.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.
B. If framing preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 WALL FRAMING

A. Either vertical or horizontal, nominal 2 inches by 4 inches (51 mm by 102 mm) metal framing spaced a maximum of 24 inches (610 mm) on center with end joints staggered from adjacent courses in both vertical and horizontal applications.
B. To comply with ANSI A108.11, either vertical or horizontal, nominal 2 inches by 4 inches (51 mm by 102 mm) metal framing spaced a maximum of 16 inches (406 mm) on center with end joints staggered from adjacent courses in both vertical and horizontal applications.
C. Install a vapor barrier.
   1. Comply with building code regarding vapor barrier requirements.
   2. Repair any punctures or tears in vapor barrier prior to the installation of the board.

3.3 PREPARATION

A. Clean surfaces thoroughly prior to installation.
B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.4 INSTALLATION

A. Install in accordance with manufacturer's instructions. Install sheets with 1/8 inch (3 mm) gap between sheets.
B. Place fasteners 8 inches (152 mm) on center no closer than 3/8 inch (9.5 mm) from board edges and 2 inches (51 mm) from board corners.
C. Boards shall be placed with a minimum 1/4 inch (6 mm) clearance from the floor surfaces and other horizontal tile termination locations, including above tub edges. This gap shall be free of adhesive and grout and filled with a flexible sealant.
D. Boards shall be placed with a minimum 1/8 inch (3 mm) clearance from wall and cabinet bases, and other horizontal tile termination locations, including above tub edges. This gap shall be free of adhesive and grout and filled with a flexible sealant.
E. Joints shall be reinforced with 2 inches (51 mm) wide, high-strength, coated, alkali-resistant, glass fiber reinforcing tape embedded into the wet mastic or modified thinset mortar and allowed to dry thoroughly.
F. For large tiled areas, movement/control joints shall be provided in accordance with ANSI A108, Section AN-3.7 or as indicated on drawings.
G. Wall tiles complying with ANSI A137.1 are attached to the board with flexible Type I mastic adhesives complying with ANSI A136.1, or acrylic or latex-modified thinset mortars complying with ANSI A118.4, in accordance with ANSI A108.

END OF SECTION

THIS PAGE LEFT BLANK INTENTIONALLY.

SECTION 09260 - GYPSUM BOARD SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Gypsum wallboard and ceiling board.
   2. Drywall finishing.

1.02 QUALITY ASSURANCE

A. Regulatory Requirements: Where required, provide fire-rated assemblies as listed in the following:
   1. Underwriters Laboratories Inc.'s (UL) "Fire Resistance Directory."

PART 2 - PRODUCTS

2.01 GYPSUM BOARD

A. Gypsum Wallboard and Ceiling Board: ASTM C 36; maximum lengths available to minimize end-to-end butt joints in each area receiving finished gypsum board.
   1. Edges: Tapered.
   2. Thickness: 5/8 inch, except as otherwise shown (fire-resistant type).
B. Manufacturers: Products of the following manufacturers or approved equal, provided they comply with requirements of the contract documents, will be among those considered acceptable:
   1. Domtar Gypsum.
   2. Georgia-Pacific Corporation.
   3. Gold Bond Building Products, a National Gypsum Division.
   4. USG Corporation.

2.02 TRIM AND ACCESSORIES

A. General: Except as otherwise specifically indicated, provide trim and accessories by manufacturer of gypsum board materials, made of galvanized steel or zinc alloy and configured for concealment in joint compound.

2.03 JOINT TREATMENT

A. General: Provide products by manufacturer of gypsum boards. Comply with ASTM C 475 and with manufacturer's recommendations for specific project conditions.
B. Joint Tape: Manufacturer's standard paper reinforcing tape.
C. Setting Type Joint Compound: Chemical hardening type, for the following applications:
   1. Exterior use: Prefilling and topping.
D. Drying Type Joint Compound: Vinyl-based type for interior use, and as follows:
   1. All-purpose type, for both embedding tape and as topping.

2.04 MISCELLANEOUS MATERIALS

A. General: Provide miscellaneous materials as produced or recommended by manufacturer of gypsum products.

PART 3 - EXECUTION

3.01 INSTALLATION OF GYPSUM BOARD

A. General: Comply with ASTM C 840 and GA-216 except where exceeded by other requirements.
   1. Wherever possible, install gypsum board to minimize butt end joints.
   2. Apply ceiling boards prior to installation of wallboards. Arrange to minimize butt end joints near center of ceiling area.
   3. Install wallboards in a manner which will minimize butt end joints in center of wall area. Stagger vertical joints on opposite sides of walls.

B. Installation on Metal Framing:
   1. Single-layer application: Install gypsum board by the following method:
      a. Screw attachment.

3.02 FINISHING

A. General: Comply with ASTM C 840 and GA-216 except where exceeded by other requirements.

B. Finish gypsum board in accordance with the following level of finish per GA-214, except where indicated otherwise on the drawings:
   1. Level 3: Embed tape in joint compound at all joints and interior angles. Provide two separate coats of compound at all joints, angles, fastener heads, and accessories. Provide smooth surfaces free of tool marks and ridges.

END OF SECTION 09260

SECTION 09300 – TILE

PART 1 – GENERAL

1.1 SUMMARY

A. Scope of work - Provide ceramic tile, tile installation materials and accessories as indicated on drawings, as specified herein, and as needed for complete and proper installation.
B. Related Documents - provisions within General and Supplementary General Conditions of the Contract, Division 1 - General Requirements, and the Drawings apply to this Section.

1.2 SECTION INCLUDES

A. Porcelain tile
B. Installation Products; adhesives, mortars, grouts and sealants
C. Waterproofing membranes for Ceramic tile work
D. Anti-fracture membranes for Ceramic tile work
E. Trim, cementitious backer units and other accessories specified herein.

1.3 RELATED SECTIONS

A. Section 03310 Cast-in-Place Concrete
B. Section 07130 Sheet Waterproofing
C. Section 07900 Joint Sealants
D. Section 09252 Backing Boards and Underlayments
E. Section 09260 Gypsum Board

1.4 REFERENCE STANDARDS

A. American National Standards Institute (ANSI) A108.01 - A108.17 American National Standard Specifications For The Installation Of Ceramic Tile
B. American National Standards Institute (ANSI) A118.1 - A118.15 American National Standard Specifications For The Installation Of Ceramic Tile
C. American National Standards Institute (ANSI) A136.1 American National Standard Specifications For The Installation Of Ceramic Tile
D. American Society For Testing And Materials (ASTM) C109 Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or 50-mm Cube Specimens)
E. American Society For Testing And Materials (ASTM) C150 Standard Specification for Portland Cement
F. American Society For Testing And Materials (ASTM) C171 Standard Specification for Sheet Materials for Curing Concrete
G. American Society For Testing And Materials (ASTM) C241 Standard Test Method for Abrasion Resistance of Stone Subjected to Foot Traffic
H. American Society For Testing And Materials (ASTM) C267 Standard Test Method for Chemical Resistance of Mortars, Grouts, and Monolithic Surfacings
I. American Society For Testing And Materials (ASTM) C482 Standard Test Method for Bond Strength of Ceramic Tile to Portland Cement
J. American Society For Testing And Materials (ASTM) C531 Standard Test Method for Linear Shrinkage and Coefficient of Thermal Expansion of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings and Polymer Concretes
K. American Society For Testing And Materials (ASTM) C905 Standard Test Method for Apparent Density of Chemical-Resistant Mortars, Grouts, and Monolithic Surfacings
L. American Society For Testing And Materials (ASTM) C920 Standard Specification for Elastomeric Joint Sealants
M. American Society For Testing And Materials (ASTM) D4263 Standard Test Method for Indicating Moisture in Concrete by The Plastic Sheet Method
N. American Society For Testing And Materials (ASTM) E96 Standard Test Methods for Water Vapor Transmission of Materials
O. American Society For Testing And Materials (ASTM) E1155 Standard Test Method for Determining F_F Floor Flatness and F_L Floor Levelness
P. American Society For Testing and Materials (ASTM) 2170 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs using in situ Probes

Q. American Society of Mechanical Engineers (ASME) - ASME A112.6.3 Floor and Trench Drains
R. Terrazzo, Tile And Marble Association Of Canada (TTMAC) Specification Guide 09300 Tile Installation Manual
S. Tile Council Of North America (TCNA) Handbook For Ceramic, Glass, and Stone Tile Installation

1.5 SYSTEM DESCRIPTION

A. Porcelain floor tile installed over concrete floor slabs using latex portland cement mortar and latex portland cement grout.

1.6 SUBMITTALS

A. Submittal Requirements: Submit samples of each type/style/finish/size/color of porcelain tile and trim unit.

1.7 QUALITY ASSURANCE

A. Tile Manufacturer (single source responsibility): Company specializing in ceramic tile, thin brick, masonry veneer, mosaics, pavers, trim units and/or thresholds with three (3) years minimum experience. Obtain tile from a single source (distributor) with resources to provide products of consistent quality in appearance and physical properties.
B. Installation System Manufacturer (single source responsibility): Company specializing in adhesives, mortars, grouts and other installation materials with ten (10) years minimum experience and ISO 9001 certification. Obtain installation materials from single source manufacturer to insure consistent quality and full compatibility.
D. Installer qualifications: company specializing in installation of ceramic tile, thin brick, masonry veneer, mosaics, pavers, trim units and/or thresholds with five (5) years documented experience with installations of similar scope, materials and design. **The installers must have completed large format tile installation training specific to materials in this project.**

1.8 DELIVERY, STORAGE AND HANDLING

A. Acceptance at Site: deliver and store packaged materials in original containers with seals unbroken and labels, including grade seal, intact until time of use, in accordance with manufacturer's instructions.
B. Store ceramic tile, stone, and installation system materials in a dry location; handle in a manner to prevent chipping, breakage, and contamination.
C. Protect latex additives, organic adhesives, epoxy adhesives and sealants from freezing or overheating in accordance with manufacturer's instructions; store at room temperature when possible.
D. Store portland cement mortars and grouts in a dry location.

1.9 PROJECT/SITE CONDITIONS

A. Provide ventilation and protection of environment as recommended by manufacturer.
B. Prevent carbon dioxide damage to ceramic tile, thin brick, masonry veneer, mosaics, pavers, trim units and/or thresholds as well as adhesives, mortars, grouts and other installation materials, by venting temporary heaters to the exterior.
C. Maintain ambient temperatures not less than 50ºF (10ºC) or more than 100ºF (38ºC) during installation and for a minimum of seven (7) days after completion. Setting of portland cement is retarded by low temperatures. Protect work for extended period of time and from damage by other trades. Installation with latex portland cement mortars requires substrate, ambient and material temperatures at least 37ºF (3ºC). There should be no ice in slab. Freezing after installation will not damage latex portland cement mortars. Protect portland cement based mortars and grouts from direct sunlight, radiant heat, forced ventilation (heat & cold) and drafts until cured to prevent premature evaporation of moisture. Epoxy mortars and grouts require surface temperatures between 60ºF (16ºC) and 90ºF (32ºC) at time of installation. It is the General Contractor’s responsibility to maintain temperature control.

1.10 SEQUENCING AND SCHEDULING

A. Coordinate installation of tile work with related work.
B. Proceed with tile work only after curbs, vents, drains, piping, and other projections through substrate have been installed and when substrate construction and framing of openings have been completed.

1.11 WARRANTY

A. The Contractor warrants the work of this Section to be in accordance with the Contract Documents and free from faults and defects in materials and workmanship for a period as determined by local or project requirements. The manufacturer of adhesives, mortars, grouts and other installation materials shall provide a written twenty-five (25) year warranty, which covers materials and labor.

1.12 MAINTENANCE

A. Submit maintenance data under provisions of Section 01300. Include cleaning methods, cleaning solutions recommended, stain removal methods, as well as polishes and waxes recommended.

1.13 EXTRA MATERIALS STOCK

Upon completion of the work of this Section, deliver to the Owner 5% minimum additional tile and trim shape of each type, color, pattern and size used in the Work, as well as extra stock of adhesives, mortars, grouts and other installation materials for the Owner's use in replacement and maintenance. Extra stock is to be from same production run or batch as original tile and installation materials.

PART 2 - PRODUCTS

2.1 MATERIALS - GENERAL

A. Colors, Textures, and Patterns, Tile, Grout, and Other Products: **Colors shall match the colors on drawings**, as manufactured by **manufacturers listed below**. Colors manufactured by a tile company other than that specified, must be approved as equal in color and texture by the Architect and the Roadside Unit. A manufacture other than specified shall submit an actual sample comparison submittal board with their **substitution samples** mounted alongside the specified tile samples for consideration as an equal tile product by the Architect and the Roadside Unit; the proposed substitution submittal board **shall be submitted 10 days prior to the receipt of bids to**

Ginger Summer
W. S. Architects, PA
3305-109 Durham Drive
Raleigh, NC 27603

1. Tile trim and accessories: Match color and finish of adjoining flat tile.

2.2 TILE PRODUCTS

A. **Floor Tile A**:
1. See finish plan for each building for types of porcelain tiles.
2. Trim units: Match color and finish of accent/floor tile:
   a. Shapes and sizes: Manufacturer's standard, as indicated; coordinated with indicated size and coursing of adjoining flat tile, where applicable
3. Manufacturers-Basis of Design: Best tile-Urban 2.0 Lava Grey. Other equal manufacturers include: Caesar Ceramics & Stonepeak.

a.	Water Absorption	ASTM C373	≤ 0.20%
b.	Breaking Strength	ASTM C648	≥400 lbs
c.	Dynamic Coefficient of Friction Wet	AcuTest	≥ 0.42
d.	Thickness Dimension	ASTM C499	In Accordance
e.	Facial Dimension	ASTM C499	In Accordance
f.	Warpage Diagonal	ASTM C485	In Accordance
g.	Wedging Average	ASTM C502	In Accordance
h.	Wear rating	4	
i.	Rectified	yes	

B. **Floor Tile B**:
1. See finish plan for each building for types of porcelain tiles.
2. Trim units: Match color and finish of accent/floor tile:
   a. Shapes and sizes: Manufacturer's standard, as indicated; coordinated with indicated size and coursing of adjoining flat tile, where applicable

3. Manufacturers-Basis of Design: Best tile, Tapestry Wood, Smoke. Other equal manufacturers include: Caesar Ceramics & Stonepeak.

a.	Water Absorption	ISO 10545-3	≤ 0.50%
b.	Breaking Strength	ISO 10545-4	≥52 N/mm2
c.	Dynamic Coefficient of Friction Wet	AcuTest	≥ 0.60
d.	Frost Resistance	ISO 10545-12	Frostproof
e.	Chemical Resistance Household	ISO 10545-13	Class A-LA-HA
f.	Chemical Resistance-low conc. acids/bases	ISO 10545-13	Class A-LA-HA
g.	Resistance to Stains	ISO 10545-14	Class 5
h.	Shade Variation	V3	
i.	Wear rating	Class 5	

C. **Wall Tile- typical**:
1. See finish plan for each building for types of porcelain tiles.
2. Trim units: Match color and finish of accent/floor tile:
   a. Shapes and sizes: Manufacturer's standard, as indicated; coordinated with indicated size and coursing of adjoining flat tile, where applicable
3. Manufacturers-Basis of Design: Best tile, Lustre Crepuscolo, Pearl, polished. Other equal manufacturers include: Caesar Ceramics & Stonepeak.

j.	Water Absorption	ISO 10545-3	≤ 0.50%
k.	Breaking Strength	ISO 10545-4	≥35 N/mm2
l.	Dynamic Coefficient of Friction Wet	AcuTest	≥ 0.26 (wall only) polished
m.	Thickness Dimension	ISO 10545-2	Conforms
n.	Frost Resistance	ISO 10545-12	Frostproof
o.	Chemical Resistance Houshold	ISO 10545-13	Class A
p.	Chemical Resistance-low conc. acids/bases	ISO 10545-13	Conforms
q.	Thermal Shock Resistance	ISO 10545-9	Resists
r.	Resistance to Stains	ISO 10545-14	Class 5
s.	Shade Variation	V3	
t.	Wear rating	Class 4	

C. **Wall Tile- accent wall**:
1. See finish plan for each building for types of porcelain tiles.
2. Trim units: Match color and finish of accent/floor tile:
   a. Shapes and sizes: Manufacturer's standard, as indicated; coordinated with indicated size and coursing of adjoining flat tile, where applicable
3. Manufacturers-Basis of Design: Best tile, Conventry, Ocean. Other equal manufacturers include: Caesar Ceramics & Roca.

a.	Water Absorption	ISO 10545-3	≤ 0.10%
b.	Breaking Strength	ISO 10545-4	≥35 N/mm2
c.	Dynamic Coefficient of Friction Wet	AcuTest	≥ 0.42 (wall only) polished
d.	Thickness Dimension	ISO 10545-2	Conforms
e.	Frost Resistance	ISO 10545-12	Frostproof
f.	Chemical Resistance Household	ISO 10545-13	Min. class GB
g.	Thermal Shock Resistance	ISO 10545-9	Resists
h.	Resistance to Stains	ISO 10545-14	Min. Class 3
i.	Shade Variation	V2	
j.	Wear rating	Class 1-wall only	

D. **Wall Tile- accent wall**:
1. See finish plan for each building for types of porcelain tiles.
2. Trim units: Match color and finish of accent/floor tile:
   a. Shapes and sizes: Manufacturer's standard, as indicated; coordinated with indicated size and coursing of adjoining flat tile, where applicable
3. Manufacturers-Basis of Design: Best tile, LM Marble Nouveau PO. Other equal manufacturers include: Caesar Ceramics & Roca.

a.	Water Absorption	ASTM C373	≤ 0.50%
b.	Scratch Hardness	MOH's	3
c.	Dynamic Coefficient of Friction Wet	A137.1	≥ 0.50 (wall only)

2.4 INSTALLATION MATERIALS MANUFACTURER

A. Basis of Design Manf: LATICRETE International, Inc., 1 Laticrete Park North, Bethany, CT 06524-3423 USA Phone 800-243-4788, (203) 393-0010 technicalservices@laticrete.com, www.laticrete.com; www.laticrete.com/green

B. Other equal manufacturers will be considered however all installation materials shall be from the same manufacturer. Also the concrete repair products shall be the same manufacturer to ensure compatibility.
   1. Mapei
   2. Schulter
   3. Sika, USA

2.5 INSTALLATION MATERIALS - TILE

A. Waterproofing and Crack Isolation Membrane to be thin, cold applied, single component liquid and load bearing and UL GREENGUARD Gold certified. Reinforcing fabric to be non-woven rot-proof specifically intended for waterproofing membrane. Waterproofing Membrane to be non-toxic, non-flammable, and non-hazardous during storage, mixing, application and when cured. It shall be certified by IAPMO and ICC approved as a shower pan liner and shall also meet the following physical requirements:

1.	Hydrostatic Test (ASTM D4068):	Pass
2.	Elongation @ break (ASTM D751):	20-30%
3.	System Crack Resistance (ANSI A118.12):	Pass (High)
4.	7 day Tensile Strength (ANSI A118.10):	265 psi (1.8 MPa)
5.	7 day Shear Bond Strength (ANSI A118.10)	200 psi (1.4 MPa)
6.	28 Day Shear Bond Strength (ANSI A118.4):	214 psi (1.48 – 2.4 MPa)
7.	Service Rating (TCNA/ASTM C627):	Extra Heavy
8.	VOC Content:	2.39 g/L
9.	Total VOC Emissions:	≤0.22 mg/m^3

(Basis of Design: LATICRETE® HYDRO BAN®) equal products from Mapei or Sika, as noted.**

B. Self-Leveling Underlayment shall be mixed with water to produce a pumpable, fast setting, free flowing cementitious underlayment, which can be poured from 1/8 in. to 1-1/4 in. (3 to 32mm) thick in one pour and GREENGUARD Gold certified.

1.	28 Day Compressive Strength (ASTM C1708.):	>4000 psi (27.6 MPa)
2.	Tensile Bond Strength (ASTM C1583):	>500 psi (3.5 MPa)
3.	Time To Foot Traffic:	1 – 4 Hours
4.	VOC Content:	0.00 g/L (NXT Level Plus); 7.00 (NXT Primer)
5.	Total VOC Emissions:	≤0.22 mg/m^3

(Basis of Design: LATICRETE NXT™ Level Plus and NXT Primer) equal products from Mapei or Sika, as noted.

C. Epoxy Grout (Commercial/Residential) shall be non-toxic, non-flammable, non-hazardous during storage, mixing, application and when cured, UL GREENGUARD Gold certified, and shall meet the following physical requirements:

1.	Compressive Strength (ANSI A118.3):	3,800 psi (26.2 MPa)
2.	Shear Bond Strength (ANSI A118.3):	1,100 psi (7.6 MPa)
3.	Tensile Strength (ANSI A118.3):	1,100 psi (7.6 MPa)
4.	Thermal Shock (ANSI A118.3):	>800 psi (5.5 MPa)
5.	Water Absorption (ANSI A118.3):	<0.05%
6.	Vertical Joint Sag (ANSI A118.3):	Pass
7.	VOC Content:	0.031 g/L
8.	Total VOC Emissions:	≤0.22 mg/m^3

9. Cured Epoxy Grout to be chemically and stain resistant to ketchup, mustard, tea, coffee, milk, soda, beer, wine, bleach (5% solution), ammonia, juices, vegetable oil, brine, sugar, cosmetics, and blood, as well as chemically resistant to dilute acids and dilute alkalis.

(Basis of Design: LATICRETE SPECTRALOCK® PRO Premium Grout) equal products from Mapei or Sika, as noted.**

2.6 INSTALLATION ACCESSORIES

A. SEALANTS
   1. Compatibility: Provide elastomeric sealants, joint fillers, and other related materials that are compatible with one another and with joint substrates for project performance conditions; color shall match wall tile grout color.
   2. Masonry / Silicone Sealant: Impregnating masonry sealer for interior and exterior manufactured stone surfaces and grout or ASTM C 920; Type S; Grade NS; Class 25; Uses NT, G, A, and O (for nonporous substrates) with added fungicide.

B. EDGE PROTECTION AND TRANSITION PROFILES
   1. Outside corners: Bullnose edge protection-1/4" radius (Schluter RONDEC or approved equal)
      a. Installed per manufacturers recommendations with connectors and end caps.
      b. Stainless steel 304
   2. Top of tile edge: -shaped profile with 1/8" wide top section and vertical wall section that together form the visible surface , integrated trapezoid-perforated anchoring leg, and integrated grout joint spacer. (Schluter DB or approved equal)
      a. Installed per manufacturers recommendations with connectors and end caps.
      b. Stainless steel 304
   3. Floor to wall transition – cove shaped profile providing a 23/32" radius for maintenance and hygienic requirements (Schluter DILEX-EHK or approved equal)
      a. Installed per manufacturers recommendations with connectors and end caps.
      b. Stainless steel 304

C. Tile Leveling System-Leveling system made up of cap and clips in order to eliminate lippage. Installed per manufacturers recommendations.
   1. Raimondi RLS Vite or approved equal.
   2. RTC-Spin doctor
   3. Lev tec

2.07 MISCELLANEOUS MATERIALS

A. Cementitious Backer Units: See section 09252
B. Tile Cleaner: Product specifically acceptable to tile manufacturer and grout manufacturer for application indicated and as recommended by National Tile Promotion Federation or Ceramic Tile Institute.
C. Grout release: A temporary, water soluble, pre-grout coating. It provides protection against grout and mortar staining and eases grout clean up. Apply per manufacturer's recommendations after tile is applied but prior to grouting.

PART 3 – EXECUTION

3.1 SUBSTRATE EXAMINATION

A. Verify that surfaces to be covered with ceramic tile, mosaics, pavers, brick, masonry veneer, stone, trim or waterproofing are:
   1. Sound, rigid and conform to good design/engineering practices;
   2. Systems, including the framing system and panels, over which ceramic tile will be installed shall be in conformance with the North Carolina Building Code (NCBC 2018) for commercial applications, or applicable building codes.
   3. Clean and free of dust, dirt, oil, grease, sealers, curing compounds, laitance, efflorescence, form oil, loose plaster, paint, and scale;
   4. For thin-bed Ceramic tile installations when a cementitious bonding material will be used, including medium bed mortar: maximum allowable variation in the tile substrate – for tiles with edges shorter than 15" (375mm), maximum allowable variation is ¼" in 10' (6mm in 3m) from the required plane, with no more than 1/16" variation in 12" (1.5mm variation in 300mm) when measured from the high points in the surface. For tiles with at least one edge 15" (375mm) in length, maximum allowable variation is 1/8" in 10' (3mm in 3m) from the required plane, with no more than 1/16" variation in 24" (1.5mm variation in 600mm) when measured from the high points in the surface. For modular substrate units, such as exterior glue plywood panels or adjacent concrete masonry units, adjacent edges cannot exceed 1/32"

(0.8mm) difference in height. For thick bed (mortar bed) Ceramic tile and stone installations, and self-leveling methods; maximum allowable variation in the installation substrate to be (1/4" in 10' (6mm in 3m).

5. To fully evacuate water, shower pan membranes and bonded waterproofing membranes in wet areas must slope to and connect with a drain. Plumbing code typically requires membranes to be sloped a minimum of ¼" per ft. (6mm per 300mm) and extend at least 3" (75mm) above the height of the curb or threshold. Account for the perimeter floor height required to form adequate slopes. Membranes must be installed over the other horizontal surfaces in wet areas subject to deterioration, like shower seats. They must be sloped and configured so as to direct water to the membrane connected to the drain. The weep holes of clamping ring drains enable water to pass from the membrane into the plumbing system. Crushed Ceramic tile or stone, or other positive weep protectors, placed around/over weep holes help prevent their blockage. To form a watertight seal, membranes must have adequate contact with the clamping ring of the drain or with the bonding area of an integrated bonding flange.
6. Not leveled with gypsum or asphalt based compounds
7. For substrates scheduled to receive a waterproofing and/or crack isolation membrane, maximum amount of moisture in the concrete/mortar bed substrate should not exceed 5 lbs./1,000 ft^2 / 24 hours (283 $\mu g/s \cdot m^2$) per ASTM F1869 or 75% relative humidity as measured with moisture probes per ASTM F2170. Consult with finish materials manufacturer to determine the maximum allowable moisture content for substrates under their finished material. Please refer to LATICRETE TDS 183 "Drying of Concrete" and TDS 166 "LATICRETE and Moisture Vapor Emission Rate, Relative Humidity and Moisture Testing of Concrete", available at www.laticrete.com, for more information.
8. Dry as per American Society for Testing and Materials (ASTM) D4263 **"Standard Test for Determining Moisture in Concrete by the Plastic Sheet Method."**

B. Concrete surfaces shall also be:
   1. Cured a minimum of 28 days at 70°F (21°C), including an initial seven (7) day period of wet curing;
   2. Wood float finished, or better, if the installation is to be done by the thin bed method;

C. Advise General Contractor and Architect of any surface or substrate conditions requiring correction before tile work commences. ***Beginning of work constitutes acceptance of substrate or surface conditions.***

3.2 INSTALLATION ACCESSORIES – CERAMIC TILE

A. ***Waterproofing and Crack Isolation Membrane (Liquid-Applied):*** for floors
Install waterproofing and crack isolation membrane in compliance with current revisions of ANSI A108.1 (2.7 Waterproofing), ANSI A108.13, and ANSI A108.17. Review the installation and plan the application sequence. Pre-cut Fabric (if required), allowing 2" (50mm) for overlap at ends and sides to fit the areas as required. Roll up the pieces for easy handling and placement. Shake or stir product as required before using.

Pre-Treat Cracks and Joints - Fill all substrate cracks, cold joints and control joints to a smooth finish using a latex-fortified thin-set. Alternatively, a liberal coat* of crack isolation membrane applied with a paint brush or trowel may be used to fill in non-structural joints and cracks. Apply a liberal coat* of crack isolation membrane approximately 8" (200mm) wide over substrate cracks, cold joints, and control joints using a paint brush or heavy napped paint roller.

Pre-Treat Coves and Floor/Wall Intersections - Fill all substrate coves and floor/wall transitions to a smooth finish and changes in plane using a latex-fortified thin-set. Alternatively, a liberal coat* of crack isolation membrane applied with a paint brush or trowel may be used to fill in cove joints and floor/wall transitions <1/8" (3mm) in width. Apply a liberal coat* of crack isolation membrane approximately 8" (200mm) wide over substrate cracks, cold joints, and control joints using a paint brush or heavy napped paint roller.

Pre-Treat Drains - Drains must be of the clamping ring type, with weepers as per ASME A112.6.3. Apply a liberal coat* of crack isolation membrane around and over the bottom half of drain clamping ring. Cover with a second liberal coat of crack isolation membrane. When the crack isolation membrane dries, apply a bead of high-performance silicone sealant where the crack isolation membrane meets the drain throat. Install the top half of drain clamping ring.

Pre-Treat Penetrations - Allow for a minimum 1/8" (3mm) space between drains, pipes, lights, or other penetrations and surrounding Ceramic tile, stone or brick. Pack any gaps around pipes, lights or other penetrations with a latex-fortified thin-set. Apply a liberal coat* of crack isolation membrane around penetration opening. Cover the first coat with a second liberal coat* of crack isolation membrane. Bring

crack isolation membrane up to level of tile or stone. When crack isolation membrane has dried to the touch seal with high-performance silicone sealant

Main Application - Allow any pre-treated areas to dry to the touch. Apply a liberal coat* of crack isolation membrane with a paint brush or heavy napped roller over substrate including pre-treated areas and allow to dry to the touch. Install another liberal coat* of crack isolation membrane over the first coat. Let the top coat of crack isolation membrane dry to the touch approximately 1 – 2 hours at 70°F (21°C) and 50% RH. When the top coat has dried to the touch inspect the surface for pinholes, voids, thin spots or other defects. crack isolation membrane will dry to an olive green color when fully cured. Use additional crack isolation membrane to seal any defects.

Movement Joints - Apply a liberal coat* of crack isolation membrane, approximately 8" (200mm) wide over the areas. Then embed and loop the 6" (150mm) wide LATICRETE Waterproofing/Anti-Fracture Fabric and allow the crack isolation membrane liquid to bleed through. Immediately apply a second coat of crack isolation membrane.

*** Dry coat thickness is 20 – 30 mil (0.02 - 0.03" or 0.5 - 0.8mm); consumption per coat is approximately 0.01 gal/ft^2 (approx. 0.4 L/m^2); coverage is approximately 100 ft^2 /gal (approx. 2.5 m^2/ L). Waterproofing/Anti-Fracture Fabric can be used to pre-treat cracks, joints, curves, corners, drains, and penetrations with** crack isolation membrane

Protection - Provide protection for newly installed membrane, even if covered with a thin-bed ceramic tile, stone or brick installation against exposure to rain or other water for a minimum of 2 hours at 70°F (21°C) and 50% RH. For temperatures between 45°F and 69°F (7°C to 21°C) allow a minimum 24 hour cure period.

Flood Testing - Allow membrane to cure fully before flood testing, typically a minimum 2 hours at 70°F (21°C) and 50% RH. Cold conditions will require a longer curing time. For temperatures between 50°F and 69°F (10°C to 21°C) allow a minimum 24 hour cure period prior to flood testing.

B. ***Waterproofing (Sheet Membrane): for walls***

Measure and cut all of the waterproofing sheet membrane sections and Sealing Tape strips to the proper size before mixing the substrate appropriate thin-set.

Mix the thin-set to a fairly wet consistency but still able to hold a notch. Dampen excessively dry porous surfaces in order to prevent premature drying and skinning of the thin-set. If skinning does occur remove thin-set and reapply using fresh mortar.

Pre-Treating (Corners and Coves): To create the watertight system, the installation process will rely on the layering of components; start with the corners: Apply thin-set mortar with a ¼"x 3/16" (6 mm x 5 mm) V-notched trowel. Press the waterproofing sheet membrane pre-formed corner firmly into the thin-set. Remove any trapped air and guarantee full adhesion to the material by spreading the thin-set from the inside of the corner out using a trowel or straightedge with rounded corners. Continue with thin-set along the floor-to-wall transition from the corner outward for the first strip of waterproofing sheet membrane Sealing Tape. Overlap the corners by 2" (50 mm). Lay the tape and remove all air pockets and excess material as with the corner piece. For any sections where two strips of waterproofing sheet membrane Sealing Tape will be joined, be certain to overlap the material by 2" (50 mm). Continue with these steps around the perimeter of the installation. Treat the vertical corners with the Sealing Tape next in the same manner as the floor-to-wall transitions were installed. Overlap the corners by 2" (50 mm).

Pre-Treating (Penetrations): Treat pipe penetrations and mixing valves by applying thin-set mortar with a ¼"x 3/16" (6 mm x 5 mm) V-notched trowel. Slide the appropriate collar over the pipe or mixing valve and press firmly into the thin-set. The urethane rubber will seal around the pipe or mixing valve. Remove any trapped air and guarantee full adhesion to the material by spreading the thin-set from the inside out using a trowel or straightedge with rounded corners.

Main Application: Important, there should not be excessive overlapping. For example, at the corner, the waterproofing sheet membrane Sealing Tape should overlap the waterproofing sheet membrane Preformed Corner but not the adjacent waterproofing sheet membrane Sealing Tape. Continue the same method to install the first waterproofing sheet membrane section on the wall. Start in the completed corner and work

your way out from the corner to the edge of the installation. Apply the thin-set to the surface of the wall with the ¼"x 3/16" (6 mm x 5 mm) V-notched trowel. If the surface is uneven, use a square-notched trowel with a wider tooth up to 3/8" (9 mm). Be sure to comb all of the thin-set in the same direction. Install the first length of sheet membrane. It may be easiest to unroll it up the wall or in the direction that you combed the thin-set. Remember to overlap the membrane by a minimum of 2" (5 cm). Be certain to leave at least ¼" (6mm) of space from the floor. Smooth the section of waterproofing sheet membrane with a flat trowel or roller from the middle towards the outside edges to assure that no air is trapped underneath. Follow the direction that the thin-set was combed onto the substrate. Use short, firm strokes to press out all of the excess thin-set and trapped air. Carefully remove or spread the excess thin-set over the seams. Apply the thin-set for the next length of waterproofing sheet membrane section. Roll the next length upwards; smoothing it as it is pressed into the thin-set. If a bulge or crease appears during the unrolling, it is OK. Simply peel the section carefully away from the wall and reapply it so that it is flat. The sections are to be well-pressed; the use of a roller is recommended but this can also be accomplished with a flat trowel. Squeeze out any extra thin-set at the seams; remove the excess or spread it uniformly down the seam. The remaining lengths can now be installed in this same manner. Best practice; sections of waterproofing sheet membrane should be butt- jointed and the seam between the waterproofing sheet membrane sections should be covered with Sealing Tape installed with the appropriate thin-set. Make sure that the Sealing Tape overlaps each waterproofing sheet membrane section by a minimum of 2" (5 cm). The floor should be the last section installed. NOTE: Sections of waterproofing sheet membrane may also be shingled (overlapped) during installation without the need for Sealing Tape. The top section must overlap a minimum of 2" (5cm) onto the bottom section of Sheet Membrane. If the waterproofing sheet membrane is damaged after installation apply a patch of the Sheet Membrane installed with the appropriate thin-set. The patch must overlap the damaged area by a minimum of 2" (5 cm). Tiling can begin immediately after installation when a flood test is not required.

Control Joints: Ceramic tile, stone and brick installations must include sealant filled joints between the ceramic tile, stone or brick which is over any control joints in the substrate. However, the sealant filled joints can be offset horizontally by as much as one tile width from the substrate control joint location to coincide with the grout joint pattern.

Movement Joints: Ceramic tile, stone and thin brick installations must include expansion joints at coves, corners, other changes in substrate plane and over any expansion joints in the substrate. Expansion joints in ceramic tile, stone or brickwork are also required at perimeters, at restraining surfaces, at penetrations and at the intervals described in the Tile Council of North America, Inc. (TCNA) Handbook Installation Method EJ171. Use high performance silicone sealant and backer rod.

C. ***Adjusting*:** Correction of defective work for a period of one (1) year following substantial completion, return to job and correct all defective work. Defective work includes, without limitation, tiles broken in normal abuse due to deficiencies in setting bed, loose tiles or grout, and all other defects which may develop as a result of poor workmanship.

3.3 INSTALLATION – CERAMIC TILE

A. ***General:*** Install in accordance with current versions of American National Standards Institute, Inc. (ANSI) "**A108 American National Standard Specifications for Installation of Ceramic Tile**" and TCNA **"Handbook for Ceramic, Glass, and Stone Tile Installation**." Cut and fit \stone, neatly around corners, fittings, and obstructions. Perimeter pieces to be minimum half tile, brick or stone. Chipped, cracked, split pieces and edges are not acceptable. Make joints even, straight, plumb and of uniform width to tolerance +/- 1/16" over 8' (1.5mm in 2.4m). Install divider strips at junction of flooring and dissimilar materials.

B. ***Self-Leveling Underlayment:*** Use Primer and high-quality fiber reinforced, cement based free-flowing underlayment, as a self-leveling underlayment to attain proper floor flatness.

C. Surface Preparation - Concrete slabs must have a minimum ICRI concrete surface profile (CSP) of 3. For more detailed ICRI CSP information refer to ICRI Guideline No. 03732. Use of chemicals to remove contaminants or to create a surface profile is not recommended. Use of a sweeping compound is not recommended as they may contain oil which will act as a bond breaker. Additionally, concrete slabs must readily absorb water, be clean, free of oil, wax, grease, sealers, curing compounds, asphalt, paint, deicing agents, dust, dirt, loose surface material and any other contaminant that will act as a bond breaker. In addition, tensile strength testing of the concrete substrate, per ASTM C1583 or ICRI Guideline No. 03739, must show a minimum of 100 psi (0.7 MPa) tensile strength prior to installation of self-leveling underlayment. Any areas that do not meet 100 psi (0.7 MPa) tensile strength must be removed and repaired.

D. General Priming Information: All surfaces must be primed prior to the installation of self-leveling underlayments. Primer is a concentrate and must be diluted per manufacturers requirements. Dilution ratio and application methods vary depending on substrate. Always stir or shake Primer concentrate prior to diluting. Mix primer with clean potable water according to the **manufacturer** chart. Water must always be carefully measured in order to ensure proper dilution is achieved. Use a mixing paddle to thoroughly combine primer and water. Primer can be broom, roller, mop, or spray applied. Substrate temperature must be a minimum 40°F (4°C) during primer application and throughout drying time. Additionally, air temperature must be maintained between 50–90°F (10–32°C) during primer application and throughout drying time. The primed surface must also be protected from weather, water and direct sunlight.

E. All Suitable Substrates: Remove any remaining puddles by brooming and spreading evenly over the surface. Allow the Primer to completely dry for a minimum of 3 – 5 hours at 70°F (21°C) and 50% Relative Humidity. Primer coat is considered dry when a minimum of 3 hours dry time has elapsed, the primer turns from milky white to clear, is dry to the touch, and there is no release of primer from the substrate. Surface may feel slightly tacky. Drying time will vary depending on surface and ambient air conditions. Substrate temperature must be a minimum 40°F (4°C) during primer application and throughout drying time. Additionally, air temperature must be maintained between 50–90°F (10–32°C) during primer application and throughout drying time. Primer must also be protected from weather and direct sunlight. Temperatures below 70°F (21°C) and/or relative humidity above 50% will increase drying time. Insufficient drying or poor film formation will result in pinholes and poor bond strength and may cause self-leveling underlayment to debond. If primer dries within 30 minutes or if a 24 hour period is exceeded after primer application, the surface must be primed again.

F. Protect Primer Application: When walking over new primer application prior to installation of a self-leveling underlayment, shoes must be protected with clean, slip-on type booties. Primed floor must not be opened to trade traffic prior to installation of underlayments If the primed floor becomes contaminated by trade traffic, construction dust, debris, or any other bond inhibiting substance, or is exposed to water/excessive moisture prior to second coat application, the contaminated first coat of primer must be completely removed by shot blasting, scarification or other mechanical means, properly re-primed and allowed to dry.

G. Self Leveling Mixing – mix according to manufacturers requirements. A flow test should always be performed to ensure that the mix is homogeneous and free from separation.

H. Perimeter Isolation Strip - It is essential that all walls and building elements are isolated from the self-leveling underlayment pours to ensure proper expansion allowance against all restraining surfaces. Attach the perimeter isolation strip to the perimeter wall of the entire subfloor, as well as around the perimeter of any protrusions, in order to isolate the floor and wall/restraining surfaces. Temporarily fasten perimeter isolation strip in place with staples masking, duct, or carpet tape. The perimeter isolation strip can then be removed after the tiles have set firm. The joints can then be filled with high performance silicone sealant.

I. Application of self leveling compound - Substrate temperature should be between 40-90°F (4-32°C) during application and air temperature maintained between 50–90°F (10–32°C). Protect areas from direct sunlight. Do not use damp curing methods or curing and sealing compounds. If required to meet level tolerances, survey surface using a digital or electronic leveling device and apply level pegs as required. Adequate ventilation should be provided to ensure uniform drying. Pump or pour blended material onto substrate at an average thickness ranging between 1/8" to 1 1/4" (6–32 mm) for all surfaces. Immediately following placement lightly smooth the surface and pour lines, when not using elevation pins the use of a gauge rake will assist in controlling material depth. Do not expose self-leveling underlayments to rolling dynamic loads, such as forklifts or scissor lifts, for at least 72 hours after installation. Proper application is the responsibility of the user. Coverage will be dependent upon relative rough-ness of substrate.

J. Thin Bed Method (interior adhered veneers): Install latex portland cement mortar in compliance with current revisions of ANSI A108.02 (3.11), A108.1B and ANSI A108.5. Use the appropriate trowel notch size to ensure proper bedding of the tile, brick or stone selected. Work the latex portland cement mortar into good contact with the substrate and comb with notched side of trowel. Spread only as much latex portland cement mortar as can be covered while the mortar surface is still wet and tacky. When installing large format (>8” x 8”/200mm x 200mm) tile/stone, rib/button/lug back tiles, pavers or sheet mounted ceramics/mosaics, spread latex portland cement mortar onto the back of (i.e. ‘back-butter’) each piece/sheet in addition to troweling latex portland cement mortar over the substrate. Beat each piece/sheet into the latex portland cement mortar

with a beating block or rubber mallet to insure full bedding and flatness. Allow installation to set until firm. Clean excess latex portland cement mortar from tile or stone face and joints between pieces.

K. Grouting or Pointing (Interior Adhered Veneers):

1. Chemical Resistant, Water Cleanable Tile-Grouting Epoxy (ANSI A118.3): Follow manufacturer's recommendations for minimum cure time prior to grouting. Store liquid components of grout for 24 hours @ 70-80°F (21-27°C) prior to use to facilitate mixing and application. Substrate temperature must be 40-95°F (4-35°C). Verify joints are free of dirt, debris or grout spacers. Sponge or wipe dust/dirt off tile faces and remove water standing in joints. Apply grout release to face of absorptive, abrasive, non-slip or rough textured Ceramic tile, pavers, bricks, stone or trim units that are not hot paraffin coated to facilitate cleaning. Mix per manufacturer's instructions. Spread using a sharp edged, firm rubber float and work grout into joints. Using strokes diagonal (at 45° angle) to the grout lines, pack joints full and free of voids/pits. Then hold float face at a 90° angle to grouted surface and use float edge to "squeegee" off excess grout, stroking diagonally to avoid pulling grout out of filled joints. Once excess grout is removed, a thin film/haze will be left. Initial cleaning of the remaining film/haze can begin approximately 20 minutes after grouting (wait longer when temperatures are cooler). Begin by mixing one cleaning additive packet with 2 gallons (7.6 L) of clean water in a clean bucket to make cleaning solution. Dip a clean sponge into the bucket and then wring out cleaning solution until sponge is damp. Using a circular motion, lightly scrub grouted surfaces with the damp sponge to loosen grout film/haze. Then drag sponge diagonally over the scrubbed surfaces to remove froth. Rinse sponge frequently and change cleaning solution at least every 50 ft^2 (4.7m^2). Discard sponges as they become "gummy" with residue. Check work as you clean and repair any low spots with additional grout. One (1) hour after finishing first cleaning, clean the same area again following the same procedure but utilizing a clean white scrub pad and fresh cleaning solution. Rinse scrub pad frequently. Drag a clean sponge diagonally over the scrubbed surfaces to remove froth. Use each side of sponge only once before rinsing and change cleaning solution at least every 50 ft^2 (4.7m^2). Allow cleaned areas to dry and inspect tile/stone surface. For persistent grout film/haze (within 24 hours), repeat scrubbing procedure with undiluted white vinegar and clean pad. Rinse with clean water and allow surface to dry. Inspect grout joint for pinholes/voids and repair them with freshly mixed Premium Grout†. *Cautions*: *Do not use undiluted white vinegar on polished marble or limestone unless a test spot in an inconspicuous area indicates no change in finish appearance; do not use acid cleaners on epoxy grout less than 7 days old.*

L. Expansion and Control Joints: Provide control or expansion joints as located in contract drawings and in full conformity, especially in width and depth, with architectural details.

1. Substrate joints must carry through, full width, to surface of tile, brick or stone.
2. Install expansion joints in tile, brick or stone work over construction/cold joints or control joints in substrates.
3. Install expansion joints where tile, brick or stone abut restraining surfaces (such as perimeter walls, curbs, columns), changes in plane and corners.
4. Joint width and spacing depends on application - follow TCNA **"Handbook for Ceramic, Glass, and Stone Tile Installation"** Detail "EJ-171 Expansion Joints" or consult sealant manufacturer for recommendation based on project parameters.
5. Joint width: ≥ ⅛"
6. Joint width: depth ~2:1 but joint depth must be ≥ ⅛" (3mm) and ≤ ½" (12mm).
7. Layout (field defined by joints): 1:1 length: width is optimum but must be ≤ 2:1. Remove all contaminants and foreign material from joint spaces/surfaces, such as dirt, dust, oil, water, frost, setting/grouting materials, sealers and old sealant/backer. Use Primer for underwater and permanent wet area applications, or for porous stone (e.g. limestone, sandstone etc…) installations. Install appropriate backing material (e.g. closed cell backer rod) based on expansion joint design and as specified in section 07 92 00. Apply masking tape to face of tile, brick or stone veneer. Use caulking gun, or other applicator, and completely fill the joints with sealant. Within 5-10 minutes of filling joint, 'tool' sealant surface to a smooth finish. Remove masking tape immediately after tooling joint. Wipe excess sealant off all surfaces immediately.

***M. Adjusting*:** Correction of defective work for a period of one (1) year following substantial completion, return to job and correct all defective work. Defective work includes, without limitation, tiles broken in normal abuse due to deficiencies in setting bed, loose tiles or grout, and all other defects which may develop as a result of poor workmanship.

3.4 CLEANING

Clean excess mortar/epoxy from veneer surfaces with water before they harden and as work progresses. Do not contaminate open grout/caulk joints while cleaning. Sponge and wash veneers diagonally across joints.

Do not use acids for cleaning. Polish with clean dry cloth. Remove surplus materials and leave premises broom clean.

3.5 PROTECTION

A. Protect finished installation. To avoid damage to finished tile work, schedule floor installations to begin only after all structural work, building enclosure, and overhead finishing work are completed.
B. Keep all traffic off finished tile floors until they have fully cured. Builder shall provide up to ¾" (19mm) thick plywood or OSB protection over non-staining Kraft® paper to protect floors after installation material shave cured. Covering the floor with polyethylene or plywood in direct contact with the floor may adversely affect the curing process of grout and latex/polymer fortified portland cement mortars.
C. Due to the slow rate of portland cement hydration and strength development at low temperatures, protect installations exposed to these conditions from traffic for longer than normal periods. Protection applies to the substrate, the installation of adhesives and joint grouts, post-installation (rain and temperature protection) until suitable cure, and also the storage and handling of the cladding material. Extend period of protection of tile work at lower temperatures, below 60°F (15°C), and at high relative humidity (>70% R.H.) due to retarded set times of mortar/adhesives. For every 18°F (10°C) below 70°F (21°C) cementitious and epoxy materials take twice as long to cure. Large format tiles and stones also require longer curing periods in cooler temperatures. Keep all traffic off of finished work until full cure. Suitable protection is to be included in the scope of work. Each component must reach a proper cure prior to installing the subsequent installation product.
D. Tent / shade and heat areas that will be subjected to the elements or freezing temperatures during installation and cure periods.
E. Keep floors installed with epoxy adhesive closed to traffic for 24 hrs. at 70°F (21°C), and to heavy traffic for 48 hours @ 70°F (21°C) unless instructed differently by manufacturer. Use kneeling boards, or equivalent, to walk/work on newly tiled floors.
F. Replace or restore work of other trades damaged or soiled by work under this section.

PART 4 – HEALTH AND SAFETY

The use of personal protection such as rubber gloves, suitable dust masks, safety glasses and industrial clothing is highly recommended. Discarded packaging, product wash and waste water should be disposed of as per local, state or federal regulations.

END OF SECTION

All references are the intellectual property of their respective owners:

TCNA Handbook for Ceramic, Glass, and Stone Tile Installation. Tile Council of North America, Inc. Anderson, SC.

American National Standard Specifications for Installation of Ceramic Tile. Tile Council of North America, Inc. Anderson, SC.

Annual Book of ASTM Standards. American Society for Testing and Materials. West Conshohocken, PA, 2001.

American National Standard Specifications for Ceramic Tile (ANSI A137.1). Tile Council of North America, Inc. Anderson, SC.

American National Standard Specifications for Glass Tile (ANSI A137.2). Tile Council of North America, Inc. Anderson, SC.

American National Standard Specifications for Glass Tile (ANSI A137.3). Tile Council of North America, Inc. Anderson, SC.

ISO 13007 Ceramic Tiles – Grouts and Adhesives, International Organization for Standardization (ISO), Geneva, Switzerland.

Floor and Trench Drains - ASME A112.6.3. American Society of Mechanical Engineers. New York, NY,

SECTION 09900 - PAINTING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Painting and finishing of exposed exterior items and surfaces.
   2. Painting and finishing of exposed interior items and surfaces.

1.02 DEFINITIONS

A. DFM (dry film mils): Thickness, measured in mils, of a coat of paint in the cured state.

1.03 SUBMITTALS

A. Product Data: Manufacturer's technical data sheets for each coating.
B. Color and Texture Samples:
   1. Provide for each coating system, color, and texture and applied to representative substrate samples.
      a. Prepare samples to show bare, prepared surface and each successive coat.
      b. Label each sample with coating name and color.
   2. Miscellaneous substrates: 12-by-12-inch hardboard.
   3. Concrete & masonry: 8-inch square samples.
   4. Wood: 8-inch square samples for surfaces; 8-inch long samples for trim.
   5. Metal: 5-by-7-inch samples.

1.04 QUALITY ASSURANCE

A. Materials: All coating materials required by this section shall be provided by a single manufacturer, unless otherwise required or approved.
B. Applicator: Firm with successful experience in painting work similar in scope to 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.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials in manufacturer's original containers bearing coating name and color, material composition data, date of manufacture, legal notices if applicable, and mixing, thinning, and application instructions.

1.06 PROJECT CONDITIONS

A. Apply coatings only under the following environmental conditions:
   1. 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, or longer if required to obtain fuel cure as indicated by manufacturer's instructions.

1.07 COORDINATION

A. Coordination: Where special coatings will be applied over shop coatings specified in other sections, coordinate work of such other sections to ensure that only approved, compatible primers are applied.

1.08 MAINTENANCE STOCK

A. At time of completing application, deliver stock of maintenance material to the owner. Furnish not less than one properly labeled and sealed 1-gallon can of each type of finish coat of each color, taken from lots furnished for the work.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. The brand-name products listed in the schedule at the end of this section and made by the following manufacturer of Low or No V.O.C. paints are the basis of the contract documents:
   1. Sherwin Williams Company - Health Spec.

B. Products of the following manufacturers or approved equal, provided they comply with requirements of the contract documents, will be among those considered in accordance with standard substitution procedures:
   1. Benjamin Moore & Company - Pristine EcoSpec.
   2. The Glidden Company* - Lifemaster.

2.02 PRODUCTS

A. Colors:
   1. For multicoat systems, apply each coat using a successively darker tint or shade, unless approved otherwise.
   2. Top coat colors: To be determined by owner/architect.

B. **Lead Content:**
   1. **Not more than 0.06 percent lead** by weight (calculated as lead metal) in the total nonvolatile content of the paint or the equivalent measure of lead in the dried film.
   2. Exception: Where permitted by applicable regulations.

PART 3 - EXECUTION

3.01 INSPECTION

A. Verify that surfaces and conditions are ready for work in accordance with coating manufacturer's recommendations.

3.02 SURFACE PREPARATION

A. Apply coatings to surfaces that are clean and properly prepared in accordance with manufacturer's instructions. Remove dirt, dust, grease, oils, and foreign matter. Prepare surface for proper texture necessary to optimum coating adhesion and intended finished

appearance. Plan cleaning, preparation, and coating operations to avoid contamination of freshly coated surfaces.

1. Do not apply coatings to labels that identify equipment, fire-resistance ratings, etc.
2. Remove hardware, cover plates, and similar items before applying coatings.
3. Provide protection for non-removable items not scheduled for coating. After application of coatings, install removed items. Use only skilled workmen for removal and replacement of such items.
4. Protect surfaces not scheduled for coating. Clean, repair, or replace to the satisfaction of the Engineer any surfaces inadvertently spattered or coated.
5. Allow substrate to dry thoroughly. Test for moisture in accordance with coating manufacturer's recommendations before applying coatings.
6. Intricate fabricated shapes may be pickled in lieu of hand or power tool cleaning.
7. Before hand or power tool cleaning, remove visible oil, grease, soluble welding residue, and salts by solvent cleaning. After hand or power tool cleaning, re-clean surfaces if necessary.
8. Before touching up coatings damaged by handling or welding, re-prepare damaged surfaces.

3.03 MIXING AND THINNING

A. Remove and discard any skin formed on surface of coatings in containers. Discard any containers where skin comprises 2 percent or more of the remaining material. Do not add thinner except as specifically recommended (not merely permitted) by the coating manufacturer for proper coating application under the circumstances prevailing at the project site when application equipment recommended by the coating manufacturer is employed. Use only the quantities and the types of thinner recommended.

3.04 APPLICATION

A. General:
   1. Apply coatings in accordance with coating manufacturer's instructions and using application method best suited for obtaining full, uniform coverage of surfaces to be coated.
   2. Apply each coat to achieve the dry film thickness per coat recommended by the coating manufacturer. Application rates in excess of those recommended and fewer numbers of coats than specified will not be accepted.
   3. Completed coatings shall be free of defects such as runs, sags, variations in color, lap or brush marks, holidays, and skips.
   4. Apply coatings according to the schedule at the end of this section and as otherwise indicated. Coat all similar surfaces not specifically mentioned unless specifically exempted.
   5. Coat front and back of miscellaneous items such as covers, access panels, and grilles. Apply fully finish coats behind movable items of furniture and equipment before installation. Apply prime coat only behind non-movable items of furniture and equipment before installation.
   6. Sand gloss coats before applying subsequent coatings.
B. Remove coatings not in compliance with this specification, re-clean and re-prepare surfaces as specified, and apply coatings to comply with the contract documents.
C. Scheduling:
   1. Apply first coat of material to properly prepared surfaces without delay.
      a. Apply successive coats within the time limits recommended by the manufacturer.

3.05 PRIME COATS

A. General:
   1. Field apply bottom coats scheduled except where the contract documents require shop coating of ferrous metals.
   2. Ferrous metals that have not been shop primed shall be field primed promptly after arrival at the site or shall be stored away from the effects of weather.
   3. Re-prepare and retouch damaged prime coats using approved, compatible primer.

B. Primers for Wood and Wood Products:
   1. Apply first coat to wood upon receipt at the site and before wood is exposed to sun or rain.
   2. Back-prime concealed surfaces and cut edges of exterior wood trim prior to installation.

3.06 FINISH COATS

A. Number of Coats and Minimum Coating Thickness:
   1. Apply not less than the number of coats indicated.
   2. Apply each coat to achieve not less than the dry film thicknesses indicated per coat.
   3. Apply additional coats at no additional cost to the owner when necessary to achieve complete hiding, uniform texture, or uniform sheen and appearance.

3.07 CLEANING AND PROTECTION

A. Cleaning:
   1. Clean work area on a daily basis; dispose of spent materials and empty containers. If requested, turn over the Engineer all empty coatings containers used during the course of each day.
   2. Remove all trace of coatings from adjacent surfaces not scheduled to be coated. Remove by appropriate methods that do not damage surfaces.

B. Protection:
   1. Protect work against damage until fully cured. Provide signs identifying wet surfaces until surfaces are adequately cured.
   2. Shortly before final completion of the project, examine surfaces for damage to coatings and restore coatings to new, undamaged condition.
   3. Touch-up of minor damage will be acceptable where result is not visibly different from surrounding surfaces. Where result is different either in color, sheen, or texture, recoat entire surface.

3.08 SCHEDULE OF COATINGS FOR INTERIOR NONTRAFFIC SURFACES

A. **Gypsum Wallboard: Walls.**
   1. Latex acrylic, Eggshell finish.
      a. Bottom coat: Airless High-Build Flat Interior Primer / Finish; 1.1DFM.
      b. Intermediate coat: Same as top coat.
      c. Top coat: High Performance Waterborne Acrylic Eggshell Enamel (color to be determined)

B. **Gypsum Wallboard: Ceilings.**
   1. Latex acrylic, Eggshell finish.
      a. Bottom coat: Airless High-Build Flat Interior Primer / Finish; 1.1DFM.
      b. Intermediate coat: Same as top coat.
      c. Top coat: High Performance Waterborne Acrylic Eggshell Enamel (color to be determined)

C. **Wood: doors, trim, display cabinet, shelving.**
   1. Varnish, satin
      a. Stain: Interior Oil Wood Finishing Stain, (color to be selected).

b. Bottom and intermediate coats: WoodPride 1908 Interior Polyurethane Satin Varnish.
c. Top coat: Interior Polyurethane Satin Varnish.

D. **Wood: Windows, ceiling, trim, shelving.**
1. Latex acrylic, Semi-Gloss finish.
a. Bottom coat: Airless High-Build Flat Interior Primer / Finish; 1.1DFM.
b. Intermediate coat: Same as top coat.
c. Top coat: High Performance Waterborne Acrylic Semi-gloss Enamel (color to be determined)

E. **Steel Door frames**
1. Latex acrylic, Semi-Gloss finish.
a. Bottom coat: Airless High-Build Flat Interior Primer / Finish; 1.1DFM.
b. Intermediate coat: Same as top coat.
c. Top coat: High Performance Waterborne Acrylic Semi-gloss Enamel (color to be determined)

F. **Gypsum Wallboard: Wet Walls.**
1. Epoxy, Eggshell finish.
a. Bottom coat: Airless High-Build Flat Interior Primer / Finish (SW ProMar 220 or equal); 1.1DFM.
b. Intermediate coat: Same as top coat.
c. Top coat: 2 part epoxy (SW Pro Industrial High Performance epoxy or equal) (color to be determined)

3.09 SCHEDULE OF COATINGS FOR EXTERIOR NONTRAFFIC SURFACES

A. **Fiber-Cement: Misc. siding & trim;**
1. Acrylic / Latex, Satin, equal to Duration.
a. Bottom coat: Same as top coat.
b. Top coat: Exterior Acrylic Flat Finish; 1.5 DFM.

B. **Wood-exposed beams, etc;**
1. Acrylic / Latex, Satin, equal to Emerald.
a. Bottom coat: Same as top coat.
b. Top coat: Exterior Acrylic Flat Finish; 1.5 DFM.

C. Tongue and Groove Ceiling
1. Polyurethane Semi-transparent Stain, equal to Woodscapes.
a. Bottom coat: Stain-two coats.
b. Top coats (2): Exterior Polyurethane Satin Finish; 1.5 DFM.

3.10 SCHEDULE OF PAINT COLORS

TO BE DETERMINED.

END OF SECTION 09900

THIS PAGE LEFT BLANK INTENTIONALLY.

SECTION 10100 - VISUAL DISPLAY BOARDS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Tack boards, see Detail on sheet A11 and Section 06200-Finish Carpentry.

1.02 SUBMITTALS

A. Product Data:
   1. Manufacturer's technical data and Manufacturer's installation and breaking-in instructions.
   2. Submit shop drawings of Display Case with wood frame, tack board, hardware, and glazing.

1.03 PROJECT CONDITIONS

A. Environmental Requirements:
   1. Install boards only when interior air and substrates have reached equilibrium moisture and temperature approximating that of normal occupied conditions.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Natural Cork Tack Boards: 4-30"x72" Display Units;
   1. Seamless, ¼-inch-thick cork sheet, laminated to ¼-inch-thick hardboard.
B. Wood Trim: See Section 06200-Finish Carpentry and Section 09900-Painting for stain and varnish.
C. Adhesives: As recommended by manufacturer for the materials and substrates to be joined.
D. Felt Seal: ¼" wide continuous felt strip adhered to the sides and bottom face of the Display Case Cedar inner frame to seal out dust when in contact with the Display Case door in the closed position.
E. Non-glare Polycarbonate Plastic sheeting

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces to receive units are true and plumb. Correct inadequate surfaces before installation of boards.
B. Verify that moisture and temperature levels of substrate and environment have stabilized.

3.02 INSTALLATION

A. General:
   1. Install off-site fabricated units as instructed by manufacturer.

2. Provide any necessary installation accessories, including blocking, backing, anchors, etc.
3. Join parts forming neatly fitted hairline joints.

3.03 PROTECTION

A. Cover completed work with building paper or other covering recommended by manufacturer.
B. Protect boards from damage until substantial completion.

END OF SECTION 10100

SECTION 10170 – PLASTIC TOILET COMPARTMENTS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Water-closet compartments and urinal screens (toilet partitions).

1.02 SUBMITTALS

A. Product Data.
B. Shop Drawings.
C. Panel Color Verification Samples: Submit 6-inch-square samples of each panel finish type and color to be installed.
D. Manufacturer's Instructions.
E. Maintenance Data.

1.03 QUALITY ASSURANCE

A. Regulatory Requirements: Products and finished installations to be used by handicapped persons must comply with requirements of the 2012 NC Building Code, Chapter 11, Accessibility, and ICC A117.1-2009.

1.04 COORDINATION

A. Use manufacturer's instructions and data to determine anchorage requirements for panel systems. In a timely manner, distribute to affected installers of related work those system components and anchorage devices provided by panel manufacturer for incorporation into other work.

PART 2 - PRODUCTS

2.01 PANEL SYSTEMS

A. Compartments: Provide compartments fabricated of partitions and erected using the following panel systems at locations indicated on the drawings:
   1. Solid plastic, floor-anchored and overhead-braced.
B. Screen Systems: Provide screens erected using the following panel systems at locations indicated on the drawings:
   1. Solid plastic, wall-hung, floor supported, and overhead braced.

2.02 PANEL MATERIALS

A. Solid Plastic:
   1. Panel material: High-density polyethylene or polypropylene, of homogeneous composition and color throughout, minimum thickness of material 1 inch. Provide seamless panels with eased edges and passing NFPA 286 fire test standard.
   2. Plastic Panel (with privacy option); Continuous mounting brackets in matching colors;
      a. ASI Accurate Partitions, color to be determined.
      b. Bradley Corp., color to be determined.
      c. **Scranton Products.*: "**color to be determined**"**
   3. Hardware, head rails, heat-sink, shoes, and accessories. Manufacturer's standard styles. The following materials will be acceptable:
      a. Chromium-plated nonferrous cast alloy ("Zamac").
      b. Extruded aluminum, anodized and polished and stainless steel shoes.

4. Manufacturers: Products of the following manufacturers or approved equal, provided they comply with requirements of the contract documents, will be among those considered acceptable :
   a. **Scranton Products***:
   b. Bradley Corp.,.
   c. ASI Accurate.

2.03 ACCESSORIES

A. General: Provide hardware and accessories as necessary to properly install panel systems indicated.
   1. **Hinge**: Self-closing, continuous type hinge, surface-mounted; adjustable to permit door to rest at any angle or closed angle.
   2. Latch for non-handicapped compartments: Surface-mounted type, with emergency access feature.
      Provide stop and keeper with rubber bumper.
   3. Latch for handicapped compartments: Surface-mounted sliding latch (for inner side of compartment doors), with emergency access feature, designed for use by handicapped persons.
   4. Provide **door pulls** on both sides of all doors, including handicapped compartments (for outer side of compartment doors): Suitable for use by handicapped persons.
   5. Combination coat hook with rubber bumper: Provide unit of sufficient length to prevent compartment door from striking installed toilet accessories. Locate a minimum of 16" below top of door.
   6. Leveling-and-anchorage devices: Rust-resistant steel devices as recommended by panel manufacturer for installation of panels in conditions indicated.
   7. **Metal shoes**: Stainless steel. Minimum shoe height: 3 inches.
   8. Fasteners: Tamper-resistant rust-proof, exposed fasteners as recommended by panel manufacturer for installation of panels and hardware in conditions indicated. Finish to match hardware.
   9. **Overhead bracing**: Antigrip headrail bracing fabricated from continuous extruded aluminum, clear anodized finish.
   10. **Brackets**: All panels shall be mounted with continuous panel brackets of aluminum, and anchored to continuous wall blocking.
   11. **Heat-Sink**: Provide solid aluminum strips at the bottom of all panels or Class A rated panels.
   12. **Ship lap edges**: reduce sight lines for enhanced privacy

PART 3 - EXECUTION

3.01 INSTALLATION

A. Perform installation in accordance with manufacturer's instructions, except where more restrictive requirements are shown, specified, or are necessary for project conditions.

END OF SECTION 10170

SECTION 10425 - SIGNS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Interior aluminum plaques and aluminum letters.
B. Provide signage as indicated on the signage schedules.

1.02 SUBMITTALS

A. Product Data: Submit for each type of sign specified, including details of construction relative to materials, dimensions of individual components, profiles, and finishes.
B. Shop drawings:
   1. Show fabrication and erection of signs. Include plans, elevations, and large-scale sections of typical members and other components. Show anchors, grounds, layout, reinforcement, accessories, and installation details.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Metal Custom Room Signs: Products of the following manufacturers or approved equal, provided they comply with requirements of the contract documents, will be among those considered acceptable (colors shall match those specified):
   1. AOA Signs, Inc. (336) 679-3344
   2. Sign-A-Rama*; (919) 773-8014
   3. Best Manufacturing Co.
   4. or approved equal.

2.02 RAISED LETTER SIGNS

A. Base Material: **Aluminum plate** with brushed and polished mill finish (Sign Plaques):
   1. Total Thickness: ½ and 1/4 inch.
   2. Height: 1.5 to 7.5” inches.
   3. Edges: Square room title with male/female caricatures on top.
B. Raised Character Size and Style: Routed and painted aluminum:
   1. Comply with applicable provisions of 2012 NC Building Code, Chapter 11, Accessibility, including International Symbol of Accessibility (restrooms, Family), and ANSI/ICC A117.1, including Tactile Characters and Braille.
   2. Character Color: Black
   3. Character Thickness: 1/32 inch minimum raised letters.
   4. Height: 5/8 inch minimum.
   5. Edges: Square.
   6. Character Font: Helvetica.
   7. Character Case: Upper case only.

2.03 INDIVIDUAL METAL LETTERS

A. Material: **Aluminum plate** with brushed mill finish:
   1. Thickness: 1/4 inch.
   2. Height: see drawings.
   3. Edges: Square.
B. Character Style:
   1. Character Font: Helvetica.
   2. Character Case: Upper case only and solid arrows.
   3. Mount individual letters on post for exterior

4. Adhere individual metal letters interior

2.05 ACCESSORIES

A. Mounting Hardware: Stainless steel or aluminum screws and double-sided tape, permanent adhesive.
B. Provide surface mounting for individual interior letters; 2-sets on the Beadboard panels.

2.06 SIGN SCHEDULE:

A. Sign custom aluminum plaques shall read as follows:

Location/Room No.	Copy	Quantity
See plan	FAMILY ROOM**	2
See plan	KNOCK BEFORE ENTRY	2
See plan	WOMEN *	1
See plan	MEN *	1
See plan	Fire extinguisher is located inside	1
See plan	ELECTRICAL	1
See plan	JANITOR	1
See plan	Indiv. Metal letters as shown on drawings	

* Provide the male or female caricature at signs noted above with aluminum figure, mount to wall 2" from the doorway or corners.
** Provide both caricatures (male & female) at signs noted above with aluminum figure, mount to wall 4" from the door opening.

PART 3 - EXECUTION

3.01 INSTALLATION

A. General:
   1. Locate sign units and accessories where indicated, using mounting methods of the type described and in compliance with the manufacturer's instructions.
   2. Install signs level, plumb, and at the height indicated, with sign surfaces free from distortion or other defects in appearance.
   3. Install project sign in locations indicated and using mounting methods indicated.
B. Aluminum Plaques and Individual Letters:
   1. Mount plaques using the standard method recommended by the manufacturer for the type of wall surface indicated (stainless steel or aluminum screws and double sided tape).
   2. Concealed mounting: Use double-sided foam tape and mount plaques at 60" above the floor adjacent to doors 2" from the latch side of the jamb for plaques and center individual letters as indicated.

3.02 CLEANING AND PROTECTION

A. After installation, clean soiled sign surfaces according to the manufacturer's instructions. Protect units from damage until acceptance by the Owner.

END OF SECTION 10425

SECTION 10522 - FIRE EXTINGUISHERS, CABINETS, AND ACCESSORIES

PART 1 - GENERAL

1.01 SUMMARY
A. Fire extinguishers and cabinet located in rooms as shown on drawings.

1.02 SUBMITTALS
A. Product Data.
B. Operating and Maintenance Data.

1.03 QUALITY ASSURANCE
A. Labels: Provide only fire extinguishers which are listed and labeled by Underwriters Laboratories Inc., or Factory Mutual System.

PART 2 - PRODUCTS

2.01 FIRE EXTINGUISHERS
A. Manufacturers: Products of the following manufacturers or approved equal, provided they comply with requirements of contract documents, will be among those considered acceptable:
   1. Fire extinguishers:
      a. Amerex Corporation.
      b. Buckeye Fire Equipment Co.
      c. Fire-End & Croker Corporation.
      d. General Fire Extinguisher Corporation.
      e. Walter Kidde, The Fire Extinguisher Co.
B. Fire Extinguishers:
   1. Rating: 4A:60B:C.
   2. Type: Multipurpose dry chemical (ammonium phosphate).
      a. Stored pressure type.
   3. Cabinet mounted.

2.02 CABINETS AND CABINET ACCESSORIES
A. Manufacturers: Products of the following manufacturers or approved equal, provided they comply with requirements of contract documents, will be among those considered acceptable:
   1. Cabinets and accessories:
      a. J.L. Industries.
      b. Larsen's Manufacturing Company.
      c. Potter-Roemer Division/Smith Industries, Inc.
      d. Samson Metal Products, Inc.
B. Cabinets:
   1. To house one extinguisher.
   2. Size: Inside minimum box dimensions: 24"h. x 9"w. x 6"d.; 4" deep into wall.]
   3. Style: Semi-recessed mounted, protruding not more than 1-1/2 inches from face of wall.
      a. Rolled edge trim.
   4. Single flat door.
      a. Frameless acrylic.
         1. Clear.
      b. Door material: Aluminum, satin anodized.

c. Surface mounted door handle, finished to match door.
d. Friction or roller catch.

5. Trim (box flange or frame): Aluminum, satin anodized.

6. Manufacturer's standard vertical lettering identifying contents of cabinet.
   a. Letters silk screen painted.
   b. Letter color: Red.
7. Box: Aluminum sheet.

C. Hinges: Provide hinges for each door; concealed or continuous type; allow full 180 degree opening of door.

PART 3 - EXECUTION

3.01 PREPARATION

A. Prepare openings for recessed cabinets.

3.02 INSTALLATION

A. Perform installation in accordance with the manufacturer's instructions except where more stringent requirements are shown or specified, and except where project conditions require extra precautions or provisions to ensure satisfactory performance of the work.
B. Install cabinets at locations indicated.
C. Install with door handle not more than 48" above finish floor per the 2012 NC Building Code, Chapter 11, Accessibility, and ICC A117.1.

END OF SECTION 10522

SECTION 10810 - TOILET ACCESSORIES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Toilet Paper Dispenser.
   2. Soap Dispenser
   3. Grab bars).
   4. Sanitary Napkin Disposal Units.
   5. Paper Towel Dispenser and waste receptacles.
   6. Mirrors (2-year warranty.
   7. Hand Dryers.
   8. Mop and broom holders.
   9. Baby Changing station

1.02 SUBMITTALS

A. Product Data.
B. Shop Drawings.
C. Manufacturer's Instructions.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. For each distinct type of toilet accessory, provide accessories fabricated by a single manufacturer.
B. All model numbers specified are products of **Bobrick* Washroom Equipment, Inc.**
C. Only equivalent products of the following other manufacturers complying with the following **Bobrick Washroom Equipment, Inc.** provided they comply with requirements of the contract documents or approved equal, will be considered acceptable:
   1. A & J Washroom Accessories
   2. American Specialties, Inc. (ASI)

2.02 TOILET ACCESSORIES

A. Toilet Paper Dispensers:
   1. Basis of design: Model B-2892 Bobrick.
      a. Classic series surface-mounted twin jumbo roll toilet tissue dispenser, holds 2-rolls 10” diameter, sliding access panel.
B. Automatic Soap Dispenser
   1. Basis of design: AIKE brushed steel AK-1206.
C. Grab Bar 36:
   1. Basis of design: B-6806.99 - 36".
      a. Stainless steel, nonslip gripping surface and concealed mounting, Model B-6806.99, by Bobrick.
D. Grab Bar 42:
   1. Basis of design: B-6806.99 - 42".
      a. Stainless steel, nonslip gripping surface and concealed mounting, Model B-6806.99, by Bobrick.
E. Grab Bar 18:
   1. Basis of design: B-6806.99 - 18".
      a. Stainless steel, nonslip gripping surface and concealed mounting, Model B-6806.99, by Bobrick.

F. Recessed Sanitary Napkin Disposal, if required:
   1. Basis of design: B-4353.
      a. Stainless steel.
      b. Single end compartments.
G. Partition Mounted Sanitary Napkin Disposal:
   1. Basis of design: B-4354.
      a. Stainless steel.
      b. Serves 2-compartments.
H. Recessed Towel Dispenser and Waste Receptacle: 600 C-fold paper towels, 18 gallon waste capacity bottom cabinet, locking doors/cabinets, recessed flush with wall, stainless steel; no sharp edges, seamless wall flanges, concealed piano hinges.
   1. Product: B-43944 manufactured by Bobrick.
   2. LinerMate accessory to be included part-number 43944-134

J&K. Mirrors: Stainless steel framed, ¼" thick float glass mirror (provide a 2-year warranty from mirrored glass from staining or delaminating and frame rusting);.
   1. Sizes: 18' x 28" and 18" x 60".
   2. Frame: Radius edges, with mitered and welded and ground corners, and tamperproof hanging system; burr free satin finish.
   3. Product: Model B-2908 1828 and B-2908 1860 manufactured by Bobrick.
L. Hand Dryers:
   1. Basis of design: Surface mounted sensor hand dryer "Xlerator" Model XL-thin air TA-SB, by Excel
      a. Automatic hand dryer, stainless steel finish.
      b. Mount 48" above finish floor.
M. Mop and Broom Holder:
   1. Basis of design: B-223 x 24" long.
   a. Stainless steel with 3 mop holders.
   b. With 3-spring loaded rubber cam mop/broom holders, Model B-223x24, by Bobrick.

2.03 MATERIALS

A. Stainless steel: Type-304 stainless steel with satin finish, typical for all accessories.
B. Mounting Devices and Fasteners: Provide toilet accessory manufacturer's recommended items for substrates and conditions indicated.

2.04 FABRICATION

A. Manufacturer's Trademarks and Model Numbers: Permanently affix manufacturer's name and model number to unexposed surface of accessory.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Perform installation in accordance with manufacturer's instructions, except where more stringent requirements are shown or specified, and except where project conditions require extra precautions or provisions to ensure satisfactory performance of the work.
B. Accessories Installed for Use by Handicapped Persons: Install as indicated on drawings and in accordance with the 2018 NC Building Code, Chapter 11, Accessibility, and ANSI A117.1.

END OF SECTION 10810

DIVISION 15A - PLUMBING

15010	Basic Plumbing Requirements
15140	Hangers and Supports
15190	Plumbing Identification
15250	Plumbing Piping Insulation
15410	Plumbing Piping
15430	Plumbing Specialties
15440	Plumbing Fixtures
15450	Water Heaters

SECTION 15010 - BASIC PLUMBING REQUIREMENTS

PART I - GENERAL

1.1 GENERAL CONDITIONS

A. The stipulations and conditions stated in this Section, together with all provisions of the "Instructions to Bidders", "General Conditions", "Supplemental General Conditions", and "Special Conditions", hereinbefore set forth, shall apply to this and the other Sections of Division 15A.

1.2 GENERAL REQUIREMENTS

A. The General Requirements hereinafter listed apply to the Plumbing Work Division. If there is any conflict between the General Requirements and the General Conditions, the General Conditions shall take precedence.

1.3 ALTERNATES

A. Carefully examine all alternates at the back of this specification to determine if any work described under the Plumbing Section will be affected thereby.

1.4 INTENT

A. The intent of these drawings and specifications are to describe the installation of a complete, fully adjusted and operational system. Therefore, any items shown on drawings and not specifically called for in the specifications, or any items specified and not specifically indicated or detailed on the drawings, or any items neither specified or shown, but which are reasonably incidental to and commonly required to make a complete job, will be furnished and installed by the Plumbing Contractor at his own expense.

1.5 DEFINITIONS

A. The Plumbing Contractor shall provide all supervision, labor, material equipment, machinery, plant, and any and all other items necessary to complete the plumbing systems. All items of equipment are specified in the singular; however, the Plumbing Contractor shall provide the number of items of equipment as indicated on the drawings, and as required for complete systems.

Where the word "provide" is used, it shall mean "furnish and install complete and ready to use".

1.6 VISIT TO THE SITE

The Plumbing Contractor shall visit the site before submitting his bid so as to be thoroughly familiar with the job conditions and/or peculiarities. No extra payment will be allowed for anything which could have been anticipated from a visit to the site.

1.7 REGULATORY REQUIREMENTS

A. All work under this Section shall be accomplished in strict accordance with State codes. Where these plans and specifications conflict with such codes, the codes shall govern. The Plumbing Contractor shall notify the Architect or Engineer of such conflicts in writing prior to receipt of bids.

1.8 PERMITS AND FEES

A. The Plumbing Contractor shall make all necessary arrangements, obtain all necessary approval,

obtain all permits and pay fees required for the installation of any of the work covered under the Plumbing Work Division of the specifications. Any fees required by any utility companies or municipal authorities for the final connections for these services shall be paid by the Plumbing Contractor under whose work such services appear. Before the job is certified as substantially complete, a certificate of approval from all authorities involved must be obtained and turned over to the Architect/Engineer.

1.9 DRAWINGS AND SPECIFICATIONS

A. The Plumbing Drawings and Specifications are intended to cover all the work enumerated under the respective headings. The drawings are diagrammatic only. No Contractor shall take advantage of conflict or error between Drawings and Specifications, or between General Drawings and Mechanical, Plumbing and/or Electrical Drawings, but shall request a clarification of such from the Architect/Engineer, should this condition exist. If there is insufficient time to issue an Addendum for this clarification, the Plumbing Contractor shall figure on the most expensive of the items in conflict.

B. The Plumbing Contractor shall refer to the Architectural and Structural Drawings and Specifications for the general construction of the building, for floors and ceiling heights, for locations of walls, partitions, beams, etc., and shall be guided accordingly for setting of all sleeves, inserts and equipment. The Plumbing Contractor shall not under any circumstances scale drawings for the location of equipment. The Plumbing Contractor shall verify the locations of all utility services.

C. The Plumbing Contractor shall keep at least one set of corrected Shop and Design Drawings at the site. Drawings are to be current, denoting approved modifications and actual installed departure. Submit drawings to Architect/Engineer before final payment is made.

1.10 SUPERVISION

A. The Plumbing Contractor performing the work specified shall be required to employ a qualified Superintendent or Foreman to continuously supervise the installation of their work, with authorization to act as agent. Contractors: He shall be capable of checking layouts, coordinating and supervising the work, establishing grades and levels, and locating chases, openings, hangers, inserts, sleeves, etc.

PART II - PRODUCTS

2.1 STANDARD PRODUCTS

A. Unless otherwise indicated in writing by the Architect/Engineer, the materials to be provided under this Specification shall be standard products of manufacturers regularly engaged in the production of such equipment and shall be the manufacturer's latest design. All items of the same type or rating shall be identical.

2.2 SUBMITTAL

A. The Plumbing Contractor shall submit, for approval, detailed shop drawings on all major equipment and where requested. No materials or equipment may be delivered to the job site or installed until the Plumbing Contractor has in his possession the approved shop drawing for the particular material or equipment. The Plumbing Contractor shall furnish the number of copies required by the General or Special Conditions of the contract, but no case less than six (6) copies.

B. Submitted material shall be properly labeled indicating specific service for which material or equipment to be used, section and article number of specifications governing, Contractor's name and name of job.

C. Approval of equipment will not relieve the Plumbing Contractor of compliance with the Specifications even if such approval is made in writing, unless the attention of the Engineer is called to the non-complying features by letter accompanying the submittal data. Approval of Submittal Data by the Engineer shall not be construed as a complete check of approval of detailed dimensions, weights, gauges, and similar details with the proposed articles. The conformance with the necessary coordination between the various other Contractors and suppliers shall be solely the responsibility of the Plumbing Contractor and with no additional expense to the Owner.

2.3 SUBSTITUTIONS

A. Manufacturer's lists are to establish a standard of quality and not intended to limit the selection to these manufacturers. All materials and equipment which are essential and have not been specified or shown, shall be new and of the highest grade and quality and free from defect or other imperfections. It should be understood that where the words "furnished and installed" are used, it is intended that the Plumbing Contractor shall purchase and install all materials required.

B. All materials and equipment proposed as substitutes for these specified shall require a ten (10) day prior approval from the Engineer prior to the bid date. No substitutions will be allowed after the ten (10) day period before the bid date.

2.4 PRODUCT HANDLING

A. Equipment and materials shall be properly stored, adequately protected, and carefully handled to prevent damage before and during installation. Equipment and materials shall be handled, stored and protected in accordance with the manufacturer's recommendations and as approved by the Architect/Engineer. Equipment installed with a factory finish shall be fully protected during construction and shall be maintained free of dust, dirt, and foreign matter. Dents and other surface damage shall be repaired or replaced to the satisfaction of the Architect/Engineer at no additional cost to the Owner.

B. The Plumbing Contractor shall clean up and remove from the job site all waste materials, packaging, crating, and refuse resulting from his work on a daily basis.

2.5 MATERIALS AND WORKMANSHIP

A. The Plumbing Contractor shall perform a first class job, both in material and workmanship. None other will be accepted. Deviations from either will be corrected by the Plumbing Contractor at the Plumbing Contractor's expense.

B. The material used throughout the work, except when otherwise noted, shall be new and of the best of its kind. No substitutes shall be used unless approved by the Architect/Engineer. All work shall be executed with a maximum speed consistent with safety and good workmanship.

C. Any equipment furnished by the Plumbing Contractor that is larger than those indicated on the drawings and described in these Specifications or have different electrical characteristics, the increase in cost to the Electrical Contractor for larger wires, conduit, circuit breakers, switches, etc. or for changes in work already installed shall be borne by the instigating Contractor.

PART III - EXECUTION

3.1 EXCAVATION AND BACKFILL

A. The Plumbing Contractor shall preform any and all trench and pit excavation and backfilling required for the installation of his work. Trenches shall be made with the sides vertical and shall be shored where necessary for the protection of men and equipment. All excavation work shall be

done in a careful manner to avoid damage to footers and foundations. The backfilling shall be placed in layers not exceeding 4 inches in depth, wetting each layer as it is placed, and thoroughly compacting each layer with mechanical tamper or other approved means. Any damage done during excavation and backfilling operations to roads, sidewalks, curbs, shrubs, sod, footers, foundations, etc. shall be replaced to its condition prior to construction at no expense to the Owner.

3.2 SCAFFOLDING, RIGGING AND HOISTING

A. The Plumbing Contractor shall furnish all necessary scaffolding, staging, rigging and hoisting required for the completion of his work. All such scaffolding, etc., shall be removed from the premises when its use is no longer required on the job.

3.3 CUTTING AND PATCHING

A. The Plumbing Contractor shall provide all cutting and patching necessary to install the work specified in this section. The patching shall match adjacent surfaces.

B. No structural member shall be cut without the approval of the Engineer, and all such cutting shall be done in a manner directed by him.

3.4 EQUIPMENT SPACE AND ARRANGEMENT

A. The equipment shall fit into the space allotted and shall allow adequate clearance for entry, installation, replacement, servicing, and maintenance. The Plumbing Contractor shall coordinate the work to ensure that equipment may be moved into place without altering building components or other installations. Access space shall not be less than the equipment manufacturer's requirements.

B. These drawings indicate the extent and general arrangement of equipment, piping, and ductwork. If any departures are deemed necessary by the Plumbing Contractor, details of such departures and the reasons therefore shall be submitted to the Architect/Engineer for approval as soon as practicable and within 30 days after award of the contract. No departure shall be made without written approval of the Architect/Engineer.

3.5 DAMAGE TO WORK ALREADY IN PLACE

A. The Plumbing Contractor shall assume full responsibility for any damage done by him, his agents or employees, to any work already in place. Any such damage done shall be repaired at the Contractor's expense by mechanics skilled at their respective trades to the approval of the Architect/Engineer.

3.6 JURISDICTION OF WORK

A. It may become necessary for the Plumbing Contractor to furnish labor or materials which is not generally accepted as part of this trade. In cases of this type, he shall contract the work or shall furnish materials and employ workmen of the trade involved in order not to cause any delay or stoppage of work caused by infringement of trade agreements as to jurisdiction, alleged or actual.

3.7 COORDINATION WITH OTHER TRADES

A. All work shall be coordinated with other trades involved in the construction project. All work shall be carefully laid out in advance to coordinate Architectural, Structural, Mechanical, Plumbing and Electrical features of construction. The Plumbing Contractor shall verify at the site all locations, grades, elevations, and utility service connections indicated. Any conflicts due to lack of proper coordination shall be brought to the attention

of the Architect/Engineer for resolution. The Plumbing Contractor shall make required changes or relocations at no additional cost to the Owner.

B. Installation, inspection, and testing of work above ceilings shall be completed and approved by the Architect/Engineer prior to installation of the specified finished ceilings. However, ceiling suspension system may be installed as required for coordination.

C. The Plumbing Contractor shall consult with the other trades at the start of the work and periodically thereafter, as required to properly coordinate the various items of work, and to avoid interferences. Should any interferences of any nature develop as the work progresses, such interferences shall be resolved and eliminated as directed. The cost of any work directed shall be borne by the Subcontractor or Contractors directed to do this work.

3.8 DIVISION OF WORK

A. This paragraph is intended to show exactly the point of division of work between the Electrical Division and the Plumbing Division.

B. All equipment covered in the Plumbing Division of the specifications shall be furnished, mounted, and aligned under the Plumbing Division. All individual motor starters, unless indicated as part of a motor control center, for this equipment shall be furnished and installed by the Plumbing Contractor.

C. All final electrical connections to equipment covered in the Plumbing Division of the specifications shall be completed under the Plumbing Division.

D. The Electrical Contractor shall provide a disconnect switch or junction box for each item of equipment under Division 16.

E. Electrical equipment and wiring that is provided by the Plumbing Contractor shall be in accordance with the Electrical specification.

3.9 EQUIPMENT INSTALLATION

A. Final connections to equipment, including pipe, duct, and controls, shall be provided under applicable sections of this Division, unless otherwise specified or indicated.

B. Manufacturer's Instructions: Equipment shall be installed as recommended by the manufacturer to conform to the requirements of the particular application, in accordance with these drawings and specifications.

3.10 OPERATION AND MAINTENANCE MANUALS

A. One complete manual as outlined herein shall be submitted for approval before conducting instruction sessions in operation, before systems or equipment tests are performed, and before final or beneficial occupancy.

B. Manuals shall have rigid covers and index tabs for each major piece of equipment, auxiliaries, and systems. The following shall be inscribed on the cover: the words "OPERATION AND MAINTENANCE MANUAL", the name and location of the building, the name of the Section, such as "Plumbing" and the name of the Plumbing Contractor. Two copies of each approved manual shall be submitted to the Owner and one copy shall be submitted to the Architect/Engineer.

C. Each piece of equipment shall be listed and identified with the same name, mark, number, or other identification as noted or scheduled in the Contract Documents.

D. Manuals shall include the following:

1. Complete operating installations, covering start-up and shutdown for all components installed.

2. Legible copies of all shop drawings. Any comments incorporated in "as noted" approvals of shop drawings shall be recorded on the drawings included in the manuals.

3. All equipment Maintenance and Service Manuals.\

E. A complete parts list for each piece of equipment.

F. All descriptive literature for the equipment.

G. Operating characteristics, performance data, ratings, and curves for each piece of equipment.

H. Internal wiring and control diagrams.

I. All other information pertinent to the maintenance and servicing of equipment and systems provided in the project.

J. Name, address, and telephone number for service on each manufacturer's equipment.

3.11 OPERATING INSTRUCTIONS

A. After all equipment and services are in operation, and the Operation and Maintenance Manuals are available, an instruction and training session shall be conducted for the Owner's operating personnel.

B. Instruction sessions shall be conducted during the Owner's normal working periods, and at times and locations satisfactory to the Owner.

3.12 EQUIPMENT START-UP

A. No equipment shall be placed in operation until it has been inspected by a qualified representative of the manufacturer and Certified to be ready for operation. The manufacturer's representative shall supervise the start-up operation and shall be responsible for all adjustments required to meet design conditions. Such services shall be at no additional cost to the Owner.

3.13 GUARANTEE

A. The Plumbing Contractor shall present to the Owner a written guarantee covering his work, including all equipment, material and workmanship. This guarantee shall be against all defects in any of the above work, and shall run for a period of one (1) year from the date of written acceptance of the Contractor's work.

B. Any defective work, equipment, material and/or workmanship that develops within the guarantee period, which is not caused by ordinary wear or abuse by other persons, shall be replaced by the Plumbing Contractor without cost to the Owner.

3.14 FINAL INSPECTION

A. When the entire Contract has been completed and the work is ready for final inspection, the Architect/Engineer or his duly authorized representative will make the inspection. At the time of inspection, the Plumbing Contractor shall demonstrate to the Architect/Engineer that the various

systems and pieces of equipment have been adjusted to operate in accordance with the requirements of the Contract.

3.15 FINAL PAYMENTS

A. All final payments are contingent upon all necessary Certificates and/or Approvals cited above, together with the written Guarantee being presented to the Owner.

END OF SECTION 15010

SECTION 15140 - HANGERS AND SUPPORTS

PART I - GENERAL

1.1 RELATED DOCUMENTS

A. Drawing and General Provisions of the Contract, including the General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes Hangers and Supports for Plumbing Systems Piping and Equipment.

PART II - PRODUCTS

2.1 PIPE HANGERS AND SUPPORTS

A. Hangers: Galvanized carbon steel, adjustable, clevis

B. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.

C. Vertical Support: Steel riser clamp

D. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

C. Shield for Insulated Piping 2 Inches and Smaller: 18 gauge galvanized steel shield over insulation in 180 degree segments, minimum 12 inches long at pipe support.

D. Sheet metal saddles must be ½ the circumference of the insulation, turned up or rounded at the corners to avoid damage to the vapor barrier.

2.2 HANGER RODS

A. Galvanized Steel Hanger Rods: Threaded both ends or continuous threaded.

2.3 FLASHING

A. Metal Flashing: 26 gauge galvanized steel

B. Flexible Flashing: 47 mil thick sheet butyl; compatible with roofing.

C. Flashing shall be compatible with the roofing material and be coordinated with the General Contractor.

2.4 SLEEVES

A. Sleeves for Pipes: Form with schedule 40, galvanized steel pipe

B. Fire Stopping Insulation: Glass fiber type, non-combustible

C. Caulk: Fire Barrier type sealant

2.5 MISCELLANEOUS MATERIALS

A. Structural Steel: ASTM A 36/A 36M, steel plates, shapes, and bars, black and galvanized

B. Bolts and Nuts: ASME B18.10 or ASTM A 183, steel, hex-head, track bolts and nuts

C. Washers: ASTM F 844, steel, plain, flat washers

D. Grout: ASTM C 1107, Grade B, non-shrink, non-metallic

1. Characteristics include post-hardening, volume-adjusting, dry, hydraulic cement-type grout that is non-staining, non-corrosive, non-gaseous and is recommended for both interior and exterior applications.

2. Design Mix: 5000-psi (34.5MPa), 28-day compressive strength

3. Water: Potable

4. Packaging: Pre-mixed and factory-packaged

2.6 ATTACHMENTS

A. Mechanical Anchor Fasteners: Insert-type attachments with pull-out and shear capacities appropriate for supported loads and building materials where used. Permitted in concrete over four (4) inches thick.

B. Weld: Type 22

C. Beam clamps: Types 20, 21, 28 or 29

D. Wood: Wood screws or lag bolts

PART III - EXECUTION

3.1 HANGERS AND SUPPORTS INSTALLATION

A. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure.

B. Install building attachments within concrete or to structural steel. Install additional attachments at concentrated loads, including valves, flanges, guides, strainers, expansion joints ,and at changes in direction of piping.

C. Install hangers and support complete with necessary inserts, bolts, rods, nuts, washers and other accessories.

D. Install hangers and supports to allow controlled movement of piping systems, permit freedom of movement between pipe anchors, and facilitate action of expansion joints, expansion loops, expansion bends and similar units.

E. Install hangers and supports so that piping live and dead loading and stresses from movement will not be transmitted to connected equipment.

F. Support horizontal piping as follows:

PIPE SIZE	HANGER SPACING	MAXIMUM DIAMETER
1/2 to 1-1/4 inch	6'-6"	3/8"
1-1/2 to 2 inch	10'-0"	3/8"
2-1/2 to 3 inch	10'-0"	1/2"
4 to 6 inch	10'-0"	5/8"
Waste Pipe	5'-0"	3/8"

G. Install hangers to provide minimum ½ inch space between finished covering and adjacent work

H. Place a hanger within 12 inches of each horizontal elbow.

I. Use hangers with 1½ inch minimum vertical adjustment

J. Support riser piping independently of connected horizontal piping.

K. Hangers shall be galvanized steel or copper.

L. Pipe strapping will not be allowed.

3.2 FLASHING

A. Provide flashing and counter-flashing where piping penetrates weather-proofed walls, floors and roofs.

B. Flash vent and soil pipes projecting six (6) inches minimum above finished roof surface with lead worked one (1) inch minimum into hub. For pipes through outside walls, turn flanges back into wall and caulk, metal counter-flash and seal.

3.3 SLEEVES

A. Size sleeves large enough to allow for movement due to expansion and contraction. Provide for continuous insulation wrapping.

B. Design hangers without disengagement of supported pipe

C. Where piping penetrates floor, ceiling, or wall, close off space between pipe and adjacent work with fire stopping insulation and caulk seal air-tight. Provide close fitting metal collar or escutcheon covers at both sides of penetration.

D. Install chrome plated steel or stainless steel escutcheons at finished surfaces.

END OF SECTION 15140

SECTION 15190 - PLUMBING IDENTIFICATION

PART I - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes plumbing identification materials and devices.

1.3 QUALITY ASSURANCE

A. Comply with ASME A13.1 for lettering size, length of color field, colors, and viewing angles of identification devices.

1.4 SEQUENCING AND SCHEDULING

A. Coordinate installation of identifying devices after completion of covering and painting where devices are applied to surfaces. Install identifying devices prior to installation of acoustical ceilings and similar concealment.

PART II - PRODUCTS

2.1 MATERIALS

A. Color: Unless specified otherwise, conform with ANSI/ASME A13.1.

1. Plastic Nameplates: Laminated three-layer plastic with engraved black letters on light contrasting background color.

2. Plastic Tags: Laminated three-layer plastic with engraved black letters on light contrasting background color. Tag size minimum 1½ inch diameter.

3. Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings.

4. Underground Plastic Pipe Markers: Bright colored continuously printed plastic ribbon tape of not less than 6 inch wide by 4 mil thick, manufactured for direct burial service.

PART III - EXECUTION

3.1 PREPARATION

A. Degrease and clean surfaces to receive adhesive for identification materials.

3.2 INSTALLATION

A. Plastic Nameplates: Install with corrosive-resistant mechanical fasteners.

B. Plastic Tags: Install with corrosive-resistant chain.

C. Plastic Tape Pipe Markers: Install complete around pipe in accordance with the manufacturer's instructions

D. Underground Plastic Pipe Markers: Install 6 to 8 inches below finished grade, directly above the buried pipe.

E. Equipment: Identify pumps, heat transfer equipment, tanks, and water treatment devices with plastic nameplates. Small devices, such as in-line pumps, may by identified with plastic tags

F. Controls: Identify control panels and major control components outside panels with plastic nameplates.

G. Piping: Identify piping, concealed or exposed, with plastic tape pipe markers. Tags may be used on small diameter piping. Identify service, flow direction, and pressure. Install in clear view and align with axis of piping. Locate identification not to exceed 20 feet on straight runs including risers and drops, adjacent to each valve and "T", at each side of penetration of structure or enclosure, and at each obstruction.

END OF SECTION 15190

SECTION 15250 - PLUMBING PIPING INSULATION

PART I - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes Plumbing Pipe Insulation.
B. All water piping shall be insulated through-out entire building, conditioned and un-conditioned spaces.

1.3 QUALITY ASSURANCE

A. Fire Performance Characteristics: Conform to the following characteristics for insulation including facings, cements, and adhesives, when tested according to ASTM E 84, by UL or other testing or inspecting organization acceptable to the authority having jurisdiction. Label insulation with appropriate markings of testing laboratory.

1. Interior Insulation: Flame spread rating of 25 or less and a smoke developed rating of 50 or less.

2. Exterior Insulation: Flame spread rating of 75 or less and a smoke developed rating of 150 or less.

1.4 SEQUENCING AND SCHEDULING

A. Schedule insulation application after testing of piping systems.

B. Schedule insulation application after installation and testing of heat trace tape.

PART II - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:

1. Flexible Elastomeric Cellular:

a. Armstrong World Industries, Inc.
b. Halstead Industrial Products
c. IMCOA
d. Rubatex Corporation

2.2 FLEXIBLE ELASTOMERIC CELLULAR

A. Material: Flexible expanded closed-cell structure with smooth skin on both sides.

B. Form: Tubular materials conforming to ASTM C 534, Type I.

C. Thermal Conductivity: 0.30 average maximum at 75 degrees F.

D. Coating: Water based latex enamel coating recommended by insulation manufacturer.

2.3 ADHESIVES

A. Flexible Elastomeric Cellular Insulation Adhesive: Solvent-based, contact adhesive recommended by insulation manufacturer.

B. Lagging Adhesive: MIL-A-3316C, non-flammable adhesive in the following Classes and Grades.

1. Class 1, Grade A for bonding glass cloth and tape to un-faced glass fiber insulation, sealing edges of glass fiber insulation, and bonding lagging cloth to un-faced glass fiber insulation.

2. Class 2, Grade A for bonding glass fiber insulation to metal surfaces.

PART III - EXECUTION

3.1 PREPARATION

A. Surface Preparation: Clean, dry, and remove foreign materials such as rust, scale, and dirt.

3.2 INSTALLATION - GENERAL

A. Select accessories compatible with materials suitable for the service. Select accessories that do not corrode, soften, or otherwise attack the insulation or jacket in either the wet or dry state.

B. Apply insulation material, accessories, and finishes according to the manufacturer's printed instructions.

C. Keep insulation materials dry during application and finishing.

D. Apply insulation continuously over fittings, valves and specialties.

E. Apply insulation with a minimum number of joints.

F. Interior Walls and Partitions Penetrations: Apply insulation continuously through walls and partitions, except fire rated walls and partitions.

G. Fire Rated Walls and Partitions Penetrations: Terminate insulation at penetrations through fire rated walls and partitions. Seal insulation ends with vapor barrier coating. Seal around penetration with fire stopping or fire resistant joint sealer.

H. Hangers and Anchors: Apply insulation continuously through hangers and around anchor attachments. Install saddles, shields, and inserts as specified.

1. Inserts and Shields: Cover hanger inserts and shields with jacket material matching adjacent pipe insulation.

3.3 FLEXIBLE ELASTOMERIC CELLULAR INSULATION INSTALLATION

A. Slip insulation on the pipe before making connections wherever possible. Seal joints with adhesive. Where the slip-on technique is not possible, cut one side longitudinally and apply to the pipe. Seal seams and joints with adhesive.

B. Valves, Fittings, and Flanges: Cut insulation segments from pipe or sheet insulation. Bond to

valve, fitting, and flange and seal joints with adhesive.

1. Miter cut materials to cover soldered elbows and tees.

2. Fabricate sleeve fitting covers from flexible elastomeric cellular insulation for screwed valves, fittings, and specialties. Miter cut materials. Overlap adjoining pipe insulation.

3.4 FINISHES

A. Flexible Elastomeric Cellular Insulation: After adhesive has fully cured, apply 2 coats of protective coating to exposed insulation.

3.5 PIPE INSULATION SCHEDULES

PIPING	THICKNESS TYPE	INSULATION IN INCHES
Domestic Hot Water Supply	ELASTOMERIC	1/2
Domestic Hot Water Re-Circulating	ELASTOMERIC	1
Domestic Cold Water	ELASTOMERIC	1/2
"P" Trap at Handicapped Fixtures	ELASTOMERIC	1/2 *

(* provide pre-formed insulation kits for the drain and supply lines)

END OF SECTION 15250

SECTION 15410 - PLUMBING PIPING

PART I - 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 plumbing piping systems to a point shown on the civil drawings. Systems include the following:

1. Potable water distribution, including cold and hot water supply and hot water circulation.

2. Sanitary Drainage and Vent Systems.

1.3 SYSTEM PERFORMANCE REQUIREMENTS

A. Provide components and installation capable of producing piping systems with the following minimum working pressure ratings, except where indicated otherwise:

1. Water Distribution Systems, Below Ground: 150 psig.

2. Water Distribution Systems, Above Ground: 125 psig.

3. Soil, Waste and Vent Systems: 10-foot head of water

PART II - PRODUCTS

2.1 SANITARY SEWER PIPING - BURIED

A. Sch. 40 PVC Pipe: ASTM D2665. Fittings: PVC. Joints: ASTM D2564, solvent weld.

2.2 SANITARY SEWER PIPING - ABOVE GRADE

A. Sch. 40 PVC Pipe: ASTM D2665. Fittings: PVC. Joints: ASTM D2564, solvent weld.

2.3 WATER PIPING - BURIED

A. Copper Tubing: ASTM B88, Type K, annealed. Fittings; ANSI/ASME B16.29, wrought copper. Joints: ANSI/ASTM B32, solder, Grade 95TA.

2.4 WATER PIPING - ABOVE GRADE

A. Copper Tubing: ASTM B88, Type L, hard drawn. Fittings: ANSI/ASME B16.23, cast brass, or ANSI/ASME B16.29, wrought copper. Joints: ANSI/ASTM B32, solder, Grade 95TA.

2.5 MANUFACTURERS

A. Acceptable Manufacturers-Valves:

1. Crane

2. Grinnell

3. Nibco

4. Apollo

2.6 GATE VALVES

A. 150 psig rated, bronze body, lever ball type, Apollo or equal.

PART III - EXECUTION

3.1 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Remove scale and dirt, on inside and outside, before assembly.

C. Prepare piping connections to equipment with flanges or unions.

3.2 INSTALLATION

A. Provide non-conducting dielectric connections wherever jointing dissimilar metals.

B. Route piping in orderly manner and maintain gradient.

C. Install piping to conserve building space and not interfere with use of space.

D. Group piping whenever practical at common elevations.

E. Install piping to allow for expansion and contraction without stressing pipes, joints, or connected equipment.

F. Provide clearance for installation of insulation and access to valves and fittings.

G. Slope water piping and arrange to drain at low points

H. Establish elevations of buried piping outside the building to ensure not less than 1 ft of cover.

I. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.

J. Prepare pipe, fittings, supports, and accessories not pre-finished, ready for finish painting.

K. Establish invert elevations, slopes for drainage to 1/8 inch per foot minimum. Maintain gradients.

L. Excavate in accordance with Sections 15010.

M. Backfill in accordance with Sections 15010

N. Install bell and spigot pipe with bell end upstream

O. Copper piping 2” and larger shall be silver-soldered.

P. Install valves with stems upright or horizontal, not inverted.

3.3 APPLICATION

A. Install unions downstream of valves and at equipment or apparatus connections.

B. Install brass male adapters each side of valves in copper piped system. Sweat solder adapters to pipe.

C. Install gate or ball valves for shut-off and to isolate equipment, part of systems, or vertical risers.

D. Install globe or ball valves for throttling, bypass, or manual flow control services.

3.4 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

A. Prior to starting work, verify system is complete, flushed and clean.

B. Inject disinfectant solution containing 100 ppm of available chlorine and allow to stand for 2 hours before flushing.

C. Flush disinfectant from system until residual is equal to that of incoming water or 1.0 mg/L.

D. Take samples from outlets and analyze in accordance with AWWA C601. Contractor shall engage an independent laboratory to conduct bacteriological and post chlorination tests certifying that the water meets the quality of drinking water. After acceptance by the Engineer of Record, "The Water Test Report for Use" is required to be submitted to SCO prior to requesting the Occupancy Permit.

3.5 SERVICE CONNECTIONS

A. Provide new sanitary sewer services. Before commencing work check invert elevations required for sewer connections, confirm inverts and ensure that these can be properly connected with slope for drainage and cover to avoid freezing.

END OF SECTION 15410

SECTION 15430 - PLUMBING SPECIALTIES

PART I - 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 Plumbing Specialties for water distribution systems; and soil, waste and vent systems.

1.3 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Submit product data including rated capacities of selected models and weights (shipping, installation, and operation). Indicate materials, finishes, dimensions, required clearances, and methods of assembly of components; and piping and wiring connections.

PART II - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:

1. Backflow Preventers:

a. Ames Co., Inc.
b. Hersey Products, Inc., Grinnell Corp.
c. Watts Regulator Co.
d. Wilkins Regulator Div., Zurn Industries, Inc.

2. Water Pressure Regulators:

a. Spence Engineering Co., Inc.
b. Watts Regulator Co.
c. Wilkins Regulator Div., Zurn Industries, Inc.

3. Specialties:

a. Josam Co.
b. Smith by Jay R. Smith Mfg. Co. Div., Smith Industries, Inc.
c. Watts Regulator Co.
d. Woodford Manufacturing Co. Div., WCM Industries, Inc.
e. Zurn by Hydromechanics Div., Zurn Industries, Inc.

2.2 CLEANOUTS

A. Exterior Surfaced Areas: Round cast nickel-bronze access frame and non-skid cover.

B. Exterior Un-Surfaced Areas: Line type with lacquered cast iron body and round epoxy coated

gasketed cover.

C. Interior Finished Floor Areas: Lacquered cast iron, two piece body, round with scoriated cover in service areas and round with depressed cover to accept floor finish in finished floor areas.

D. Interior Finished Wall Areas: Line type with lacquered cast iron body and round epoxy coated gasketed cover, and round stainless steel access cover secured with machine screw.

2.3 WATER HAMMER ARRESTORS

A. ANSI A112.26.1; sized in accordance with PDI WH-201, pre-charged suitable for operation in temperature range -100 to 300 degrees F and maximum 250 psig working pressure.

2.4 TRAP SEAL PRIMER VALVE:

A. ASSE 1018; water supply fed type, fully automatic 125psig minimum working pressure, Bronze body with atmospheric vented drain chamber, ½ inch threaded or solder joint inlet and outlet connections, Chrome plated, or rough bronze finish. Unit shall be capable of being located on any active water line.

2.5 BACKFLOW PREVENTERS

A. Reduced Pressure Back-flow Preventers: ANSI/ASSE 1013; bronze body with bronze and plastic internal parts and stainless steel springs; two independently operating, spring loaded check valves; diaphragm type differential pressure relief valve located between check valves; third check valve which opens under back pressure in case of diaphragm failure; non-threaded vent outlet; assembled with two gate valves, strainer, and four test cocks.

PART III - EXECUTION

3.1 PREPARATION

A. Coordinate construction areas to receive drains to the required invert elevations.

3.2 INSTALLATION AND APPLICATION

A. Install specialties in accordance with manufacturer's instructions to permit intended performance.

B. Extend clean-outs to finished floor. Lubricate threaded clean-out plugs Teflon pipe dope. Ensure clearance at clean-out for rodding of drainage system.

C. Encase exterior clean-outs in concrete flush with grade.

D. Install water hammer arrestors complete with accessible isolation valve.

END OF SECTION 15430

SECTION 15440 – PLUMBING FIXTURES

PART I - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes plumbing fixtures and trim, fittings, and accessories, appliances, appurtenances, equipment, and supports associated with plumbing fixtures.

B. See fixture schedule for fixture types and requirements.

1.3 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Product data for each type of plumbing fixture specified, including fixture and trim, fittings, accessories, appliances, appurtenances, equipment, supports, construction details, dimensions of components, and finishes.

PART II - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers (or approved equal):

1. Fixtures and Trim:

a. American Standard, Inc.
b. Eljer; A Household International Co.
c. Kohler Co.

2. Stainless Steel Sinks:

a. Elkay Manufacturing Co.
b. Just Manufacturing Co.
c. Kohler Co.

3. Mop Basins:

a. Crane Plumbing/Fiat Products.
b. Florestone Products Co., Inc.
c. Swan Corp.

4. Water Coolers:

a. Elkay Manufacturing Co.
b. Halsey Taylor
c. Haws Drinking Faucet Co.
d. Sunroc Corporation
e. Oasis

5. Toilet Seats:

    a. Bemis Mfg. Co.
    b. Beneke Division: Sanderson Plumbing Products, Inc.
    c. Church Seat Co.
    d. Kohler Co.
    e. Olsonite Corp.

6. Flushometers:

    a. Coyne & Delaney Co.
    b. Sloan Valve Co.
    c. Zurn Industries, Inc.; Flush Valve Operations.

7. Commercial/Industrial Cast-Brass Faucets:

    a. American Standard, Inc.
    b. Chicago Faucet Co.
    c. Delta Faucet Co.
    d. Eljer; A Household International Co.
    e. T & S Brass and Bronze Works, Inc.
    f. Cambridge Brass
    g. Elkay Manufacturing Co.
    h. Sloan
    i. Speakman Co.

8. Commercial/Institutional Shower and Bathtub Valves and Trim:

    a. Symmons Industries, Inc.
    b. Bradley Corp.
    c. Speakman Co.
    d. Delta Faucet Co.

END OF SECTION 15440

SECTION 15450 - WATER HEATERS

PART I - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes Electric Water Heaters and In-Line Circulators.

1.3 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Product data including rated capacities of selected models, weights (shipping, installed, and operating), furnished specialties, and accessories, and indicating dimensions, required clearances, and methods of assembly of components, and piping and wiring connections.

PART II - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:

1. Water Heaters:

a. Bradford-White Corp.
b. A.O. Smith Water Products Co. Div.
c. State Industries, Inc.
d. Ruud

2.5 COMMERCIAL ELECTRIC WATER HEATERS

A. Factory assembled and wired, electric, vertical storage type, 150 psig maximum working pressure.

B. Glass lined welded steel tank; four (4) inch diameter inspection port, thermally insulated with minimum two (2) inches glass fiber encased in corrosion-resistant steel jacket; baked-on enamel finish.

C. Brass water connections and dip tube, drain valve, high-density magnesium anode, and ASME rated temperature and pressure relief valve.

D. Flange-mounted immersion heating electrical elements; individual elements sheathed with Incoloy corrosion- resistant metal alloy, rated less than 75 Watts per square inch.

2.6 IN-LINE CIRCULATOR PUMPS

A. Casing: Bronze, rated for 125 psig working pressure

B. Impeller: Bronze

C. Shaft: Alloy steel with integral thrust collar and two (2) oil lubricated bronze sleeve bearings.

D. Seal: Carbon rotating against a stationary ceramic seat.

E. Drive: Flexible coupling

2.7 THERMAL EXPANSION TANKS

A. Construction: Welded steel, tested and stamped in accordance with Section 8D of ANSI/ASME Code; supplied with National Board Form U-1, rated for working pressure of 125 psig, maximum operating temperature 210 degrees F., with flexible EPDM diaphragm sealed into tank.

B. Accessories: Pressure gage and air-charging fitting, tank drain; pre-charge to 55 psig.

C. Size: 10.5" diameter, 16" overall length, 5 gallon capacity.

PART III - EXECUTION

3.1 WATER HEATER INSTALLATION

A. Install water heaters in accordance with manufacturer's instructions and to UL requirements.

B. Coordinate with plumbing piping and related electrical work to achieve complete operating system.

3.2 PUMP INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Provide air cock and drain connection on horizontal pump casings.

C. Decrease from line size, with long radius reducing elbows or reducers. Support piping adjacent to pump such as that no weight is carried on pump casings.

Ensure pumps operate at specified system fluid temperatures without vapor binding and cavitation, are non-overloading in parallel or individual operation, and operate within 25 percent of midpoint of published maximum efficiency curve.

END OF SECTION 15450

DIVISION 15B: MECHANICAL

15500	Basic Mechanical Requirements
15501	Hangers and Supports
15503	Mechanical Identification
15505	Piping Insulation
15507	Ductwork Insulation
15675	Ductless Outdoor Air Systems
15870	Power Ventilators
15891	Metal Ductwork
15910	Duct Accessories
15932	Air Outlets and Inlets
15990	Testing, Adjusting and Balancing

SECTION 15500 BASIC MECHANICAL REQUIREMENTS

PART I - GENERAL

1.1 GENERAL CONDITIONS

A. The Stipulations and Conditions stated in this Section, together with all provisions of the "Instructions to Bidders", "General Conditions", "Supplemental General Conditions", and "Special Conditions", herein before set forth, shall apply to this and the other Sections of Division 15.

1.2 GENERAL REQUIREMENTS

A. The General Requirements hereinafter listed apply to the Mechanical Work Division. If there is any conflict between the General Requirements and the General Conditions, the General Conditions shall take precedence.

1.3 ALTERNATES

A. Carefully examine all Alternates at the back of this Specification to determine if any work described under the Mechanical Section will be affected thereby.

1.4 INTENT

A. The intent of these Drawings and Specifications are to describe the installation of a complete, fully adjusted, and operational system. Therefore, any items shown on Drawings and not specifically called for in the Specifications, or any items specified and not specifically indicated or detailed on the Drawings, or any items neither specified or shown, but which are reasonably incidental to and commonly required to make a complete job, will be furnished and installed by the Mechanical Contractor at his own expense.

1.5 DEFINITIONS

A. The Mechanical Contractor shall provide all supervision, labor, material equipment, machinery, plant, and any and all other items necessary to complete the mechanical systems. All items of equipment are specified in the singular; however, the Mechanical Contractor shall provide the number of items of equipment as indicated on the Drawings, and as required for complete systems.

Where the word "provide" is used, it shall mean "furnish and install complete and ready to use".

1.6 VISIT TO THE SITE

A. The Mechanical Contractor shall visit the site before submitting his bid, so as to be thoroughly familiar with the job conditions and/or peculiarities. No extra payment will be allowed for anything that could have been anticipated from a visit to the site.

1.7 REGULATORY REQUIREMENTS

A. All work under this Section shall be accomplished in strict accordance with State codes. Where these Plans and Specifications conflict with such codes, the codes shall govern. The Mechanical Contractor shall notify the Architect or Engineer of such conflicts in writing prior to receipt of bids.

1.8 PERMITS AND FEES

A. The Mechanical Contractor shall make all necessary arrangements, obtain all necessary approval, obtain all permits and pay fees required for the installation of any of the work covered under the Mechanical Work Division of the Specifications. Any fees required by any utility companies or municipal authorities for the final connections for these services shall be paid by the Mechanical Contractor under whose work such services appear. Before the job is certified as substantially complete, a Certificate of Approval from all authorities involved must be obtained and turned over to the Architect/Engineer.

1.9 DRAWINGS AND SPECIFICATIONS

A. The Mechanical Drawings and Specifications are intended to cover all the work enumerated under the respective headings. The drawings are diagrammatic only. No Contractor shall take advantage of conflict or error between Drawings and Specifications, or between general Drawings and Mechanical, Plumbing and/or Electrical Drawings, but shall request a clarification of such from the Architect/Engineer, should this condition exist. If there is insufficient time to issue an Addendum for this clarification, the Mechanical Contractor shall figure on the most expensive of the items in conflict.

B. The Mechanical Contractor shall refer to the Architectural and Structural Drawings and Specifications for the general construction of the building, for floors and ceiling heights, for locations of walls, partitions, beams, etc., and shall be guided accordingly for setting of all sleeves, inserts and equipment. No Contractor shall under any circumstances scale Drawings for the location of equipment. The Mechanical Contractor shall verify the locations of all utility services.

C. The Mechanical Contractor shall keep at least one (1) set of corrected Shop and Design Drawings at the site. Drawings are to be current, denoting approved modifications and actual installed departure. Submit drawings to Architect/Engineer before final payment is made.

1.10 SUPERVISION

A. The Mechanical Contractor performing the work specified shall be required to employ a qualified superintendent or foreman to continuously supervise the installation of their work, with authorization to act as agent Contractors. He shall be capable of checking layouts, coordinating and supervising the work, establishing grades and levels and locating chases, openings, hangers, inserts, sleeves, etc.

PART II - PRODUCTS

2.1 STANDARD PRODUCTS

A. Unless otherwise indicated in writing by the Architect/Engineer, the materials to be provided under this Specification shall be standard products of manufacturers regularly engaged in the production of such equipment and shall be the manufacturer's latest design. All items of the same type or rating shall be identical.

2.2 SUBMITTAL

A. The Mechanical Contractor shall submit, for approval, detailed Shop Drawings on all major equipment and where requested. No materials or equipment may be delivered to the job site or installed until the Mechanical Contractor has in his possession the approved shop drawing for the particular material or equipment. The Mechanical Contractor shall furnish the number of copies required by the General or Special Conditions of the contract, but in no case less than six (6) copies.

B. Submitted material shall be properly labeled indicating specific Service for which material or equipment to be used, Section and Article Number of Specifications governing, Contractor's name

and name of job.

C. Approval of equipment will not relieve the Mechanical Contractor of compliance with the specifications even if such approval is made in writing, unless the attention of the Engineer is called to the non-complying features by letter accompanying the submittal data. Approval of submittal data by the Engineer shall not be construed as a complete check of approval of detailed dimensions, weights, gauges and similar details with the proposed articles. The conformance with the necessary coordination between the various other contractors and suppliers shall be solely the responsibility of the Mechanical Contractor and with no additional expense to the Owner.

2.3 SUBSTITUTIONS

A. Manufacturer's lists are to establish a Standard of Quality and not intended to limit the selection to these manufacturers. All materials and equipment which are essential and have not been specified or shown shall be new and of the highest grade and quality. Free from defect or other imperfections. It should be understood that where the words "furnished and installed" are used, it is intended that the Mechanical Contractor shall purchase and install all materials required.

B. All materials and equipment proposed as substitutes for these specified shall require a ten (10) day prior approval from the Engineer prior to the bid date. No substitutions will be allowed after the ten (10) day period before the bid date.

2.4 PRODUCT HANDLING

A. Equipment and materials shall be properly stored, adequately protected, and carefully handled to prevent damage before and during installation. Equipment and materials shall be handled, stored and protected in accordance with the manufacturer's recommendations and as approved by the Architect/Engineer. Equipment installed with a factory finish shall be fully protected during construction and shall be maintained free of dust, dirt, and foreign matter. Dents and other surface damage shall be repaired or replaced to the satisfaction of the Architect/Engineer at no additional cost to the Owner

B. The Mechanical Contractor shall clean up and remove from the job site all waste materials, packaging, crating, and refuse resulting from his work on a daily basis.

2.5 MATERIALS AND WORKMANSHIP

A. The Mechanical Contractor shall perform a first class job, both in material and workmanship. None other will be accepted. Deviations from either will be corrected by the Mechanical Contractor at the Mechanical Contractor's expense.

B. The material used throughout the work, except when otherwise noted, shall be new and of the best of its kind. No substitutes shall be used unless approved by the Architect/Engineer. All work shall be executed with a maximum speed consistent with safety and good workmanship.

C. Any equipment furnished by the Mechanical Contractor that is larger than those indicated on the Drawings and described in these Specifications or have different electrical characteristics, the increase in cost to the Electrical Contractor for larger wires, conduit, circuit breakers, switches, etc. or for changes in work already installed shall be borne by the instigating Contractor.

PART III - EXECUTION

3.1 EXCAVATION AND BACKFILL

A. The Mechanical Contractor shall preform any and all trench and pit excavation and backfilling

required for the installation of his work. Trenches shall be made with the sides vertical and shall be shored where necessary for the protection of men and equipment. All excavation work shall be done in a careful manner to avoid damage to footers and foundations. The backfilling shall be placed in layers not exceeding four (4) inches in depth, wetting each layer as it is placed, and thoroughly compacting each layer with mechanical tamper or other approved means. Any damage done during excavation and back-filling operations to roads, sidewalks, curbs, shrubs, sod, footers, foundations, etc. shall be replaced to its condition prior to construction at no expense to the Owner.

3.2 SCAFFOLDING, RIGGING AND HOISTING

A. The Mechanical Contractor shall furnish all necessary scaffolding, staging, rigging and hoisting required for the completion of his work. All such scaffolding, etc., shall be removed from the premises when its use is no longer required on the job.

3.3 CUTTING AND PATCHING

A. The Mechanical Contractor shall provide all cutting and patching necessary to install the work specified in this Section. The patching shall match adjacent surfaces.

B. No Structural member shall be cut without the approval of the Engineer and all such cutting shall be done in a manner directed by him.

3.4 EQUIPMENT SPACE AND ARRANGEMENT

A. The equipment shall fit into the space allotted and shall allow adequate clearance for entry, installation, replacement, servicing and maintenance. The Mechanical Contractor shall coordinate the work to ensure that equipment may be moved into place without altering building components or other installations. Access space shall not be less than the equipment manufacturer's requirements.

B. These drawings indicate the extent and general arrangement of equipment, piping, and ductwork. If any departures are deemed necessary by the Mechanical Contractor, details of such departures and the reasons therefore shall be submitted to the Architect/Engineer for approval as soon as practicable and within 30 days after Award of Contract. No departure shall be made without written Approval of the Architect/Engineer.

3.5 DAMAGE TO WORK ALREADY IN PLACE

A. The Mechanical Contractor shall assume full responsibility for any damage done by him, his agents or employees, to any work already in place. Any such damage done shall be repaired at the Contractor's expense by mechanics skilled at their respective trades, to the approval of the Architect/Engineer.

3.6 JURISDICTION OF WORK

A. It may become necessary for the Mechanical Contractor to furnish labor or material which is not generally accepted as part of this trade. In cases of this type, he shall contract the work, or shall furnish materials and employ workmen of the trade involved in order not to cause any delay or stoppage of work caused by infringement of trade agreements as to jurisdiction, alleged or actual.

3.7 COORDINATION WITH OTHER TRADES

A. All work shall be coordinated with other trades involved in the construction project. All work shall be carefully laid out in advance to coordinate Architectural, Structural, Mechanical, Plumbing and Electrical features of construction. The Contractor shall verify at the site all

locations, grades, elevations, and utility service connections indicated. Any conflicts due to lack of proper coordination shall be brought to the attention of the Architect/Engineer for resolution. The Mechanical Contractor shall make required changes or relocations at no additional cost to the Owner.

B. Installation, inspection, and testing of work above ceilings shall be completed and approved by the Architect/Engineer prior to installation of the specified finished ceilings. However, ceiling suspension system may be installed as required for coordination.

C. The Mechanical Contractor shall consult with the other trades at the start of the work and periodically thereafter, as required to properly coordinate the various items of work, and to avoid interferences. Should any interferences of any nature develop as the work progresses, such interferences shall be resolved and eliminated as directed. The cost of any work directed will be borne by the subcontractor or contractors directed to do this work.

3.8 DIVISION OF WORK

A. This paragraph is intended to show exactly the point of division of work between the Electrical Division and the Mechanical Division.

B. All equipment covered in the Mechanical Division of the Specifications shall be furnished, mounted and aligned under the Mechanical Division. All individual motor starters, unless indicated as part of a motor control center, for this equipment shall be furnished and installed by the Mechanical Contractor.

C. All final electrical connections to equipment covered in the Mechanical Division of the Specifications shall be completed under the Mechanical Division.

D. The Electrical Contractor shall provide a disconnect switch or junction box for each item of equipment under Division 16.

E. Electrical equipment and wiring that is provided by the Mechanical Contractor shall be in accordance with the Electrical specification.

3.9 EQUIPMENT INSTALLATION

A. Final connections to equipment, including pipe, duct, and controls, shall be provided under applicable sections of this Division, unless otherwise specified or indicated.

B. Manufacturer's Instructions: Equipment shall be installed as recommended by the manufacturer to conform to the requirements of the particular application, in accordance with these Drawings and Specifications.

3.10 OPERATION AND MAINTENANCE MANUALS

A. One complete Manual as outlined herein shall be submitted for approval before conducting instruction sessions in operation, before systems or equipment tests are performed, and before final or beneficial occupancy.

B. Manuals shall have rigid covers and index tabs for each major piece of equipment, auxiliaries, and systems. The following shall be inscribed on the cover: the words "OPERATION AND MAINTENANCE MANUAL", the name and location of the building, the name of the Section, such as "Heating" and the name of the Mechanical Contractor. Two (2) copies of each approved manual shall be submitted to the Owner and one (1) copy shall be submitted to the Architect/Engineer.

C. Each piece of equipment shall be listed and identified with the same name, mark, number, or other identification as noted or scheduled in the Contract Documents.

D. Manuals shall include the following:

1. Complete Operating Installations, covering start-up and shutdown for all components installed.

2. Legible copies of all Shop Drawings. Any comments incorporated in "as noted" approvals of Shop Drawings shall be recorded on the Drawings included in the Manuals.

3. All equipment Maintenance and Service Manuals.

4. A complete parts list for each piece of equipment.

5. All descriptive literature for the equipment.

6. Operating characteristics, performance data, ratings, and curves for each piece of equipment such as condensers, fans and air handling units.

7. Internal wiring and control diagrams.

8. Automatic temperature control diagrams, part descriptions and numbers, and sequences of operation. Drawings shall be neatly folded and inserted in a separate clear plastic binder. The plastic binders shall be bound in the back of each Manual.

9. Final Testing and Balancing Reports.

10. All other information pertinent to the maintenance and servicing of equipment and systems provided in the Project.

11. Name, address, and telephone number for service on each manufacturer's equipment.

3.11 OPERATING INSTRUCTIONS

A. After all equipment and services are in operation, and the Operation and Maintenance Manuals are available, an instruction and training session shall be conducted for the Owner's operating personnel.

B. Instruction sessions shall be conducted during the Owner's normal working periods, and at times and locations satisfactory to the Owner.

3.12 EQUIPMENT START-UP

A. No equipment shall be placed in operation until it has been inspected by a qualified representative of the manufacturer and certified to be ready for operation. The manufacturer's representative shall supervise the start-up operation and shall be responsible for all adjustments are required to meet design conditions. Such services shall be at no additional cost to the Owner.

3.13 GUARANTEE

A. The Mechanical Contractor shall present to the Owner a written Guarantee covering his work, including all equipment, material and workmanship. This Guarantee shall be against all defects in any of the above work, and shall run for a period of one (1) year from the date of written acceptance of the Contractor's work.

B. Any defective work, equipment, material and/or workmanship that develops within the Guarantee

period, which is not caused by ordinary wear or abuse by other persons, shall be replaced by the Mechanical Contractor without cost to the Owner.

3.14 FINAL INSPECTION

A. When the entire Contract has been completed and the work is ready for final inspection, the Architect/Engineer or his duly authorized representative will make the inspection. At the time of inspection, the Mechanical Contractor shall demonstrate to the Architect/Engineer that the various systems and pieces of equipment have been adjusted to operate in accordance with the requirements of the Contract.

3.15 FINAL PAYMENTS

A. All Final Payments are contingent upon all necessary Certificates and/or Approvals cited above, together with the written Guarantee being presented to the Owner.

END OF SECTION 15500

SECTION 15501 - HANGERS AND SUPPORTS

PART I - GENERAL

1.1 RELATED DOCUMENTS

A. Drawing and General Provisions of the Contract, including the General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

B. This Section includes Hangers and Supports for Mechanical Systems Piping and Equipment.

PART II - PRODUCTS

2.1 PIPE HANGERS AND SUPPORTS

A. Hangers: Galvanized carbon steel, adjustable, clevis.

B. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

C. Shield for Insulated Piping 2 Inches and Smaller: 18 gage galvanized steel shield over insulation in 180 degree segments, minimum 12 inches long at pipe support.

2.2 HANGER RODS

A. Steel Hanger Rods: Threaded both ends or continuous threaded.

2.3 FLASHING

A. Metal Flashing: 26 gage galvanized steel.

B. Flexible Flashing: 47 mil thick sheet butyl; compatible with roofing.

2.4 SLEEVES

A. Sleeves for Pipes: Form with schedule 40, galvanized steel pipe

B. Sleeves for Pipes Through Fire Rated and Fire Resistive Floors and Walls, and Fireproofing: Prefabricated fire rated sleeves including seals, UL listed.

C. Sleeves for Round Ductwork: Form with galvanized steel.

D. Sleeves for Rectangular Ductwork: Form with galvanized steel or wood.

E. Fire Stopping Insulation: Glass fiber type, non-combustible.

F. Caulk: Fire Barrier type sealant.

2.5 MISCELLANEOUS MATERIALS

A. Structural Steel: ASTM A 36/A 36M, steel plates, shapes, and bars, black and galvanized.

B. Bolts and Nuts: ASME B18.10 or ASTM A 183, steel, hex-head, track bolts and nuts.

C. Washers: ASTM F 844, steel, plain, flat washers.

2.6 ATTACHMENTS

A. Mechanical-Anchor Fasteners: Insert-type attachments with pull-out and shear capacities appropriate for supported loads and building materials where used. Permitted in concrete over 4 inches thick.

B. Beam Clamps: Types 20, 21, 28 or 29

C. Wood: Wood screws or lag bolts

PART III - EXECUTION

3.1 HANGERS AND SUPPORTS INSTALLATION

A. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure.

B. Install building attachments within concrete or to structural steel. Install additional attachments at concentrated loads, including valves, flanges, guides, strainers, expansion joints, and at changes in direction of piping.

C. Install hangers and support complete with necessary inserts, bolts, rods, nuts, washers, and other accessories.

D. Install hangers and supports to allow controlled movement of piping systems, permit freedom of movement between pipe anchors, and facilitate action of expansion joints, expansion loops, expansion bends, and similar units.

E. Install hangers and supports so that piping live and dead loading and stresses from movement will not be transmitted to connected equipment.

F. Support horizontal piping as follows:

PIPE SIZE	HANGER SPACING	MAXIMUM HANGER DIAMETER
1/2 to 1-1/4 inch	6' - 6"	3/8"
1-1/2 to 2 inch	10' - 0"	3/8"

G. Install hangers to provide minimum ½ inch space between finished covering and adjacent work.

H. Place a hanger within 12 inches of each horizontal elbow.

I. Use hangers with 1½ inch minimum vertical adjustment.

J. Support vertical piping at every floor.

L. Support riser piping independently of connected horizontal piping.

M. All pipe hangers shall be galvanized steel or copper.

N. Pipe strapping, duct tape or zip ties will not be allowed.

3.2 EQUIPMENT BASES AND SUPPORTS

A. Provide equipment bases of concrete.

B. Provide templates, anchor bolts, and accessories for mounting and anchoring equipment.

3.3 EQUIPMENT SUPPORTS

A. Fabricate structural steel stands to suspend equipment from structure above or support equipment above floor.

B. Grouting: Place grout under supports for equipment, and make a smooth bearing surface.

3.4 METAL FABRICATION

A. Cut, drill, and fit miscellaneous metal fabrications for pipe and equipment supports.

B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.

C. Field Welding: Comply with AWS D1.1 procedures for manual shielded metal arc welding, appearance and quality of welds.

3.5 FLASHING

A. Provide flexible flashing and metal counter-flashing where piping and ductwork penetrate weather or waterproofed walls, floors, and roofs.

B. Provide curbs for mechanical roof installations 14 inches minimum high above roofing surface. Flexible sheet flash and counter-flash with sheet metal; seal watertight.

3.6 SLEEVES

A. Size sleeves large enough to allow for movement due to expansion and contraction. Provide for continuous insulation wrapping.

B. Design hangers without disengagement of supported pipe.

C. Where piping penetrates floor, ceiling, or wall, close off space between pipe and adjacent work with fire stopping insulation and caulk seal air tight. Provide close fitting metal collar or escutcheon covers at both sides of penetration.

D. Install chrome plated steel or stainless steel escutcheons at finished surfaces.

END OF SECTION 15501

SECTION 15503 - MECHANICAL IDENTIFICATION

PART I - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes mechanical identification materials and devices.

1.3 QUALITY ASSURANCE

A. Comply with ASME A13.1 for lettering size, length of color field, colors, and viewing angles of identification devices.

1.4 SEQUENCING AND SCHEDULING

A. Coordinate installation of identifying devices after completion of covering and painting where devices are applied to surfaces. Install identifying devices prior to installation of acoustical ceilings and similar concealment.

PART II - PRODUCTS

2.1 MATERIALS

A. Color: Unless specified otherwise, conform with ANSI/ASME A13.1.

B. Plastic Nameplates: Laminated three-layer plastic with engraved black letters on light contrasting background color.

C. Plastic Tags: Laminated three-layer plastic with engraved black letters on light contrasting background color. Tag size minimum 1½ inch diameter.

D. Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings.

E. Underground Plastic Pipe Markers: Bright colored continuously printed plastic ribbon tape of not less than 6 inches wide by 4 mil thick, manufactured for direct burial service.

PART III - EXECUTION

3.1 PREPARATION

A. De-grease and clean surfaces to receive adhesive for identification materials.

B. Prepare surfaces in accordance with manufacturers' recommendations.

3.2 INSTALLATION

A. Plastic Nameplates: Install with corrosive resistant mechanical fasteners.

B. Plastic Tags Install with corrosive resistant chain.

C. Plastic Tape Pipe Markers: Install completely around pipe in accordance with manufacturer's instructions.

D. Underground Plastic Pipe Markers: Install 6 to 8 inches below finished grade, directly above buried pipe.

E. Equipment: Identify air handling units, pumps, heat transfer equipment, tanks, and water treatment devices with plastic nameplates. Small devices, such as in-line pumps, may be identified with plastic tag.

F. Controls: Identify control panels and major control components outside panels with plastic nameplates.

G. Valves: Identify valves in main and branch piping with tags.

H. Piping: Identify piping, concealed or exposed, with plastic tape pipe markers. Tags may be used on small diameter piping. Identify service, flow direction, and pressure. Install in clear view and align with axis of piping. Locate identification not to exceed 20 feet on straight runs including risers and drops, adjacent to each valve and "T", at each side of penetration of structure or enclosure and at each obstruction.

3.3 VALVE CHART AND SCHEDULE

A. Provide valve chart and schedule in aluminum frame with clear plastic shield. Install at location as directed.

END OF SECTION 15503

SECTION 15505 – PIPING INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes Mechanical Pipe Insulation.

1.3 QUALITY ASSURANCE

A. Fire Performance Characteristics: Conform to the following characteristics for insulation including facings, cements, and adhesives, when tested according to ASTM E 84, by UL or other testing or inspecting organization acceptable to the authority having jurisdiction. Label insulation with appropriate markings of testing laboratory.

1. Interior Insulation: Flame spread rating of 25 or less and a smoke developed rating of 50or less.

2. Exterior Insulation: Flame spread rating of 75 or less and a smoke developed rating of 150 or less.

1.4 SEQUENCING AND SCHEDULING

A. Schedule insulation application after testing of piping systems.

B. Schedule insulation application after installation and testing of heat trace tape.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers

1. Flexible Elastomeric Cellular:

a. Armstrong World Industries, Inc.
b. Halstead Industrial Products
c. IMCOA
d. Rubatex Corporation

2.2 FLEXIBLE ELASTOMERIC CELLULAR

A. Material: Flexible expanded closed-cell structure with smooth skin on both sides.

B. Form: Tubular materials conforming to ASTM C 534, Type I.

C. Thermal Conductivity: 0.30 average maximum at 75 degrees F.

D. Coating: Water based latex enamel coating recommended by insulation manufacturer.

2.3 ADHESIVES

A. Flexible Elastomeric Cellular Insulation Adhesive: Solvent-based, contact adhesive recommended by insulation manufacturer.

2.4 ACCESSORIES AND ATTACHMENTS

A. Bands: ¾-inch wide, 0.007 inch thick, Aluminum

B. Wire: 16-gauge, soft-annealed stainless steel

PART 3 - EXECUTION

3.1 PREPARATION

A. Surface Preparation: Clean, dry, and remove foreign materials such as rust, scale, and dirt.

3.2 INSTALLATION - GENERAL

A. Select accessories compatible with materials suitable for the service. Select accessories that do not corrode, soften, or otherwise attack the insulation or jacket in either the wet or dry state.

B. Apply insulation material, accessories, and finishes according to the manufacturer's printed instructions.

C. Keep insulation materials dry during application and finishing.

D. Apply insulation continuously over fittings, valves, and specialties.

E. Apply insulation with a minimum number of joints.

F. Interior Walls and Partitions Penetrations: Apply insulation continuously through walls and partitions, except fire-rated walls and partitions.

G. Fire-Rated Walls and Partitions Penetrations: Terminate insulation at penetrations through fire rated walls and partitions. Seal insulation ends with vapor barrier coating. Seal around penetration with fire stopping or fire resistant joint sealer.

H. Hangers and Anchors: Apply insulation continuously through hangers and around anchor attachments. Install saddles, shields, and inserts as specified.

1. Inserts and Shields: Cover hanger inserts and shields with jacket material matching adjacent pipe insulation.

3.3 FLEXIBLE ELASTOMERIC CELLULAR INSULATION INSTALLATION

A. Slip insulation on the pipe before making connections wherever possible. Seal joints with adhesive. Where the slip-on technique is not possible, cut one side longitudinally and apply to the pipe. Seal seams and joints with adhesive.

B. Valves, Fittings, and Flanges: Cut insulation segments from pipe or sheet insulation. Bond to valve, fitting, and flange and seal joints with adhesive.

1. Miter cut materials to cover soldered elbows and tees.

2. Fabricate sleeve fitting covers from flexible elastomeric cellular insulation for screwed valves, fittings, and specialties. Miter cut materials. Overlap adjoining pipe insulation.

3.4 FINISHES

A. Flexible Elastomeric Cellular Insulation: After adhesive has fully cured, apply 2 coats of protective coating to exposed insulation. Paint all exterior insulation with UV resistant paint as recommended by Insulation manufacturer.

3.5 PIPE INSULATION SCHEDULES

INTERIOR COLD CONDENSATE DRAINS

PIPE SIZES (NPS)	MATERIALS	THICKNESS IN INCHES
1/2 TO 4	FLEXIBLE ELASTOMERIC	1

REFRIGERANT SUCTION

PIPE SIZES (NPS)	MATERIALS	THICKNESS IN INCHES
	FLEXIBLE ELASTOMERIC	2

END OF SECTION 15505

SECTION 15507 - DUCTWORK INSULATION

PART I - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes Duct and Plenum Insulation.

1.3 QUALITY ASSURANCE

A. Fire Performance Characteristics: Conform to the following characteristics for insulation including linings, cements, and adhesives, when tested according to ASTM E 84, by UL or other testing or inspecting organization acceptable to the authority having jurisdiction. Label insulation with appropriate markings of testing laboratory.

1. Interior Insulation: Flame spread rating of 25 or less and a smoke developed rating of 50 or less.

2. Exterior Insulation: Flame spread rating of 75 or less and a smoke developed rating of 150 or less.

PART II – PRODUCTS

2.1 MANUFACTURERS

!. Glass Fiber:

a. Certain Teed Corporation
b. Knauf Fiberglass GmbH
c. Manville
d. Owens-Corning Fiberglass Corporation
e. USG Interiors, Inc. - Thermafiber Division

2.2 INSTALLATION

A. GLASS FIBER

1. Material: Inorganic glass fibers, bonded with a thermosetting resin.

B. Jacket: All purpose, factory-applied, laminated glass fiber reinforced, flame retardant Kraft paper and aluminum foil having self-sealing lap.

C. Blanket: ASTM C 553, Type II, Class F-1, jacketed flexible blankets-2” thick.

1. Thermal Conductivity: 0.32 average maximum, at 75 degrees F mean temperature.

D. Adhesive: Produced under the UL Classification and follow-up service.

1. Type: Non-Flammable, solvent-based.
2. Service Temperature Range: Minus 20 to 180 degrees F.

2.3 ACCESSORIES AND ATTACHMENTS

A. Corner Angles: 28-gauge, 1inch by 1-inch aluminum, adhered to 2-inch by 2-inch Kraft paper.

B. Anchor Pins: Capable of supporting 20 pounds each. Provide anchor pins and speed washers of sizes and diameters as recommended by the manufacturer for insulation type and thickness.

2.4 SEALING COMPOUNDS

A. Vapor Barrier Compound: Water-based, fire-resistive composition

1. Water Vapor Permeance: 0.08 perm maximum
2. Temperature Range: Minus 20 to 180 degrees F

PART III - EXECUTION

3.1 PREPARATION

A. Surface Preparation: Clean, dry, and remove foreign materials such as rust, scale and dirt.

3.2 INSTALLATION

A. Select accessories compatible with materials suitable for the service. Select accessories that do not corrode, soften, or otherwise attack the insulation or jacket in either the wet or dry state.

B. Apply insulation material, accessories, and finishes according to the manufacturer's printed instructions.

C. Install insulation with smooth, straight, and even surfaces.

D. Seal joints and seams to maintain vapor barrier.

E. Seal penetrations for hangers, supports, anchors and other projections.

F. Keep insulation materials dry during application and finishing.

G. Blanket Insulation: Install tight and smooth. Secure to ducts having long sides or diameters as follows:

1. Smaller Than 24 Inches: Bonding adhesive applied in 6-inch wide transverse strips on 12-inch centers.

2. Twenty-four (24) Inches and Larger: Anchor pins spaced 12 inches apart each way. Apply bonding adhesive to prevent sagging of the insulation.

3. Overlap joints three (3) inches.

4. Seal joints, breaks, and punctures with vapor barrier compound.

END OF SECTION 15507

Guide Specifications - RN Series Packaged Units

Section 15675 - Packaged Units / Outdoor Air Handling Units

Part 1 - General

1.01 Related Documents

1.02 General Description

A. This section includes the design, controls and installation requirements for packaged units / outdoor air handling units.

1.03 Quality Assurance

A. Packaged air-cooled condenser units shall be certified in accordance with ANSI/AHRI Standard 340/360 performance rating of commercial and industrial unitary air-conditioning and heat pump equipment.

B. Unit shall be certified in accordance with UL Standard 1995/CSA C22.2 No. 236, Safety Standard for Heating and Cooling Equipment.

C. Unit shall be certified in accordance with UL Standard 60335-2-40 and CSA C22.2 No. 236, Safety Standard for Heating and Cooling Equipment.

D. Unit and refrigeration system shall comply with ASHRAE 15, Safety Standard for Mechanical Refrigeration.

E. Unit Energy Efficiency Ratio (EER) shall be equal to or greater that prescribed by ASHRAE 90.1, Energy Efficient Design of New Buildings except Low-Rise Residential Buildings.

F. Unit shall be safety certified by ETL and ETL US listed. Unit nameplate shall include the ETL/ETL Canada label.

1.04 Submittals

A. Product Data: Literature shall be provided that indicates dimensions, operating and shipping weights, capacities, ratings, fan performance, filter information, factory supplied accessories, electrical characteristics and connection requirements. Installation, Operation, and Maintenance manual with startup requirements shall be provided.

B. Shop Drawings: Unit drawings shall be provided that indicate assembly, unit dimensions, construction details, clearances and connection details. Computer generated fan curves for each fan shall be submitted with specific design operation point noted. Wiring diagram shall be provided with details for both power and control systems and differentiate between factory installed and field installed wiring.

1.05 Delivery, Storage, and Handling

A. Unit shall be shipped with doors screwed shut and outside air hood closed to prevent damage during transport and thereafter while in storage awaiting installation.

B. Follow Installation, Operation, and Maintenance manual instructions for rigging, moving, and unloading the unit at its final location.

C. Unit shall be stored in a clean, dry place protected from construction traffic in accordance with the Installation, Operation, and Maintenance manual.

1.06 Warranty

A. Manufacturer shall provide a parts and labor warranty for a period of 12 months from the date of equipment startup or 18 months from the date of original equipment shipment from the factory, whichever is less. Warranty shall cover material and workmanship that prove defective, within the specified warranty period, provided manufacturer's written instructions for Installation, Operation, and maintenance have been followed. Warranty excludes parts associated with routine maintenance, such as belts and filters.

Part 2 - Products

2.01 Manufacturer

A. **Products shall be provided by the following manufacturers:**

1. AAON, Greenheck, CaptiveAire
2. Substitute equipment may be considered for approval that includes at a minimum:
   a. R-454B refrigerant
   b. Variable capacity compressor with 10-100% capacity control
   c. Direct drive supply fans
   d. Double wall cabinet construction with foam injected insulation. Foam board is not acceptable.
   e. Insulation with a minimum R-value of 13
   f. Stainless steel drain pans

2.02 Packaged Units

A. **General Description**

1. Packaged rooftop unit shall include compressors, evaporator coils, filters, supply fans, dampers, reheat coil, electric heaters, and unit controls.
2. Unit shall be factory assembled and tested including leak testing of the DX coils, and run testing of the completed unit. Run test report shall be supplied with the unit in the service compartment's literature pocket.

3. Unit shall have decals and tags to indicate lifting and rigging, service areas and caution areas for safety and to assist service personnel.
4. Unit components shall be labeled, including electrical and controls components.
5. Estimated sound power levels (dB) shall be shown on the unit ratings sheet.
6. Installation, Operation, and Maintenance manual shall be supplied within the unit.
7. Laminated color-coded wiring diagram shall match factory installed wiring and shall be affixed to the interior of the control compartment's hinged access door.
8. Unit nameplate shall be provided in two locations on the unit, affixed to the exterior of the unit and affixed to the interior of the control compartment's hinged access door.

B. **Construction**

1. All cabinet walls, access doors, and roof shall be fabricated of double wall, impact resistant, rigid polyurethane foam panels.
2. Unit insulation shall have a minimum thermal resistance R-value of 13. Foam insulation shall have a minimum density of 2 pounds/cubic foot and shall be tested in accordance with ASTM D1929-11 for a minimum flash ignition temperature of 610°F.
3. Unit construction shall be double wall with G90 galvanized steel on both sides and a thermal break. Double wall construction with a thermal break prevents moisture accumulation on the insulation, provides a cleanable interior, reduces heat transfer through the panel, and prevents exterior condensation on the panel.
4. Unit shall be designed to reduce air leakage and infiltration through the cabinet. Cabinet leakage shall not exceed 1% of total airflow when tested at 3 times the minimum external static pressure provided in AHRI Standard 340/360. Panel deflection shall not exceed L/240 ratio at 125% of design static pressure, at a maximum 8 inches of positive or negative static pressure, to reduce air leakage. Deflection shall be measured at the midpoint of the panel height and width. Continuous sealing shall be included between panels and between access doors and openings to reduce air leakage. Piping and electrical conduit through cabinet panels shall include sealing to reduce air leakage.
5. Roof of the air tunnel shall be sloped to provide complete drainage. Cabinet shall have rain break overhangs above access doors.
6. Access to filters, dampers, cooling coils, reheat coil, and electrical and controls components shall be through hinged access doors with quarter turn, zinc cast, lockable handles. Full length stainless steel piano hinges shall be included on the doors.

7. Exterior paint finish shall be capable of withstanding at least 2,500 hours, with no visible corrosive effects, when tested in a salt spray and fog atmosphere in accordance with ASTM B 117-95 test procedure.
8. Units with cooling coils shall include double sloped 304 stainless steel drain pans.
9. Unit shall be provided with horizontal discharge and horizontal return air openings. All openings through the base pan of the unit shall have upturned flanges of at least 1/2 inch in height around the opening.
10. Unit shall include lifting lugs on the top of the unit.
11. Corrosion Protection: Coils shall have flexible, epoxy polymer E-Coat uniformly applied to all coil surface areas without material bridging between fins. Humidity and water immersion resistance shall be up to a minimum 1,000 hours each (ASTM D2247-92 and ASTM D870-92). Corrosion durability shall be confirmed through testing, with coating capable of withstanding at least 10,000 hours of salt spray per ASTM B117-90. Coated coils shall receive a spray-applied, UV-Resistance polyurethane topcoat to prevent UV degradation of the E-Coat. Coating shall carry a 5 year warranty, from the date of original equipment shipment from the factory. Exterior paint finish shall be capable of withstanding at least 2,500 hours, with no visible corrosive effects, when tested in a salt spray and fog atmosphere in accordance with ASTM B 117-95 test procedure.

C. **Electrical**

1. Unit shall have a 5kAIC SCCR.
2. Unit shall be provided with factory installed and factory wired, non-fused disconnect switch.
3. Unit shall be provided with a factory installed and factory wired 115V, 12 amp GFI outlet disconnect switch in the unit control panel.
4. Unit shall be provided with phase and brown out protection which shuts down all motors in the unit if the electrical phases are more than 10% out of balance on voltage, the voltage is more than 10% under design voltage or on phase reversal.

D. **Supply Fans**

1. Unit shall include direct drive, unhoused, backward curved, plenum supply fans.
2. Blowers and motors shall be dynamically balance and mounted on rubber isolators.

E. **Cooling Coils**

1. Evaporator Coils
   a. Coils shall be designed for use with R-454B refrigerant and constructed of copper tubes with aluminum fins mechanically bonded to the tubes and galvanized steel end casings. Fin design shall be sine wave rippled.

b. Coils shall be hydrogen or helium leak tested.

c. Coils shall be furnished with factory installed expansion valves.

1. Unit shall be factory charged with R-454B refrigerant.

2. Lead refrigeration circuit shall be provided with hot gas reheat coil, modulating valves, electronic controller, supply air temperature sensor and a control signal terminal which allow the unit to have a dehumidification mode of operation, which includes supply air temperature control to prevent supply air temperature swings and overcooling of the space.

3. Lag refrigeration circuit shall be provided with hot gas reheat coil, modulating valves, electronic controller, supply air temperature sensor and a control signal terminal which allow the unit to have a dehumidification mode of operation, which includes supply air temperature control to prevent supply air temperature swings and overcooling of the space.

a. Coils shall be designed for use with R-454B refrigerant. Coils shall be multi-pass and fabricated from aluminum microchannel tubes.

F. **Electric Heating**

1. Unit shall include an electric heater consisting of electric heating coils, fuses and a high temperature limit switch, with capacities as shown on the plans.

2. Electric heating coils shall be located in the reheat position downstream of the cooling coil.

3. Electric heater shall have full modulation capacity controlled by an SCR (Silicon Controlled Rectifier). Supply air temperature sensor shall be factory provided and field installed in the supply air ductwork. The electric heat shall be controlled by the factory mounted controller.

G. **Filters**

1. Unit shall include 4 inch thick, pleated panel filters with an ASHRAEMERV rating of 13, upstream of the cooling coil. Unit shall also include 2 inch thick, pleated panel pre filters with an ASHRAE MERV rating of 8, upstream of the 4 inch filters.

2. Unit shall include a clogged filter switch.

H. **Outside Air/Economizer**

1. Unit shall include 100% motor operated outside air damper assembly constructed of extruded aluminum, hollow core, airfoil blades with rubber edge and end seals. Damper blades shall be gear driven and designed to haveno more than 20 cfm of leakage per sq ft. at 4 in. w.g. air pressure differential across the damper. Low leakage dampers shall be Class 2 AMCA certified, in accordance with AMCA Standard 511.Damper assembly shall be controlled by spring return, 2 position actuator. Unit shall include outside air opening bird screen and outside air hood.

I. **Controls**

1. Factory Installed and Factory Provided Controller

a. Unit controller shall be capable of controlling all features and options of the unit. Controller shall be factory installed in the unit controls compartment and factory tested. Controller shall be capable of stand alone operation with unit configuration, setpoint adjustment, sensor status viewing, unit alarm viewing, and occupancy scheduling available without dependence on a building management system.

b. Controller shall have an onboard clock and calendar functions that allow for occupancy scheduling.

c. Controller shall include non-volatile memory to retain all programmed values without the use of a battery, in the event of a power failure.

d. Makeup Air Controller

1. Unit shall modulate cooling with constant airflow to meet ventilation outside air loads. Cooling capacity shall modulate based on supply air temperature.

2. With modulating hot gas reheat, unit shall modulate cooling and hot gas reheat as efficiently as possible, to meet outside air humidity loads and prevent supply air temperature swings and overcooling of the space.

3. Unit shall modulate heating with constant airflow to meet ventilation outside air loads. Heating capacity shall modulate based on supply air temperature.

e. Unit configuration, setpoint adjustment, sensor status viewing, unit alarm viewing, and occupancy scheduling shall be accomplished with connection to interface module with LCD screen and input keypad, interface module with touch screen, or with connection to PC with free configuration software. Controller shall be capable of connection with other factory installed and factory provided unit controllers with individual unit configuration, setpoint adjustment, sensor status viewing, and occupancy scheduling available from a single unit. Connection between unit controllers shall be with a modular cable. Controller shall be capable of communicating and integrating with a LonWorks or BACnet network.

J. **Accessories**

1. Unit shall be provided with a safety shutdown terminal block for field installation of a smoke detector which shuts off the unit's control circuit.

Part 3 - Execution

3.01 Installation, Operation, and Maintenance

A. Installation, Operation, and Maintenance manual shall be supplied with the unit.

B. Installing contractor shall install unit, including field installed components, in accordance with Installation, Operation, and Maintenance manual instructions.

C. Start up and maintenance **requirements shall be complied with to ensure safe and correct operation of the unit.**

SECTION 15870 - POWER VENTILATORS

PART I - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes Power Ventilators.

1.3 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections:

1. Product data for selected models, including specialties, accessories, and the following:

a. Motor ratings and electrical characteristics plus motor and fan accessories.

b. Materials gauges and finishes.

2. Shop drawings from manufacturer detailing equipment assemblies and indicating dimensions, weights, required clearances, components, and location and size of field connections.

PART II - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:

1. Carnes Company, Inc.
2. Cook (Loren) Co.
3. Greenheck Fan Corp.
4. Penn Ventilator Co., Inc.

2.2 ROOF EXHAUSTERS

A. Centrifugal Fan Unit: V-belt driven with spun aluminum housing; resilient mounted motor, ½ inch mesh, 16 gauge aluminum bird screen; square base to suit roof curb with continuous curb gaskets; secured with cadmium plated bolts and screws.

B. Roof Curb: 16 inch high with continuously welded seams and factory installed door nailer strip.

C. Disconnect Switch: Factory wired, non-fusible, in housing for thermal overload protected motor.

D. Back Draft Damper: Gravity activated, aluminum multiple blade construction, felt edged with nylon bearings.

E. Sheaves: Cast iron or steel, dynamically balanced, bored to fit shafts and keyed; variable and adjustable pitch motor sheave selected so required rpm is obtained with sheaves set at mid-position; fan shaft with self-aligning pre-lubricated ball bearings.

2.3 WALL EXHAUSTERS

A. Centrifugal Fan Unit: V-belt driven with spun aluminum housing; resilient mounted motor, ½ inch mesh, 16 gauge aluminum bird screen; secured with cadmium plated bolts and screws.

B. Disconnect Switch: Factory wired, non-fusible, in housing for thermal overload protected motor.

C. Back Draft Damper: Gravity activated, aluminum multiple blade construction, felt edged with nylon bearings.

D. Sheaves: Cast iron or steel, dynamically balanced, bored to fit shafts and keyed; variable and adjustable pitch motor sheave selected so required rpm is obtained with sheaves set at mid-position; fan shaft with self-aligning pre-lubricated ball bearings.

2.4 CEILING EXHAUST FANS

A. Centrifugal Fan Unit: V-belt or direct drive with galvanized steel housing lined with ½ inch acoustic insulation, resilient mounted motor, gravity back draft damper in discharge.

B. Disconnect Switch: Factory wired, non-fusible, in housing for thermal overload protected motor.

C. Grille: Molded white plastic or aluminum with baked white enamel finish.

D. Sheaves: Cast iron or steel, dynamically balanced, bored to fit shafts and keyed; variable and adjustable pitch motor sheaves selected so required RPM is obtained with sheaves set at mid-position; fan shaft with self-aligning pre-lubricated ball bearings.

2.5 IN-LINE CABINET EXHAUST FANS

A. Centrifugal Fan Unit: V-belt or direct driven, with galvanized steel housing lined with ½ inch acoustic insulation, resilient mounted motor, gravity back draft damper in discharge.

B. Disconnect Switch: Factory wired, non-fusible, in housing for thermal overload protected motor.

C. Sheaves: Cast iron or steel, dynamically balanced, bored to fit shafts and keyed; variable and adjustable pitch motor sheaves selected so required RPM is obtained with sheaves set at mid-position; fan shaft with self-aligning pre-lubricated ball bearings.

2.6 ROOF SUPPLY FAN

A. Fan Unit: Direct driven axial type, aluminum hood, bird screen, die formed aluminum propeller blades riveted to steel hub, resilient mounted motor square base to suit roof curb.

B. Roof Curbs: 16 inch high, continuously welded seams, and factory door nailed strip. Roof curb shall have same manufacturer as fan and be supplied by Mechanical Contractor and installed by the General Contractor.

C. Disconnect Switch: Factory wired, non-fusible, in housing for thermal overload protected motor.

PART III - EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Secure roof exhausters with lag screws to roof curb.

END OF SECTION 15870

SECTION 15891 - METAL DUCTWORK

PART I - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes low pressure ducts and plenums for heating, ventilating, and air conditioning systems

PART II - PRODUCTS

2.1 MATERIALS

A. Steel Ducts: ASTM A525 or ASTM A527 galvanized steel sheet, lock-forming quality, having zinc coating of G-90 for each side in conformance with ASTM A90.

B. Insulated Flexible Ducts: Flexible duct wrapped with flexible glass fiber insulation, enclosed by seamless aluminum pigmented plastic vapor barrier jacket; maximum 0.23 K value at 75 degrees F.

C. Fasteners: Rivets, bolts, or sheet metal screws

D. Sealant: Liquid non-hardening, water resistant, fire resistive, compatible with mating materials; liquid used alone or with tape, or heavy mastic.

E. Hanger Rod: Steel, galvanized; threaded both ends, threaded one end, or continuously threaded.

2.2 LOW PRESSURE DUCTWORK

A. Fabricate and support in accordance with SMACNA Low Pressure Duct Construction Standards and ASHRAE handbooks, except as indicated. Provide duct material, gages, re-inforcing and sealing for operating pressures indicated.

B. No variation of duct configuration or sizes permitted except by written permission.

C. Construct T's, bends, and elbows with radius of not less than 1½ times width of duct on center line. Where not possible and where rectangular elbows are used, provide turning vanes.

D. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible. Divergence upstream of equipment shall not exceed 30 degrees; convergence downstream shall not exceed 45 degrees.

E. Connect flexible ducts to metal ducts with liquid adhesive.

F. Use crimp joints with or without bead for joining round duct sizes 8 inch and smaller with crimp in direction of air flow.

G. Use double nuts and lock washers on threaded rod supports.

2.3 FACTORY FABRICATED DUCTWORK

A. Duct shall be of standard spiral lock seam or single-rib construction and shall be provided according to the gages given in the following table:

Diameter (inches)	Thickness (inches)
3 - 8	.032
9 - 14	.040
15 - 36	.050

B. Duct shall be provided in continuous, unjoined lengths wherever possible. Except when interrupted by fittings, round duct sections.

C. Fittings shall be round and shall have a wall thickness in accordance with the following table:

Fitting Body Diameters (inches)	Minimum Round Fitting Thickness (inches)
3-14	.040
15-26	.050
27-36	.063

D. Elbows shall be of die-stamped, gored or pleated construction. The bend radius of stamped, gored and pleated elbows shall be 1.5 time the elbow diameter.

E. All round elbows in diameter of 8 inches or less shall be of die-stamped or pleated construction.

F. All round elbows in diameter of 9 inches through 14 inches shall be of gored or pleated construction.

G. All round elbows in diameter greater than 14 inches shall be of gored construction.

H. Diverging-flow fittings shall be constructed with a radiused entrance to all branch taps and with no excess material projecting from the body into the branch tap entrance.

I. All take-off or branch entrances shall be by means of factory fabricated fittings.

J. All fitting ends shall be sized to slip inside mating duct sections. They shall provide a tight fit and have a minimum 2-inch insertion length with a stop bead. No additional coupling shall be required for duct to fitting joints.

PART III - EXECUTION

3.1 INSTALLATION

A. Factory Fabricated ductwork can be substituted for low-pressure field constructed ductwork.

B. All factory fabricated spiral duct and fittings shall be installed in accordance with manufacturer's recommendations.

C. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.

D. Connect diffusers or troffer boots to low pressure ducts with 5 feet maximum length of flexible duct. Hold in place with strap or clamp.

E. During construction provide temporary closures of metal or taped polyethylene on open ductwork

to prevent construction dust from entering ductwork system.

3.3 ADJUSTING AND CLEANING

A. Clean duct system and force air at high velocity through duct to remove accumulated dust. To obtain sufficient air, clean half the system at a time. Protect equipment that may be harmed by excessive dirt with temporary filters or bypass during cleaning.

B. Clean duct systems with high power vacuum machines. Protect equipment that may be harmed by excessive dirt with filters, or bypass during cleaning. Provide adequate access into ductwork for cleaning purposes.

END OF SECTION 15891

SECTION 15910 - DUCT ACCESSORIES

PART I - 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. Not used
2. Turning Vanes
3. Duct Mounted Access Doors and Panels
4. Flexible Connectors
5. Flexible Ducts

1.3 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Product data including details for materials, dimensions of individual components, profiles, and finishes.

C. Shop drawings from manufacturer detailing assemblies: Include dimensions, weights, loadings, required clearances, method of field assembly, components, and location and size of each field connection.

PART II - PRODUCTS

2.3 AIR TURNING DEVICES

A. Multi-blade device with blades aligned in short dimension; steel or aluminum construction; with individually adjustable blades, mounting straps.

2.4 FLEXIBLE DUCT CONNECTIONS

A. Fabricate in accordance with SMACNA Low Pressure Duct Construction Standards, and as indicated.

B. Provide factory made spin-in starting collars for connections to trunk ducts.

2.5 DUCT ACCESS DOORS

A. Fabricate in accordance with SMACNA Low Pressure Duct Construction Standards and as indicated.

B. Review locations prior to fabrication.

C. Fabricate rigid and close fitting doors of galvanized steel with sealing gaskets and quick fastening locking devices. For insulated ductwork, install minimum one-inch thick insulation with sheet metal cover.

D. Access doors smaller than 12 inches square may be secured with sash locks.

E. Provide two hinges and two sash locks for sizes up to 18 inches square, three hinges and two compression latches with outside and inside handles for sizes up to 24 x 48 inches. Provide an additional hinge for larger sizes.

F. Access doors with sheet metal screw fasteners are not acceptable.

PART III - EXECUTION

3.1 INSTALLATION

A. Install accessories in accordance with manufacturer's instructions.

B. Provide balancing dampers at points on low pressure supply systems where branches are taken from larger ducts as required for air balancing. Use splitter dampers only where indicated.

C. Provide flexible connections immediately adjacent to equipment in ducts associated with fans and motorized equipment.

D. Provide duct access doors for inspection and cleaning before and after filters, coils, fans, automatic dampers, at fire dampers, and elsewhere as indicated. Provide minimum 8 x 8 inch size for hand access, 18 x 18 inch size for shoulder access, and as indicated.

E. Provide duct test holes where indicated and required for testing and balancing purposes.

END OF SECTION 15910

SECTION 15932 - AIR OUTLETS AND INLETS

PART I - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this Section.

1.2 DESCRIPTION OF WORK

A. Extent of air outlets and inlets work is indicated by Drawings and Schedules and by Requirements of this Section.

B. Types of outlets and inlets required for this Project include the following:

1. Ceiling Air Diffusers
2. Wall Registers and Grilles
3. Louvers

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's technical product data for air outlets and inlets including the following:

1. Schedule of air outlets and inlets indicating drawing designation, room location, number furnished, model number, size and accessories furnished.

2. Data sheet for each type of air outlet and inlet, and accessory furnished; indicating construction, finish and mounting details.

3. Performance data for each type of air outlet and inlet furnished, throw and drop; and noise criteria ratings. Indicate selections on data.

B. Shop Drawings: Submit manufacturer's assembly-type shop drawing for each type of air outlet and inlet, indicating materials and methods of assembly of components.

PART II - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Diffusers & Grilles

1. Titus, Inc.
2. Metalaire, Inc.
3. Carnes, Inc.
4. E. H. Price

B. Louvers

1. Arrow United Industries, Inc.
2. Louvers & Dampers, Inc.
3. Penn Ventilator Co., Inc.
4. Ruskin Mfg. Co.
5. Safe-Air Inc.

6. Vent Products Co., Inc.
7. NCA
8. Cesco Products

2.2 RECTANGULAR CEILING DIFFUSERS

A. Rectangular, extruded aluminum, multi-core type diffuser to discharge air in 360 degree pattern.

B. Provide inverted T-bar type frame. In plaster ceilings, provide plaster frame and ceiling frame.

C. Fabricate of aluminum with baked enamel off-white finish.

D. Provide opposed blade damper with damper adjustable from diffuser face.

2.3 CEILING GRID CORE EXHAUST AND RETURN REGISTERS/GRILLES

A. Fixed grilles of 1/2 x 1/2 x 1 inch egg crate.

B. Provide inverted T-bar type frame. In plaster ceilings, provide plaster frame and ceiling frame.

C. Fabricate of aluminum with baked enamel off-white finish.

D. Where not individually connected to exhaust fans, provide integral, gang-operated opposed blade dampers with removable key operator, operable from face.

2.4 WALL SUPPLY REGISTERS/GRILLES

A. Streamlined and individually adjustable blades, depth of which exceeds ¾ inch maximum spacing with spring or other device to set blades, horizontal face, double deflection.

B. Fabricate 1¼ inch margin frame with countersunk screw mounting and gasket.

C. Fabricate of aluminum extrusions with 20 gauge minimum frames and 22 gauge minimum blades, with baked enamel off-white finish.

D. Provide integral, gang-operated opposed blade dampers with removable key operator, operable from face.

2.6 LOUVERS

A. Provide 4-inch deep louvers with blades on 45 degree slope with center baffle and return bend, heavy channel frame, bird screen with ½ inch square mesh.

B. Fabricate of 12-gauge extruded aluminum, welded assembly, with factory baked enamel finish. Color selection from manufacturer standard.

C. Furnish with interior screw holes in jambs for installation.

2.7 ROOF HOODS

A. Fabricate air inlet or exhaust hoods in accordance with SMACNA Low Pressure Duct Construction Standards.

B. Fabricate of aluminum, minimum 16 gauge base and 18 gauge hood; suitably reinforced; with removable hood; bird screen with ½ inch square mesh and factory prime coat baked enamel finish.

C. Mount unit on minimum 12-inch high curb base with insulation between duct and curb.

D. Make hood outlet area minimum of twice throat area.

PART III - EXECUTION

3.1 INSTALLATION

A. Install items in accordance with manufacturer's instructions.

B. Check location of outlets and inlets and make necessary adjustments in position to conform with architectural features, symmetry and lighting arrangement.

C. Install diffusers to ductwork with air-tight connection.

D. Provide balancing dampers on duct take-off to diffusers, and grilles and registers, regardless of whether dampers are specified as part of the diffuser, or grille and register assembly.

E. Paint ductwork visible behind air outlets and inlets matte black.

END OF SECTION 15932

SECTION 15990 - TESTING, ADJUSTING AND BALANCING

PART I - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this Section.

1.2 SUMMARY

A. This Section specifies the Requirements and Procedures of Total Mechanical Systems Testing, Adjusting and Balancing. Requirements include measurement and establishment of the fluid quantities of the Mechanical Systems as required to meet Design Specifications and Recording and reporting the results.

B. Testing and Balancing must be conducted by an independent, Certified Testing and Balancing firm, registered with either the AABC or the NEBB.

C. The Test and Balance Contractor shall be a subcontractor to the Mechanical Contractor.

1.3 SECTION INCLUDES

A. Testing, adjustment and balancing of air systems.

B. Measurement of final operating condition of HVAC Systems.

C. Sound measurement of equipment operating conditions.

D. Vibration measurement of equipment operating conditions.

1.4 SUBMITTALS

A. Submit under provisions of Section 15500.

B. Submit name of adjusting and balancing agency for approval within 30 days after Award of Contract.

C. Field Reports: Submit under provisions of Section 15500.

D. Field Reports: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.

E. Prior to commencing work, submit report forms or outlines indicating adjusting, balancing, and equipment data required.

F. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Owner and for inclusion in operating and maintenance manuals.

G. Provide reports in soft cover, letter size, 3-ring binder manuals, complete with index page and indexing tabs, with cover identification at front and side. Report shall reference the Contract Drawings for location of equipment and devices. Where reference to the contract drawings is not satisfactory, include a set of reduced drawings or sketches with equipment and devices identified to correspond with data sheets.

H. Include detailed procedures, agenda, sample report forms and copy of AABC National Project Performance Guaranty prior to commencing system balance.

I. Test Reports: Indicate data on AABC National Standards for Total System Balance forms or NEBB forms.

1.5 QUALITY ASSURANCE

A. Perform total system balance in accordance with AABC National Standards for Field Measurement and Instrumentation, Total System Balance, ASHRAE 111, and NEBB Procedural Standards for Testing, Balancing and Adjusting of Environmental Systems.

B. Maintain one copy of each document on site.

1.6 SEQUENCING AND SCHEDULING

A. Sequence work under the provisions of Section 15500.

B. Sequence work to commence after completion of systems and schedule completion of work before Substantial Completion of Project.

C. Schedule work under the provisions of Section 15500.

D. Schedule and provide assistance in final adjustment and test of Smoke Control System with Fire Authority.

PART II - PRODUCTS (Not Used)

PART III - EXECUTION

3.1 EXAMINATION

A. Verify that systems are complete and operable before commencing work. Ensure the following conditions:

1. Systems are started and operating in a safe and normal condition.

2. Control systems are installed complete and operable.

3. Proper thermal overload protection is in place for electrical equipment.

4. Ductwork Systems:

a. Final filters are clean and in place. If required, install temporary media in addition to final filters.
b. Duct systems are clean of debris.
c. Fans are rotating correctly.
d. Dampers are in place and open.
e. Air coil fins are cleaned and combed.
f. Access doors are closed and duct end caps are in place.
g. Air inlets and outlets are installed and connected.
h. Duct system leakage is minimized.

B. Submit Field Reports: Report defects and deficiencies noted during performance of services which prevent system balance.

C. Beginning of work means acceptance of existing conditions.

3.2 PREPARATION

A. Provide instruments required for testing, adjusting, and balancing operations. Make instruments available to Owner to facilitate spot checks during testing.

B. Provide additional balancing devices as required.

3.3 INSTALLATION TOLERANCES

A. HVAC Systems: Adjust to within plus or minus 5 percent of design for supply and return systems and plus or minus 10 percent of design for exhaust systems.

B. Air Outlets and Inlets: Adjust outlets and inlets in space to within plus or minus 10 percent of design.

3.4 ADJUSTING

A. Ensure recorded data represents actual measured or observed conditions.

B. Permanently mark settings of balancing devices allowing settings to be restored. Set and lock memory stops.

C. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.

D. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

3.5 AIR SYSTEM PROCEDURE

A. Adjust equipment and distribution systems to provide required or design air quantities.

B. Make air quantity measurements in ducts by Pitot tube traverse of entire cross sectional area of duct.

C. Measure and record air quantities at air inlets and outlets.

D. Adjust distribution system to obtain uniform space temperatures free from objectionable drafts and noise.

E. Use volume control devices to regulate air quantities only to extent that adjustments do not create objectionable air motion or sound levels. Adjust air volume by adjusting duct internal devices such as dampers and splitters. Do not utilize opposed blade dampers at air inlets and outlets.

F. Vary total system air quantities by adjusting sheave position at each fan. Vary branch air quantities by damper regulation.

G. Measure and record static air pressure conditions at air supply and exhaust units, including filter and coil pressure drops, and total pressure across the fan. Make allowances for 50 percent loading of filters.

H. Adjust settings and minimum set points for motorized and back draft dampers to design conditions.

I. Measure and record inlet and outlet temperatures at each air supply unit at full cooling and heating capacity.

3.6 REPORT FORMS

A. Forms shall include the following:

1. Title Page:
   a. Name of Testing, Adjusting and Balancing Agency
   b. Address of Testing, Adjusting and Balancing Agency
   c. Telephone number of Testing, Adjusting and Balancing Agency
   d. Project Name
   e. Project Location
   f. Project Architect
   g. Project Engineer
   h. Project Contractor
   i. Project Altitude
   j. Report Date

2. Summary Comments:
   a. Design versus final performance
   b. Notable characteristics of system
   c. Description of systems operation sequence
   d. Summary of outdoor and exhaust flows to indicate amount of building pressurization
   e. Nomenclature used throughout report
   f. Test Conditions

3. Instrument List:
   a. Instrument
   b. Manufacturer
   c. Model Number
   d. Serial Number
   e. Range
   f. Calibration Date

4. Electric Motors:
   a. Manufacturer
   b. Model/Frame
   c. HP/BHP/Efficiency
   d. Phase, Voltage, Amperage; Nameplate, Actual, No Load
   e. RPM
   f. Service Factor
   g. Starter Size, Rating, Heater Elements
   h. Sheave Make/Size/Bore

5. V-Belt Drive:
   a. Identification/Location
   b. Required Driven RPM
   c. Driven Sheave, Diameter and RPM
   d. Belt, Size and Quantity
   e. Motor Sheave Diameter and RPM
   f. Center to center distance, maximum, minimum, and actual

6. Equipment Data:
   a. Identification/number

b. Manufacturer
c. Model number and Serial number
d. Capacity
e. Service
f. Design flow rate, pressure drop, BHP
g. Actual flow rate, pressure drop, BHP
h. Temperature readings

7. Duct Traverse:
   a. System zone/branch
   b. Duct size
   c. Area
   d. Design velocity
   e. Design air flow
   f. Test velocity
   g. Test air flow
   h Duct static pressure
   i Air temperature
   j Correction factor

8. Air Distribution Test Sheet:
   a. Air terminal number
   b. Room number/location
   c. Terminal type
   d. Terminal size
   e. Area factor
   f. Design velocity
   g. Design air flow
   h. Test (final) velocity
   i Test (final) air flow
   j. Percent of design air flow

3.7 SOUND AND VIBRATION TESTING

A. Test and adjust Mechanical Systems for sound and vibration in accordance with the detailed instructions of the referenced Standards.

B. Sound Level Test and Report:
   1. Location
   2. Octave Bands - equipment off
   3. Octave Bands - equipment on

C. Vibration Test and Report:

1. Location of Points:
   a. Fan bearing: drive end
   b. Fan bearing: opposite end
   c. Motor bearing: center (if applicable)
   d. Motor bearing: drive end
   e. Motor bearing: opposite end
   f. Casing: (bottom or top)
   g. Casing: (side)
   h. Duct after flexible connection: (discharge)
   i. Duct after flexible connection: (suction)

2. Test Readings:

a. Horizontal, velocity and displacement
b. Vertical, velocity and displacement
c. Axial, velocity and displacement

3. Normally acceptable readings, velocity and acceleration

4. Unusual conditions at time of test

5. Vibration source (if non-complying)

END OF SECTION 15990

DIVISION 16 - ELECTRICAL

16010	Basic Electrical Requirements
16050	Basic Electrical Materials & Methods
16100	Raceways, Boxes & Cabinets
16120	Wires & Cables
16140	Wiring Devices
16190	Supporting Devices
16195	Electrical Identification
16452	Grounding
16476	Disconnects
16515	Interior Lighting
16525	Exterior Lighting

SECTION 16010 - BASIC ELECTRICAL REQUIREMENTS

PART I - GENERAL

1.1 GENERAL CONDITIONS

A. The Stipulations and Conditions stated in this Section, together with all provisions of the "Instructions to Bidders", "General Conditions", "Supplemental General Conditions" and "Special Conditions", hereinbefore set forth, shall apply to this and the other Sections of Division 16.

1.2 GENERAL REQUIREMENTS

A. The General Requirements hereinafter listed apply to the Electrical Work Division. If there is any conflict between the General Requirements and the General Conditions, the General Conditions shall take precedence.

1.3 ALTERNATES

A. See drawings for approved equals. No alternates are allowed in the bid documents.

1.4 INTENT

A. The intent of these Drawings and Specifications are to describe the installation of a complete, fully adjusted, and operational system. Therefore, any items shown on Drawings and not specifically called for in the Specifications, or any items specified and not specifically indicated or detailed on the Drawings, or any items neither specified or shown, but which are reasonably incidental to and commonly required to make a complete job, will be furnished and installed by the Electrical Contractor at his own expense.

1.5 DEFINITIONS

A. The Electrical Contractor shall provide all supervision, labor, material equipment, machinery, plant, and any and all other items necessary to complete the Electrical systems. All items of equipment are specified in the singular; however, the Electrical Contractor shall provide the number of items of equipment as indicated on the drawings, and as required for complete systems.

Where the word "provide" is used, it shall mean "furnish and install complete and ready to use”.

1.6 VISIT TO THE SITE

A. The Electrical Contractor shall visit the site before submitting his bid so as to be thoroughly familiar with the job conditions and/or peculiarities. No extra payment will be allowed for anything which could have been anticipated from a visit to the site.

1.7 REGULATORY REQUIREMENTS

A. All work under this section shall be accomplished in strict accordance with State codes. Where these plans and specifications conflict with such codes, the codes shall govern.

B. The Electrical Contractor shall notify the Architect or Engineer of such conflicts in writing prior to receipt of bids.

C. References to the National Electrical Code (NEC), Underwriters Laboratories, Inc. (UL), and National Fire Protection Association (NFPA) are a minimum installation requirement.

D. The following regulatory shall be used as minimum standards:

AEIC	American Association of Edison Illuminating Companies
ANSI	American National Standards Institute
ASTM	American Society for Testing and Materials
ICEA	Insulated Cable Engineers Association
IEEE	Institute of Electrical and Electronic Engineers
NCCM	N.C. Construction Manual w/G.S. as listed
NCSBC	N.C. State Building Code
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NESC	National Electrical Safety Code
NFPA	National Fire Protection Association
U/L	Underwriters' Laboratories, Inc.
OSHA	Occupational Safety and Health Standards
ASHRAE/IES	90.1 energy code

1.8 TEST STANDARDS

A. All material and equipment shall be listed, labeled or certified by a nationally recognized testing laboratory to meet Underwriters Laboratories, Inc., or third party agencies accredited by the North Carolina Building Code Councils latest edition or amendment.

1.9 PERMITS AND FEES

A. The Electrical Contractor shall make all necessary arrangements, obtain all necessary approval, and obtain all permits required for the installation of any of the work covered under the Electrical Work Division of the Specifications. Any fees required by any utility companies or municipal authorities for the final connections for these services shall be paid by the Electrical Contractor under whose work such services appear. Before the job is certified as substantially complete, a Certificate of Approval from all authorities involved must be obtained and turned over to the Architect/Engineer.

1.10 DRAWINGS AND SPECIFICATIONS

A. The Electrical Drawings and Specifications are intended to cover all the work enumerated under the respective headings. The Drawings are diagrammatic only. No Contractor shall take advantage of conflict or error between Drawings and Specifications, or between General Drawings and Mechanical, Plumbing and/or Electrical Drawings, but shall request a clarification of such from the Architect/Engineer, should this condition exist. If there is insufficient time to issue an Addendum for this clarification, the Electrical Contractor shall include in his bid the most expensive of the items in conflict.

B. The Electrical Contractor shall refer to the Architectural and Structural Drawings and Specifications for the general construction of the building, for floors and ceiling heights, for locations of walls, partitions, beams, etc., and shall be guided accordingly for setting of all sleeves, inserts and equipment. No Contractor shall under any circumstances scale drawings for the location of equipment. The Electrical Contractor shall verify the locations of all utility services and electrical equipment.

C. The Electrical Contractor shall keep at least one set of corrected Shop and Design Drawings at the site. Drawings are to be current, denoting approved modifications and actual installed departure. Submit Drawings to Architect/Engineer before final payment is made.

1.11 SUPERVISION

A. The Electrical Contractor performing the work specified shall be required to employ a qualified superintendent or foreman to continuously supervise the installation of their work, with authorization to act as agent. He shall be capable of checking layouts, coordinating and supervising the work, establishing grades and levels and locating chases, openings, hangers, inserts, sleeves, etc.

PART II - PRODUCTS

2.1 STANDARD PRODUCTS

A. Unless otherwise indicated in writing by the Architect/Engineer, the materials to be provided under this Specification shall be standard products of manufacturers regularly engaged in the production of such equipment and shall be the manufacturer's latest design. All items of the same type or rating shall be identical.

2.2 SUBMITTAL

A. The Electrical Contractor shall submit, for approval, detailed Shop Drawings on all major equipment and where requested. No materials or equipment may be delivered to the job site or installed until the Electrical Contractor has in his possession the approved Shop Drawing for the particular material or equipment. The Electrical Contractor shall furnish the number of copies required by the General or Special Conditions of the contract, but no case less than six (6) copies.

B. Submitted material shall be properly labeled indicating specific service for which material or equipment is to be used, Section and Article Number of Specifications governing, Contractor's name and name of job.

C. Approval of equipment will not relieve the Electrical Contractor of compliance with the Specifications even if such approval is made in writing, unless the attention of the Engineer is called to the non-complying features by letter accompanying the submittal data. Approval of submittal data by the Engineer shall not be construed as a complete check of approval of detailed dimensions, weights, gauges, and similar details with the proposed articles. The conformance with the necessary coordination between the various other Contractors and suppliers shall be solely the responsibility of the Electrical Contractor and with no additional expense to the Owner.

2.3 SUBSTITUTIONS

A. Manufacturer's lists are to establish a standard of quality and not intended to limit the selection to these manufacturers. All materials and equipment which are essential and have not been specified or shown shall be new and of the highest grade and quality free from defect or other imperfections. It should be understood that where the words "furnished and installed" are used, it is intended that the Electrical Contractor shall purchase and install all materials required, unless otherwise noted.

B. All materials and equipment proposed as substitutes for these specified shall require a ten (10) day prior approval from the Engineer prior to the bid date. No substitutions will be allowed after the ten (10) day period before the bid date.

C. All products shall be furnished in compliance with NC General Statute 133-3.

2.4 PRODUCT HANDLING

A. Equipment and materials shall be properly stored, adequately protected, and carefully handled to prevent damage before and during installation. Equipment and materials shall be handled, stored and protected in accordance with the manufacturer's recommendations and as approved by the Architect/Engineer. Equipment installed with a factory finish shall be fully protected during

construction and shall be maintained free of dust, dirt and foreign matter. Dents and other surface damage shall be repaired or replaced to the satisfaction of the Architect/Engineer at no additional cost to the Owner.

B. The Electrical Contractor shall clean up and remove from the job site all waste materials, packaging, crating, and refuse resulting from his work on a daily basis.

2.5 MATERIALS AND WORKMANSHIP

A. The Electrical Contractor shall perform a first class job, both in material and workmanship. None other will be accepted. Deviations from either will be corrected by the Electrical Contractor at the Electrical Contractor's expense.

B. The material used throughout the work, except when otherwise noted, shall be new and of Specification grade and the best of its kind. No substitutes shall be used unless approved by the Architect/Engineer. All work shall be executed with a maximum speed consistent with safety and good workmanship.

C. Any equipment furnished by the Mechanical Contractor or any other Contractor that is larger than those indicated on the Drawings and described in these Specifications or have different Electrical characteristics, the increase in cost to the Electrical Contractor for larger wires, conduit, circuit breakers, switches, etc. or for changes in work already installed shall be borne by the instigating Contractor.

PART III - EXECUTION

3.1 EXCAVATION AND BACKFILL

A. The Electrical Contractor shall preform any and all trench and pit excavation and backfilling required for the installation of his work. Trenches shall be made with the sides vertical and shall be shored where necessary for the protection of men and equipment. All excavation work shall be done in a careful manner to avoid damage to footers and foundations. The backfilling shall be placed in layers not exceeding 4 inches in depth, wetting each layer as it is placed and thoroughly compacting each layer with Mechanical tamper or other approved means. Any damage done during excavation and backfilling operations to roads, sidewalks, curbs, shrubs, sod, footers, foundations, etc. shall be replaced to its original condition prior to construction at no expense to the owner. All work will be approved by the Engineer.

3.2 SCAFFOLDING, RIGGING AND HOISTING

A. The Electrical Contractor shall furnish all necessary scaffolding, staging, rigging and hoisting required for the completion of his work. All such scaffolding, etc., shall be removed from the premises when its use is no longer required on the job.

3.3 CUTTING AND PATCHING

A. The Electrical Contractor shall provide all cutting and patching necessary to install the work specified in the 16000 Sections. The patching shall match adjacent surface material and finishes.

B. No Structural member shall be cut without the approval of the Engineer and all such cutting shall be done in a manner directed by him.

C. Cutting or Holes:

1. Locate holes in advance where they are proposed in the Structural Sections such as ribs or beams. Obtain the approval of the Engineer prior to drilling through Structural

Sections.

2. Cut holes through concrete and masonry in new and existing structures with a diamond core drill or concrete saw. Pneumatic hammer, impact electric, hand or manual hammer type drills are not allowed.

3.4 WATERPROOFING

A. At floor, exterior wall, and roof conduit penetrations, completely seal clearances around the conduit and make watertight. All work subject to approval of the Engineer.

3.5 EQUIPMENT SPACE AND ARRANGEMENT

A. The equipment shall fit into the space allotted and shall allow adequate clearance for entry, installation, replacement, servicing, and maintenance. The Electrical Contractor shall coordinate the work to ensure that equipment may be moved into place without altering building components or other installations. Access space shall not be less than the equipment manufacturer's requirements. Working clearances shall be not less than N.E.C or other regulatory requirements.

B. These drawings indicate the extent and general arrangement of equipment. If any departures are deemed necessary by the Electrical Contractor, details of such departures and the reasons therefore shall be submitted to the Architect/Engineer for approval as soon as practicable and within 30 days after Award of the Contract. No departure shall be made without written approval of the Architect/Engineer. Any delay on the Contractor's part to provide such submittal will not constitute an extension of the Contract time.

3.6 DAMAGE TO WORK ALREADY IN PLACE

A. The Electrical Contractor shall assume full responsibility for any damage done by him, his agents or employees, to any work already in place. Any such damage done shall be repaired at the Contractor's expense by Mechanics skilled at their respective trades, to the approval of the Architect/Engineer.

3.7 JURISDICTION OF WORK

A. It may become necessary for the Electrical Contractor to furnish labor or materials which are not generally accepted as part of this trade. In cases of this type, he shall contract the work or shall furnish materials and employ workmen of the trade involved in order not to cause any delay or stoppage of work caused by infringement of Trade Agreements as to jurisdiction, alleged or actual.

3.8 COORDINATION WITH OTHER TRADES

A. All work shall be coordinated with other trades involved in the construction project. All work shall be carefully laid out in advance to coordinate Architectural, Structural, Mechanical, Plumbing and Electrical features of construction. The Contractor shall verify at the site all locations, grades, elevations and utility service connections indicated. Any conflicts due to lack of proper coordination shall be brought to the attention of the Architect/Engineer for resolution. The Electrical Contractor shall make required changes or relocations at no additional cost to the Owner.

B. Installation, inspection, and testing of work above ceilings shall be completed and approved by the Architect/Engineer prior to installation of the specified finished ceilings. However, a Ceiling Suspension System may be installed as required for coordination.

C. The Electrical Contractor shall consult with the other trades at the start of the work and periodically thereafter, as required to properly coordinate the various items of work, and to avoid interferences. Should any interferences of any nature develop as the work progresses, such

interferences shall be resolved and eliminated as directed. The cost of any work directed shall be borne by the Subcontractor or Contractors directed to do this work.

3.9 DIVISION OF WORK

A. These paragraphs are intended to show exactly the point of division of work between the Electrical Division and the Mechanical Division or any other division.

C. All equipment covered in the Mechanical Division or any other Division of the Specifications shall be furnished, mounted, and aligned under the respective Division. All starters, controls and wiring for this equipment, including final connection to the same, shall be furnished and installed under that Division.

D. Divisions of the Specifications shall be completed under the respective Division.

E. Under Division 16, the Contractor shall be responsible for providing all line side power wiring, conduit, disconnect switches, and junction boxes as shown on the electrical drawings.

3.10 EQUIPMENT INSTALLATION

A. Manufacturer's Instructions: Equipment shall be installed as recommended by the manufacturer to conform to the requirements of the particular application, in accordance with these Drawings and Specifications.

3.11 OPERATION AND MAINTENANCE MANUALS

A. Prepare maintenance manuals in accordance with Division 1 Section "PROJECT CLOSEOUT". In addition to the requirements specified in Division 1, include the following information for equipment items:

1. Description of function, normal operating characteristics and limitations, performance curves, engineering data and tests, and complete nomenclature and commercial numbers of replacement parts.

2. Manufacturer's printed Operating Procedures to include start-up, break-in, and routine and normal Operating Instructions; regulation, control, stopping, shutdown, and emergency instructions and summer and winter operating instructions.

3. Maintenance procedures for routine preventative maintenance and troubleshooting; disassembly, repair, and re-assembly; aligning and adjusting instructions.

4. Servicing Instructions and Lubrication Charts and Schedules.

3.12 RECORD DOCUMENTS

A. Prepare record documents in accordance with the requirements in Division 1 Section "PROJECT CLOSEOUT". In addition to the requirements specified in Division 1, indicate installed conditions for:

1. Major raceway systems, size and location, for both exterior and interior; locations of control devices; distribution and branch electrical circuitry; and fuse and circuit breaker size and arrangements.

2. Equipment locations (exposed and concealed) dimensioned from prominent building lines.

3. Approved substitutions, Contract modifications and actual equipment and materials installed.

3.13 GUARANTEE

A. The Electrical Contractor shall present to the Owner a written guarantee covering his work, including all equipment, material and workmanship. This guarantee shall be against all defects in any of the above work, and shall run for a period of one (1) year from the date of written acceptance of the Contractor's work.

B. Any defective work, equipment, material and/or workmanship that develops within the Guarantee period, which is not caused by ordinary wear or abuse by other persons, shall be replaced by the Electrical Contractor without cost to the Owner.

3.14 FINAL INSPECTION

A. When the entire Contract has been completed and the work is ready for final inspection, the Architect/Engineer or his duly authorized representative will make the inspection. At the time of inspection, the Electrical Contractor shall demonstrate to the Architect/Engineer that the various systems and pieces of equipment have been adjusted to operate in accordance with the requirements of the Contract. The State Construction Office is the Authority Having Jurisdiction (AHJ) for the Electrical Inspections on this project. It is the responsibility of the Electrical Contractor to notify the State Property Electrical Inspectors in the State Construction Office, to schedule the required rough-in, above ceiling, and final inspections. No work will be covered up until after the inspection has been completed and approved by an authorized SCO inspector. SCO Electrical inspectors are only available Monday thru Friday.

3.15 FINAL PAYMENTS

A. All Final Payments are contingent upon all necessary Certificates and/or Approvals cited above, together with the written Guarantee being presented to the Owner.

3.16 DOCUMENTATION

A. All tests shall be completely documented indicated time of day, temperature, and all pertinent test information.

B. All required documentation of readings shall be submitted to the engineer prior to, and as one of the prerequisites for, final acceptance of the project.

END OF SECTION 16010

SECTION 16050 - BASIC ELECTRICAL MATERIALS AND METHODS

PART I - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes limited Scope, General Construction Materials and Methods for Application with Electrical Installations as follows:

1. Miscellaneous metals for support of electrical materials and equipment.

2. Joint sealers for sealing around electrical materials and equipment; and for sealing penetrations in fire and smoke barriers, floors, and foundation walls.

1.3 DEFINITIONS

A. The following definitions apply to excavation operations:

1. Additional Excavation: Where excavation has reached required subgrade elevations, if unsuitable bearing materials are encountered, continue excavation until suitable bearing materials are reached. The Contract Sum may be adjusted by an appropriate Contract Modification.

2. Sub-Base: As used in this Section refers to the compacted soil layer used in pavement systems between the subgrade and the pavement base course material.

3. Sub-Grade: As used in this Section refers to the compacted soil immediately below the slab or pavement system.

4. Unauthorized excavation consists of removal of materials beyond indicated sub-grade elevations or dimensions without specific direction from the Architect.

1.4 SEQUENCE AND SCHEDULING

A. Coordinate the shut-off and disconnection of electrical service with the Owner and the utility company.

PART II - PRODUCTS

2.1 SOIL MATERIALS

A. Sub-Base Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, crushed slag, or natural or crushed sand.

B. Drainage Fill: Washed, evenly graded mixture of crushed stone, or crushed or uncrushed gravel, with 100 percent passing a 1½ inch sieve, and not more than 5 percent passing a No. 4 sieve.

C. Backfill and Fill Materials: Materials complying with ASTM D2487 soil classification groups GW, GP, GM, SM, SW, and SP; free of clay, rock, or gravel larger than 2 inches in any dimension; debris; waste; frozen materials; and vegetable and other deleterious matter.

2.2 MISCELLANEOUS METALS

A. Steel plates, shapes, bars, and bar grating: ASTM A 36.

B. Cold-Formed Steel Tubing: ASTM A 500.

C. Hot-Rolled Steel Tubing: ASTM A 501.

D. Steel Pipe: ASTM A 53, Schedule 40, welded.

E. Fasteners: Zinc-coated, type, grade and class as required.

PART III - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting installation and application of joint sealers. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 EXCAVATION

A. Slope sides of excavations to comply with local codes and ordinances. Shore and brace as required for stability of excavation.

B. Install sediment and erosion control measures in accordance with local codes and ordinances.

C. Dewatering: Prevent surface water and subsurface or groundwater from flowing into excavations and from flooding project site and surrounding area.

1. Do not allow water to accumulate in excavations. Remove water to prevent softening of bearing materials.

2. Provide and establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey surface water to collecting or run-off areas. Do not use trench excavations as temporary drainage ditches.

D. Material Storage: Stockpile satisfactory excavated materials where directed, until required for backfill or fill. Place, grade, and shape stockpiles for proper drainage.

1. Locate and retain soil materials away from edge of excavations. Do not store within drip line of trees indicated to remain.

2. Remove and legally dispose of excess excavated materials and materials not acceptable for use as backfill or fill.

E. Trenching: Excavate trenches for electrical installations as follows:

1. Excavate trenches to the uniform width, sufficiently wide to provide ample working room and a minimum of 6 to 9 inches clearance on both sides of raceways and equipment.

2. Excavate trenches to depth indicated or required.

3. Limit the length of open trench to that in which installations can be made and the trench backfilled within the same day.

4. Where rock is encountered, carry excavation below required elevation and backfill with a layer of crushed stone or gravel prior to installation of raceways and equipment. Provide a minimum of 6 inches of stone or gravel cushion between rock bearing surface and electrical installations.

F. Cold Weather Protection: Protect excavation bottoms against freezing when atmospheric temperature is less than 35 degrees F (1 degree 2 C).

G. Backfilling and Filling: Place soil materials in layers to required subgrade elevations for each area classification listed below, using materials specified in Part 2 of this Section.

1. Under walks and pavements, use a combination of sub-base materials and excavated or borrowed materials.

2. Under building slabs, use drainage fill materials.

3. Under piping and equipment, use subbase materials where required over rock bearing surface and for correction of unauthorized excavation.

4. For raceways less than 30 inches below surface of roadways, provide 4-inch thick concrete base slab support. After installation of raceways, provide a 4-inch thick concrete encasement (sides and top) prior to backfilling and placement of roadway sub-base.

5. Other areas, use excavated or borrowed materials.

H. Backfill excavations as promptly as work permits, but not until completion of the following:

1. Inspection, testing, approval, and locations of underground utilities have been recorded.

2. Removal of concrete formwork.

3. Removal of shoring and bracing and backfilling of voids.

4. Removal of trash and debris.

I. Placement and Compaction: Place backfill and fill materials in layers of not more than eight (8) inches in loose depth for material compacted by heavy equipment, and not more than four (4) inches in loose depth for material compacted by hand operated tampers.

J. Before compaction, moisten or aerate each layer as necessary to provide optimum moisture content. Compact each layer to required percentage of maximum dry density or relative dry density for each area classification specified below. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.

K. Place backfill and fill materials evenly adjacent to structures, piping, and equipment to required elevations. Prevent displacement of raceways and equipment by carrying material uniformly around them to approximately same elevation in each lift.

L. Compaction: Control soil compaction during construction, providing minimum percentage of density specified for each area classification indicated below.

1. Percentage of Maximum Density Requirements: Compact soil to not less than the following percentages of maximum density for soils which exhibit a well-defined moisture density relationship (cohesive soils), determined in accordance with ASTM D 1557 and not less than the following percentages of relative density, determined in

accordance with ASTM D 2049, for soils which will not exhibit a well-defined moisture density relationship (cohesion-less soils).

2. Areas Under Structures, Building Slabs and Steps, Pavements: Compact top 12 inches of material, or 95 percent relative density for cohesionless material.

   a. Areas Under Walkways: Compact top 6 inches of subgrade and each layer of backfill or fill material to 90 percent maximum density for cohesive material or 95 percent relative density for cohesionless material.

   b. Other Areas: Compact top 6 inches of subgrade and each layer of backfill or fill material to 85 percent maximum density for cohesive soils, and 90 percent relative density for cohesionless soils.

3. Moisture Control: Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water. Apply water in minimum quantity necessary to achieve required moisture content and to prevent water appearing on surface during, or subsequent to, compaction operations.

4. Subsidence: Where subsidence occurs at electrical installation excavations during the period 12 months after Final Completion, remove surface treatment (i.e., pavement, lawn, or other finish), add backfill material, compact to specified conditions, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent areas.

3.3 ERECTION OF METAL SUPPORTS AND ANCHORAGE

A. Cut, fit, and place miscellaneous metal fabrications accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.

B. Field Welding: Comply with AWS "Structural Welding Code".

END OF SECTION 16050

SECTION 16100 - RACEWAYS, BOXES AND CABINETS

PART I - 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 Raceways, Fittings, Boxes, Enclosures and Cabinets for Electrical Wiring.

PART II - PRODUCTS

2.1 METAL CONDUIT AND TUBING

A. Rigid Steel Conduit: ANSI C80.1

B. Intermediate Metal Conduit: ANSI C80.6

C. Electrical Metallic Tubing and Fittings: ANSI C80.3 with compression-type fittings.

D. Flexible Metal Conduit: Zinc coated steel

E. Liquid tight Flexible Metal Conduit: Flexible steel conduit with PVC jacket.

F. Fittings: NEMA FB 1, compatible with conduit/tubing materials.

G. Non-Metallic Rigid Conduit: Schedule 40 pvc as where shown on the drawings.

H. "MC" type cable. (shall not be used, except for light fixture whips. Max length 5 feet.)

2.2 OUTLET AND DEVICE BOXES

A. Sheet Metal Boxes: NEMA OS 1

B. Cast Metal Boxes: NEMA FB 1, type FD, cast alloy box with gasketed cover

2.3 PULL AND JUNCTION BOXES

A. Small Sheet Metal Boxes: NEMA OS 1.

B. Cast Metal Boxes: NEMA FB 1, cast aluminum with gasketed cover.

C. Pull Boxes: Code gauge steel with screw type removable cover. NEMA rated for the condition.

PART III - EXECUTION

3.1 EXAMINATION

A. Examine surfaces to receive raceways, boxes, enclosures, and cabinets for compliance with installation tolerances and other conditions affecting performance of the raceway system. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 MINIMUM CONDUIT SIZE: (unless indicated otherwise) on the drawings conduit shall be sized as follows:

A. Indoors: The minimum conduit size shall be 1/2".

1. Flexible metal conduit may be used for tap connection to recessed lighting fixtures.

B. Outdoors: Branch circuit conduit installed below grade to exterior equipment shall be one (1) inch minimum unless noted otherwise.

3.3 WIRING METHODS: Unless noted otherwise on the drawings the following materials shall be used:

A. Outdoors: Use the following wiring methods:

1. Exposed: Rigid or intermediate metal conduit.

2. Underground: Galvanized Rigid Conduit.

3. Connection to Vibrating Equipment (including transformers and hydraulic, pneumatic, or electric solenoid or motor-driven equipment): Liquid tight flexible metal conduit.

4. Boxes and Enclosures: NEMA Type 3R or Type 4.

B. Indoors: Use the following wiring methods:

1. Connection to Vibrating Equipment (including transformers and hydraulic, pneumatic, or electric solenoid or motor-driven equipment): Flexible metal conduit, except in wet or damp locations use liquid tight flexible metal conduit.

2. Damp or Wet Locations: Rigid steel conduit.

3. Exposed: Electrical metallic tubing above 8 feet and rigid metallic conduit below eight (8) feet.

4. Concealed: Electrical metallic tubing.

5. Boxes and Enclosures: NEMA Type 1, except in damp or wet locations use NEMA Type 3R, unless otherwise noted.

3.4 INSTALLATION

A. Telephone/Data/Cable TV outlet boxes shall be 2 gang with appropriate trim and cover. Coordinate cover plates with Owner.

B. Provide insulated bushings for all conduit ends.

C. Conceal rigid conduit and EMT, unless otherwise indicated, within finished walls, ceilings, above attic space and below floors.

D. Keep raceways at least 6 inches (150 mm) away from parallel runs of flues and steam or hot water pipes. Install horizontal raceway runs above water and steam piping.

E. Install raceways level and square and at proper elevations. Provide adequate headroom.

F. Complete raceway installation before starting conductor installation.

G. Use temporary closures to prevent foreign matter from entering raceway.

H. Protect stubs from damage where conduits rise through floor slabs. Arrange so curved portion of bends is not visible above the finished slab.

I. **Where non-metallic conduit is shown to be used below the slab provide rigid conduit to turn up into the building space or at all exterior walls, poles or equipment.**

J. Use raceway fittings compatible with raceway and suitable for use and location. For intermediate steel conduit, use threaded rigid steel conduit fittings, except as otherwise indicated.

K. Run concealed raceways with a minimum of bends in the shortest practical distance considering the type of building construction and obstructions, except as otherwise indicated. Where the number of bends exceed the total number required by the N.E.C., provide pull boxes as required by code.

L. Install raceways parallel to or at right angles to surfaces or structural members, and follow the surface contours as much as practical.

1. Run parallel or banked raceways together, on common supports where practical.

2. Make bends in parallel or banked runs from same centerline to make bends parallel. Use factory elbows only where they can be installed parallel; otherwise, provide field bends for parallel raceways.

M. Join raceways with fittings designed and approved for the purpose and make joints tight.

1. Use bonding jumpers where joints cannot be made tight.

2. Use insulating bushings to protect conductors.

3. Provide expansion joint fittings where required for the raceway used.

N. IMC and GRC shall terminate with either a double locknut/bushing set or in a threaded hub.

O. Where conduit type "LB" fittings are used all conduits on conduits over 2" in size shall be "MOGAL" type.

P. "EMT" connectors shall be steel plated hexagonal compression type only. Do not use pot metal, set-screw, or indenter type connectors.

Q. Where concentric, eccentric, or oversized knockouts are encountered, a grounding-type insulated bushing shall be provided.

R. Where conduits of any type pass over a building expansion joint, a standard “expansion joint” fitting, compatible with the type raceway, shall be provided.

S. Terminations: Where raceways are terminated with locknuts and bushings, align the raceway to enter squarely and install the locknuts with dished part against the box. Where terminations cannot be made secure with one locknut, use two locknuts, one inside and one outside the box.

T. Where terminating in threaded hubs, screw the raceway or fitting tight into the hub so the end bears against the wire protection shoulder. Where chase nipples are used, align the raceway so the coupling is square to the box and tighten the chase nipple so no threads are exposed.

U. Install pull cords in all empty raceways. Use monofilament plastic line having not less than 200-lb

(90 kg) tensile strength. Leave not less than 12 inches (300 mm) of slack at each end of the pull cord.

V. Telephone and Signal System Raceways 2 Inch Trade Size and Smaller: In addition to the above requirements, install in maximum lengths of 150 feet (45 m) and with a maximum of two 90-degree bends or equivalent. Install pull or junction boxes where necessary to comply with these requirements. Pull boxes shall be a minimum of 10" square x 6" deep with removable cover.

W. Install raceway sealing fittings at suitable, approved, accessible locations and fill them with UL-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 and elsewhere as indicated:

1. Where conduits enter or leave hazardous classified locations.

2. Where conduits pass from warm locations to cold locations, such as exterior spaces and air-conditioned spaces.

3. Where otherwise required by the NEC.

X. Stub-Up Connections: Extend conduits through concrete floor a minimum of 6" for connection to freestanding equipment. Extend conductors to equipment with flexible metal conduit. Where equipment connections are not made under this Contract verify the length of the flexible connectors.

Y. Flexible Connections: Use maximum of 6 feet (1830 mm) of flexible conduit for recessed and semi-recessed lighting fixtures; for equipment subject to vibration, noise transmission, or movement; and for all motors. Use liquid tight flexible conduit in wet or damp locations. Install separate ground conductor.

AA. Provide grounding connections for raceway, boxes and components. Tighten connectors and terminals according to tightening torques specified in UL Standard 486A.

BB. All underground raceways shall be identified by "UNDERGROUND LINE MARKING TAPE" located directly above the raceway at 6" below finished grade. Tape shall be permanent, bright-colored, continuous, magnetic strip, printed, plastic tape compounded for direct burial not less than 6" wide and 4 mils thick. Printed legend shall be indicative of the service it is marking. Provide sufficient tape not less than 2/3 of the width of the item marked for the full length of the Raceway.

CC. Where underground raceways are required to turn up into cabinets, equipment, etc., and on to poles, the elbow required and the sub-up out of the slab or earth shall be rigid steel.

DD. Where shown to be used on the drawings PVC non-metallic conduit used exterior to the building for grouped circuits it shall be encased in a minimum of 3" of 3000 psi rated concrete. Concrete encased non-metallic ducts shall be supported on plastic separators coordinated with duct size and spacing. Separators shall be spaced close enough to prevent sagging and deforming of ducts. Secure separators to the earth and to ducts to prevent floating during placement of concrete. Do not use steel or tie wires in such a way to form conductive or magnetic loops around ducts or duct groups.

EE. The Raceway System shall not be relied on for grounding continuity. A green grounding conductor, properly sized per NEC Table 250-122, shall be run in all power raceways.

FF. Where non-metallic conduit is allowed on the drawings all bends and off-sets shall be made by approved mechanical benders per the manufacturers instruction. Any conduit not in compliance

will be removed.

3.5 PROTECTION

A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, to ensure that coatings, finishes, and cabinets are without damage or deterioration at Substantial Completion.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.

2. Repair damage to paint finishes with matching touch-up coating recommended by the manufacturer.

3.6 CLEANING

A. Upon completion of installation of system, including outlet fittings and devices, inspect exposed finish. Remove burrs, dirt and construction debris and repair damaged finish, including chips.

END OF SECTION 16100

SECTION 16120 - WIRES AND CABLES

PART I - 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 Building Wires and Cables and Associated Splices, Connectors and Terminations for Wiring Systems rated 600 Volts and Less.

PART II - PRODUCTS

2.1 BUILDING WIRES AND CABLES

A. UL-listed building wires and cables with conductor material, insulation type, cable construction, and rating as specified in Part 3 "Applications" Article.

B. Rubber Insulation: Conform to NEMA WC 3.

C. Thermoplastic Insulation: Conform to NEMA WC 5.

D. Cross-Linked Polyethylene Insulation: Conform to NEMA WC 7.

E. Ethylene Propylene Rubber Insulation: Conform to NEMA WC 8.

F. Solid conductor for 10 AWG and smaller: Stranded conductor for larger than 10 AWG.

2.2 CONNECTORS AND SPLICES

A. UL-listed factory fabricated wiring connectors of size, ampacity rating, material, and type and class for application and for service indicated.

PART III - EXECUTION

3.1 EXAMINATION

A. Examine raceways and building finishes to receive wires and cables for compliance with installation tolerances and other conditions. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 APPLICATIONS

A. Feeders and Branch Circuits: Type THHN\THWN or XHHW, copper conductor, in raceway.

3.3 INSTALLATION

A. All conductors shall be copper.

B. Minimum conductor size for power and lighting circuits shall be #12 AWG. Maximum conductor size shall be 500 KCMIL AWG.

C. All power and lighting circuits #10 awg and smaller shall be solid copper conductors. Conductor sizes #8 awg and larger shall be Class "B" stranded copper conductors.

D. Pull conductors into raceway simultaneously where more than one is being installed in same raceway.

1. Use pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation.

2. Use pulling means, including fish tape, cable, rope, and basket weave wire/cable grips that will not damage cables or raceway.

E. Conductor Splices: Keep to minimum.

F. Wiring at Outlets: Install with at least 8 inches of slack conductor at each outlet.

G. Connect outlets and components to wiring and to ground as indicated. Tighten to UL Standard 486A.

H. Power and Lighting circuits shall have individual neutral conductors.

I. All power circuits noted for computer equipment with isolated grounding shall be individually installed in a separate conduit with separate phase, neutral conductor, grounding conductor, and isolated grounding conductor, unless noted otherwise.

J. In no case shall any wire installed to a device exceed the U.L. rating of the device.

3.4 SPLICING

A. Joints in solid conductors shall be using Idea "wire nuts", 3M Company "scotch lock", or "T&B" "PIGGY" connectors in junction boxes, outlet boxes and lighting fixtures.

B. "Sta-kon" or other permanent type crimp connectors shall not be used for branch circuit connections.

C. Joints in stranded conductors shall be spliced by approved mechanical connectors. Solderless mechanical connectors similar to "NSI" multi-cable connector blocks for splices and taps, provided with UL approved insulating covers, may be used instead of mechanical connectors plus tape.

D. Conductors in all cases, shall be continuous from outlet to outlet unless "taps" are required and shall be made only within outlet, junction boxes, troughs and gutters.

3.5 VOLTAGE DROP

A. Where conductor length from the panel to the first outlet on a 120 volt circuit exceeds 100 feet, the branch circuit conductors from the panel to the first outlet shall be not smaller than #10 awg.

3.6 FIELD QUALITY CONTROL

A. Testing: Upon installation of wires and cables and before electrical circuitry has been energized, demonstrate product capability and compliance with requirements.

1. Procedures: Perform each Visual and Mechanical Inspection and Electrical Test stated in NETA Standard ATS, Section 7.3.1. Certify compliance with test parameters.

B. Correct malfunctioning products at site, where possible, and re-test to demonstrate compliance; otherwise, remove and replace with new units and re-test.

3.7 ELECTRICAL TESTING

A. Feeder Insulation Resistance Testing:

1. All current carrying phase conductors and neutrals shall be tested as installed, and before connections are made, for insulation resistance and accidental grounds. This shall be done with a 500-volt megger. The procedures listed below shall be followed:

2. Minimum readings shall be one million (1,000,000) or more ohms for # 6 AWG wire and smaller, 250,000 ohms or more for #4 wire or larger, between conductor and the grounding conductor.

3. After all devices and equipment are installed and all connections completed to each panel, the Contractor shall disconnect the neutral feeder conductor from the neutral bar and take a megger reading between the neutral bar and the grounded enclosure. If this reading is less than 250,000 ohms, the Contractor shall disconnect the branch circuit neutral wires from the neutral bar. Test each neutral conductor separately until the low readings are found. The Contractor shall correct troubles, reconnect and re-test until at least 250,000 ohms from the neutral bar to the grounded panel can be achieved with only the neutral feeder disconnected.

4. The Contractor shall send a letter to the Engineer certifying that the above has been done and tabulating the megger readings for each panel. This shall be done at least four (4) days prior to final inspection.

5. At the final inspection, the Contractor shall furnish a megger and show the Engineers that the panels comply with the above requirements. He shall also furnish a hook-on type ammeter and a voltmeter and take current and voltage readings as directed by the representatives.

END OF SECTION 16120

SECTION 16140 - WIRING DEVICES

PART I - 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 various types of receptacles, connectors, switches and finish plates.

1.3 SUBMITTALS

A. Submit the following according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product data for each product specified.

PART II - PRODUCTS

2.1 WIRING DEVICES

A. Comply with NEMA Standard WD 1-101968, "General Purpose Wiring Devices".

B. Enclosures: NEMA 1 equivalent, except as otherwise indicated.

C. Color: Selected by Architect.

D. Duplex receptacles shall be of the grounding type arranged for back and side wiring, with separate single or double grounding terminals. Receptacles shall be straight blade, rated 20 amp, 125 volt and the face configuration shall conform to the NEMA Standard No. WDI.101968, and shall be approved third party listed. Self-grounding or automatic type grounding receptacles are not acceptable in lieu of receptacles with separate grounding screw lugs and a direct green insulated conductor connection to the equipment grounding system. Receptacles shall be Federal specification grade mounted vertically.

E. Receptacles, Straight-Blade, Special Features: Comply with the basic requirements specified above for straight-blade receptacles of the class and type indicted, and with the following additional requirements:

1. Ground Fault Circuit Interrupter (GFCI) Receptacles: UL Standard 943, "Ground Fault Circuit Interrupters" with integral NEMA 5-20R duplex receptacle. Design units for installation in a 2¾ inch (70-mm) deep outlet box without an adapter.

2. Isolated Ground Receptacles: Equipment grounding contacts are connected only to the green grounding screw terminal of the device and have inherent electrical isolation from the mounting strap.

a. Devices: Listed and labeled as isolated ground receptacles.

b. Isolation Method: Integral to the receptacle construction and not dependent on removable parts.

c. Color: Orange with "green" triangle.

F. Receptacles, Industrial Heavy-Duty: Conform to NEMA Standard PK 4 "Plugs, Receptacles and Cable Connectors of the Pin and Sleeve type for Industrial Use".

G. Plug Sets: Match voltage and current ratings and number of conductors to requirements of the equipment being connected.

H. Single pole and three/four-way toggle type Snap Switches: Shall be 20 amp 120/277v. a.c. rated, quiet-type a.c. switches, NRTL listed and labeled as complying with UL Standard 20 "General Use Snap Switches" and with Federal Specification W-S-896. Color selected by Architect.

I. Dimmer Switches: Modular full-wave solid-state units with integral, quiet On/Off switches, and audible and electromagnetic noise filters. See plans for model numbers.

1. Wattage rating shall be 2000 watts minimum, except as otherwise indicted.

2. Control: Continuously adjustable slide or toggle. Single pole or 3-way switch to suit conditions.

J. Motion Sensor Switches

1. Single Pole-single switching- Hubbell Model LHMTS1

2. Single Pole-double switching-Hubbell Model LMHTD2

3. Switches shall be combination ultrasonic and passive infrared.

4. 100 square foot coverage, 180 degree.

5. 120 volt: 800 watt incandescent, 1000 watt fluorescent.

6. 277 volt, 1800 watt fluorescent.

7. 5 year warranty.

8. Equals by Wattstopper and Lutron.

K. Wall Plates: Single and combination types that mate and match with corresponding wiring devices. Features include the following:

1. Color: Matches wiring device except as otherwise indicate.

2. Plate-Securing Screws: Metal with heads colored to match plate finish

2.2 FLOOR SERVICE OUTLET ASSEMBLIES

A. Types: Modular, above-floor, or recessed in floor, dual service units suitable for the wiring method indicated.

B. Compartmentation: Barrier separates power and signal compartments.

C. Housing Material: Die-cast aluminum, satin finished.

D. Power Receptacle: NEMA configuration 5-20R, ivory finish, except as otherwise indicated.

E. Signal Outlet: Blank cover with bushed cable opening, except as otherwise indicated.

2.3 MULTI-OUTLET ASSEMBLIES

A. Comply with Standard UL 5, "Surface Metal Raceways and Fittings".

B. Components of Assemblies: Products of a single manufacturer designed to be used together to provide a complete matching assembly of raceways and receptacles.

C. Raceway Material: Metal with manufacturer's standard corrosion-resistant finish.

PART III - EXECUTION

3.1 INSTALLATION

A. Install devices and assemblies plumb and secure.

B. Install wall plates when painting is complete.

1. Arrangement of Devices: Except as otherwise indicated, mount flush, with long dimension vertical and grounding terminal of receptacles on top. Group adjacent switches under single, multi-gang wall plates.

C. Protect devices and assemblies during painting.

D. Adjust locations at which floor service outlets are installed to suit the indicated arrangement of partitions and furnishings.

E. Field verify the actual location of all outlet devices above equipment or counter tops before rough-in and installation. Any outlet installed in conflict with equipment or conditions that could have been avoided, will be corrected at the Contractor's expense.

F. Provide weatherproof cast aluminum cover plates for all device’s exterior to the building or in "wet" locations, Hubbell WP26M or equal. Ensure covers for outdoor receptacles are Extra Duty rated per 2017 NEC 406.9(B)(1).

G. GFCI protection shall be provided for all receptacles exterior to the building, in restrooms or where required by Code.

H. Locate all receptacles in rated walls with 24" minimum horizontal separation. This includes devices located opposite each other in the walls.

3.2 IDENTIFICATION

A. Comply with Division 16 Section "Electrical Identification".

1. Switches: Where 3 or more switches are ganged and elsewhere where indicated, identify each switch with approved legend engraved on wall plate.

2. Receptacles: Identify the panelboard and circuit number from which served. Use machine-printed, pressure-sensitive, abrasion-resistant label tape on face of plate and durable wire markers or tags within outlet boxes.

3.3 GROUNDING

A. Isolated Ground Receptacles: Connect to isolated grounding conductor routed to designated

isolated equipment ground terminal of Electrical System.

3.3 FIELD QUALITY CONTROL

A. Testing: Test wiring devices for proper polarity and ground continuity. Operate each operable device at least six (6) times.

B. Test ground-fault circuit interrupter operation with both local and remote fault simulations according to manufacturer recommendations.

C. Replace damaged or defective components.

3.4 CLEANING

A. General: Internally clean devices, device outlet boxes and enclosures. Replace stained or improperly painted wall plates or devices.

END OF SECTION 16140

SECTION 16190 - SUPPORTING DEVICES

PART I - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes secure support from the building structure for Electrical items by means of Hangers, Supports, Anchors, Sleeves, Inserts, Seals and Associated Fastenings.

1.3 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Product data for each type of product specified.

PART II - PRODUCTS

2.1 COATINGS

A. Coating: Supports, support hardware and fasteners shall be protected with zinc coating or with treatment of equivalent corrosion resistance using approved alternative treatment, finish and inherent material characteristic. Products for use outdoors shall be hot-dip galvanized.

2.2 MANUFACTURED SUPPORTING DEVICES

A. Raceway Supports: Clevis hangers, riser clamps, conduit straps, threaded C clamps with retainers, ceiling trapeze hangers, wall brackets and spring steel clamps.

1. Expansion Anchors: Carbon steel wedge or sleeve type.

2. Toggle Bolts: All steel spring-head type.

B. Conduit Sealing Bushings: Factory-fabricated watertight conduit sealing bushing assemblies suitable for sealing around conduit or tubing passing through concrete floors and walls. Construct seals with steel sleeve, malleable iron body, neoprene sealing grommets or rings, metal pressure rings, pressure clamps and cap screws.

C. U-Channel Systems: 16-gage steel channels, with 9/16-inch diameter holes, at a minimum of 8 inches on center, in top surface. Provide fittings and accessories that mate and match with U-channel and are of the same manufacturer.

2.3 FABRICATED SUPPORTING DEVICES

A. General: Shop or field fabricated supports or manufactured supports assembled from U-Channel components.

B. Steel Brackets: Fabricated of angles, channels and other standard structural shapes. Connect with welds and machine bolts to form rigid supports.

C. Pipe Sleeves: Provide pipe sleeves of one of the following:

1. Sheet Metal: Fabricate from galvanized sheet metal; round tube closed with snap-lock joint, welded spiral seams, or welded longitudinal joint. Fabricate sleeves from the following gage metal for sleeve diameter noted:

a. 3-inch and smaller: 20-gage
b. 4-inch to 6-inch: 16-gage

2. Steel Pipe: Fabricate from Schedule 40 galvanized steel pipe.

3. Plastic Pipe: Fabricate from Schedule 80 PVC plastic pipe.

PART III - EXECUTION

3.1 INSTALLATION

A. Install supporting devices to fasten electrical components securely and permanently in accordance with NEC requirements.

B. Coordinate with the building structural system and with other electrical installation.

C. Raceway Supports: Comply with the NEC and the following requirements:

1. Strength of each support shall be adequate to carry present and future load multiplied by a safety factor of at least four. Where this determination results in a safety allowance of less than 200 lbs, provide additional strength until there is a minimum of 200 lbs safety allowance in the strength of each support.

2. Install individual and multiple (trapeze) raceway hangers and riser clamps as necessary to support raceways. Provide U-bolts, clamps, attachments and other hardware necessary for hanger assembly and for securing hanger rods and conduits.

3. Support parallel runs of horizontal raceways together on trapeze-type hangers.

4. Support individual horizontal raceways by separate pipe hangers. Spring steel fasteners may be used in lieu of hangers only for 1 inch and smaller raceways serving lighting and receptacle branch circuits above suspended ceilings only. For hanger rods with spring steel fasteners, use ¼ inch diameter or larger threaded steel. Use spring steel fasteners that are specifically designed for supporting single conduits or tubing.

5. Space supports for raceway's types not covered by the above in accordance with NEC.

6. Support exposed and concealed raceway within 1 foot of an unsupported box and access fittings. In horizontal runs, support at the box and access fittings may be omitted where box or access fittings are independently supported and raceway terminals are not made with chase nipples or threadless box connectors.

7. In vertical runs, arrange support so the load produced by the weight of the raceway and the enclosed conductors is carried entirely by the conduit supports with no weight load on raceway terminals.

8. In interior spaces provide a minimum of ¼ inch space for all conduits installed on the exterior building walls. Approved "clamp-back" or strut devices shall be used.

D. Miscellaneous Supports: Support miscellaneous electrical components as required to produce the

same structural safety factors as specified for raceway supports. Install metal channel racks for mounting cabinets, panelboards, disconnects, control enclosures, pull boxes, junction boxes, transformers and other devices.

E. In open overhead spaces, cast boxes threaded to raceways need not be supported separately except where used for fixture support; support sheet metal boxes directly from the building structure or by bar hangers. Where bar hangers are used, attach the bar to raceways on opposite sides of the box and support the raceway with an approved type of fastener not more than 24 inches from the box.

F. Conduit Seals: Install bushing seals for conduit penetrations of slabs on grade and exterior walls below grade. Tighten sleeve seal screws until sealing grommets have expanded to form watertight seal.

G. Fastening: Unless otherwise indicated, fasten electrical items and their supporting hardware securely to the building structure, including but not limited to conduits, raceways, cables, cable trays, bus ways, cabinets, panelboards, transformers, boxes, disconnect switches and control components in accordance with the following:

1. Fasten by means of wood screws or screw-type nails on wood, toggle bolts on hollow masonry units, concrete inserts or expansion bolts on concrete or solid masonry and machine screws, welded threaded studs, or spring-tension clamps on steel. Do not weld conduit, pipe straps or items other than threaded studs to steel structures. In partitions of light steel construction, use sheet metal screws.

END OF SECTION 16190

SECTION 16195 - ELECTRICAL IDENTIFICATION

PART I - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections apply to this Section.

1.2 SUMMARY

A. This Section includes Identification of Electrical Materials, Equipment and Installations.

1.3 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Product Data for each type of product specified.

PART II - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:

1. Ideal Industries, Inc.
2. National Band and Tag Co.
3. Panduit Corp.
4. Seton Name Plate Co.
5. Standard Signs, Inc.
6. W.H. Brady, Co.

2.2 ELECTRICAL IDENTIFICATION PRODUCTS

A. Colored Adhesive Marking Tape for Raceways, Wires, and Cables: Self-adhesive vinyl tape not less than 3 mils thick by 1 inch to 2 inches in width. Colors to match color schemes noted herein.

B. Underground Line Marking Tape: Permanent, bright colored, continuous printed, metallic strip, plastic tape compounded for direct burial service not less than 6 inches wide by 4 mils thick. Printed legend indicative of general type of underground line below.

C. Wire/Cable Designation Tape Markers: Vinyl or vinyl cloth, self adhesive, wrap-around, cable/conductor markers with pre-printed numbers and letter.

D. Furnish and install engraved laminated phenolic nameplates for all safety switches, panelboards, transformers, switchboards, switchboard branch breakers, motor control centers and other electrical equipment. Nameplates shall be securely attached with self-tapping stainless steel screws, if the screw end is protected; otherwise rivets shall be used. Letters shall be approximately ½" high minimum. Embossed self-adhesive tape is not acceptable for marking equipment.

E. Cable Ties: Fungus inert, self-extinguishing, one-piece, self-locking nylon cable ties, 0.18-inch minimum width, 50-lb minimum tensile strength, and suitable for a temperature range from minus 50 degrees F to 350 degrees F. Provide ties in specified colors when used for color coding.

PART III - EXECUTION

3.1 INSTALLATION

A. Lettering and Graphics: Coordinate names, abbreviations, colors and other designations used in Electrical Identification work with corresponding designations specified or indicated. Install numbers, lettering, and colors as approved in submittals and as required by code.

B. Sequence of Work: Where identification is to be applied to surfaces that require finish, install identification after completion of finish work.

C. Identify Junction, Pull, and Connection Boxes: Install on outside of box cover. Label box covers with identity of contained circuits. Use pressure-sensitive plastic labels at exposed locations and similar labels concealed boxes. Color code boxes as indicated below. Method shall be by colored adhesive not less than 4 square inches for 4" boxes and larger boxes. Permanent type "magic" markers are not accepted as a means of identification.

120/240 volt blue

D. Underground Electrical Line Identification: During trench backfilling, for exterior underground power, signal and communications lines, install continuous underground plastic line marker, located directly above line at 6 inches below finished grade where multiple lines are installed in a common trench or concrete envelope. Provide marker tape to cover 2/3 of the overall width.

E. Conductor Color Coding: Provide color coding for secondary service, feeder, and branch circuit conductors throughout the project secondary electrical system as follows:

120/240 Volts	**Phase**
Black	A
Red	B
White	Neutral
Green	Ground

G. Use conductors with color factory-applied the entire length of the conductors except as follows:

1. The following field-applied color-coding methods may be used in lieu of factory-coded wire for sizes larger than No. 10 AWG.

a. Apply colored, pressure-sensitive plastic tape in half- lapped turns for a distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply the last two laps of tape with no tension to prevent possible unwinding. Use 1-inch wide tape in colors as specified. Do not obliterate cable identification markings by taping. Tape locations may be adjusted slightly to prevent such obliteration minimum width 2".

H. Tag or label conductors as follows:

1. Multiple Circuits: Where multiple branch circuits or control wiring or communications/signal conductors are present in the same box or enclosure (except for three-circuit, four-wire home runs), label each conductor or cable. Provide legend indicating source, voltage, circuit number, and phase for branch circuit wiring. Phase and voltage of branch circuit wiring may be indicated by mean of coded color of conductor insulation. For control and communications/signal wiring, use color coding or wire/cable marking tape at terminations and at intermediate locations where conductors appear in wiring boxes, troughs, and control cabinets. Use consistent letter/number conductor designations throughout on wire/cable marking tapes.

2. Match identification markings with designations used in panelboards shop drawings, Contract Documents, and similar previously established identification schemes for the facility's electrical installations.

I. Install equipment/system circuit/device identification as follows:

1. Apply equipment identification labels of engraved plastic-laminate on each major unit of electrical equipment in building, including central or master unit of each electrical system. This includes communication/signal/alarm systems, unless unit is specified with its own self-explanatory identification. Except as otherwise indicated, provide single line of text, with 1/2 inch high lettering on 1½ inch high label (2 inch high where two lines are required), white lettering in blue field for normal power equipment other face colors shall match the equipment served. Text shall match terminology and numbering of the Contract Documents and shop drawings.

2. All Phenolic labels shall be securely attached to the equipment by self-tapping stainless steel screws.

3. Name plate colors shall be as follows:

....Blue surface with white core for 120/240 Volt Equipment.

J. Apply circuit/control/item designation labels of engraved plastic laminate for disconnect switches, breakers, pushbuttons, pilot lights, motor control centers, and similar items for power distribution and control components above, except panelboards and alarm/signal components, where labeling is specified elsewhere. Panelboards and Disconnecting means must identify source of supply per NEC 110.22(A) & 408.4(B). For panelboards, provide framed, typed circuit schedules with explicit description and identification of items controlled by each individual breaker. Pencil in all spare and leave spaces blank.

K. All outlet boxes, junction boxes and pull boxes shall have their covers and exterior visible surfaces painted with colors to match the surface color scheme specified. This includes covers on boxes above lay-in and other type accessible ceilings.

L. All empty conduit runs and conduit with conductors for future use shall be identified for use and shall indicate where they terminate. Identification shall be by pressure sensitive label applied to the conduit or outlet; designate "use" and "location served".

END OF SECTION 16195

SECTION 16452 - GROUNDING

PART I - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes Solid Grounding of Electrical Systems and Equipment. It includes basic requirements for grounding for protection of life, equipment, circuits, and systems. Grounding requirements specified in this Section may be supplemented in other Sections of these Specifications.

1.3 QUALITY ASSURANCE

A. Listing and Labeling: Provide products specified in this Section that are listed and labeled. The terms "listed" and "labeled" shall be defined as they are in the National Electrical Code, Article 100.

PART II - PRODUCTS

2.1 GROUNDING AND BONDING PRODUCTS

A. Products: Of types indicated and of sizes and ratings to comply with NEC. Where types, sizes, ratings, and quantities indicated are in excess of NEC requirements, the more stringent requirements and the greater size, rating, and quantity indications govern.

B. Conductor Materials: Copper

2.2 WIRE AND CABLE CONDUCTORS

A. General: Comply with Division 16 Section "Wires and Cables". Conform to NEC Table 8, except as otherwise indicated, for conductor properties, including stranding.

B. Equipment Grounding Conductor: Green insulated

C. Grounding Electrode Conductor: Stranded cable

D. Bare Copper Conductors: Conform to the following:

1. Solid Conductors: ASTM B-3

2. Assembly of Stranded Conductors: ASTM B-8

3. Tinned Conductors: ASTM B-33

2.3 MISCELLANEOUS CONDUCTORS

A. Ground Bus: Bare annealed copper bars of rectangular cross section, full-size rated.

B. Braided Bonding Jumpers: Copper tape, braided No. 30 gauge bare copper wire, terminated with copper ferrules.

C. Bonding Strap Conductor/Connectors: Soft copper, 0.05 inch thick and 2 inches wide, except as indicated.

2.4 CONNECTOR PRODUCTS

A. General: Listed and labeled as Grounding Connectors for the materials used.

B. Pressure Connectors: High conductivity-plated units

C. Bolted Clamps: Heavy-duty units listed for the application

2.5 GROUNDING ELECTRODES

A. Ground Rods: Copper-clad steel with high strength steel core and electrolytic grade copper outer sheath, molten welded to core.

1. Size: 3/4 inch by 10 feet

PART III - EXECUTION

3.1 APPLICATION

A. Equipment Grounding Conductor Application: Comply with NEC Article 250 for sizes and quantities of equipment grounding conductors, except where larger sizes or more conductors are indicated.

1. The raceway system shall not be relied on for ground continuity .Install an equipment ground conductor in all power related conduits. Size conductor as required by NEC Table 250-122. Data and Signal conduits do not require a separate grounding conductor unless required by the manufacturer of the equipment to be installed.

C. Signal and Communications: For telephone, alarm, and communication systems, provide a #6 AWG minimum green insulated copper conductor in raceway from the grounding electrode system to each terminal equipment location. Leave 3' pigtail wiring at termination point where equipment boards are shown. Make direct connection where equipment is provided.

3.2 INSTALLATION

A. General: Ground electrical systems and equipment in accordance with NEC requirements except where the Drawings or Specifications exceed NEC requirements.

B. The electrical service shall be grounded by three (3) means:

1. To the cold water main, if metallic and in direct contact with the earth for at least 10 feet as per the NEC Article 250-52(A)(1).

2. To the steel frame of the building, provided the building frame is effectively grounded.

3. To ground rod(s)

C. Ground Rods: Locate a minimum of one-rod length from each other and at least the same distance from any other grounding electrode. Interconnect ground rods with bare conductors buried at least 24 inches below grade. Connect bare-cable ground conductors to ground rods by means of exothermic welds except as otherwise indicated. Make these connections without

damaging the copper coating or exposing the steel. Use ¾ inch by 10 ft. ground rods except as otherwise indicated. Drive rods until tops are 6 inches below finished floor or final grade except as otherwise indicated. All ground connections shall be accessible.

D. Metallic Water Service Pipe: Provide insulated copper ground conductors, sized as indicated, in conduit from the building main service equipment, or the ground bus, to main metallic water service entrances to the building. Connect ground conductors to the main metallic water service pipes by means of ground clamps. Where a dielectric main water fitting is installed, connect the ground conductor to the street side of the fitting. Do not install a grounding jumper around dielectric fittings. Bond the ground conductor conduit to the conductor at each end.

E. Route grounding conductors along the shortest and straightest paths possible without obstructing access or placing conductors where they may be subjected to strain, impact, or damage, except as indicated.

3.3 CONNECTIONS

A. General: Make connections in such a manner as to minimize possibility of galvanic action or electrolysis. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.

1. Use electroplated or hot tin-coated materials to assure high conductivity and make contact points closer in order of galvanic series.

2. Make connections with clean bare metal at points of contact.

3. Aluminum to steel connections shall be with stainless steel separators and mechanical clamps.

4. Aluminum to galvanized steel connections shall be with tin-plated copper jumpers and mechanical clamps.

5. Coat and seal connections involving dissimilar metals with inert material such as red lead paint to prevent future penetration of moisture to contact surfaces.

B. Terminate insulated equipment grounding conductors for feeders and branch circuits with pressure-type grounding lugs. Where metallic raceways terminate at metallic housings without mechanical and electrical connection to the housing, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to the ground bus in the housing. Bond electrically non-continuous conduits at both entrances and exits with grounding bushings and bare grounding conductors.

C. Tighten grounding and bonding connectors and terminals, including screws and bolts, in accordance with manufacturer's published torque tightening values for connectors and bolts. Where manufacturer's torquing requirements are not indicated, tighten connections to comply with torque tightening values specified in UL 486A and UL 486B.

D. Compression-Type Connections: Use hydraulic compression tools to provide the correct circumferential pressure for compression connectors. Use tools and dies recommended by the manufacturer of the connectors. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on the ground conductor.

3.4 FIELD QUALITY CONTROL

A. Tests: Subject the completed grounding system to a megger test at each location where a

maximum ground resistance level is specified, at service disconnect enclosure ground terminal, and at ground test wells. Measure ground resistance without the soil being moistened by any means other than natural precipitation or natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance. Perform tests by the 2 point method in accordance with Section 9.03 of IEEE 81, "Guide for Measuring Earth Resistivity, Ground Impedance and Earth Surface Potentials of a Grounding System".

B. Service Grounding Test

1. After completion of the electrical grounding and bonding systems, test the ground resistance with a ground resistance tester. Where test shown resistance-to-ground is over 25 ohms, provide additional ground rods until the minimum of 25 ohms is achieved.

C. Deficiencies: Where ground resistances exceed specified values, and if directed, modify the grounding system to reduce resistance values. Where measures are detected that exceed those indicated the provisions of the Contract, covering changes will apply.

D. Report: Prepare test reports of the ground resistance at each test location. Include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.

3.5 CLEANING AND ADJUSTING

A. Restore surface features at areas disturbed by excavation and re-establish original grades. Where sod has been removed, replace it as soon as possible after backfilling is completed. Restore areas disturbed by trenching, storing of dirt, cable laying, and other Work to their original condition. Include necessary topsoil, fertilizing, liming, seeding, sodding, sprigging, or mulching.

END OF SECTION 16452

SECTION 16476 – DISCONNECTS

PART I - 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 Equipment and Service disconnects.

1.3 SUBMITTALS

A. General: Submit the following according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product Data for Switches and Accessories specified in this Section.

1.4 QUALITY ASSURANCE

A. Comply with NFPA 70 "National Electrical Code" for components and installation.

B. Listing and Labeling: Provide products specified in this Section that are listed and labeled.

1. The Terms "Listed" and "Labeled": As defined in the "National Electrical Code", Article 100.

PART II - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:

1. Cutler-Hammer Products; Eaton Corp.

2. Siemens

3. Square D Company

2.2 ENCLOSED SWITCHES

A. Enclosed Non-Fusible Switch: NEMA KS 1, Type HD, handle lockable with 2 padlocks.

B. Enclosed Fusible Switch, 800 Amperes and Smaller: NEMA KS 1, Type HD, clips to accommodate specified fuses, enclosure consistent with environment where located, handle lockable with 2 padlocks, and interlocked with cover in CLOSED position.

C. Enclosure: NEMA KS 1, Type 1, unless specified or required otherwise to meet environmental conditions of installed location.

D. Outdoor Locations: Type 3R

E. Other Wet or Damp Indoor Locations: Type 4

F. All switches shall be "Heavy Duty" rated for the voltage required.

G. Coordinate all fuse rated switches with the equipment to be furnished. Furnish fuses.

H. Safety switches shall be third-party listed.

I. Switches shall have defeatable door interlocks that prevent the door from opening when the operating handle is in the open position.

J. Switches shall have handles whose positions are easily recognizable in the “on” or “off” position. For safety reasons, padlocks shall be provided for switches located in the public areas.

K. Switches shall have nonteasible, positive, quick make-quick-quick-break mechanisms.

L. Switches shall be properly labeled. See section 16195, Electrical Identification.

PART III - EXECUTION

3.1 INSTALLATION

A. Install enclosed switches level and plumb.

B. Where fuses are required, the fuses shall be matched with the equipment supplier's requirements.

C. Provide one additional set of fuses for each disconnect switch.

3.2 FIELD QUALITY CONTROL

A. Testing: After installing enclosed switches and after electrical circuitry has been energized, demonstrate product capability and compliance with requirements.

B. Correct malfunctioning units at site, where possible, and retest to demonstrate compliance. Otherwise, remove and replace with new units and re-test.

3.3 CLEANING

A. After completing system installation, including outlet fittings and devices, inspect exposed finish. Remove burrs, dirt, construction debris and repair damaged finish including chips, scratches and abrasions.

END OF SECTION 16476

SECTION 16515 - INTERIOR LIGHTING

PART I - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes interior lighting fixtures, lamps, ballasts, emergency lighting units, and accessories.

1.3 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Product data describing fixtures, lamps, ballasts, and emergency lighting units. Arrange product data for fixtures in order of fixture designation. Include data on features and accessories and the following information:

1. Outline drawings of fixtures indicating dimensions and principal features.

2. Electrical ratings and photometric data with specified lamps and certified results of independent laboratory tests.

3. Data on batteries and chargers of emergency lighting units.

4. Shop Drawings from manufacturers detailing non-standard fixtures and indicating dimensions, weights, methods of field assembly, components, features and accessories.

5. Non-returnable samples, when requested by Engineer, for verification purposes of specific individual fixtures.

1.4 QUALITY ASSURANCE

A. Comply with NFPA 70 "National Electrical Code" for components and installation.

B. Listing and Labeling: Provide fixtures that are listed and labeled for their indicated use on the Project.

C. Coordination of Fixtures With Ceiling: Coordinate fixtures mounting hardware and trim with the ceiling system. Provide plaster or sheet-rock trims when required on the project whether indicated or not at no additional cost to the Owner. Coordinate with Architectural Plans before ordering fixtures.

1.5 WARRANTY

A. Minimum warranty period on emergency lights shall be three (3) years from date acceptance. Warranty shall include all parts (less lamps).

B. All other lighting products shall be warranted for a period of not less than 1 year from date of acceptance. This warranty does not include miscellaneous parts which are external to the product

(i.e. lamps) which are considered maintenance item.

PART II - PRODUCTS

2.1 FIXTURES - GENERAL

A. Comply with the requirements specified in the Articles below and the Lighting Fixture Schedule on the Drawings.

2.2 FIXTURE COMPONENTS - GENERAL

A. Metal Parts: Free from burrs and sharp corners and edges.

B. Sheet Metal Components: Steel, except as indicated. Components are formed and supported to prevent warping and sagging.

C. Doors, Frames, and Other Internal Access: Smooth operating and free from light leakage under operating conditions. Arrange to permit re-lamping without use of tools. Arrange doors, frames, lenses, diffusers, and other pieces to prevent accidental falling during re-lamping and when secured in the operating position. Light seal strips inside the fixture will not be allowed.

D. Reflecting Surfaces: Minimum reflectances as follows, except as otherwise indicated:

1. White Surfaces: 85 percent

2. Specular Surfaces: 83 percent

3. Diffusing Specular Surfaces: 75 percent

4. Laminated Silver Metalized Film: 90 percent

E. Lenses, Diffusers, Covers, and Globes: 100 percent virgin acrylic

1. Plastic: Highly resistance to yellowing and other changes due to aging, exposure to heat and UV radiation.

2. Lens Thickness: 0.125 inches minimum

2.3 SUSPENDED FIXTURE SUPPORT COMPONENTS

A. Single-Stem Hangers: ½ inch steel tubing with swivel ball fitting and ceiling canopy. Finish same as fixture.

B. Twin-Stem Hangers: Two, ½ inch steel tubes with single canopy arranged to mount a single fixture. Finish same as fixture.

C. Rod Hangers: 3/16 inch diameter cadmium plated, threaded steel rod.

2.4 LED Fixtures

A. All LED lamps to be 3500 K-rated unless noted otherwise.

2.5 EXIT SIGNS

A. Conform to UL 924, "Emergency Lighting and Power Equipment”.

1. Arrows: Include as indicated.

B. Emergency Exit Signs shall be of the "LED" style.

C. Units shall be completely self-contained, provided with maintenance-free battery, automatic charger, and other features. Luminaire must be third-party listed as emergency lighting equipment, and meet or exceed the following standards: NEC, NC Building Code, Volume X Energy code, NFPA-101, and NEMA Standards.

D. BATTERY-It shall be sealed, maintenance-free type, with minimum of 90 minutes operating endurance. Must have a normal life expectancy of 10 years. Batteries shall be a high temperature type with an operating range of 0 degree C to 60 degrees C and contain a resealable pressure vent, a sintered + positive and – negative terminal.

E. CHARGER- It shall be fully automatic solid state type, full wave rectifying, with current limiting. Charger shall restore the battery to its full charge within 24 hours after a discharge of 90 minutes under full rated load. The unit shall be activated when the voltage drops below 80%. A low voltage disconnect switch shall be included if LEAD battery is used to disconnect the battery from the load and prevent damage from a deep discharge during extended power outage.

F. ADDITIONAL FEATURES- Pilot light to indicate the unit is connected to AC power. The battery shall have rate discharge pilot light, unless self-diagnostic type. Test switch to simulate the operation of the unit upon loss of AC power by energizing the lamps from the battery. This simulation must also exercise the transfer relay.

G. WARRANTY-The entire unit shall be warranted for 3 years. The battery must have an additional 2 more years pro-rated warranty. Warranty shall start from the date of project final acceptance. Warranty shall be included in the contract document.

H. LED-The use of LED is required due to their reliable performance, low power consumption, and limited maintenance requirements. Maximum LED failure rate shall be 25% within a seven (7) year period; otherwise, if exceeded, manufacturer shall replace the complete unit at no charge to the owner.

2.6 EMERGENCY LIGHTING UNITS

A. Conform to UL 924, "Emergency Lighting and Power Equipment" requirements for "Unit Equipment". Provide self-contained units with the following features and additional characteristics as indicated.

B. Units shall be completely self-contained, provided with maintenance-free battery, automatic charger, and other features. Luminaire must be third-party listed as emergency lighting equipment, and meet or exceed the following standards: NEC, NC Building Code, Volume X Energy code, NFPA-101, and NEMA Standards.

C. BATTERY-It shall be sealed, maintenance-free type, with minimum of 90 minutes operating endurance. Must have a normal life expectancy of 10 years. Batteries shall be a high temperature type with an operating range of 0 degree C to 60 degrees C and contain a resealable pressure vent, a sintered + positive and – negative terminal.

D. CHARGER- It shall be fully automatic solid state type, full wave rectifying, with current limiting. Charger shall restore the battery to its full charge within 24 hours after a discharge of 90 minutes under full rated load. The unit shall be activated when the voltage drops below 80%. A low voltage disconnect switch shall be included if LEAD battery is used to disconnect the battery from the load and prevent damage from a deep discharge during extended power outage.

E. ADDITIONAL FEATURES- Pilot light to indicate the unit is connected to AC power. The

battery shall have rate discharge pilot light, unless self-diagnostic type. Test switch to simulate the operation of the unit upon loss of AC power by energizing the lamps from the battery. This simulation must also exercise the transfer relay.

F WARRANTY-The entire unit shall be warranted for 3 years. The battery must have an additional 2 more years pro-rated warranty. Warranty shall start from the date of project final acceptance. Warranty shall be included in the contract document.

2.7 FINISH

A. Steel Parts: Manufacturer's standard finish applied over corrosion-resistant primer, free of streaks, runs, holidays, stains, blisters, and defects. Remove fixtures showing evidence of corrosion during project warranty period and replace with new fixtures.

B. Paint parts after fabrication.

PART III – EXECUTION

3.1 INSTALLATION

A. Setting and Securing: Set units plumb, square, and level with ceiling and walls, and secure according to manufacturer's printed instructions and approved Shop Drawings.

B. Support For Recessed and Semi-Recessed Fixtures: Units shall be supported independent from suspended ceiling. Install fixture with support wires at 2 diagonal corners to the structure or building steel.

1. Fixtures of Sizes Less Than Ceiling Grid: Center in the acoustical panel. Support fixtures independently with at least two ¾ inch metal channels spanning and secured to the ceiling tees.

2. Install support clips or screws for recessed fixtures, securely fastened to ceiling grid members, at or near each fixture corners.

3. Support wires shall be not less than the support wires for the ceiling system.

C. Support for Suspended Fixtures: Brace pendants and rods that are 4 feet long or longer to limit swinging. Support stem mounted single unit suspended fluorescent fixtures with twin stem hangers. For continuous rows, use tubing or stem for wiring at one point and tubing or rod for suspension for each unit length of chassis, including one at each end.

D. Lamping: See Schedule on Drawings, or provide standard lamp for the rating of the fixture.

E. Where mounting height for fixtures are not scheduled, coordinate with the Engineer before any installation.

3.2 FIELD QUALITY CONTROL

A. Inspect each installed fixture for damage. Replace damaged fixtures and components.

B. Emergency Battery Units Test: Verify normal operation of each fixture after fixtures have been installed and circuits have been energized with normal power source. Interrupt electrical energy for a period of not less than 90 minutes to demonstrate proper operation of Emergency Lighting installation. Include the following in tests of emergency lighting equipment.

1. Duration of supply

2. Low battery voltage shut-down

3. Normal transfer to battery source and retransfer to normal

4. Low supply voltage transfer

C. Replace or repair malfunctioning fixtures and components, then retest. Repeat procedure until all units operate properly.

D. Contractor shall perform a test on each unit after it is permanently installed and charged for a minimum of 24 hours. Battery shall be tested for 90 minutes. The battery test shall be done 10 days prior to final inspection by the State Construction Office. Any unit which fails the test must be repaired or replaced and tested again. Copy of the test report shall be sent to the State Construction Office.

3.3 ADJUSTING AND CLEANING

A. Clean fixtures upon completion of installation. Use methods and materials recommended by manufacturer.

B. Adjust aimable fixtures to provide required light intensities.

END OF SECTION 16515

SECTION 16525 – EXTERIOR LIGHTING

PART I – 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 exterior lighting fixtures, lamps, ballasts, poles standards and accessories.

1.3 SUBMITTALS

A. General: Submit the following according to Conditions of Contract and Division 1 Specification Sections.

B. Product data describing fixtures, lamps, ballasts, poles, and accessories. Arrange product data for fixtures in order of fixture designation. Include data on features, poles, accessories and the following:

C. Outline drawings of fixtures and poles indicating dimensions and principal features.

D. Electrical ratings and photometric data with certified results of independent laboratory tests.

E. Shop Drawings from manufacturers detailing non-standard fixtures and poles and indicating dimensions, weights, methods at field assembly, components, and accessories.

1.4 QUALITY ASSURANCE

A. Comply with NFPA 70 "National Electrical Code" for components and installation.

B. Comply with ANSI C2, "National Electrical Safety Code".

C. Listing and Labeling: Provide fixtures and accessories that are listed and labeled for their indicated use and location on the Project.

1.5 STORAGE AND HANDLING OF POLES

A. General: Store poles on decay-resistant treated skids at least 1 ft. above grade and vegetation. Support pole to prevent distortion and arrange to provide free air circulation.

B. Metal Poles: Retain factory-applied pole wrappings until just before pole installation. Handle all poles with web fabric straps.

1.6 EXTRA MATERIALS

A. Furnish extra materials matching products installed as described below, packaged with protective covering for storage, and identified with labels describing contents. Deliver extra materials to the Owner.

1. Lamps: 2 lamps for each type installed
2. Ballasts: 1 for each type and rating installed

PART II - PRODUCTS

2.1 FIXTURE COMPONENTS - GENERAL

A. Metal Parts: Free from burrs and sharp edges and corners

B. Sheet Metal Components: Corrosion-resistant aluminum, except as indicated. Form and support to prevent warping and sagging.

C. Housings: Rigidly formed, weather and light-tight enclosures that will not warp, sag, or deform in use. Provide filter/breather for enclosed fixtures.

D. Doors, Frames and Other Internal Access Provisions: Smooth operating, free from light leakage under operating conditions, and arranged to permit re-lamping without use of tools. Arrange doors, frames, lenses, diffusers, and other pieces to prevent accidental falling during re-lamping and when secured in the operating position. Provide for door removal for cleaning or replacing lens. Arrange for door opening to disconnect ballast.

E. Exposed Hardware Material: Stainless Steel

F. Reflecting Surfaces: Minimum reflectance as follows, except as otherwise indicated:

G. Specular Surfaces: 83 percent

H. Plastic Parts: Resistant to yellowing and other changes due to aging and exposure to heat and UV radiation.

I. Lenses and Refractors: Materials as indicated. Use heat and aging-resistant, resilient gaskets to seal and cushion lens and refractor mounting in fixture doors.

J. Photoelectric Relay: UL 773, "Plug-in, Locking Type Photo controls for Use With Area Lighting" where indicated on the Plans.

2.2 LAMPS

A. Conform to ANSI Standards, C78 series, applicable to each type of lamp. Provide fixtures with indicated lamps. Where lamps are not indicated, provide lamps recommended by manufacturer.

2.3 FINISH

A. Metal Parts: Manufacturer's standard finish except as otherwise indicated. Finish applied over corrosion-resistant primer, free of streaks, runs, holidays, stains, blisters, and similar defects. Remove poles, fixtures, and accessories showing evidence of corrosion or finish failure during Project warranty period and replace with new items.

B. Other Parts: Manufacturer's standard finish except as otherwise indicated.

PART III - EXECUTION

3.1 INSTALLATION

A. Set units plumb, square, level, and secure according to manufacturer's written instructions and shop drawings.

3.2 GROUNDING

A. Ground fixtures and metal poles according to Division 16 Section "Grounding".

1. Poles: Ground metallic components of lighting unit and foundations. Connect fixtures to grounding system with minimum No. 10 AWG conductor.

3.3 FIELD QUALITY CONTROL

A. Inspect installed units for damage.

B. Provide advance notice of dates and times for field tests.

C. Provide instruments to make and record test results.

D. Tests: Verify normal operation of lighting units after installing fixtures and energizing circuits with normal power source. Include the following:

1. Check for excessively noisy ballasts.

E. Replace or repair damaged and malfunctioning units and retest.

3.4 ADJUSTING AND CLEANING

A. Clean components on completion of installation. Use methods and materials recommended by manufacturer.

B. Adjust aimable fixtures to provide required light intensities.

END OF SECTION 16525

ITEMIZED PROPOSAL FOR CONTRACT NO. DA00713

County: CURRITUCK

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
			ROADWAY ITEMS			
0001	6975000000-N	SP	GENERIC REST AREA ITEM ELECTRICAL INSTALLATION FOR REST AREA BUILDING - CURRITUCK	Lump Sum	L.S.	
0002	6975000000-N	SP	GENERIC REST AREA ITEM GENERAL CONSTRUCTION OF REST AREA BUILDING - CURRITUCK	Lump Sum	L.S.	
0003	6975000000-N	SP	GENERIC REST AREA ITEM MECHANICAL INSTALLATION FOR REST AREA BUILDING - CURRITUCK	Lump Sum	L.S.	
0004	6975000000-N	SP	GENERIC REST AREA ITEM PLUMBING INSTALLATION OF REST AREA BUILDING - CURRITUCK	Lump Sum	L.S.	

1340/Oct29/Q4/D27900000000/E4

Total Amount Of Bid For Entire Project :

Execution of Contract

Contract No: DA00713

County: Currituck

ACCEPTED BY THE DEPARTMENT

_____

Contract Officer

_____

Date

Signature Sheet (Bid) - ACCEPTANCE SHEET